

KIC 009408654

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})
009408654-01	OBS	No	0.529939	131.915653	31.3	2.609	9.6	6.0	4.91	11053	3.14	0.00
009408654-02	OBS	No	158.395915	152.825782	503.6	3.000	10.3	-1.0	4.91	11053	11.35	423.79

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009408654-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009408654-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_NOFITS—HALO_GHOST

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

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

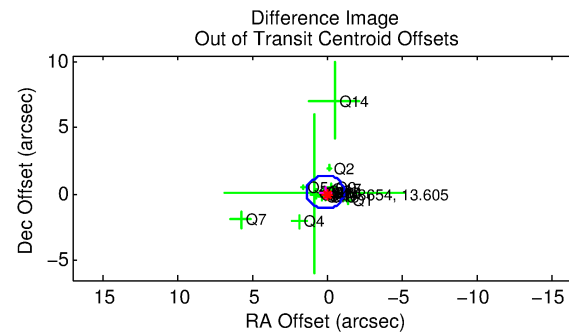
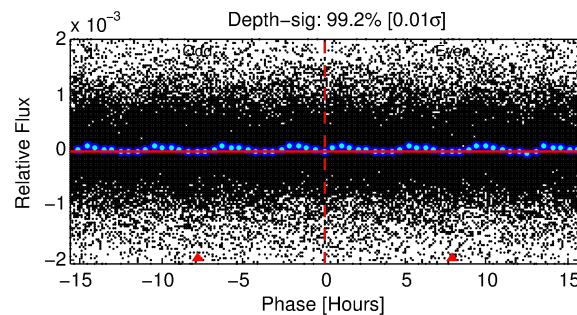
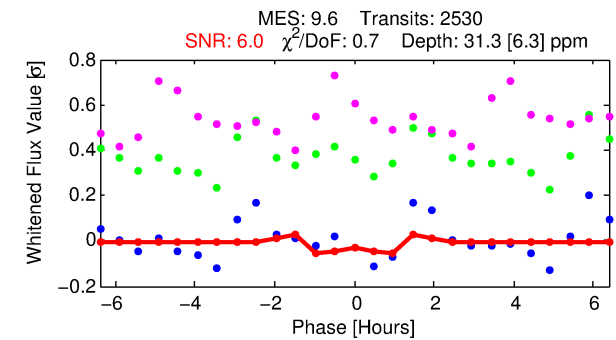
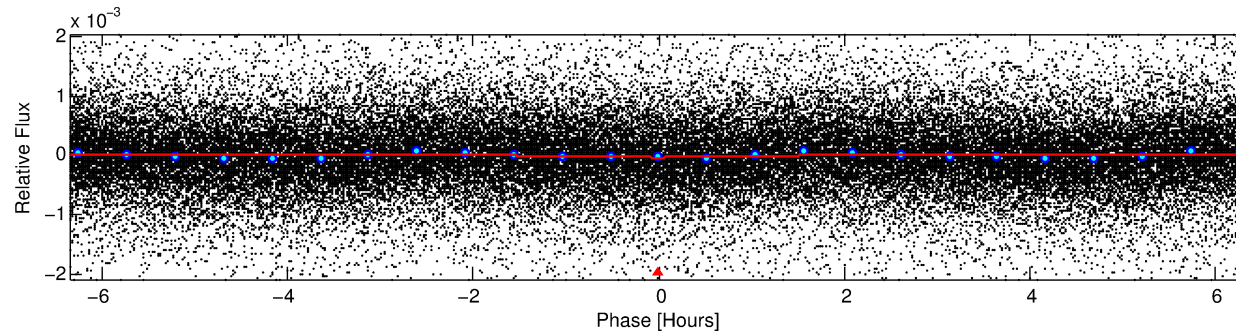
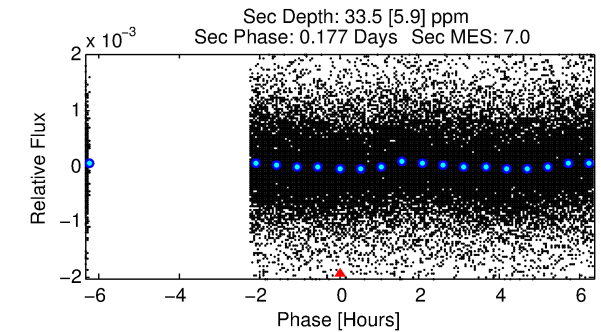
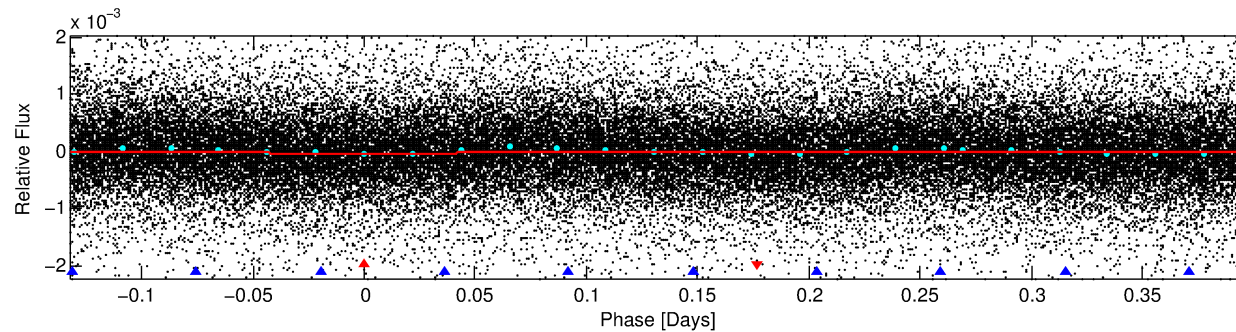
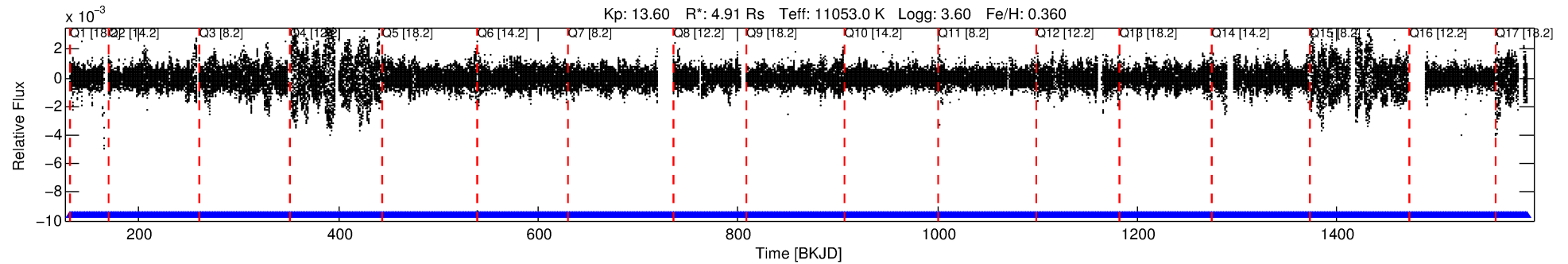
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009408654-01

No Significant Match Found

DV One-Page Summary

KIC: 9408654 Candidate: 1 of 2 Period: 0.530 d



DV Fit Results:

Period = 0.52994 [0.00002] d
Epoch = 131.9157 [0.0021] BKJD
Rp/R* = 0.0059 [0.0012]
a/R* = 1.17 [0.50]
b = 0.90 [0.34]
Seff = N/A
Teq = N/A
Rp = 3.14 [1.59] Re
a = N/A
Ag = N/A
Teffp = N/A

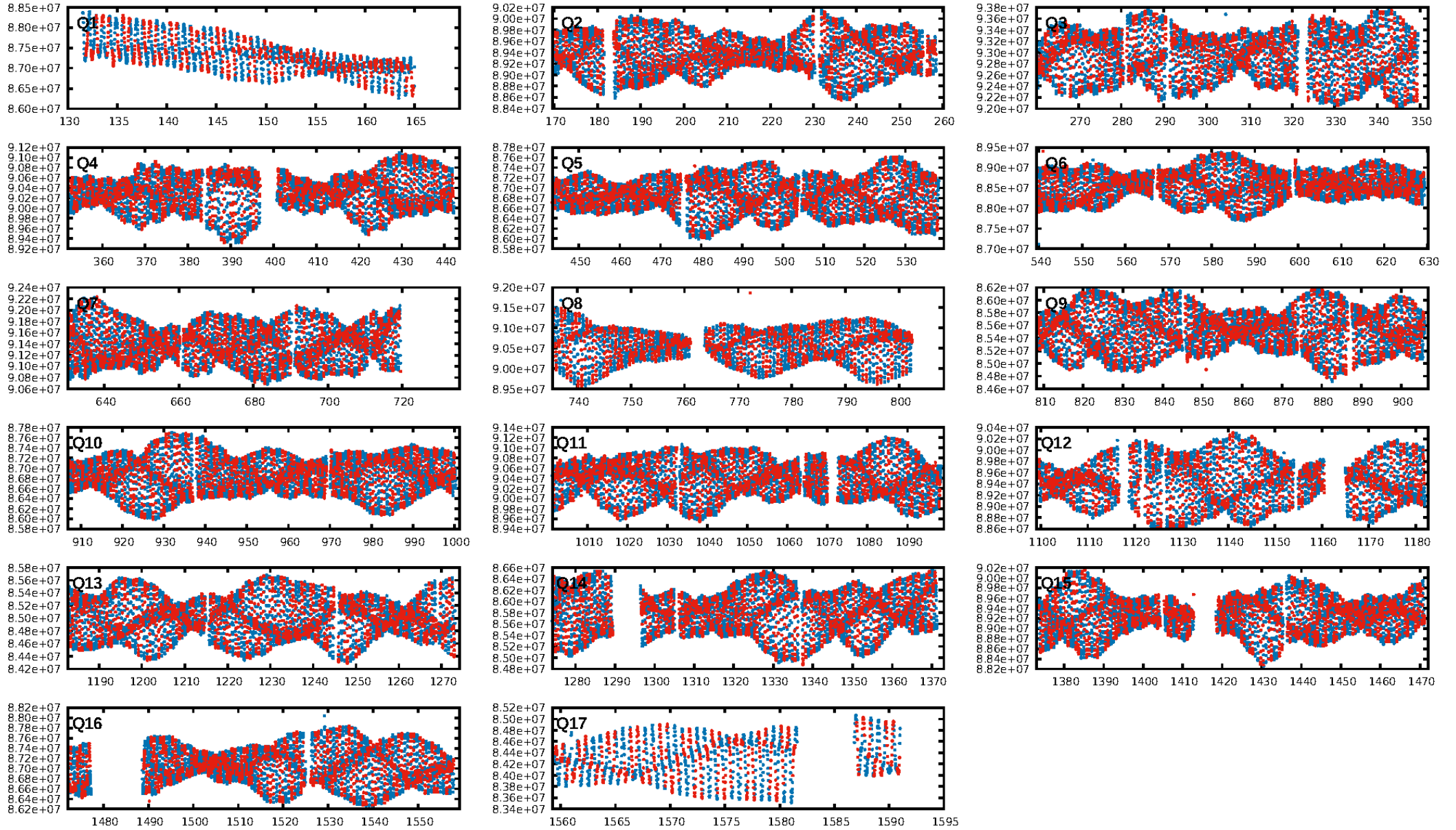
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [952.95σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.68e-16
RollingBand-fgt: 1.00 [2417/2417]
GhostDiagnostic-chr: -2.029
Centroid-sig: 1.9%
Centroid-so: 1.097 arcsec [1.83σ]
OotOffset-rm: 0.183 arcsec [0.43σ]
KicOffset-rm: 0.188 arcsec [0.45σ]
OotOffset-st: 3/4/4/5 [16]
KicOffset-st: 3/4/4/5 [16]
DiffImageQuality-fgm: 0.50 [8/16]
DiffImageOverlap-fno: 1.00 [17/17]

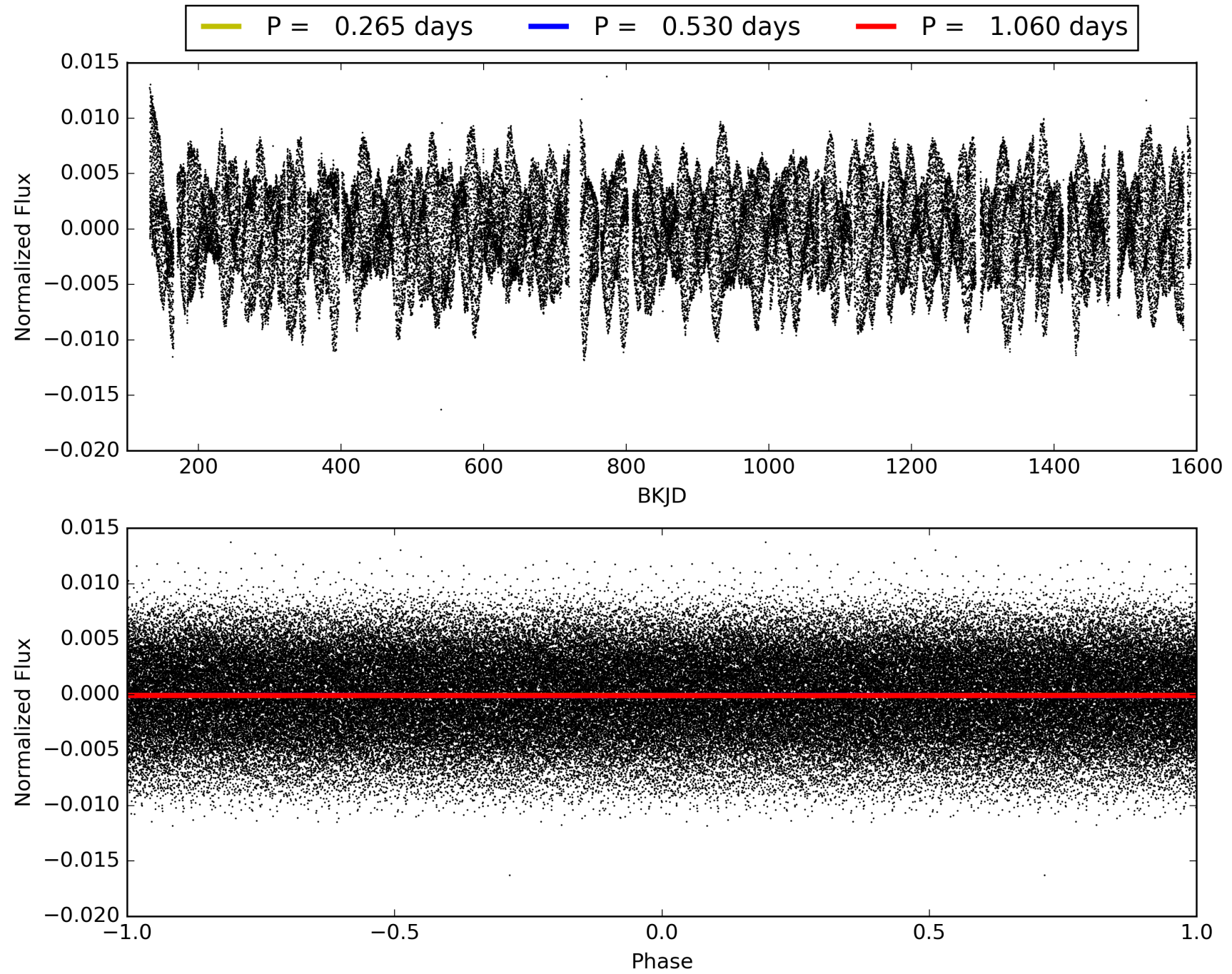
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 01:01:50 Z

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

TCE 009408654-01, PDC Light Curves

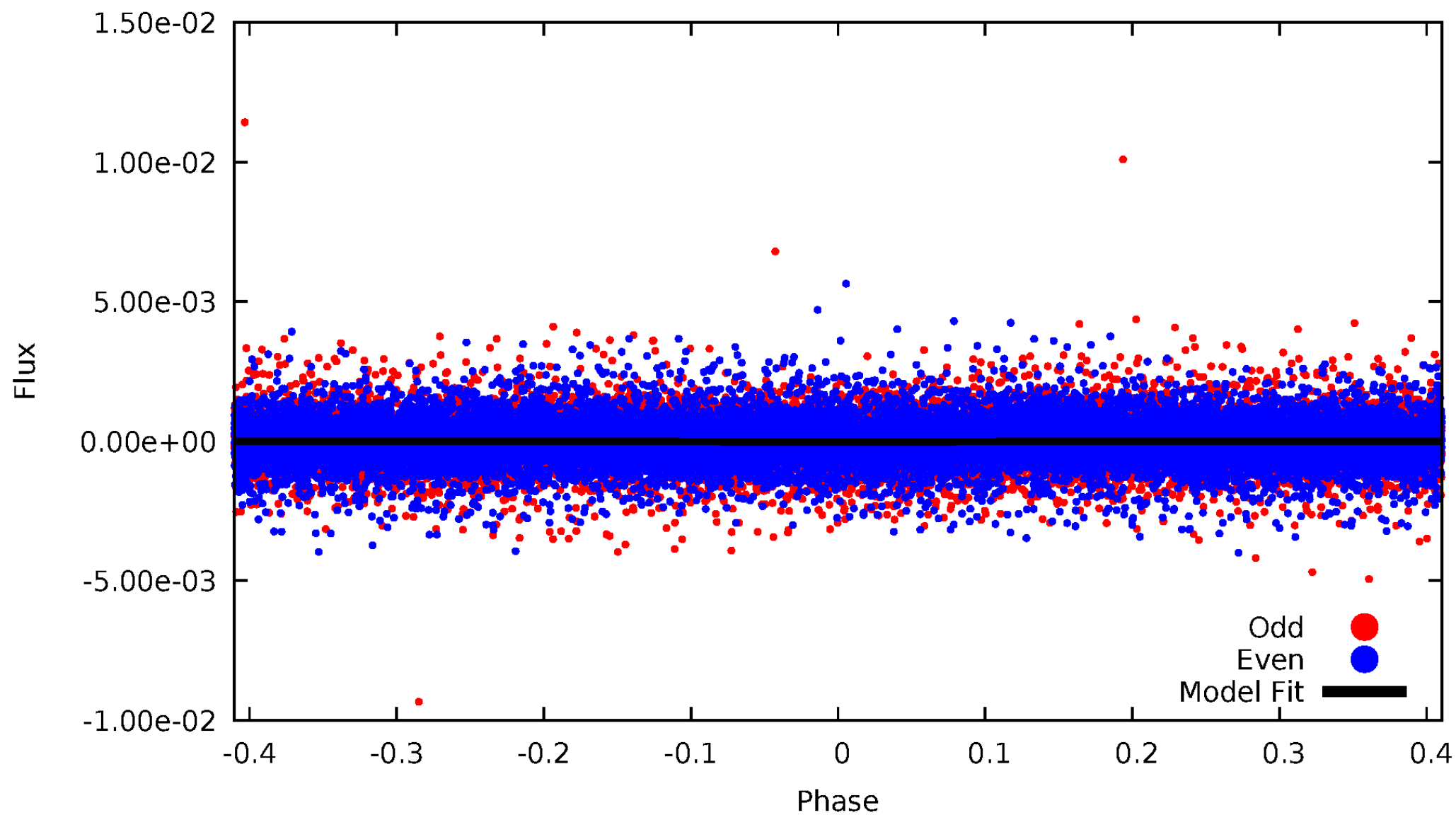


TCE 009408654-01



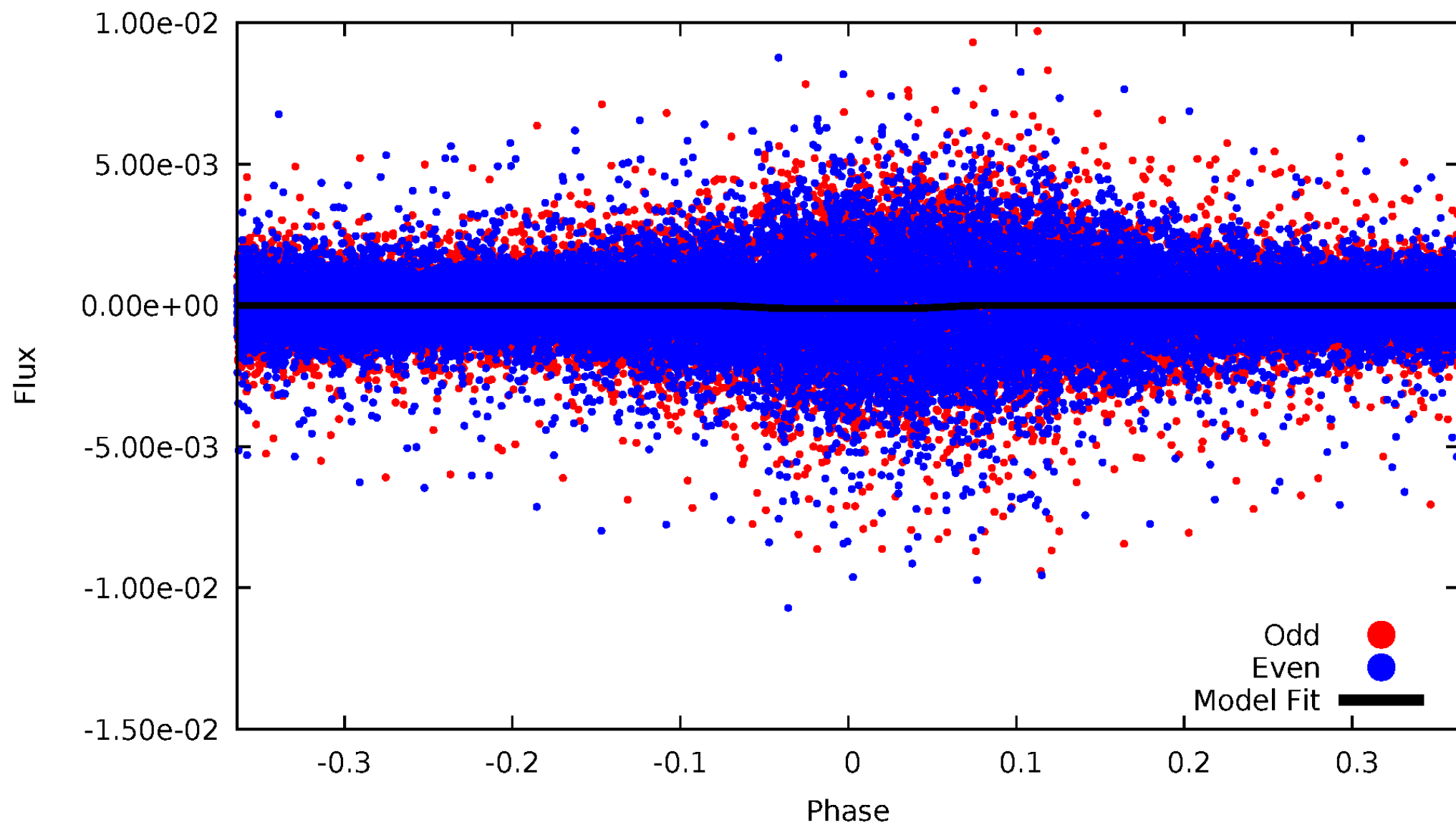
DV Odd/Even

TCE 009408654-01

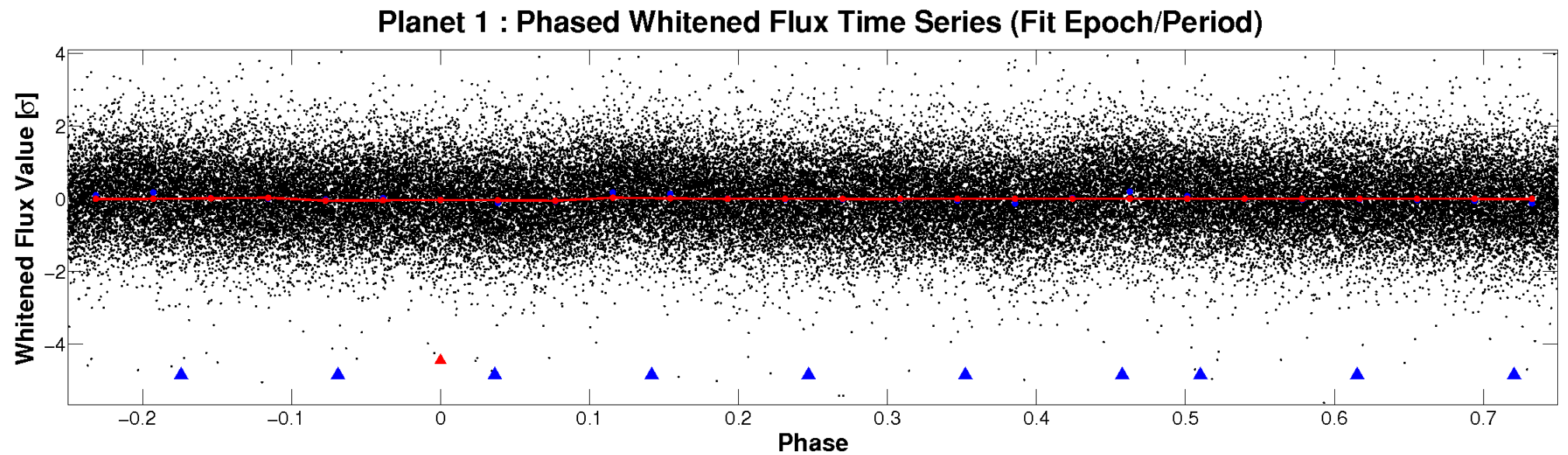
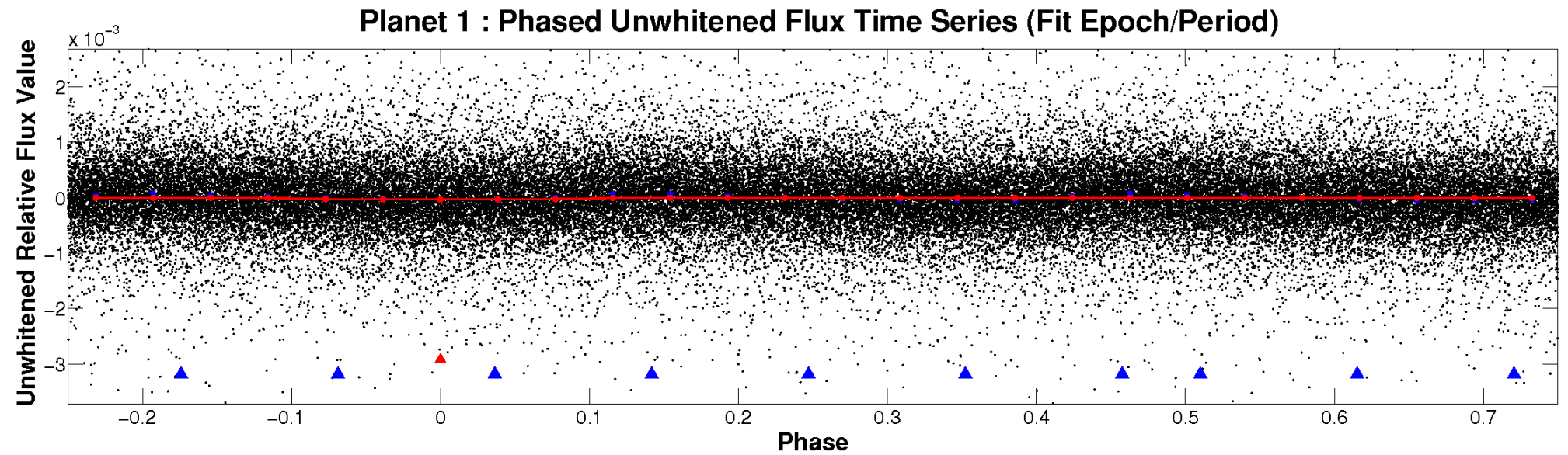


ALT Odd/Even

TCE 009408654-01

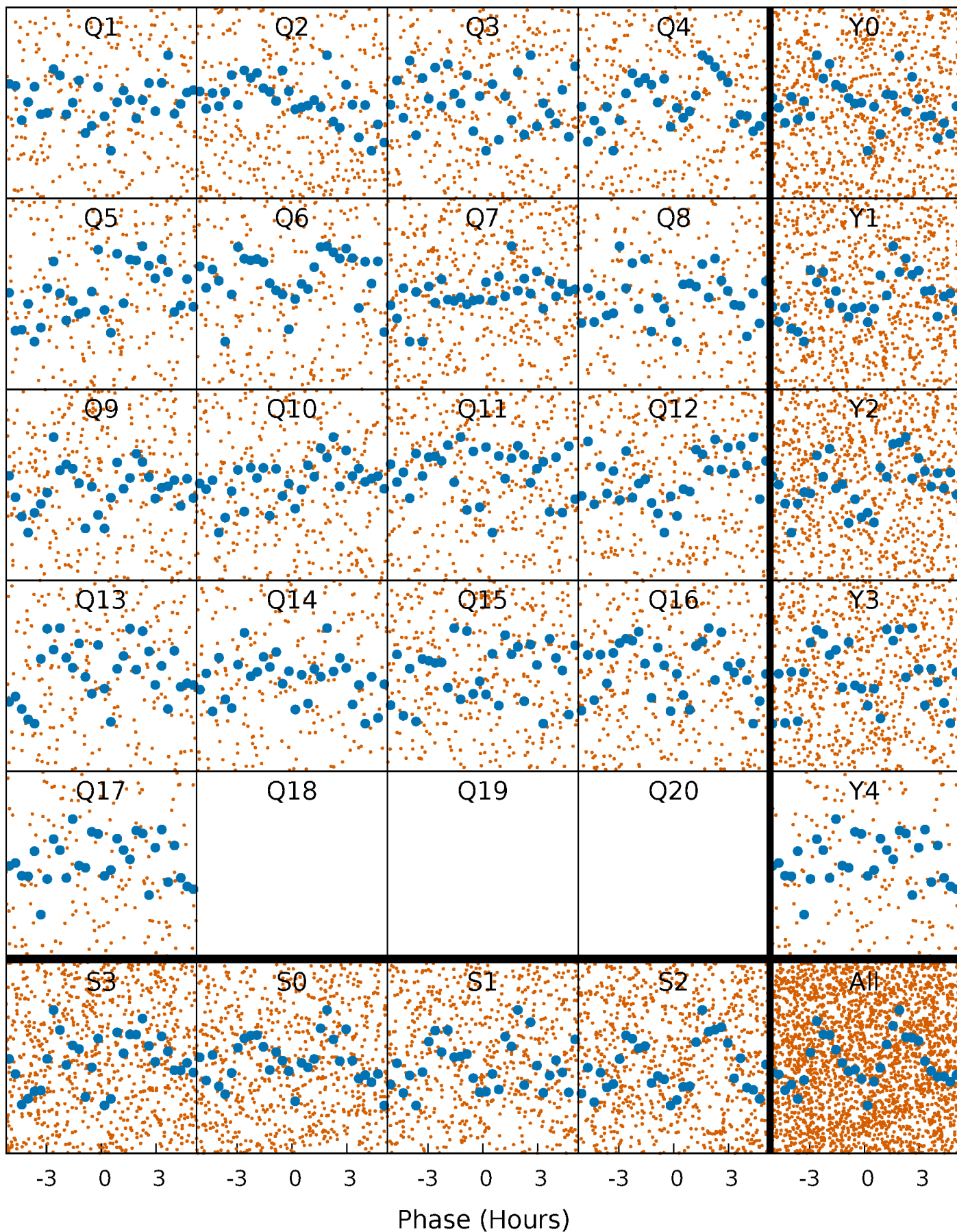


Non-Whitened Vs. Whitened Light Curve



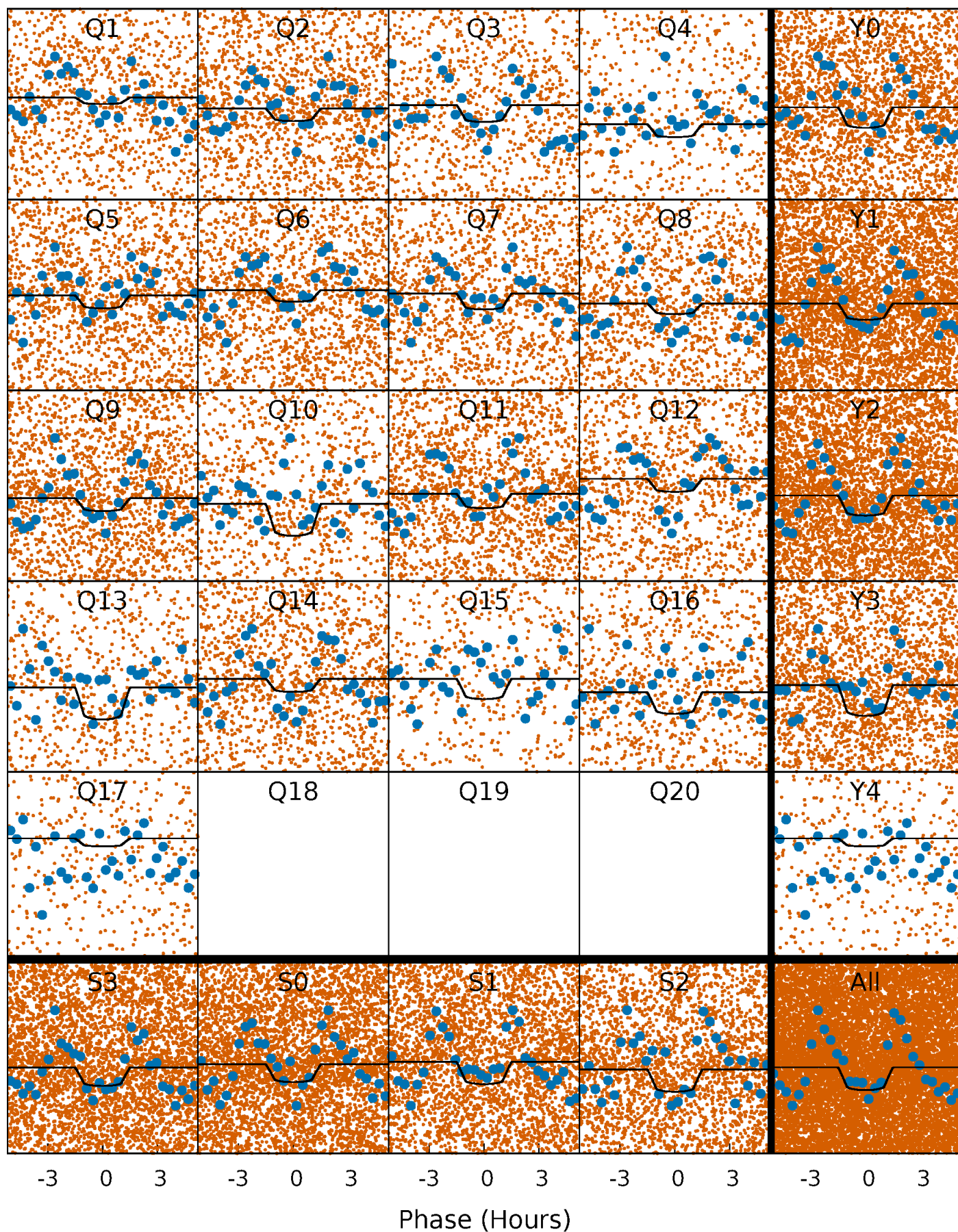
PDC Quarter-Phased Transit Curves

TCE 009408654-01 P= 0.529939 Days $T_0=131.915653$ (BKJD)



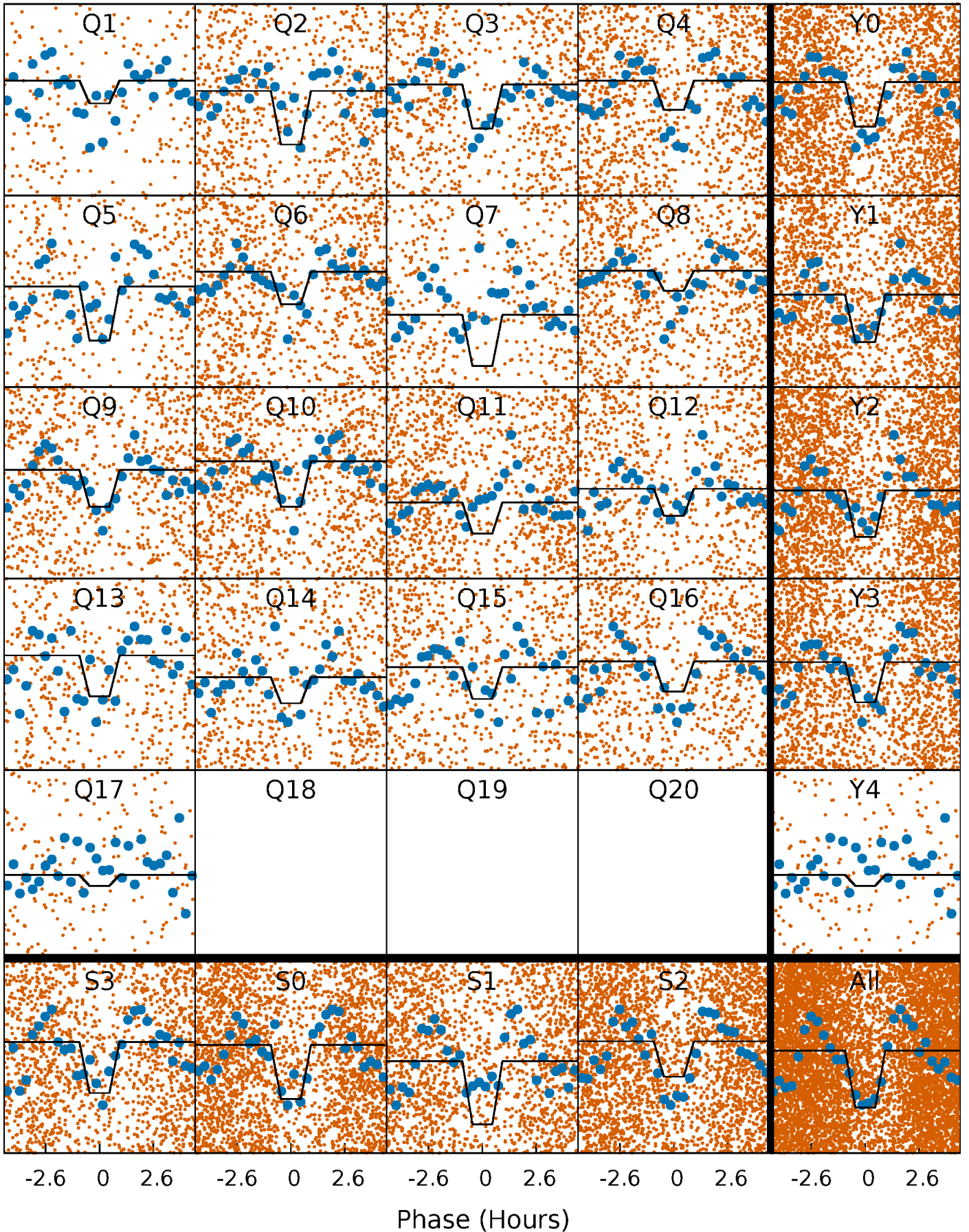
DV Quarter-Phased Transit Curves

TCE 009408654-01 P= 0.529939 Days $T_0=131.915653$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

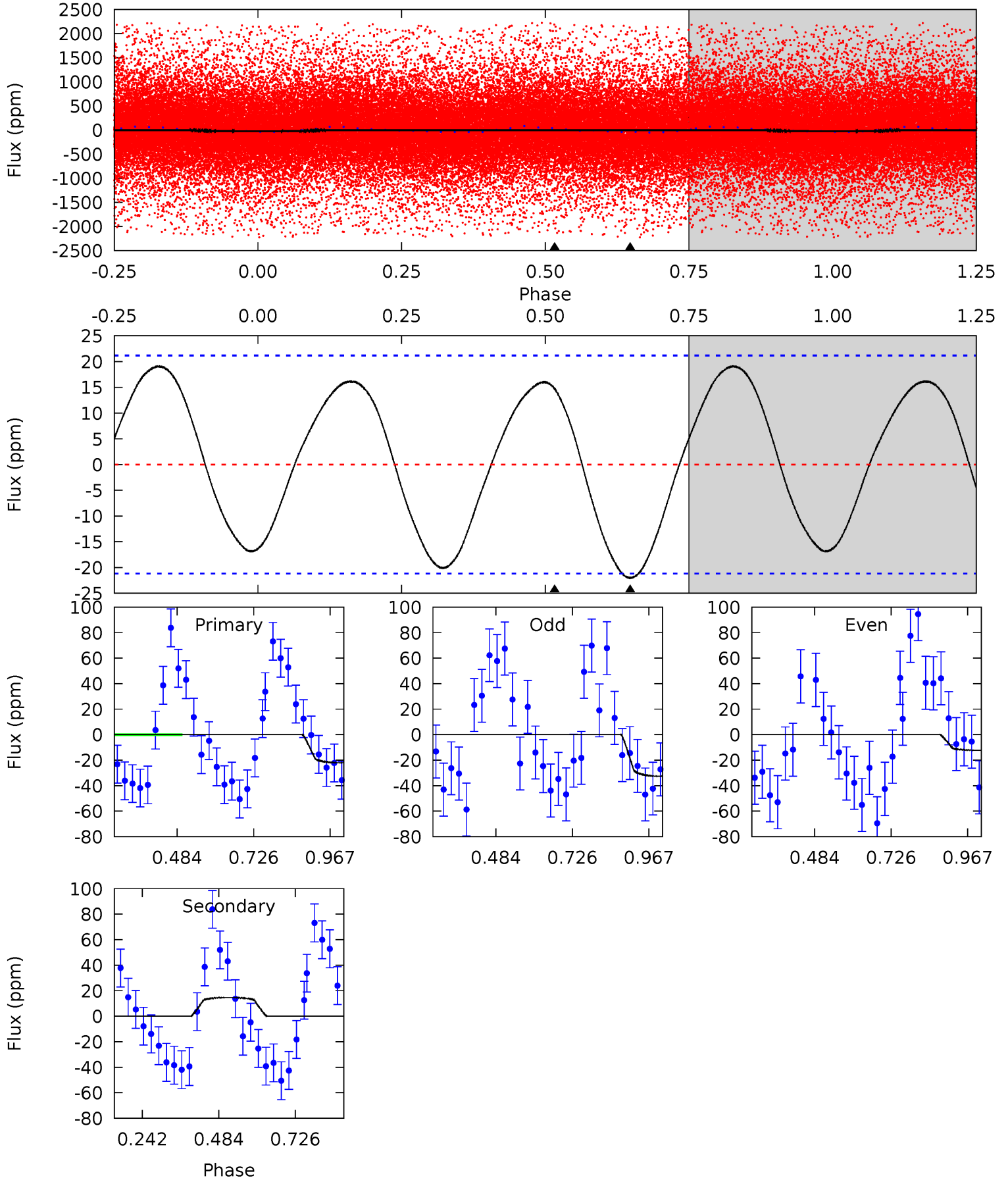
TCE 009408654-01 P= 0.529938 Days $T_0=131.921149$ (BKJD)



DV Model-Shift Uniqueness Test

009408654-01, P = 0.529939 Days, E = 131.385714 Days

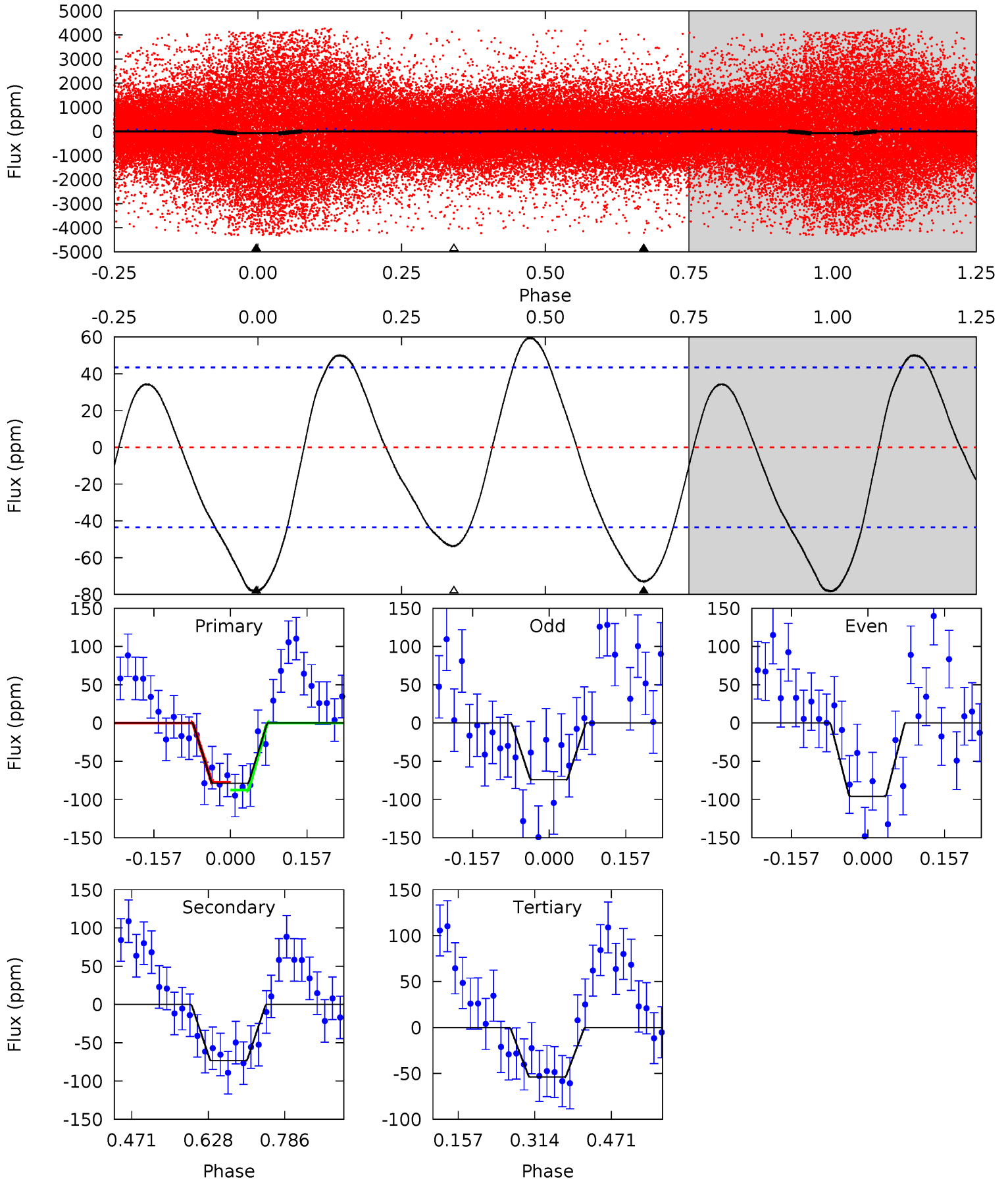
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.55	-3.04	0	0	4.38	1.17	2.29	4.55	4.55	-3.04	-3.04	2.11	0.76	0.46	0.08



Alt Model-Shift Uniqueness Test

009408654-01, P = 0.529938 Days, E = 131.391211 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.09	7.52	5.54	0	4.47	1.41	3.95	2.55	8.09	1.98	7.52	1.12	1.01	0.43	0.42



Stellar Parameters For KIC 009408654

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	11053^{+238}_{-1433}	$3.603^{+0.417}_{-0.074}$	$0.360^{+0.050}_{-0.300}$	$4.909^{+0.400}_{-2.268}$	$3.520^{+0.070}_{-0.865}$	$0.042^{+0.152}_{-0.010}$
	+2%/-13%	+12%/-2%	+14%/-83%	+8%/-46%	+2%/-25%	+362%/-23%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009408654-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	15 ± 5	$2.87^{+0.80}_{-0.79}$	10088^{+1045}_{-1334}	-9786^{+1323}_{-1532}	$-0.358^{+0.166}_{-0.366}$
Alt.	-73 ± 10	$5.34^{+0.96}_{-1.24}$	10144^{+948}_{-1513}	6943^{+1396}_{-1642}	$0.531^{+0.307}_{-0.162}$

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 $A_{obs} \gg 1.0$

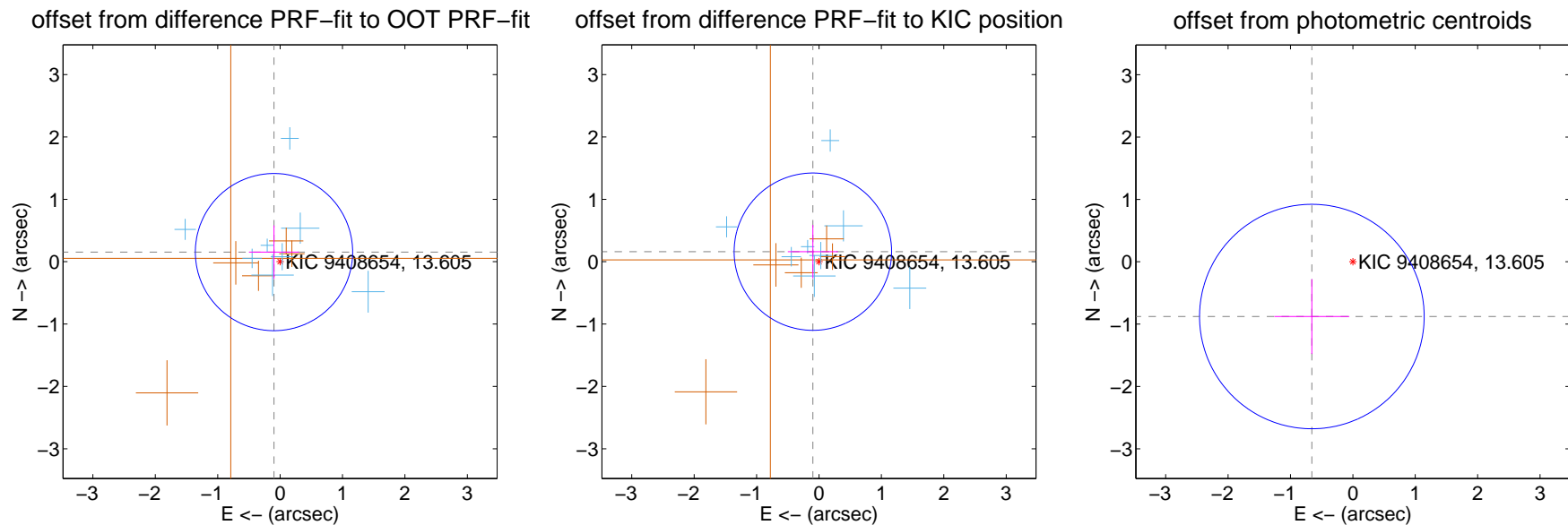
DV Centroid Data

Supplemental centroid analysis for 009408654-01. Kepler magnitude: 13.61. Transit SNR 6.01

There are 8 quarters with good PRF difference image offsets

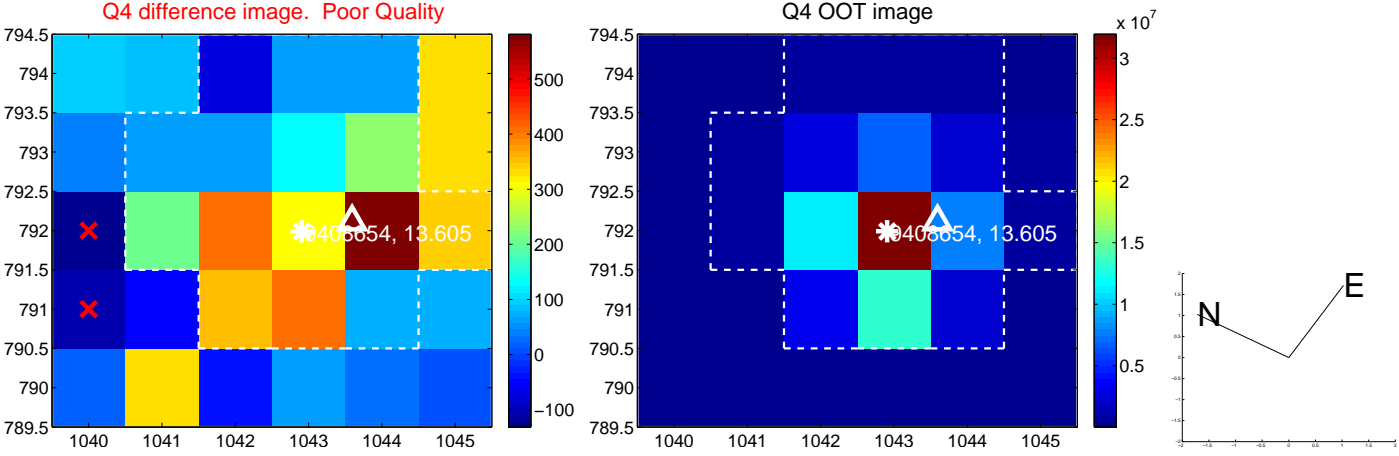
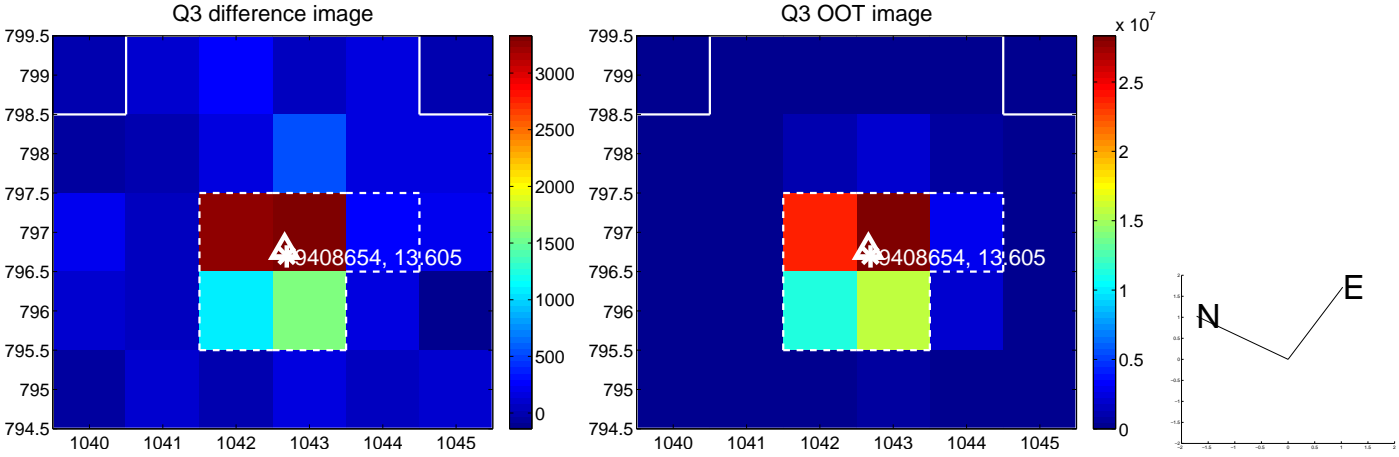
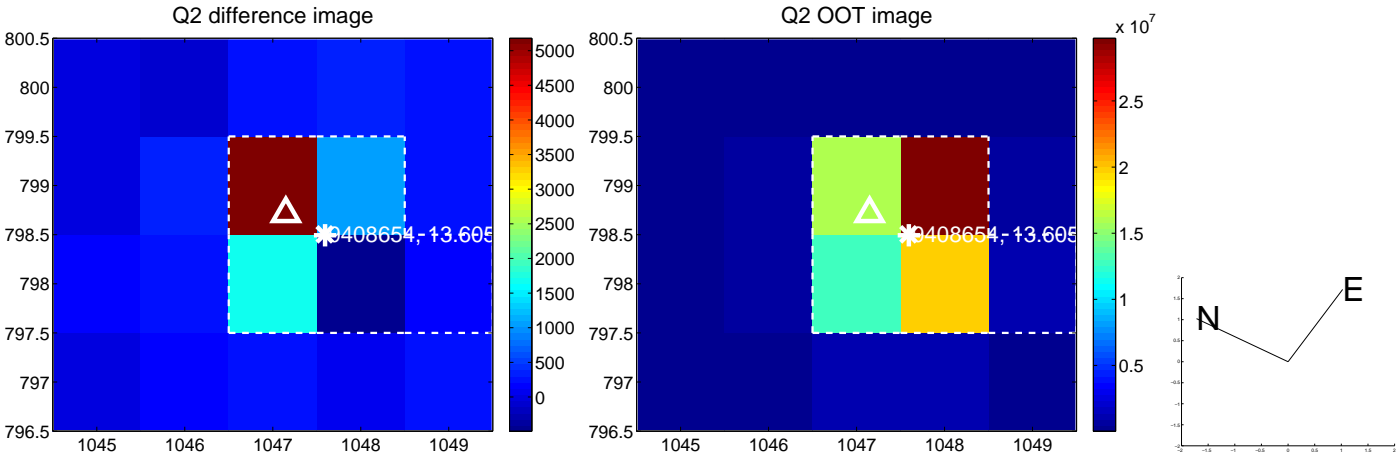
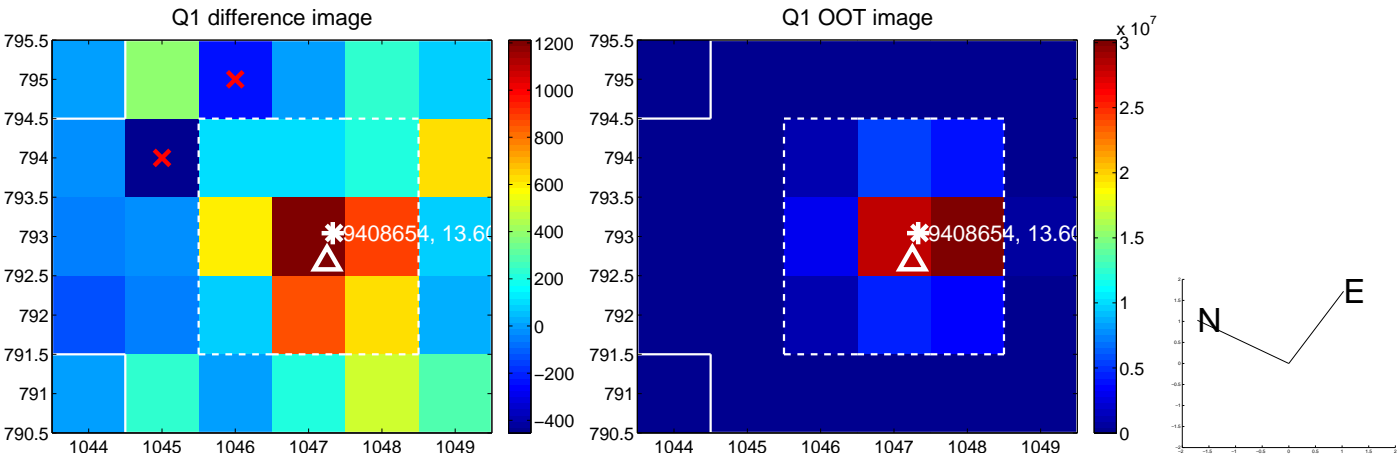
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.183 ± 0.420	0.43	0.098 ± 0.402	0.154 ± 0.427
PRF-fit source offset from KIC position	0.188 ± 0.420	0.45	0.098 ± 0.402	0.161 ± 0.427
photometric centroid source offset	1.10 ± 0.60	1.83	0.66 ± 0.60	-0.88 ± 0.60

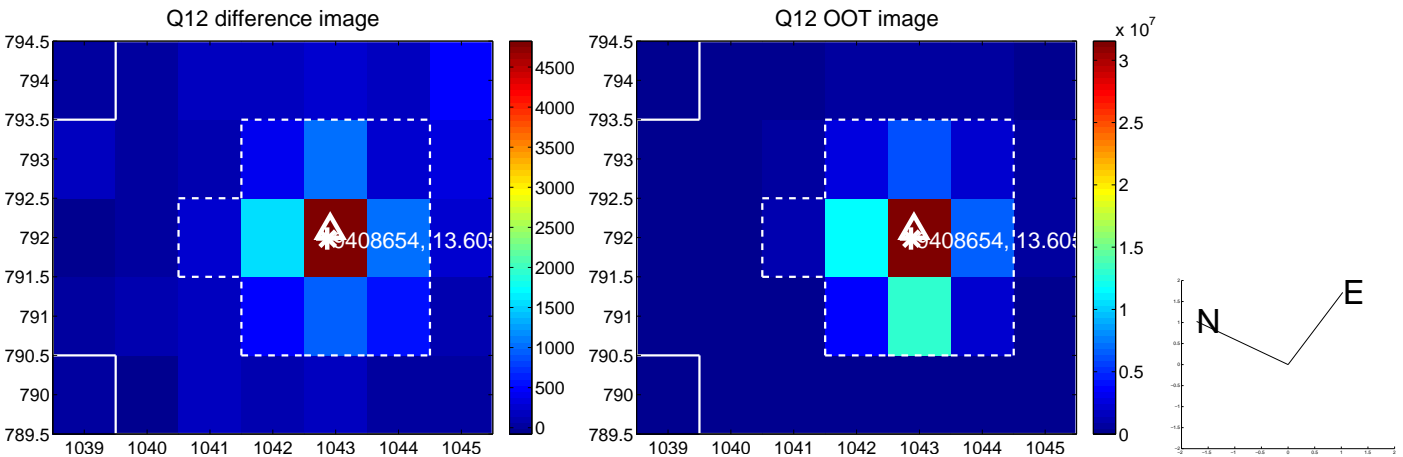
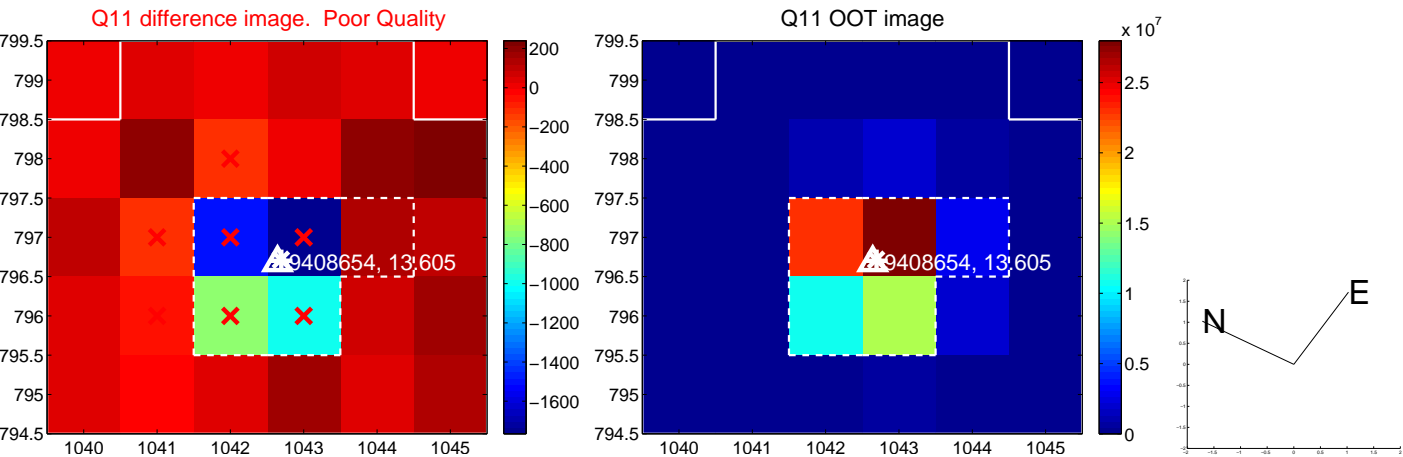
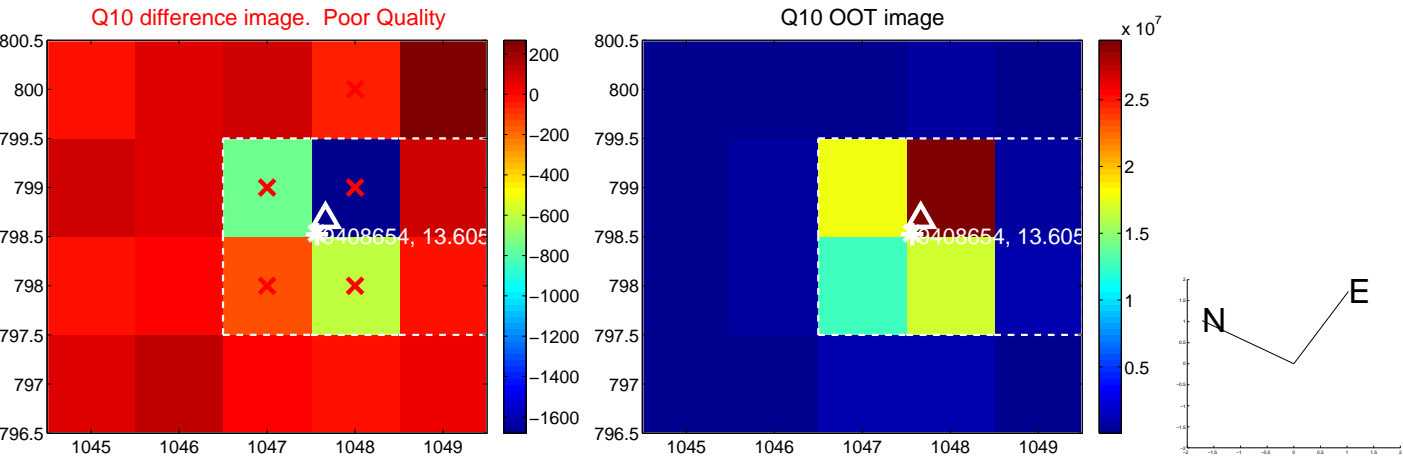
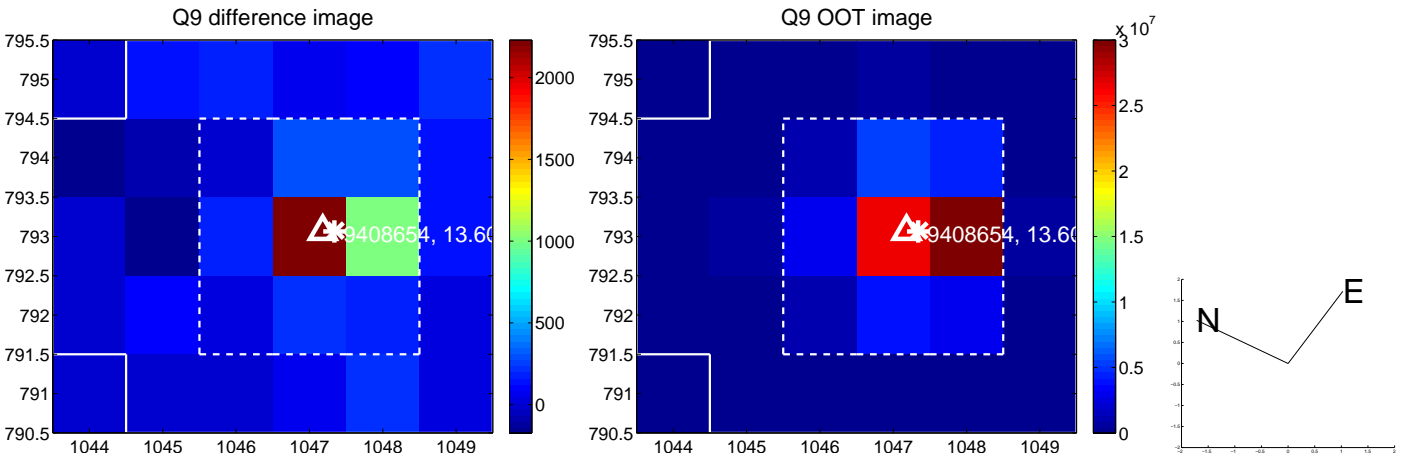


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

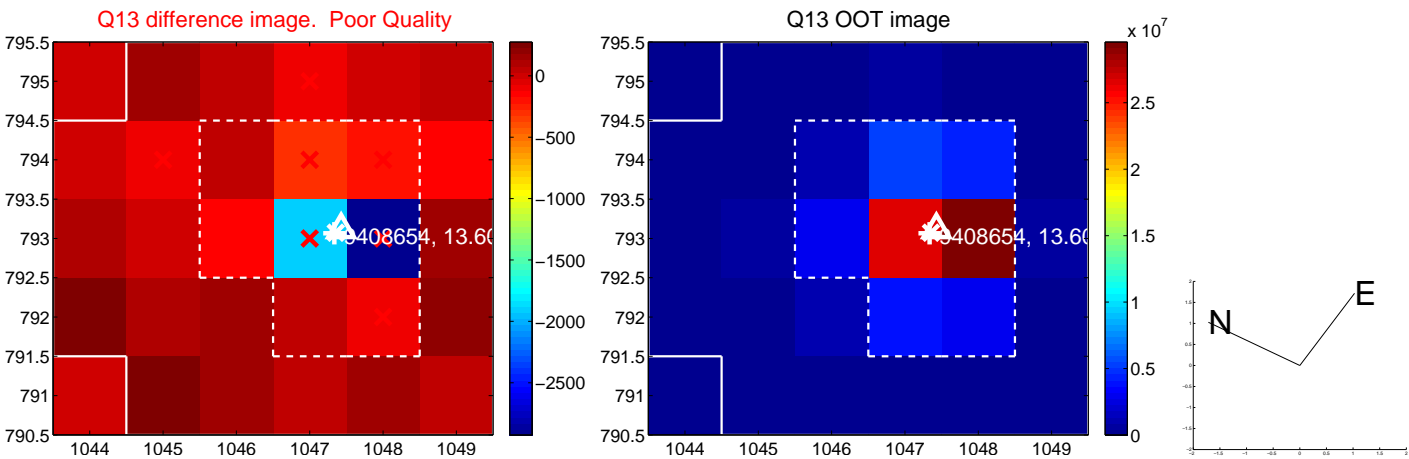
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



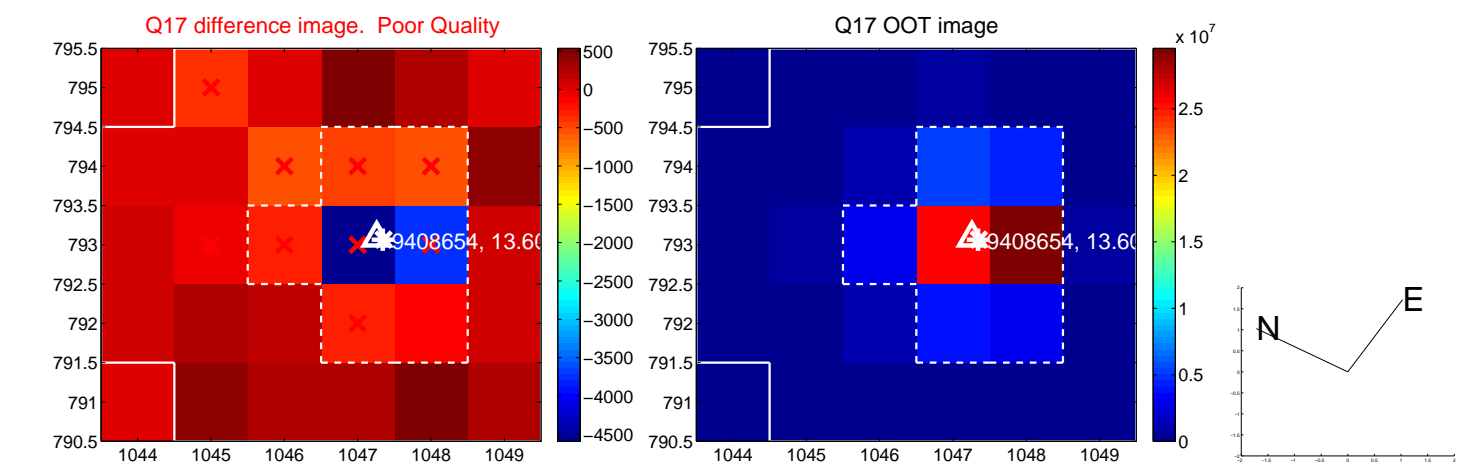
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



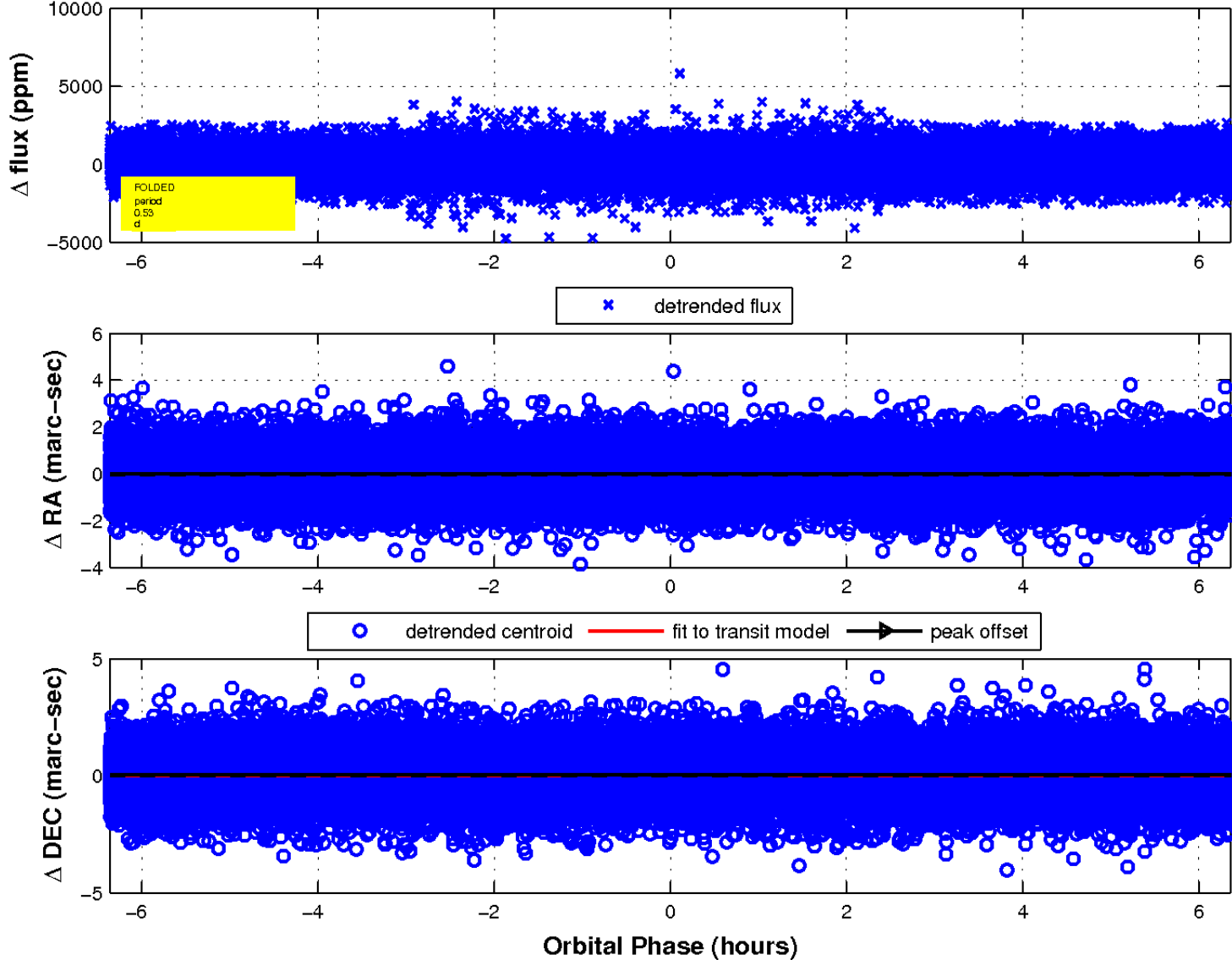
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

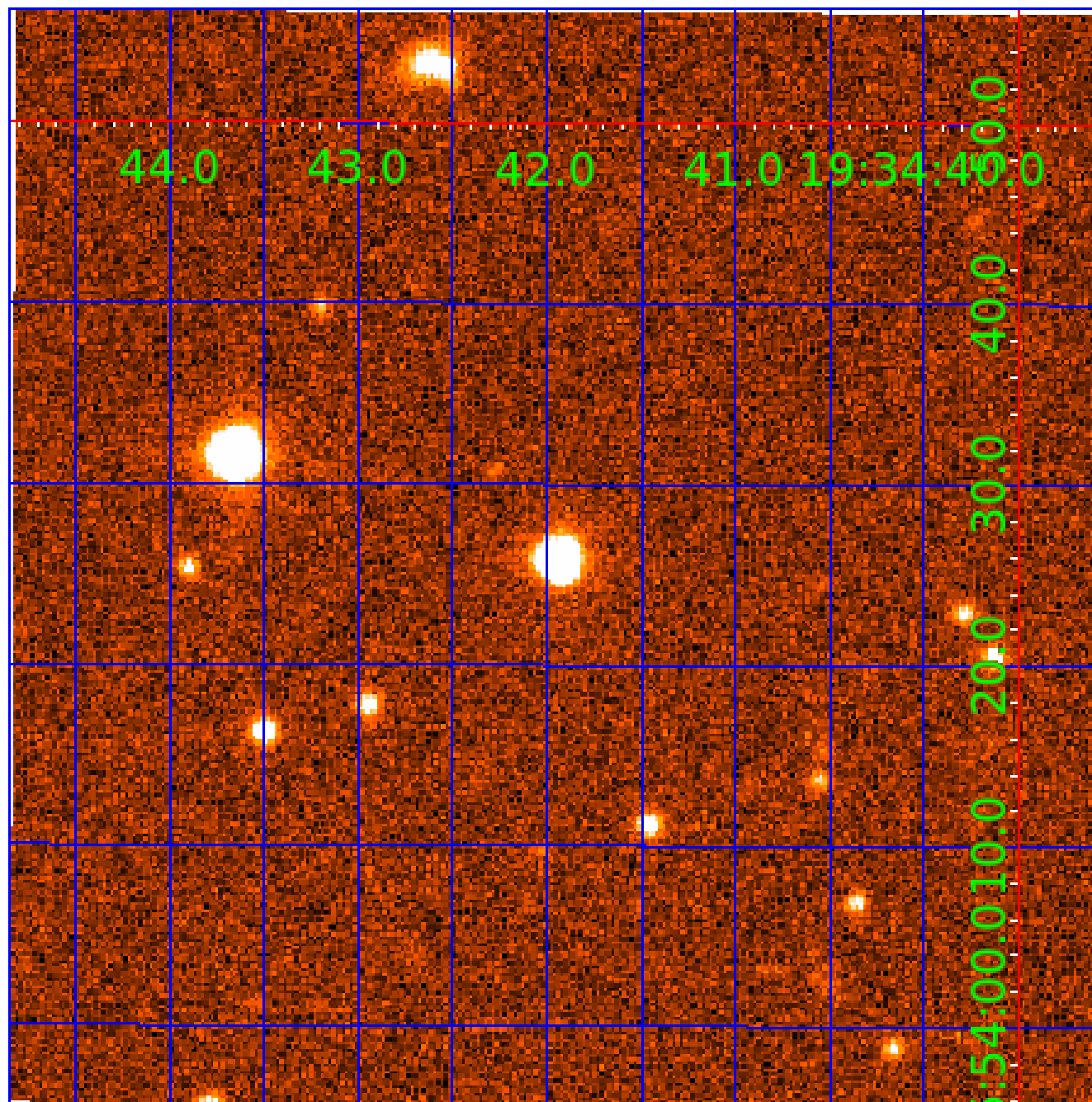


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 009408654

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})
009408654-01	OBS	No	0.529939	131.915653	31.3	2.609	9.6	6.0	4.91	11053	3.14	0.00
009408654-02	OBS	No	158.395915	152.825782	503.6	3.000	10.3	-1.0	4.91	11053	11.35	423.79

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009408654-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009408654-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_NOFITS—HALO_GHOST

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

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

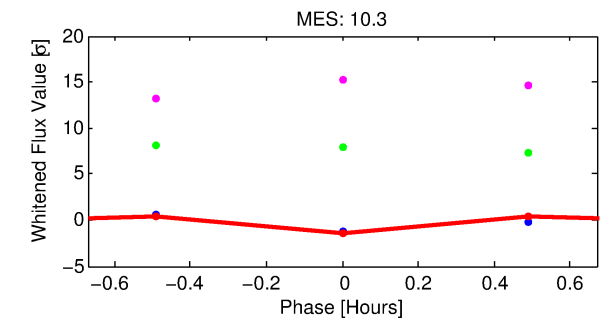
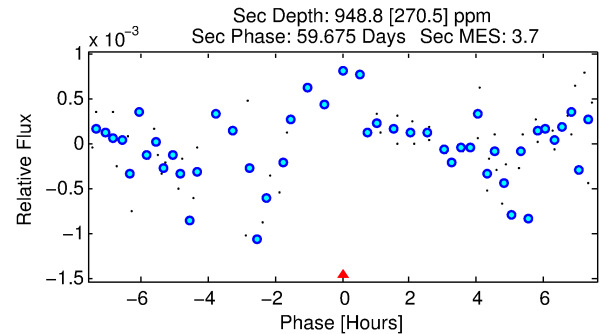
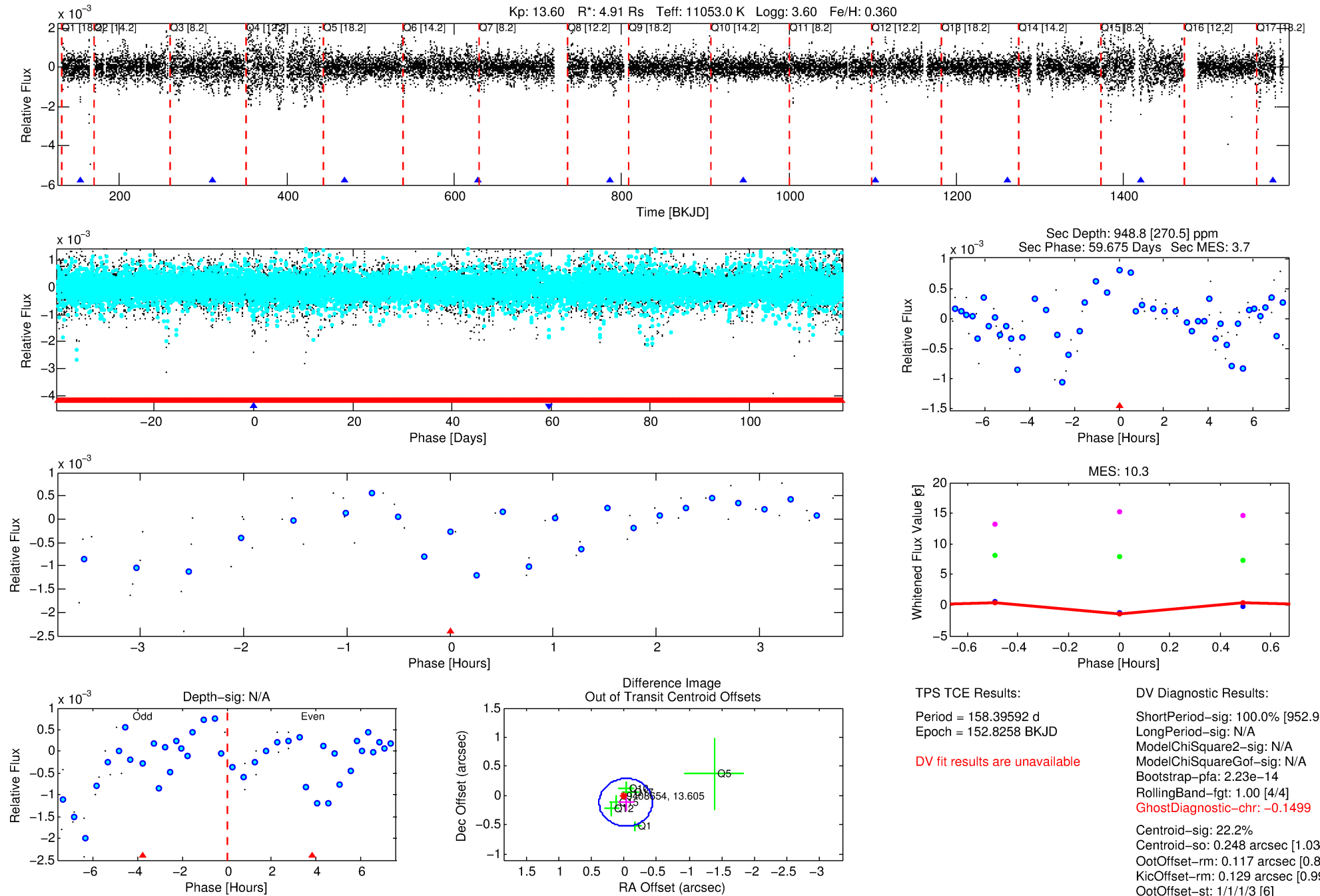
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009408654-02

No Significant Match Found

DV One-Page Summary

KIC: 9408654 Candidate: 2 of 2 Period: 158.396 d



TPS TCE Results:

Period = 158.39592 d
Epoch = 152.8258 BKJD

DV fit results are unavailable

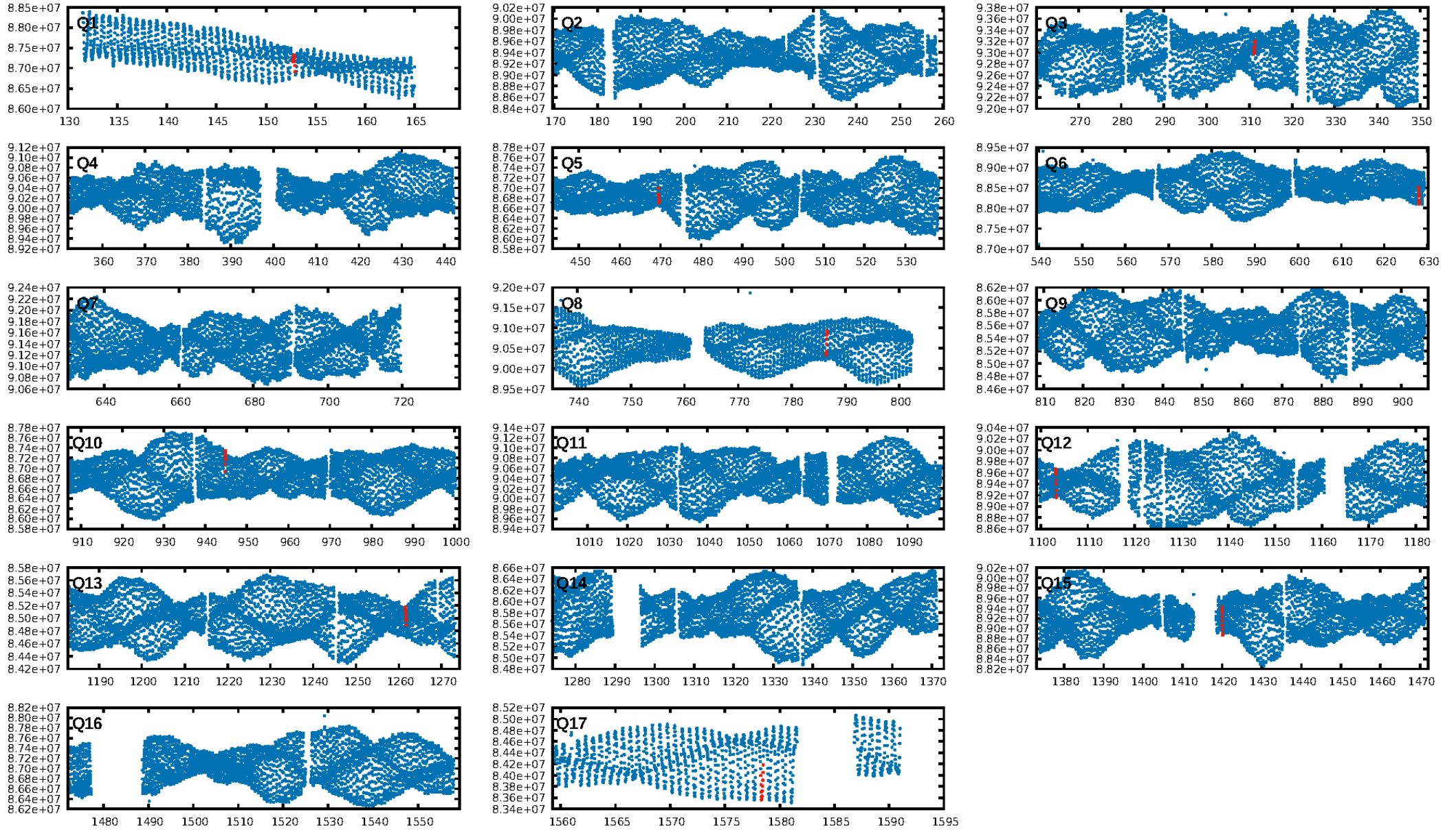
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [952.95 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.23e-14
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -0.1499
Centroid-sig: 22.2%
Centroid-so: 0.248 arcsec [1.03 σ]
OotOffset-rm: 0.117 arcsec [0.86 σ]
KicOffset-rm: 0.129 arcsec [0.99 σ]
OotOffset-st: 1/1/1/3 [6]
KicOffset-st: 1/1/1/3 [6]
DiffImageQuality-fgm: 0.50 [3/6]
DiffImageOverlap-fno: 0.00 [0/6]

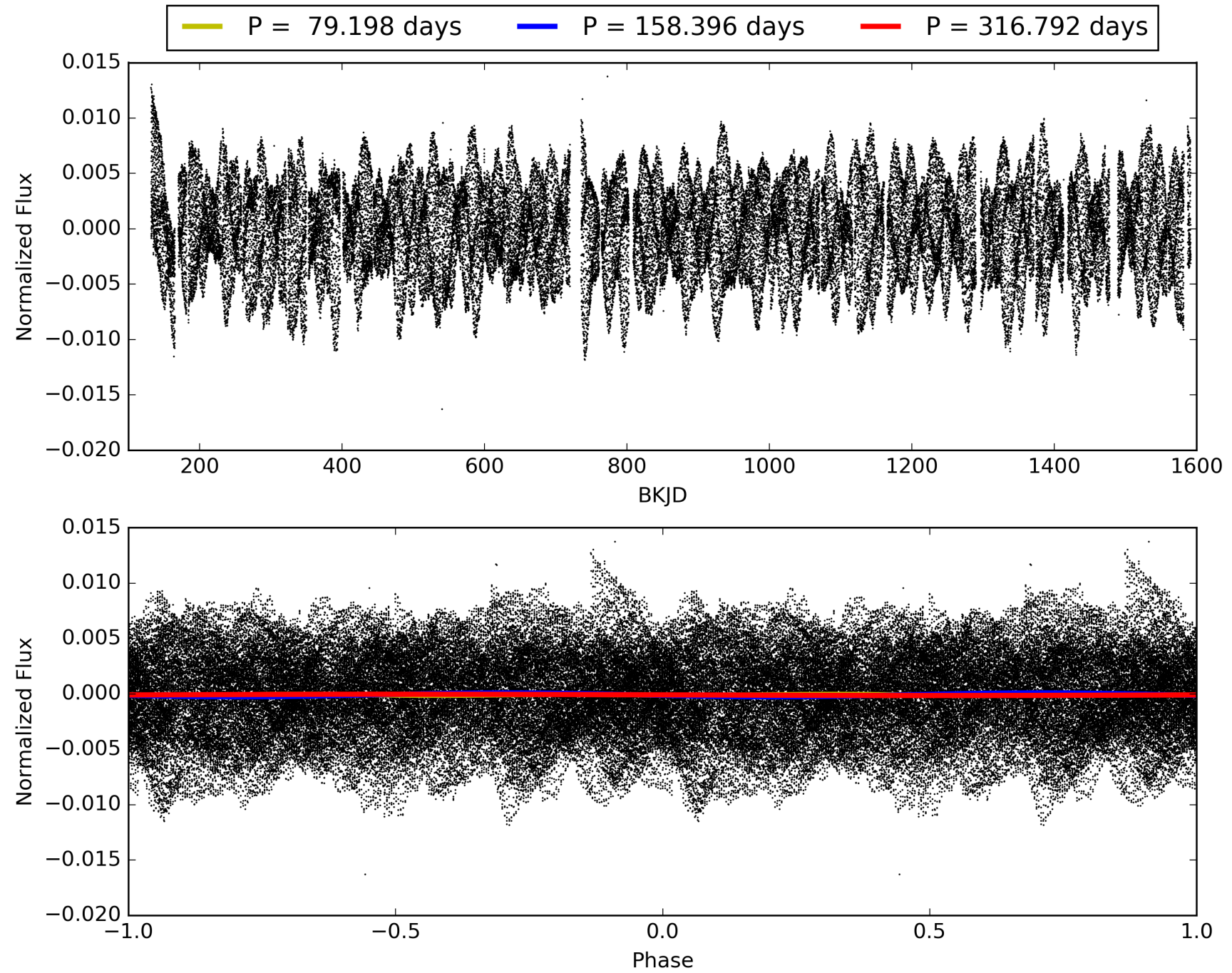
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 01:02:05 Z

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

TCE 009408654-02, PDC Light Curves

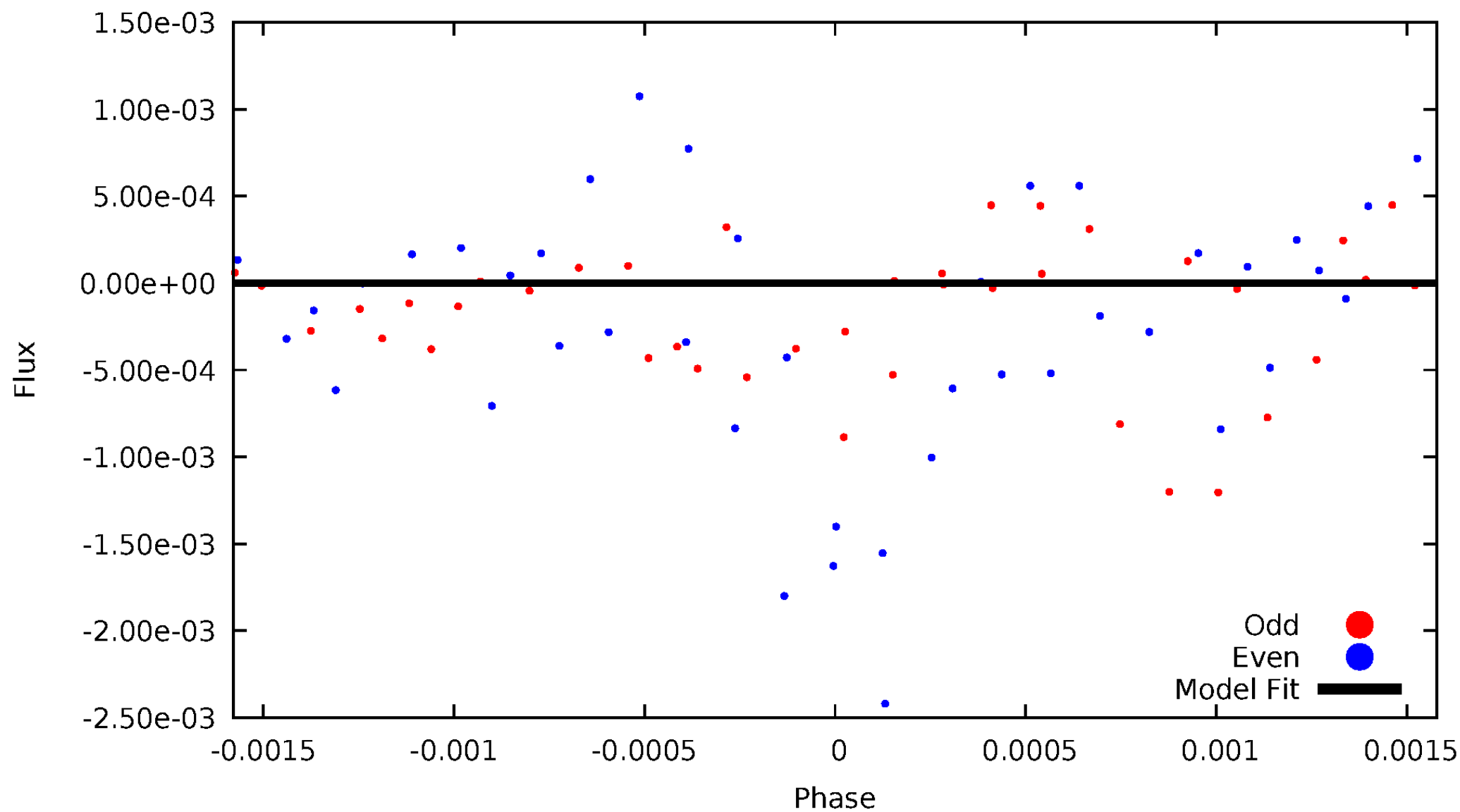


TCE 009408654-02



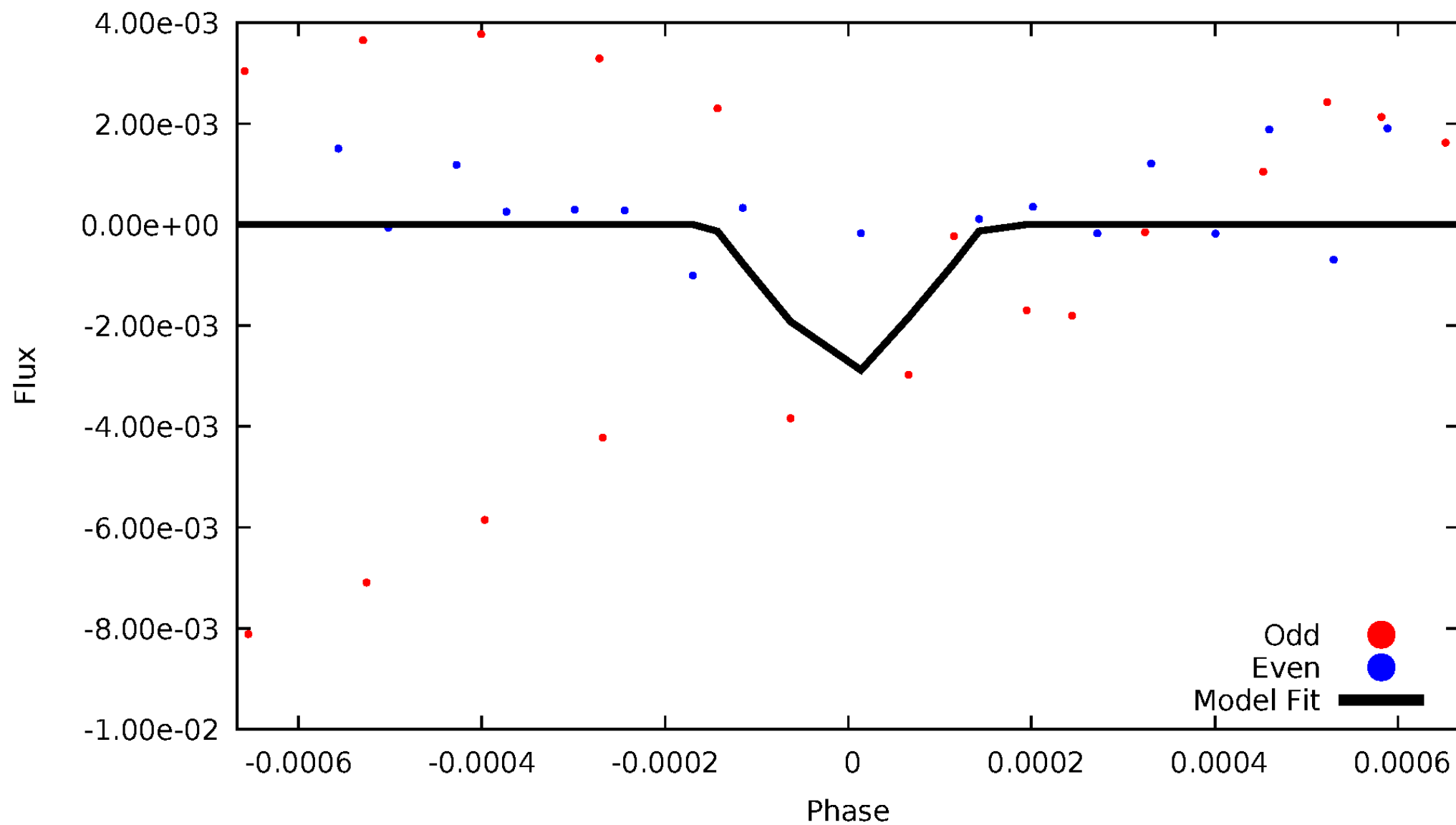
DV Odd/Even

TCE 009408654-02



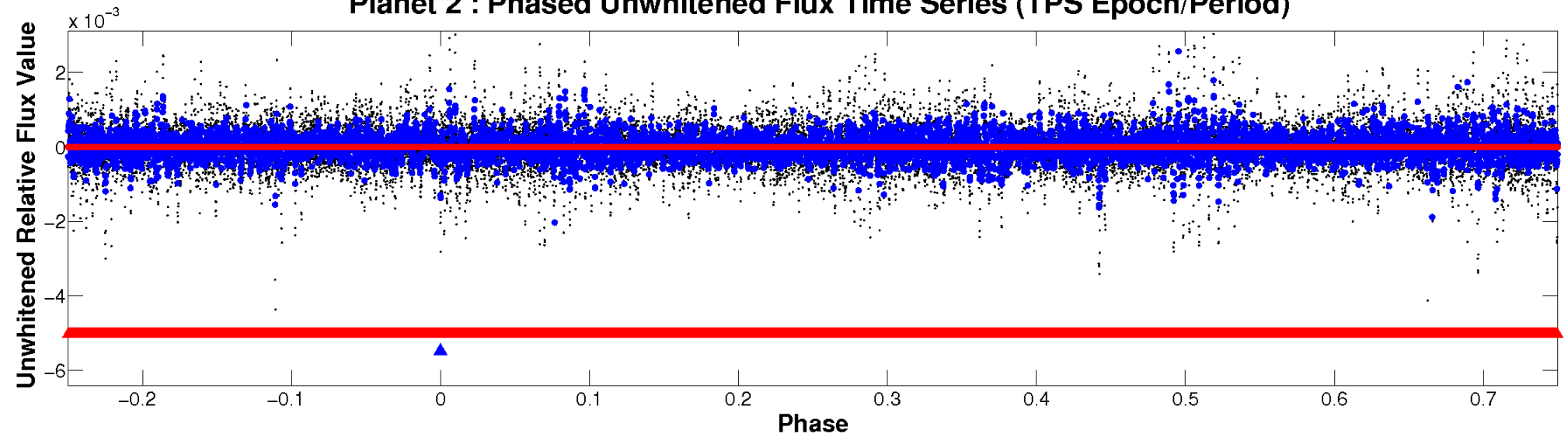
ALT Odd/Even

TCE 009408654-02



Non-Whitened Vs. Whitened Light Curve

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

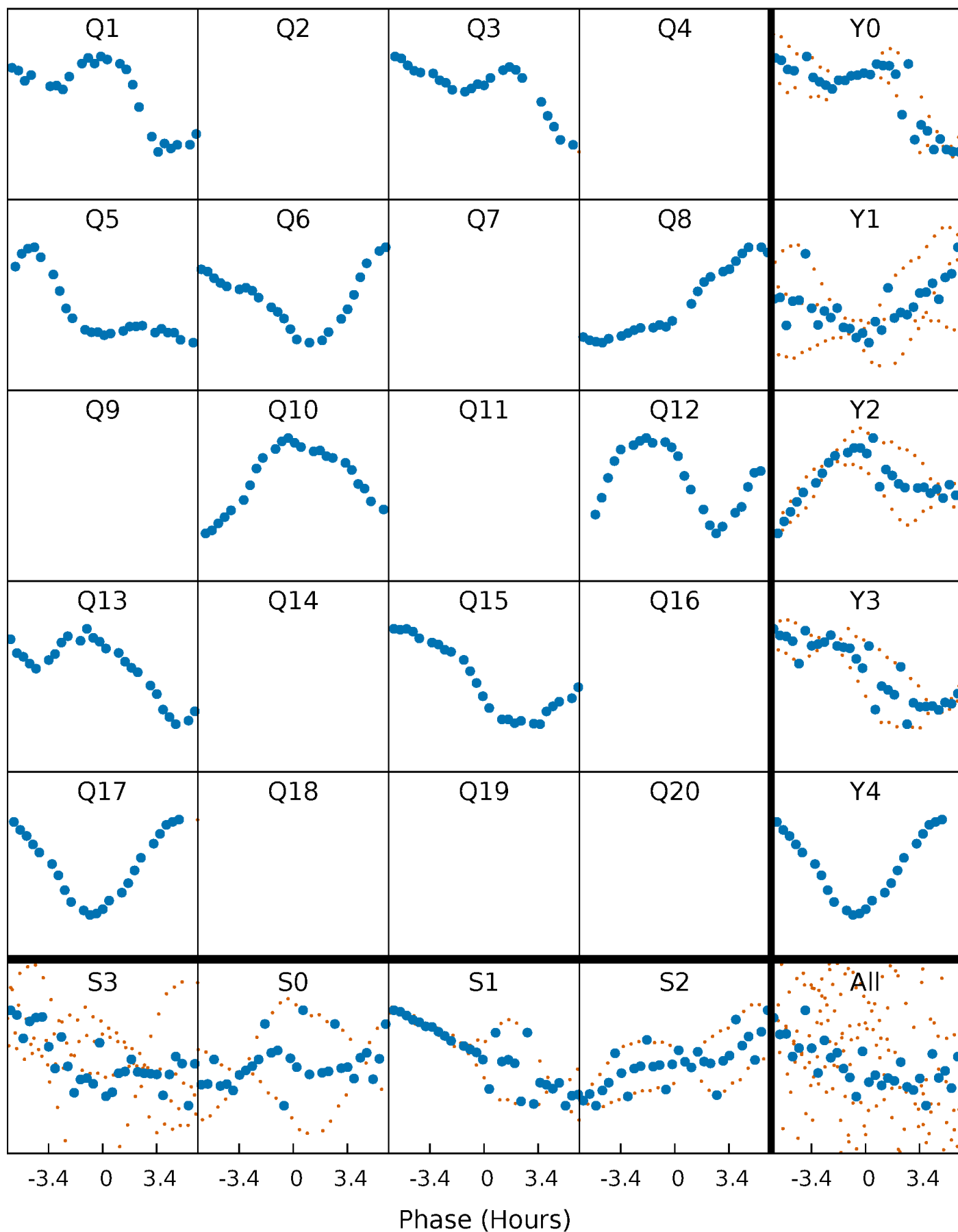


Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)



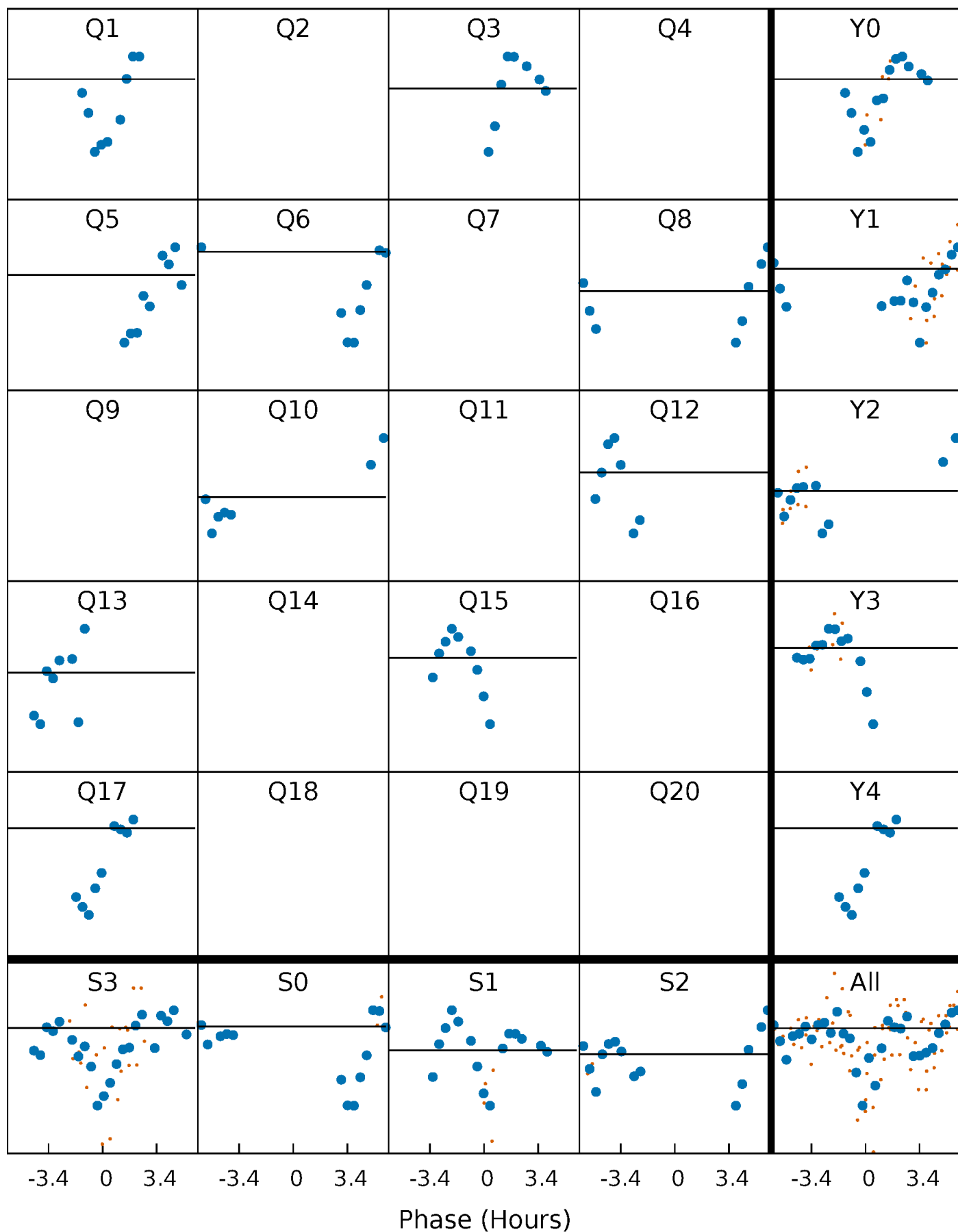
PDC Quarter-Phased Transit Curves

TCE 009408654-02 P=158.395915 Days $T_0=152.825782$ (BKJD)



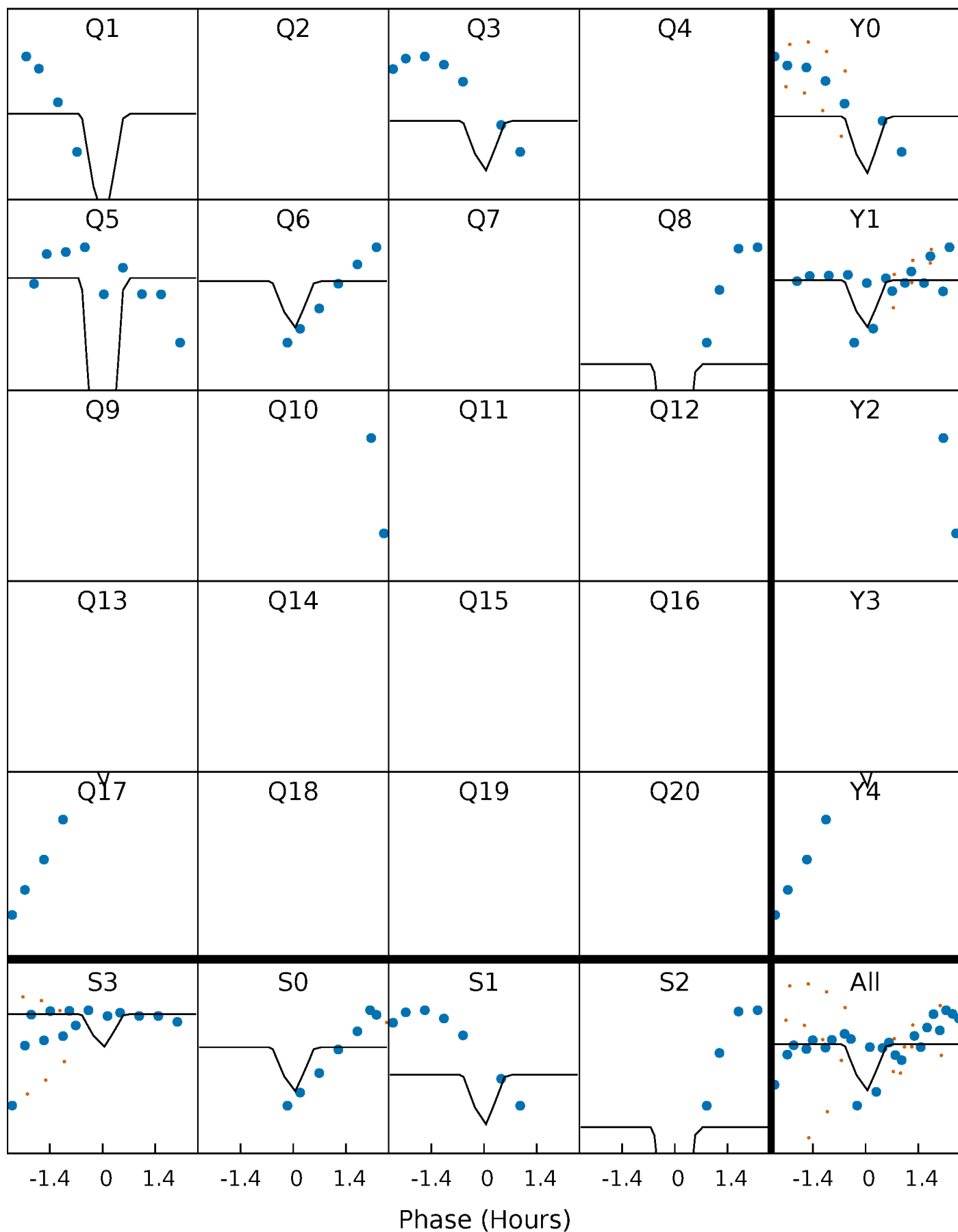
DV Quarter-Phased Transit Curves

TCE 009408654-02 P=158.395915 Days $T_0=152.825782$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

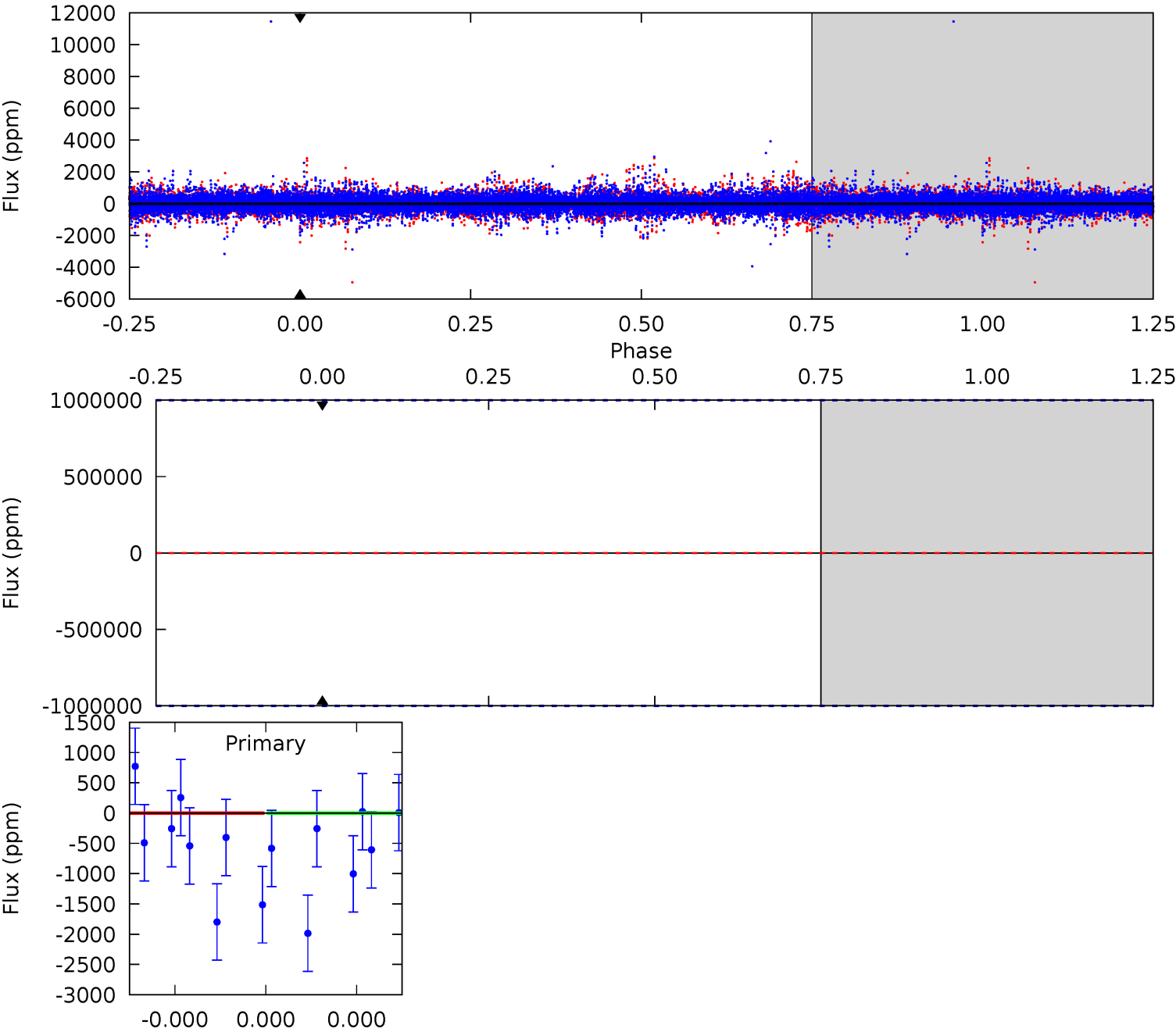
TCE 009408654-02 P=158.395915 Days $T_0=152.954154$ (BKJD)



DV Model-Shift Uniqueness Test

009408654-02, P = 158.395915 Days, E = 152.825782 Days

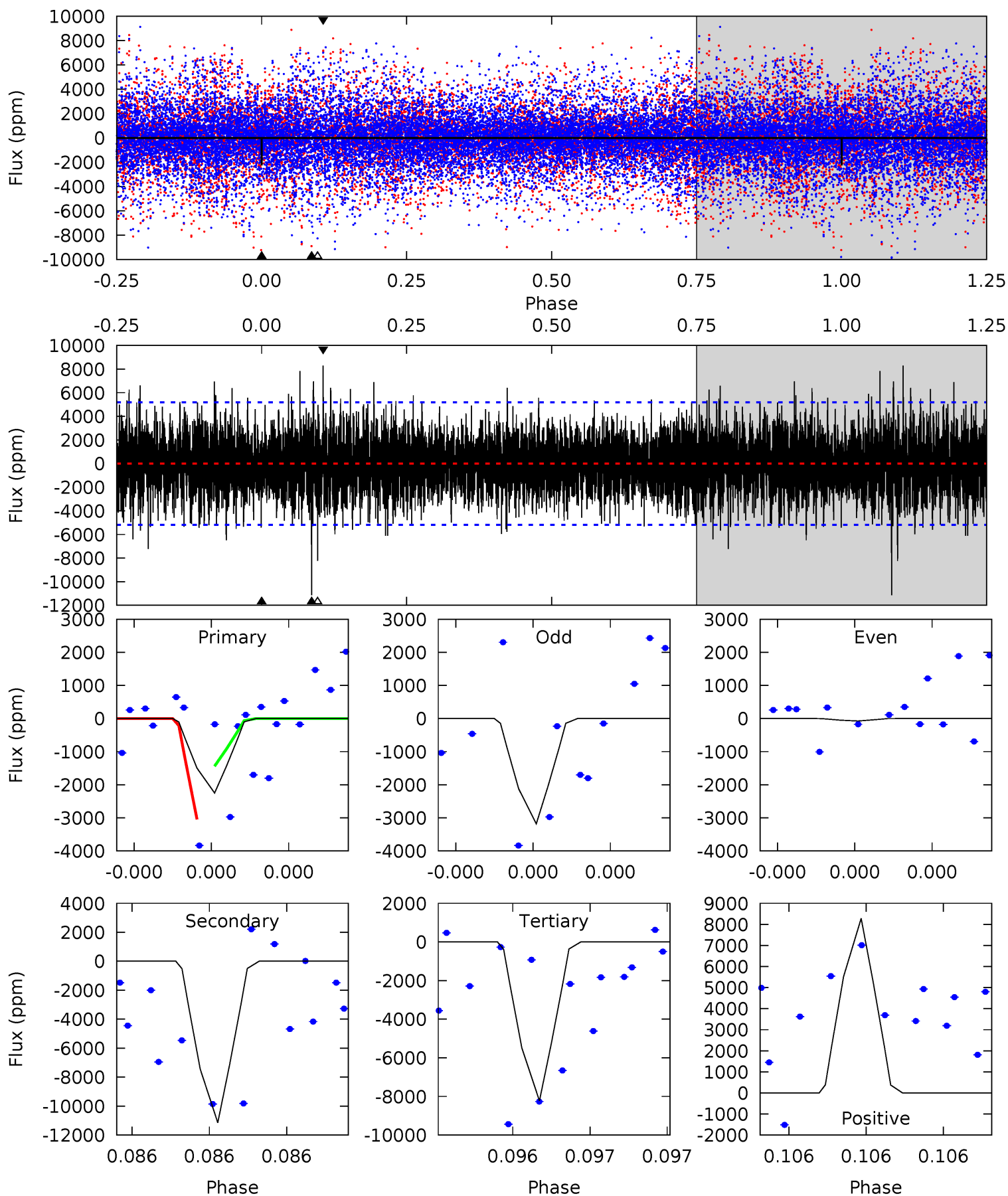
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

009408654-02, P = 158.395915 Days, E = 152.954154 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.44	12.1	8.94	9.00	5.64	3.58	2.19	-6.50	-6.55	3.17	3.11	1.65	20.7	0.43	0.83



Stellar Parameters For KIC 009408654

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	11053^{+238}_{-1433}	$3.603^{+0.417}_{-0.074}$	$0.360^{+0.050}_{-0.300}$	$4.909^{+0.400}_{-2.268}$	$3.520^{+0.070}_{-0.865}$	$0.042^{+0.152}_{-0.010}$
	+2%/-13%	+12%/-2%	+14%/-83%	+8%/-46%	+2%/-25%	+362%/-23%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009408654-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	0 ± 1000000	$35.41^{+41.56}_{-24.17}$	1509^{+152}_{-227}	4397^{+88265}_{-77044}	44^{+61906}_{-46663}
Alt.	-11147 ± 920	$41.84^{+43.43}_{-27.32}$	1519^{+146}_{-233}	12314^{+25535}_{-4712}	2652^{+18368}_{-2024}

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 $A_{obs} \gg 1.0$

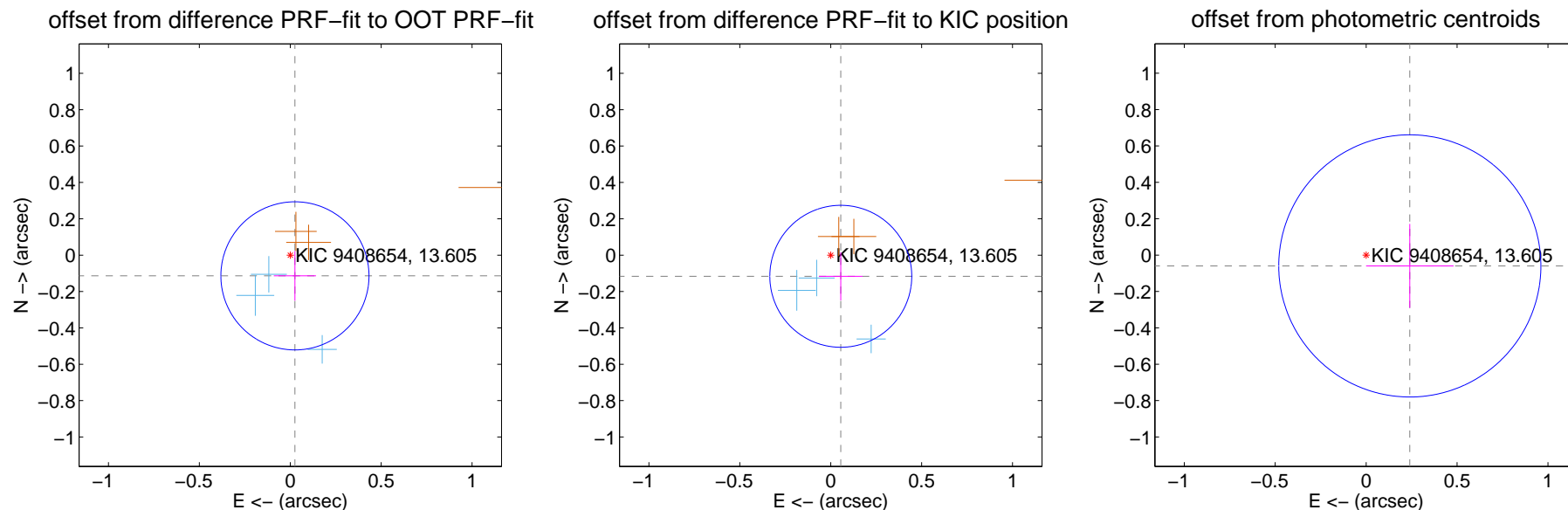
DV Centroid Data

Supplemental centroid analysis for 009408654-02. Kepler magnitude: 13.61. Transit SNR -1.00

There are 3 quarters with good PRF difference image offsets

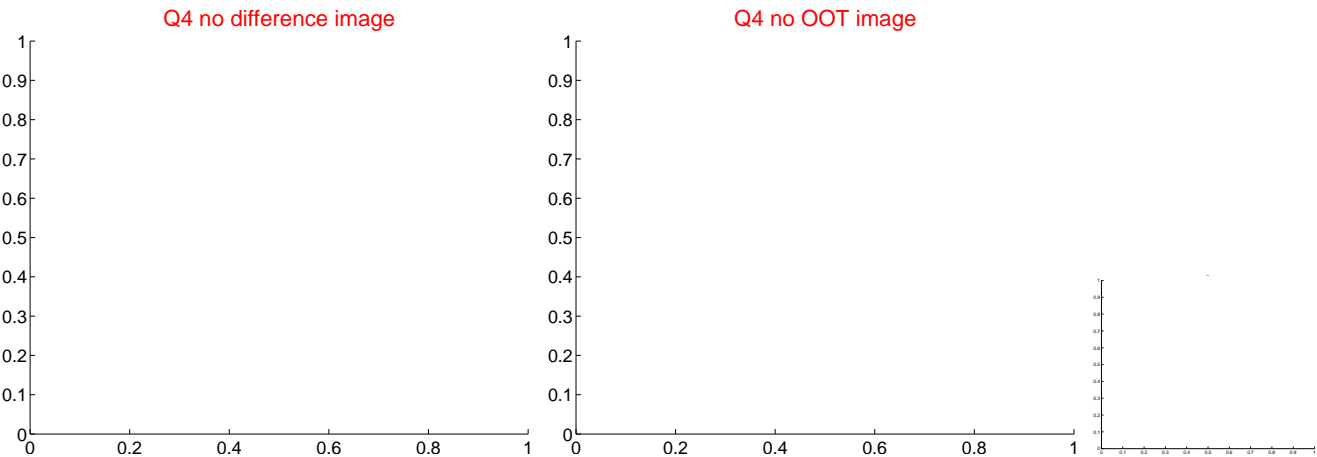
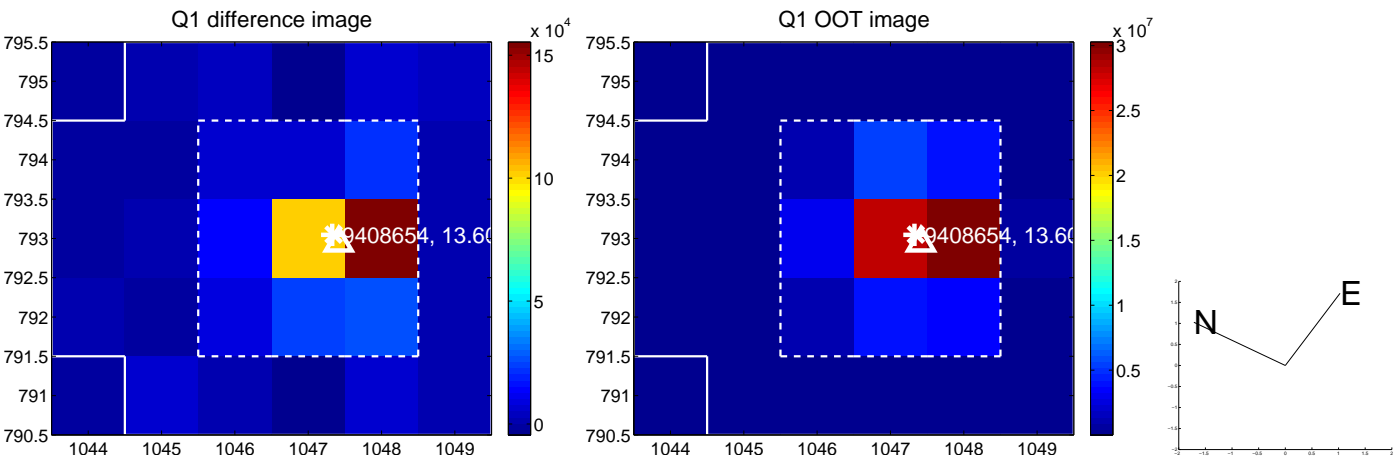
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.117 ± 0.136	0.86	-0.026 ± 0.116	-0.114 ± 0.137
PRF-fit source offset from KIC position	0.129 ± 0.130	0.99	-0.055 ± 0.119	-0.116 ± 0.132
photometric centroid source offset	0.25 ± 0.24	1.03	-0.24 ± 0.24	-0.06 ± 0.23

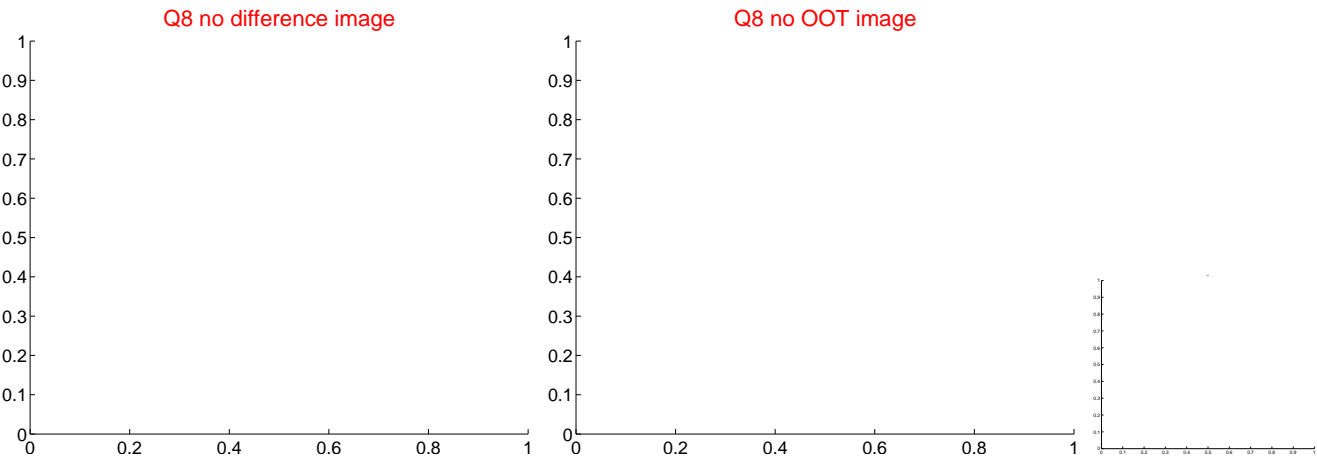
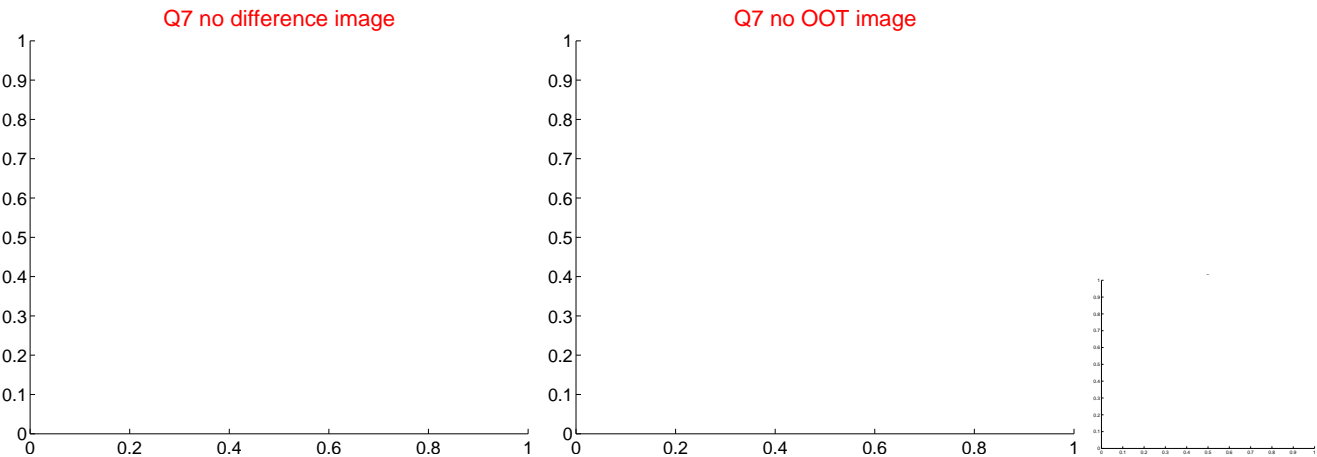
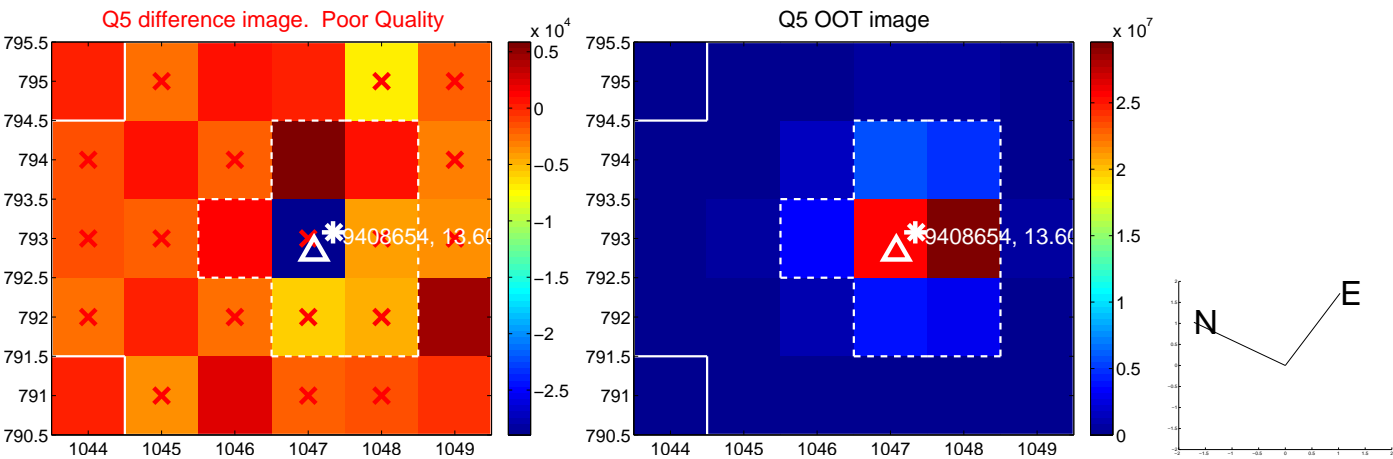


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

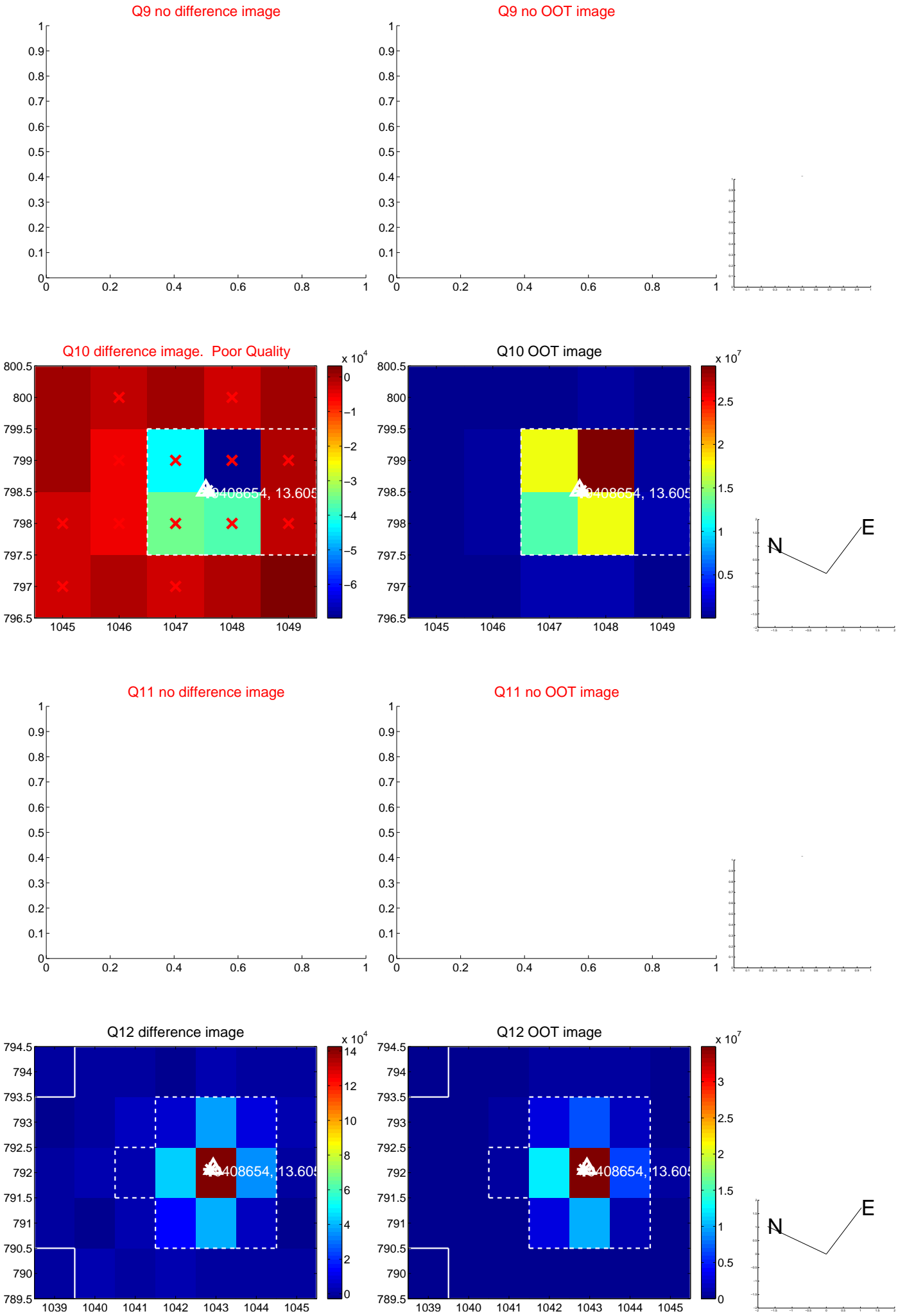
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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.



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

Q13 no difference image



Q13 no OOT image



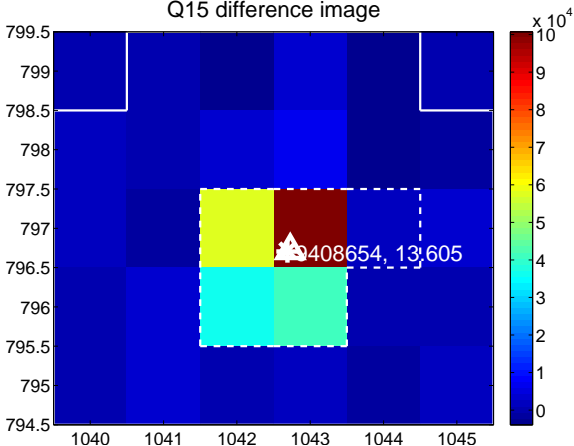
Q14 no difference image



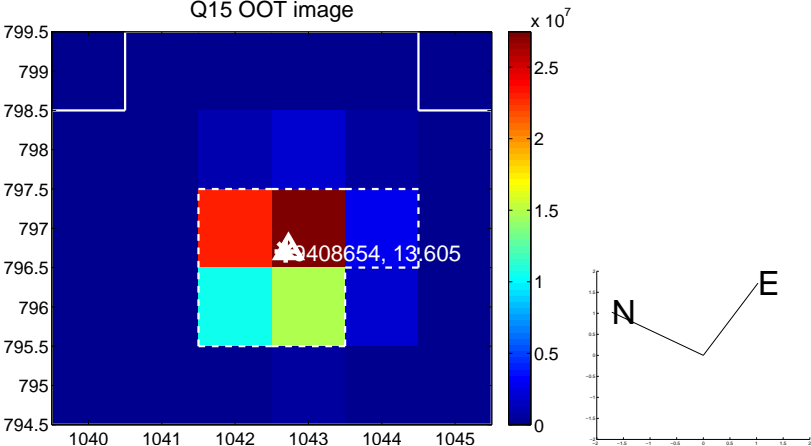
Q14 no OOT image



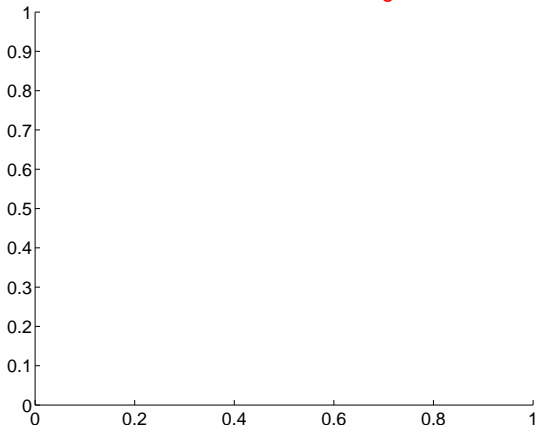
Q15 difference image



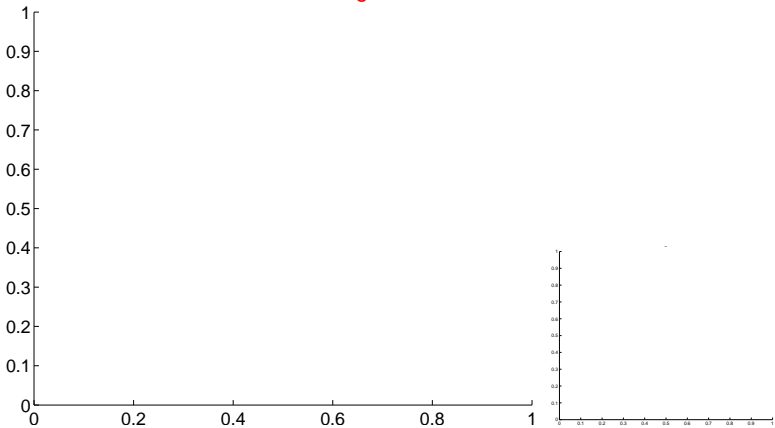
Q15 OOT image



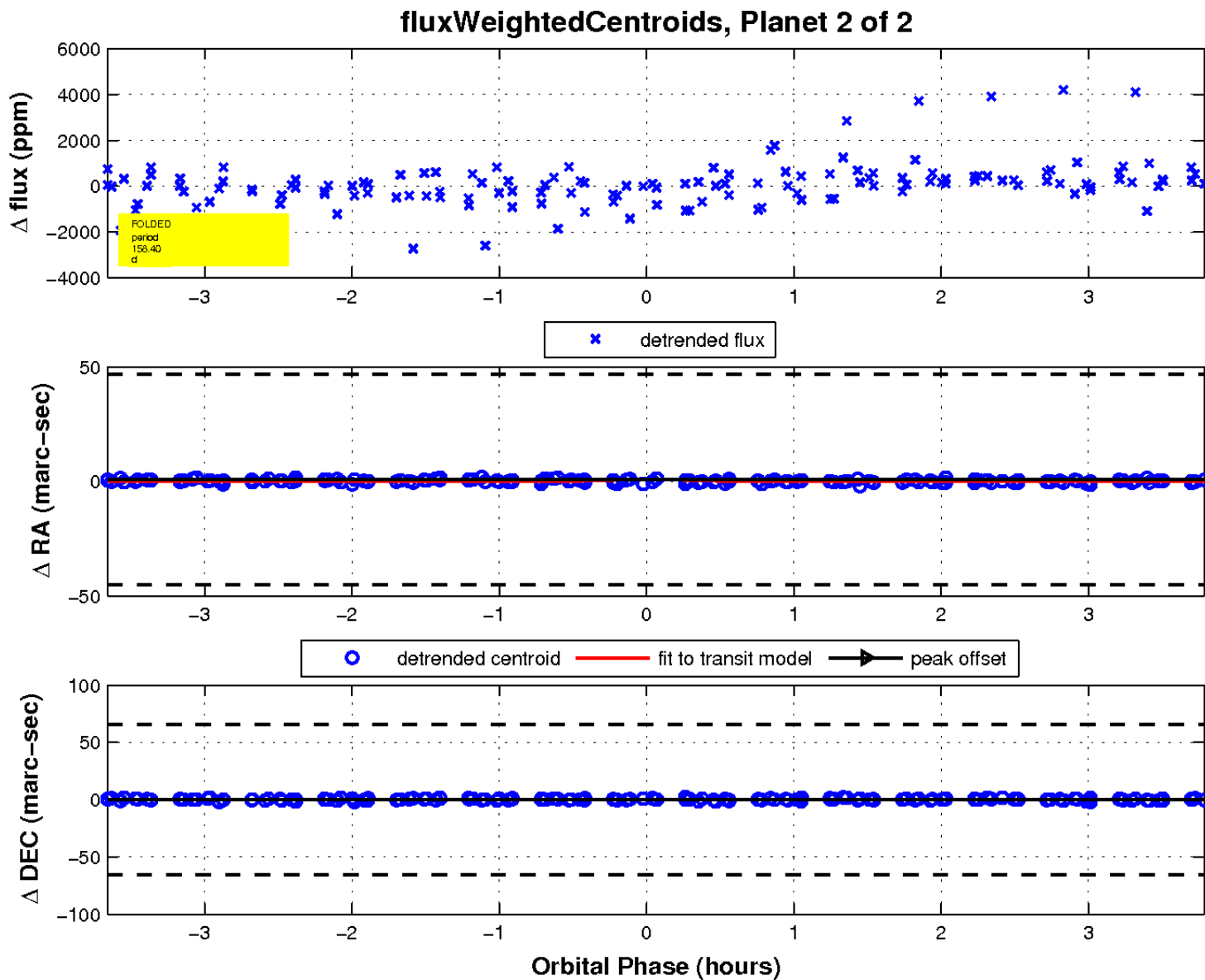
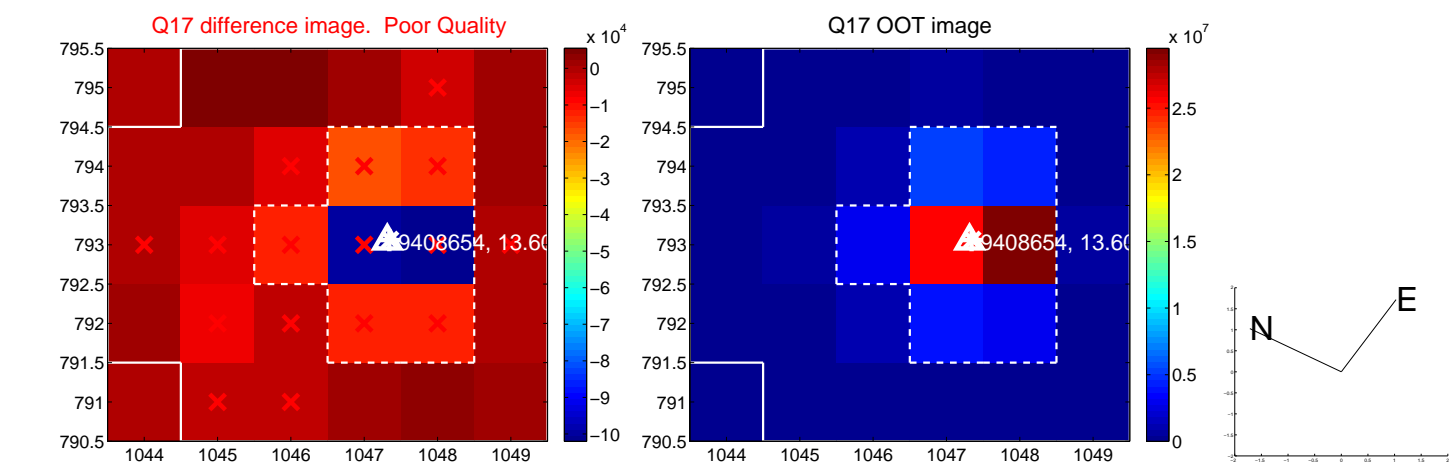
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

