

KIC 009837578

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})
009837578-01	OBS	2937.01	20.733617	132.852798	423839.7	3.500	9272.0	-1.0	0.97	5620	53.14	45.15
009837578-02	OBS	No	10.366862	132.958371	263944.6	5.000	6320.8	-1.0	0.97	5620	46.51	113.77
009837578-03	OBS	No	6.911114	132.801153	101.6	12.550	263.4	5.2	0.97	5620	0.97	195.35
009837578-04	OBS	No	185.413920	188.270963	3734.9	22.498	26.5	23.0	0.97	5620	11.07	2.43
009837578-05	OBS	No	333.649734	244.113348	382.8	10.696	26.5	3.7	0.97	5620	1.95	1.11
009837578-06	OBS	No	117.823087	164.388285	11977.6	2.000	29.9	-1.0	0.97	5620	10.59	4.45

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009837578-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—HAS_SEC_TCE—CENT_NOFITS
009837578-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
009837578-03	OBS	FP	0.00	1	0	0	1	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_FEW_DIFFS—EPHEM_MATCH
009837578-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009837578-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009837578-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—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.

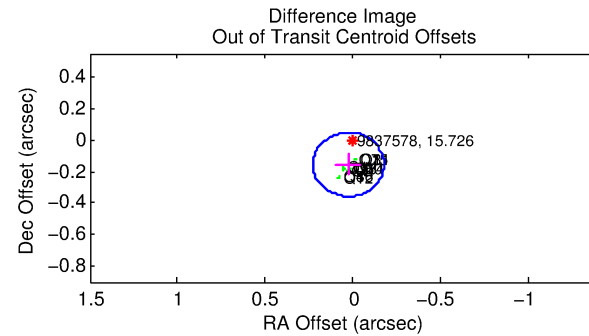
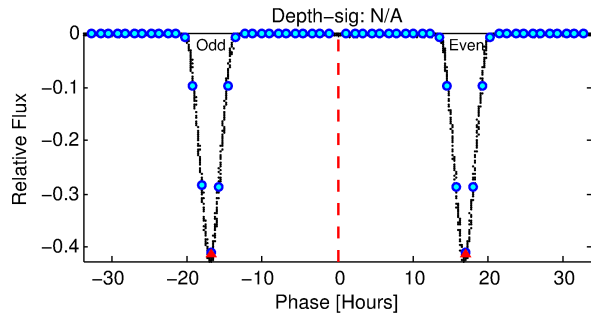
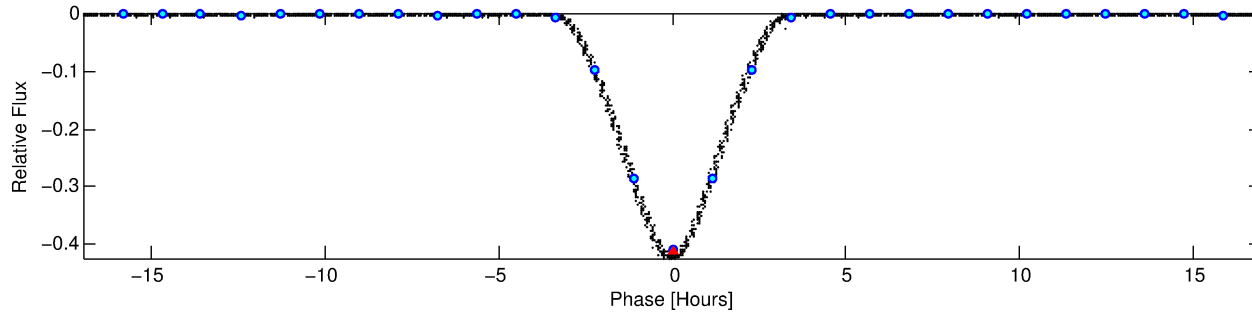
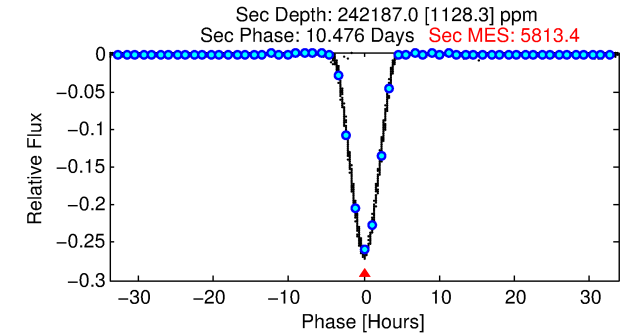
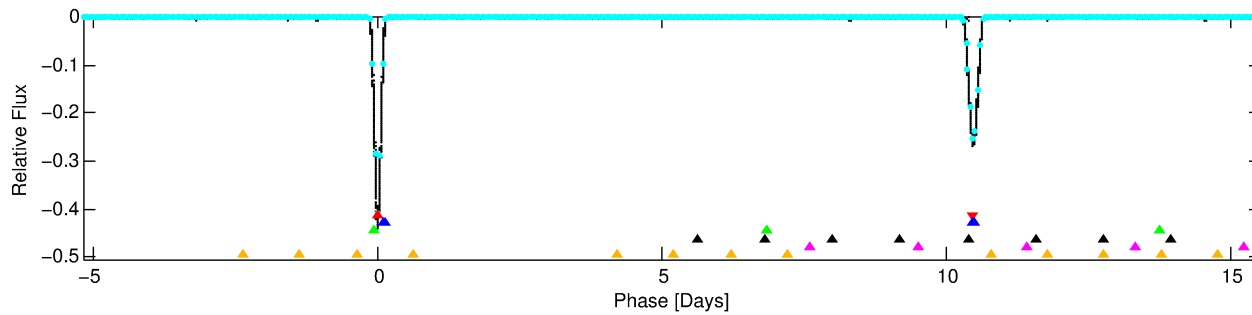
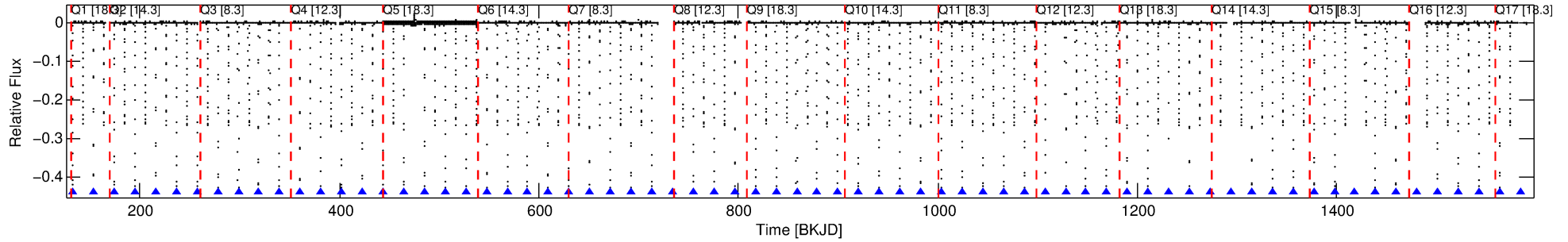
Ephemeris Match Information For 009837578-01

No Significant Match Found

DV One-Page Summary

KIC: 9837578 Candidate: 1 of 6 Period: 20.734 d
KOI: K02937 Corr: No Ephemeris Match

Kp: 15.73 R*: 0.97 Rs Teff: 5620.0 K Logg: 4.36 Fe/H: -0.320



TPS TCE Results:

Period = 20.73362 d
Epoch = 132.8528 BKJD

DV fit results are unavailable

DV Diagnostic Results:

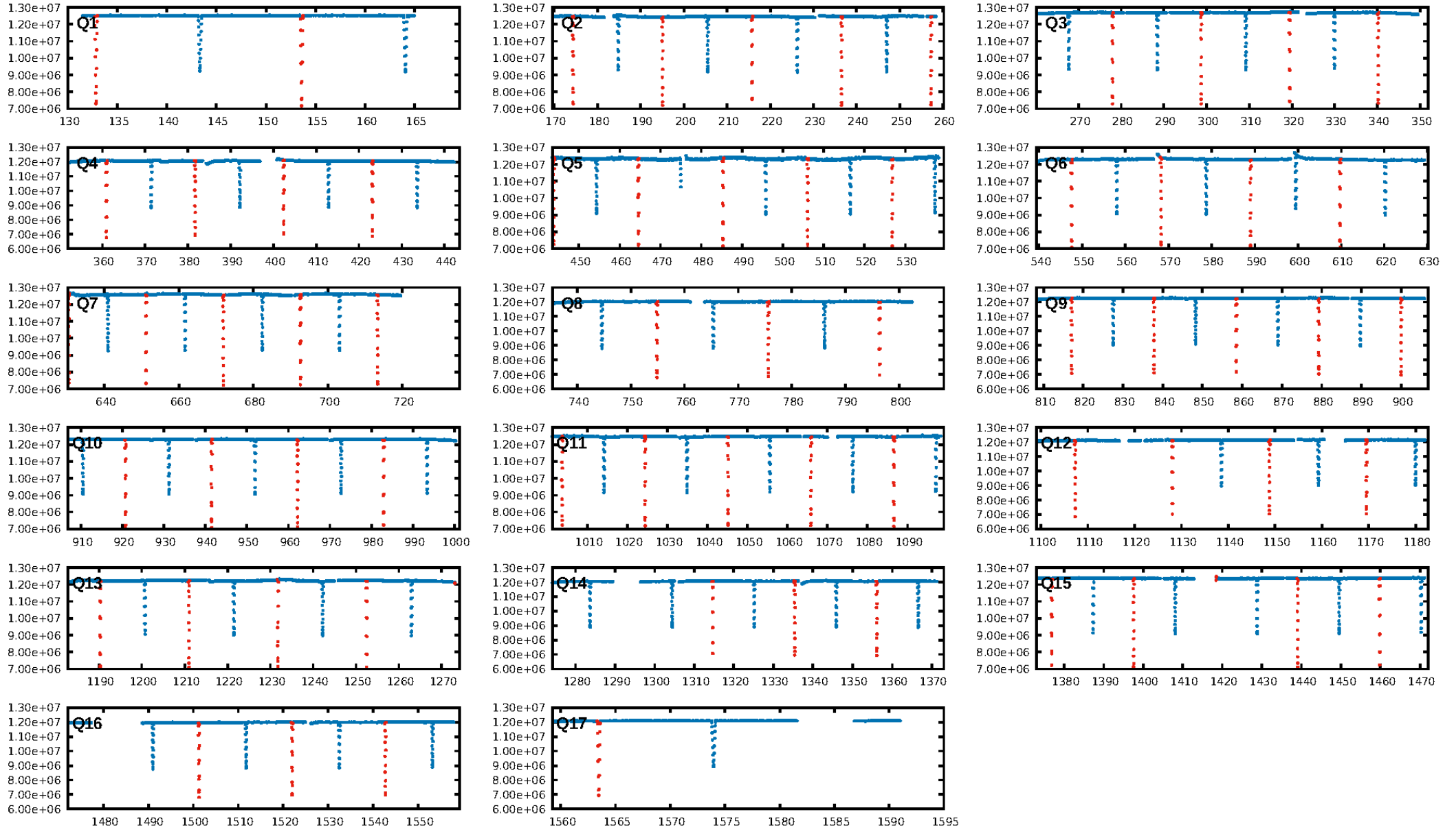
ShortPeriod-sig: 100.0% [40.77 σ]
LongPeriod-sig: 100.0% [578.04 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [63/63]
GhostDiagnostic-chr: 1.383

Centroid-sig: 0.0%
Centroid-so: 0.267 arcsec [222.71 σ]
OotOffset-rm: 0.156 arcsec [2.30 σ]
KicOffset-rm: 0.223 arcsec [3.33 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 0.00 [0/17]

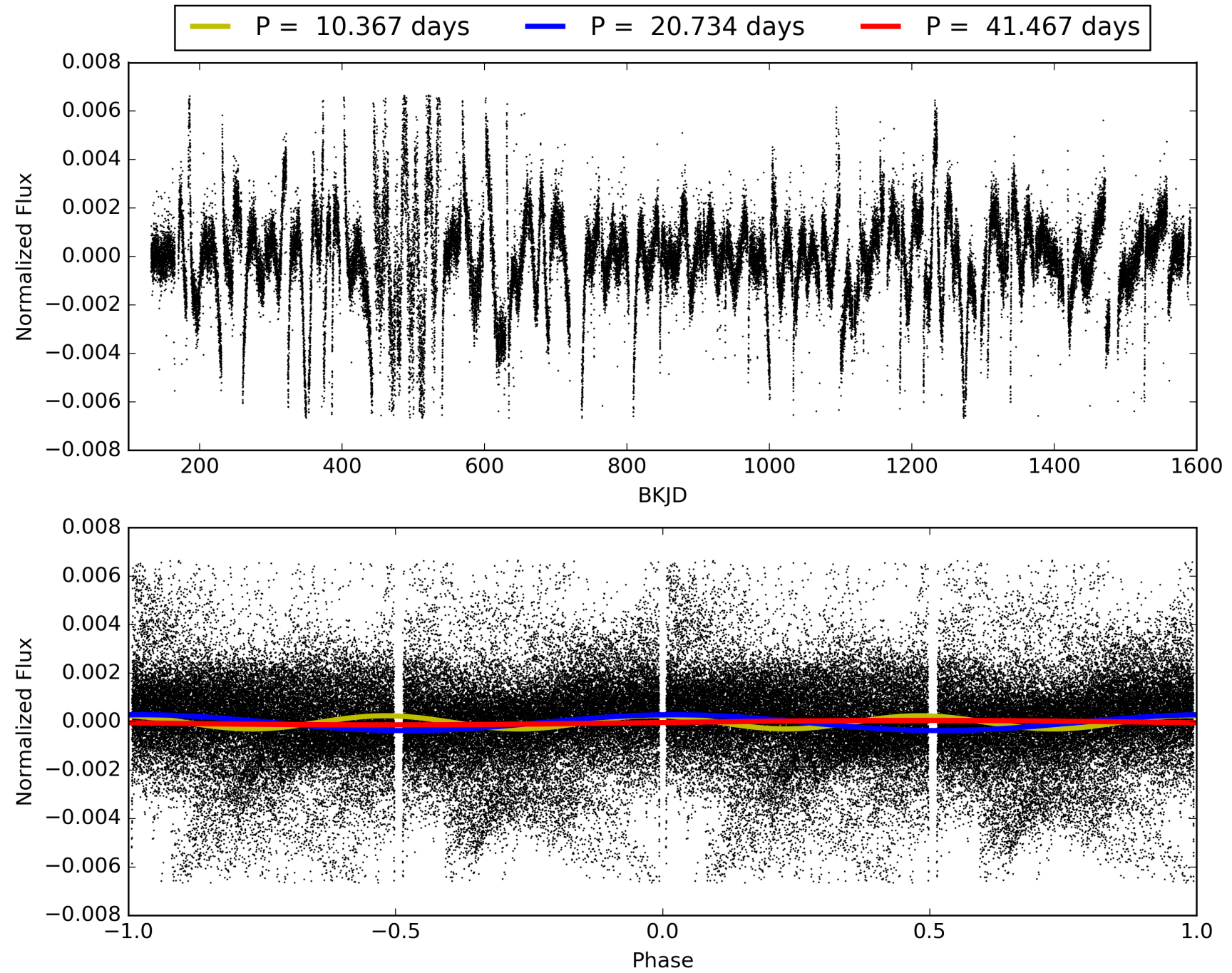
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 01:26:52 Z

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

TCE 009837578-01, PDC Light Curves

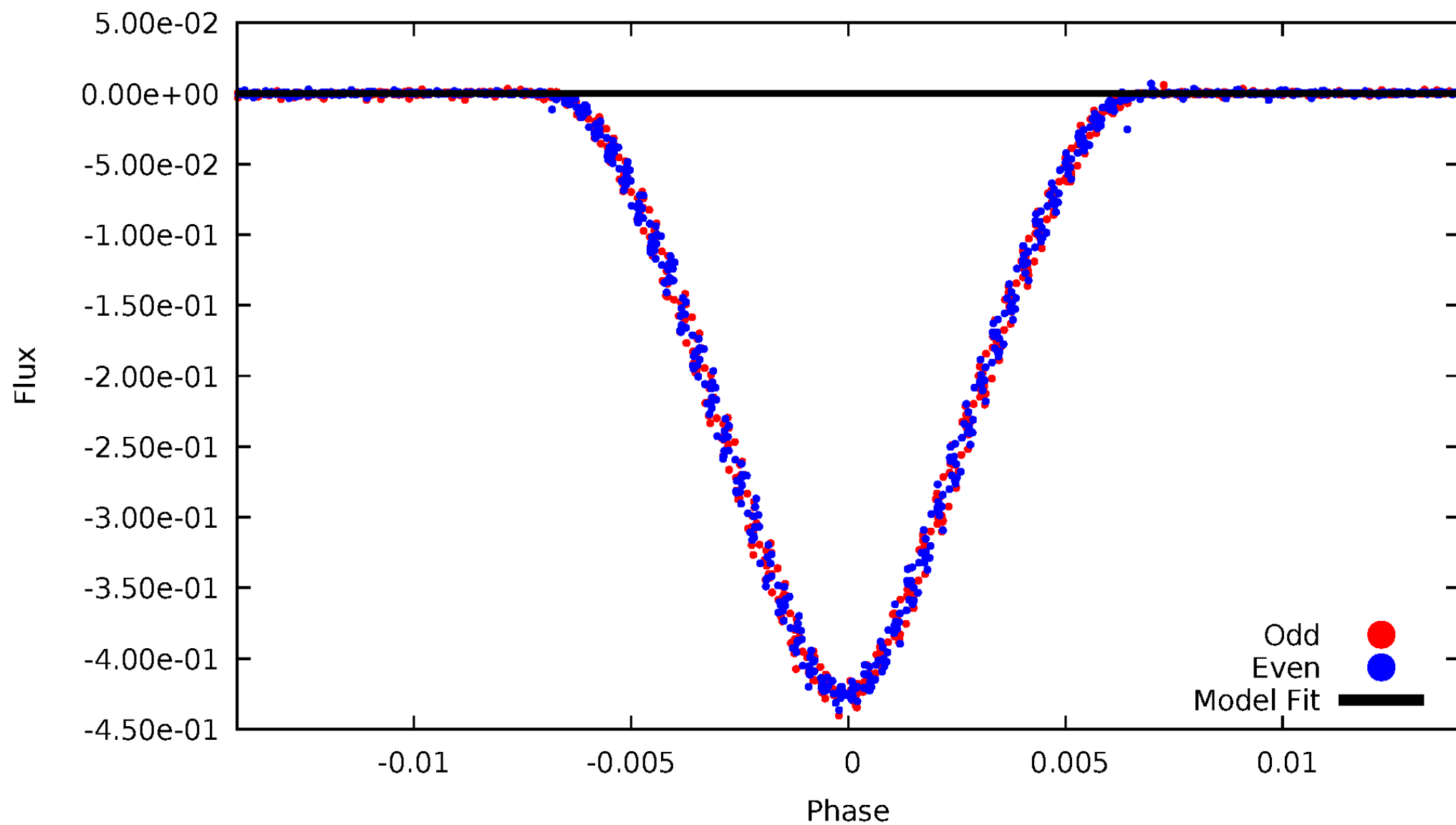


TCE 009837578-01



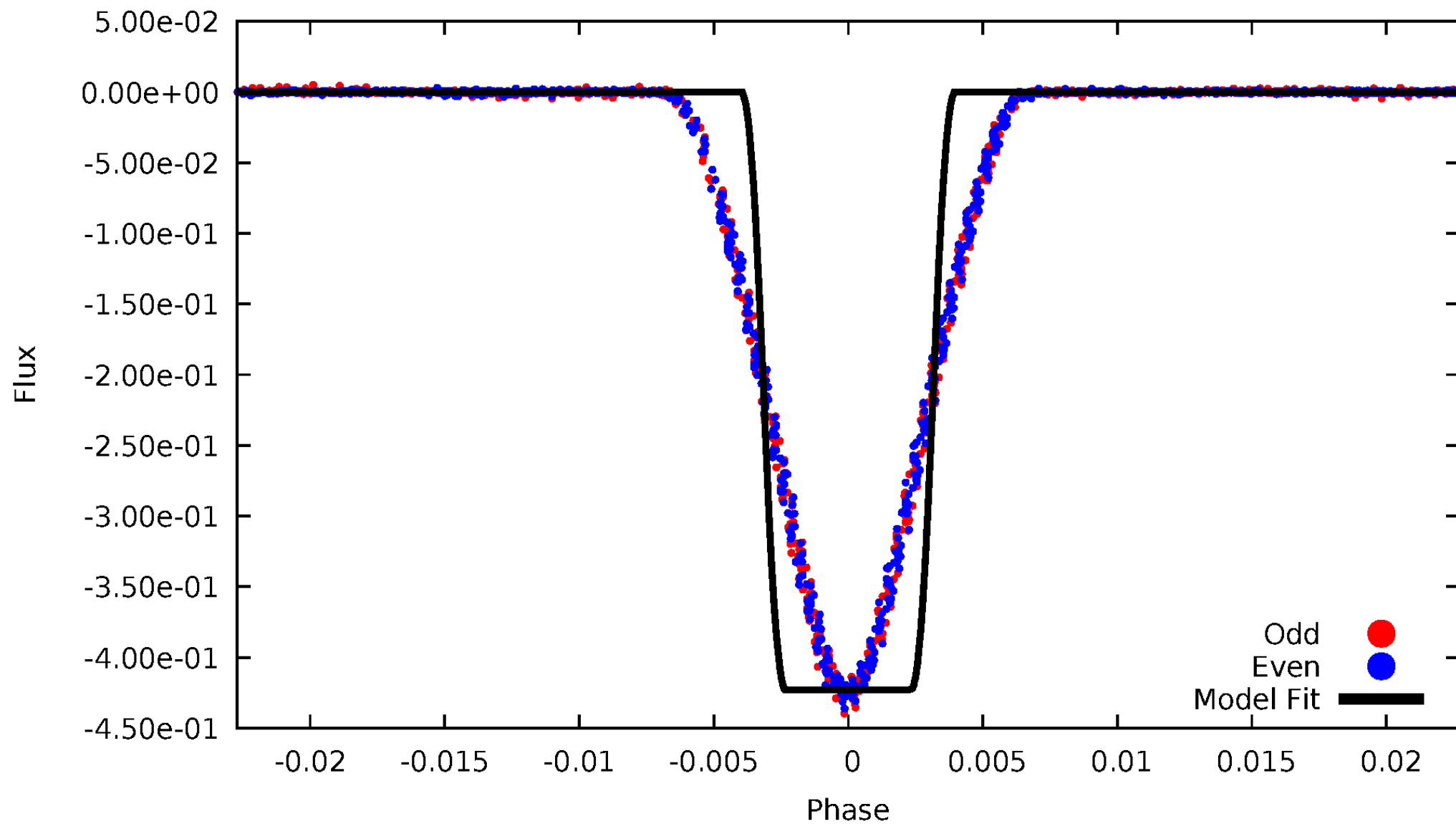
DV Odd/Even

TCE 009837578-01



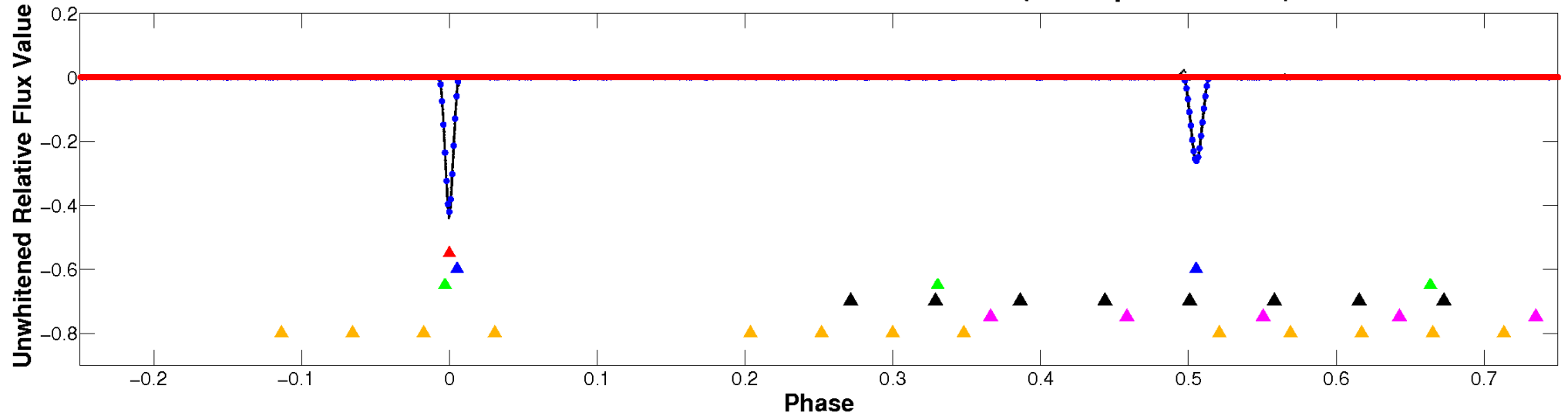
ALT Odd/Even

TCE 009837578-01



Non-Whitened Vs. Whitened Light Curve

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

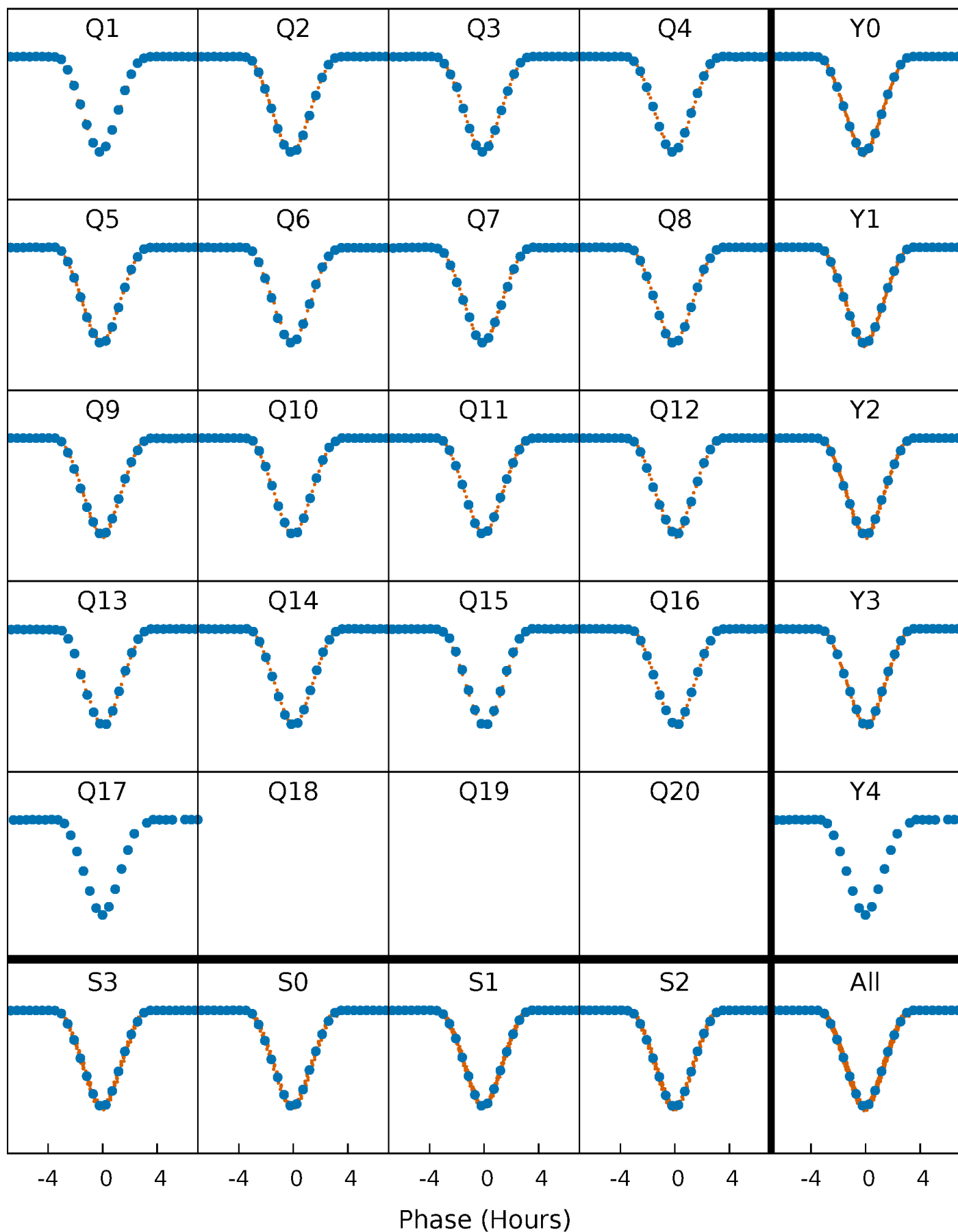


Planet 1 : Phased Whitened Flux Time Series (TPS Epoch/Period)



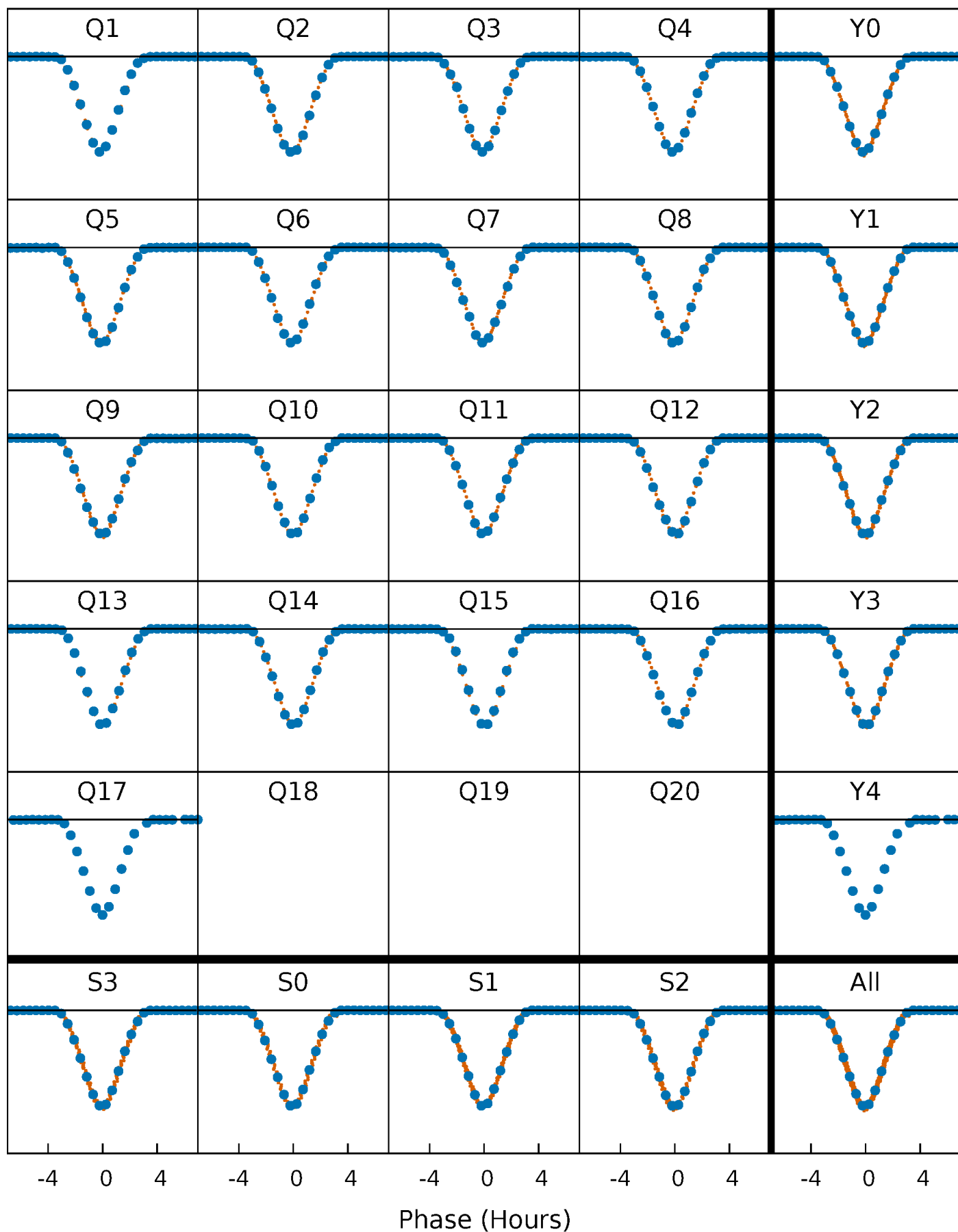
PDC Quarter-Phased Transit Curves

TCE 009837578-01 P= 20.733617 Days $T_0=132.852798$ (BKJD)



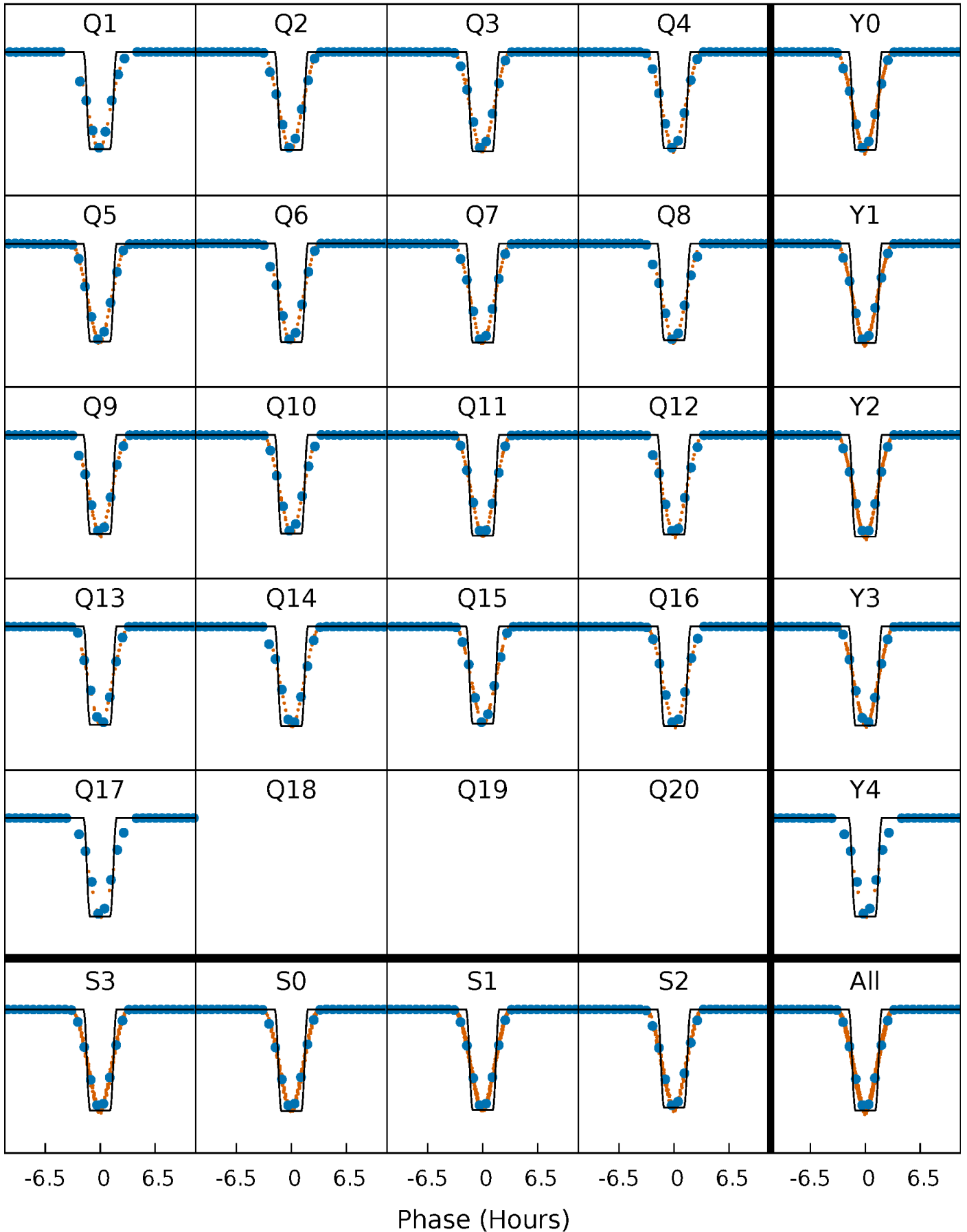
DV Quarter-Phased Transit Curves

TCE 009837578-01 P= 20.733617 Days $T_0=132.852798$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

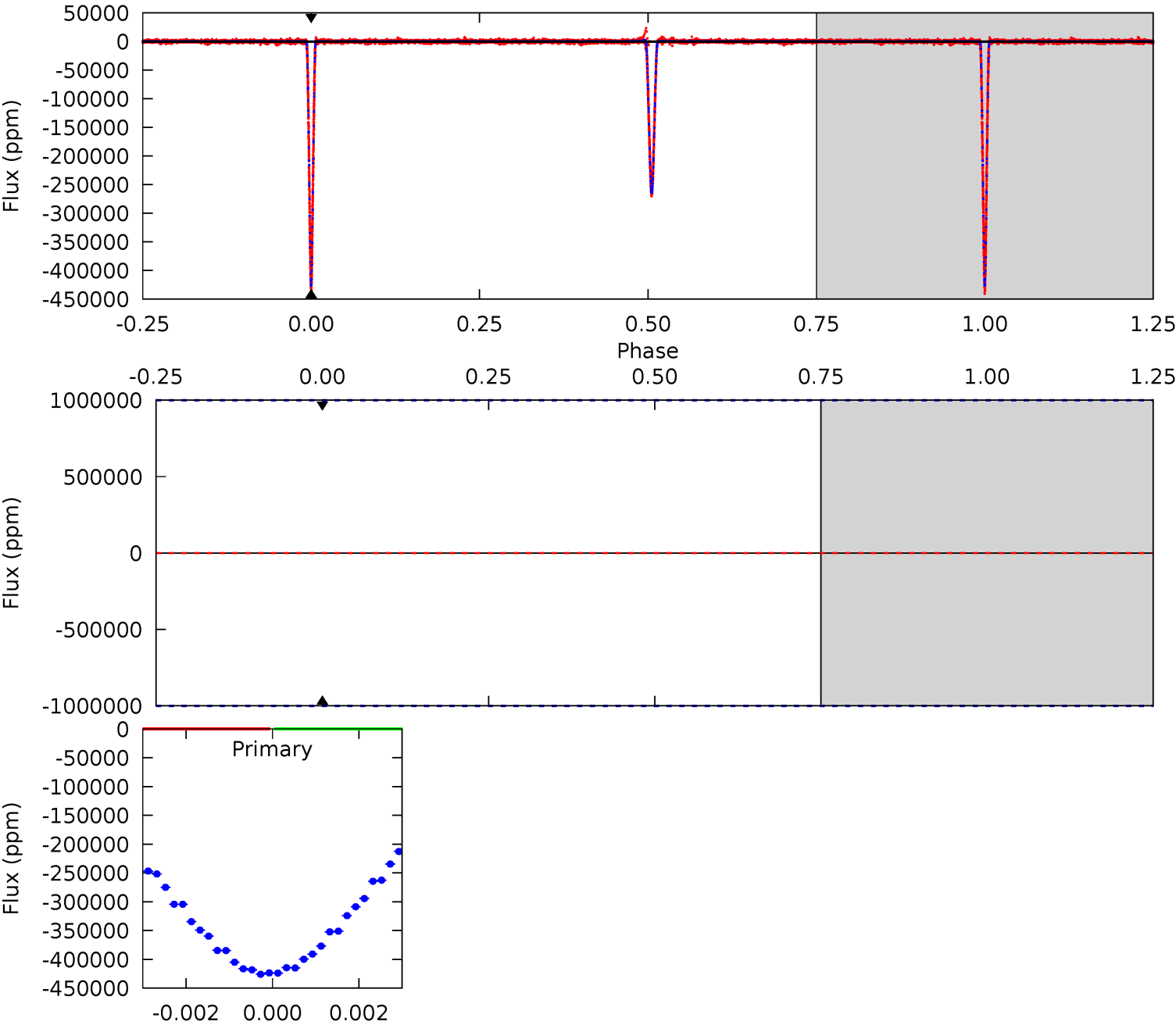
TCE 009837578-01 P= 20.733617 Days $T_0=132.851317$ (BKJD)



DV Model-Shift Uniqueness Test

009837578-01, P = 20.733617 Days, E = 112.119181 Days

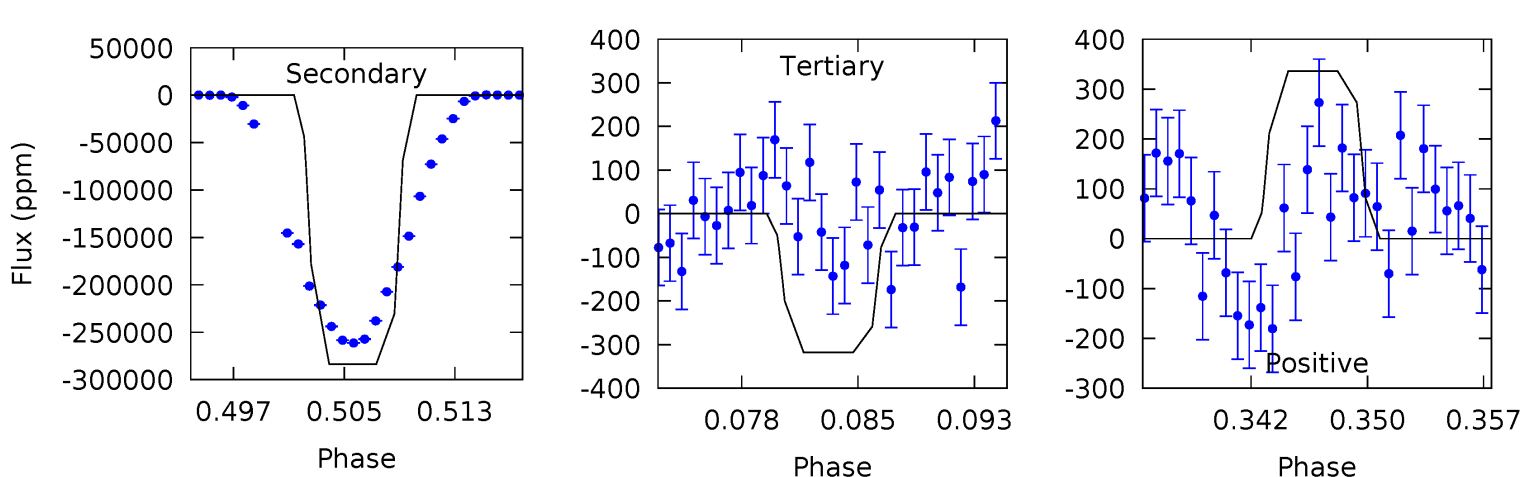
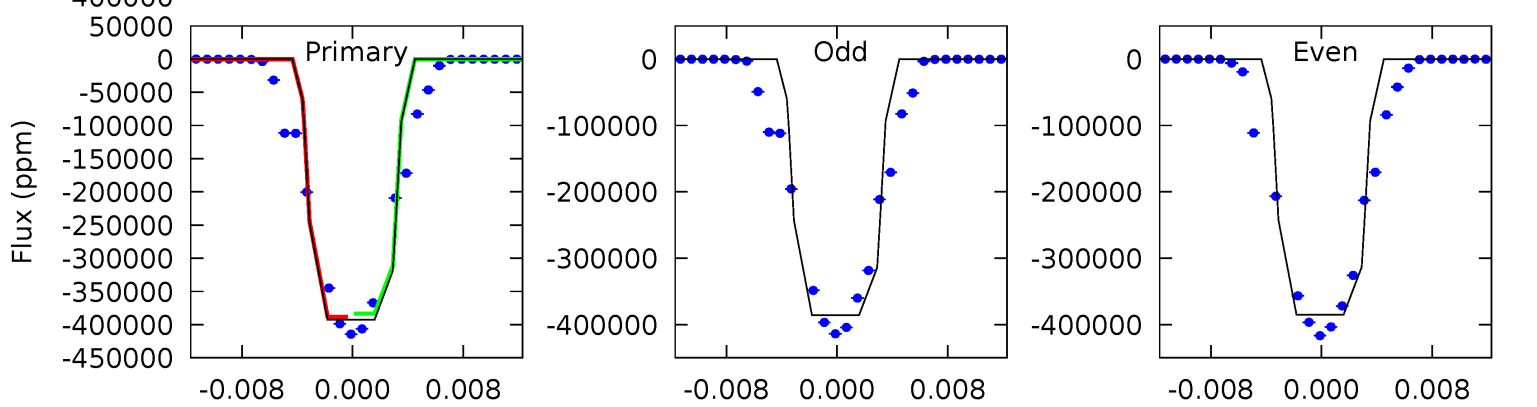
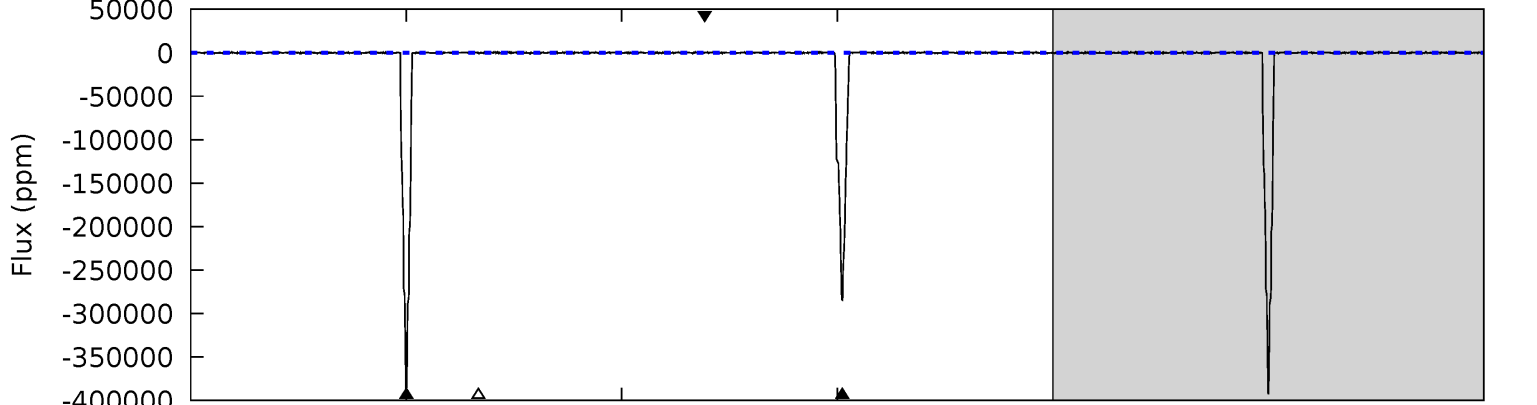
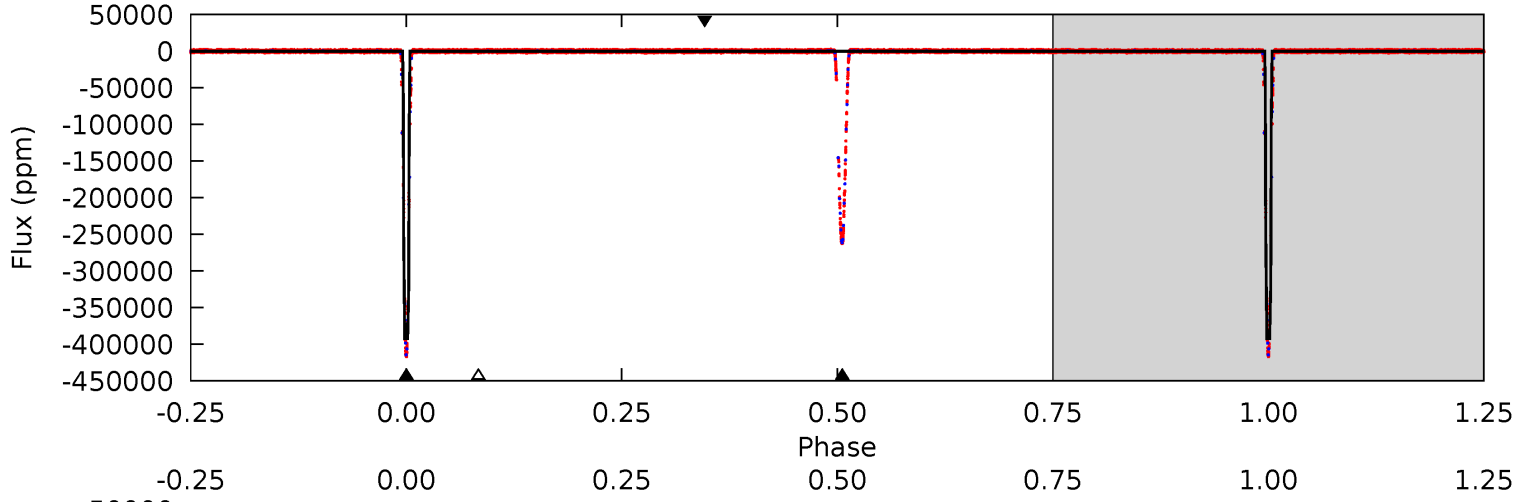
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

009837578-01, P = 20.733617 Days, E = 112.117700 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4972	3594	4.03	4.25	5.07	2.66	4.50	4968	4968	3590	3590	6.47	1.00	0.00	0



Stellar Parameters For KIC 009837578

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5620^{+118}_{-75}	$4.363^{+0.065}_{-0.040}$	$-0.320^{+0.150}_{-0.100}$	$0.974^{+0.067}_{-0.067}$	$0.797^{+0.067}_{-0.024}$	$1.217^{+0.300}_{-0.166}$
	+2%/-1%	+1%/-1%	+47%/-31%	+7%/-7%	+8%/-3%	+25%/-14%
Source	SPE36	TRA36	SPE36	DSEP		

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

Secondary Eclipse Parameters for KIC 009837578-01 / KOI 2937.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	0 ± 1000000	$52.70^{+11.06}_{-11.51}$	922^{+22}_{-23}	-2902^{+7747}_{-1722}	$-21.020^{+487.632}_{-349.612}$
Alt.	-283752 ± 79	$68.11^{+11.40}_{-10.95}$	924^{+23}_{-25}	5585^{+474}_{-373}	893^{+382}_{-232}

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

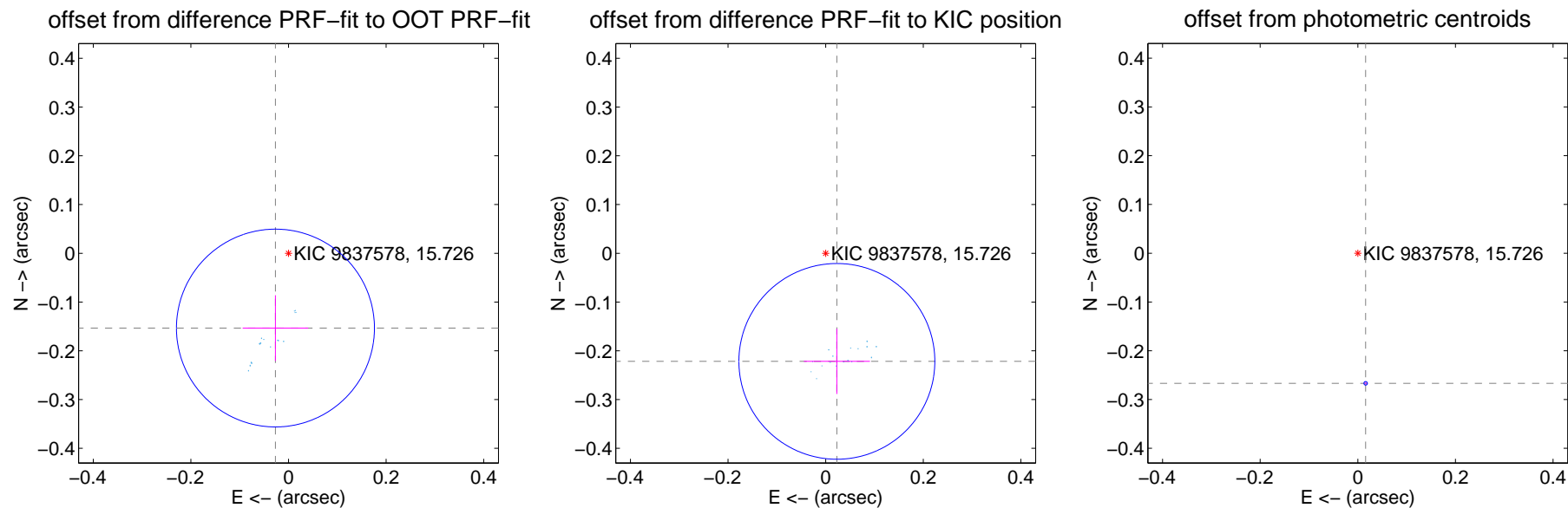
DV Centroid Data

Supplemental centroid analysis for 009837578-01. Kepler magnitude: 15.73. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

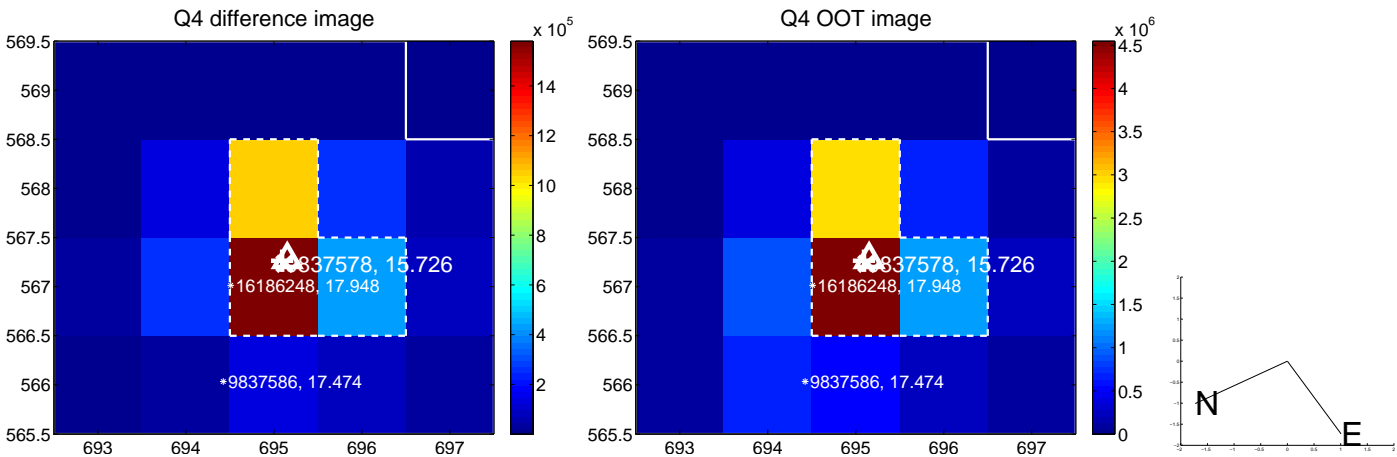
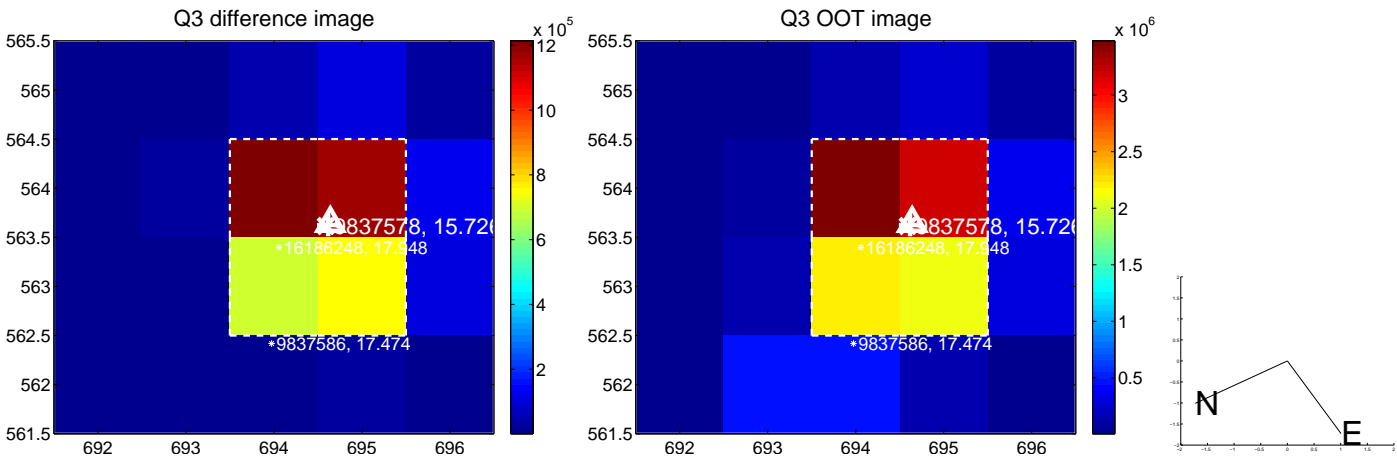
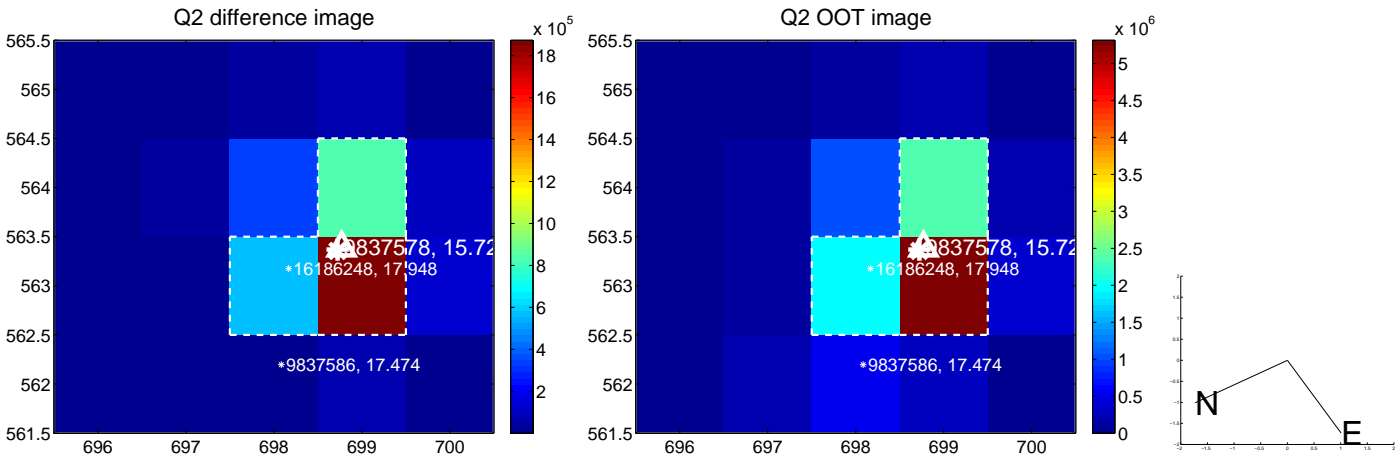
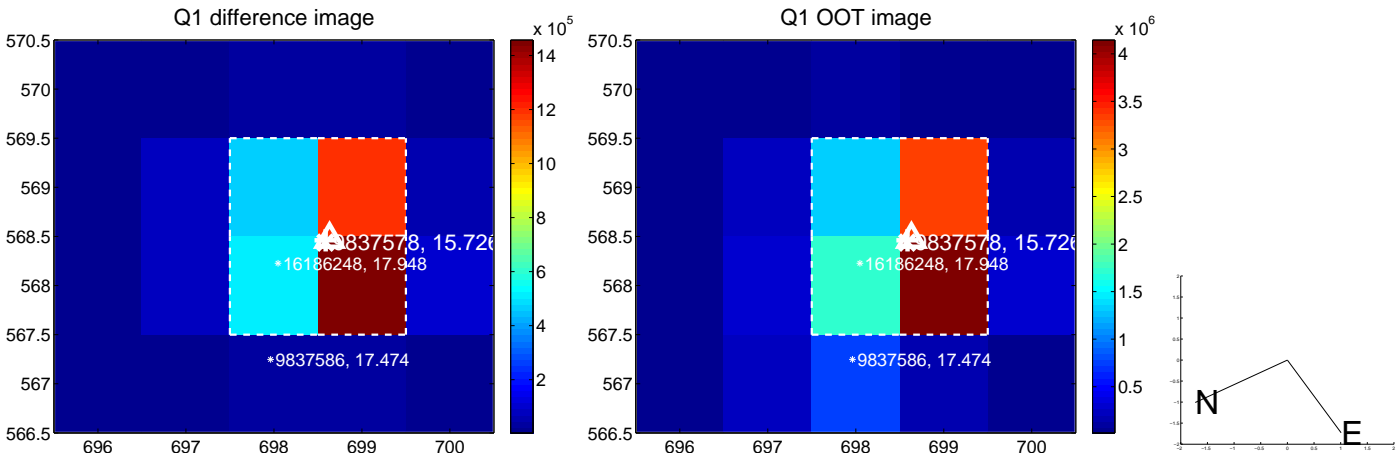
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.156 ± 0.068	2.30	0.027 ± 0.067	-0.153 ± 0.067
PRF-fit source offset from KIC position	0.223 ± 0.067	3.33	-0.023 ± 0.068	-0.222 ± 0.067
photometric centroid source offset	0.27 ± 0.00	222.71	-0.02 ± 0.00	-0.27 ± 0.00

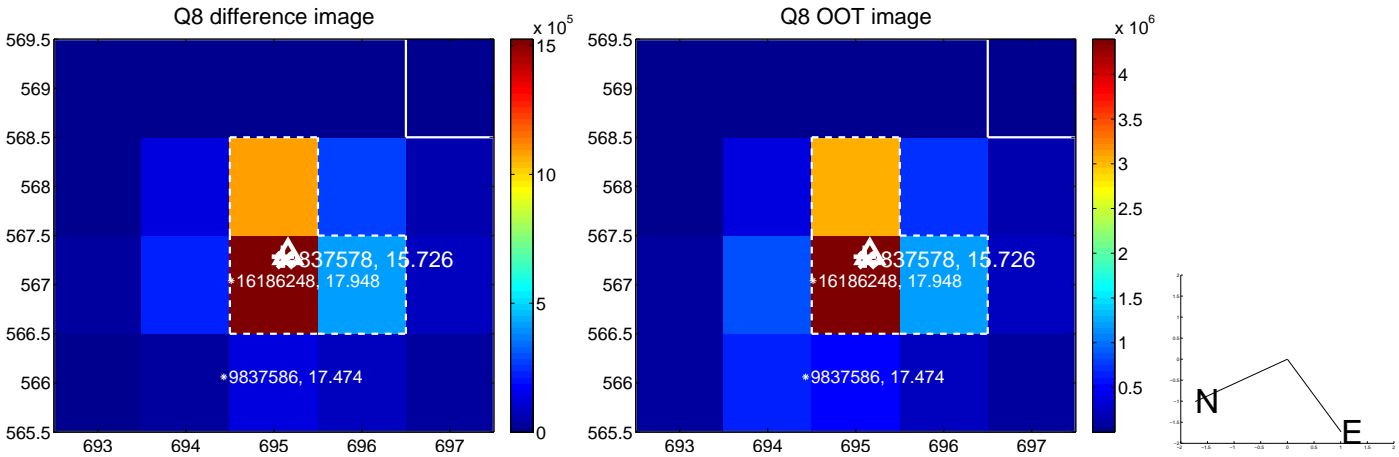
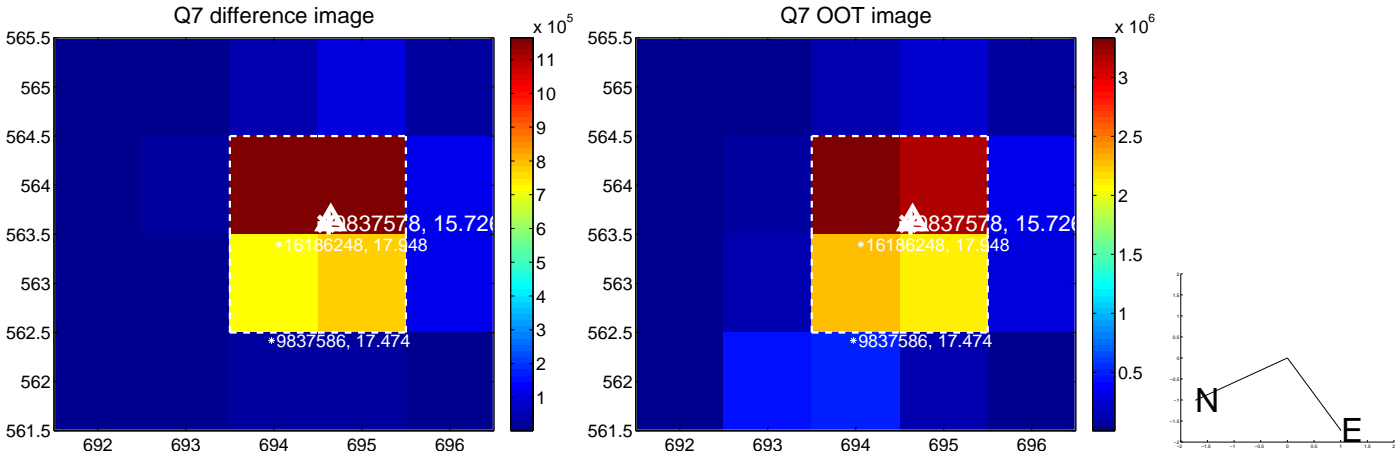
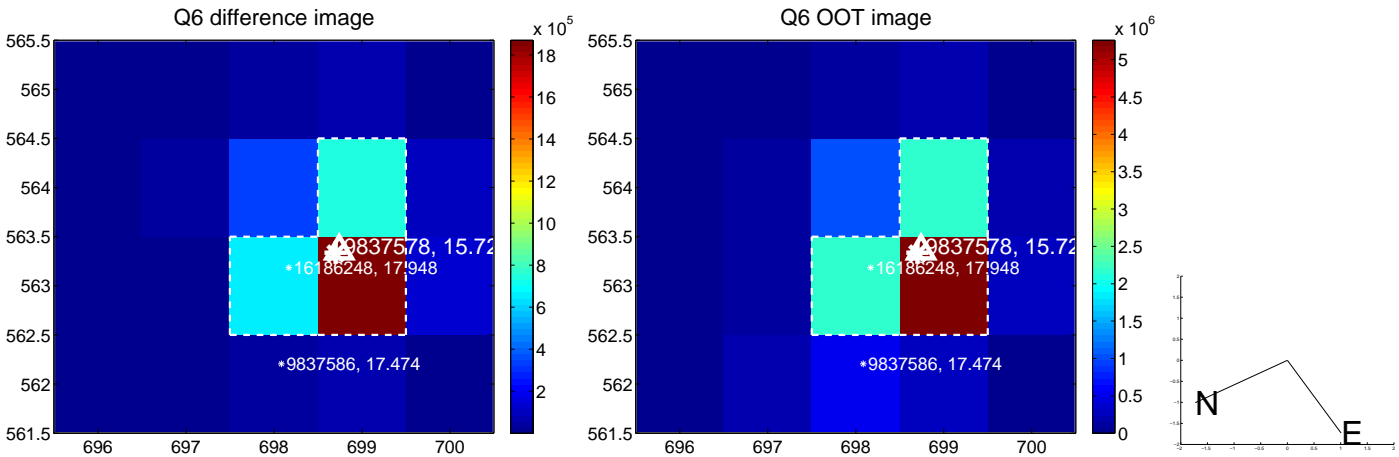
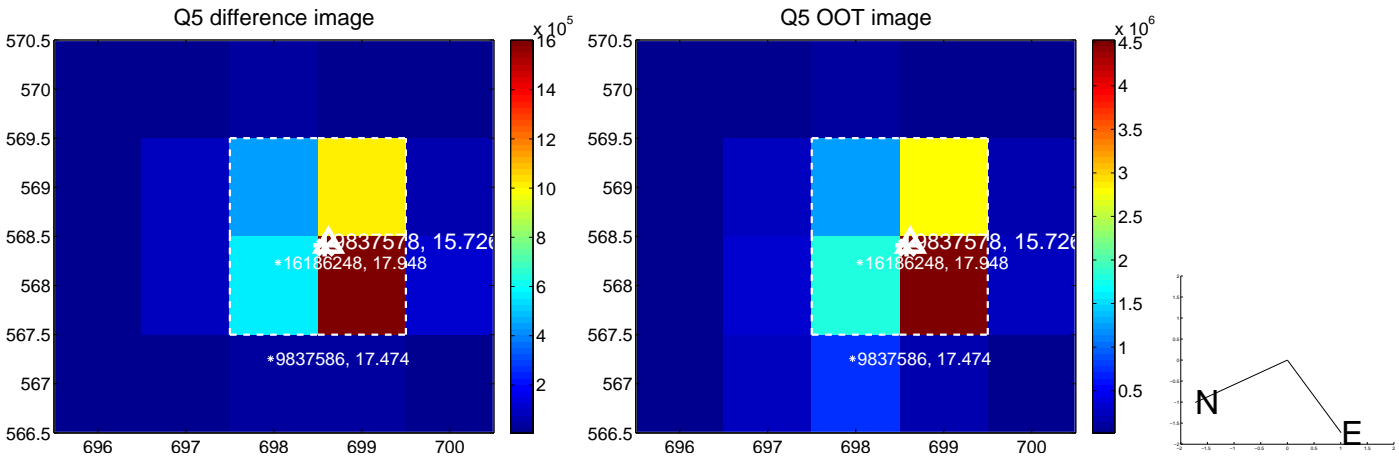


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

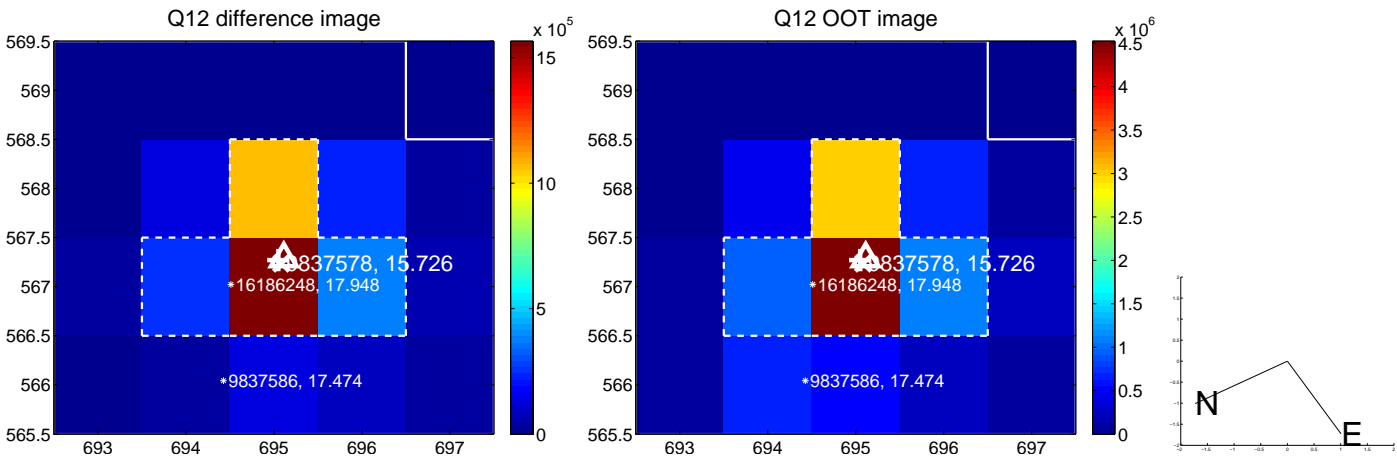
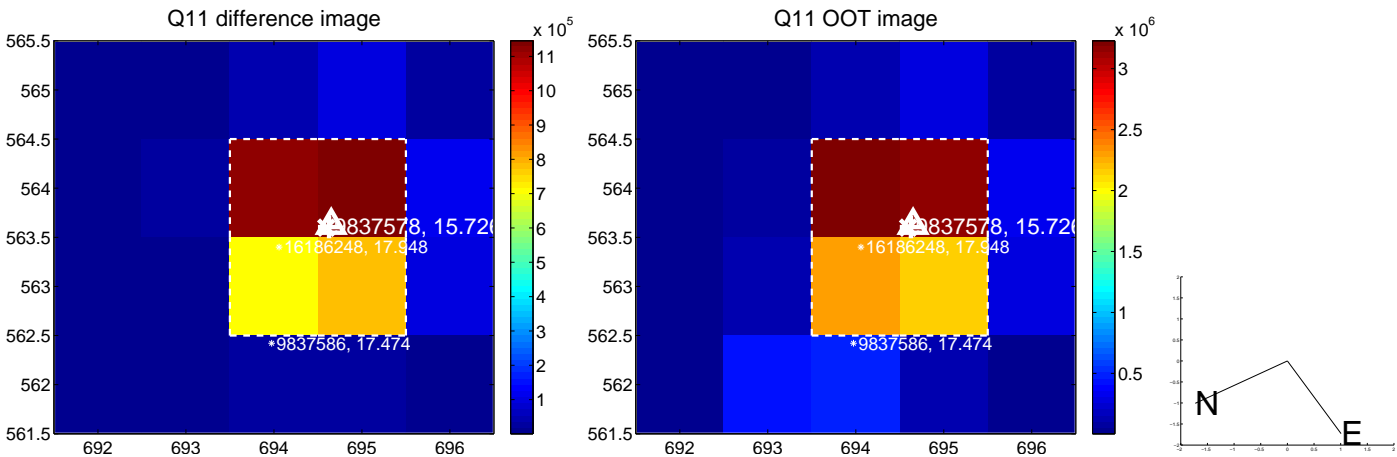
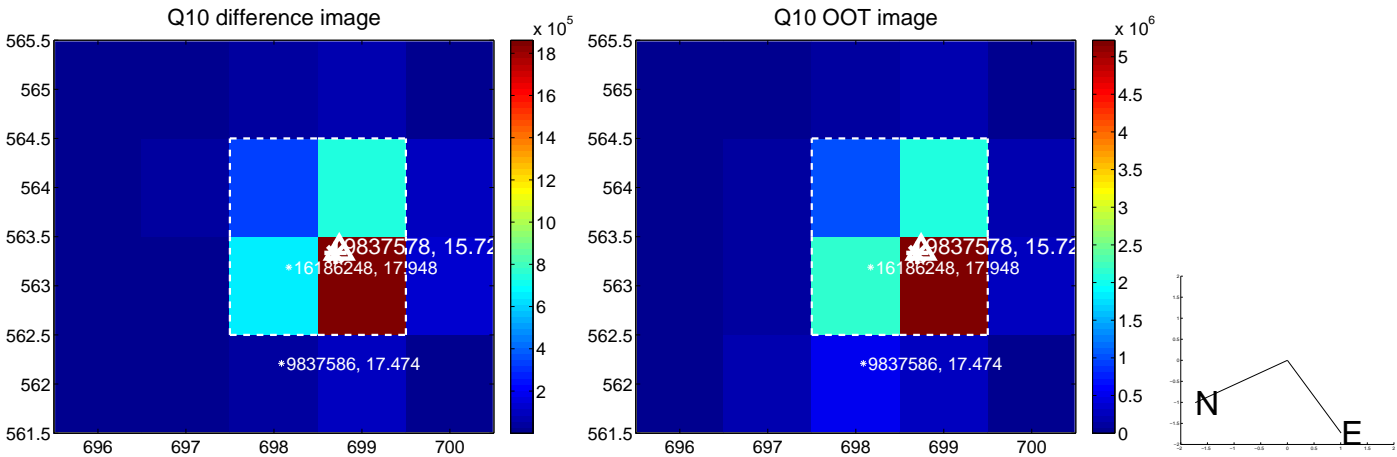
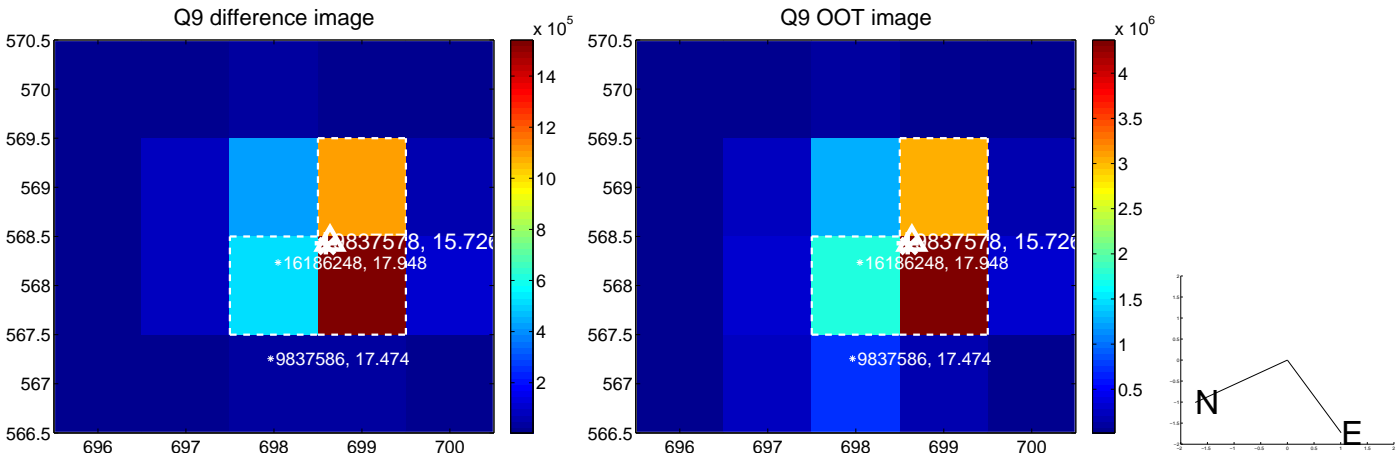
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



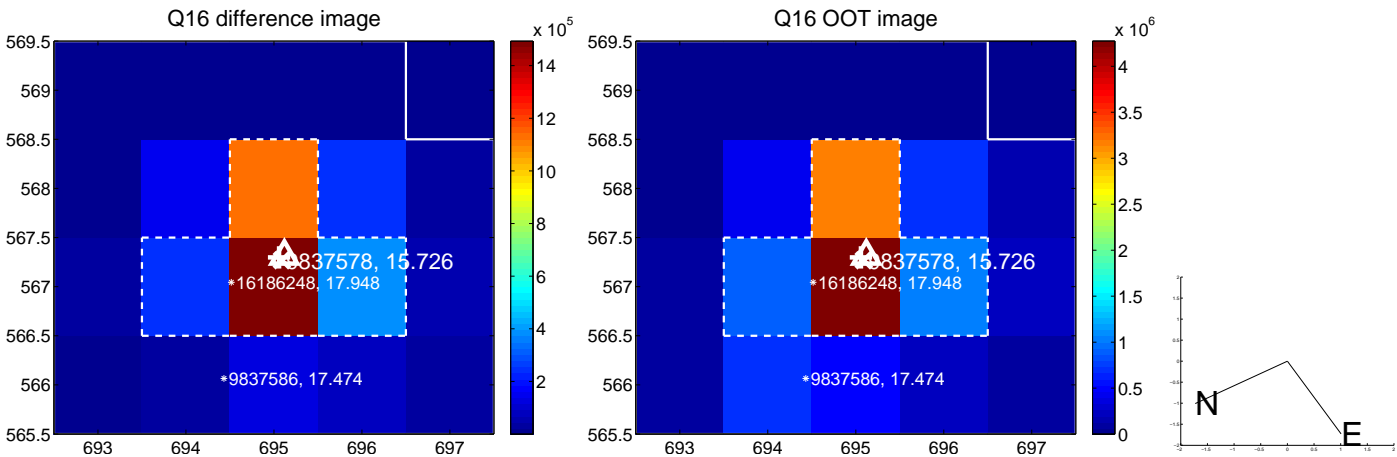
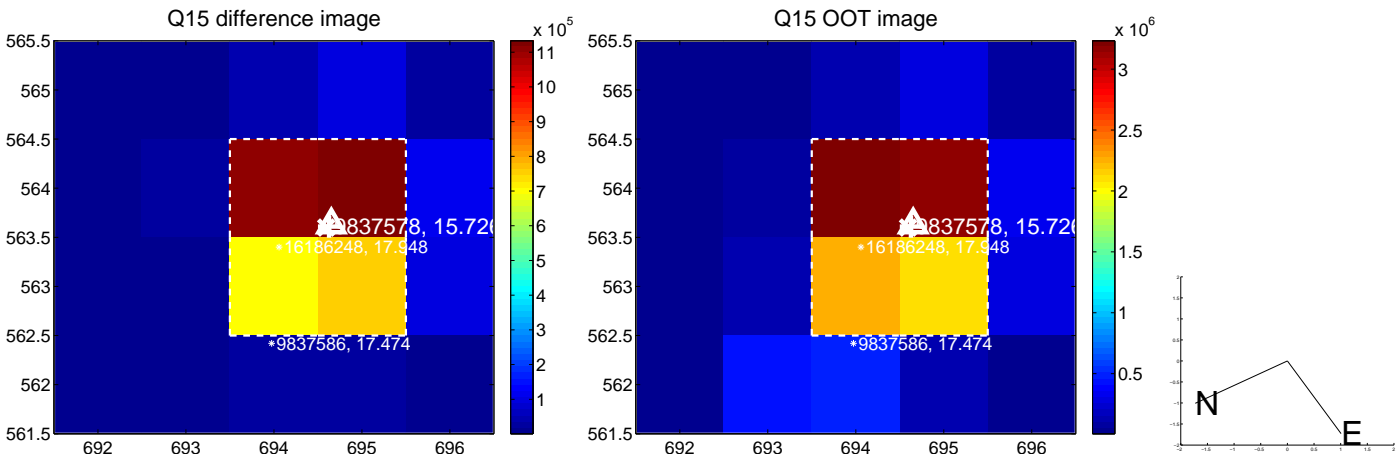
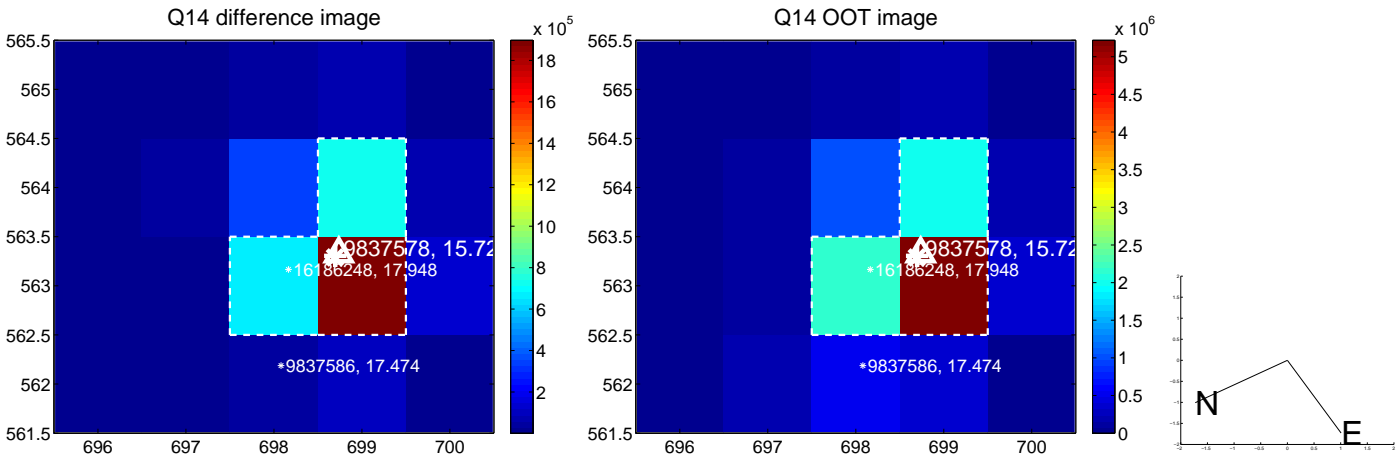
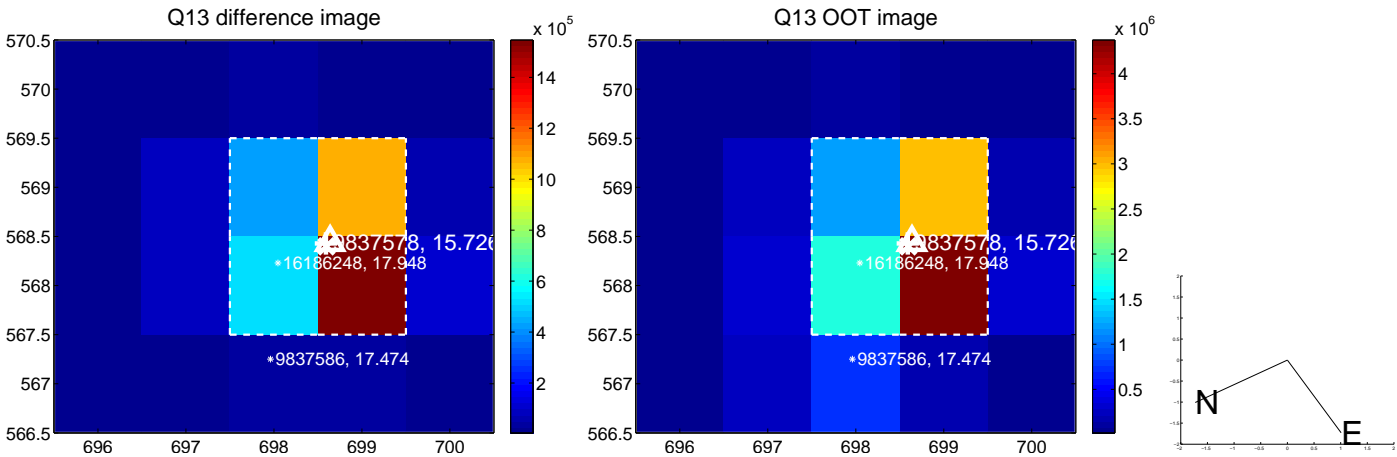
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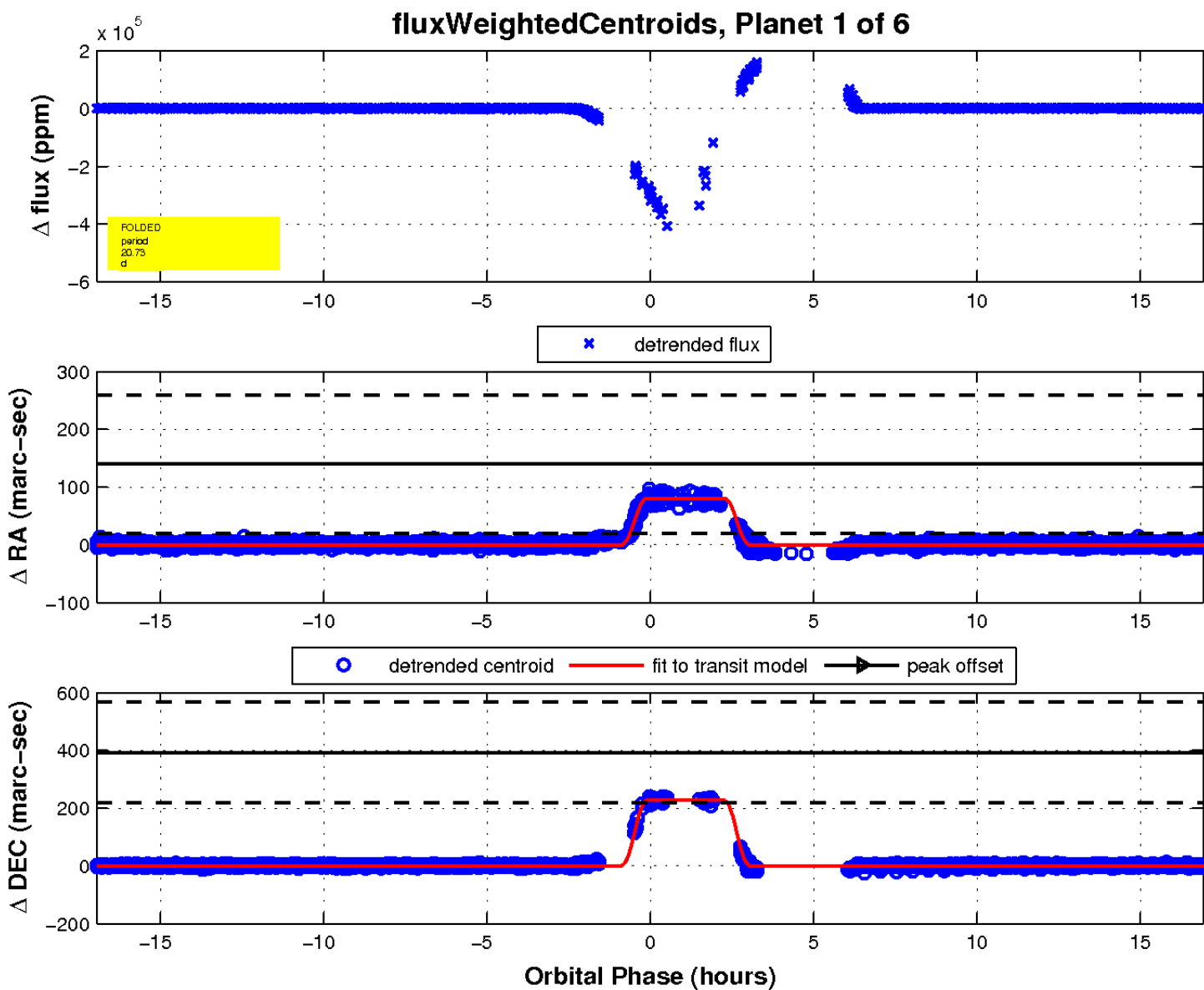
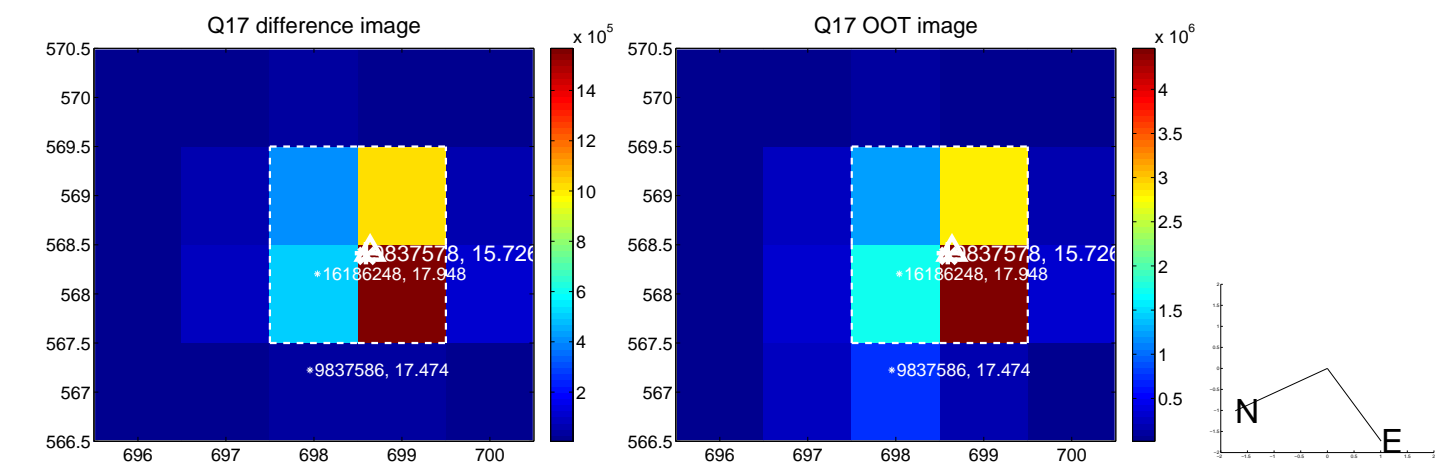
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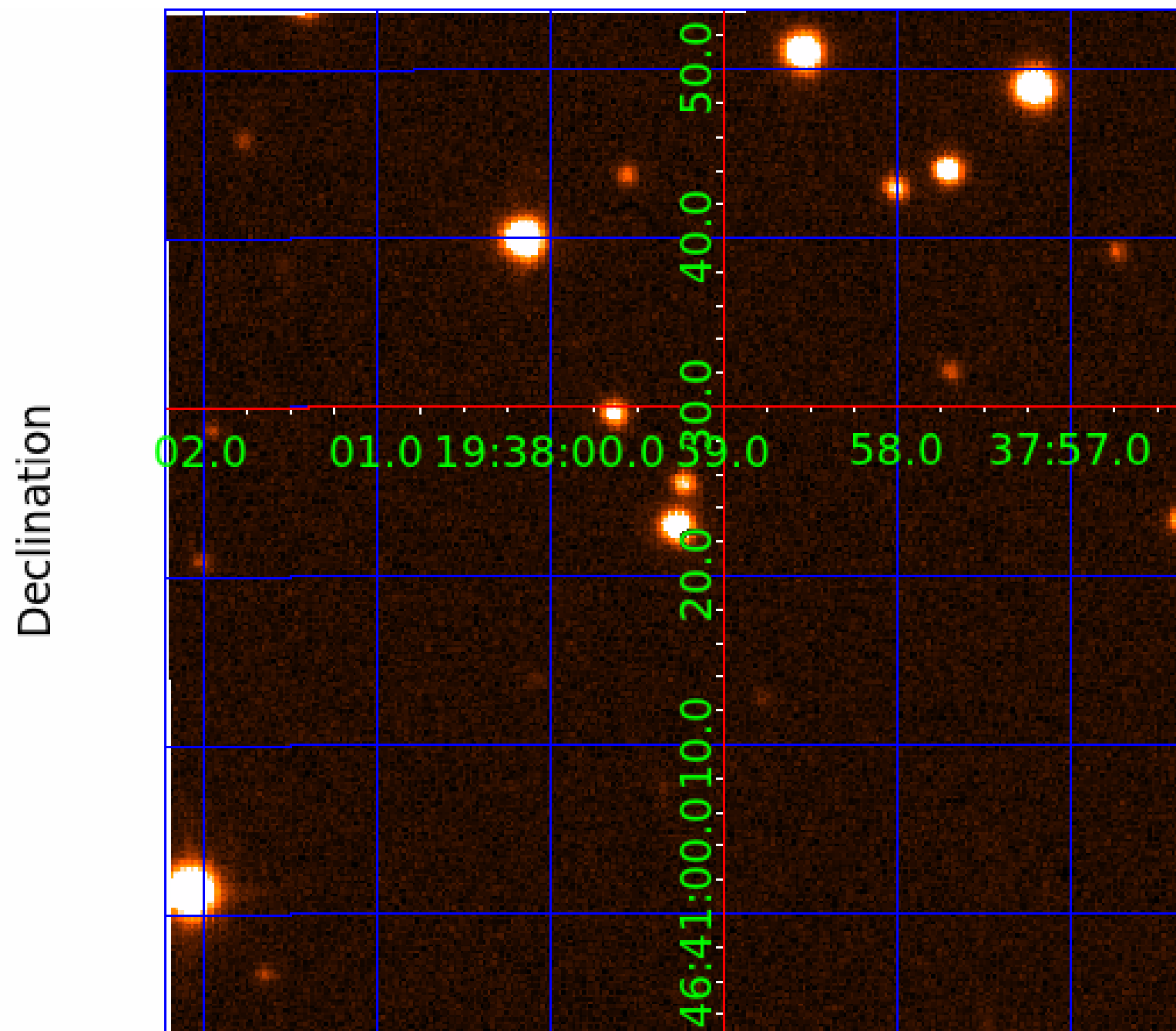
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 009837578

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})
009837578-01	OBS	2937.01	20.733617	132.852798	423839.7	3.500	9272.0	-1.0	0.97	5620	53.14	45.15
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009837578-04	OBS	No	185.413920	188.270963	3734.9	22.498	26.5	23.0	0.97	5620	11.07	2.43
009837578-05	OBS	No	333.649734	244.113348	382.8	10.696	26.5	3.7	0.97	5620	1.95	1.11
009837578-06	OBS	No	117.823087	164.388285	11977.6	2.000	29.9	-1.0	0.97	5620	10.59	4.45

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009837578-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—HAS_SEC_TCE—CENT_NOFITS
009837578-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
009837578-03	OBS	FP	0.00	1	0	0	1	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_FEW_DIFFS—EPHEM_MATCH
009837578-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009837578-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009837578-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—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.

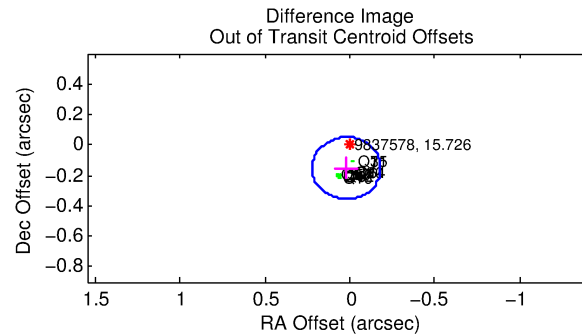
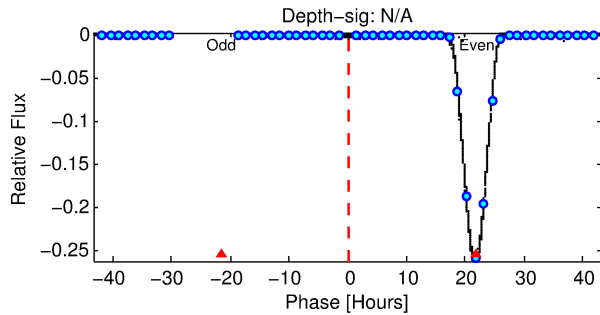
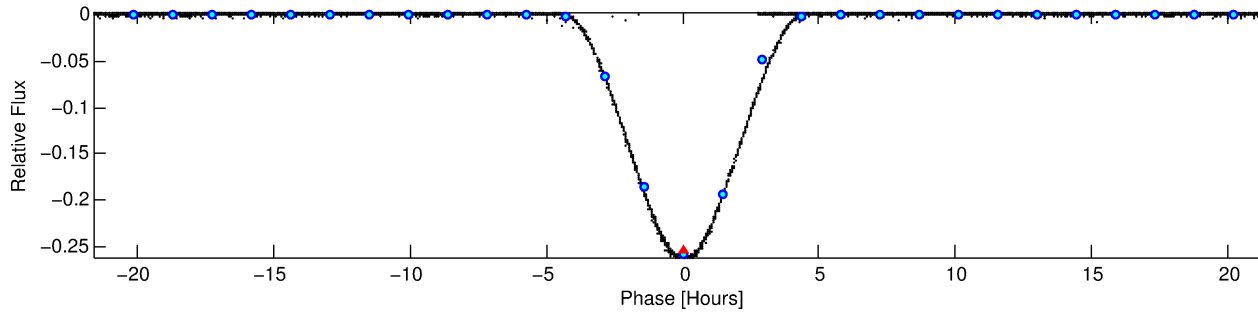
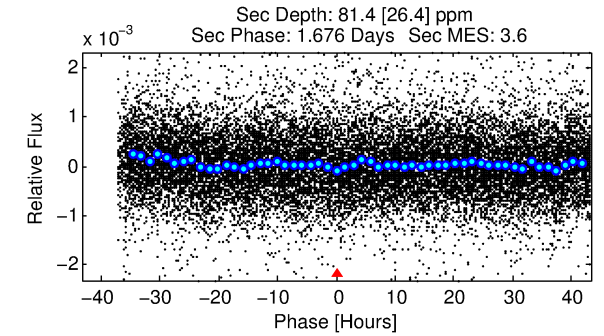
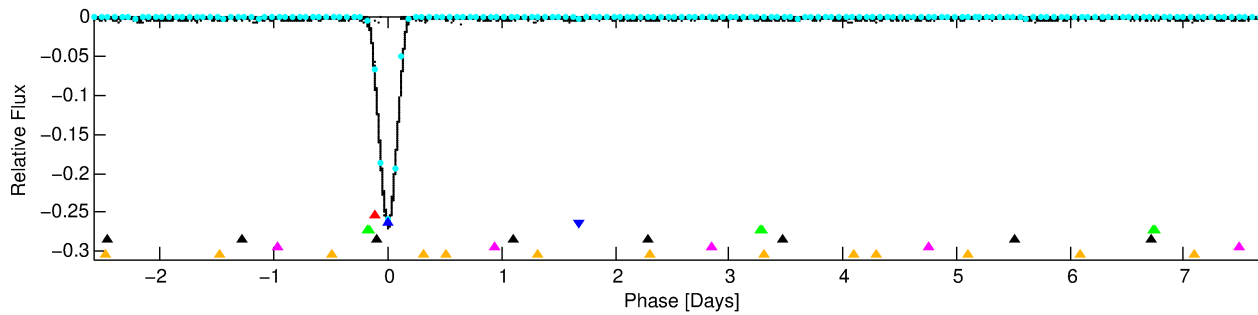
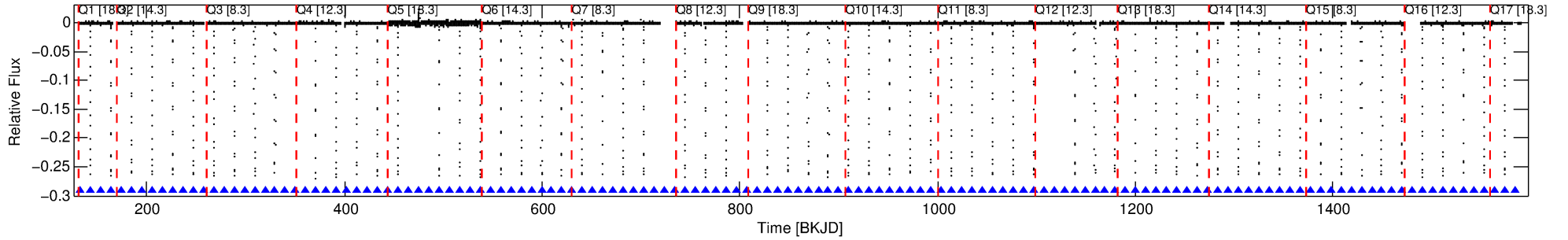
Ephemeris Match Information For 009837578-02

No Significant Match Found

DV One-Page Summary

KIC: 9837578 Candidate: 2 of 6 Period: 10.367 d
KOI: K02937 Corr: No Ephemeris Match

Kp: 15.73 R*: 0.97 Rs Teff: 5620.0 K Logg: 4.36 Fe/H: -0.320



TPS TCE Results:

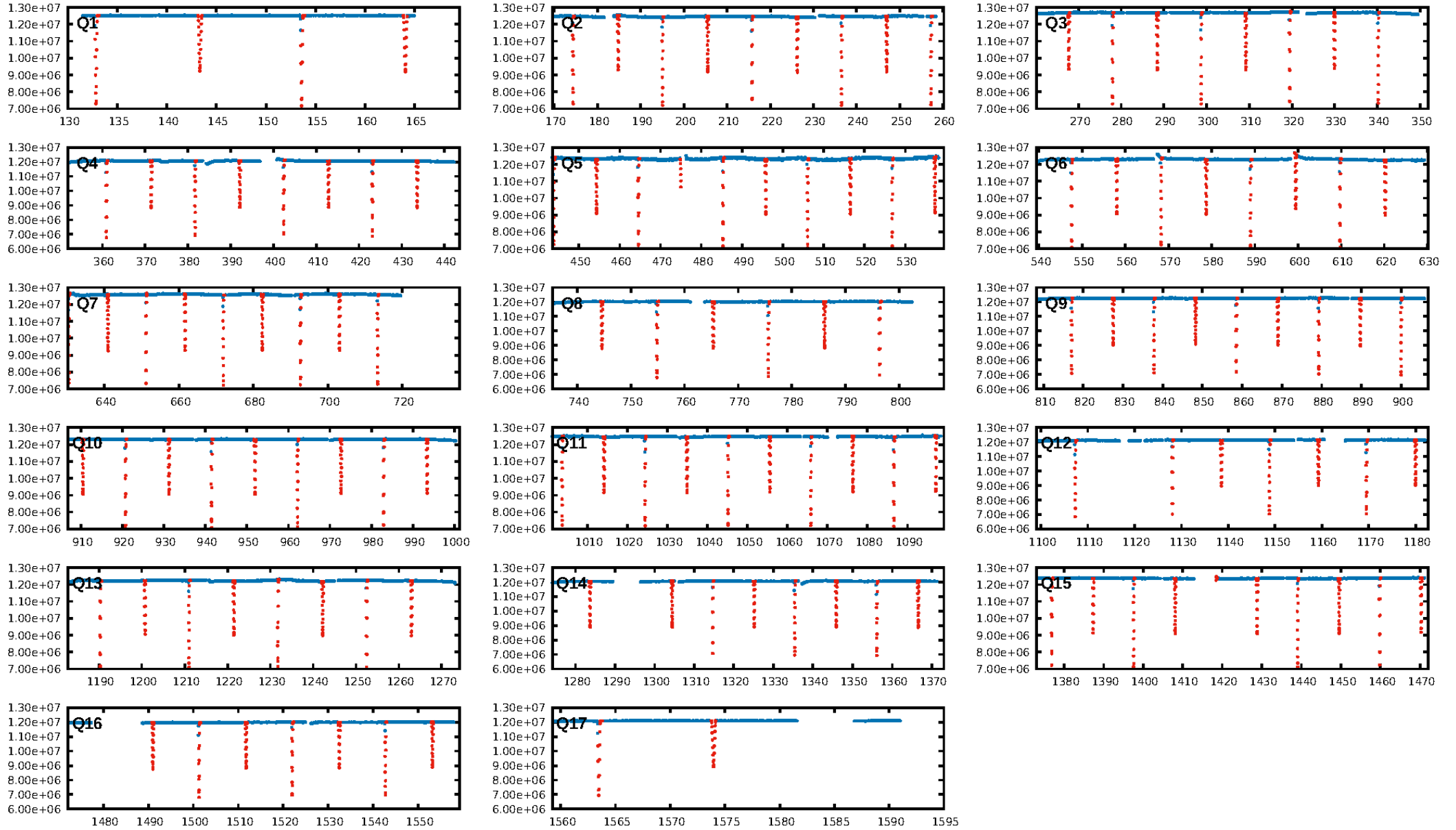
Period = 10.36686 d
Epoch = 132.9584 BKJD

DV fit results are unavailable

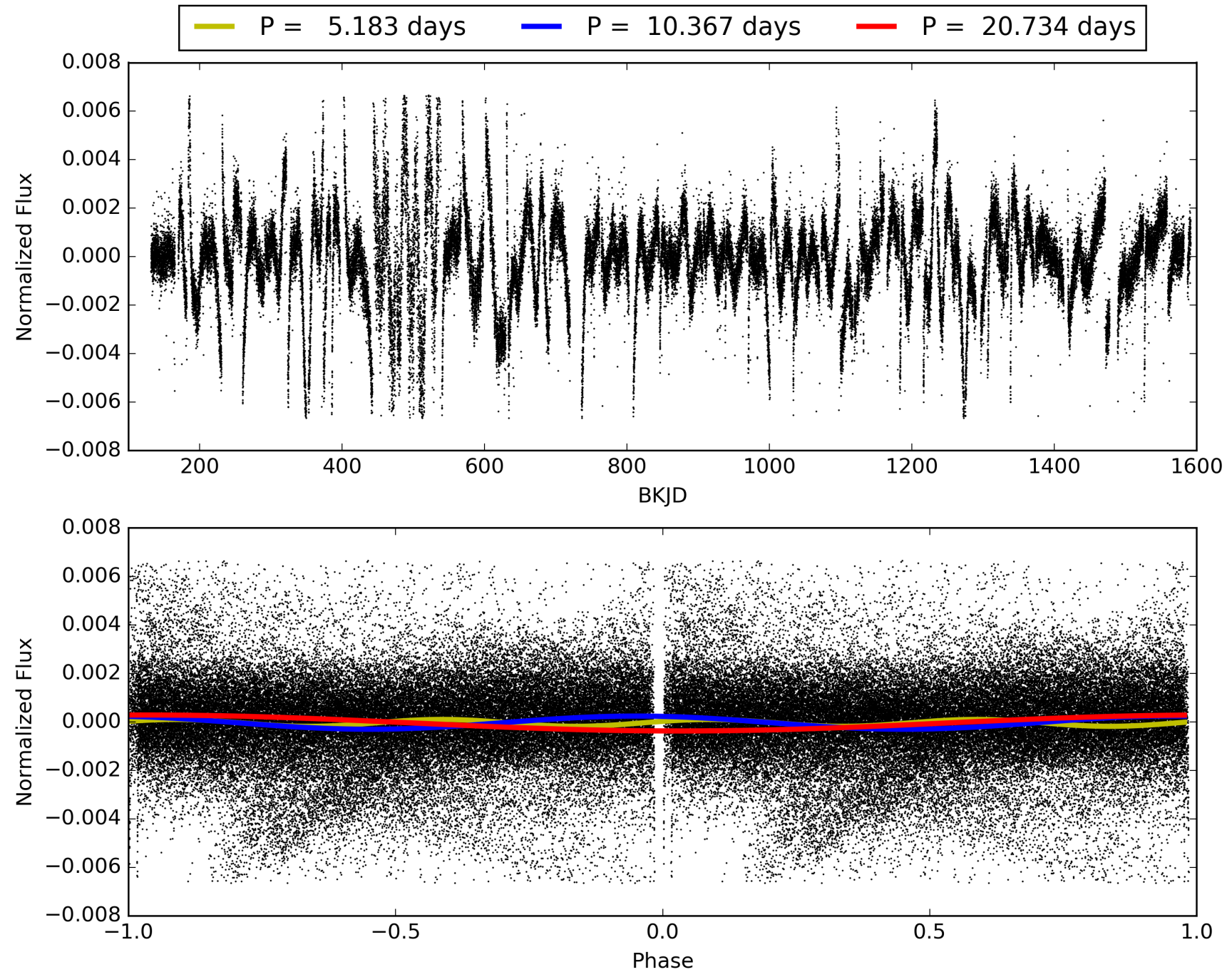
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [6.14 σ]
LongPeriod-sig: 100.0% [40.77 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [125/125]
GhostDiagnostic-chr: 2.866
Centroid-sig: 0.0%
Centroid-so: 0.097 arcsec [90.66 σ]
OotOffset-rm: 0.154 arcsec [2.27 σ]
KicOffset-rm: 0.220 arcsec [3.29 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 009837578-02, PDC Light Curves

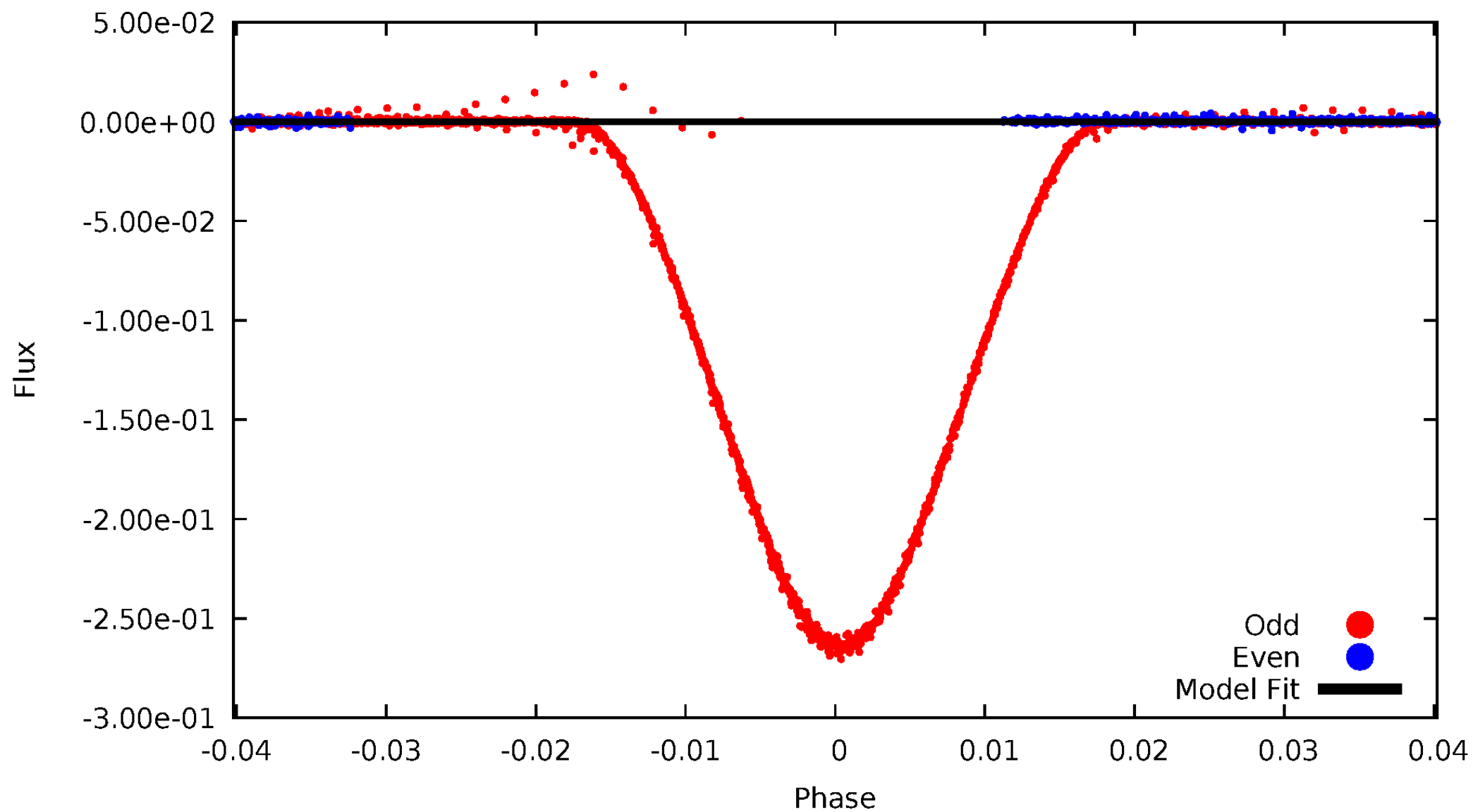


TCE 009837578-02



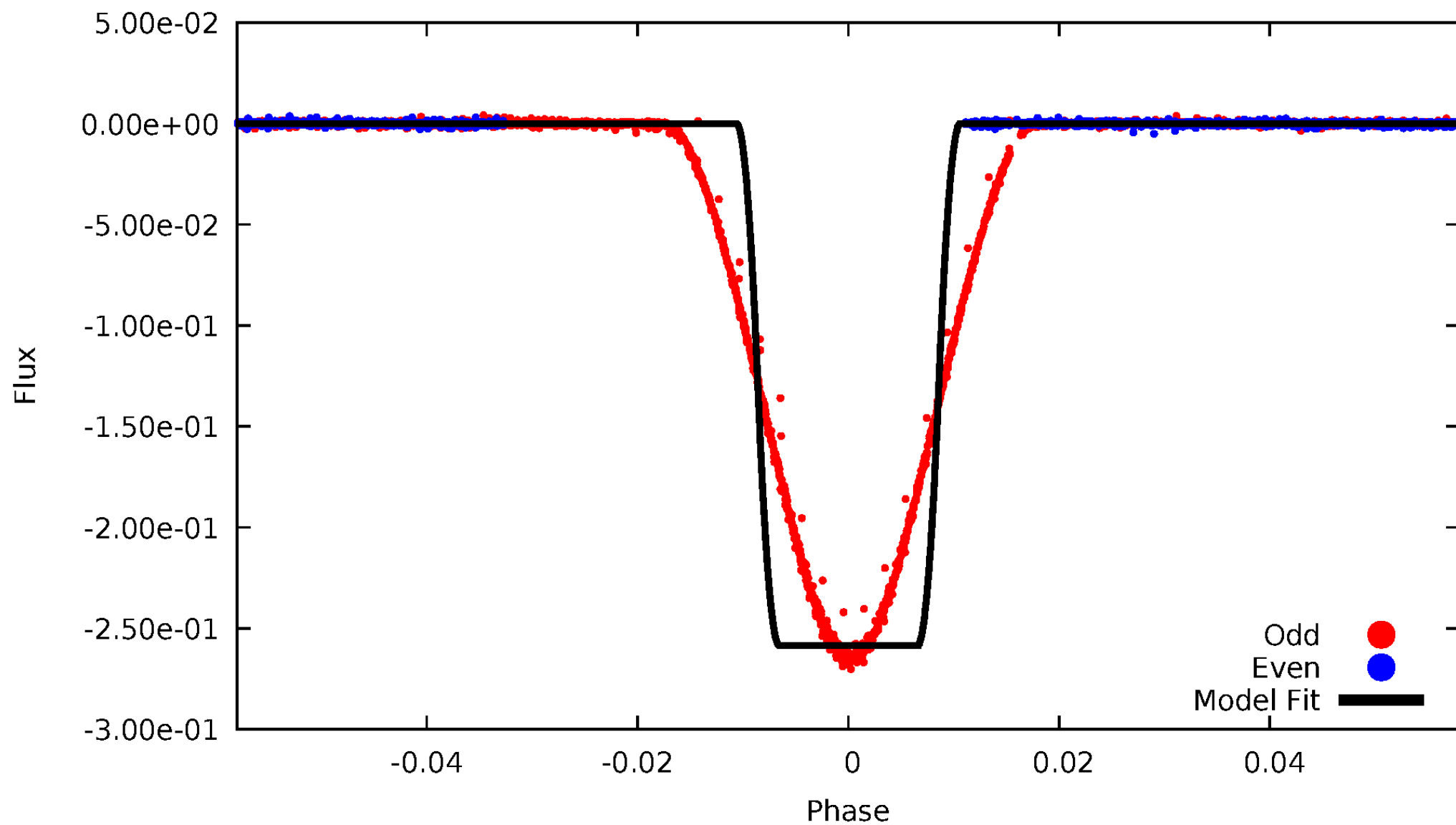
DV Odd/Even

TCE 009837578-02



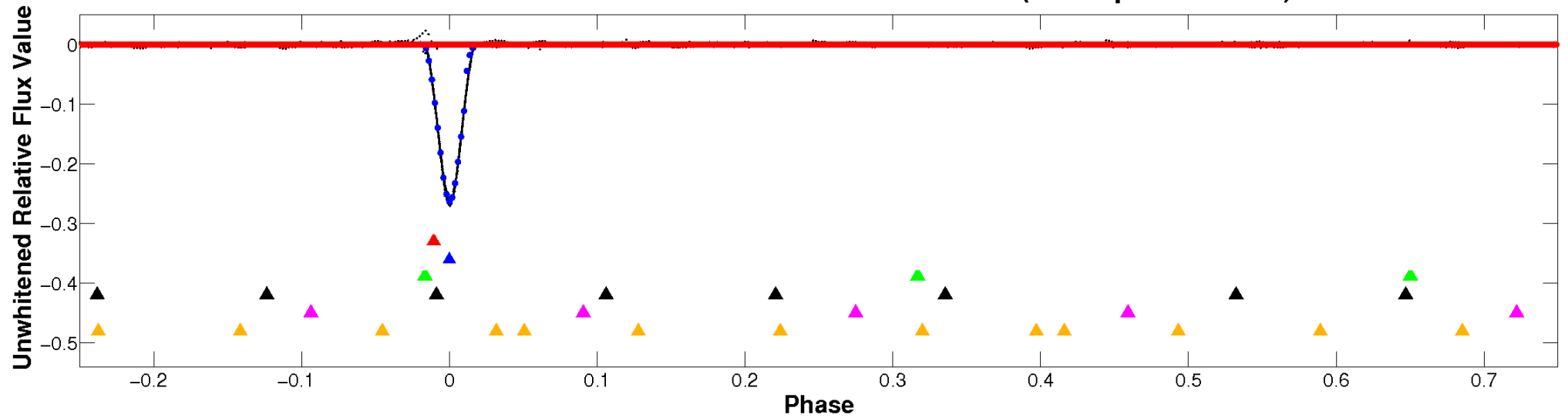
ALT Odd/Even

TCE 009837578-02

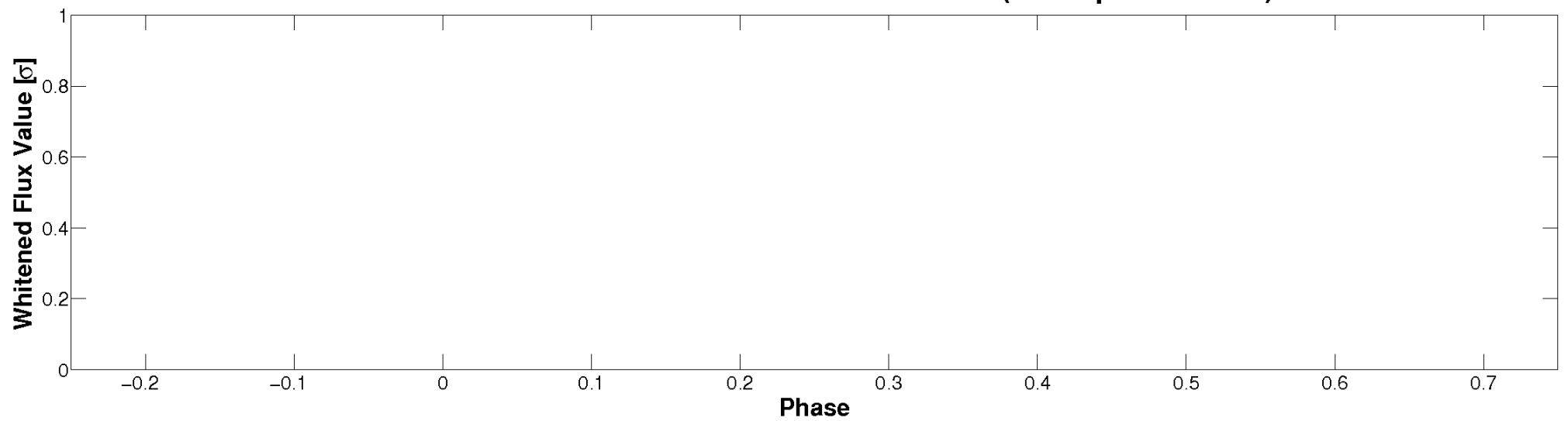


Non-Whitened Vs. Whitened Light Curve

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

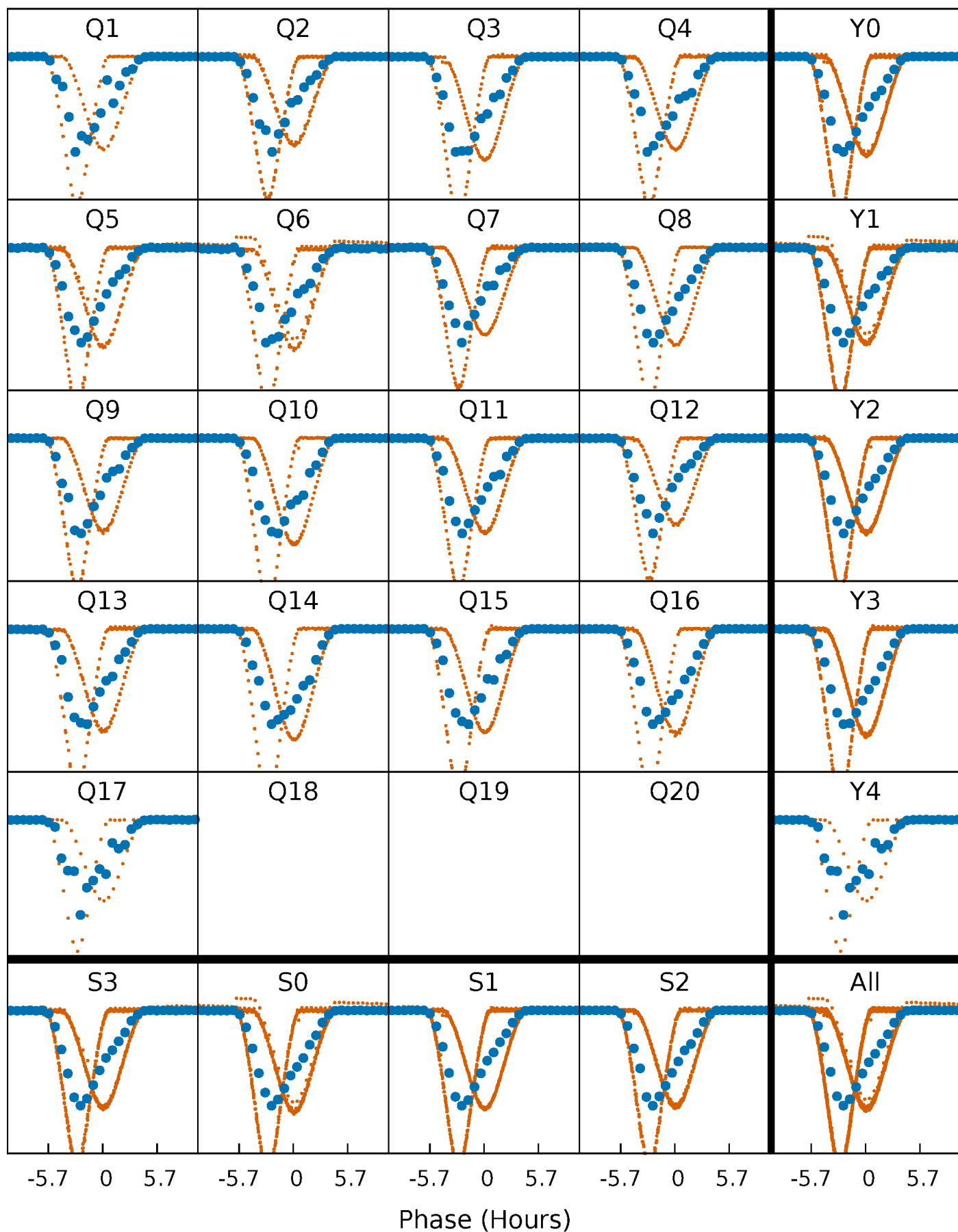


Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)



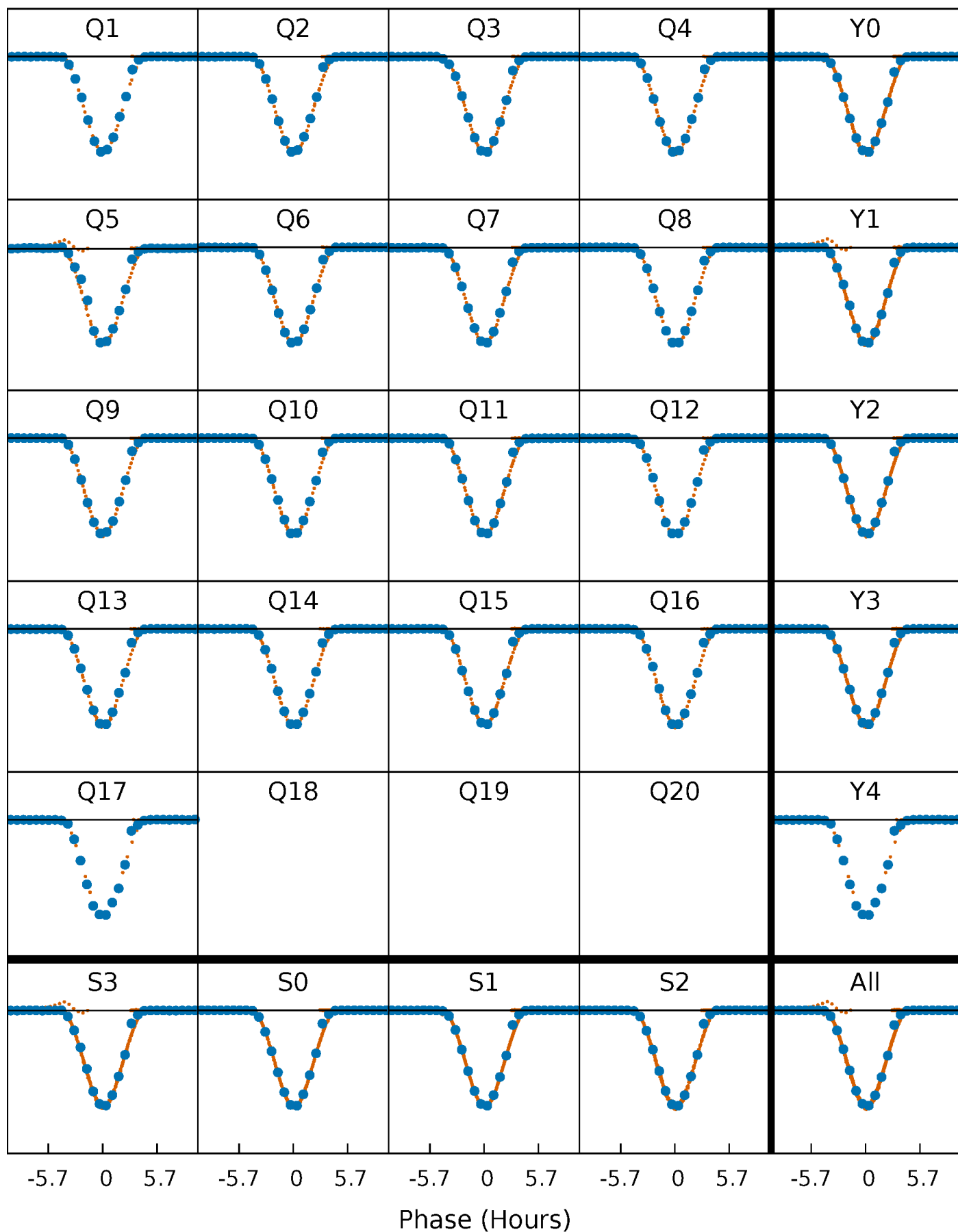
PDC Quarter-Phased Transit Curves

TCE 009837578-02 P= 10.366862 Days $T_0=132.958371$ (BKJD)



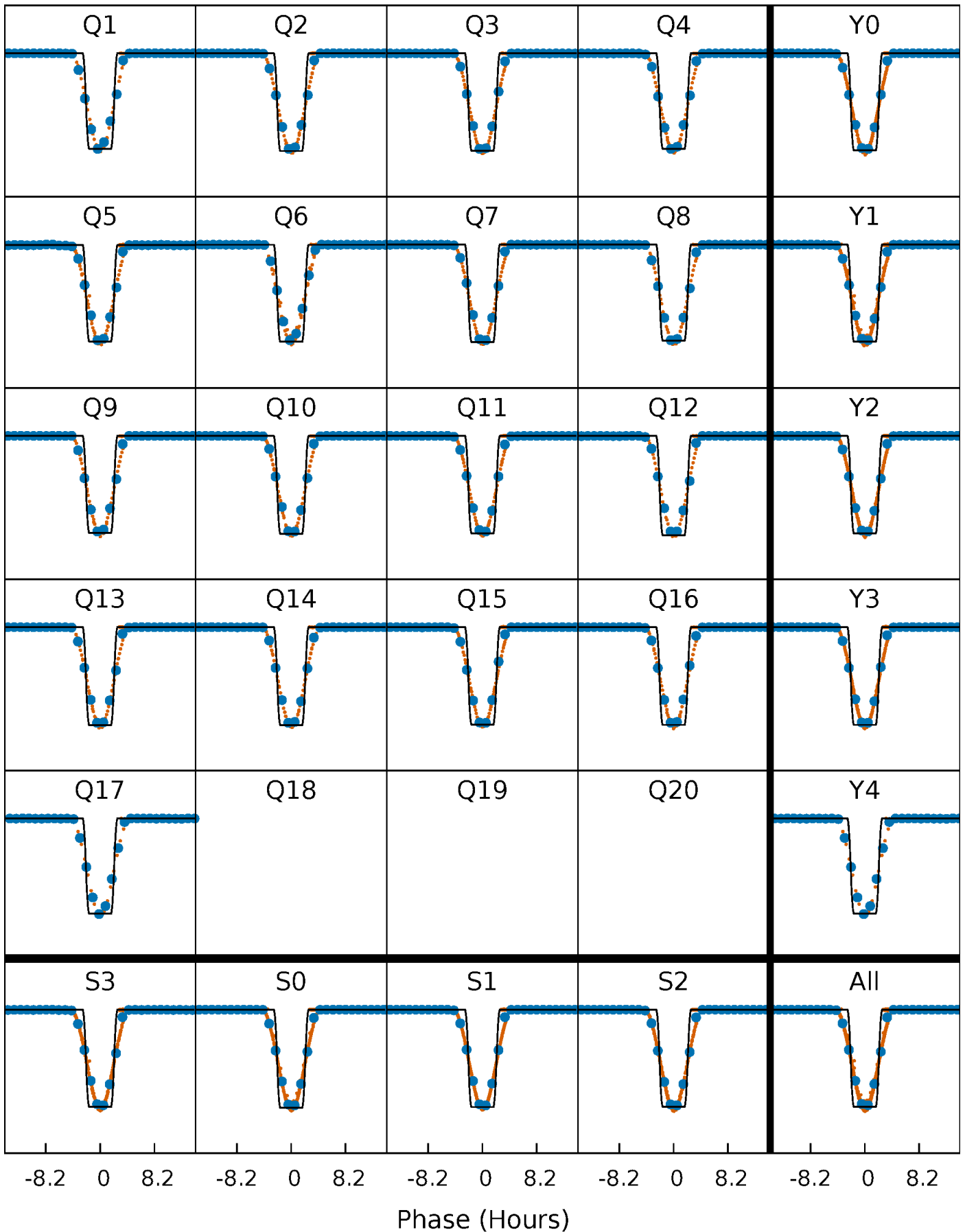
DV Quarter-Phased Transit Curves

TCE 009837578-02 P= 10.366862 Days $T_0=132.958371$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

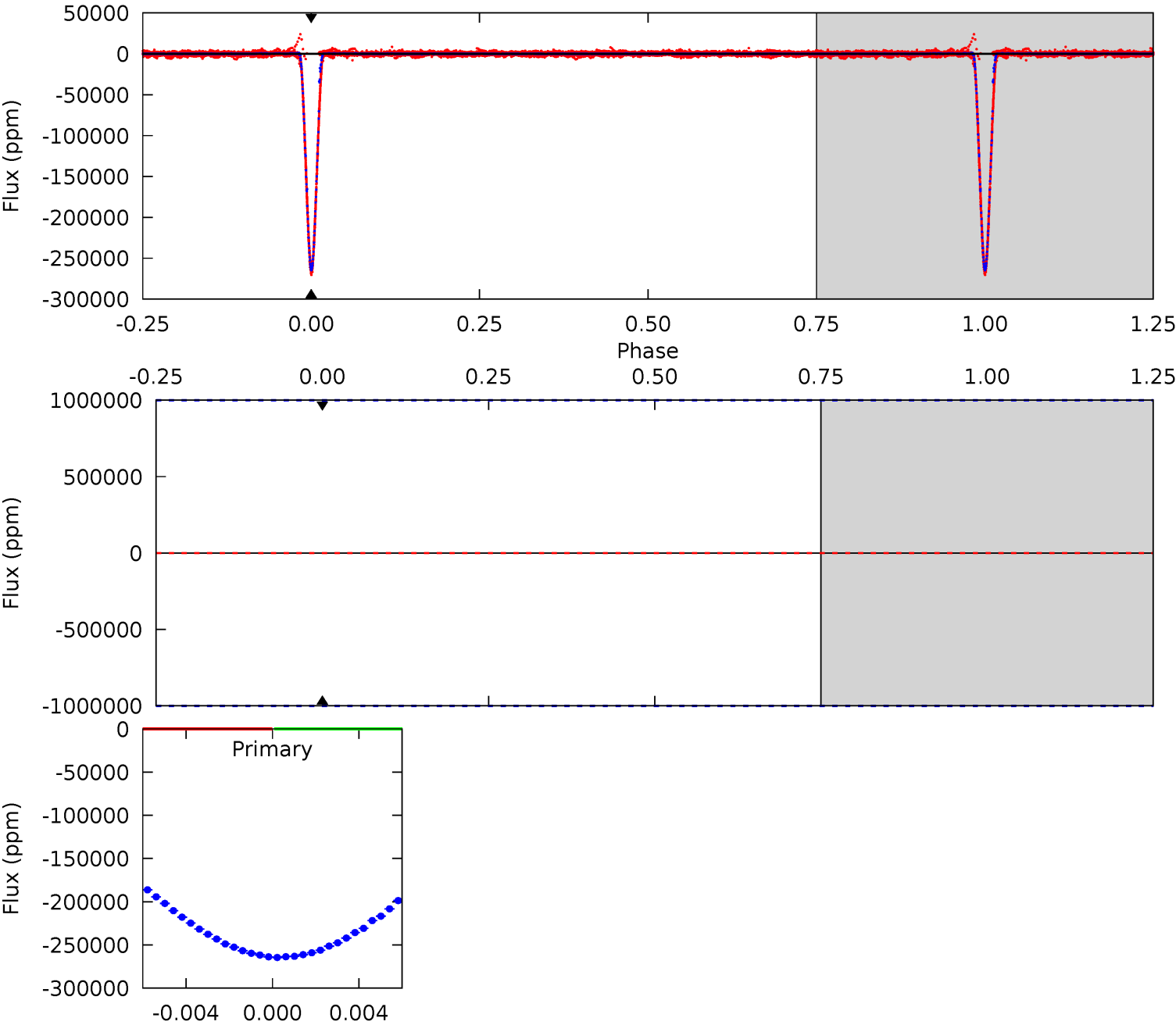
TCE 009837578-02 $P = 10.366862$ Days $T_0 = 132.959987$ (BKJD)



DV Model-Shift Uniqueness Test

009837578-02, P = 10.366862 Days, E = 122.591509 Days

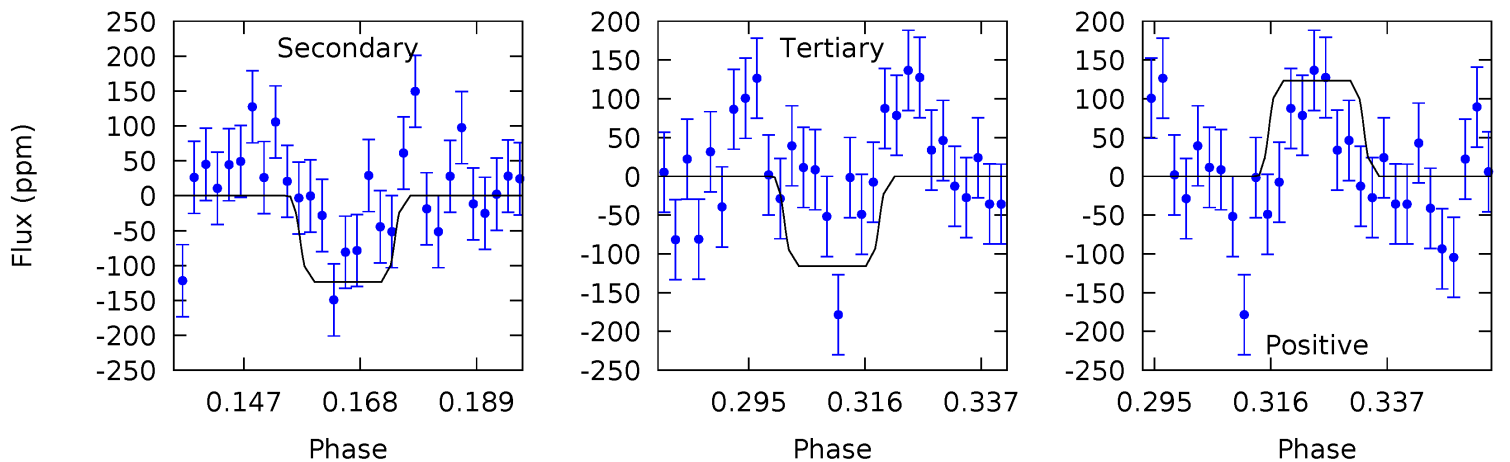
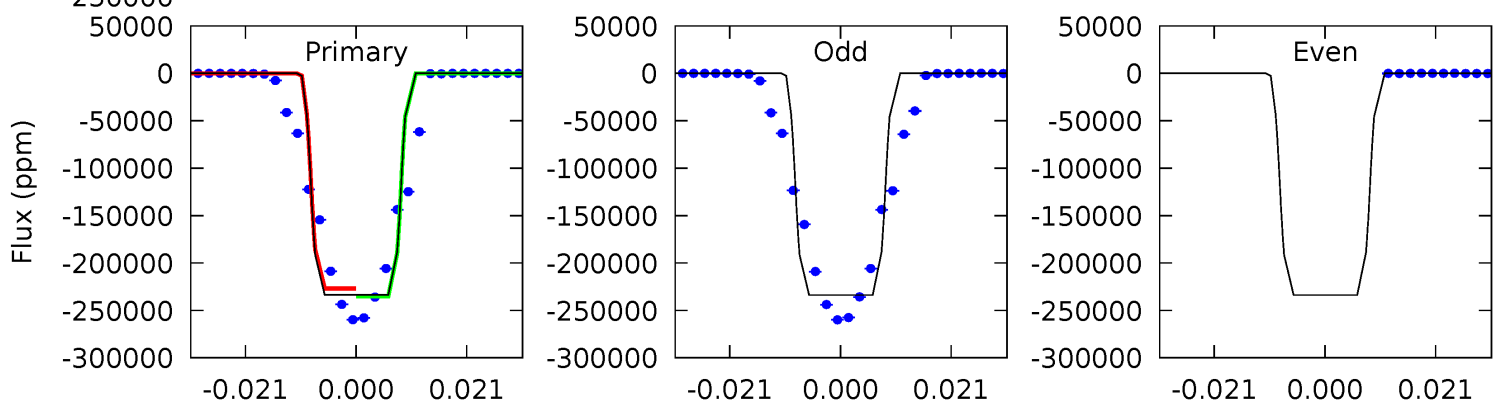
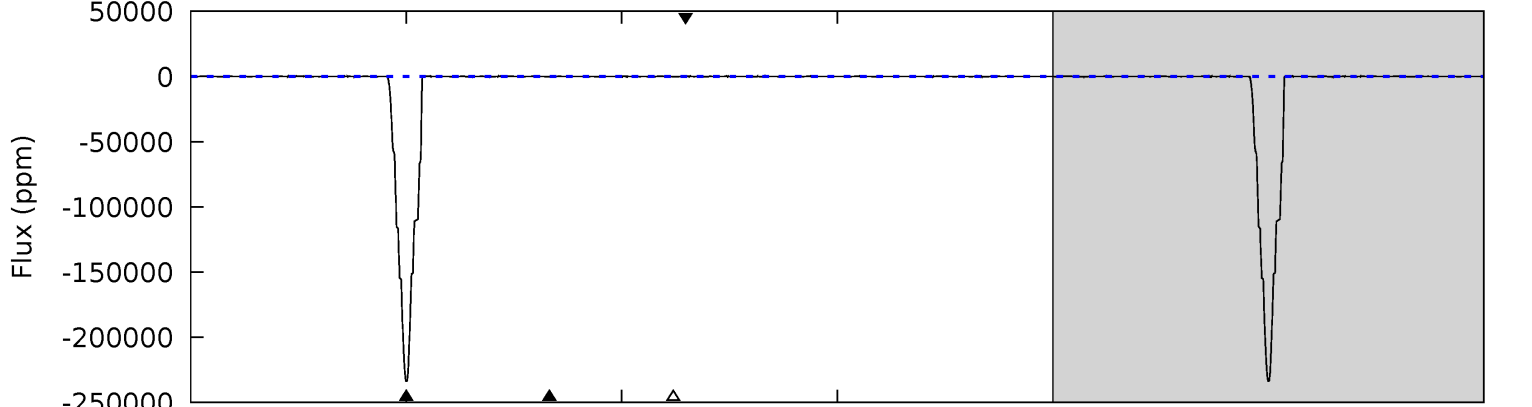
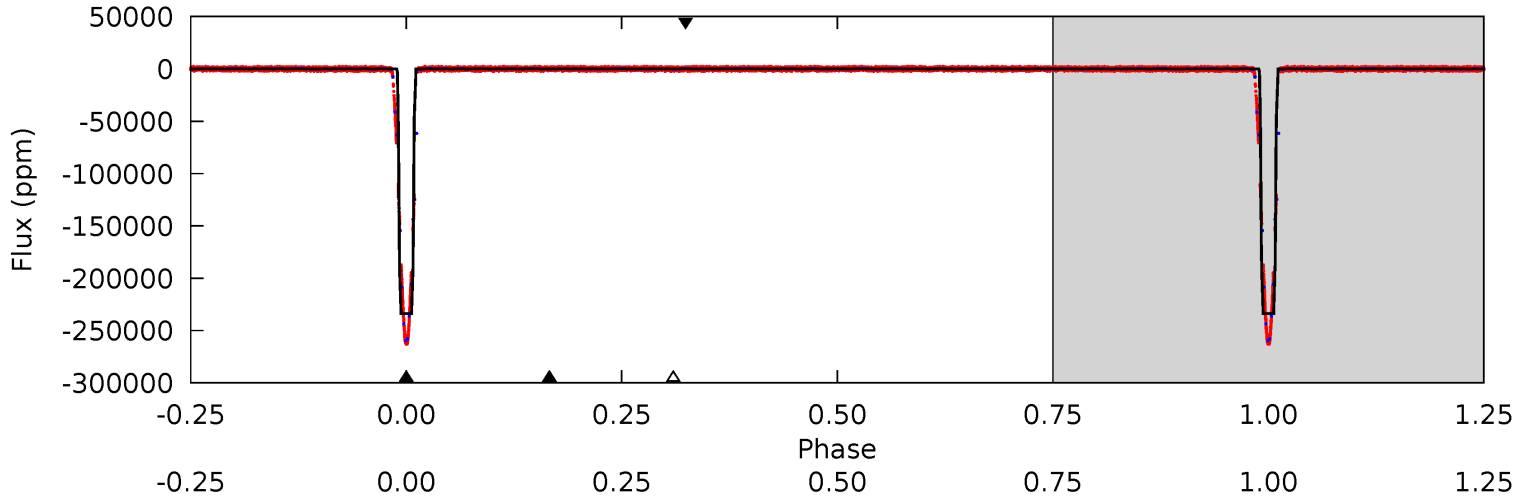
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

009837578-02, P = 10.366862 Days, E = 122.593125 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7486	3.95	3.71	3.95	4.88	2.31	1.60	7482	7482	0.24	0.00	0	0.99	0.00	0



Stellar Parameters For KIC 009837578

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5620^{+118}_{-75}	$4.363^{+0.065}_{-0.040}$	$-0.320^{+0.150}_{-0.100}$	$0.974^{+0.067}_{-0.067}$	$0.797^{+0.067}_{-0.024}$	$1.217^{+0.300}_{-0.166}$
	+2%/-1%	+1%/-1%	+47%/-31%	+7%/-7%	+8%/-3%	+25%/-14%
Source	SPE36	TRA36	SPE36	DSEP		

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

Secondary Eclipse Parameters for KIC 009837578-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	0 ± 1000000	$46.71^{+11.68}_{-10.90}$	1160^{+31}_{-29}	-2902^{+7981}_{-1942}	$-7.307^{+234.584}_{-177.604}$
Alt.	-123 ± 31	$54.58^{+11.06}_{-11.51}$	1162^{+29}_{-27}	-1803^{+353}_{-80}	$0.171^{+0.119}_{-0.065}$

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 $A_{obs} \gg 1.0$

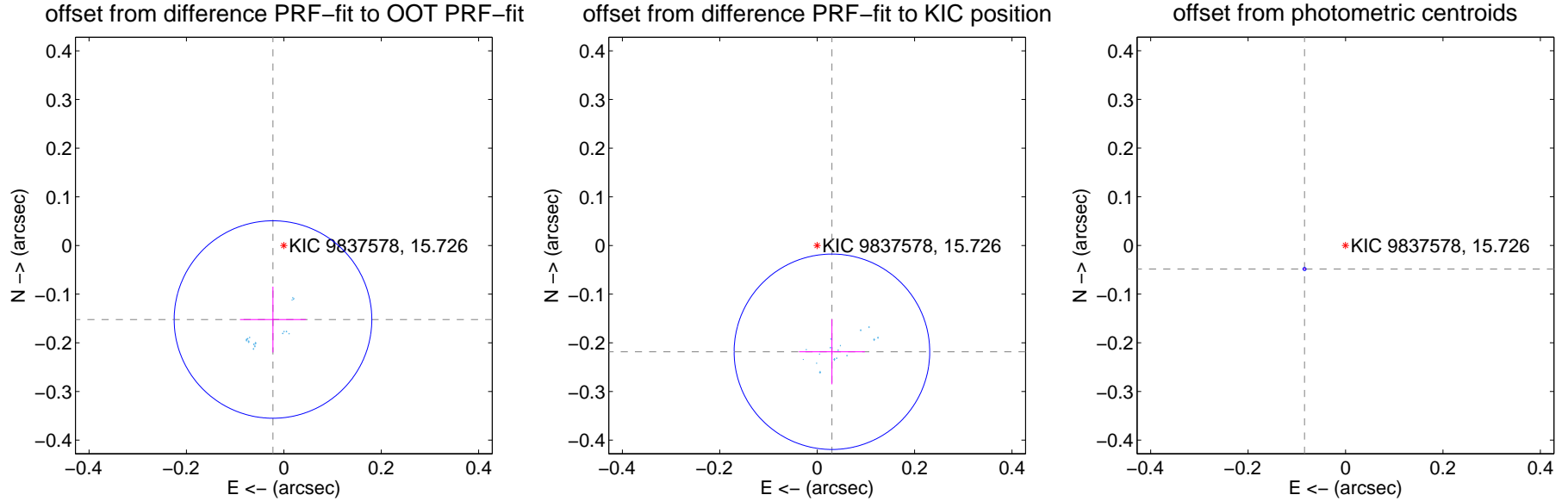
DV Centroid Data

Supplemental centroid analysis for 009837578-02. Kepler magnitude: 15.73. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

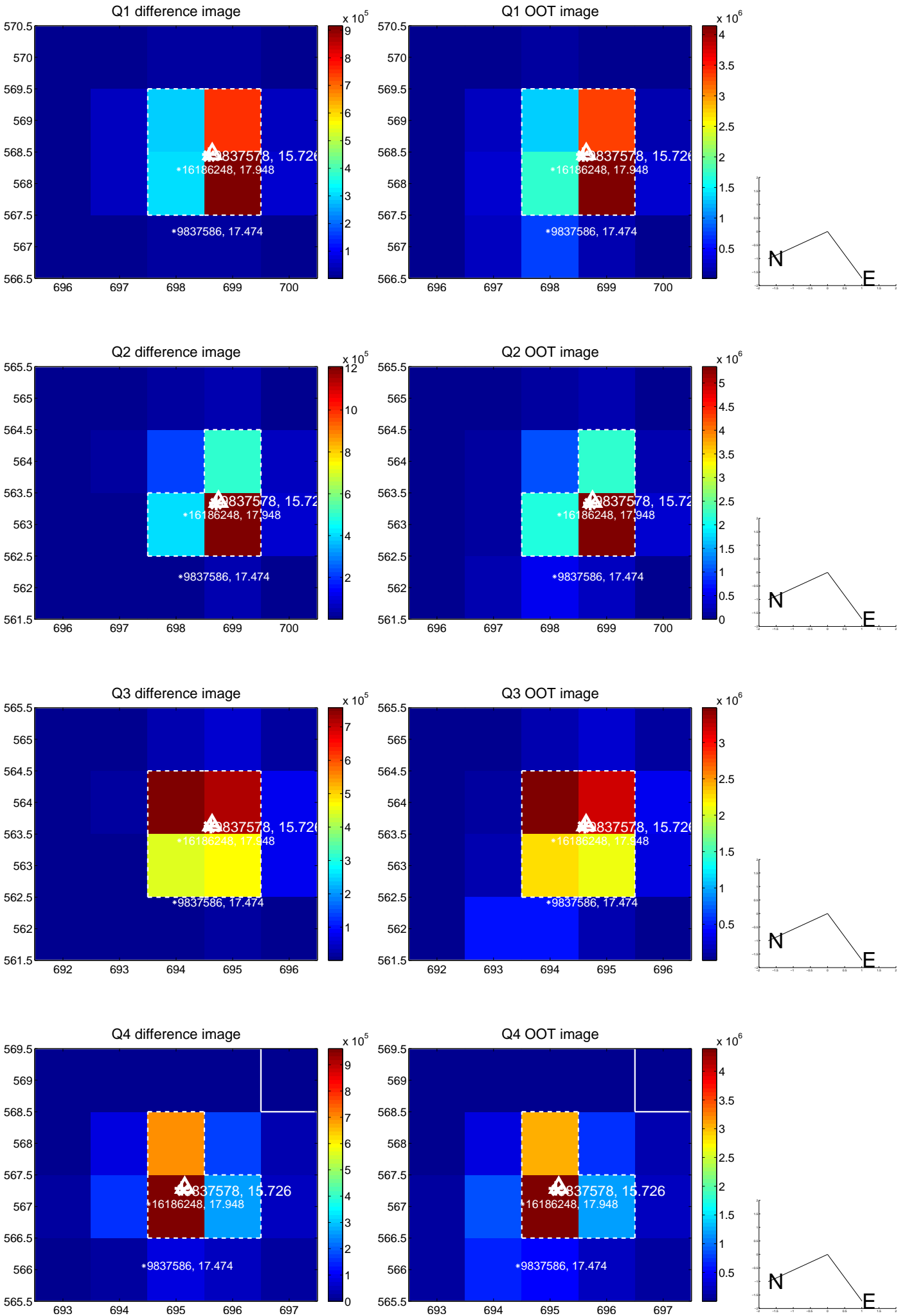
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.154 ± 0.068	2.27	0.022 ± 0.068	-0.152 ± 0.068
PRF-fit source offset from KIC position	0.220 ± 0.067	3.29	-0.030 ± 0.068	-0.218 ± 0.067
photometric centroid source offset	0.10 ± 0.00	90.66	0.08 ± 0.00	-0.05 ± 0.00

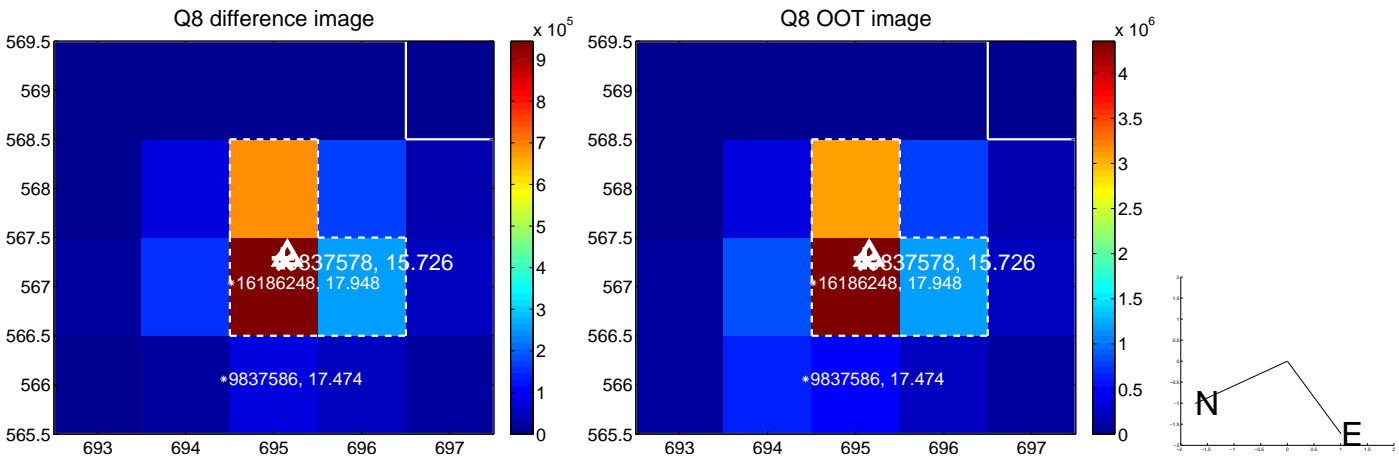
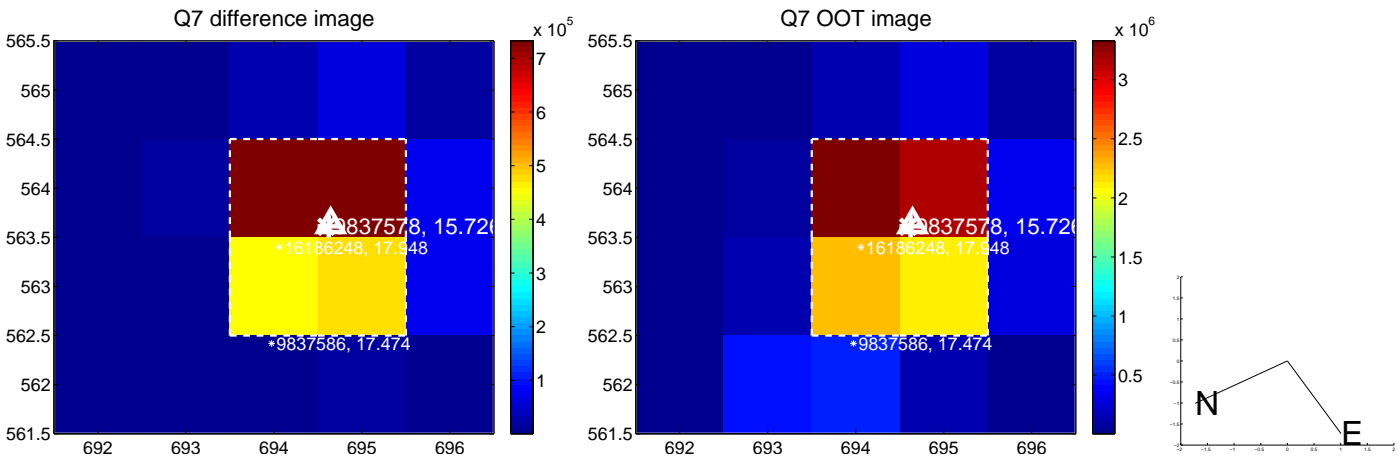
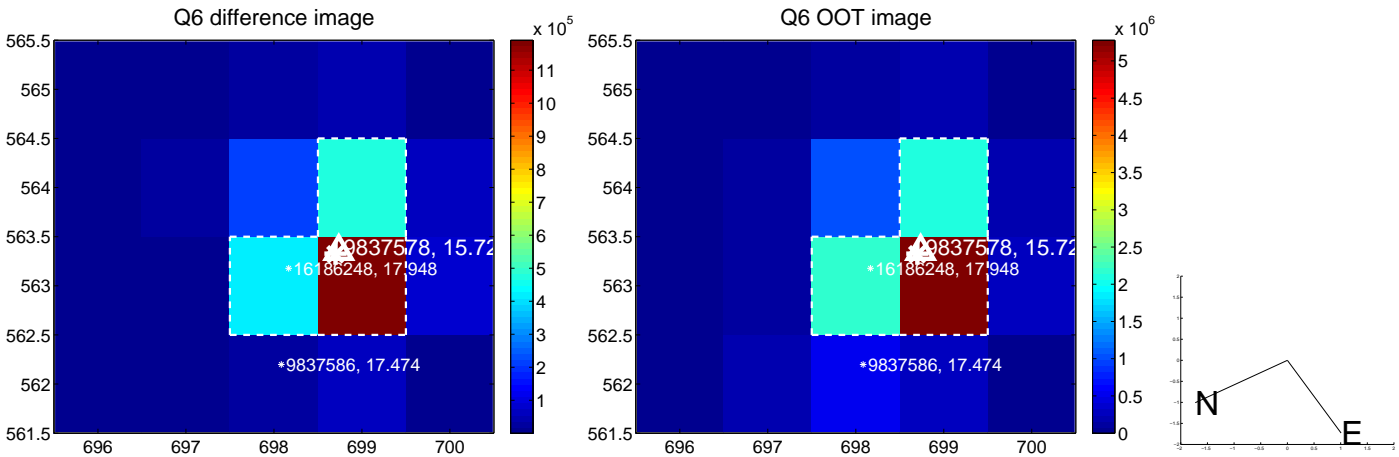
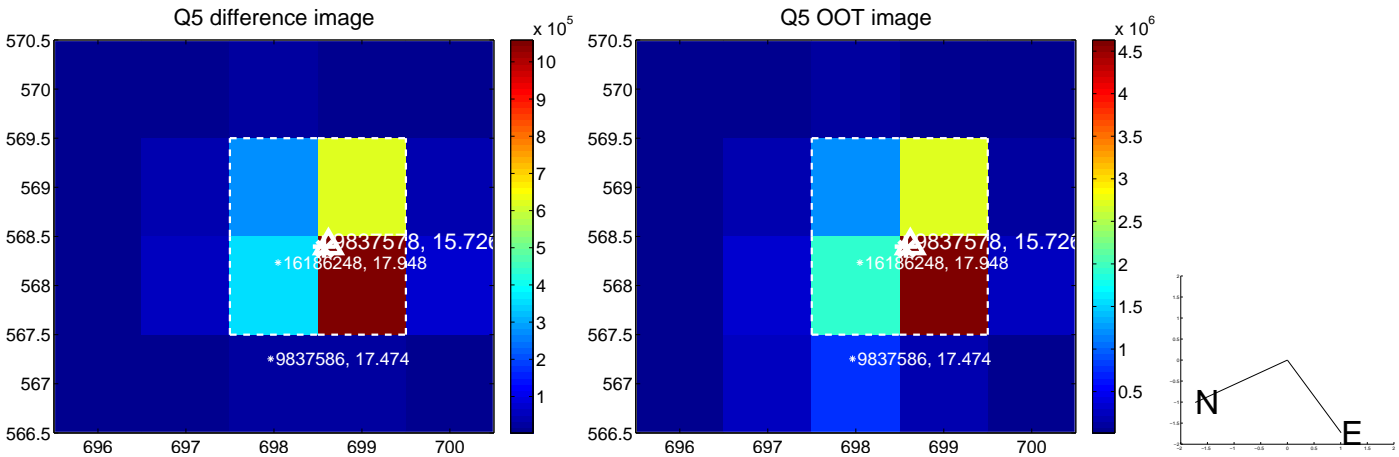


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

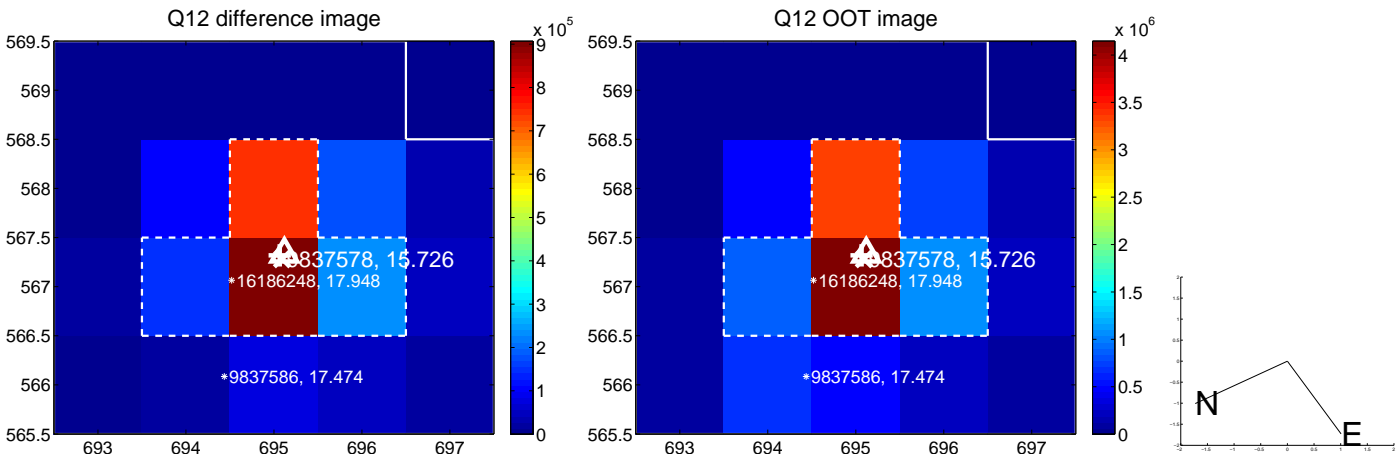
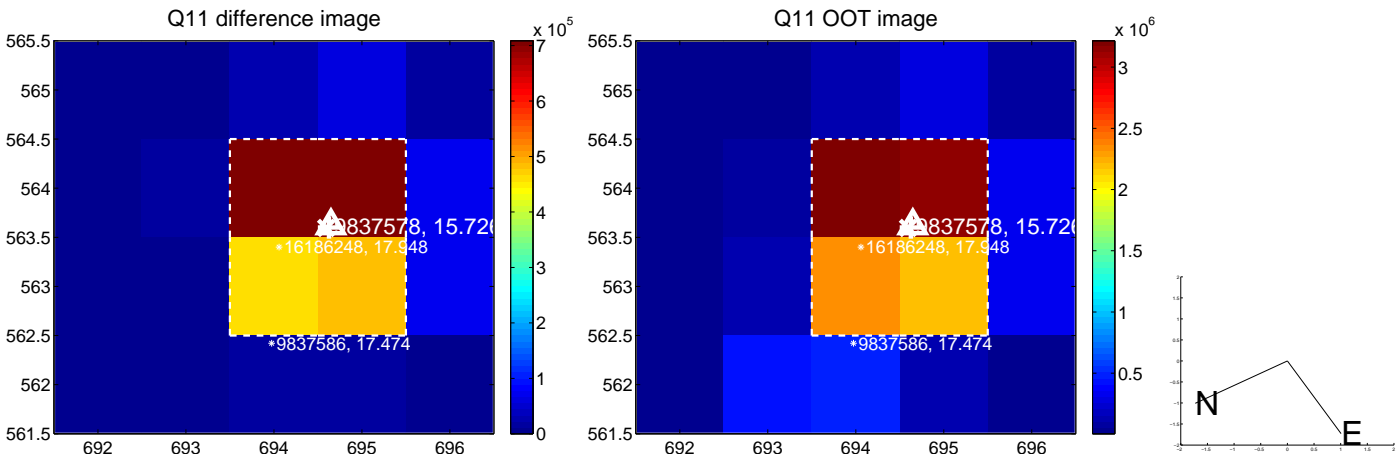
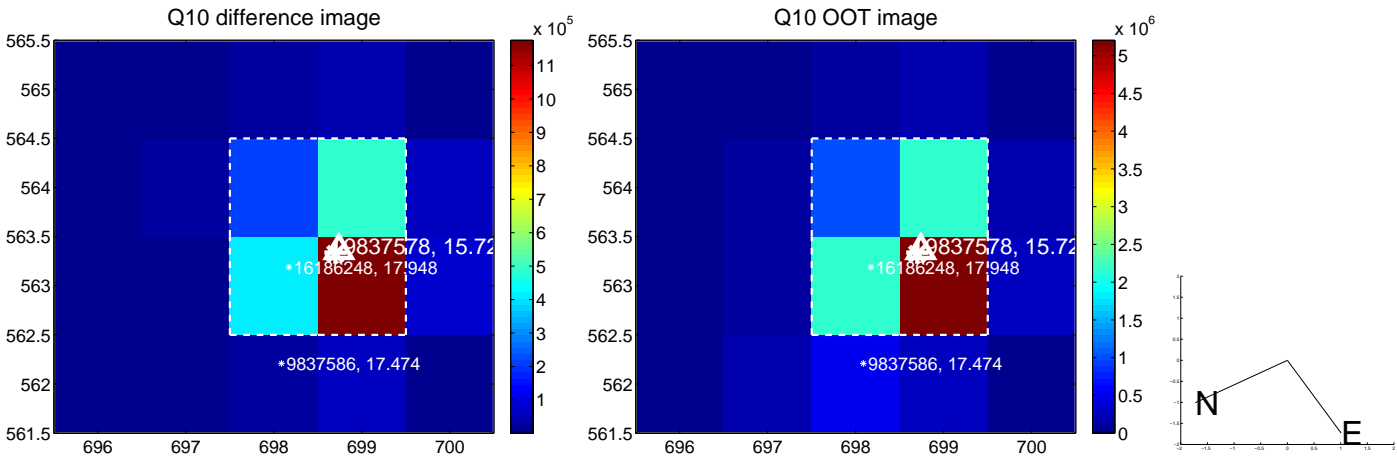
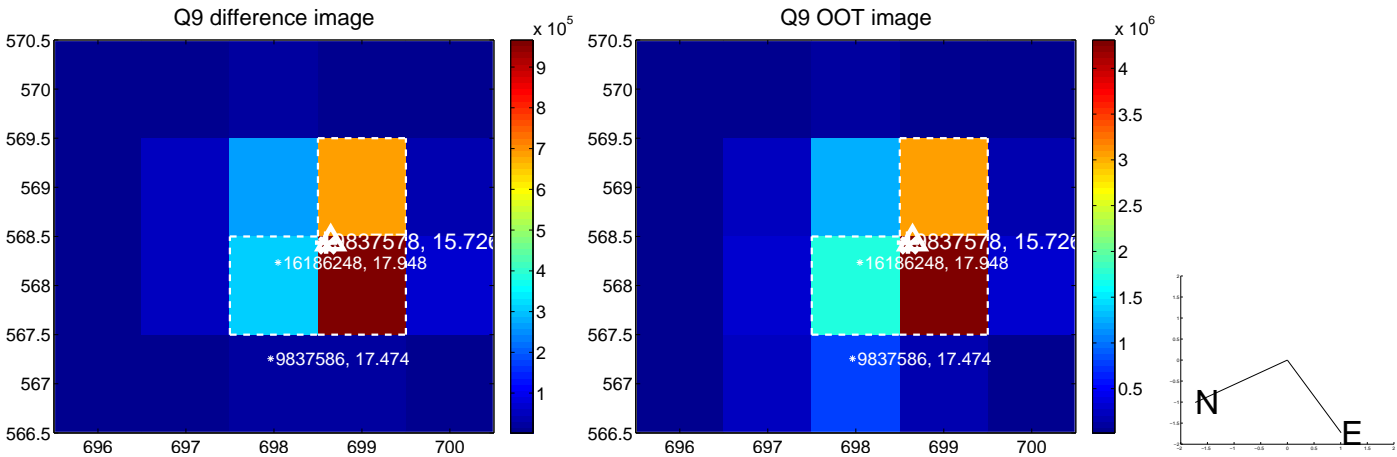
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



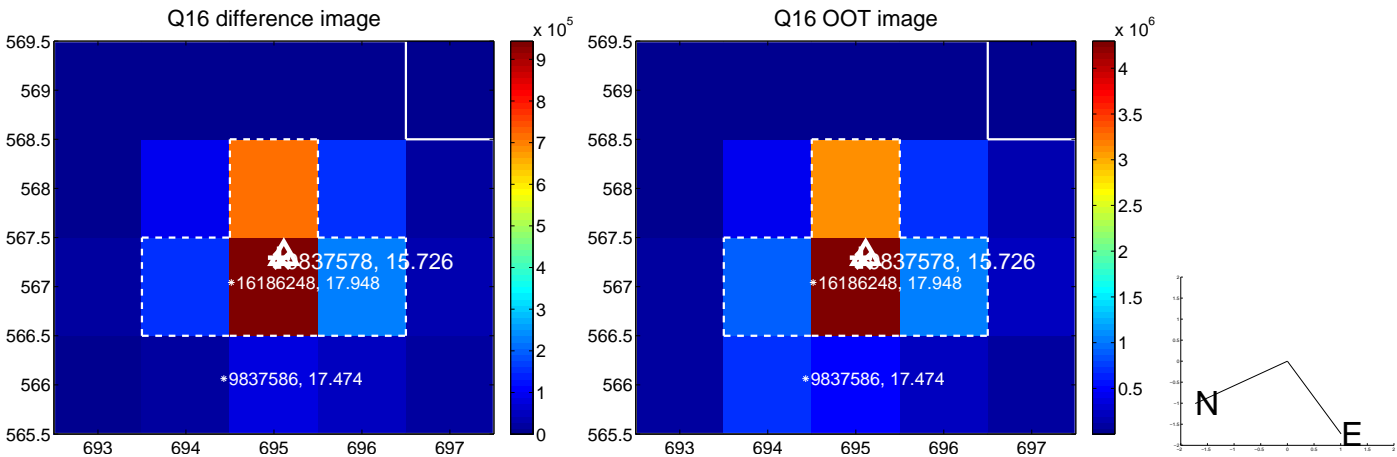
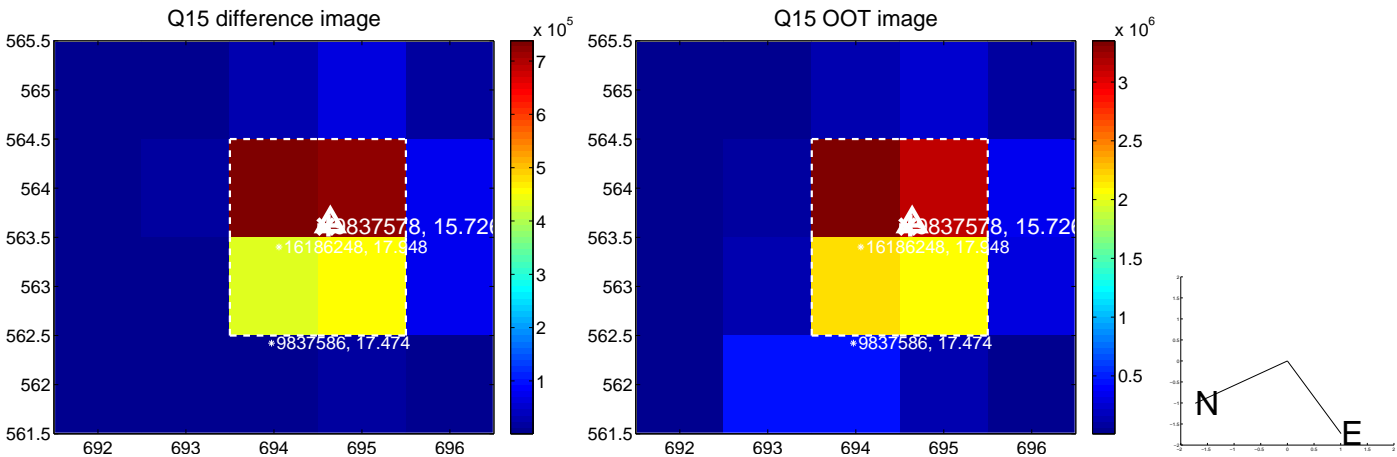
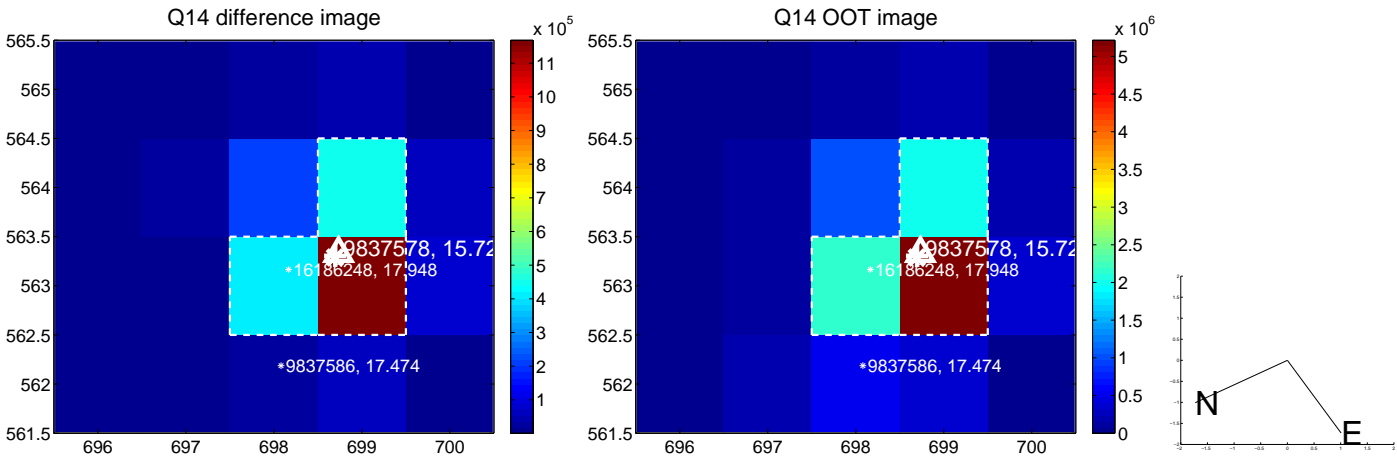
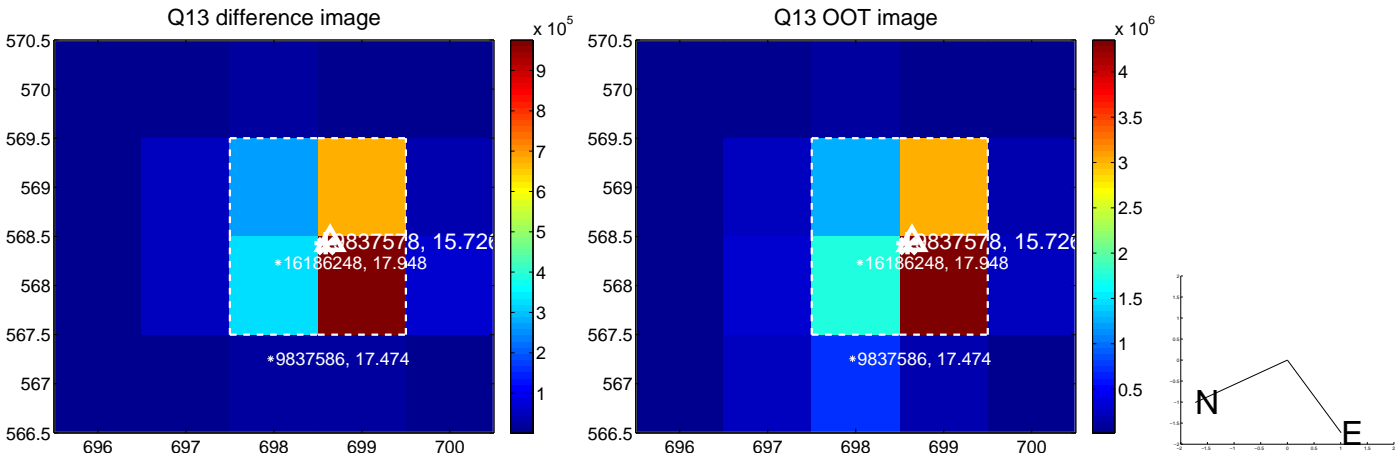
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



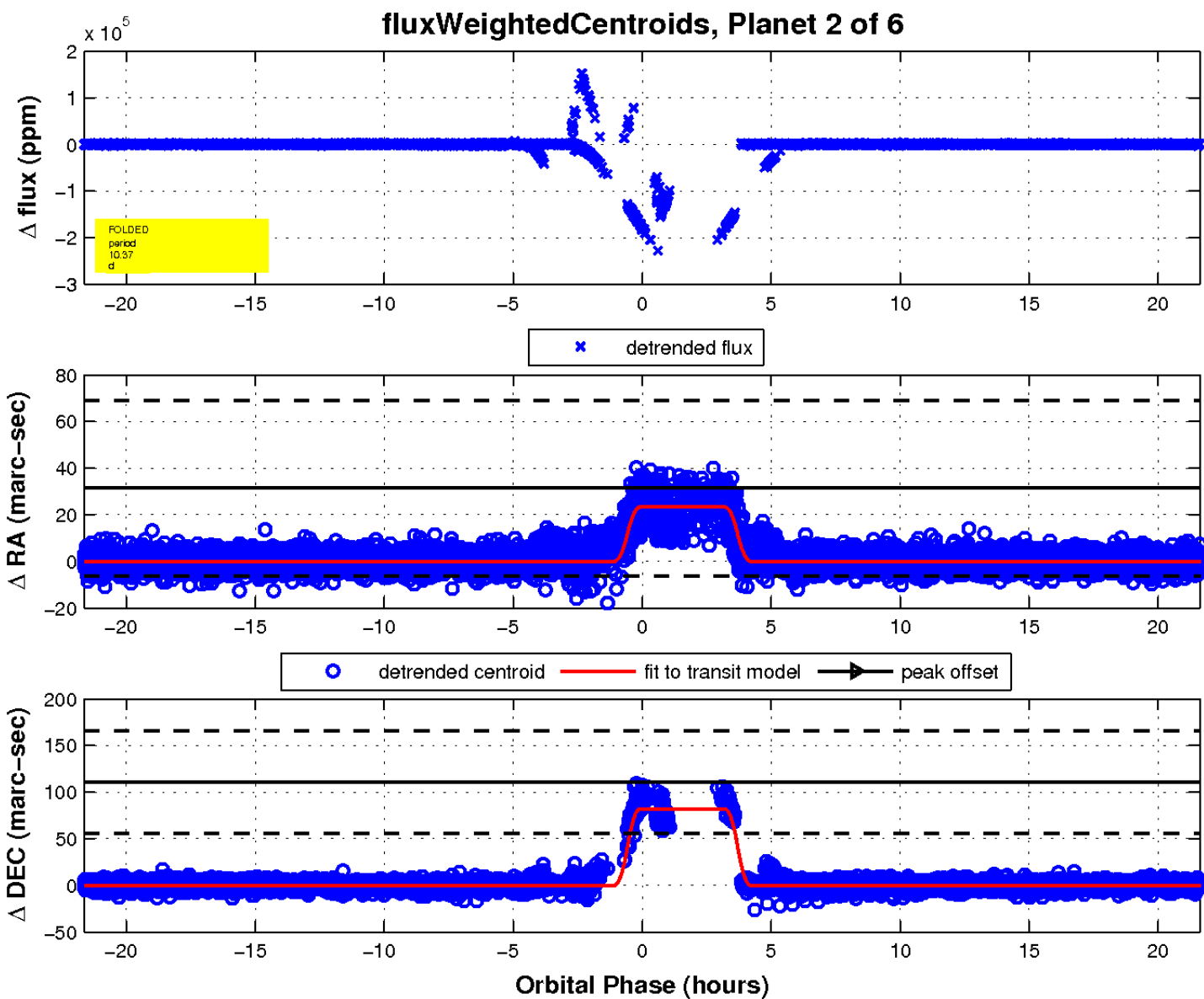
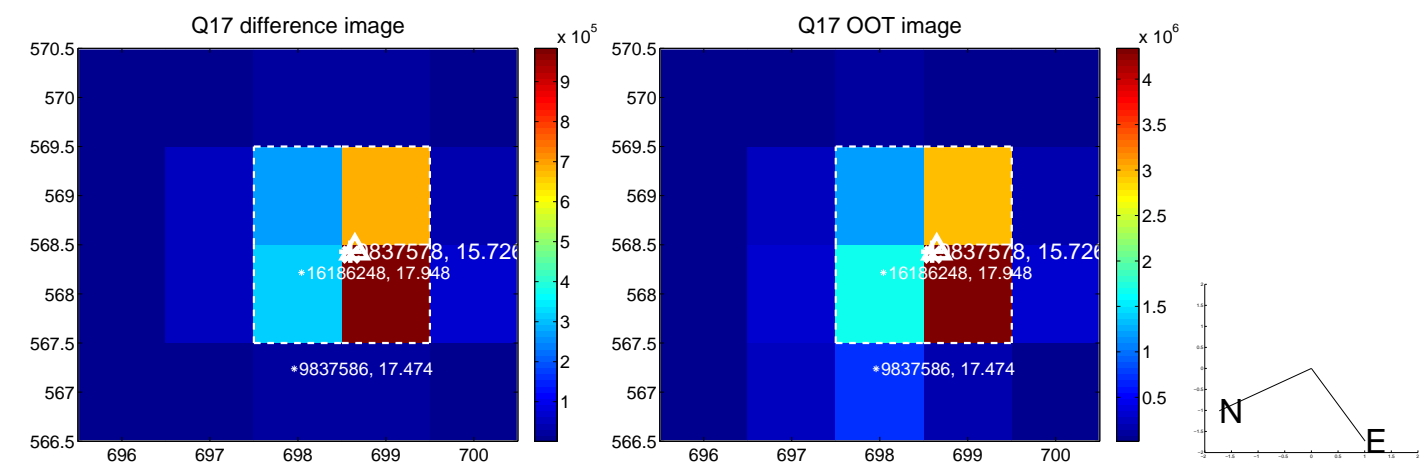
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



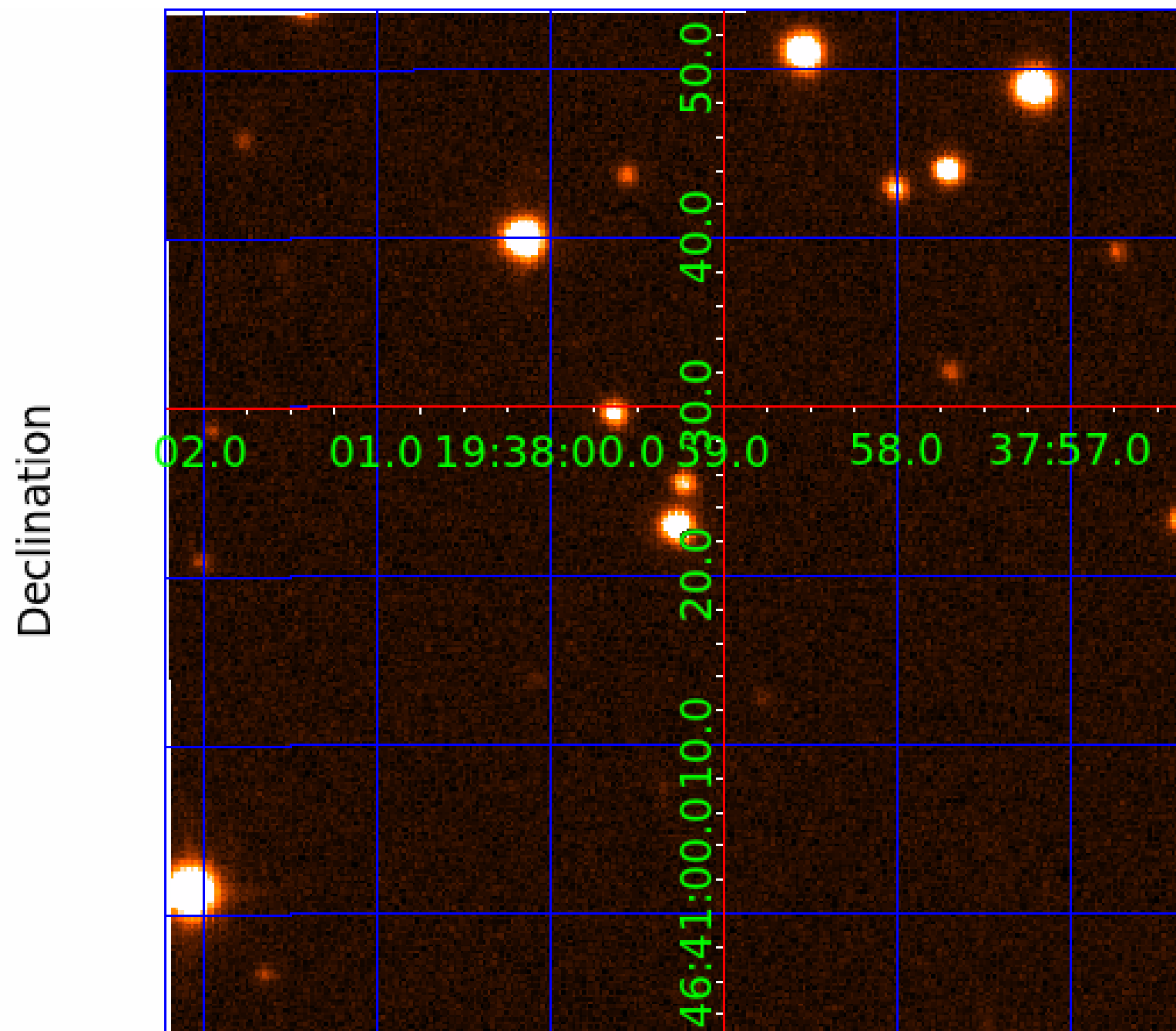
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 009837578

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})
009837578-01	OBS	2937.01	20.733617	132.852798	423839.7	3.500	9272.0	-1.0	0.97	5620	53.14	45.15
009837578-02	OBS	No	10.366862	132.958371	263944.6	5.000	6320.8	-1.0	0.97	5620	46.51	113.77
009837578-03	OBS	No	6.911114	132.801153	101.6	12.550	263.4	5.2	0.97	5620	0.97	195.35
009837578-04	OBS	No	185.413920	188.270963	3734.9	22.498	26.5	23.0	0.97	5620	11.07	2.43
009837578-05	OBS	No	333.649734	244.113348	382.8	10.696	26.5	3.7	0.97	5620	1.95	1.11
009837578-06	OBS	No	117.823087	164.388285	11977.6	2.000	29.9	-1.0	0.97	5620	10.59	4.45

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009837578-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—HAS_SEC_TCE—CENT_NOFITS
009837578-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
009837578-03	OBS	FP	0.00	1	0	0	1	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_FEW_DIFFS—EPHEM_MATCH
009837578-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009837578-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009837578-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—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 009837578-03

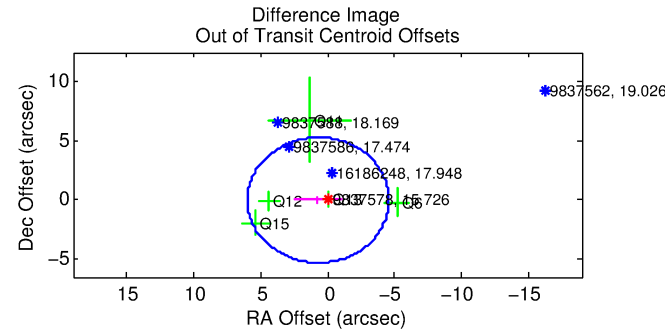
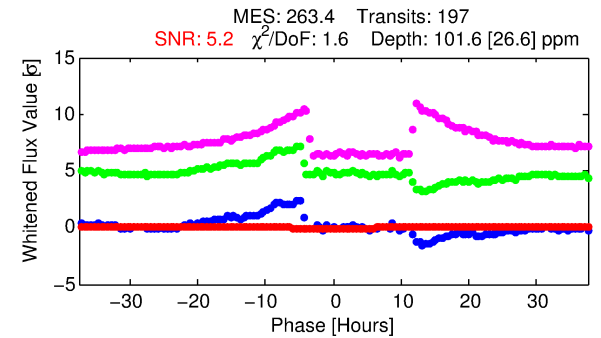
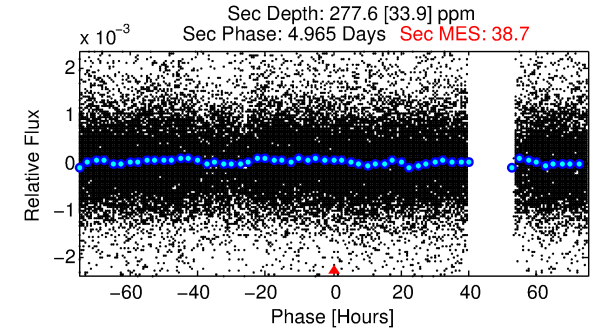
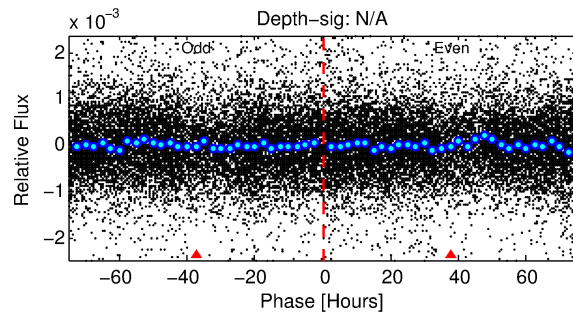
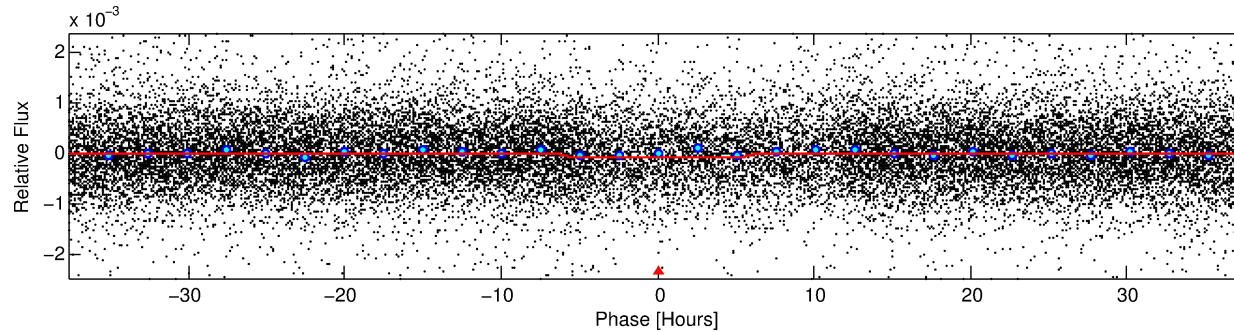
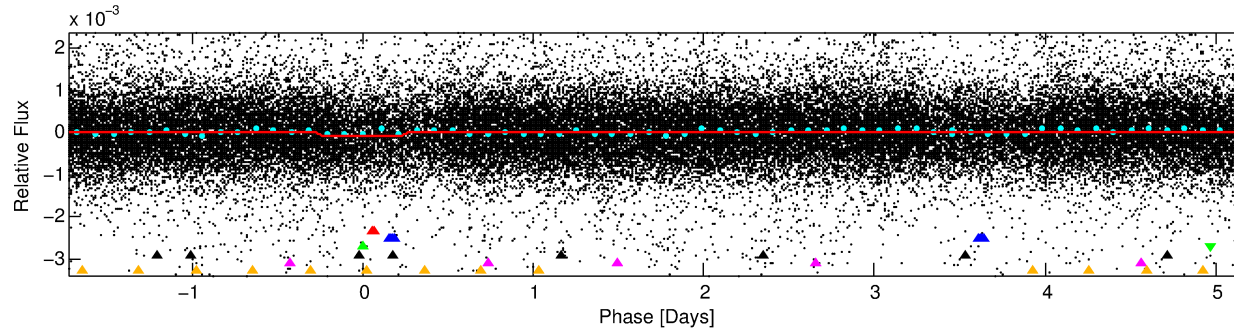
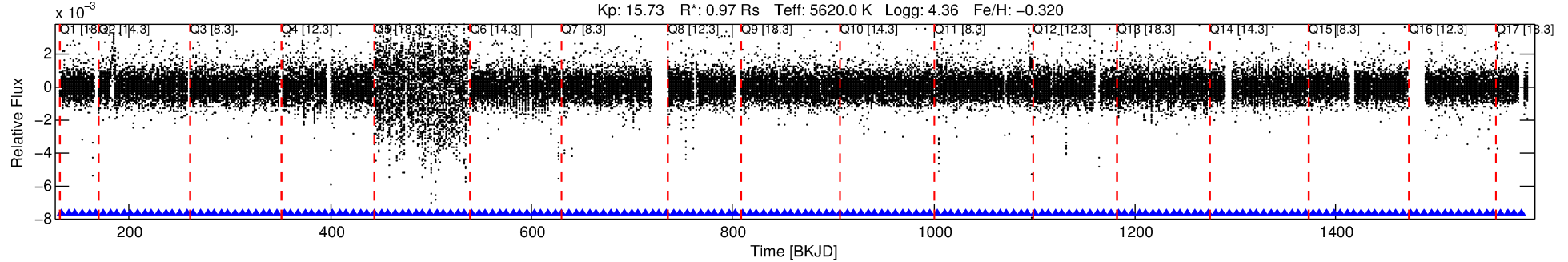
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
009837578-03	9837578	3442.01	9837586	1:3	5.4	1	1	17.47	15.72	1174.30	Direct-PRF	0	2.69	1.53

Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 9837578 Candidate: 3 of 6 Period: 6.911 d
KOI: K02937 Corr: No Ephemeris Match

Kp: 15.73 R*: 0.97 Rs Teff: 5620.0 K Logg: 4.36 Fe/H: -0.320



DV Fit Results:

Period = 6.91111 [0.00024] d
Epoch = 132.8012 [0.0265] BKJD
Rp/R* = 0.0091 [0.0341]
a/R* = 4.29 [67.17]
b = 0.01 [1986.41]
Seff = 195.35 [27.01]
Teq = 953 [33] K
Rp = 0.97 [3.62] Re
a = 0.0659 [0.0045] AU
Ag = 702.34 [5236.09] [0.13σ]
Teff = 7588 [14141] K [0.47σ]

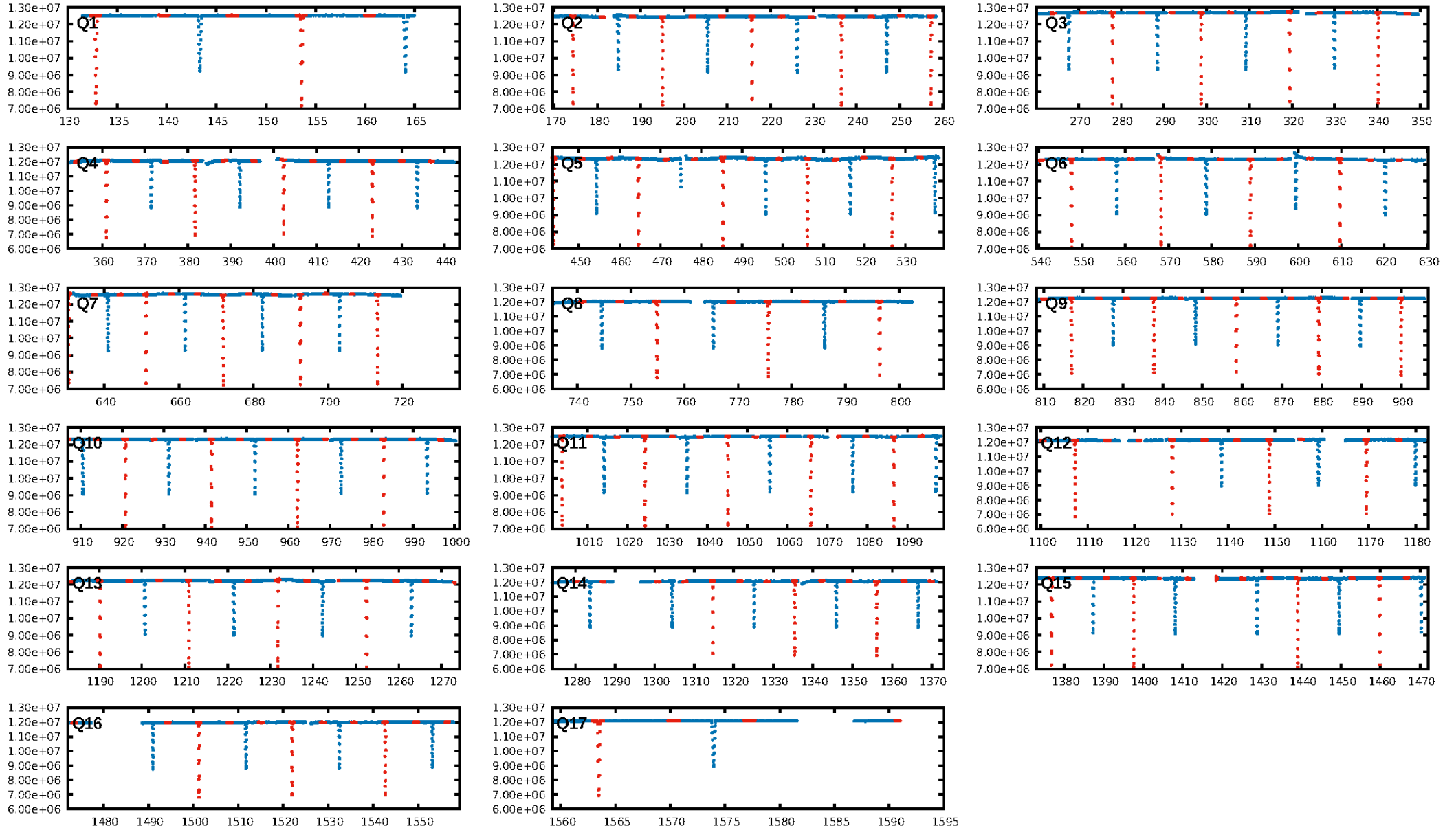
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [6.14σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [188/188]
GhostDiagnostic-chr: 0.9237
Centroid-sig: 0.3%
Centroid-so: 2.755 arcsec [1.78σ]
OotOffset-rm: 0.710 arcsec [0.40σ]
KicOffset-rm: 0.608 arcsec [0.33σ]
OotOffset-st: 1/2/1/1 [5]
KicOffset-st: 1/2/1/1 [5]
DiffImageQuality-fgm: 0.20 [1/5]
DiffImageOverlap-fno: 1.00 [17/17]

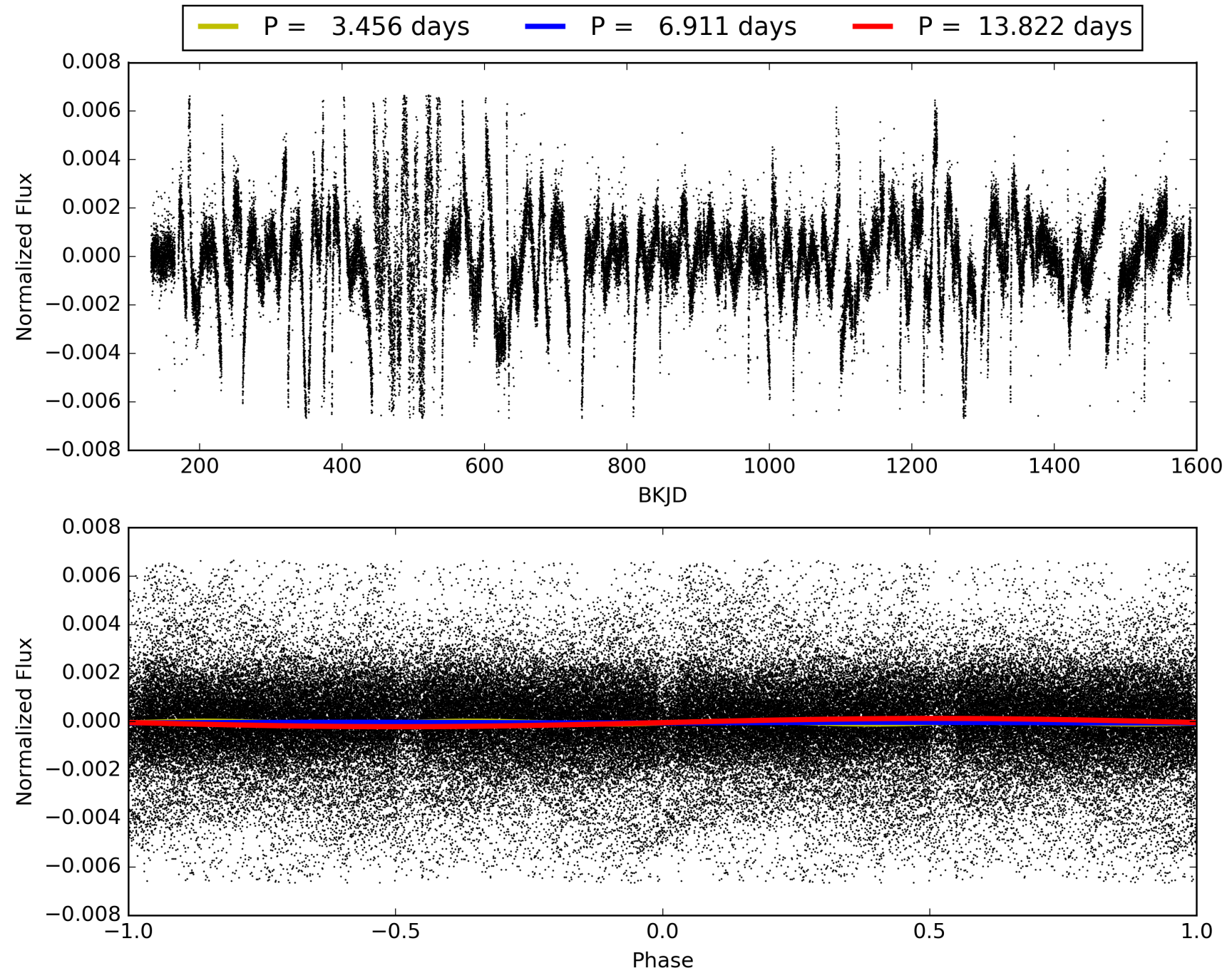
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 01:27:01 Z

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

TCE 009837578-03, PDC Light Curves

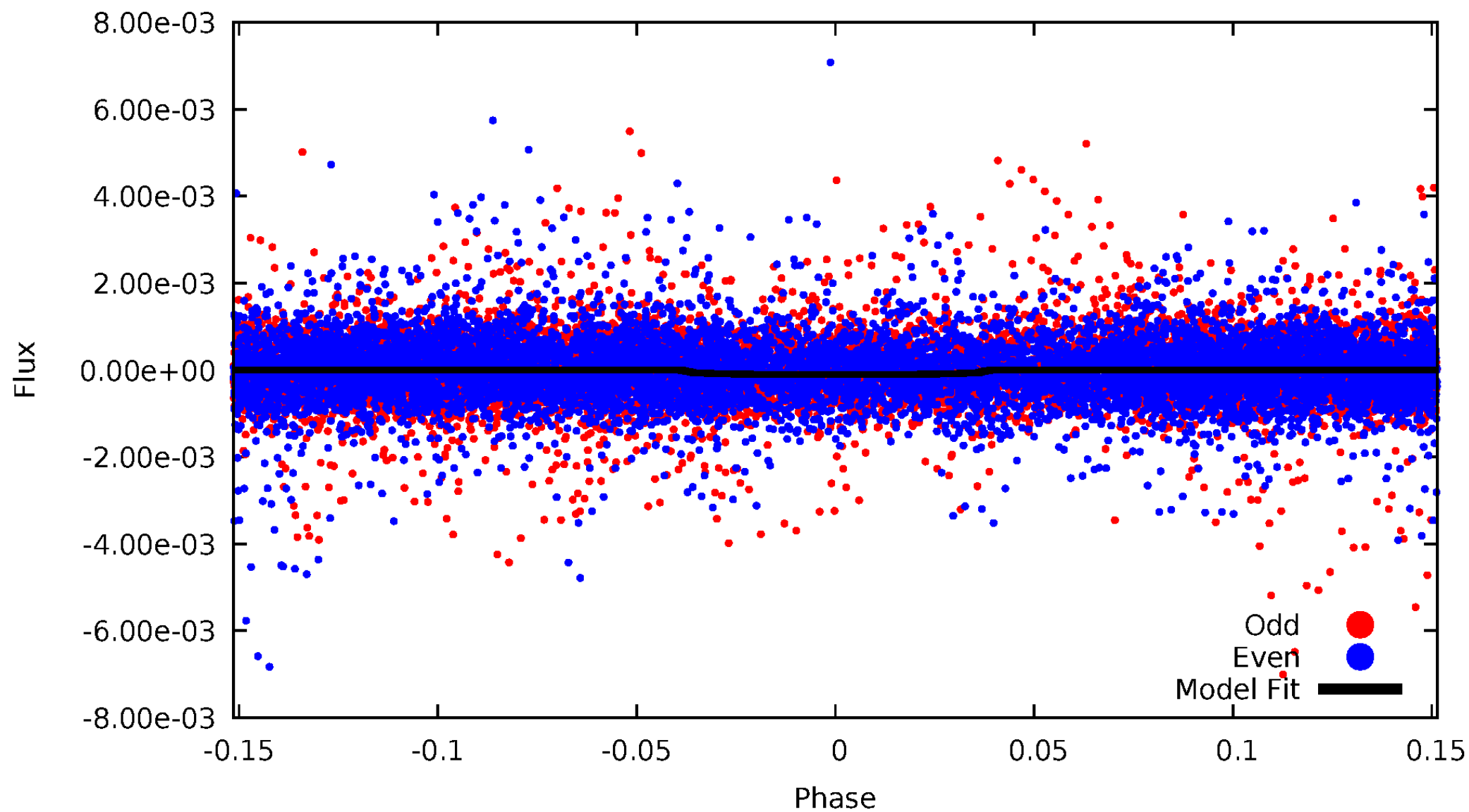


TCE 009837578-03



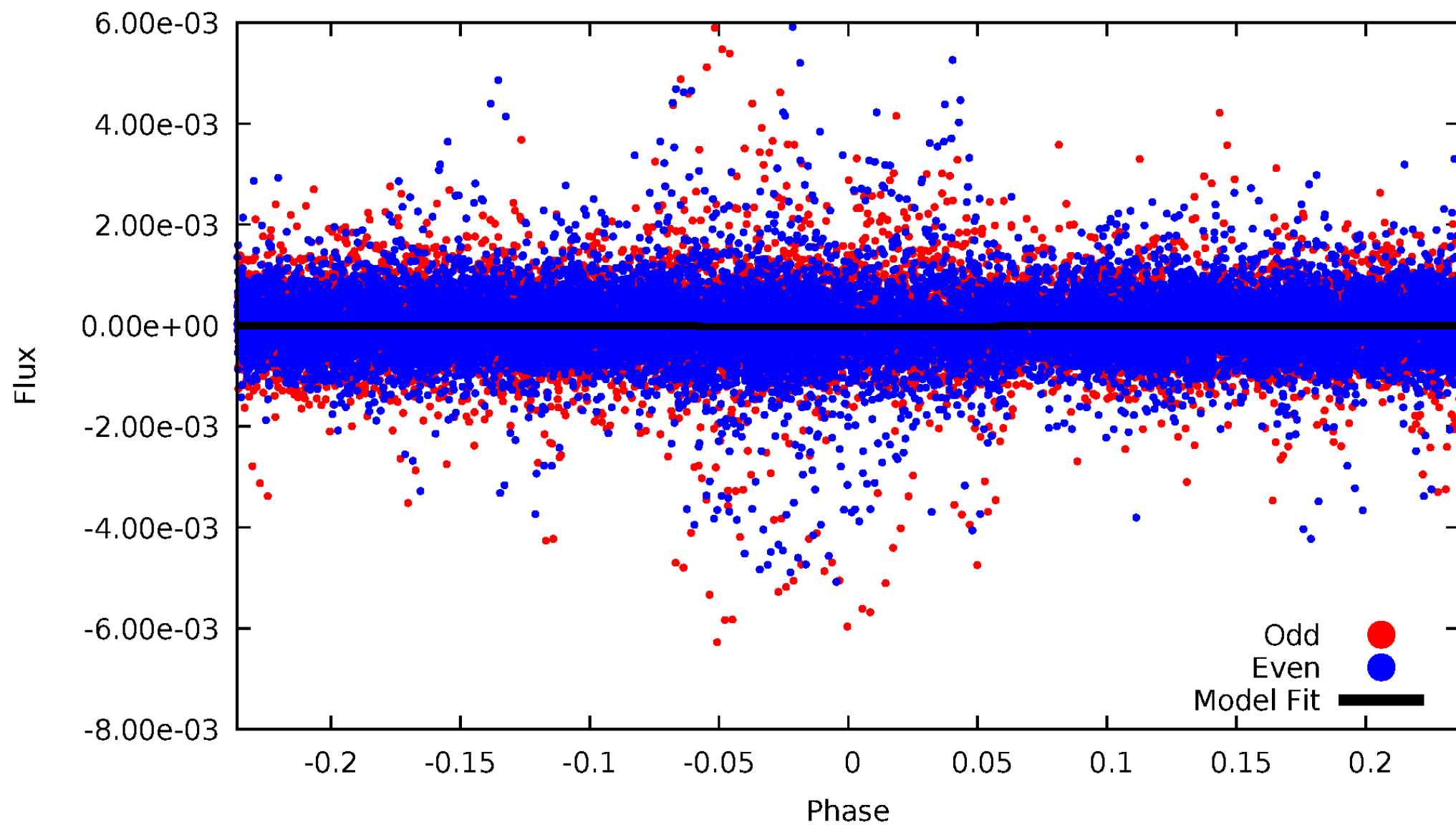
DV Odd/Even

TCE 009837578-03



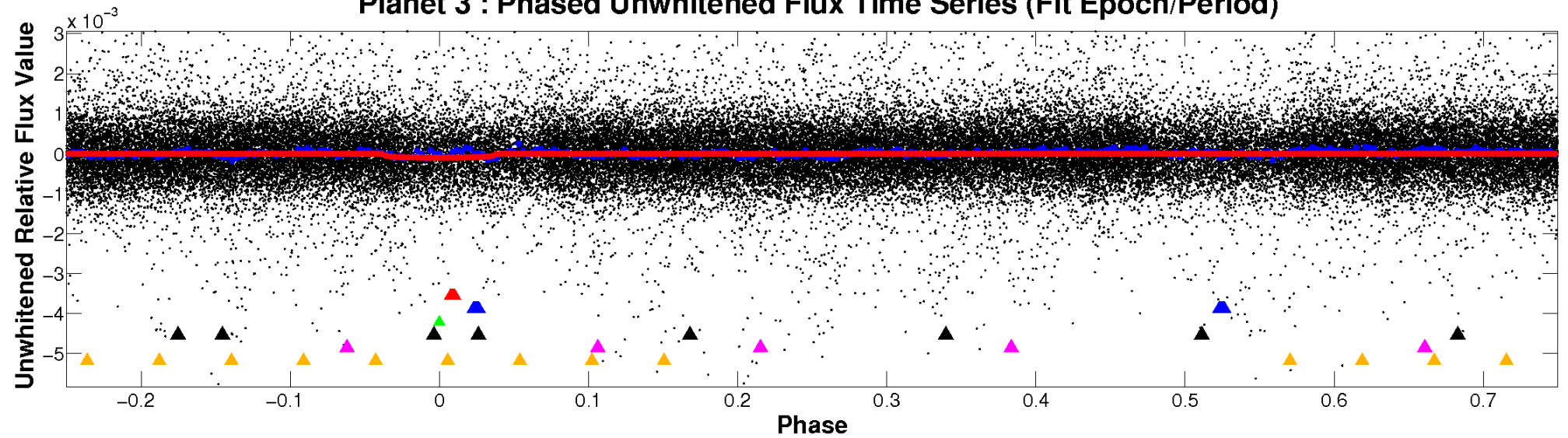
ALT Odd/Even

TCE 009837578-03

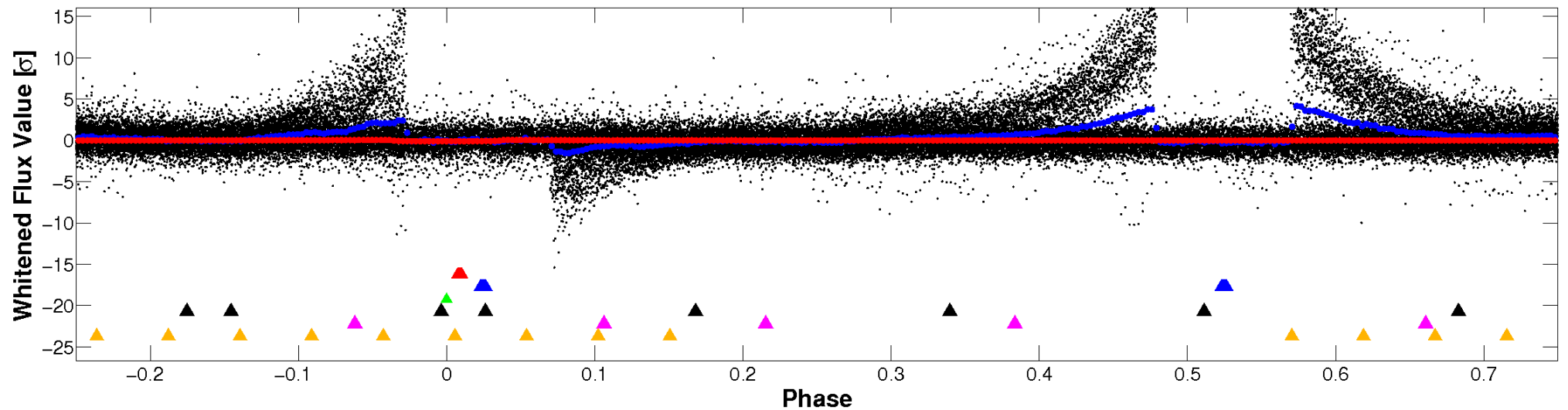


Non-Whitened Vs. Whitened Light Curve

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

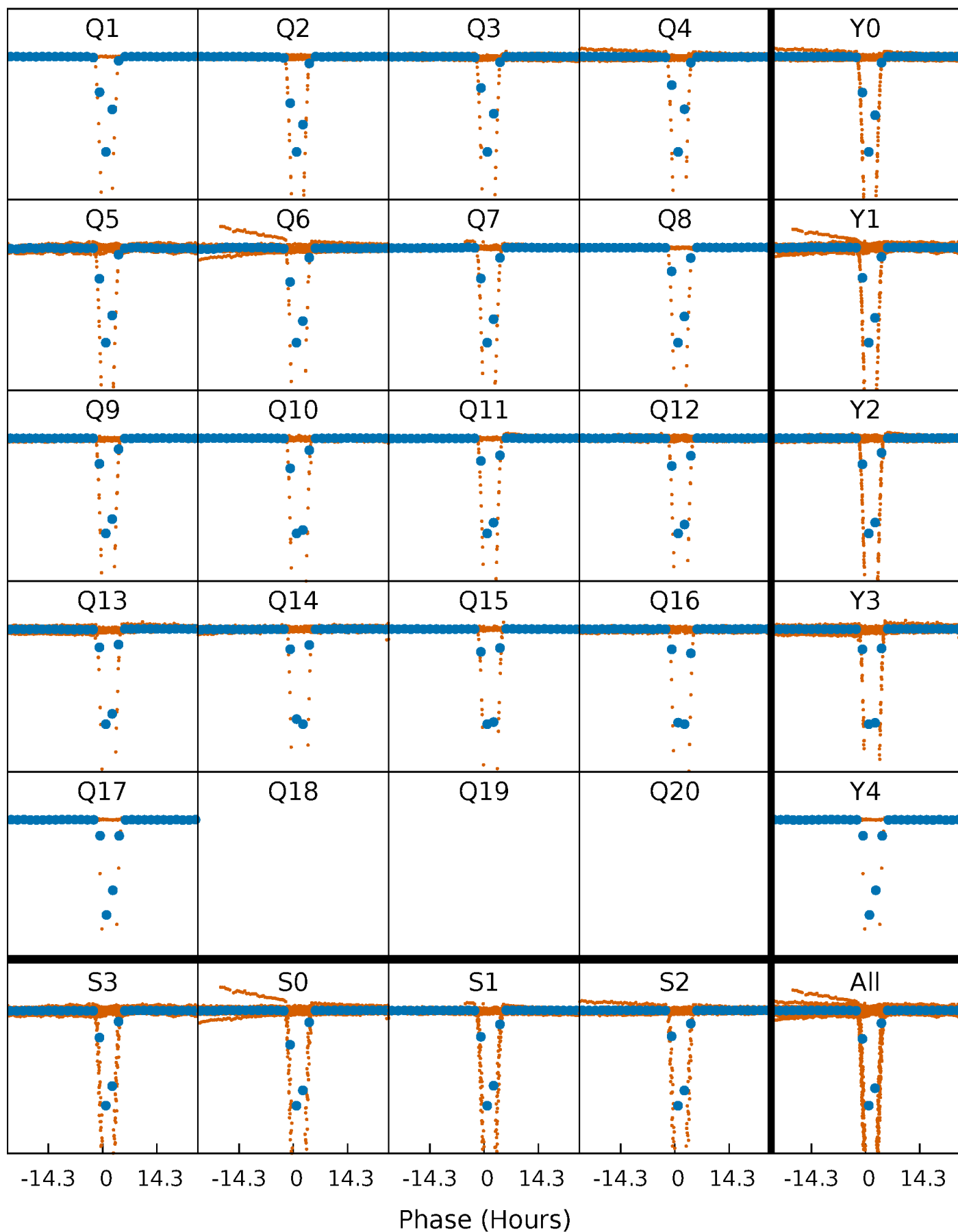


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



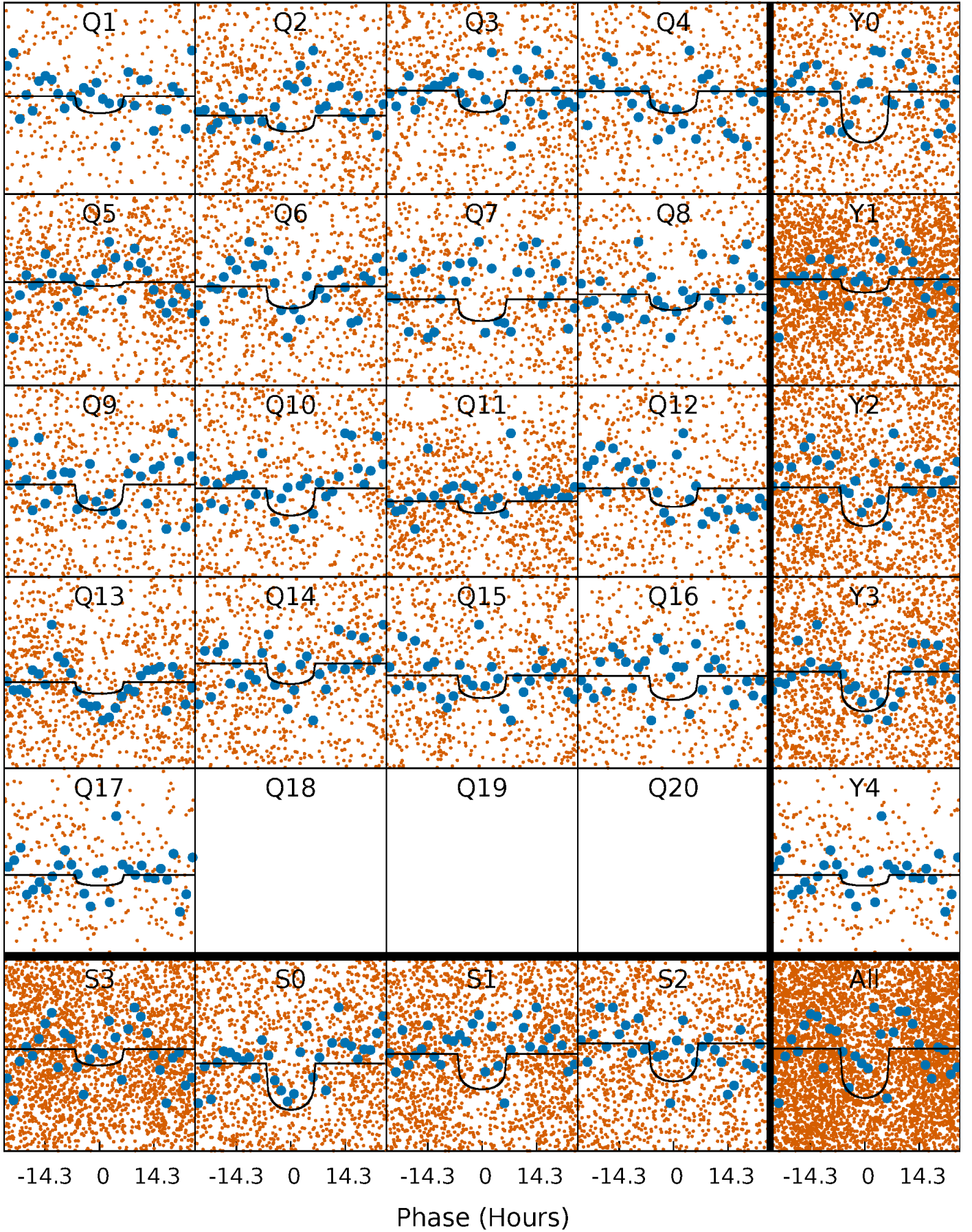
PDC Quarter-Phased Transit Curves

TCE 009837578-03 P= 6.911114 Days $T_0=132.801153$ (BKJD)



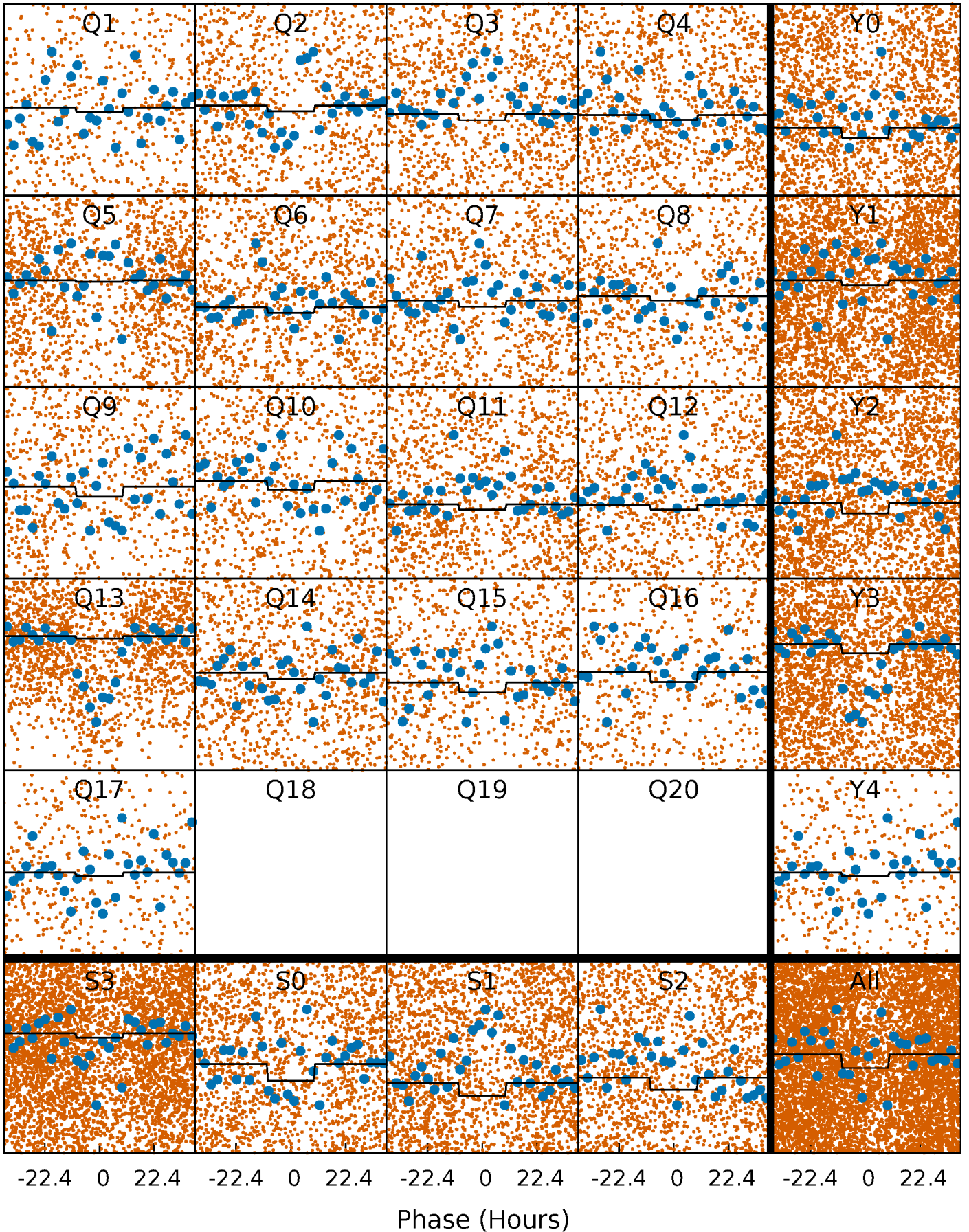
DV Quarter-Phased Transit Curves

TCE 009837578-03 $P = 6.911114$ Days $T_0 = 132.801153$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

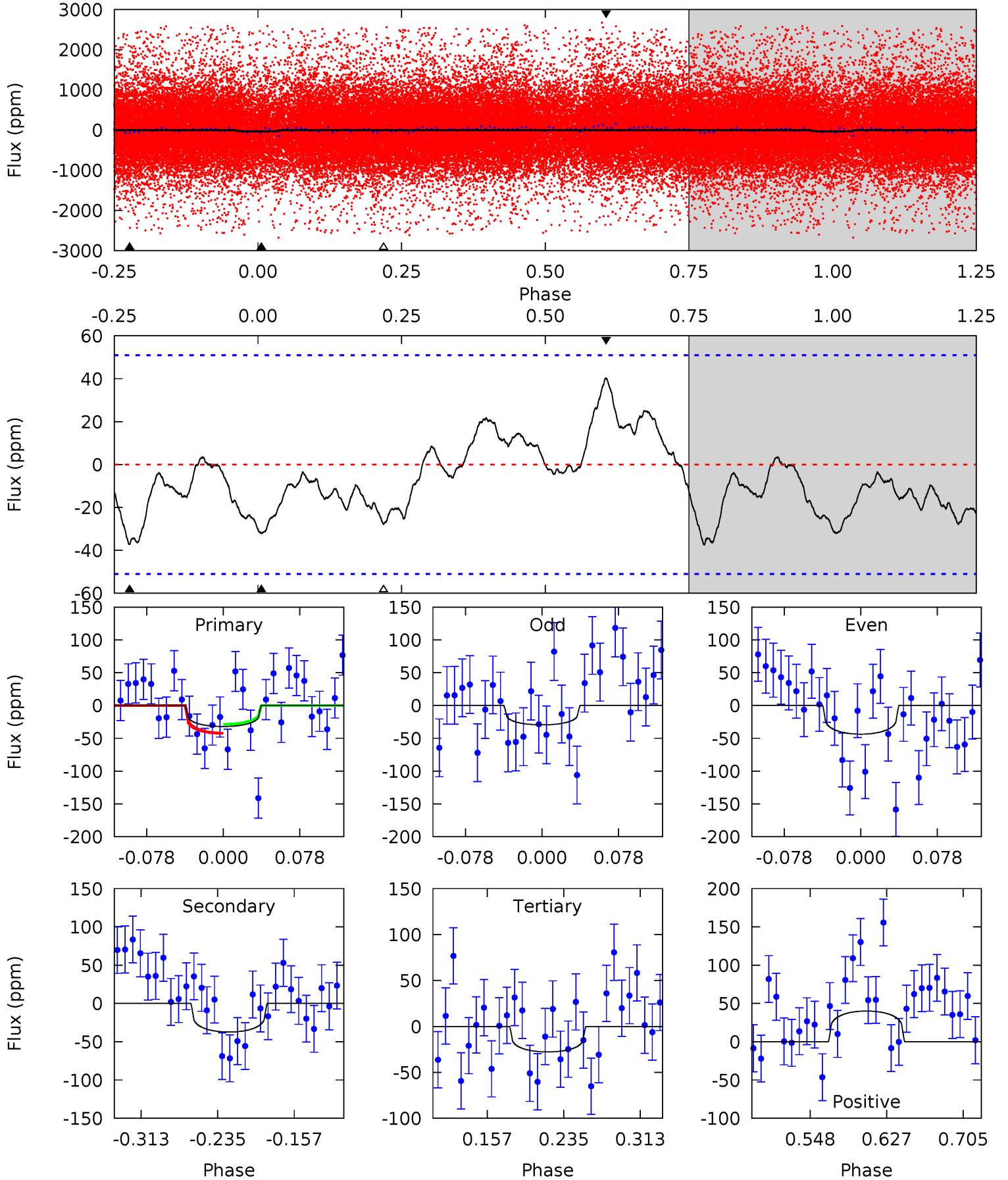
TCE 009837578-03 P= 6.911041 Days $T_0=132.678641$ (BKJD)



DV Model-Shift Uniqueness Test

009837578-03, P = 6.911114 Days, E = 125.890039 Days

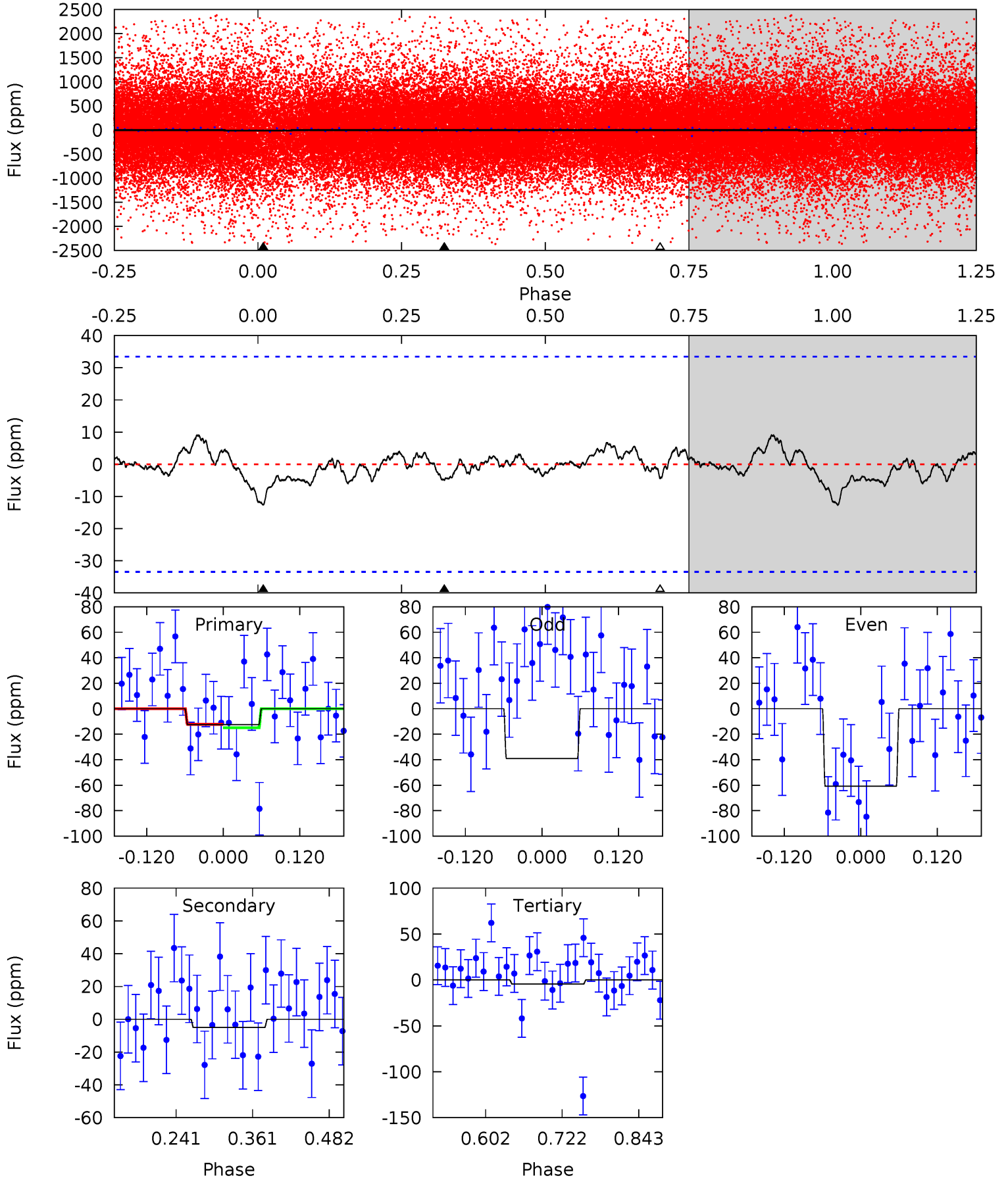
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.90	3.38	2.51	3.63	4.62	1.76	1.40	0.39	-0.73	0.86	-0.25	0.64	1.68	0.52	0.62



Alt Model-Shift Uniqueness Test

009837578-03, P = 6.911041 Days, E = 125.767600 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.70	0.67	0.61	0	4.53	1.55	0.38	1.09	1.70	0.06	0.67	1.46	0.61	0.42	0.18



Stellar Parameters For KIC 009837578

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5620^{+118}_{-75}	$4.363^{+0.065}_{-0.040}$	$-0.320^{+0.150}_{-0.100}$	$0.974^{+0.067}_{-0.067}$	$0.797^{+0.067}_{-0.024}$	$1.217^{+0.300}_{-0.166}$
	+2%/-1%	+1%/-1%	+47%/-31%	+7%/-7%	+8%/-3%	+25%/-14%
Source	SPE36	TRA36	SPE36	DSEP		

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

Secondary Eclipse Parameters for KIC 009837578-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-37 ± 11	$2.81^{+3.19}_{-2.00}$	1331^{+36}_{-35}	3250^{+1734}_{-658}	11^{+115}_{-9}
Alt.	-5 ± 7	$2.60^{+2.83}_{-1.76}$	1330^{+37}_{-34}	2346^{+1115}_{-4613}	$1.266^{+16.583}_{-1.656}$

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

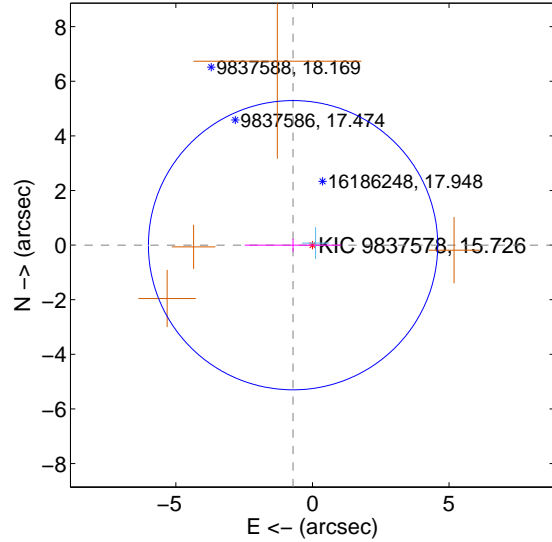
Supplemental centroid analysis for 009837578-03. Kepler magnitude: 15.73. Transit SNR 5.21

There are 1 quarters with good PRF difference image offsets

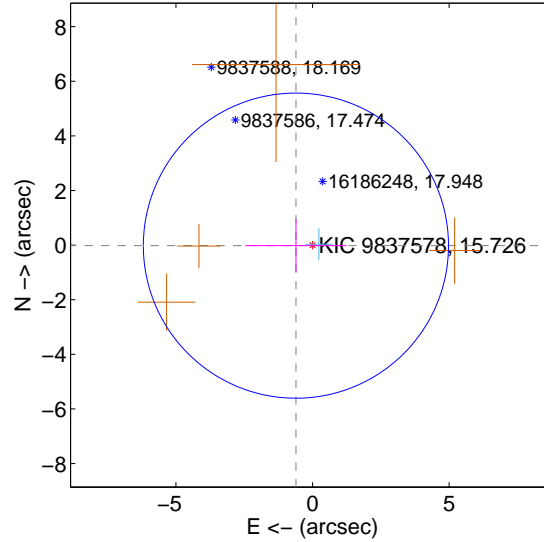
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.710 ± 1.765	0.40	0.710 ± 1.765	-0.003 ± 0.239
PRF-fit source offset from KIC position	0.608 ± 1.862	0.33	0.608 ± 1.853	-0.020 ± 0.972
photometric centroid source offset	2.75 ± 1.54	1.78	-0.76 ± 1.35	-2.65 ± 1.56

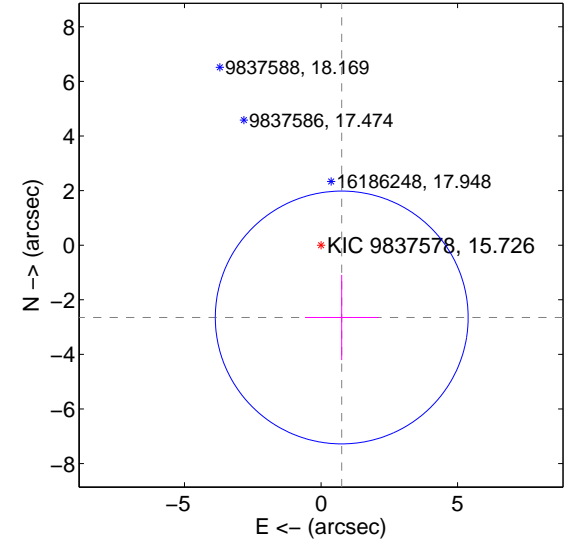
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

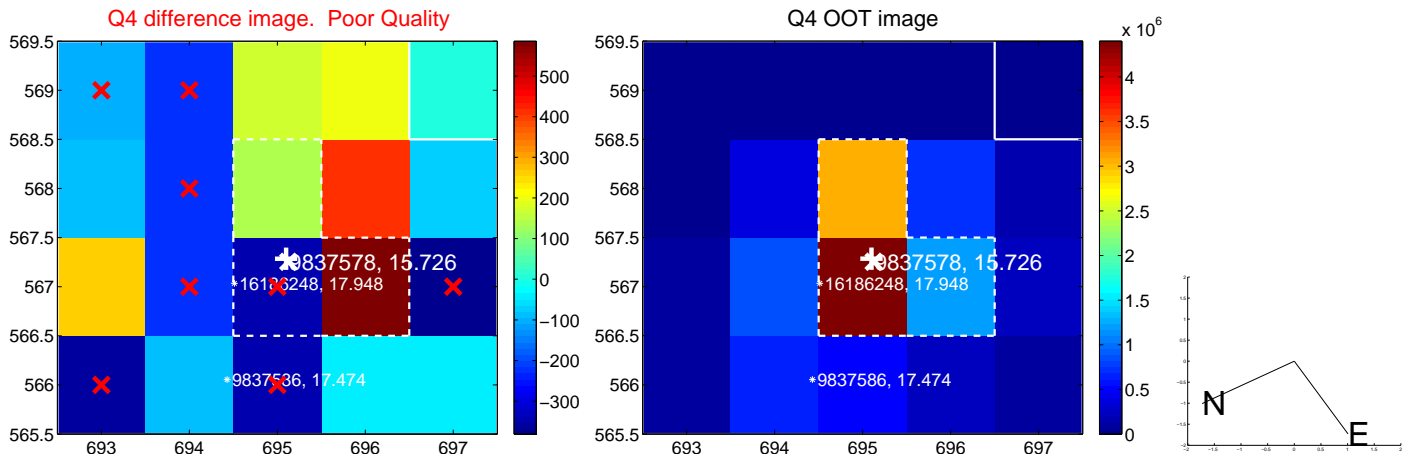
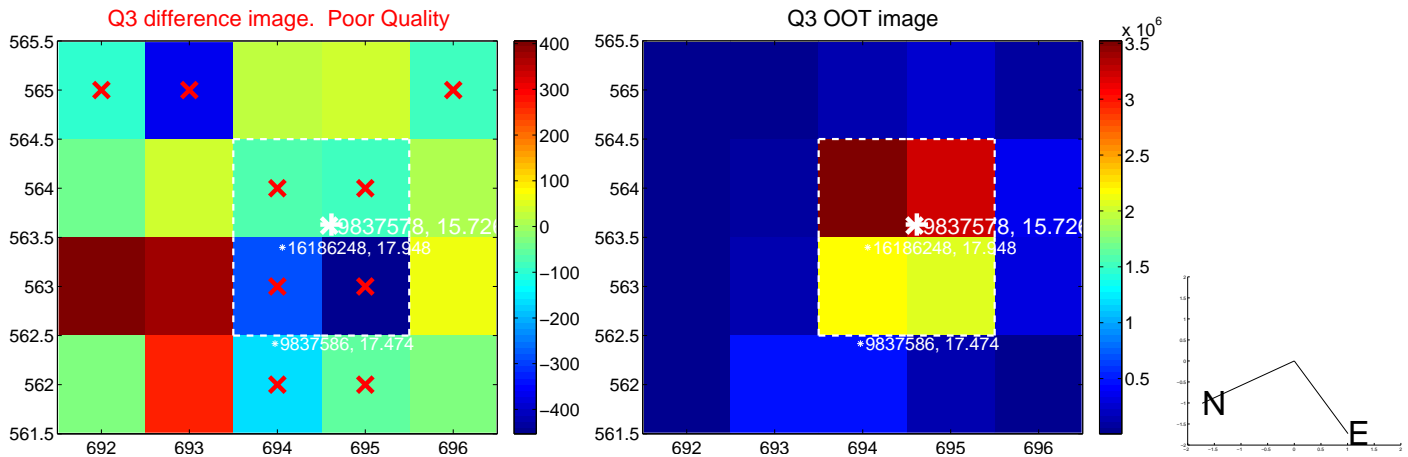
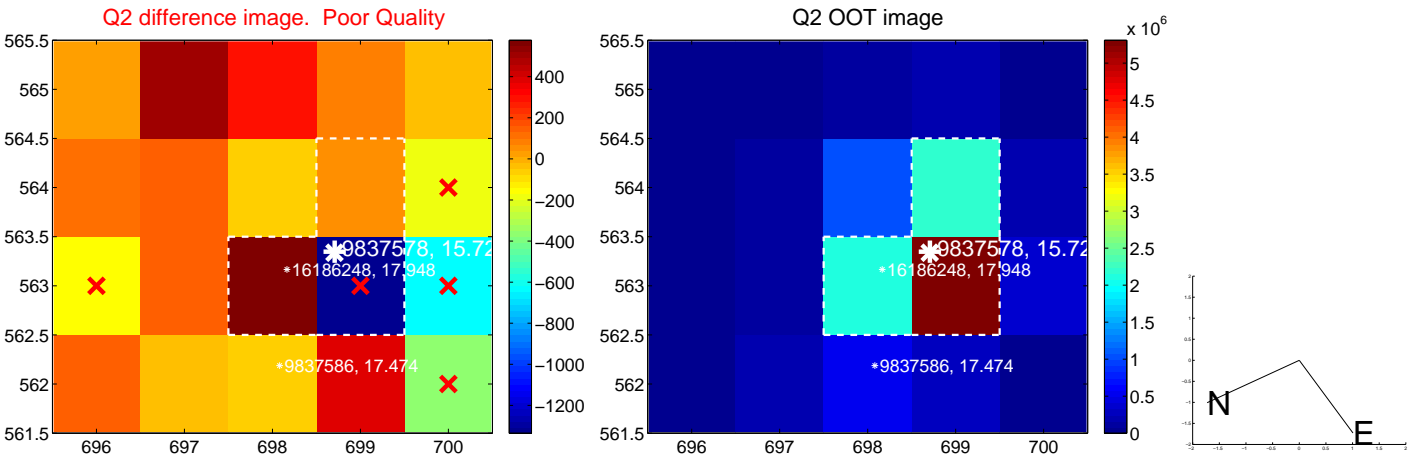
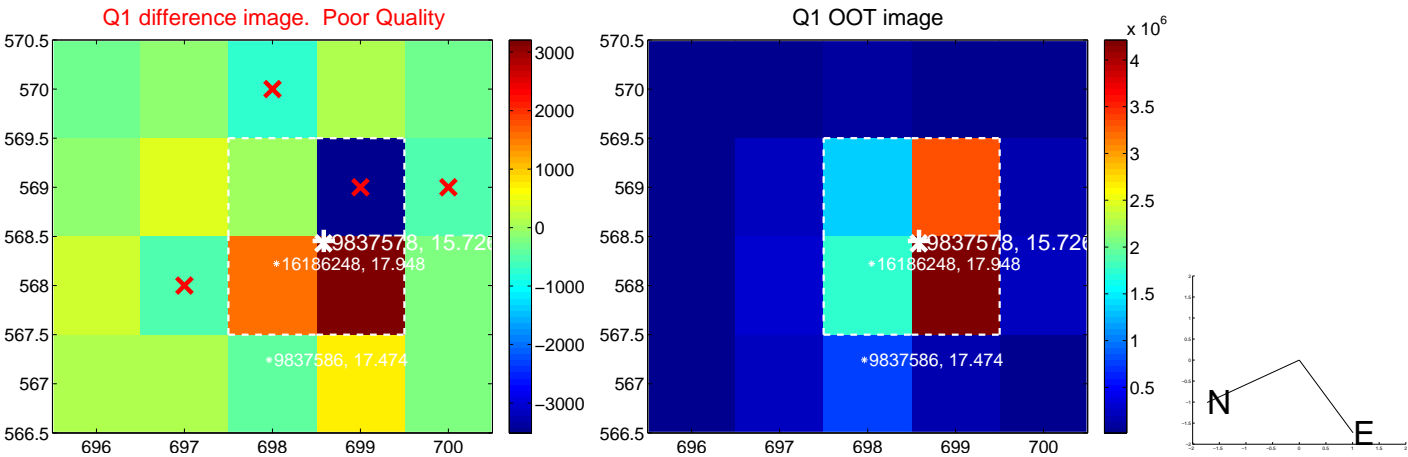


offset from photometric centroids

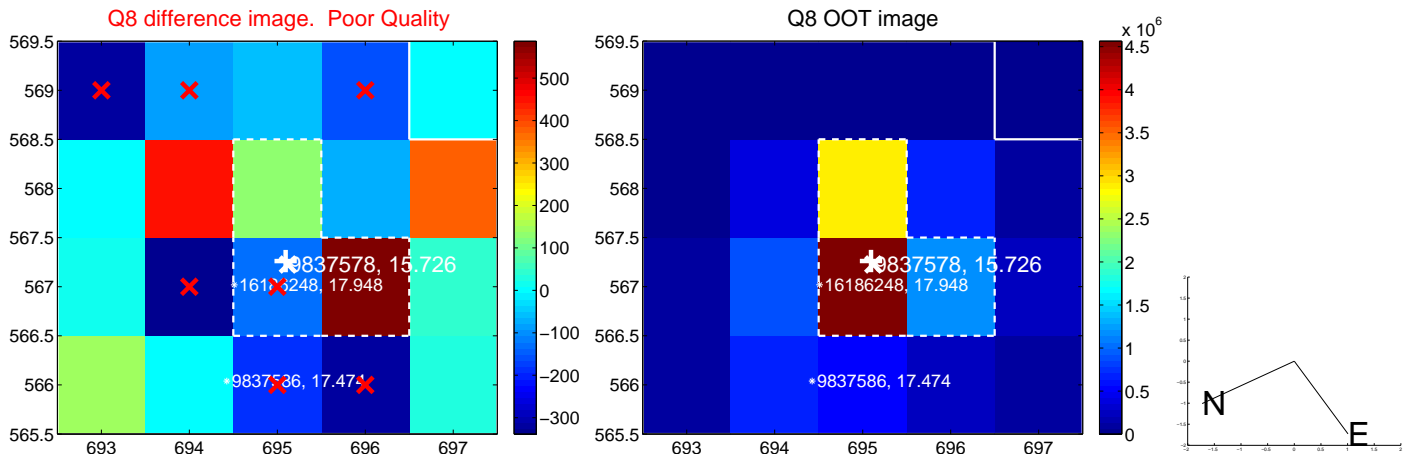
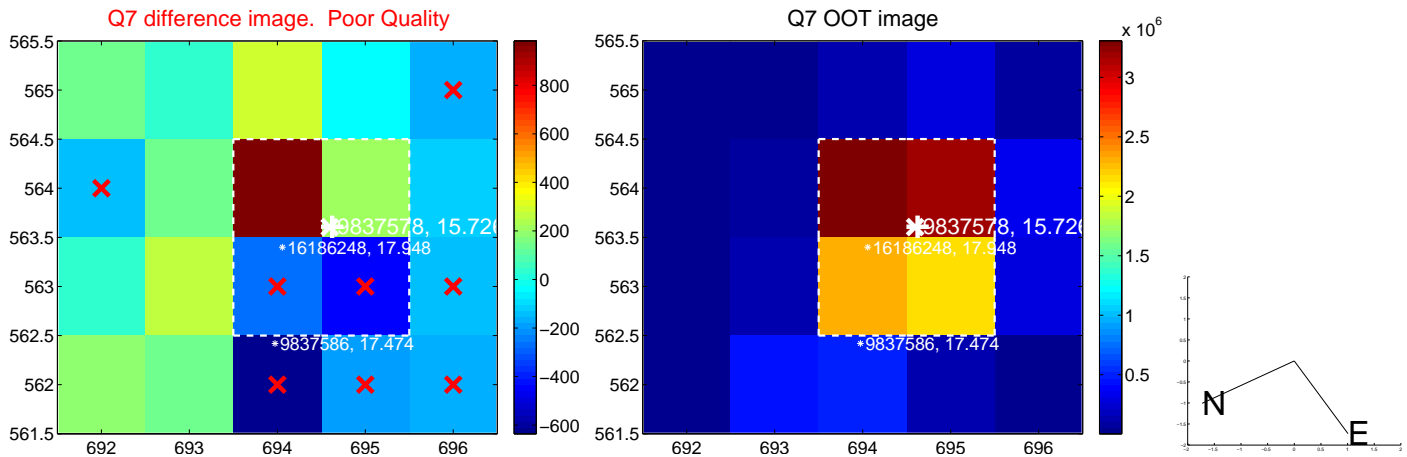
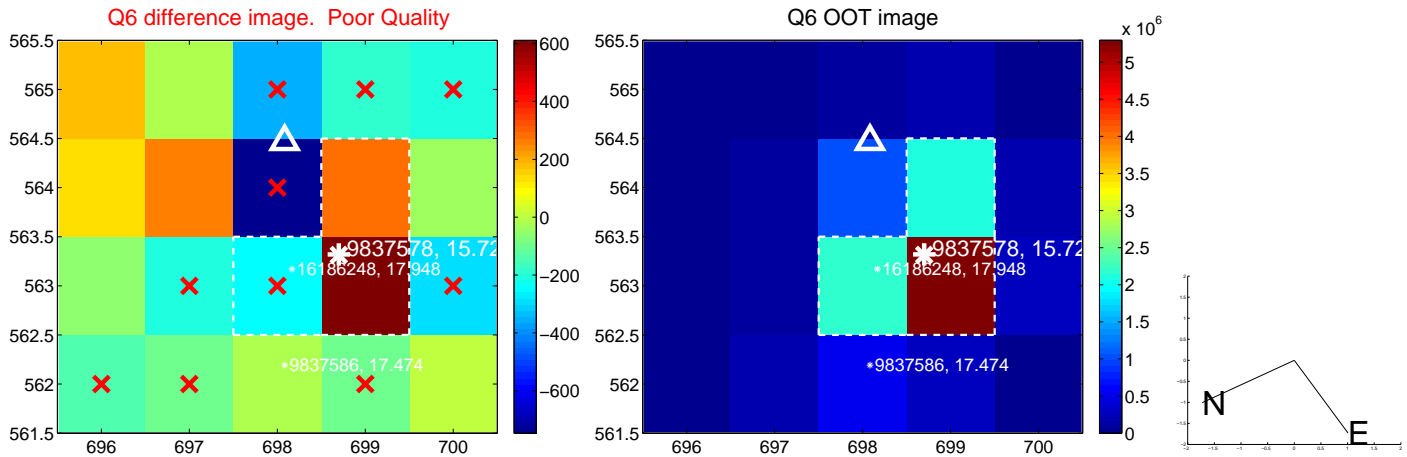
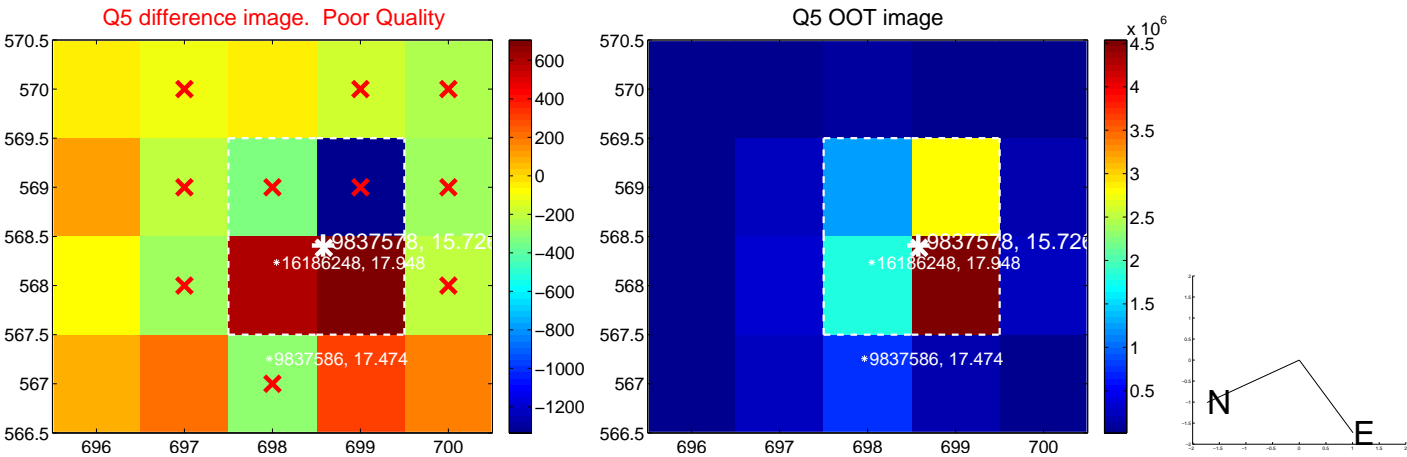


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

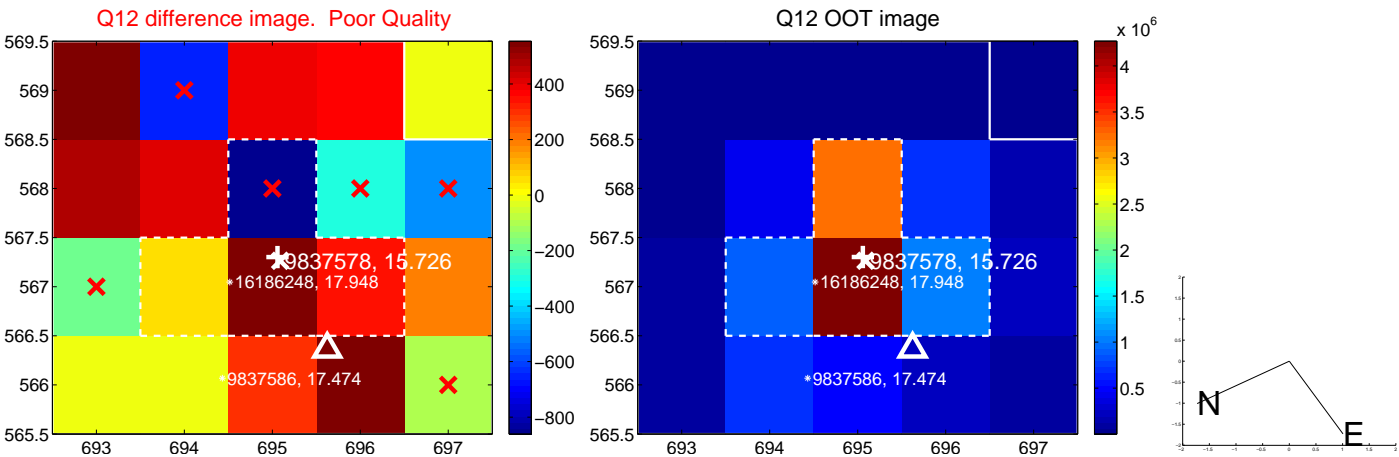
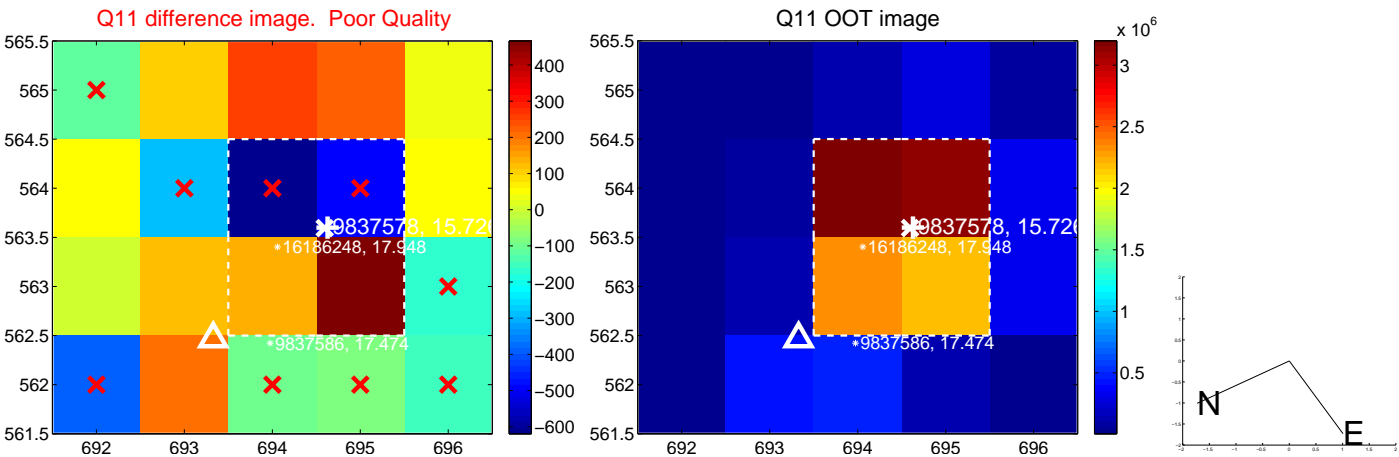
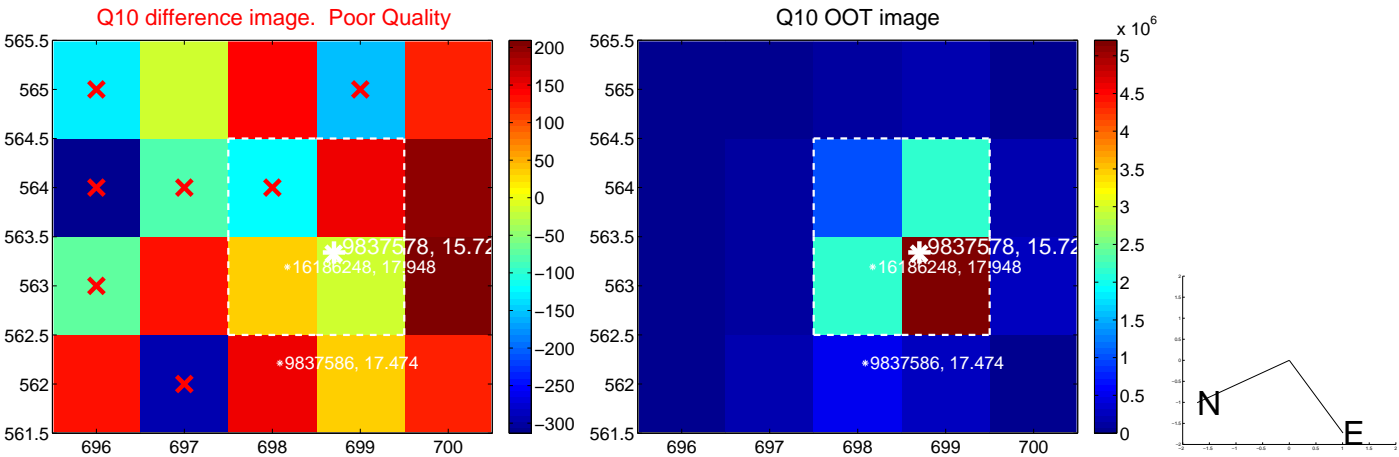
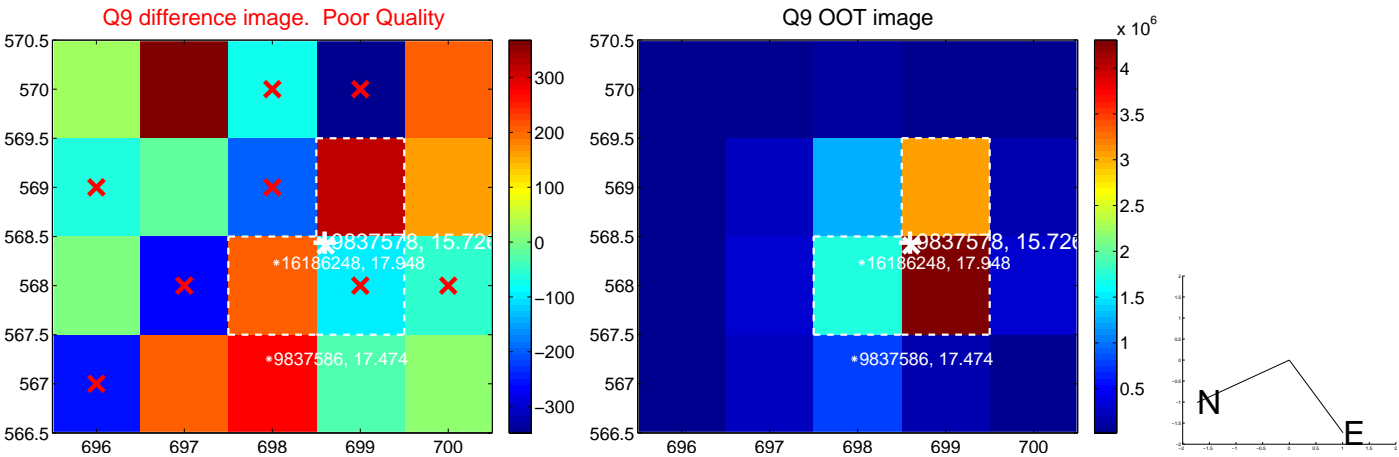
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



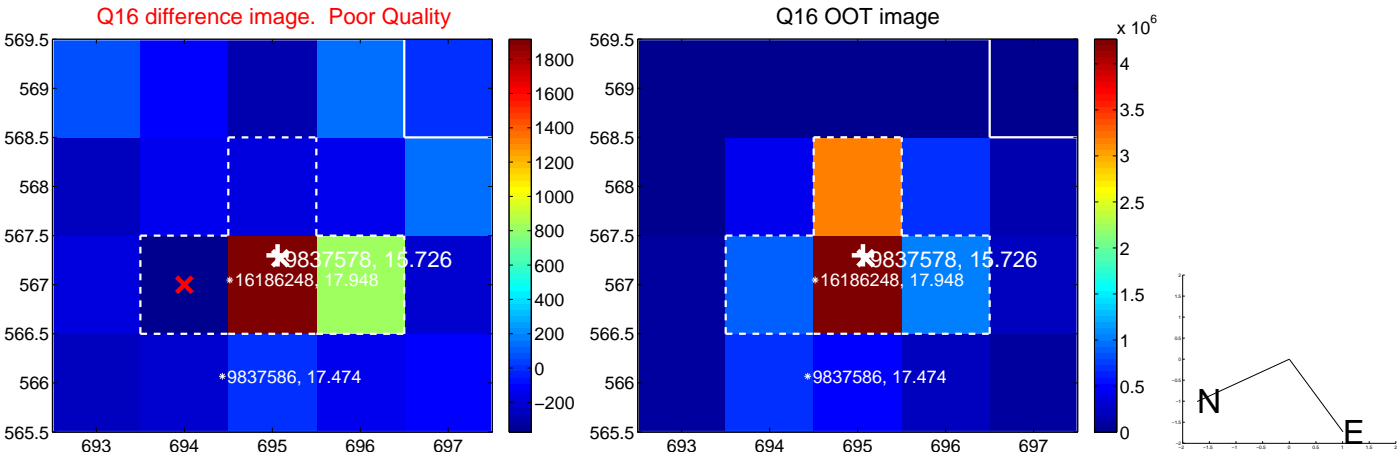
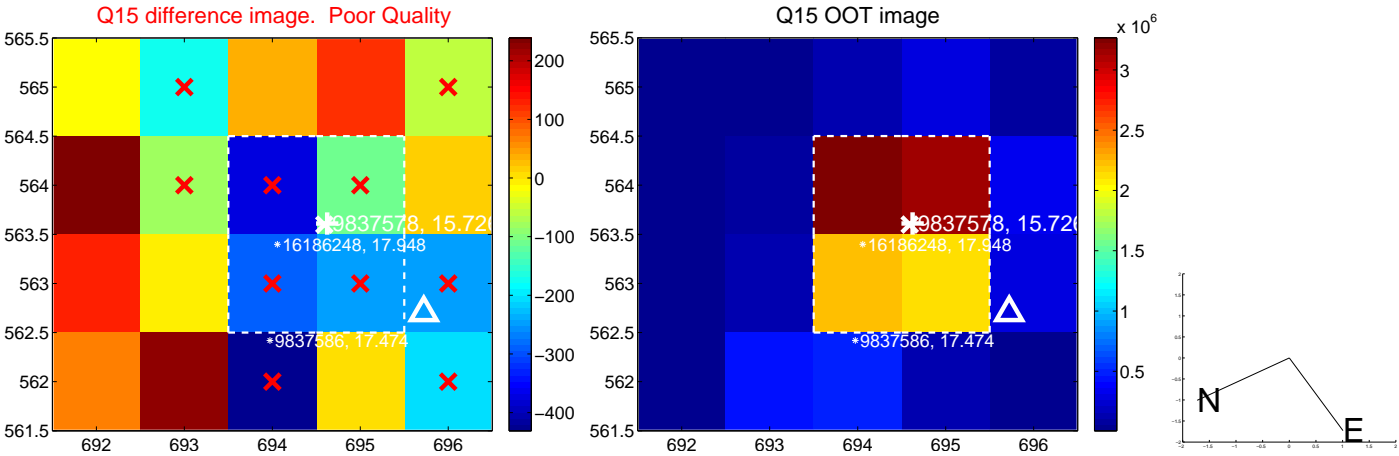
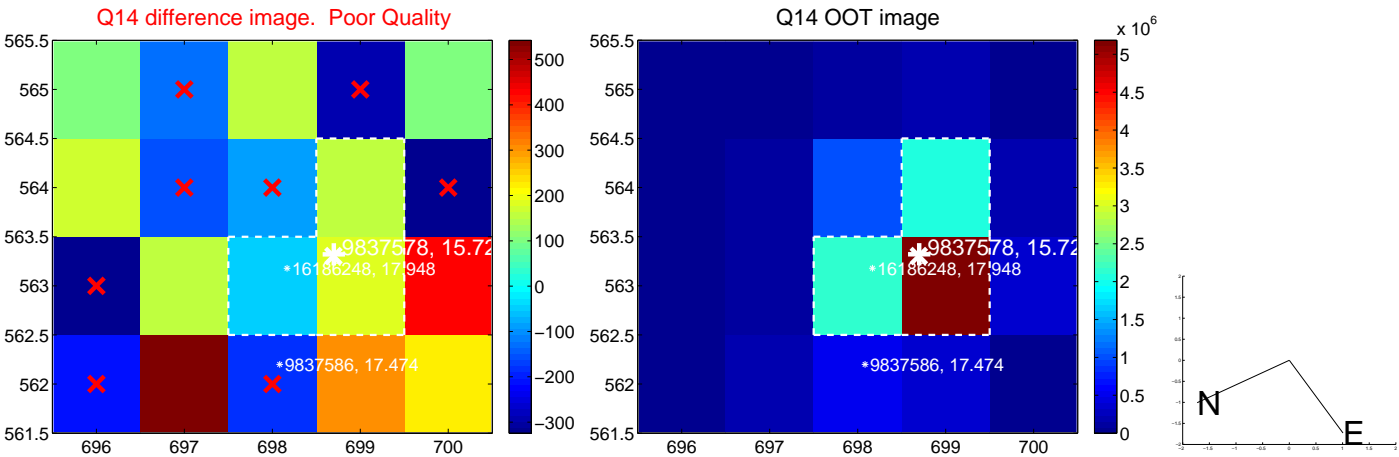
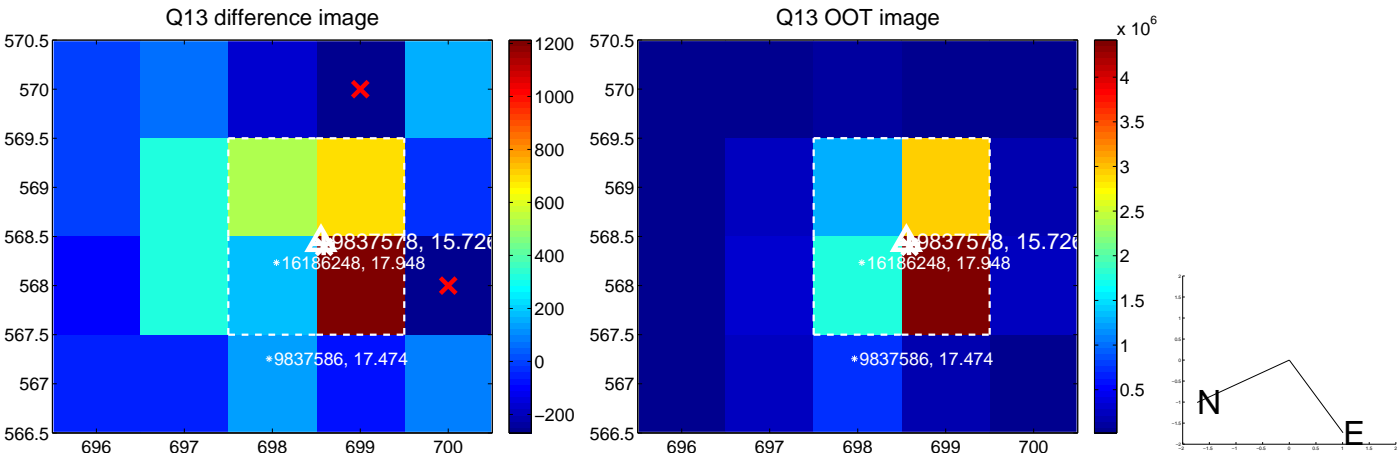
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



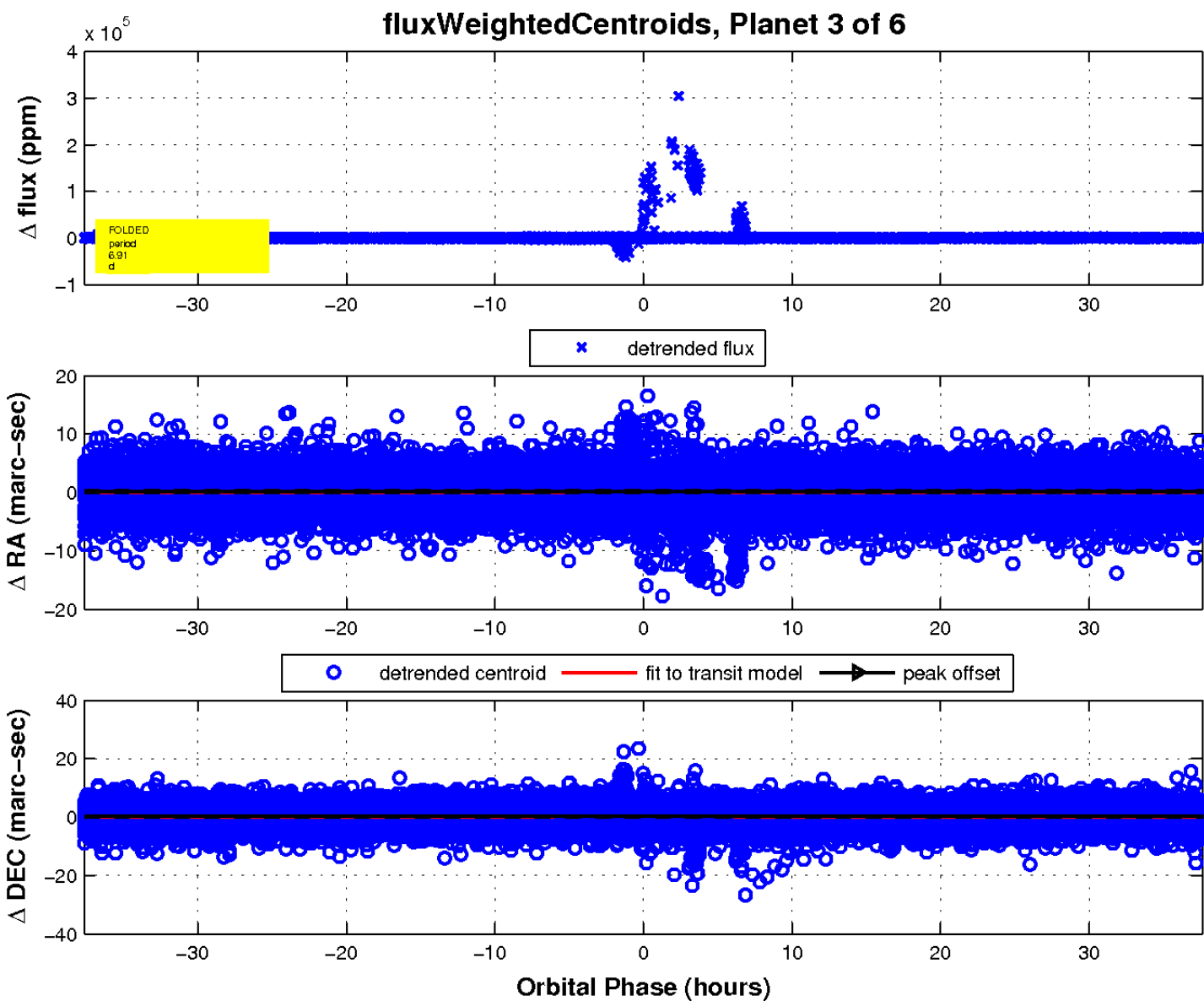
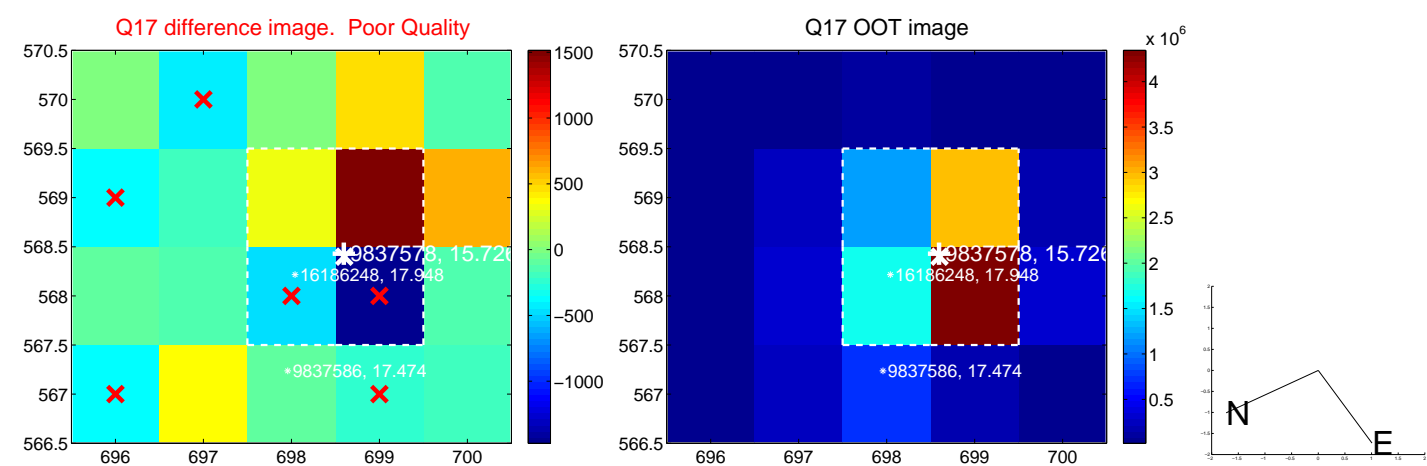
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



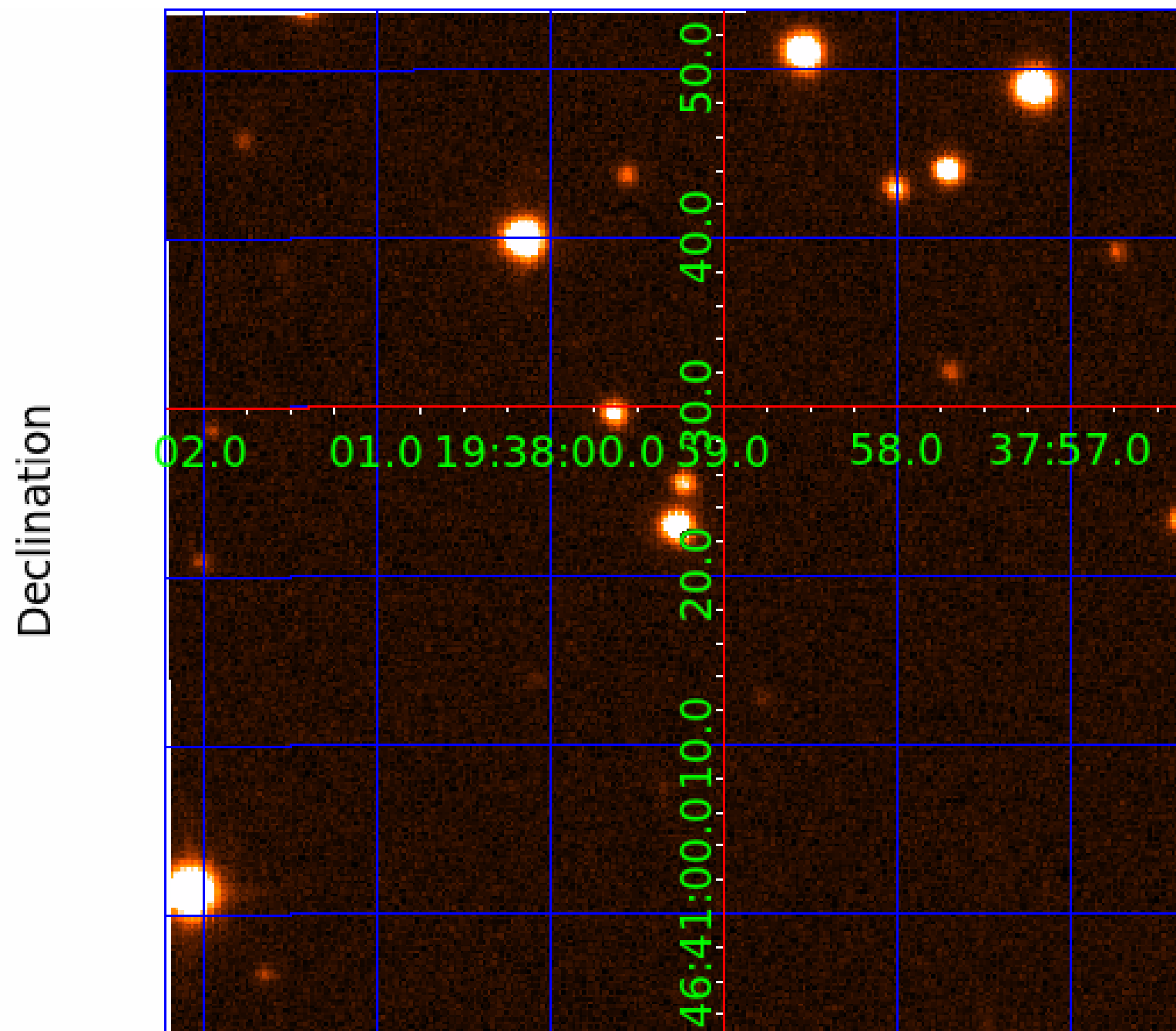
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 009837578

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})
009837578-01	OBS	2937.01	20.733617	132.852798	423839.7	3.500	9272.0	-1.0	0.97	5620	53.14	45.15
009837578-02	OBS	No	10.366862	132.958371	263944.6	5.000	6320.8	-1.0	0.97	5620	46.51	113.77
009837578-03	OBS	No	6.911114	132.801153	101.6	12.550	263.4	5.2	0.97	5620	0.97	195.35
009837578-04	OBS	No	185.413920	188.270963	3734.9	22.498	26.5	23.0	0.97	5620	11.07	2.43
009837578-05	OBS	No	333.649734	244.113348	382.8	10.696	26.5	3.7	0.97	5620	1.95	1.11
009837578-06	OBS	No	117.823087	164.388285	11977.6	2.000	29.9	-1.0	0.97	5620	10.59	4.45

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009837578-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—HAS_SEC_TCE—CENT_NOFITS
009837578-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
009837578-03	OBS	FP	0.00	1	0	0	1	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_FEW_DIFFS—EPHEM_MATCH
009837578-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009837578-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009837578-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—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.

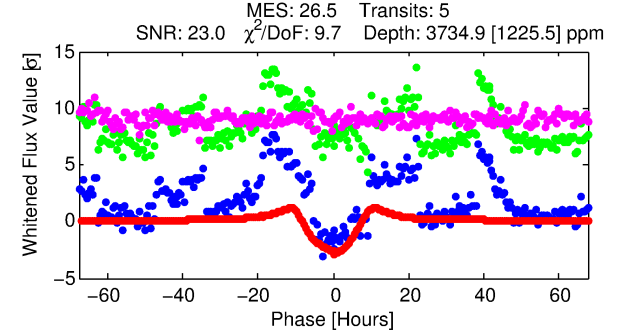
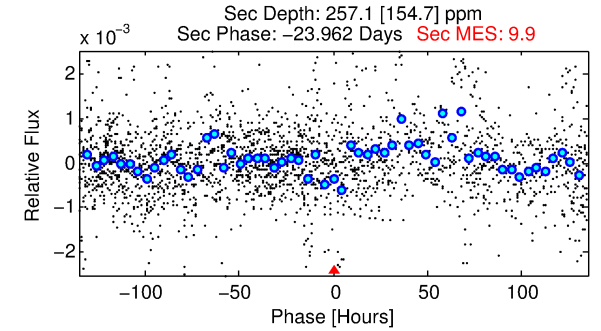
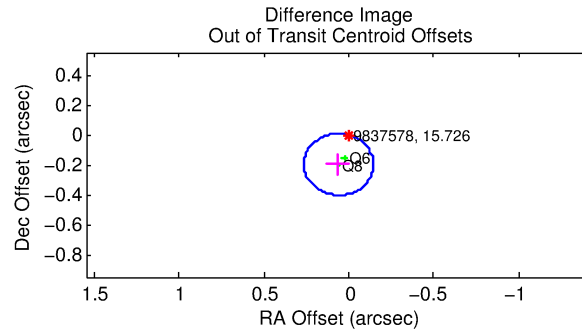
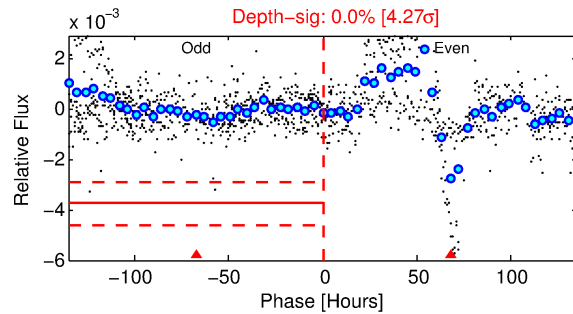
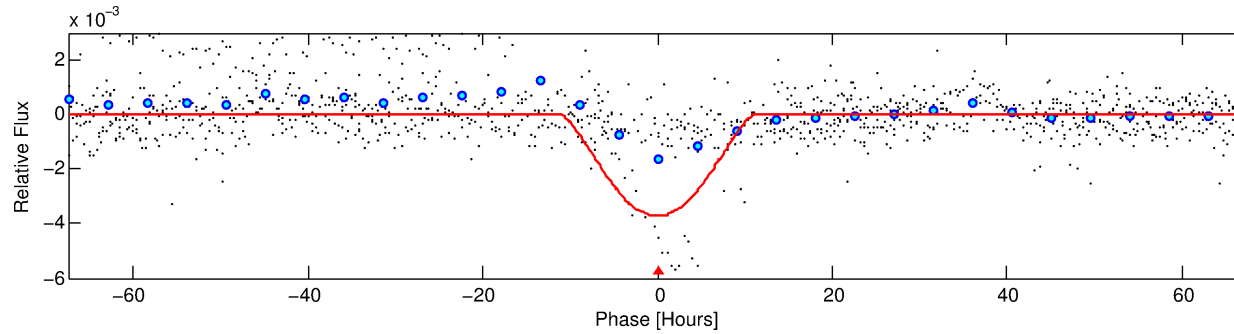
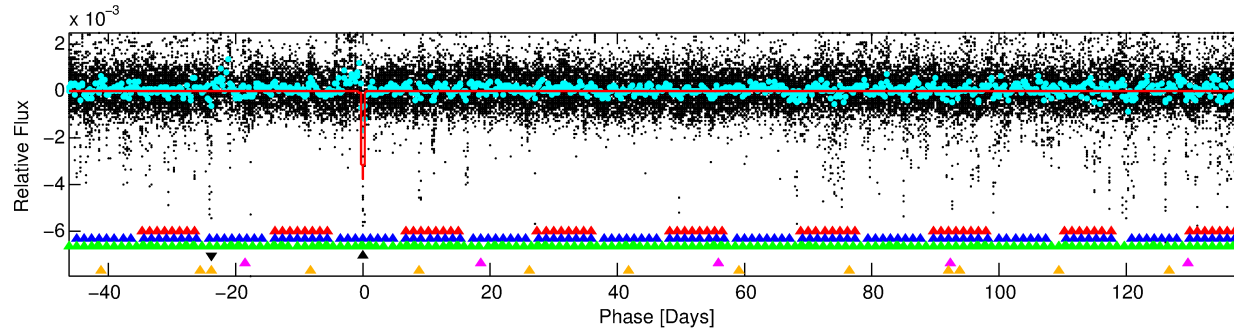
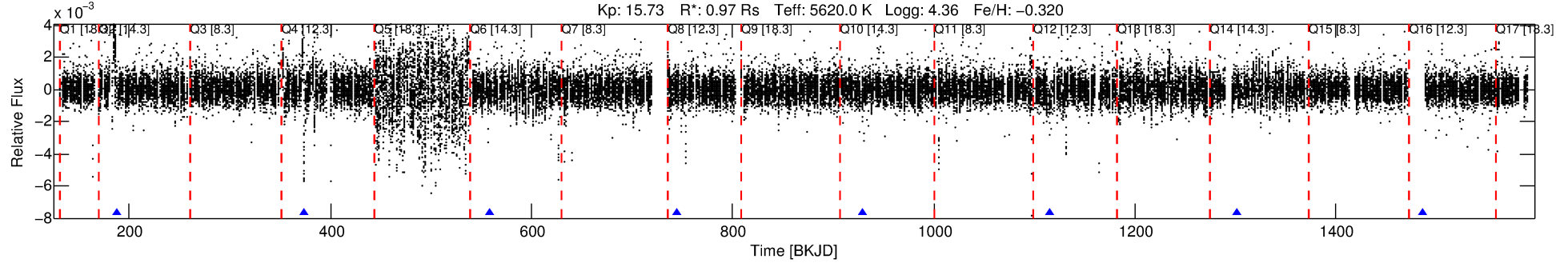
Ephemeris Match Information For 009837578-04

No Significant Match Found

DV One-Page Summary

KIC: 9837578 Candidate: 4 of 6 Period: 185.414 d
KOI: K02937 Corr: No Ephemeris Match

Kp: 15.73 R*: 0.97 Rs Teff: 5620.0 K Logg: 4.36 Fe/H: -0.320



DV Fit Results:

Period = 185.41392 [0.02271] d
Epoch = 188.2710 [0.0792] BKJD
Rp/R* = 0.1042 [0.4031]
a/R* = 29.56 [21.82]
b = 1.00 [0.59]
Seff = 2.43 [0.34]
Teff = 318 [11] K
Rp = 11.07 [42.86] Re
a = 0.5904 [0.0400] AU
Ag = 402.17 [3122.08] [0.13σ]
Teffp = 2205 [4279] K [0.44σ]

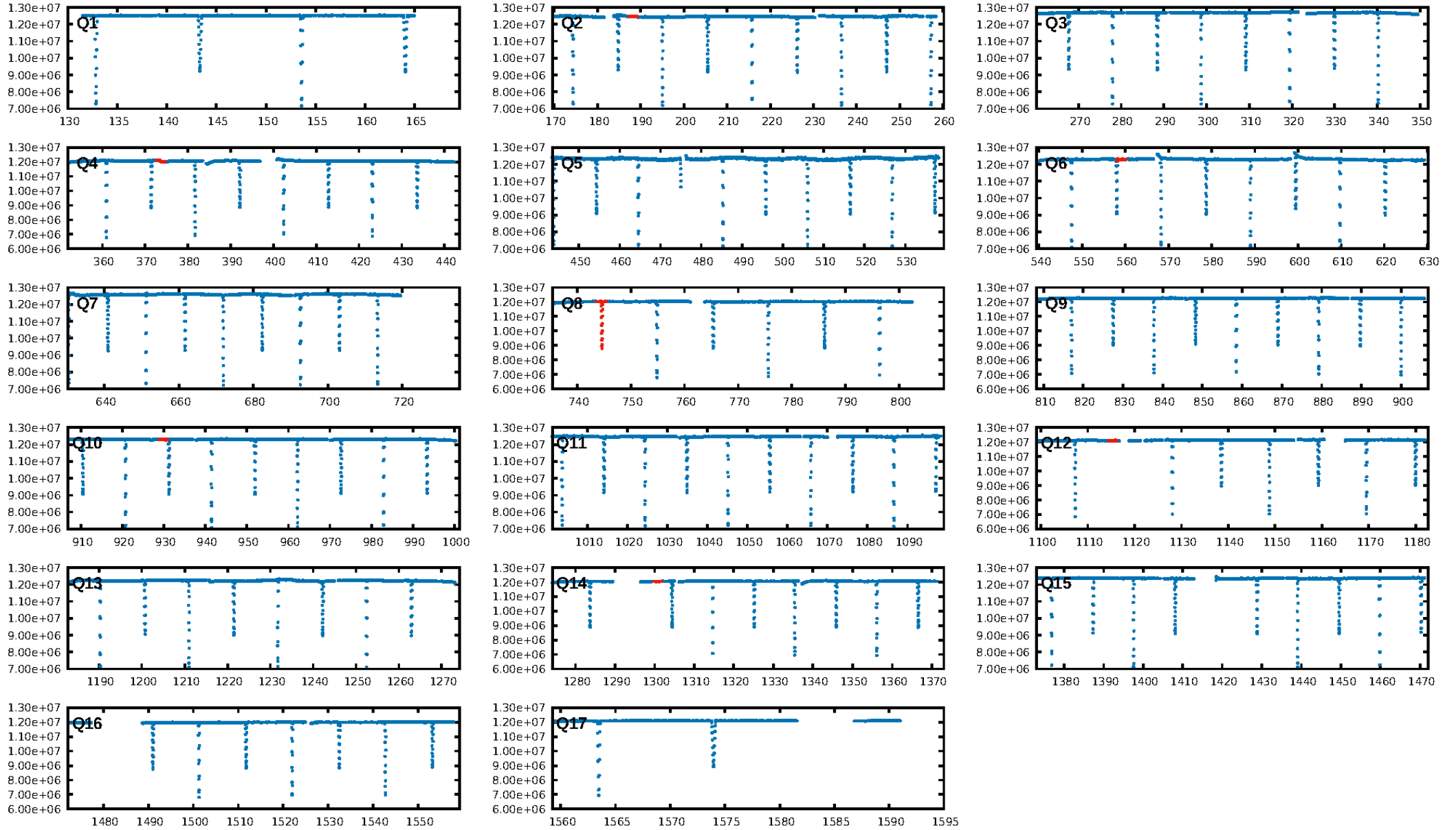
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [71.82σ]
LongPeriod-sig: 100.0% [142.82σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 0.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [5/5]
GhostDiagnostic-chr: 0.1481
Centroid-sig: 11.8%
Centroid-so: 0.238 arcsec [1.22σ]
OotOffset-rm: 0.207 arcsec [3.02σ]
OotOffset-st: 1/0/1/0 [2]
KicOffset-rm: 0.204 arcsec [2.91σ]
KicOffset-st: 1/0/1/0 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 0.00 [0/4]

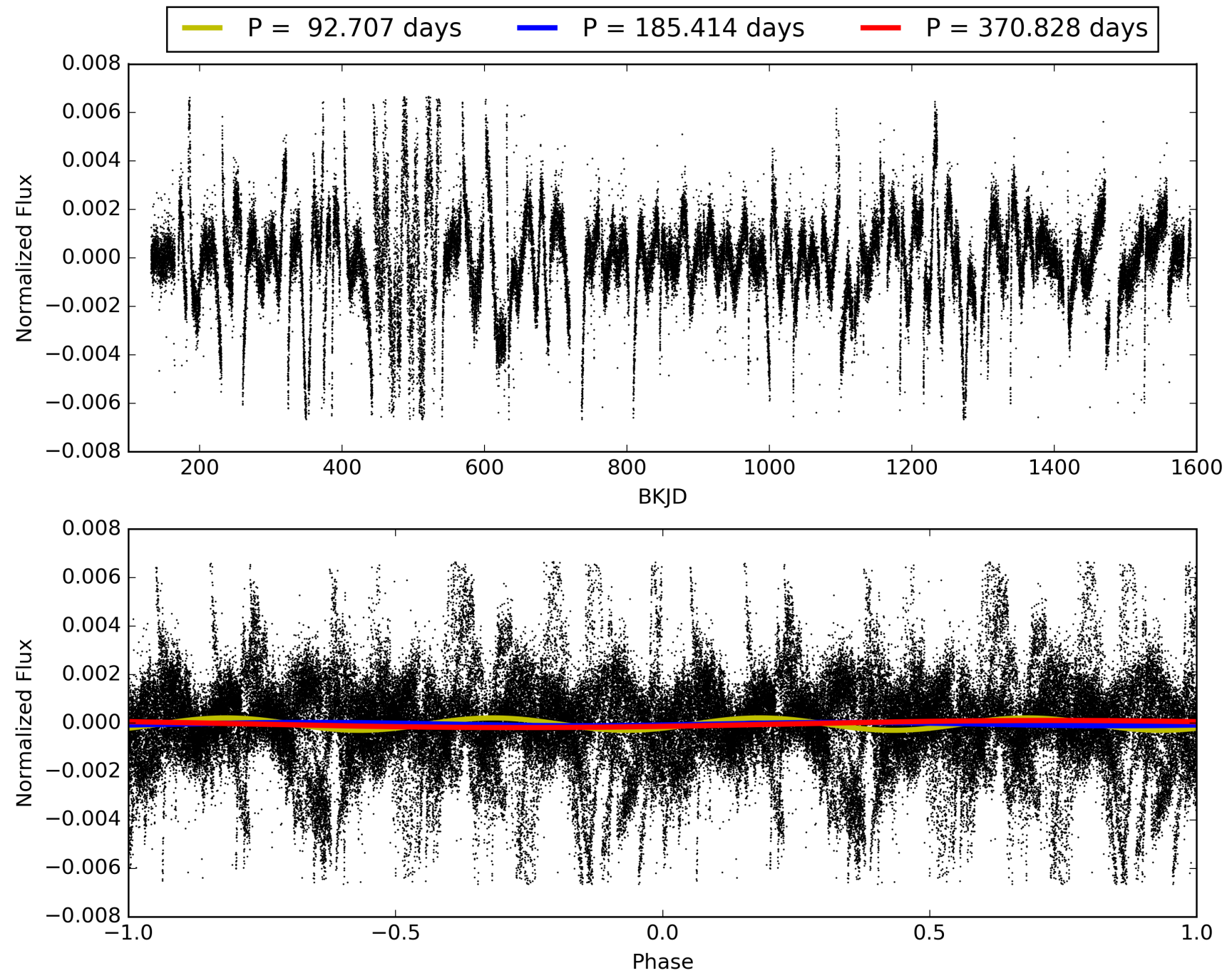
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 01:27:10 Z

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

TCE 009837578-04, PDC Light Curves

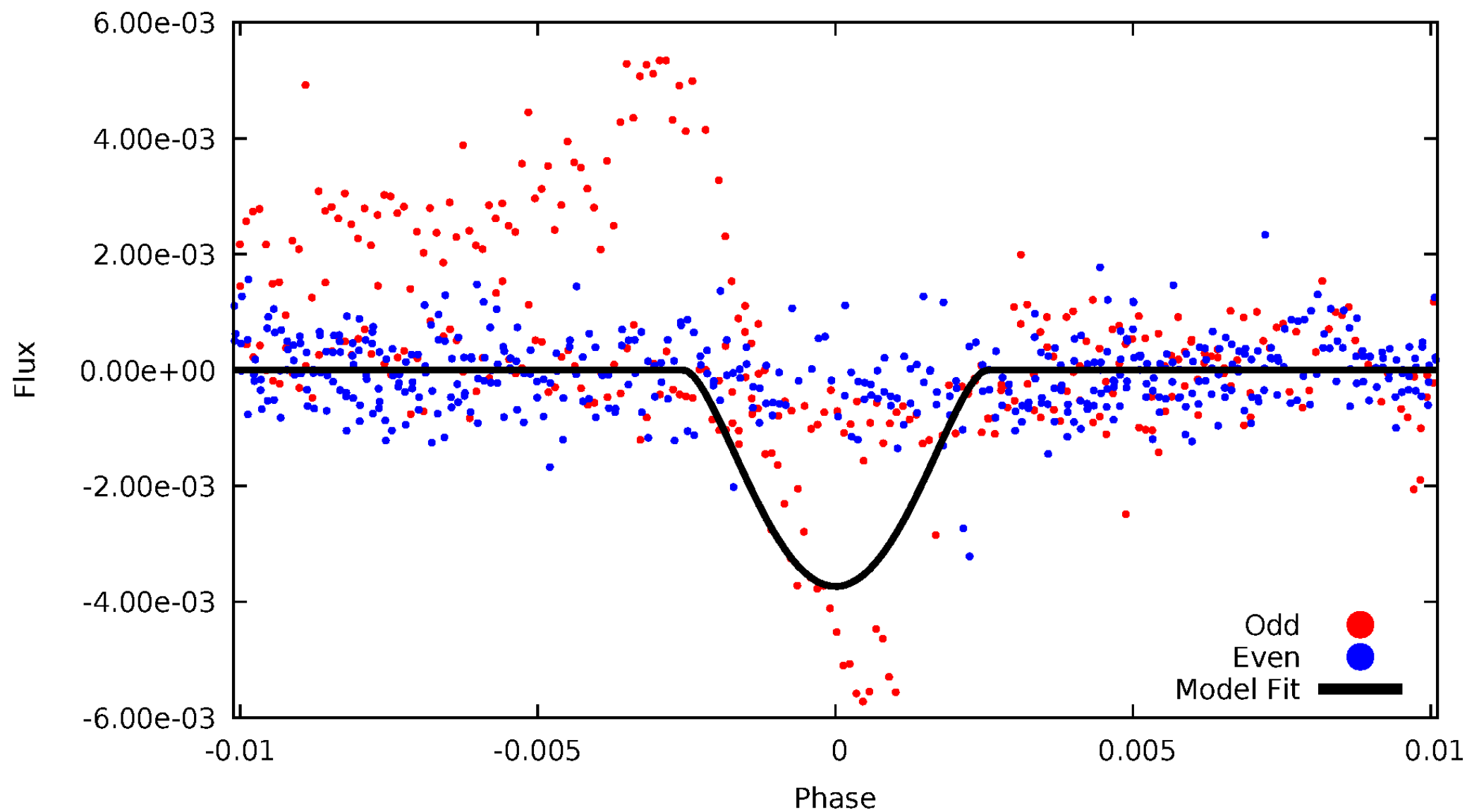


TCE 009837578-04



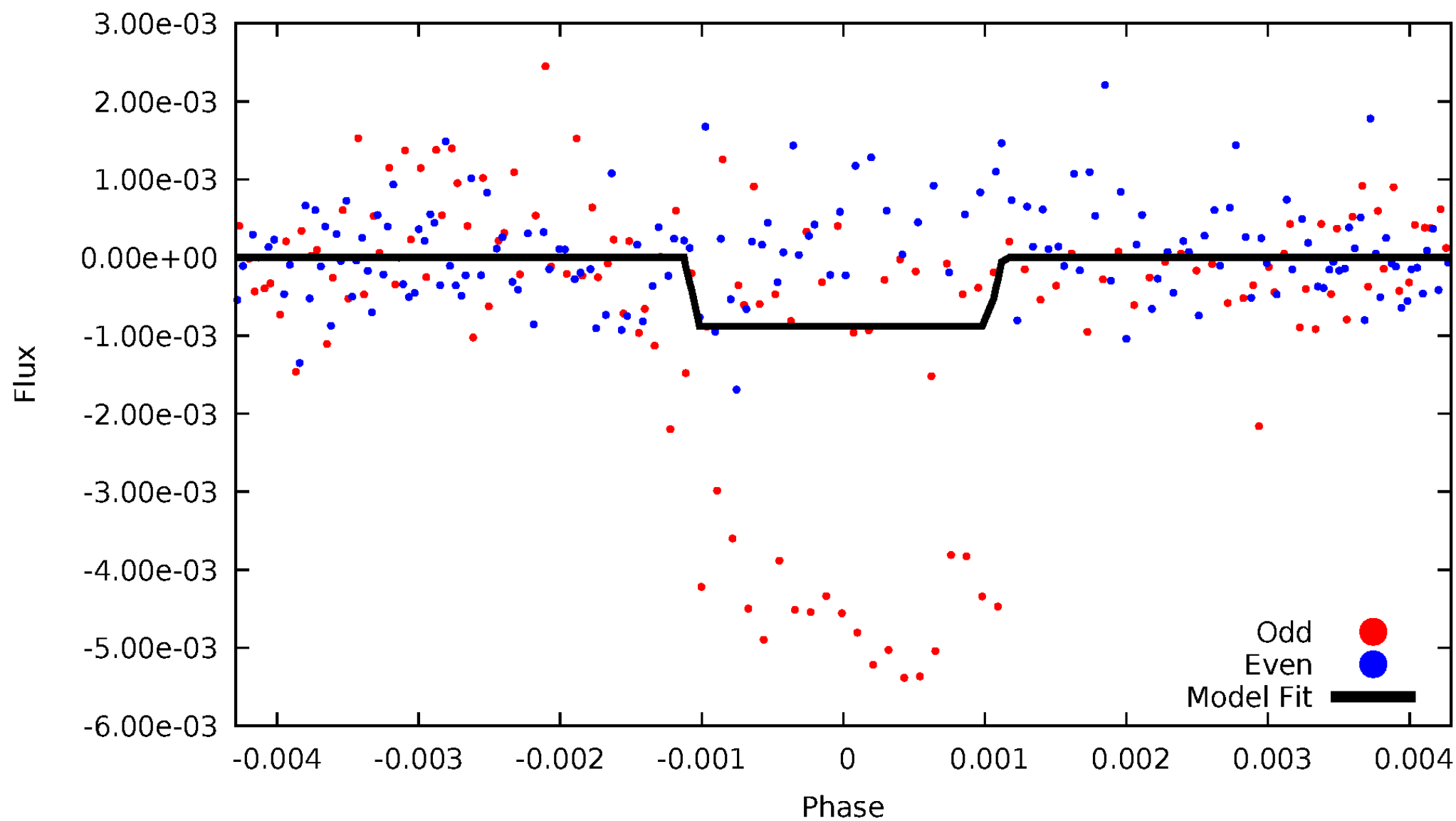
DV Odd/Even

TCE 009837578-04



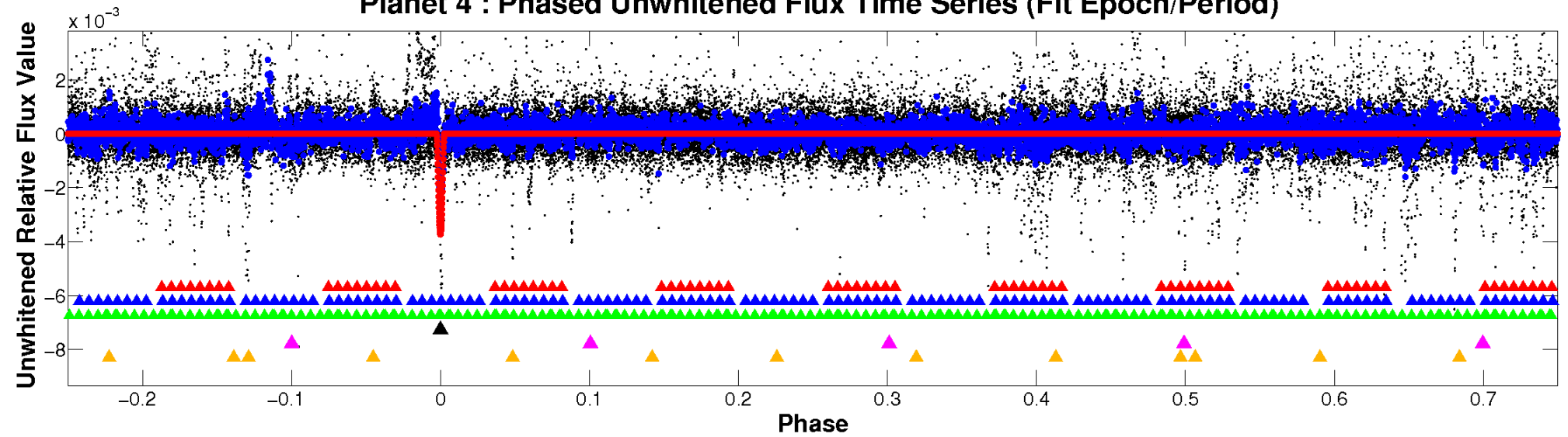
ALT Odd/Even

TCE 009837578-04

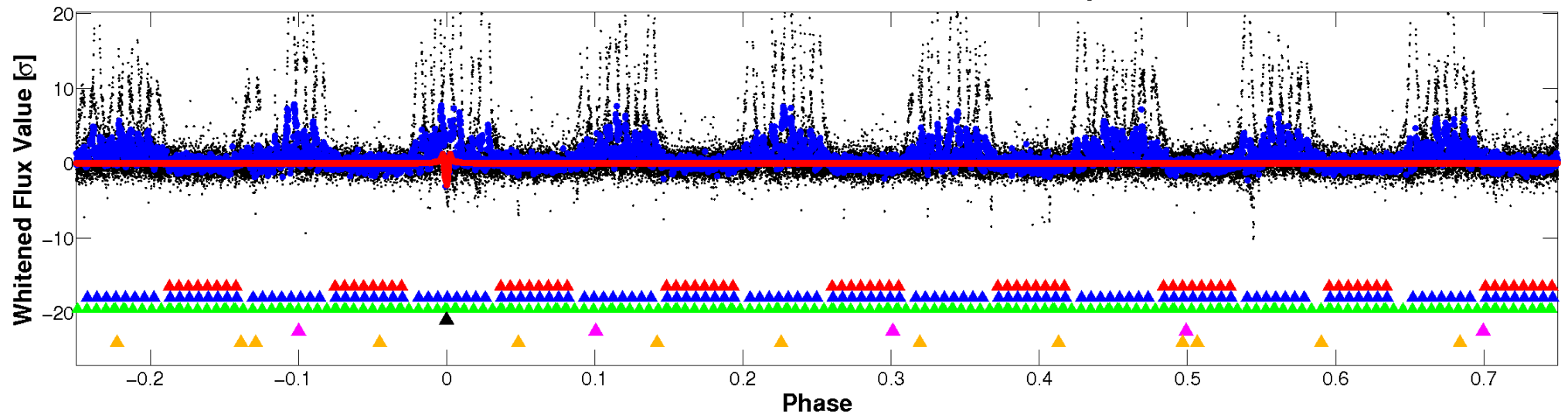


Non-Whitened Vs. Whitened Light Curve

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

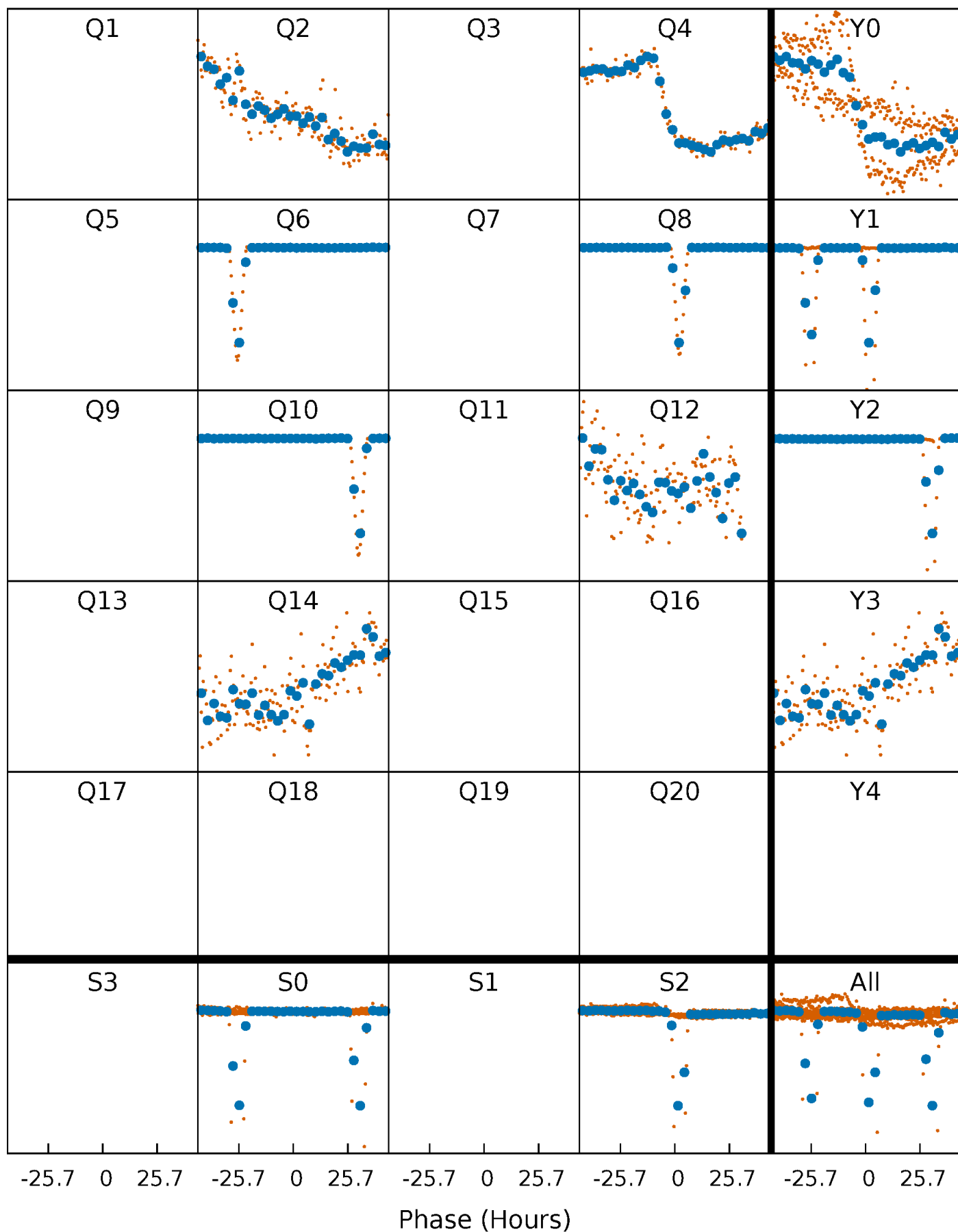


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



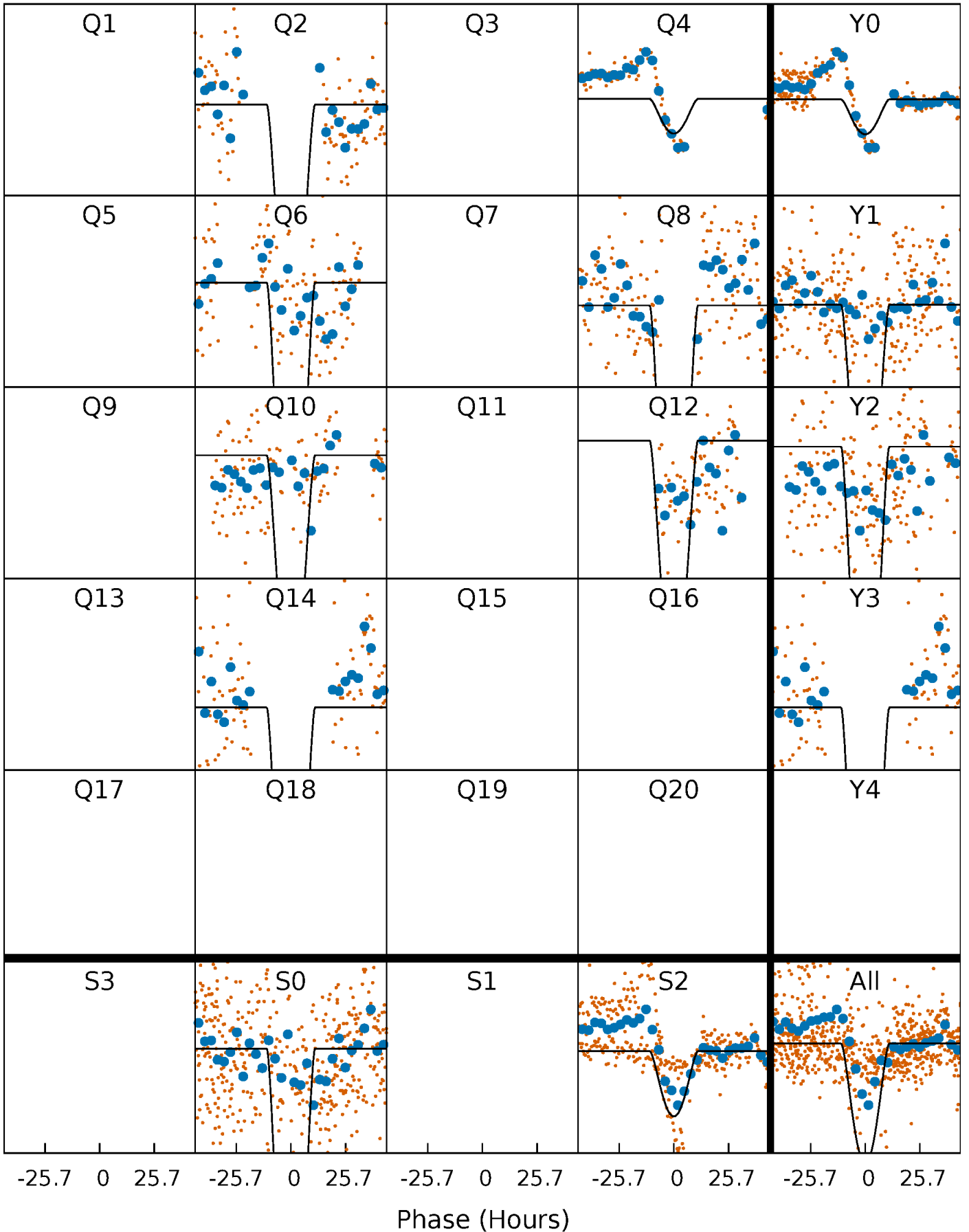
PDC Quarter-Phased Transit Curves

TCE 009837578-04 $P=185.413920$ Days $T_0=188.270963$ (BKJD)



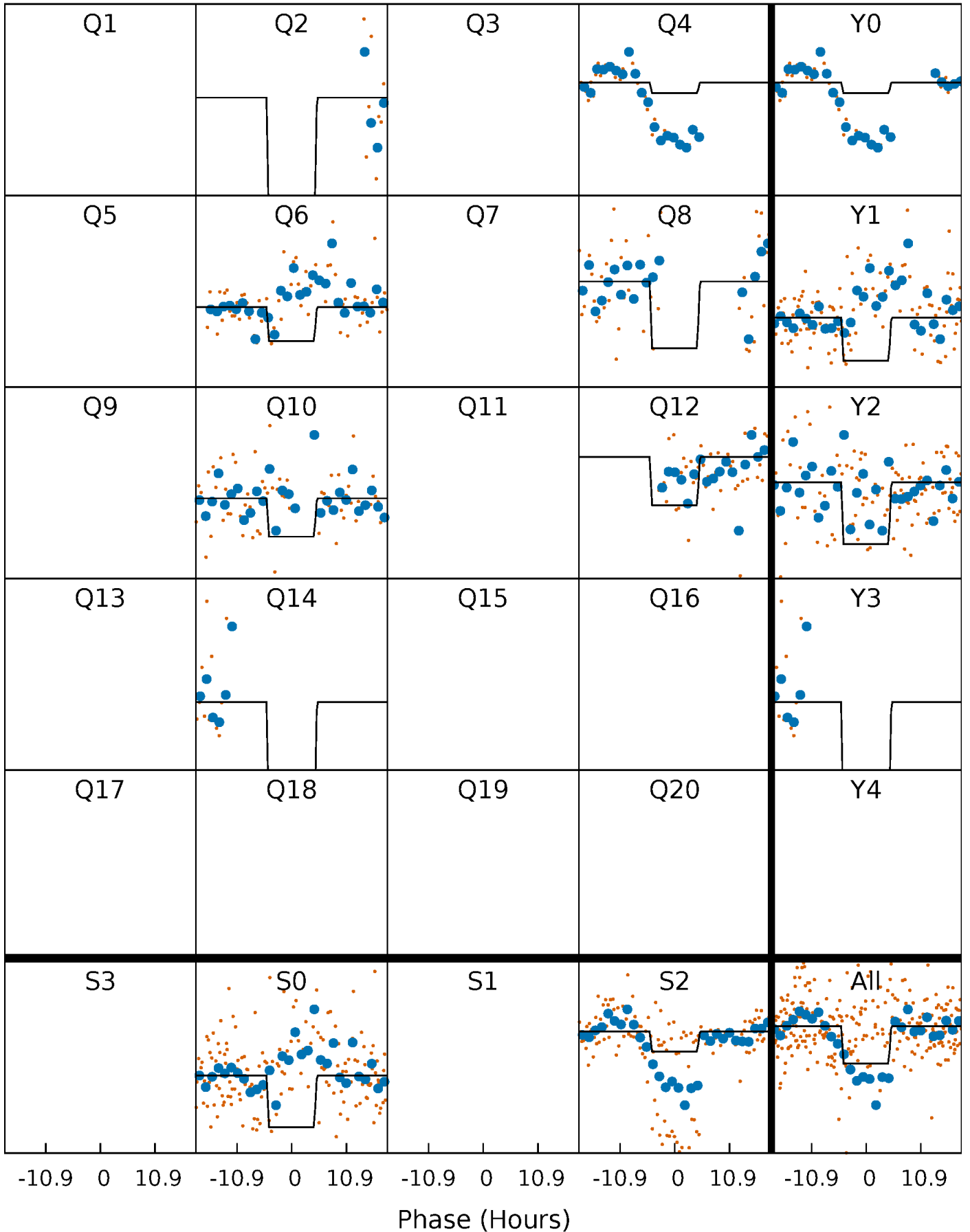
DV Quarter-Phased Transit Curves

TCE 009837578-04 P=185.413920 Days $T_0=188.270963$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

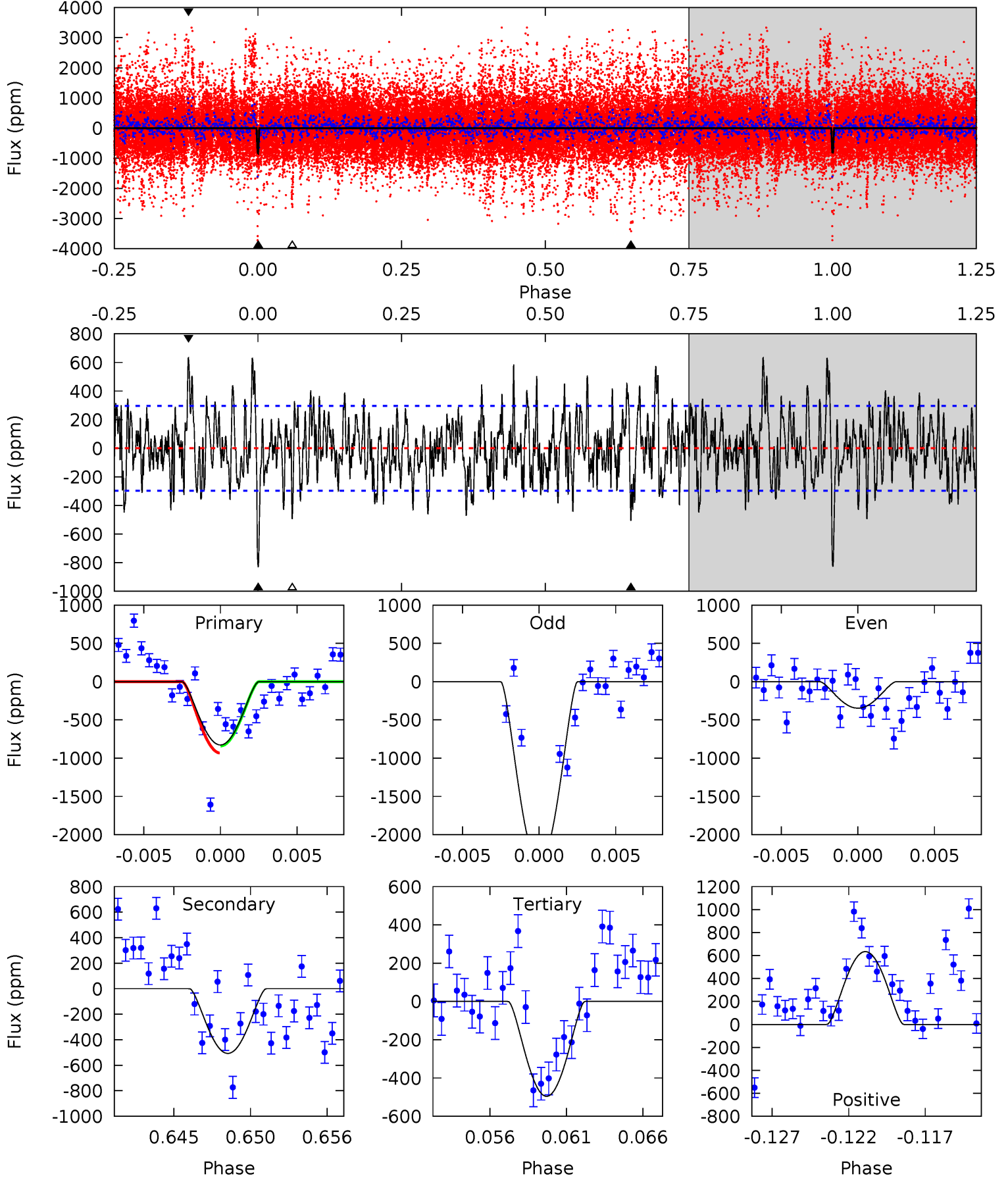
TCE 009837578-04 P=185.359634 Days $T_0=188.310707$ (BKJD)



DV Model-Shift Uniqueness Test

009837578-04, P = 185.413920 Days, E = 2.857043 Days

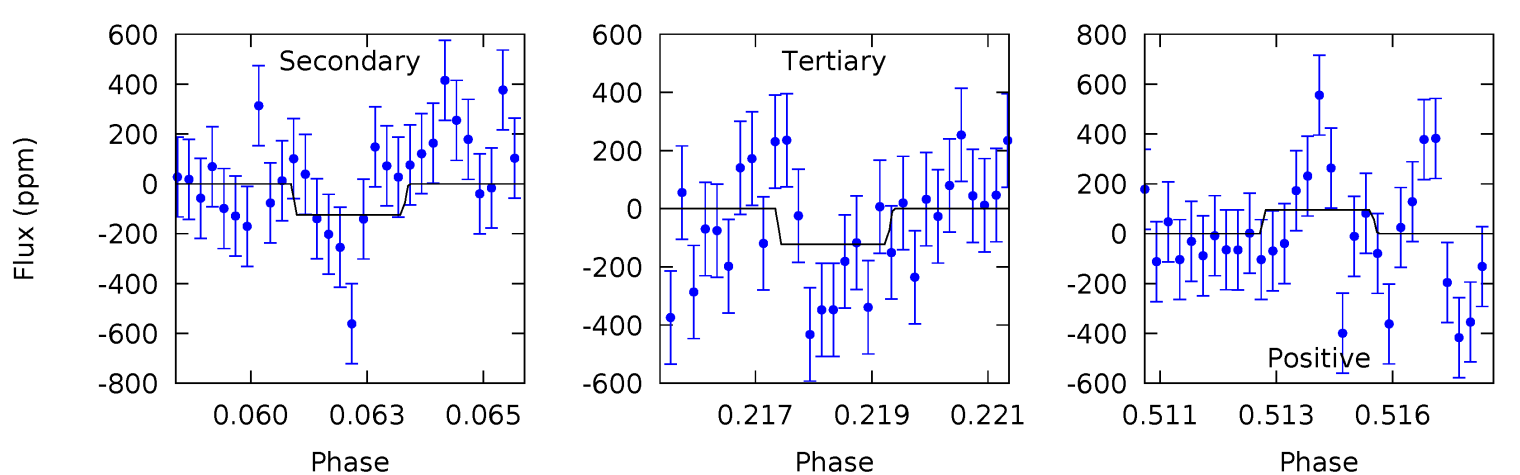
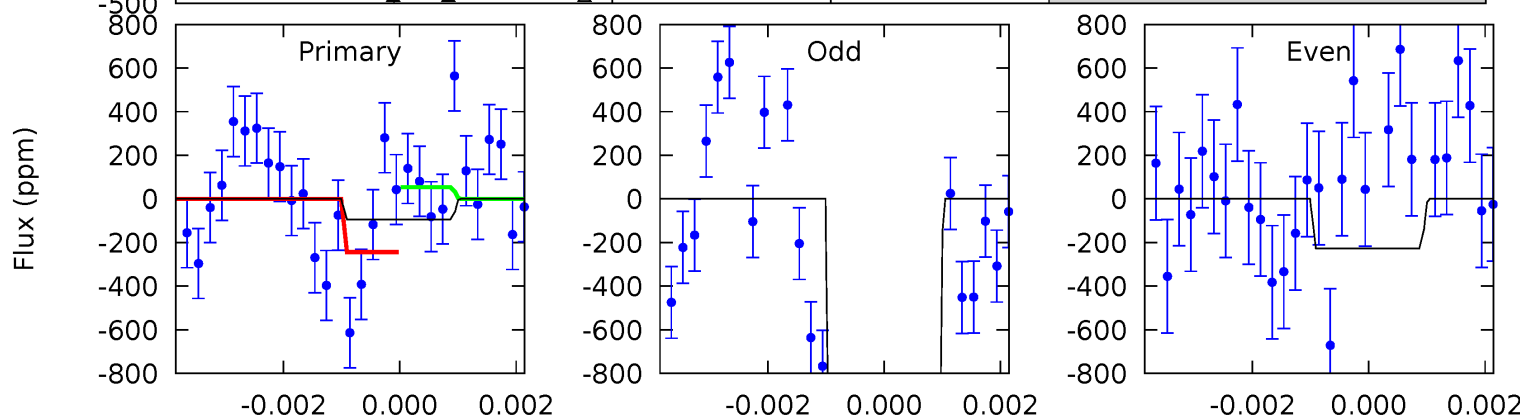
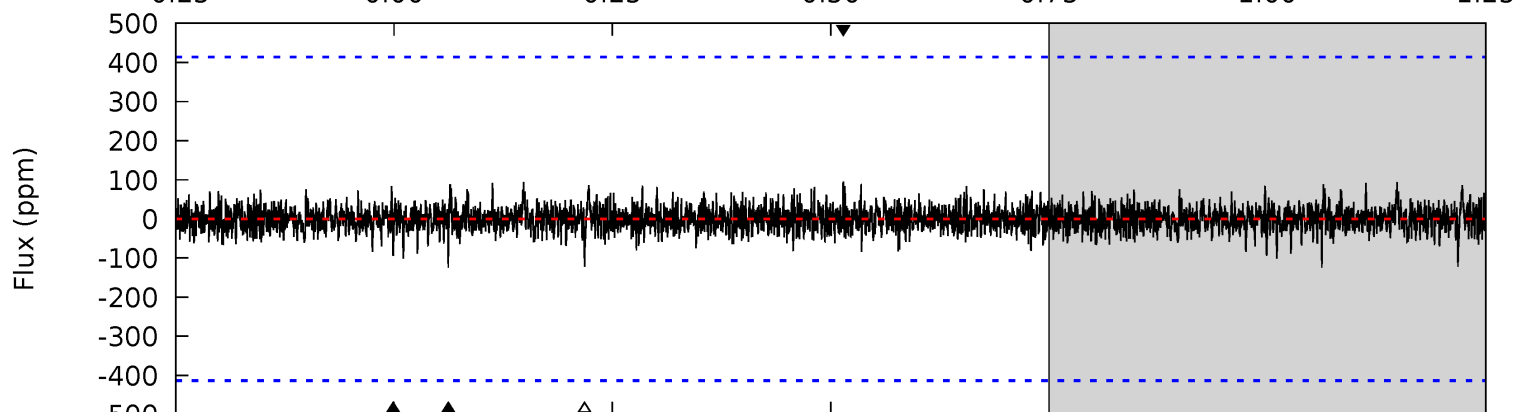
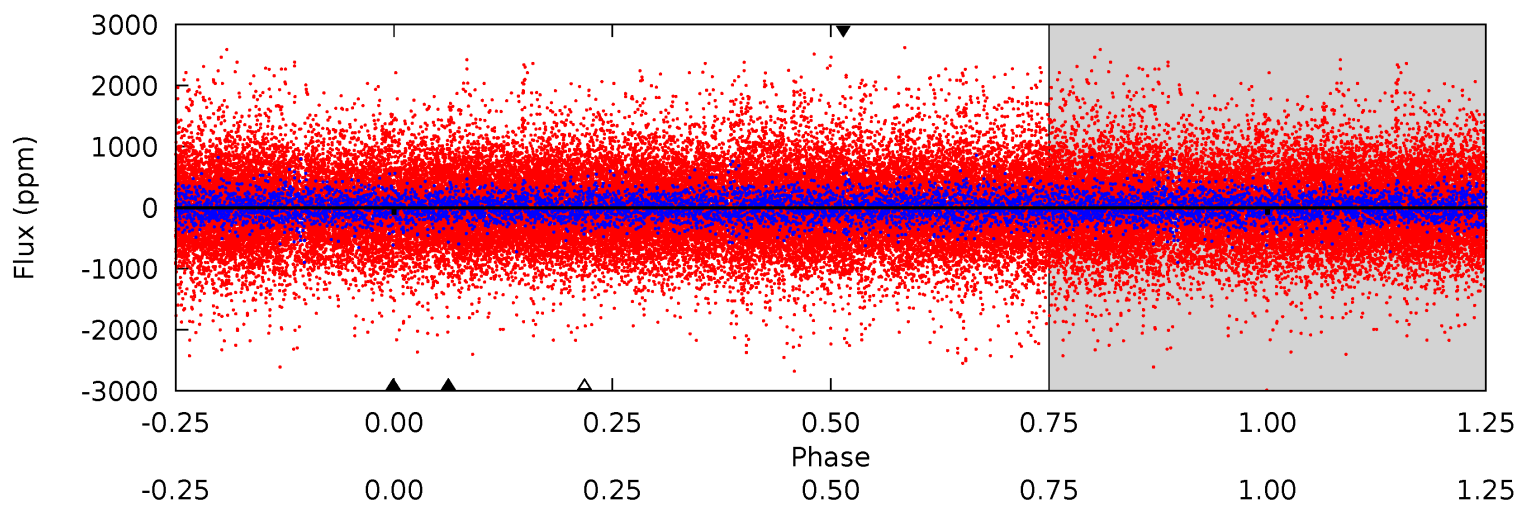
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.4	8.81	8.61	11.0	5.15	2.80	3.23	5.76	3.36	0.20	-2.21	17.6	2.57	0.43	0.81



Alt Model-Shift Uniqueness Test

009837578-04, P = 185.359634 Days, E = 2.951073 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.21	1.60	1.56	1.22	5.31	3.06	0.32	-0.35	-0.01	0.04	0.38	13.4	-8.16	0.43	0



Stellar Parameters For KIC 009837578

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5620^{+118}_{-75}	$4.363^{+0.065}_{-0.040}$	$-0.320^{+0.150}_{-0.100}$	$0.974^{+0.067}_{-0.067}$	$0.797^{+0.067}_{-0.024}$	$1.217^{+0.300}_{-0.166}$
	+2%/-1%	+1%/-1%	+47%/-31%	+7%/-7%	+8%/-3%	+25%/-14%
Source	SPE36	TRA36	SPE36	DSEP		

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

Secondary Eclipse Parameters for KIC 009837578-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-507 ± 58	$33.37^{+31.87}_{-23.71}$	444^{+10}_{-12}	2404^{+942}_{-343}	92^{+1028}_{-68}
Alt.	-125 ± 78	$28.80^{+32.97}_{-19.32}$	444^{+12}_{-11}	2067^{+584}_{-334}	24^{+184}_{-19}

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

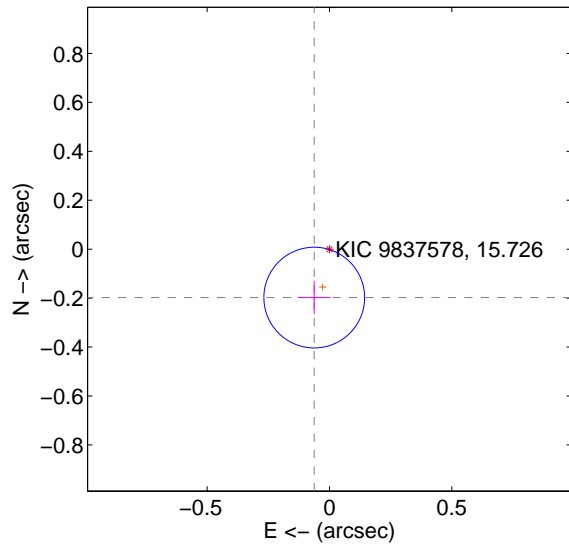
Supplemental centroid analysis for 009837578-04. Kepler magnitude: 15.73. Transit SNR 23.03

There are 1 quarters with good PRF difference image offsets

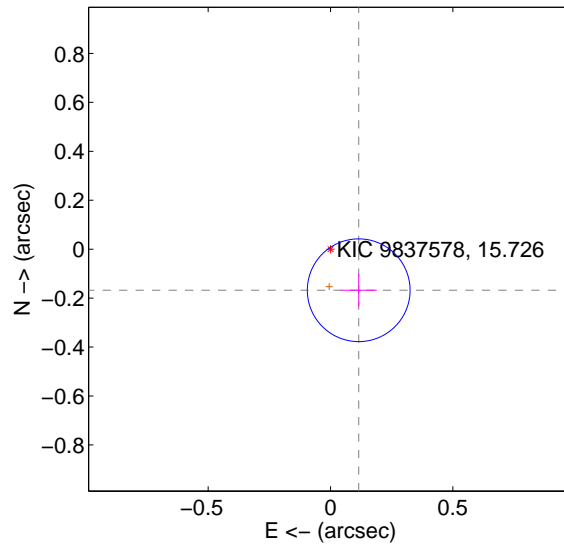
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.207 ± 0.069	3.02	0.062 ± 0.067	-0.198 ± 0.069
PRF-fit source offset from KIC position	0.204 ± 0.070	2.91	-0.115 ± 0.074	-0.168 ± 0.067
photometric centroid source offset	0.24 ± 0.20	1.22	0.24 ± 0.20	-0.02 ± 0.23

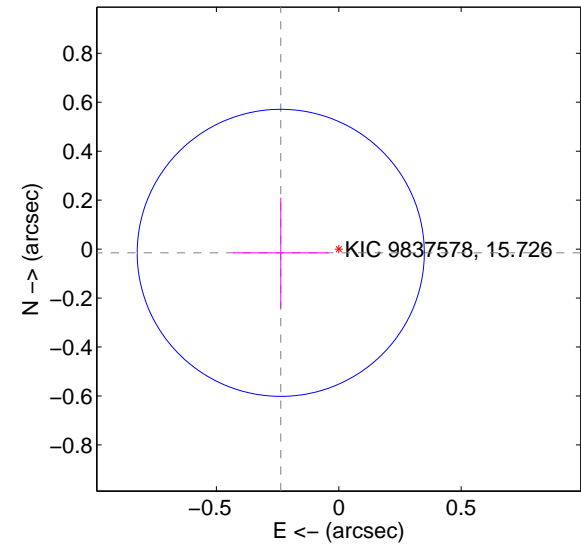
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

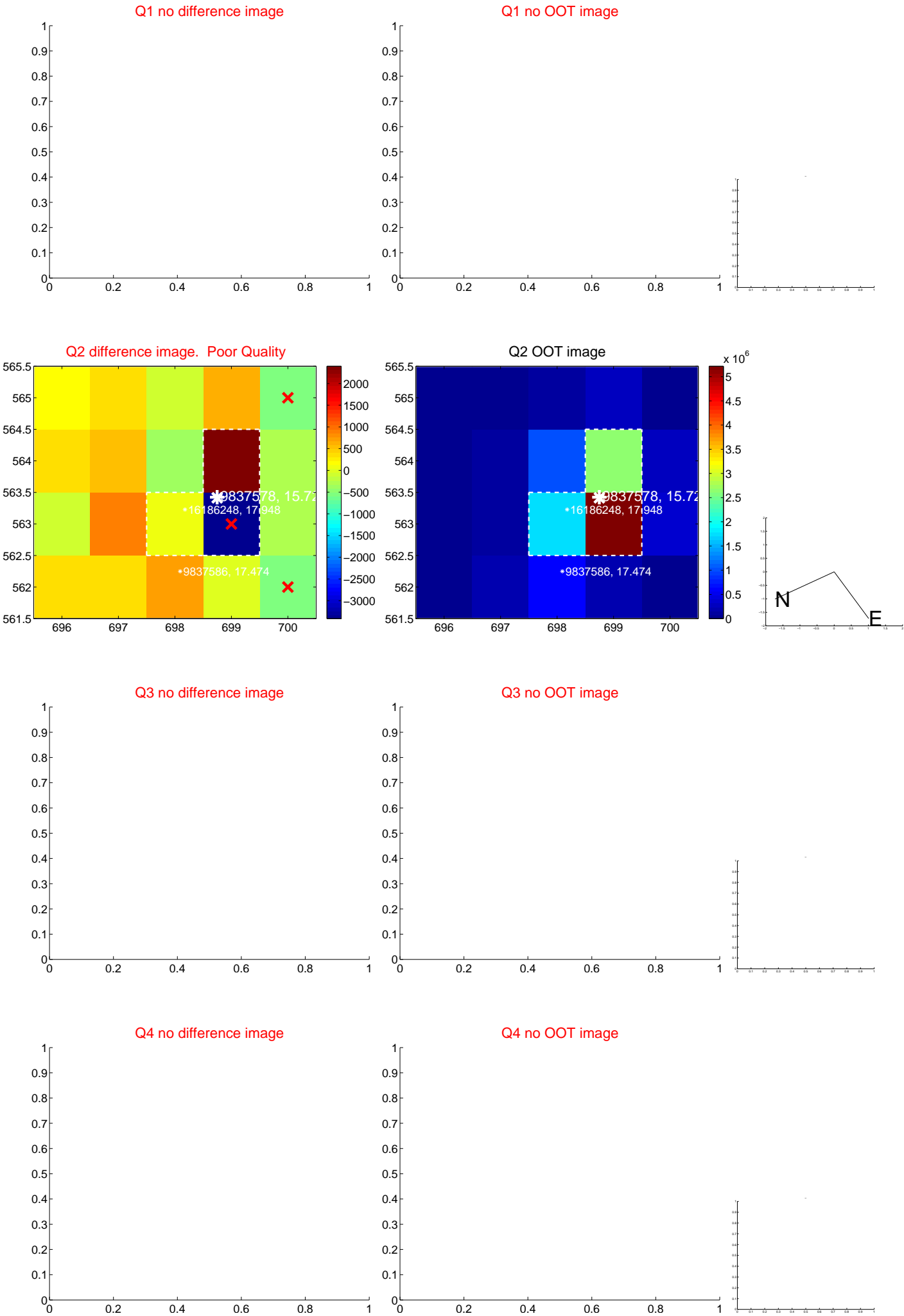


offset from photometric centroids

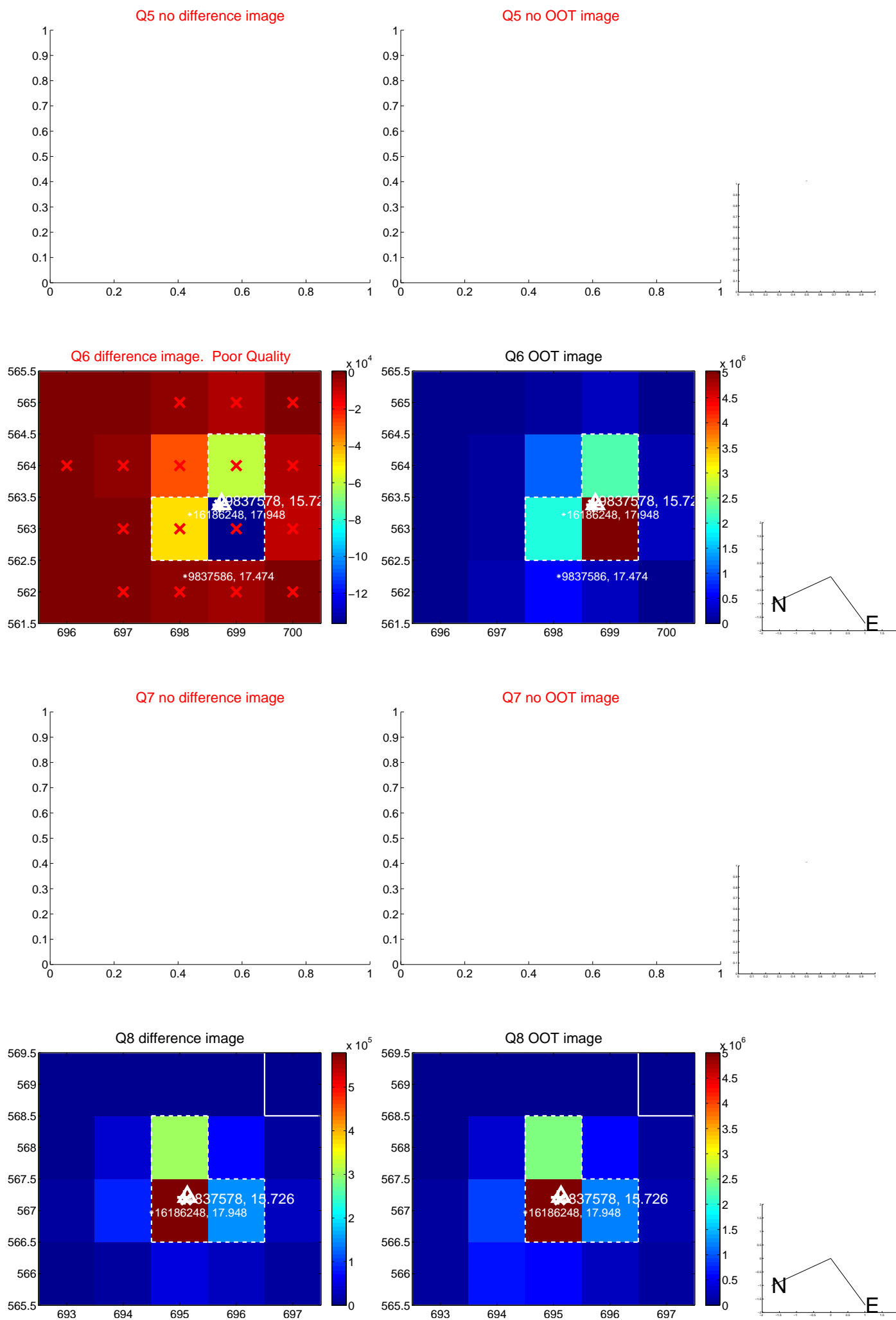


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



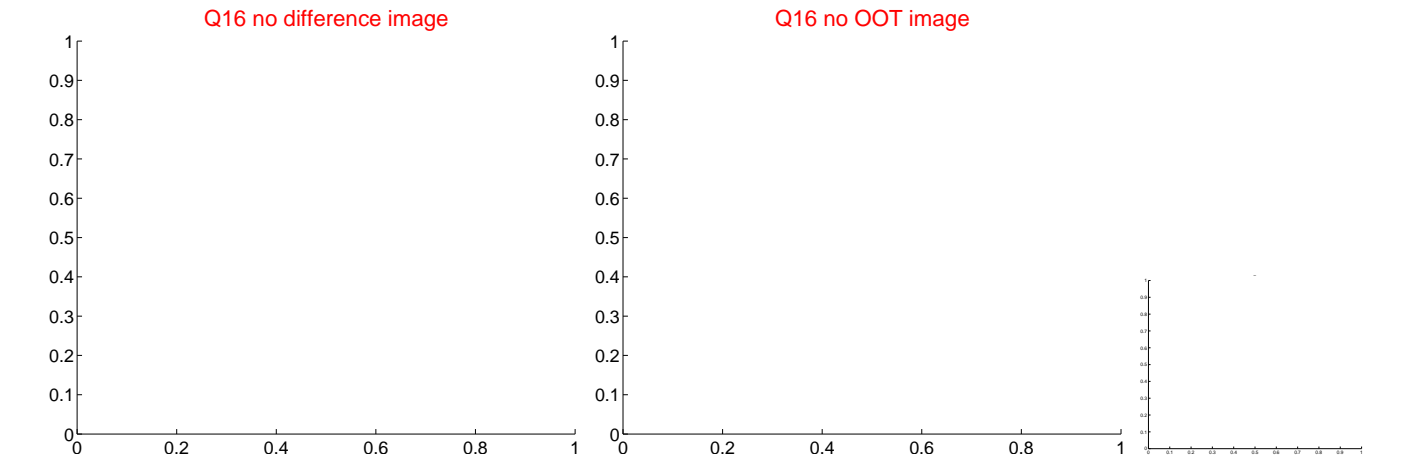
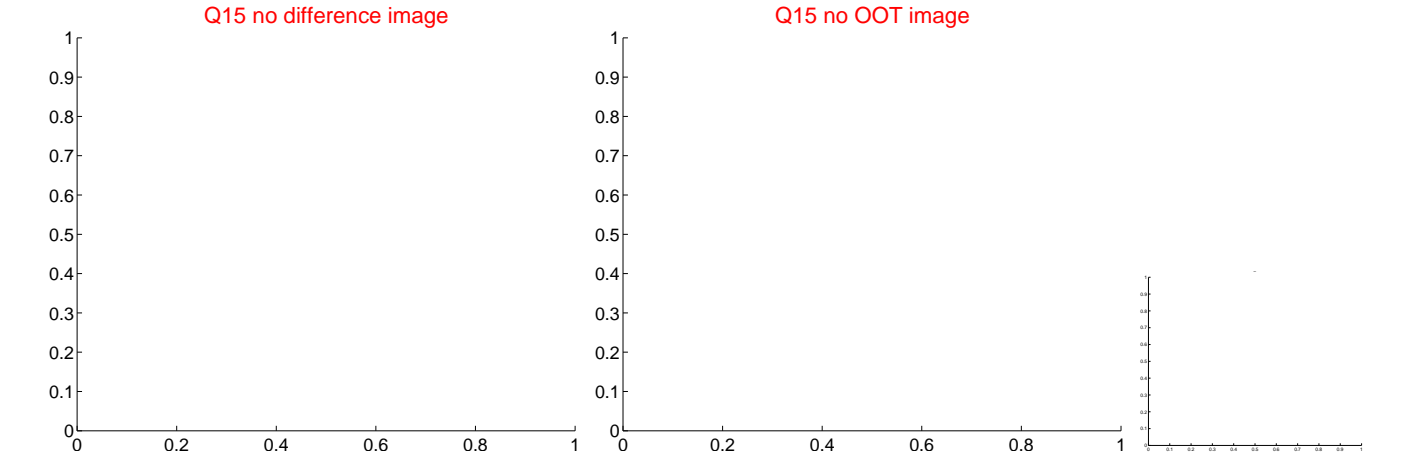
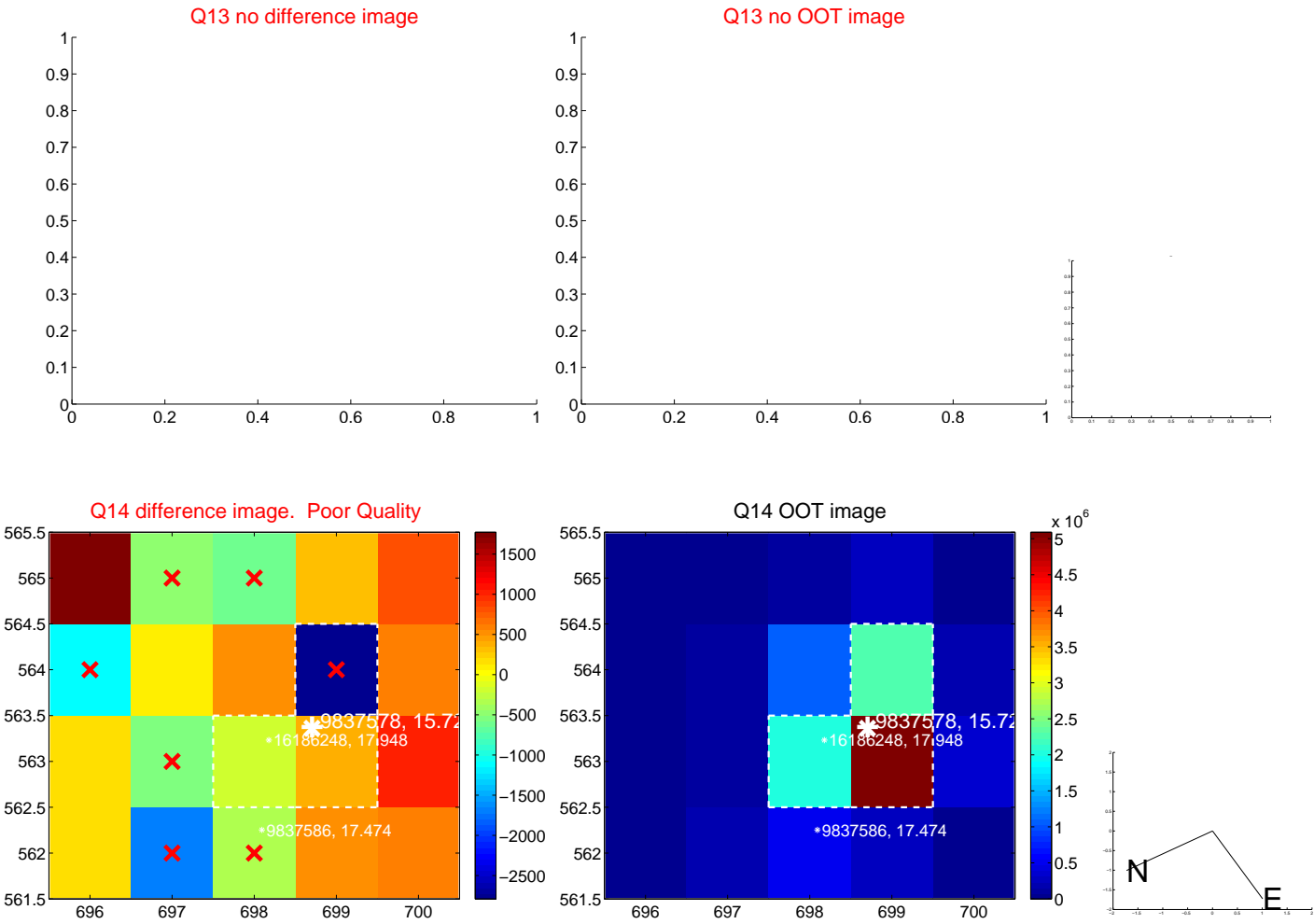
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



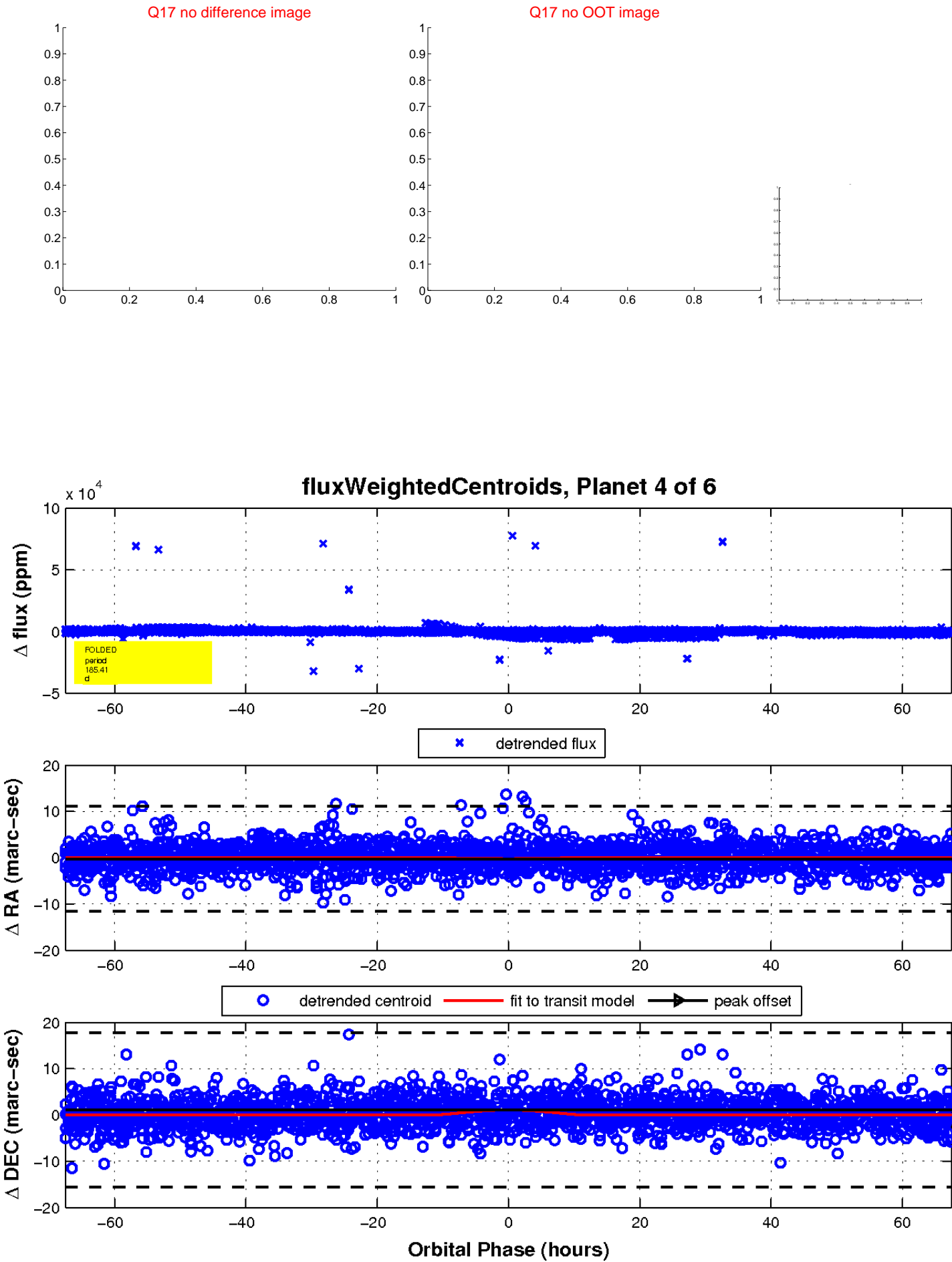
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



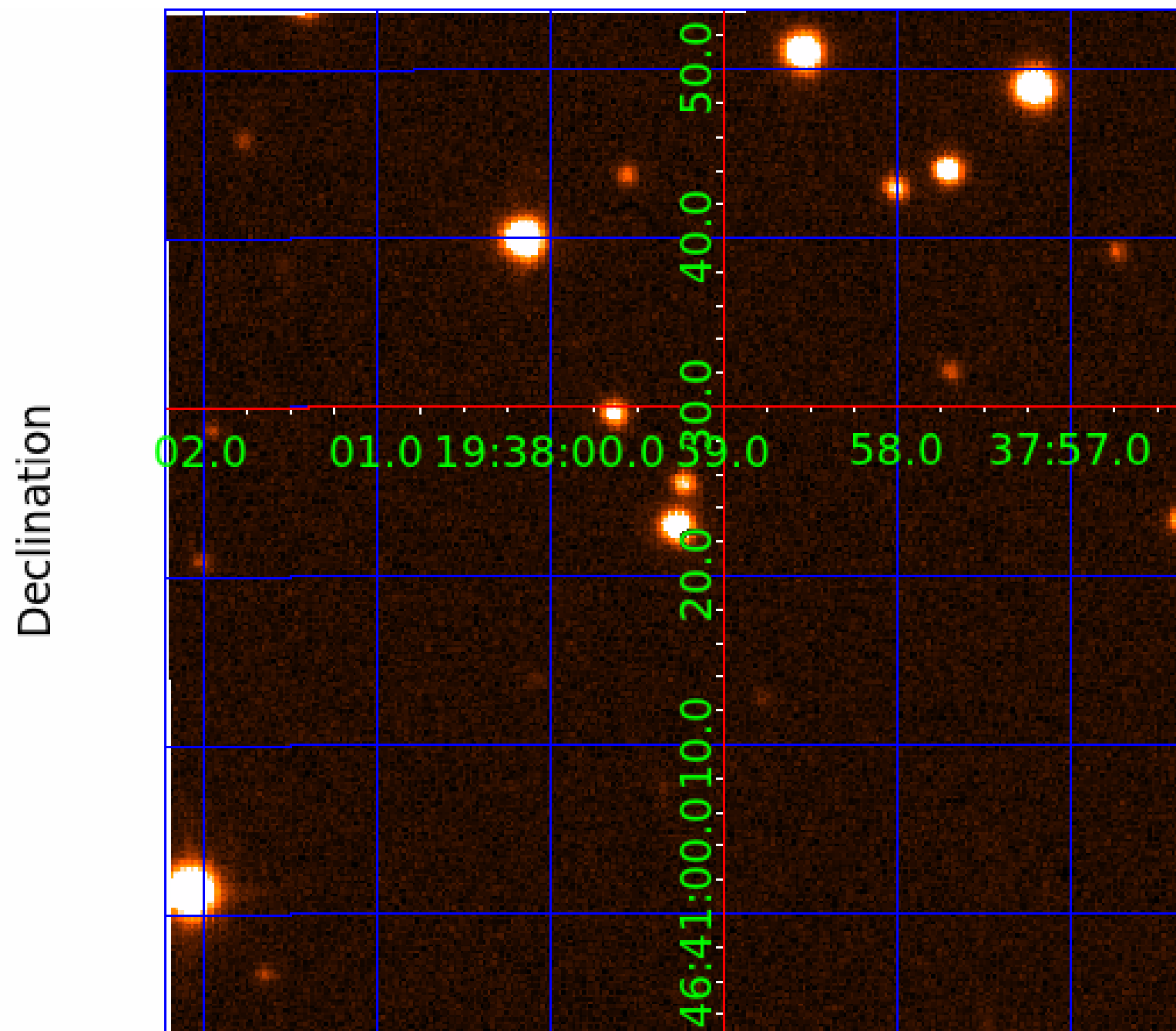
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



UKIRT Image



KIC 009837578

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})
009837578-01	OBS	2937.01	20.733617	132.852798	423839.7	3.500	9272.0	-1.0	0.97	5620	53.14	45.15
009837578-02	OBS	No	10.366862	132.958371	263944.6	5.000	6320.8	-1.0	0.97	5620	46.51	113.77
009837578-03	OBS	No	6.911114	132.801153	101.6	12.550	263.4	5.2	0.97	5620	0.97	195.35
009837578-04	OBS	No	185.413920	188.270963	3734.9	22.498	26.5	23.0	0.97	5620	11.07	2.43
009837578-05	OBS	No	333.649734	244.113348	382.8	10.696	26.5	3.7	0.97	5620	1.95	1.11
009837578-06	OBS	No	117.823087	164.388285	11977.6	2.000	29.9	-1.0	0.97	5620	10.59	4.45

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009837578-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—HAS_SEC_TCE—CENT_NOFITS
009837578-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
009837578-03	OBS	FP	0.00	1	0	0	1	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_FEW_DIFFS—EPHEM_MATCH
009837578-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009837578-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009837578-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—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.

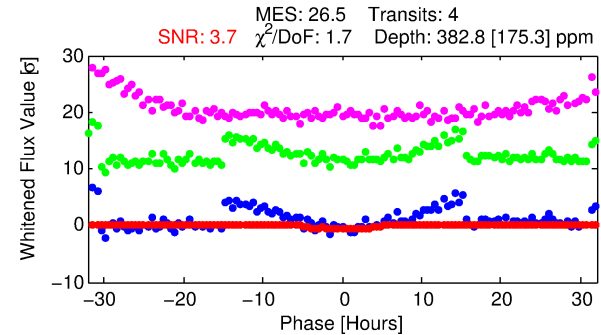
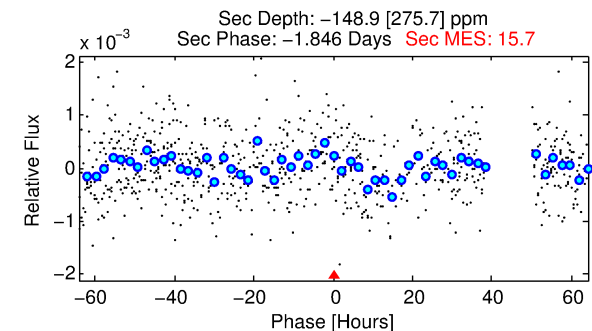
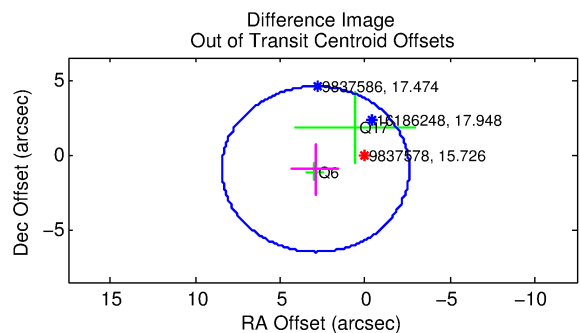
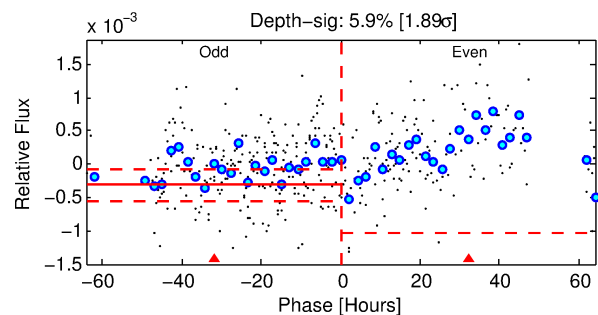
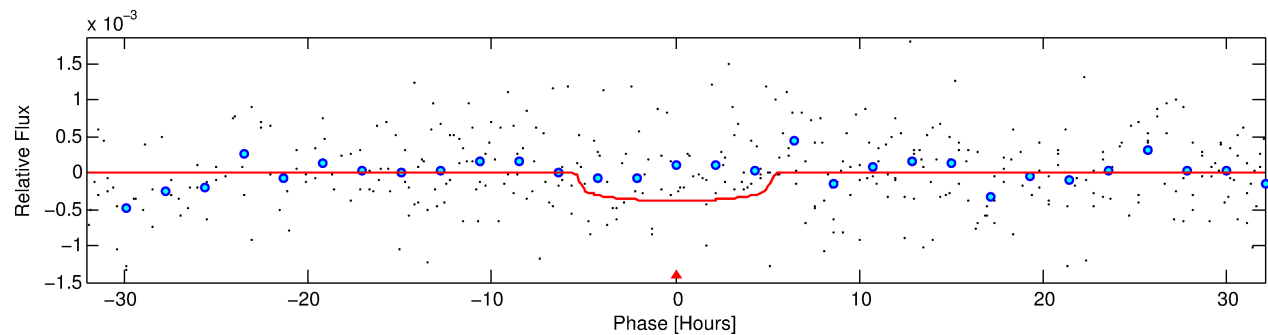
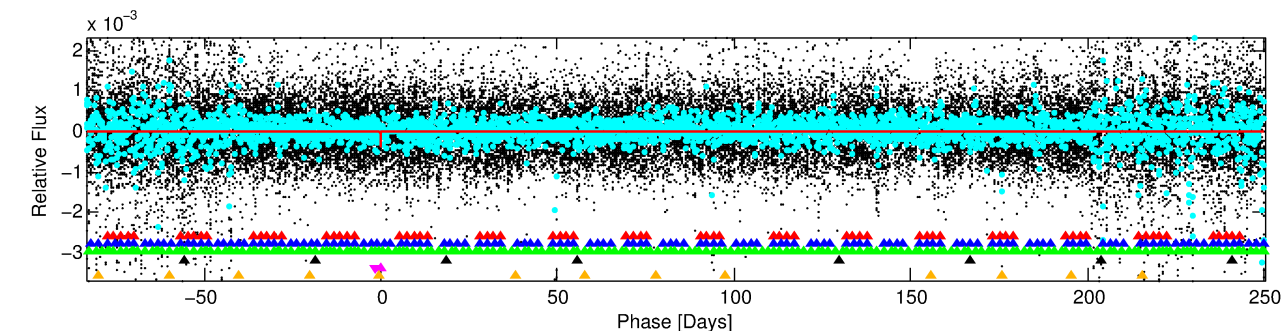
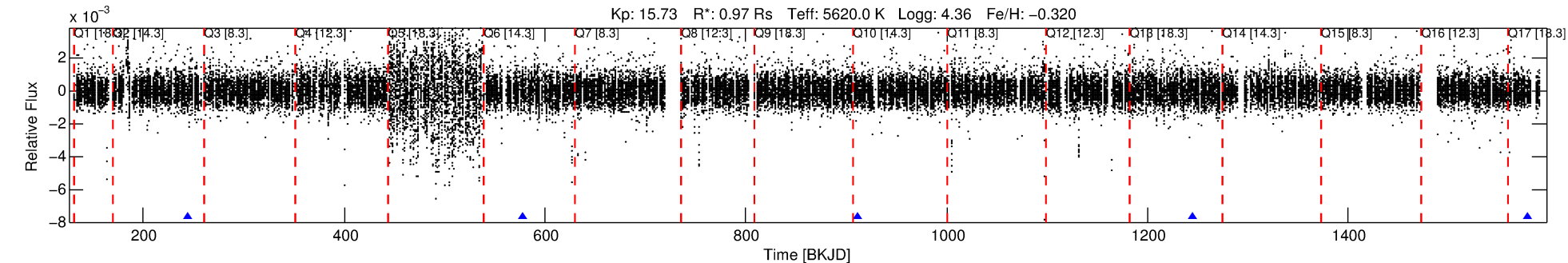
Ephemeris Match Information For 009837578-05

No Significant Match Found

DV One-Page Summary

KIC: 9837578 Candidate: 5 of 6 Period: 333.650 d
KOI: K02937 Corr: No Ephemeris Match

Kp: 15.73 R*: 0.97 Rs Teff: 5620.0 K Logg: 4.36 Fe/H: -0.320



DV Fit Results:

Period = 333.64973 [0.01884] d
Epoch = 244.1133 [0.0520] BKJD
Rp/R* = 0.0183 [0.0835]
a/R* = 210.54 [4230.60]
b = 0.51 [29.74]
Seff = 1.11 [0.15]
Teq = 262 [9] K
Rp = 1.95 [8.88] Re
a = 0.8735 [0.0592] AU
Ag = N/A
Teffp = N/A

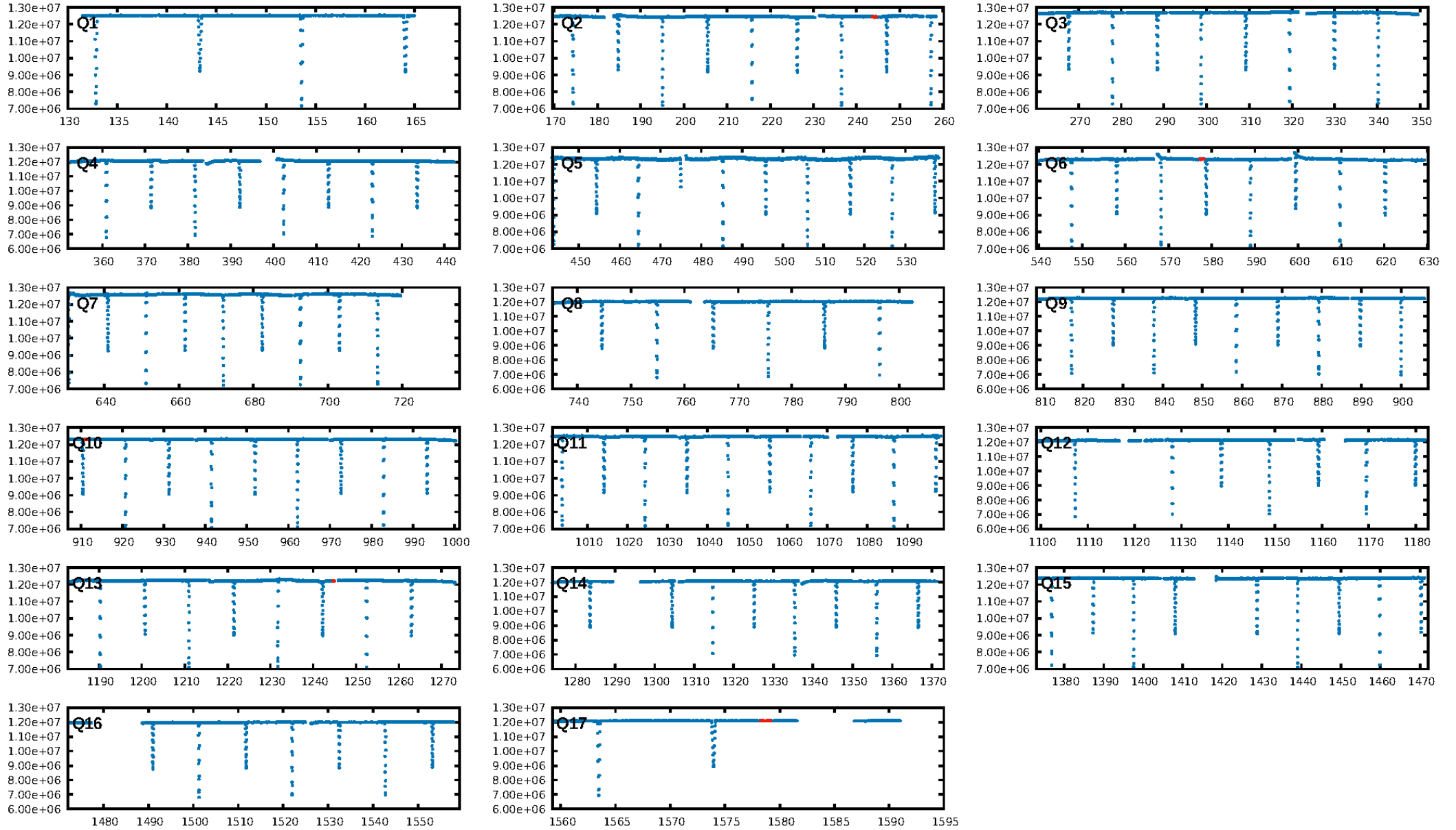
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [142.82σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 84.3%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 7.833
Centroid-sig: 83.5%
Centroid-so: 0.605 arcsec [0.21σ]
OotOffset-rm: 3.063 arcsec [1.66σ]
KicOffset-rm: 3.043 arcsec [1.74σ]
OotOffset-st: 1/0/0/1 [2]
KicOffset-st: 1/0/0/1 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 0.25 [1/4]

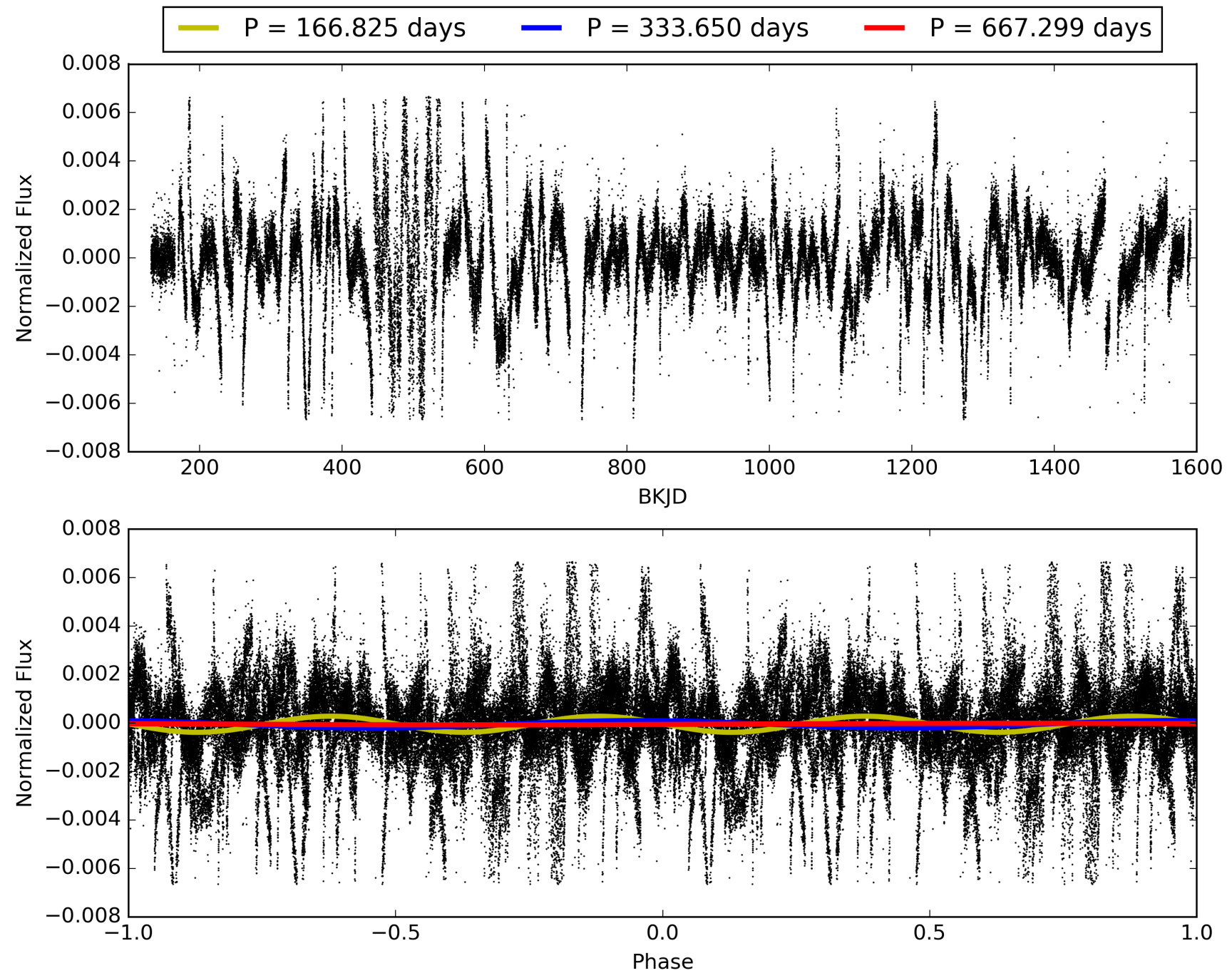
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 01:27:18 Z

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

TCE 009837578-05, PDC Light Curves

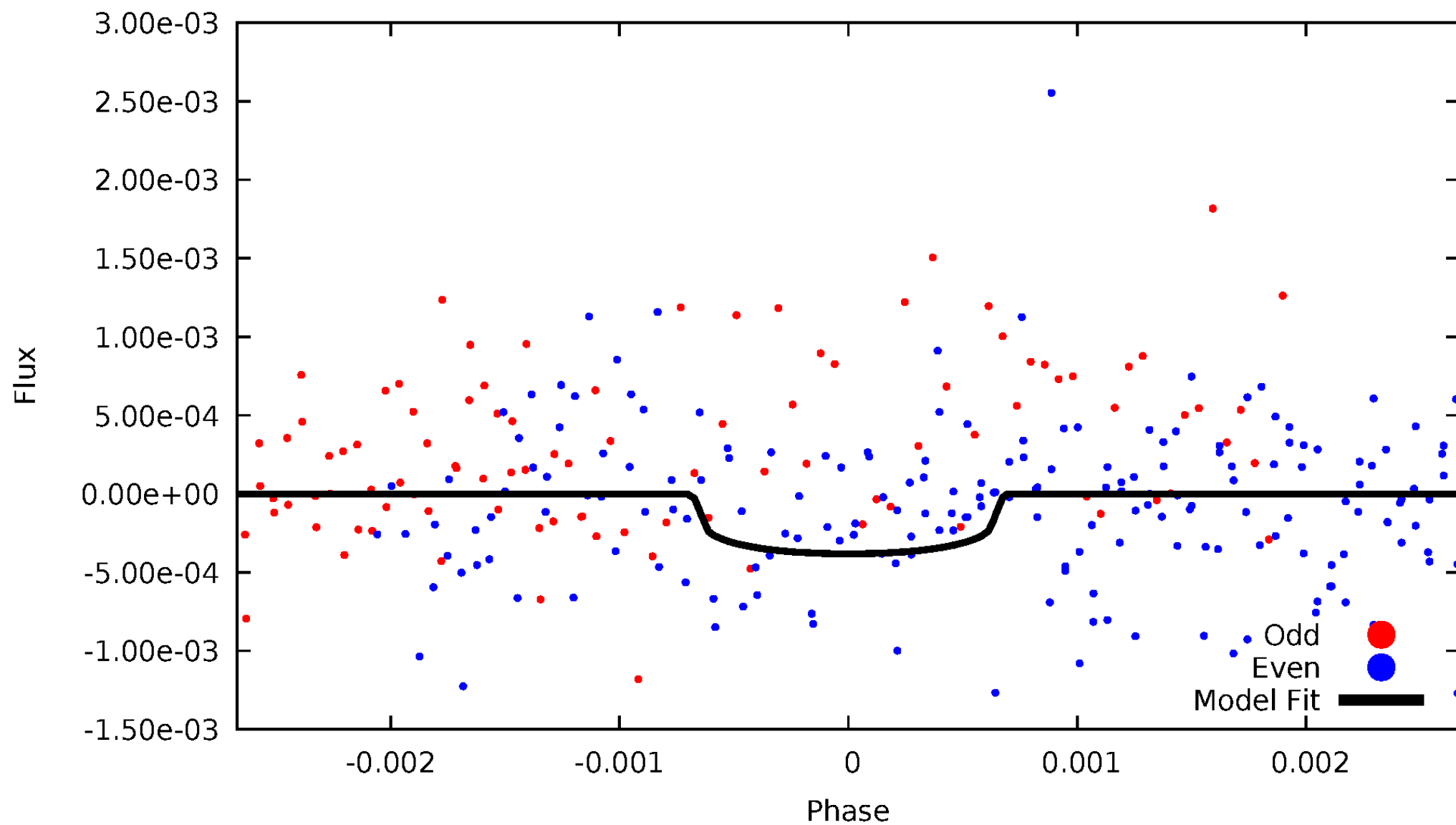


TCE 009837578-05



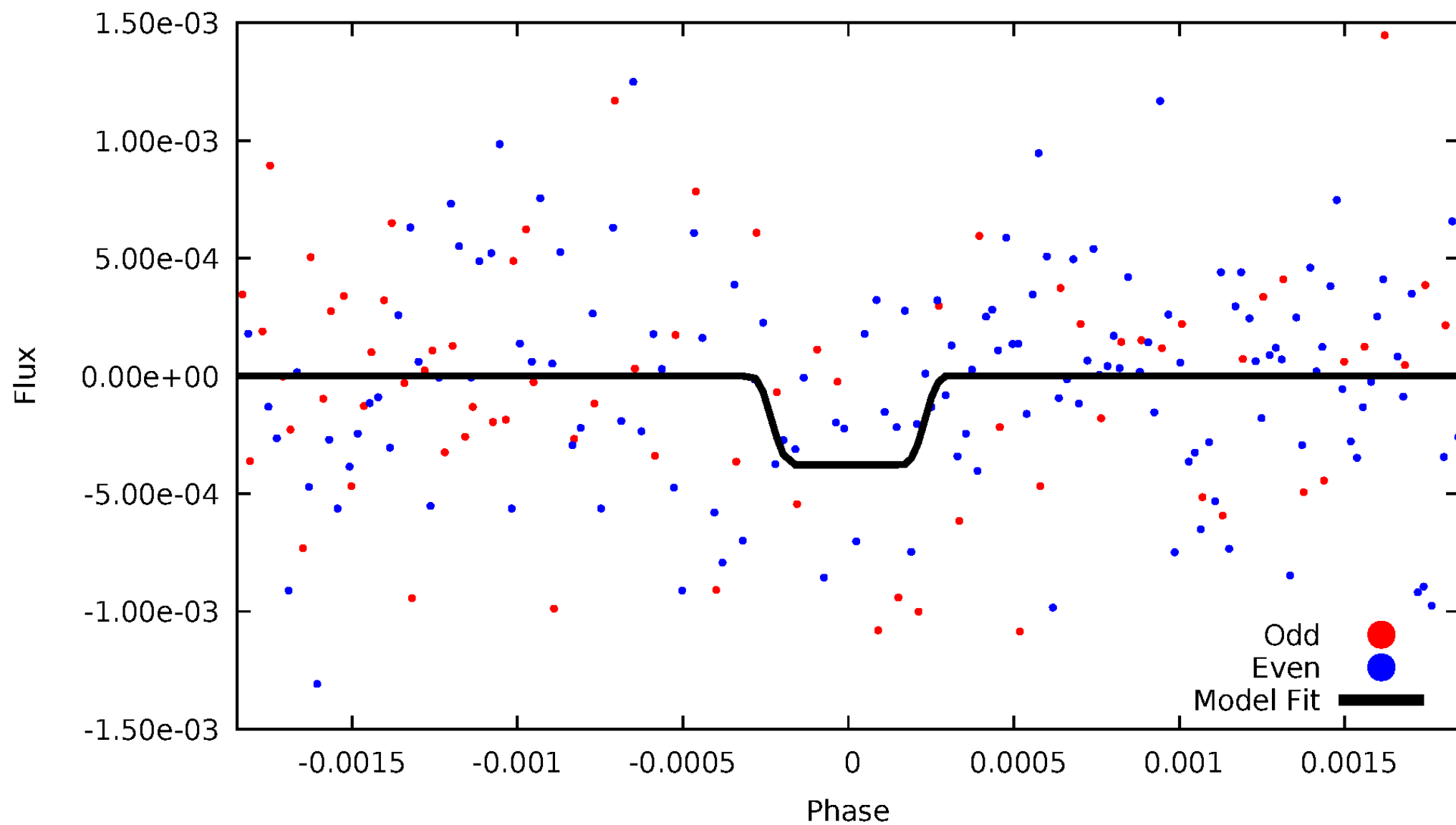
DV Odd/Even

TCE 009837578-05



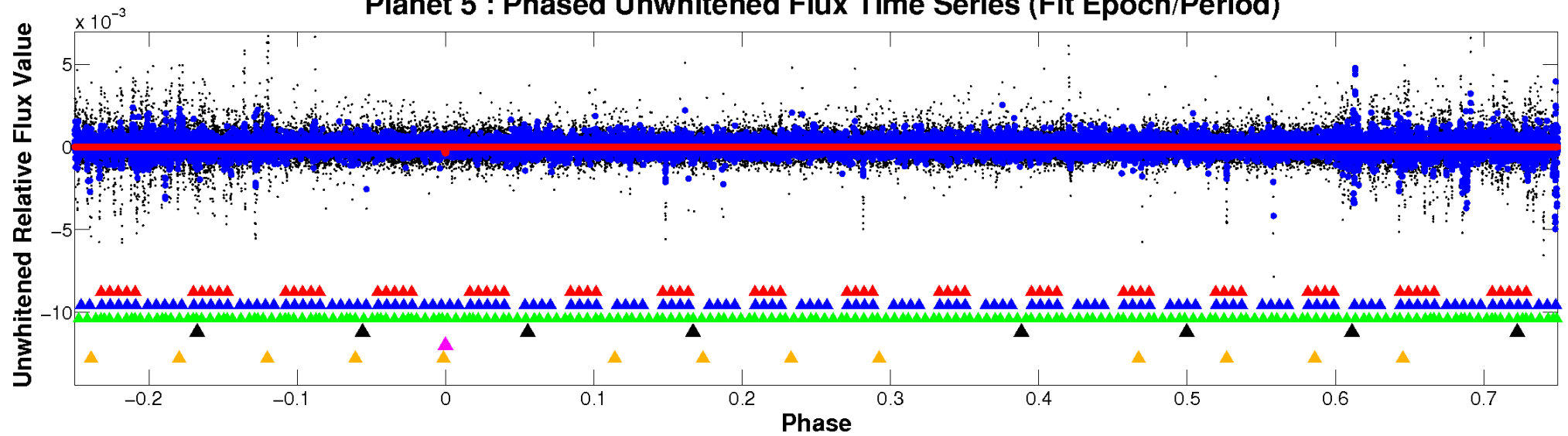
ALT Odd/Even

TCE 009837578-05

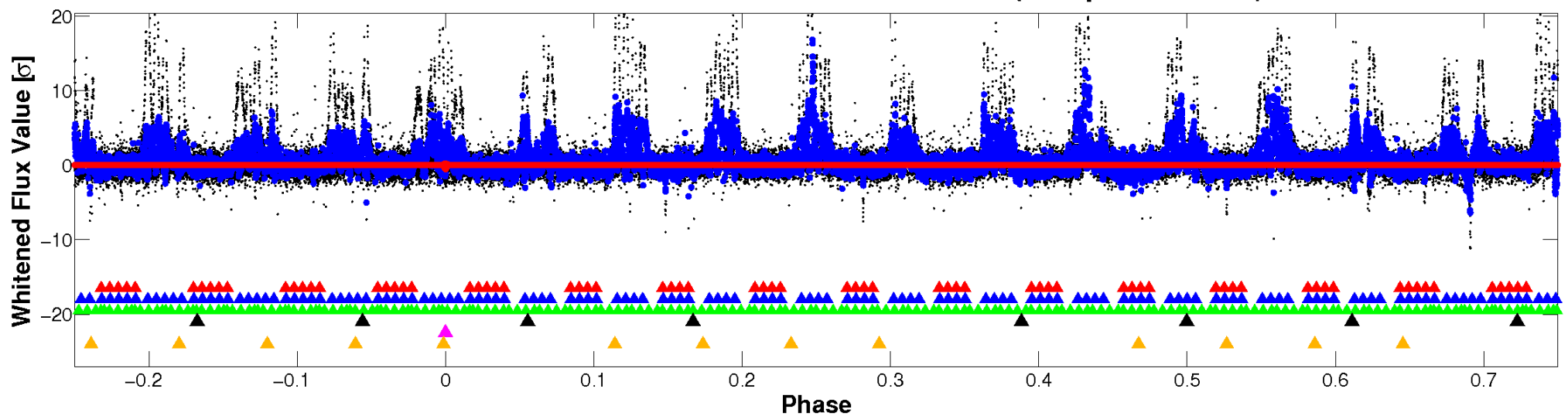


Non-Whitened Vs. Whitened Light Curve

Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

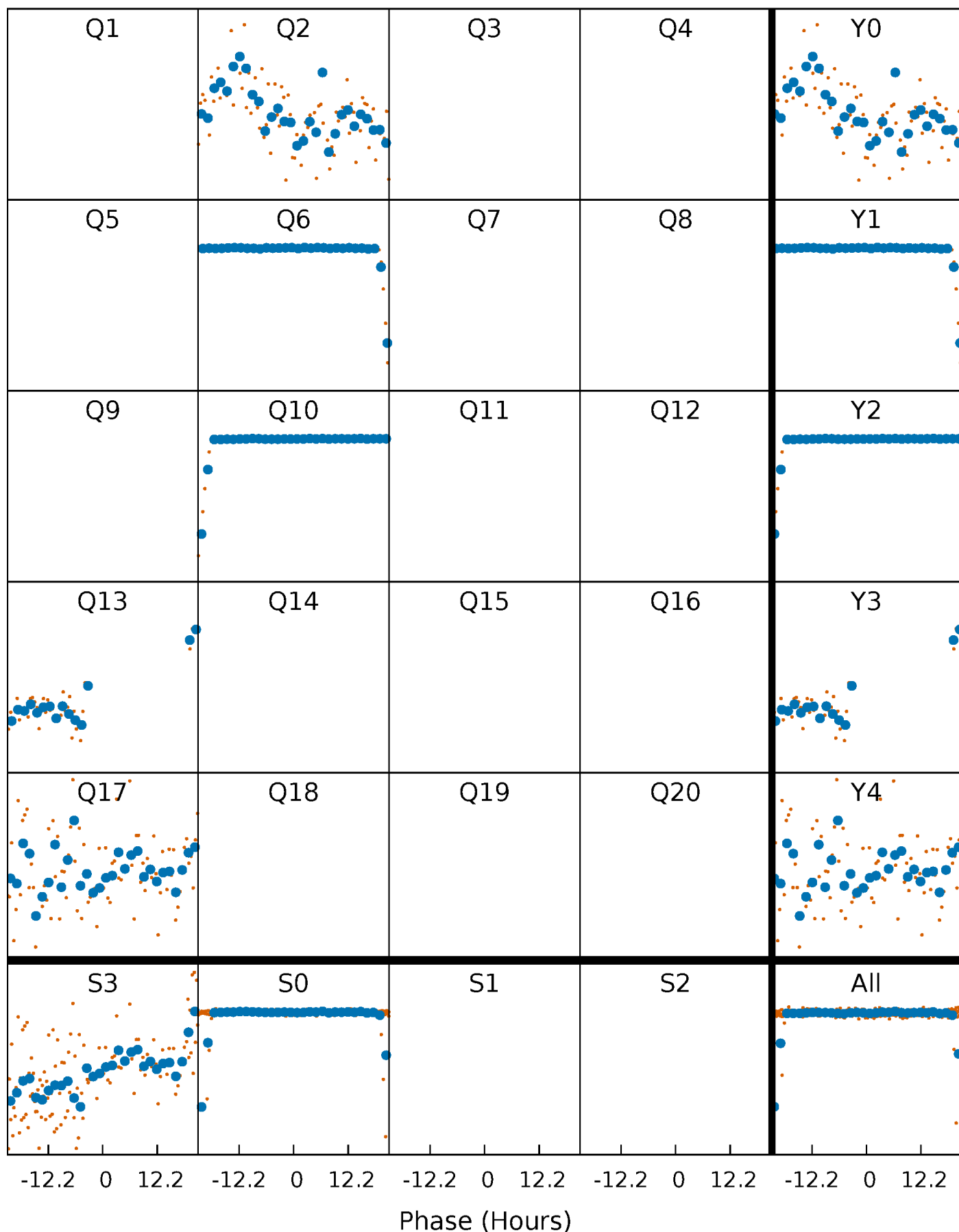


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



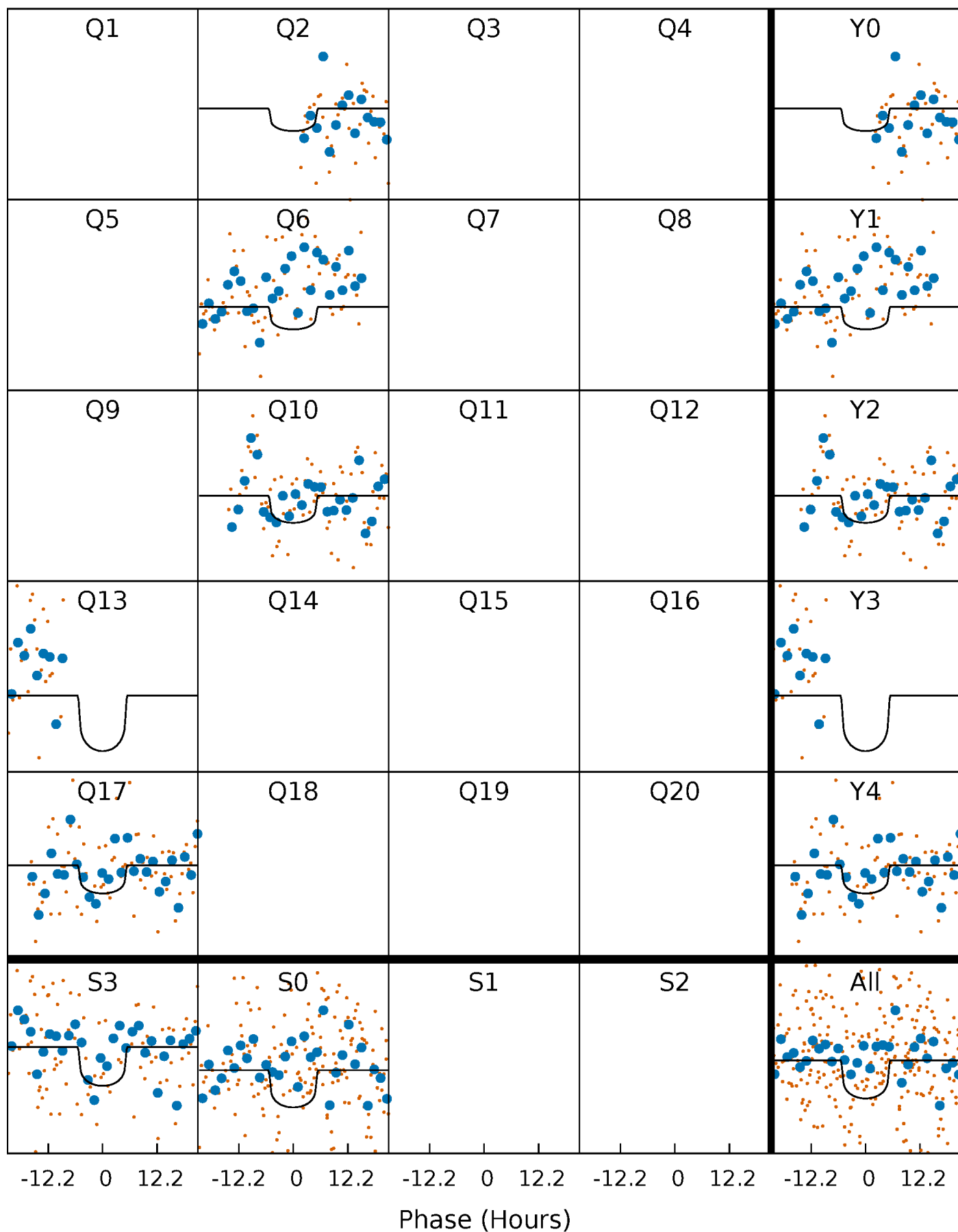
PDC Quarter-Phased Transit Curves

TCE 009837578-05 $P=333.649734$ Days $T_0=244.113348$ (BKJD)



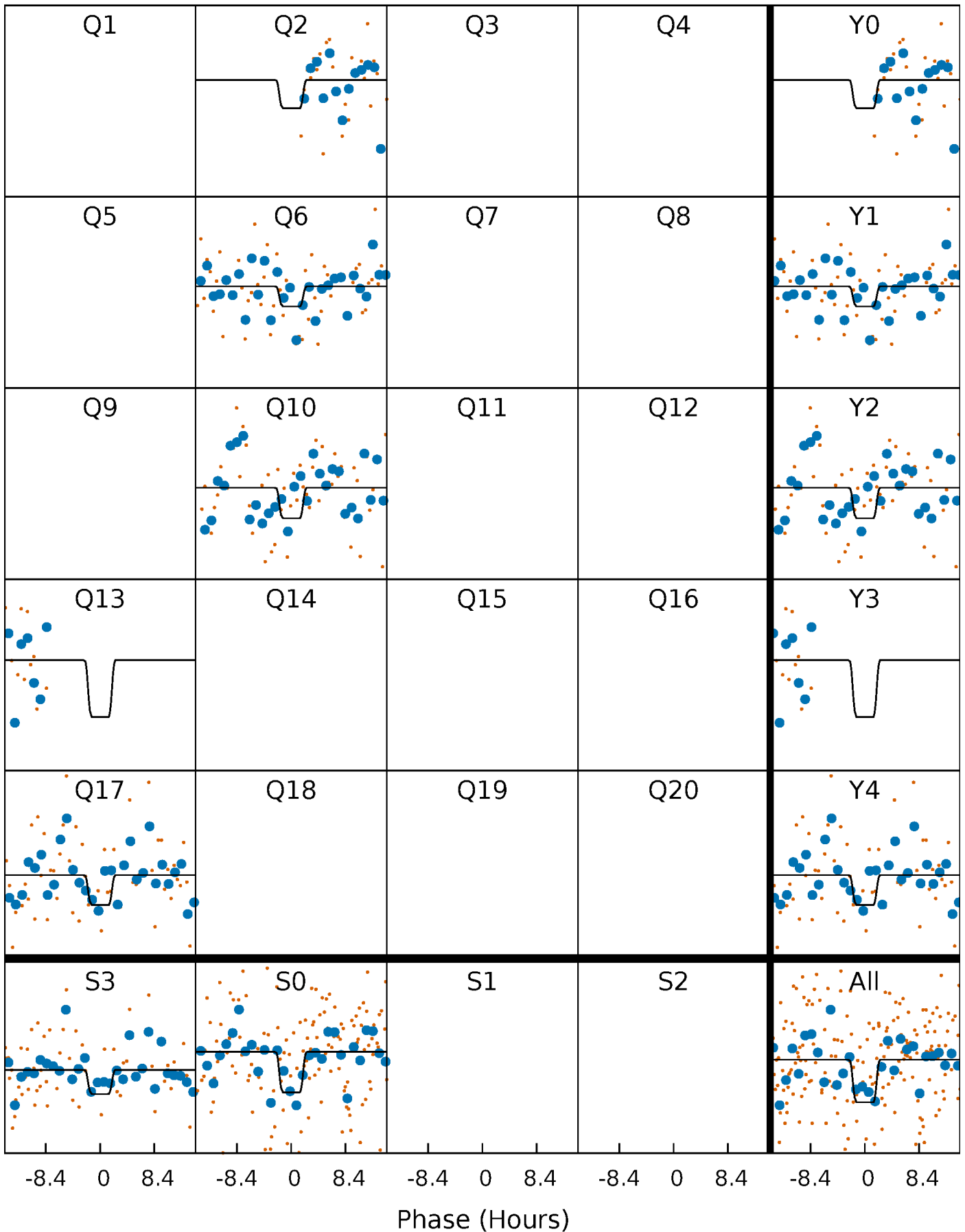
DV Quarter-Phased Transit Curves

TCE 009837578-05 $P=333.649734$ Days $T_0=244.113348$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

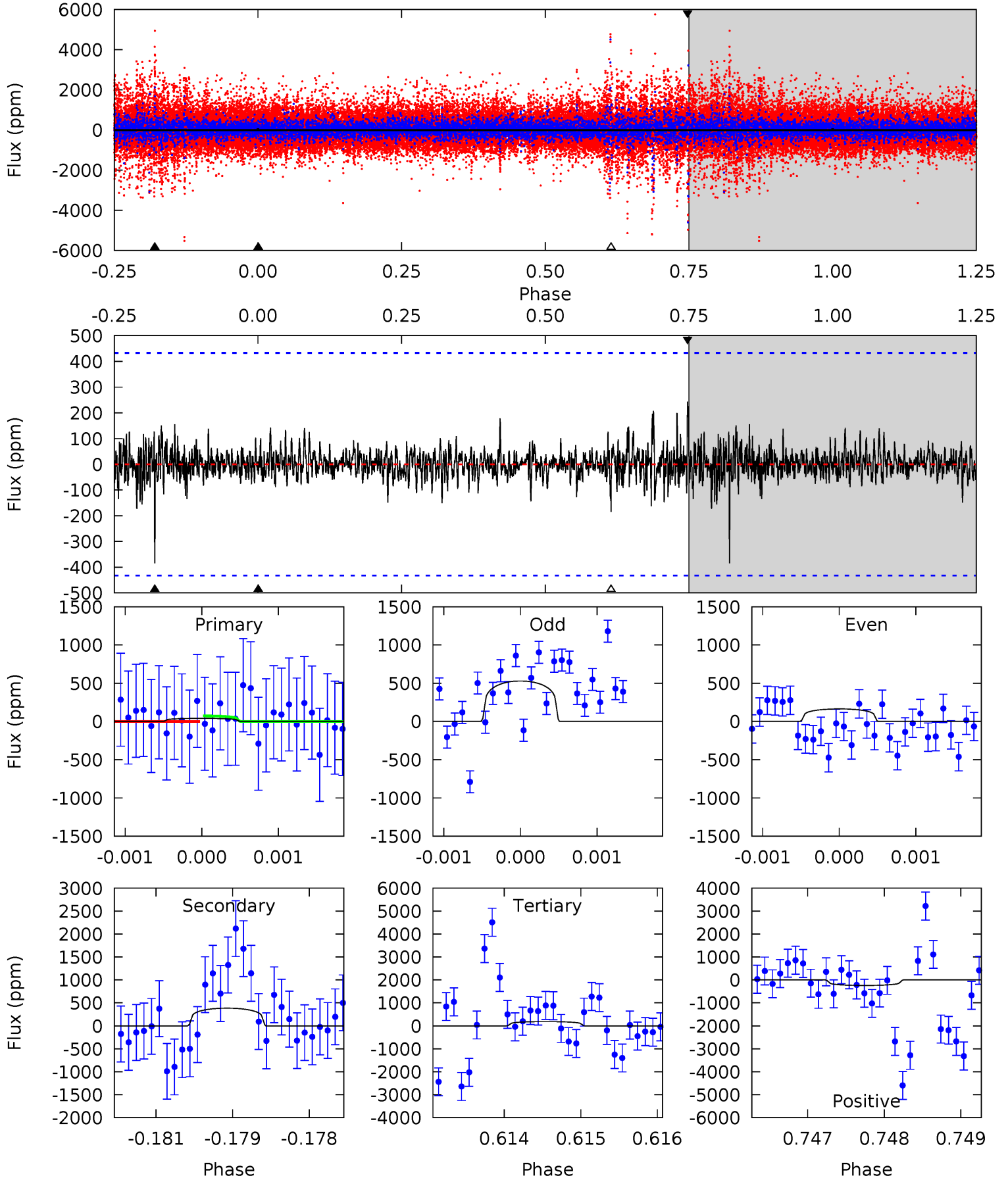
TCE 009837578-05 $P=333.632357$ Days $T_0=244.121502$ (BKJD)



DV Model-Shift Uniqueness Test

009837578-05, P = 333.649734 Days, E = 244.113348 Days

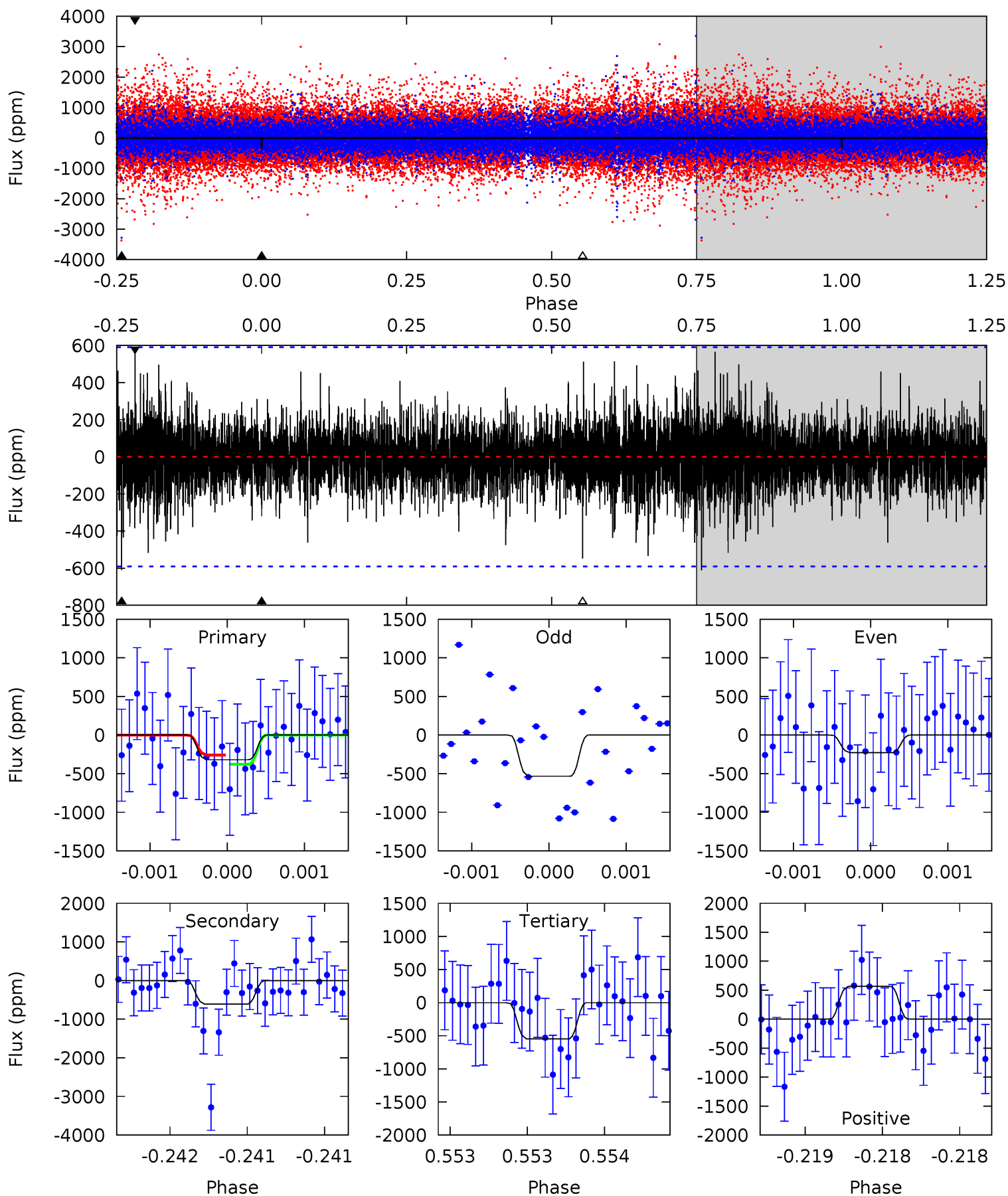
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.50	4.80	2.30	3.02	5.40	3.20	0.57	-1.80	-2.53	2.49	1.77	1.74	0.23	0.39	0.43



Alt Model-Shift Uniqueness Test

009837578-05, P = 333.632357 Days, E = 244.121502 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.00	5.73	5.14	5.31	5.54	3.44	1.16	-2.14	-2.31	0.58	0.41	1.13	1.10	0.48	0.55



Stellar Parameters For KIC 009837578

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5620^{+118}_{-75}	$4.363^{+0.065}_{-0.040}$	$-0.320^{+0.150}_{-0.100}$	$0.974^{+0.067}_{-0.067}$	$0.797^{+0.067}_{-0.024}$	$1.217^{+0.300}_{-0.166}$
	+2%/-1%	+1%/-1%	+47%/-31%	+7%/-7%	+8%/-3%	+25%/-14%
Source	SPE36	TRA36	SPE36	DSEP		

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

Secondary Eclipse Parameters for KIC 009837578-05 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-384 ± 80	$6.94^{+6.60}_{-4.55}$	366^{+9}_{-9}	3540^{+1740}_{-668}	3161^{+24188}_{-2366}
Alt.	-610 ± 107	$6.56^{+6.65}_{-4.54}$	366^{+10}_{-9}	3922^{+2416}_{-810}	6082^{+53234}_{-4662}

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

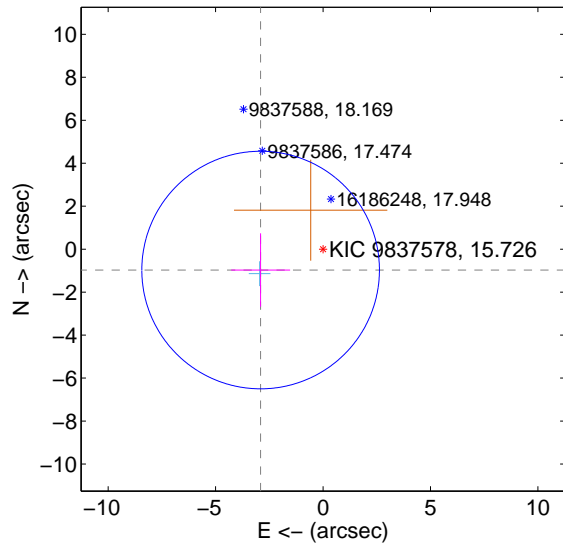
Supplemental centroid analysis for 009837578-05. Kepler magnitude: 15.73. Transit SNR 3.72

There are 1 quarters with good PRF difference image offsets

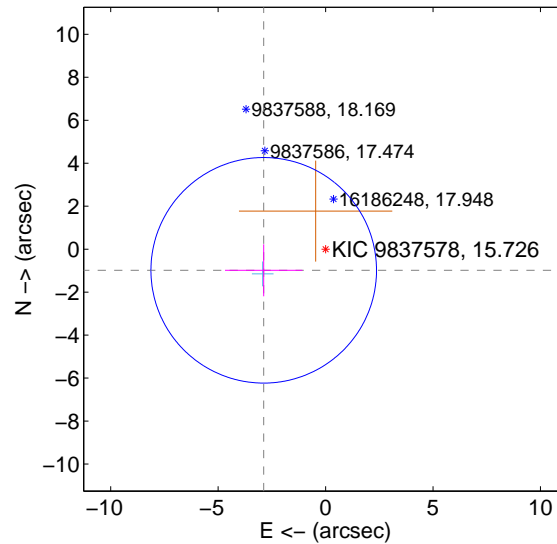
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	3.063 ± 1.843	1.66	2.905 ± 1.373	-0.971 ± 1.708
PRF-fit source offset from KIC position	3.043 ± 1.750	1.74	2.879 ± 1.802	-0.984 ± 1.212
photometric centroid source offset	0.61 ± 2.93	0.21	-0.23 ± 2.42	-0.56 ± 3.00

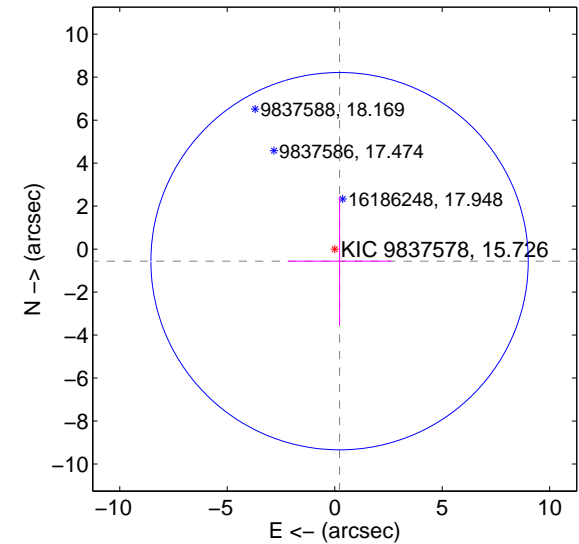
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

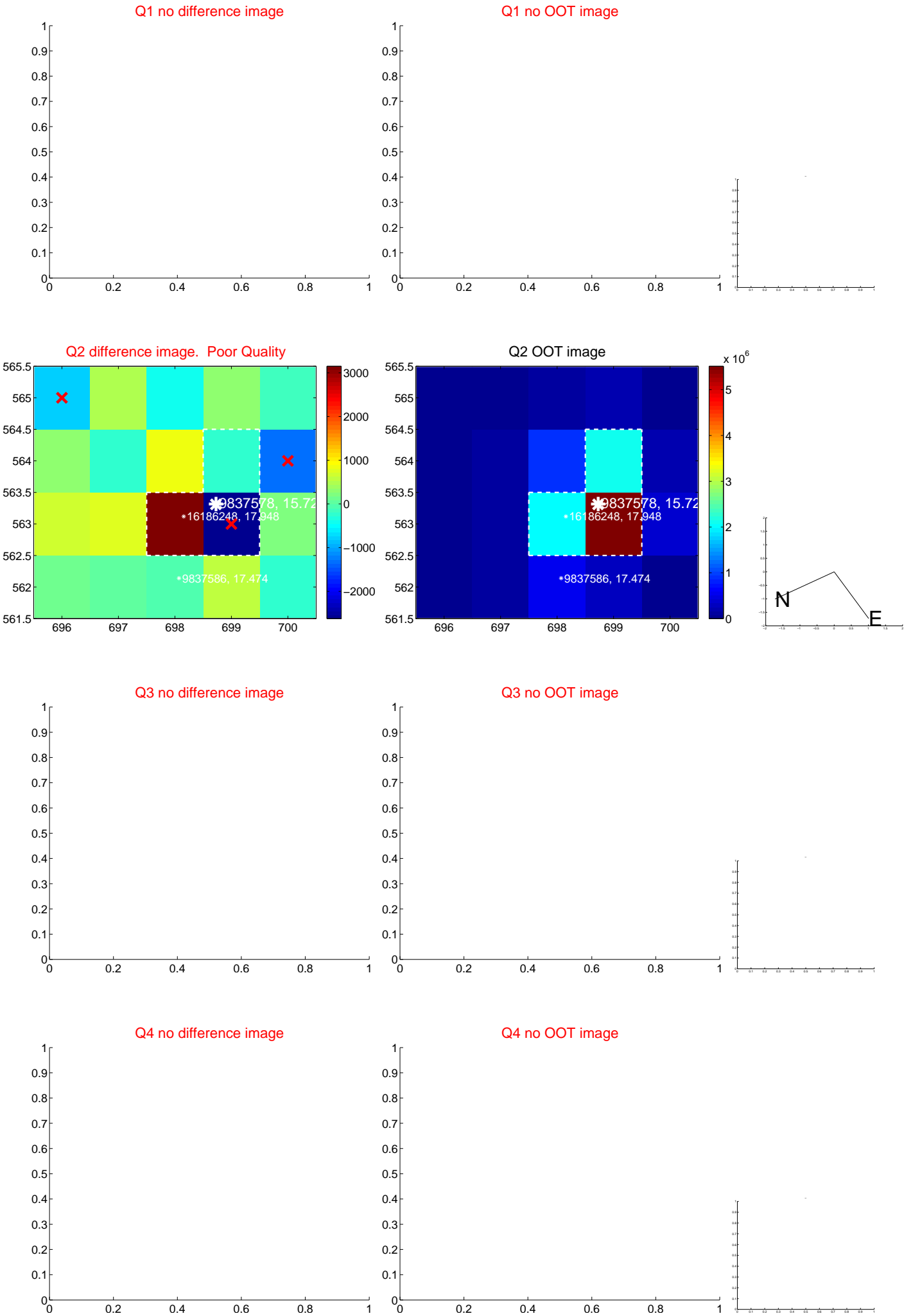


offset from photometric centroids



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 ×: 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.

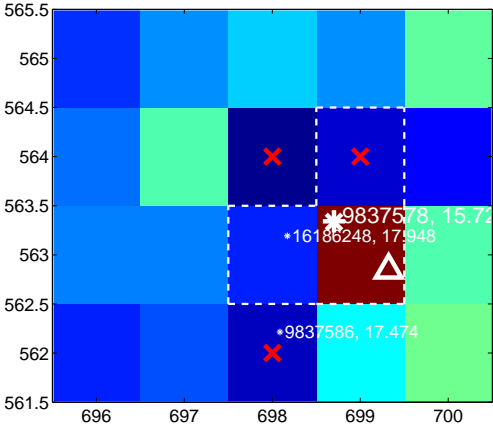
Q5 no difference image



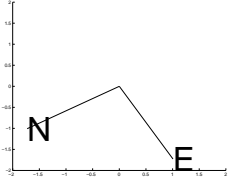
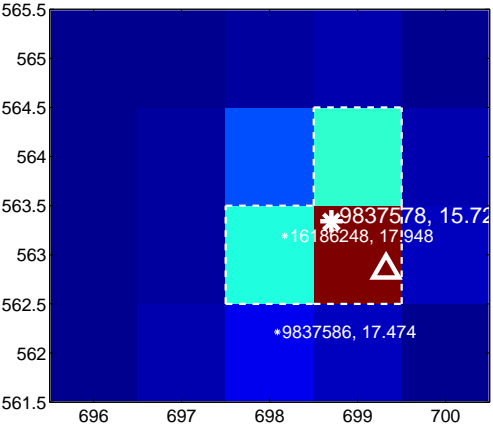
Q5 no OOT image



Q6 difference image



Q6 OOT image



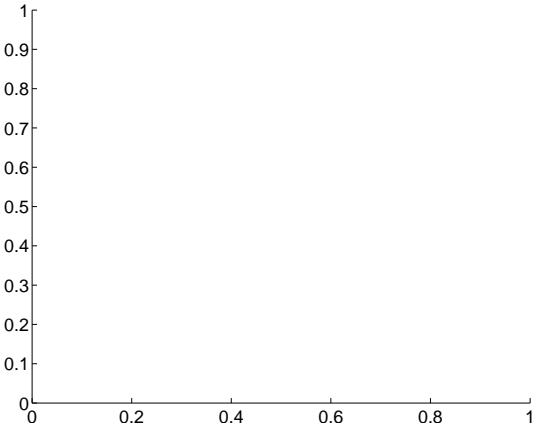
Q7 no difference image



Q7 no OOT image



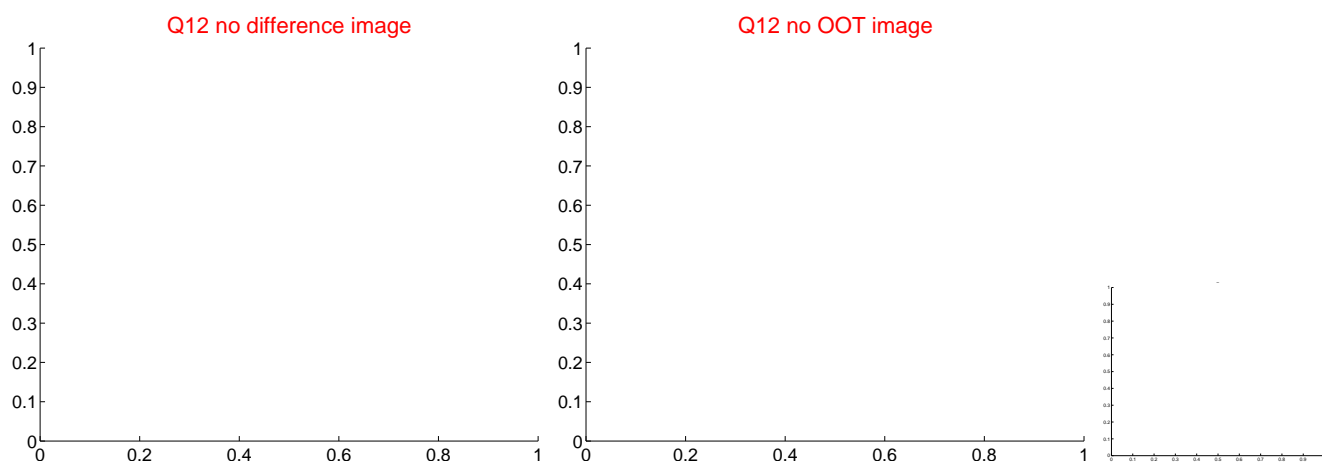
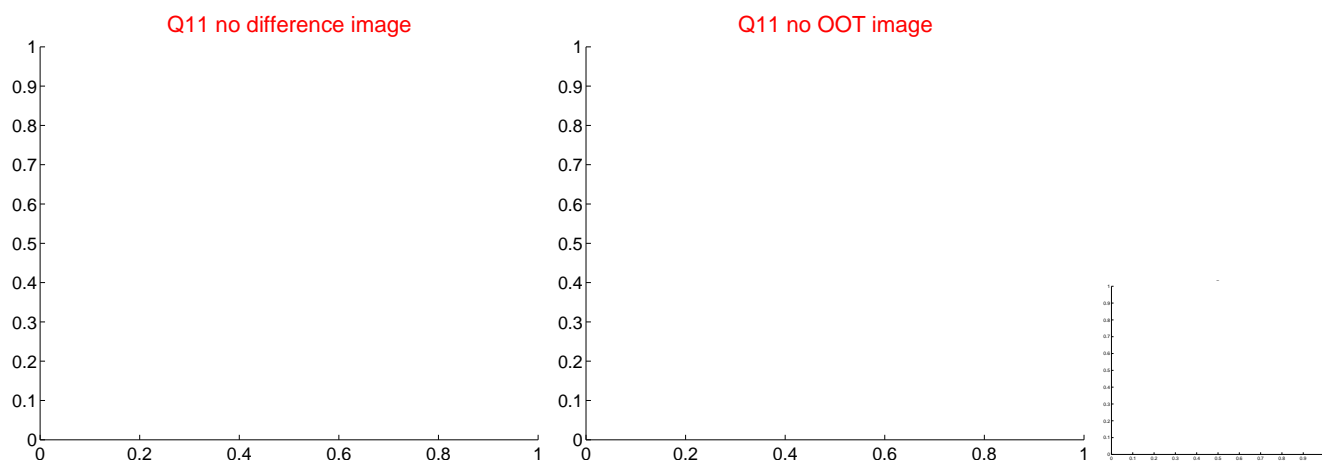
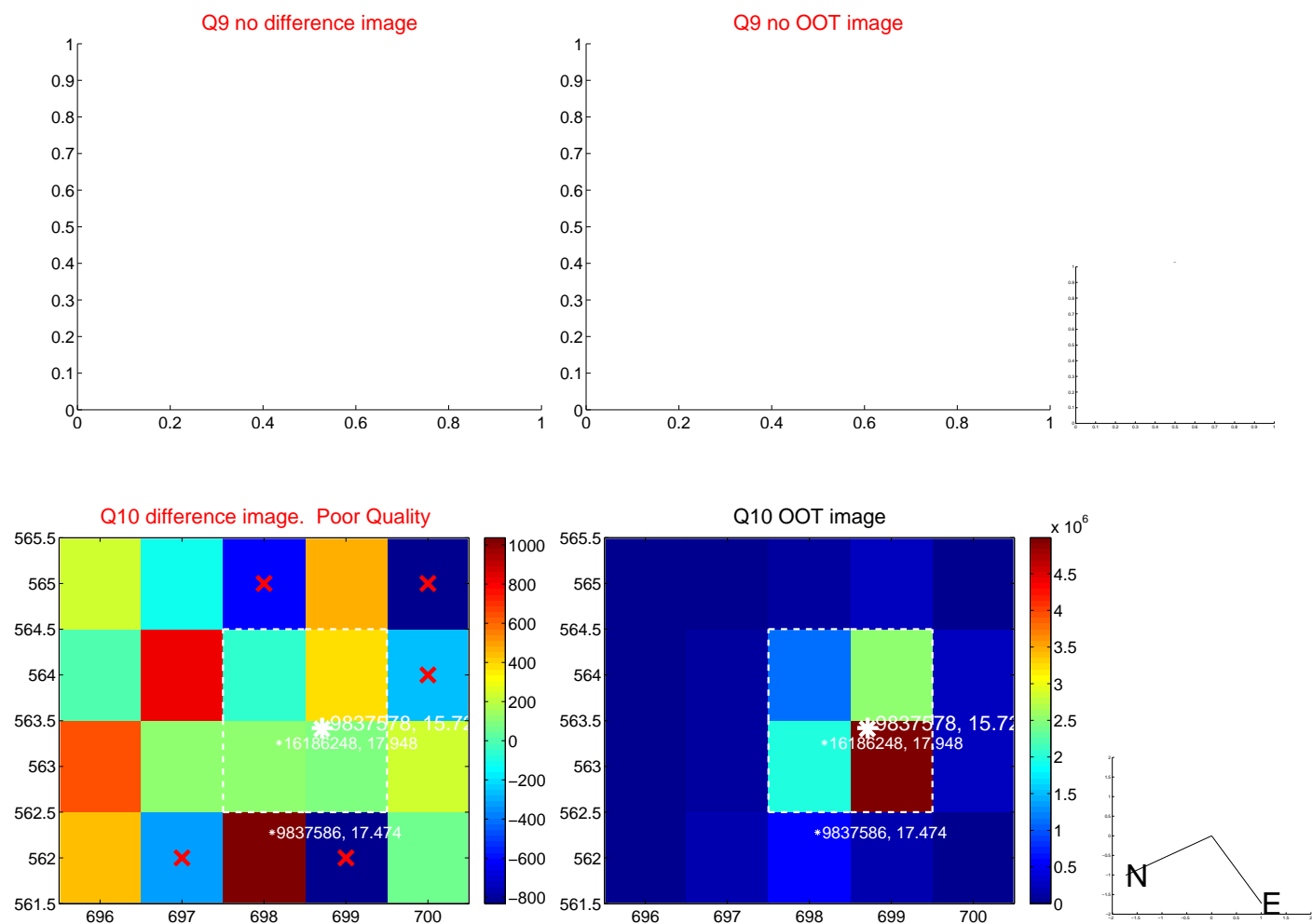
Q8 no difference image



Q8 no OOT image



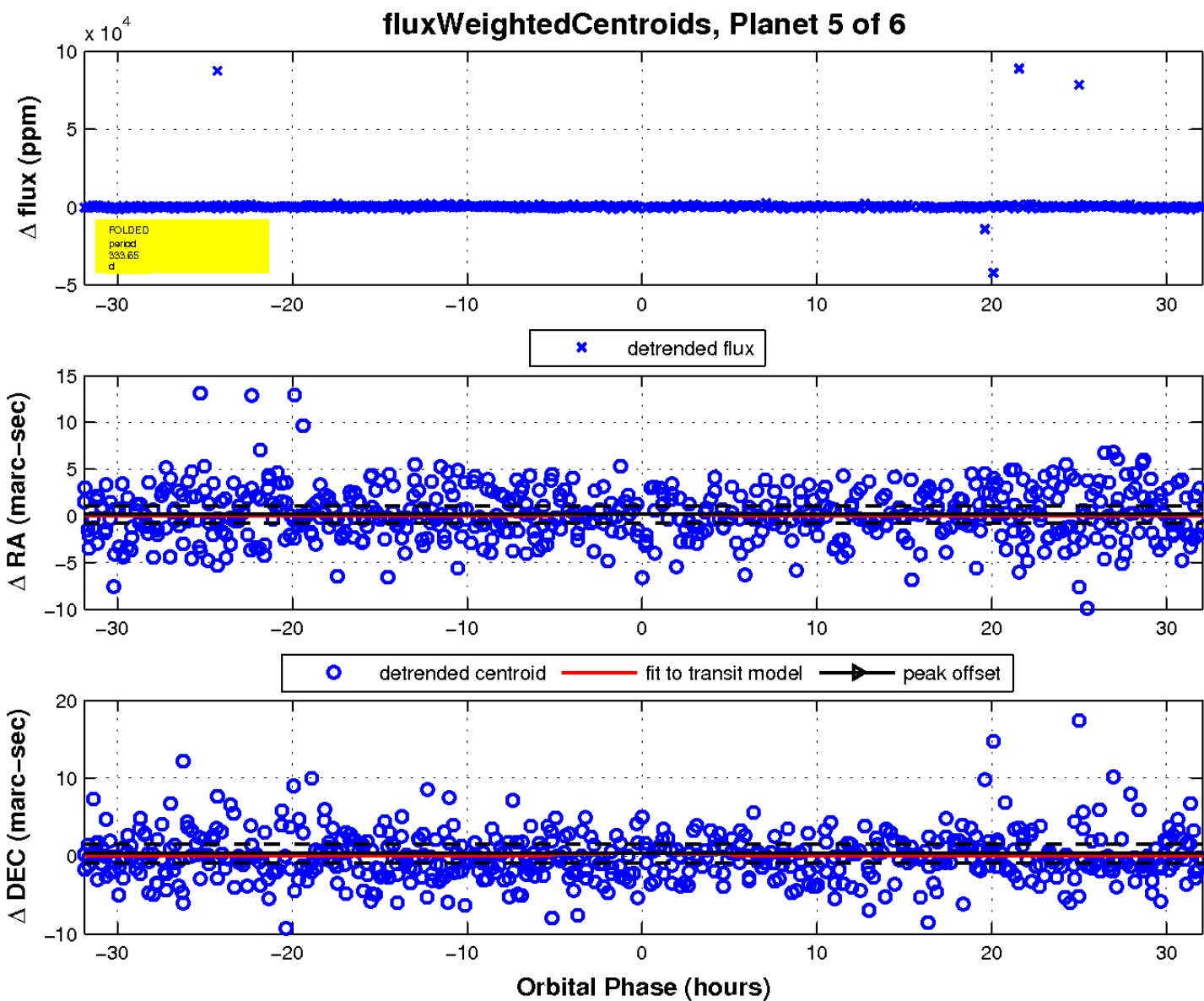
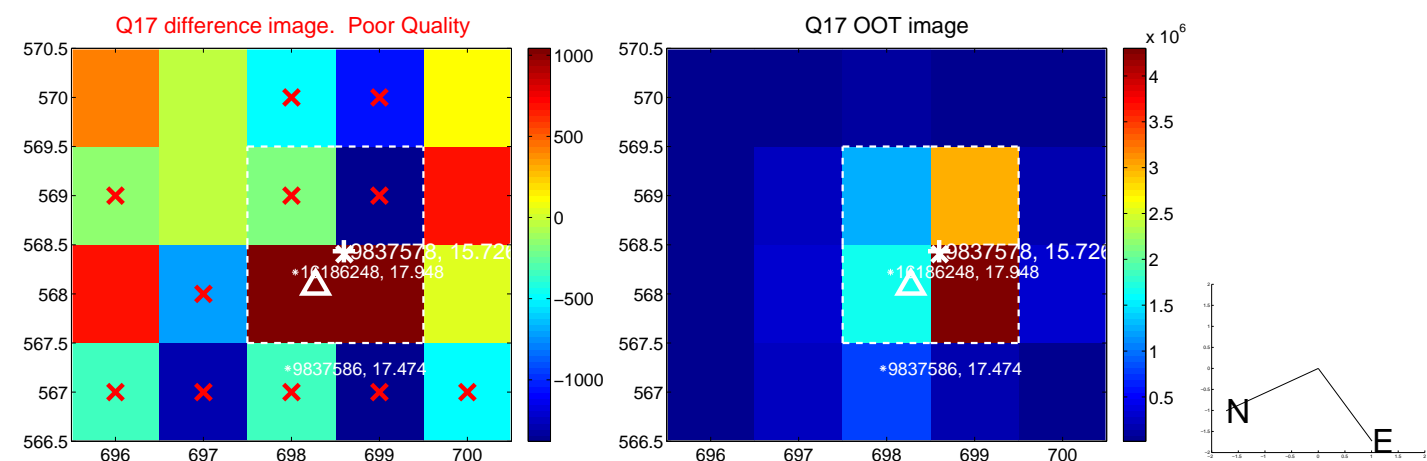
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



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

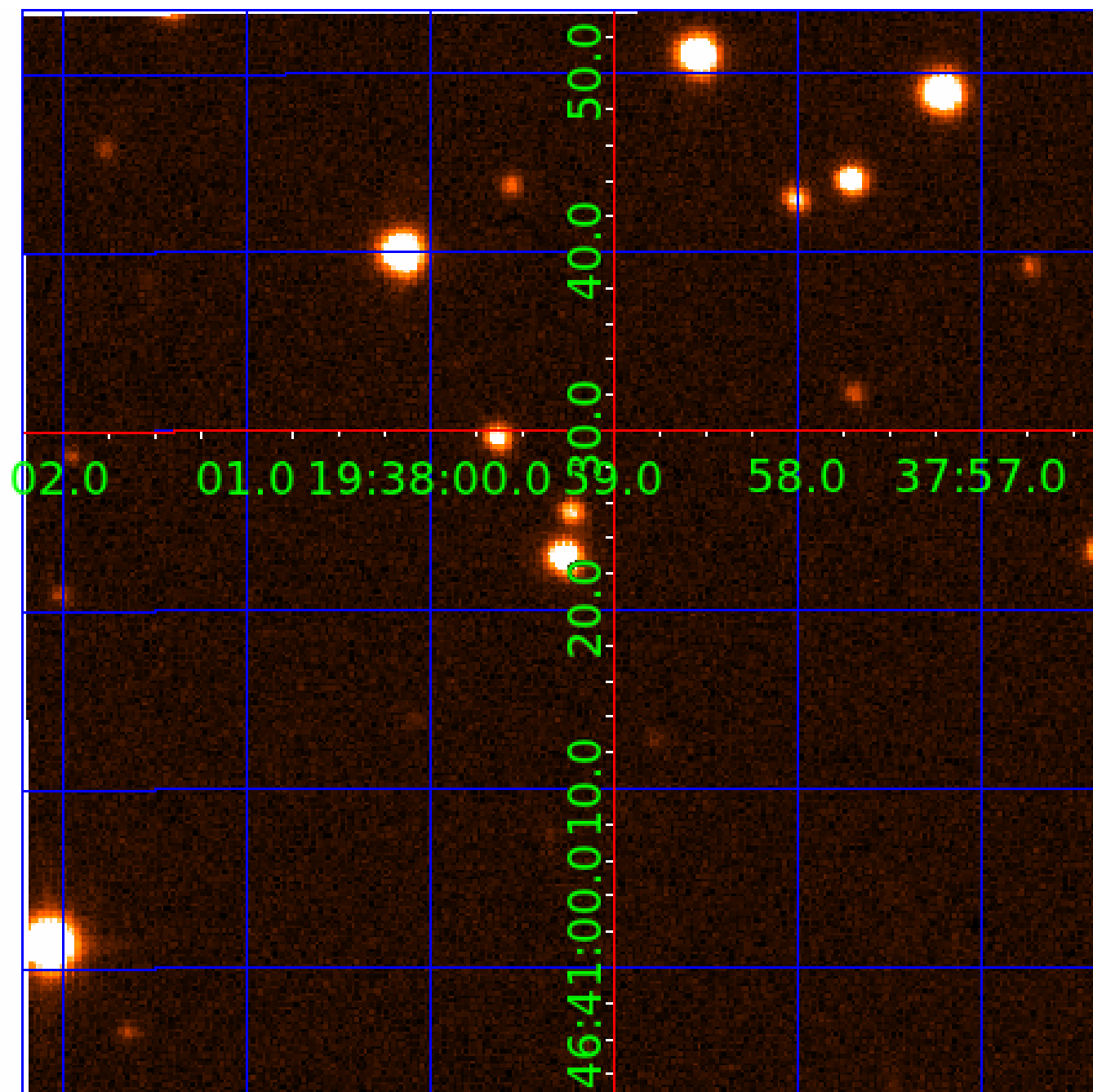


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009837578

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})
009837578-01	OBS	2937.01	20.733617	132.852798	423839.7	3.500	9272.0	-1.0	0.97	5620	53.14	45.15
009837578-02	OBS	No	10.366862	132.958371	263944.6	5.000	6320.8	-1.0	0.97	5620	46.51	113.77
009837578-03	OBS	No	6.911114	132.801153	101.6	12.550	263.4	5.2	0.97	5620	0.97	195.35
009837578-04	OBS	No	185.413920	188.270963	3734.9	22.498	26.5	23.0	0.97	5620	11.07	2.43
009837578-05	OBS	No	333.649734	244.113348	382.8	10.696	26.5	3.7	0.97	5620	1.95	1.11
009837578-06	OBS	No	117.823087	164.388285	11977.6	2.000	29.9	-1.0	0.97	5620	10.59	4.45

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009837578-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—HAS_SEC_TCE—CENT_NOFITS
009837578-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
009837578-03	OBS	FP	0.00	1	0	0	1	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_FEW_DIFFS—EPHEM_MATCH
009837578-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009837578-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009837578-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—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 009837578-06

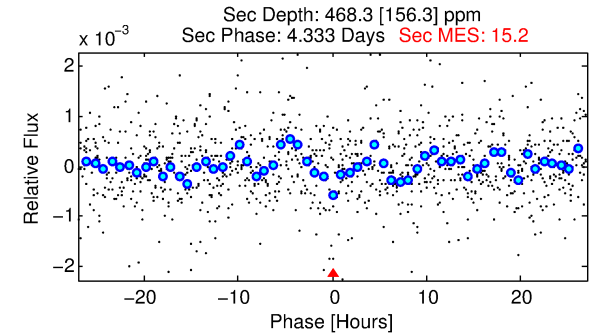
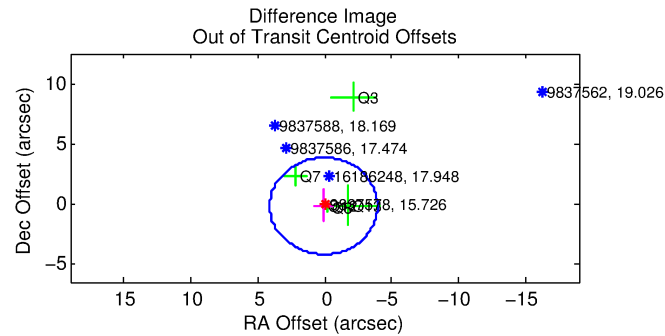
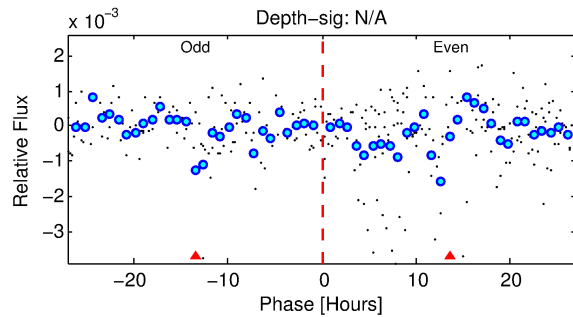
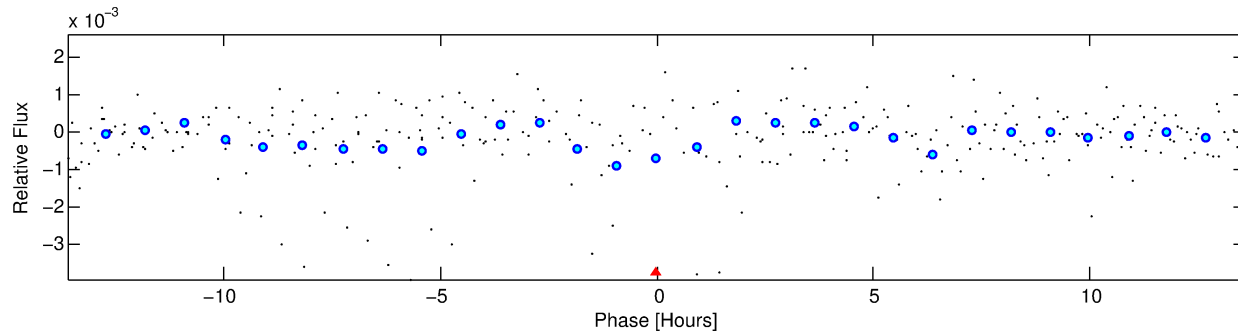
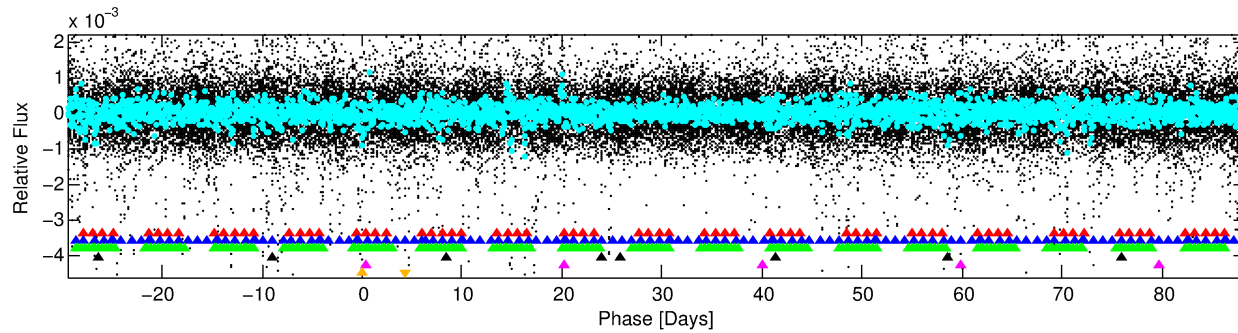
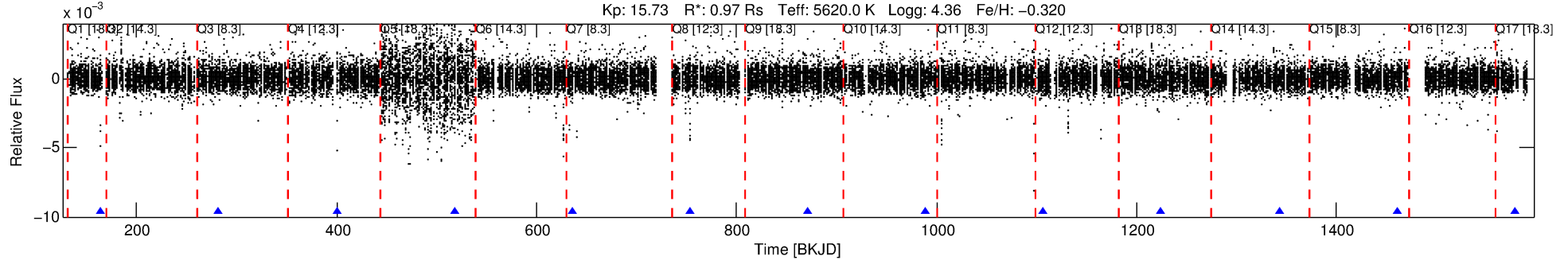
No Significant Match Found

DV One-Page Summary

KIC: 9837578 Candidate: 6 of 6 Period: 117.823 d

KOI: K02937 Corr: No Ephemeris Match

Kp: 15.73 R*: 0.97 Rs Teff: 5620.0 K Logg: 4.36 Fe/H: -0.320



TPS TCE Results:

Period = 117.82309 d
Epoch = 164.3883 BKJD

DV fit results are unavailable

DV Diagnostic Results:

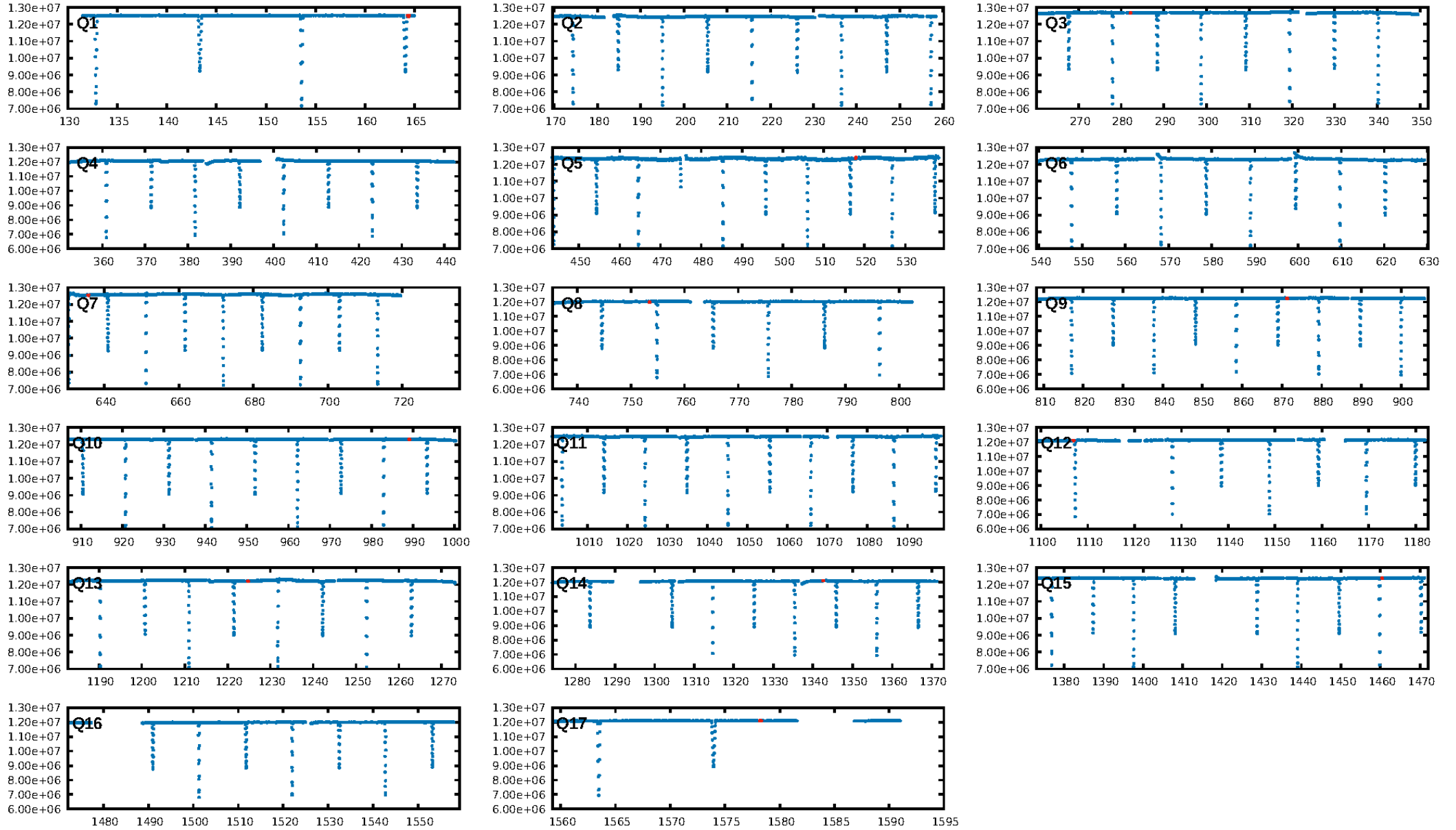
ShortPeriod-sig: 100.0% [578.04σ]
LongPeriod-sig: 100.0% [71.82σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [5/5]
GhostDiagnostic-chr: -0.3587

Centroid-sig: 3.9%
Centroid-so: 0.816 arcsec [1.07σ]
OotOffset-rm: 0.196 arcsec [0.15σ]
KicOffset-rm: 0.250 arcsec [0.22σ]
OotOffset-st: 0/2/2 [6]
KicOffset-st: 0/2/2 [6]
DiffImageQuality-fgm: 0.17 [1/6]
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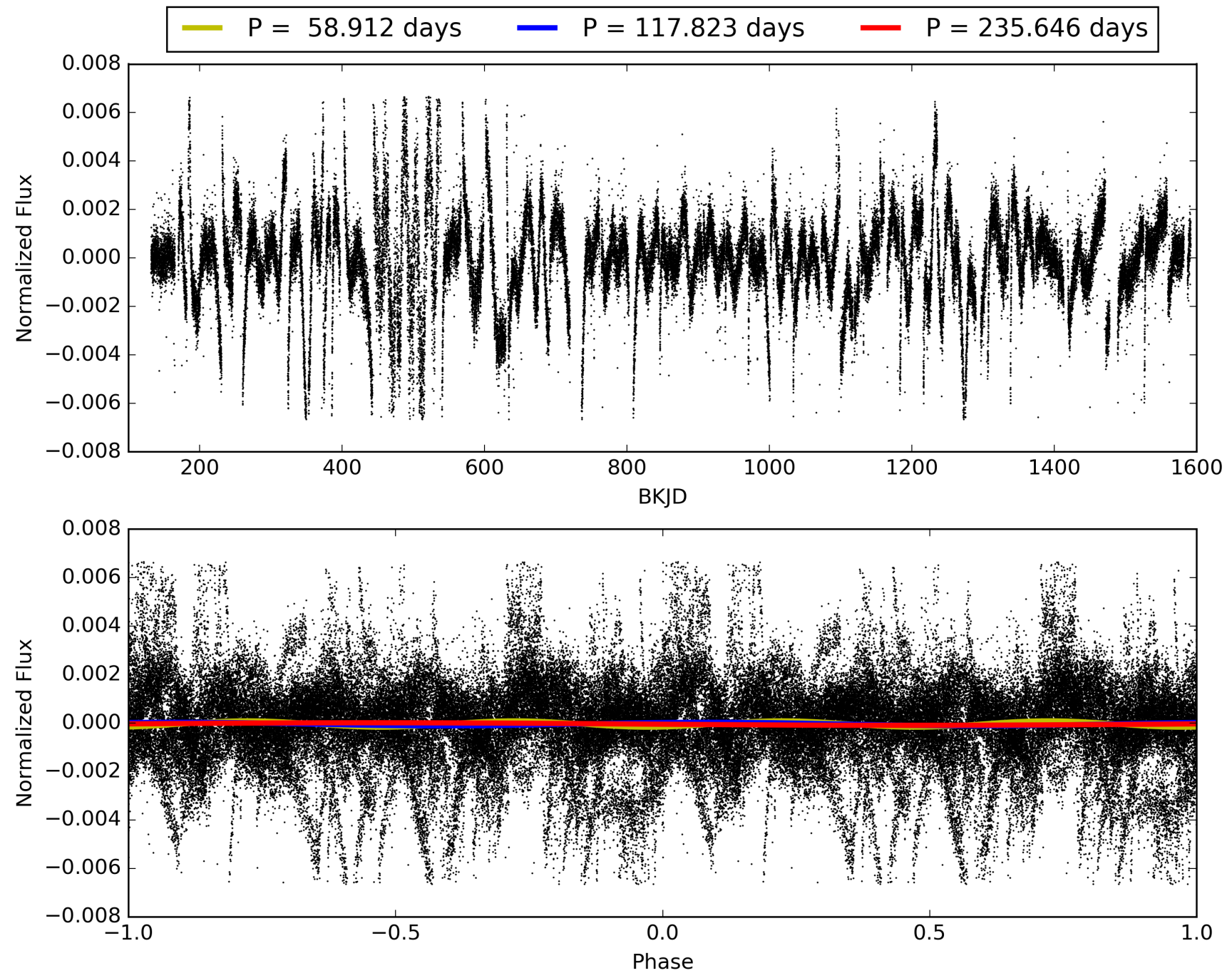
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009837578-06, PDC Light Curves

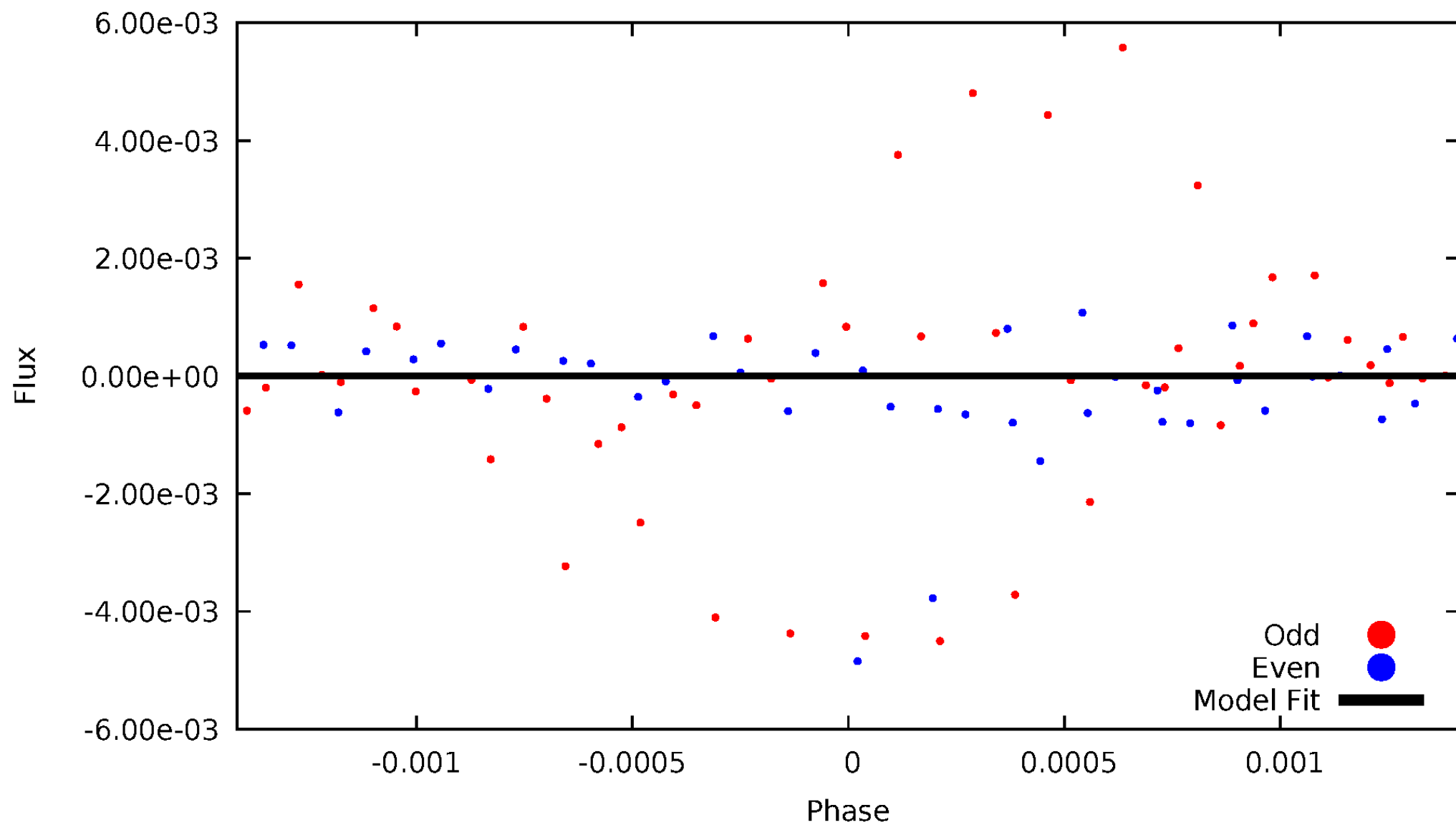


TCE 009837578-06



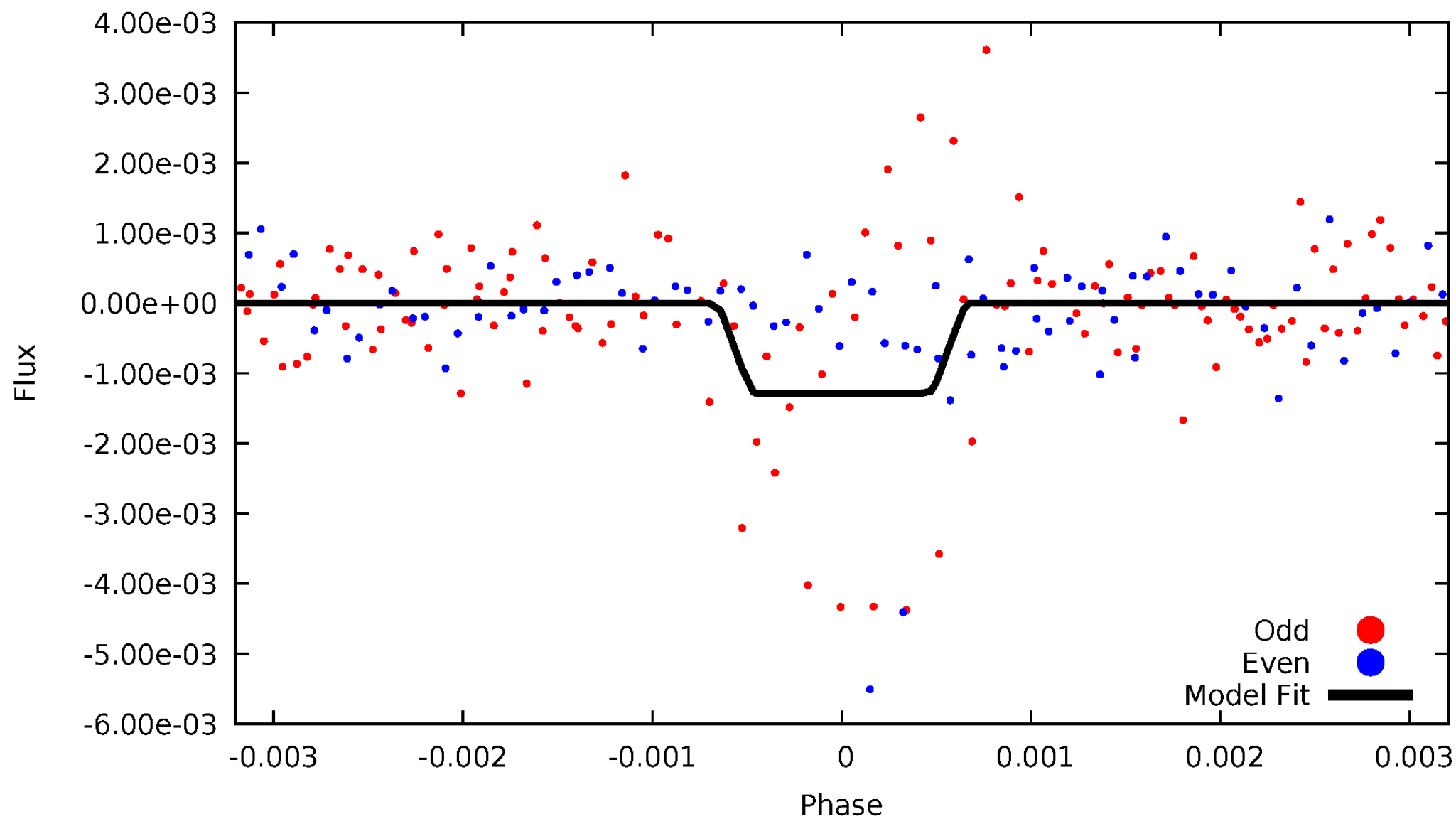
DV Odd/Even

TCE 009837578-06



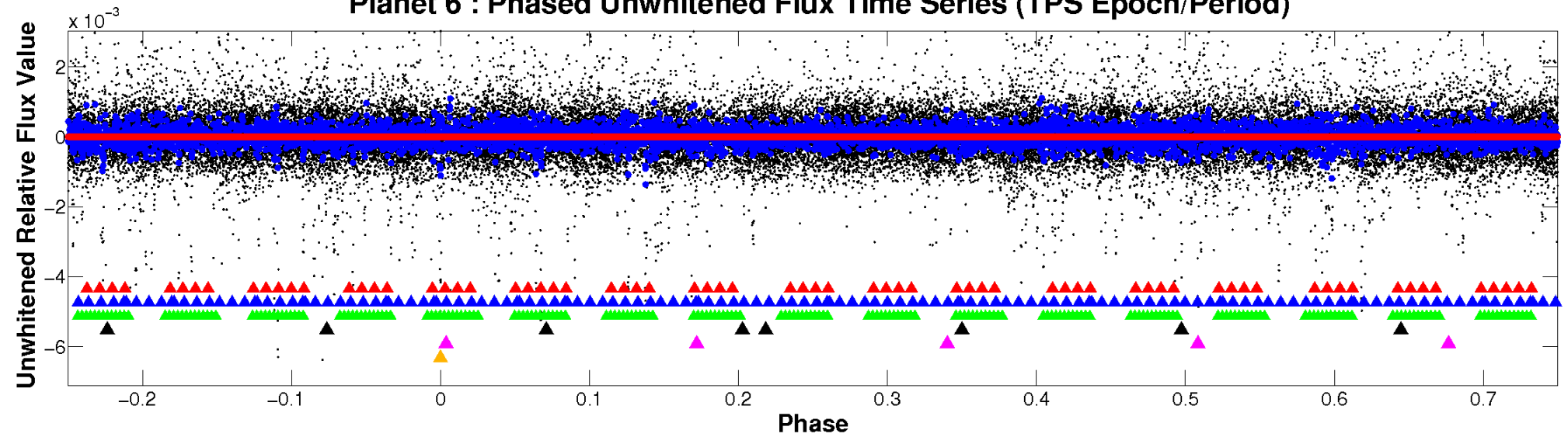
ALT Odd/Even

TCE 009837578-06



Non-Whitened Vs. Whitened Light Curve

Planet 6 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)

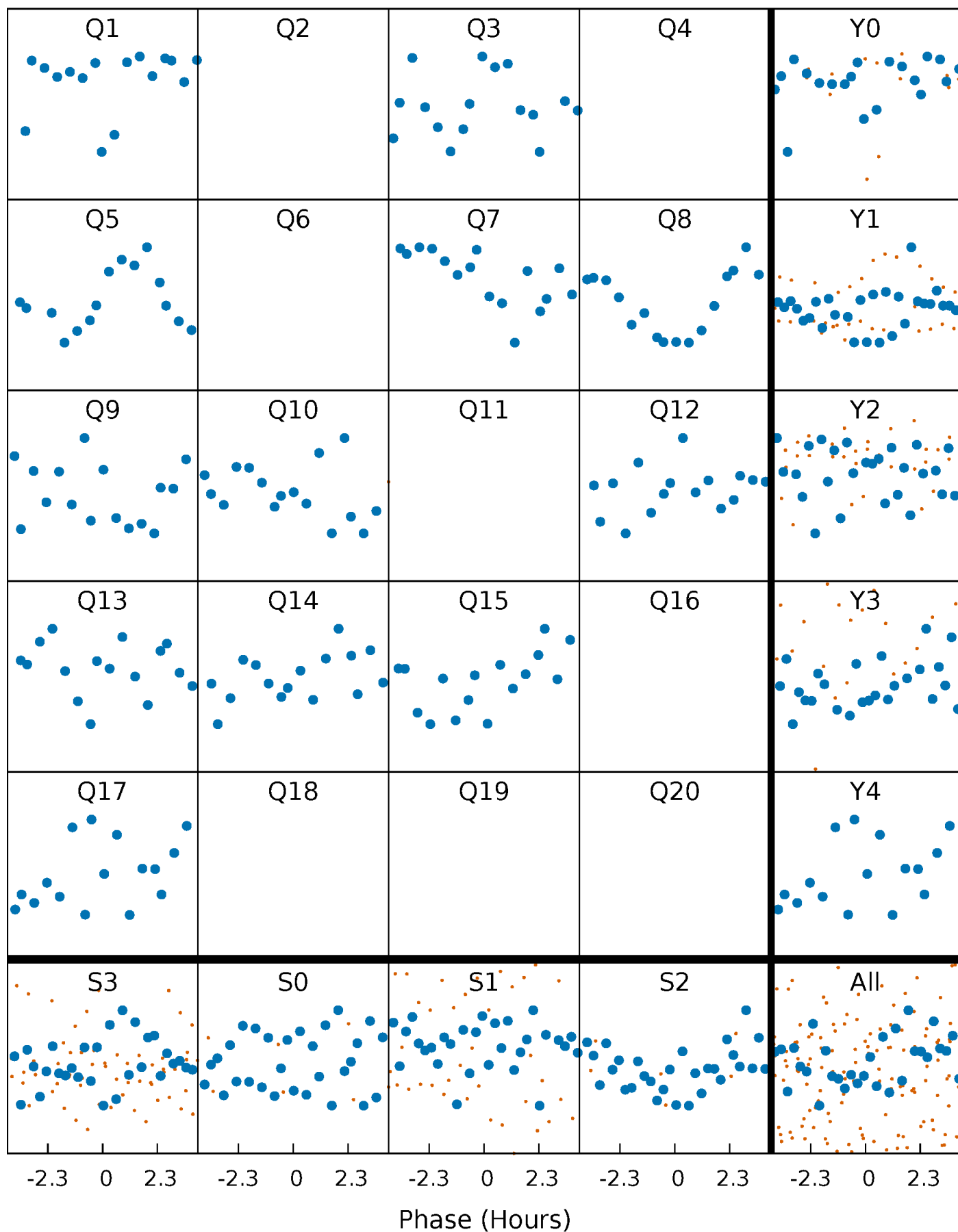


Planet 6 : Phased Whitened Flux Time Series (TPS Epoch/Period)



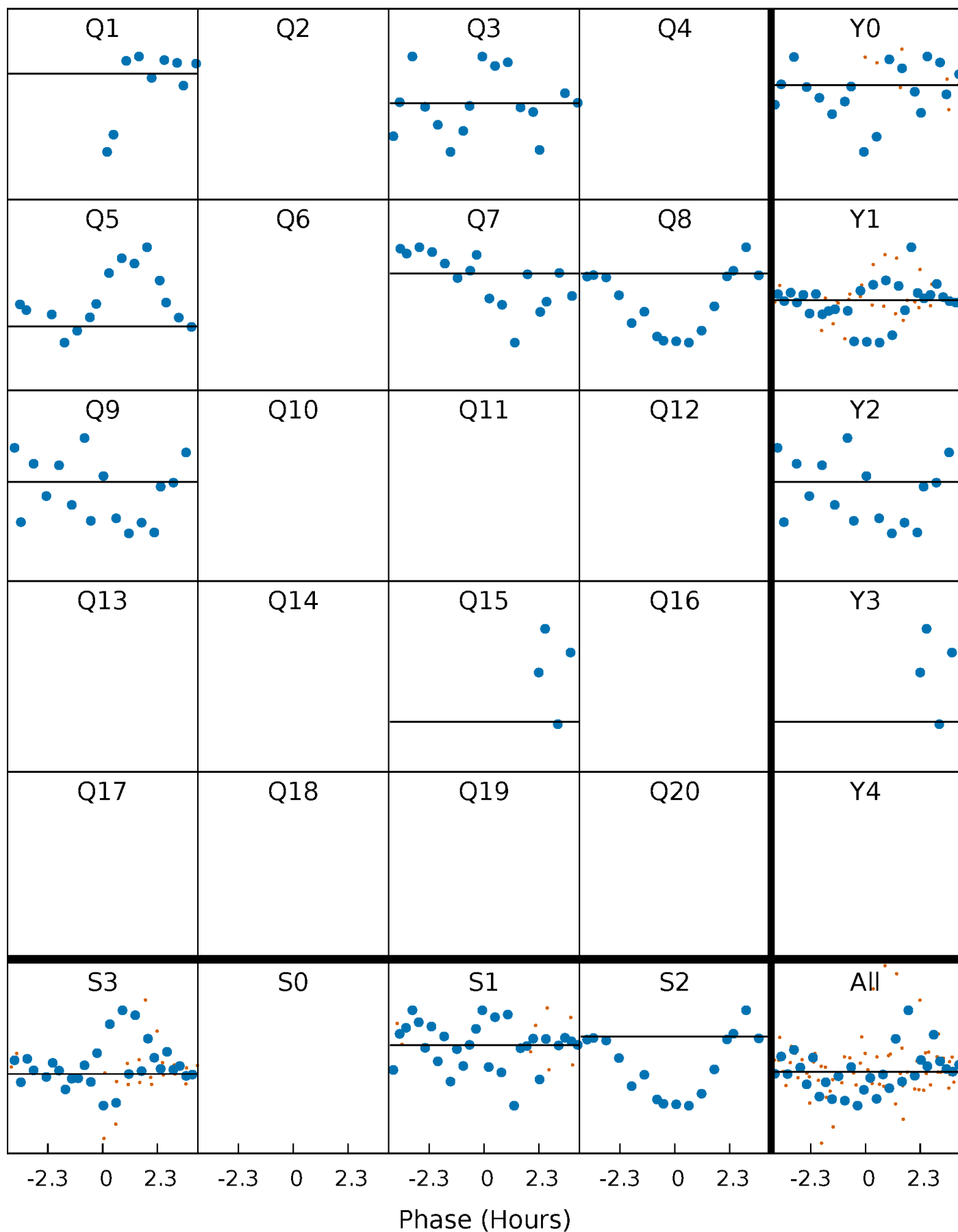
PDC Quarter-Phased Transit Curves

TCE 009837578-06 P=117.823087 Days $T_0=164.388285$ (BKJD)



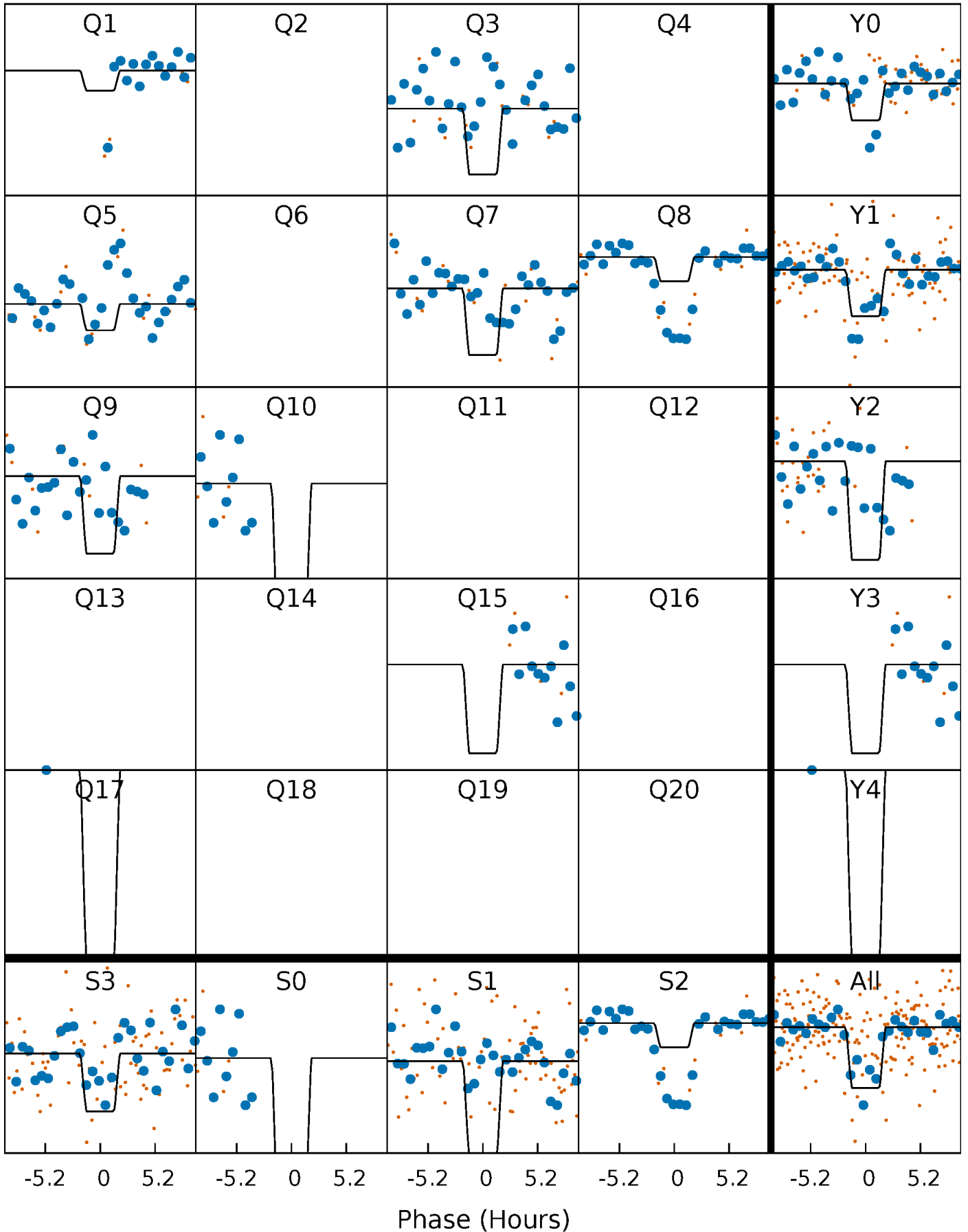
DV Quarter-Phased Transit Curves

TCE 009837578-06 P=117.823087 Days $T_0=164.388285$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

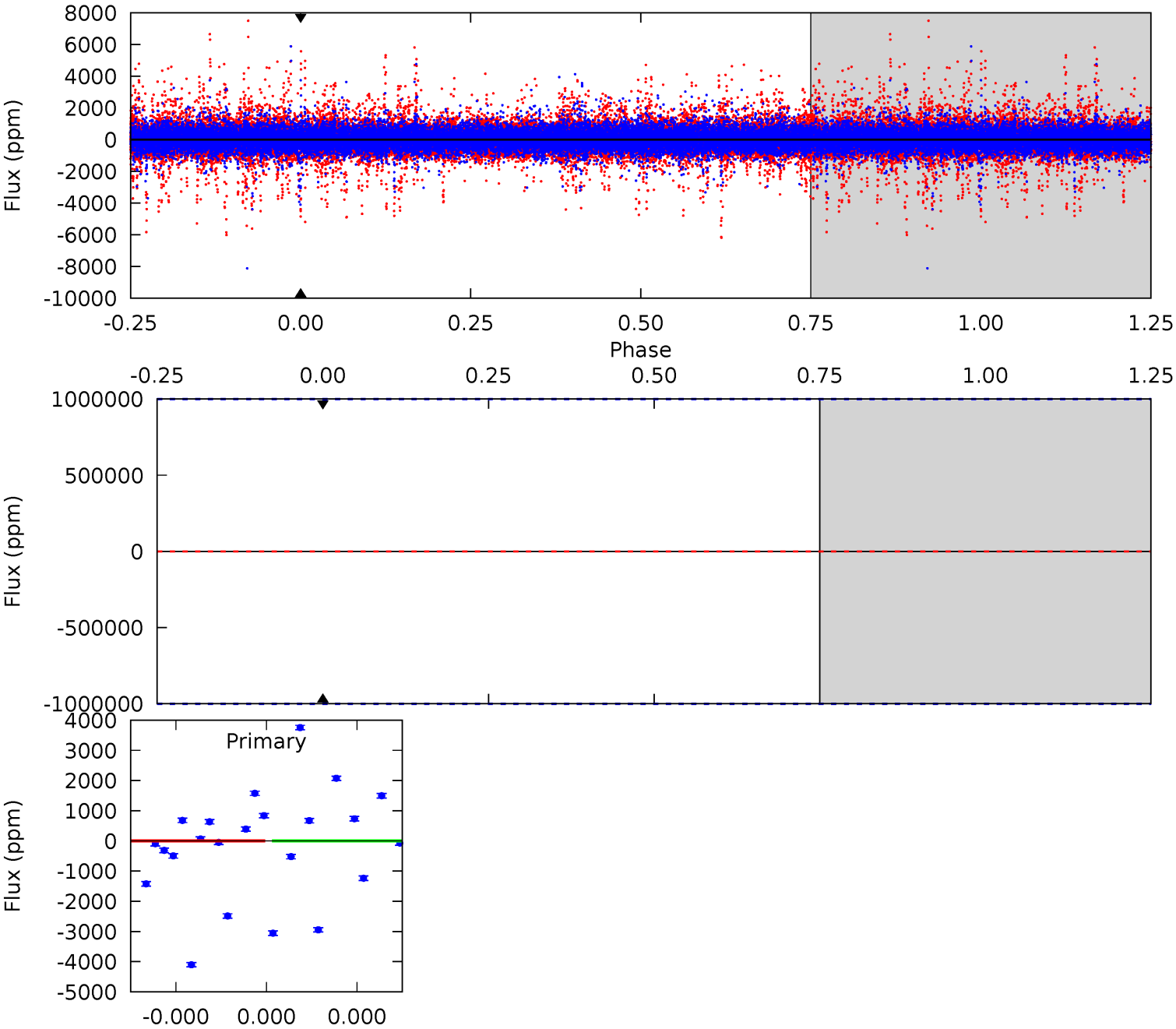
TCE 009837578-06 P=117.823087 Days $T_0=164.373107$ (BKJD)



DV Model-Shift Uniqueness Test

009837578-06, P = 117.823087 Days, E = 46.565198 Days

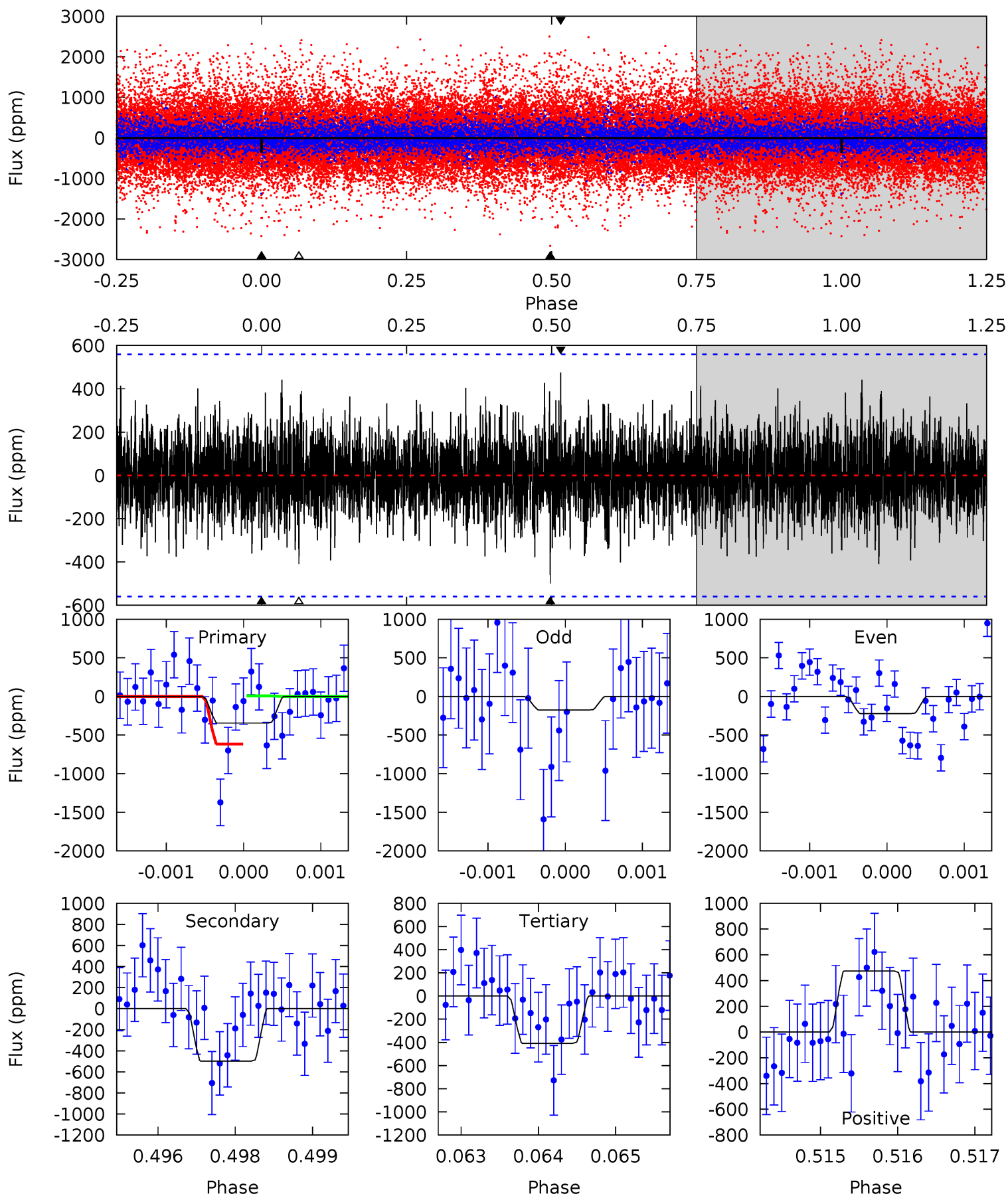
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

009837578-06, P = 117.823087 Days, E = 46.550020 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.33	4.82	3.95	4.59	5.40	3.21	1.14	-0.62	-1.25	0.87	0.23	0.24	4.99	0.49	0



Stellar Parameters For KIC 009837578

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5620^{+118}_{-75}	$4.363^{+0.065}_{-0.040}$	$-0.320^{+0.150}_{-0.100}$	$0.974^{+0.067}_{-0.067}$	$0.797^{+0.067}_{-0.024}$	$1.217^{+0.300}_{-0.166}$
	+2%/-1%	+1%/-1%	+47%/-31%	+7%/-7%	+8%/-3%	+25%/-14%
Source	SPE36	TRA36	SPE36	DSEP		

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

Secondary Eclipse Parameters for KIC 009837578-06 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	0 ± 1000000	$12.31^{+9.36}_{-7.55}$	517^{+15}_{-14}	1941^{+10216}_{-13814}	$6.941^{+109690.283}_{-104469.493}$
Alt.	-499 ± 103	$8.58^{+8.52}_{-5.53}$	516^{+13}_{-13}	3443^{+1636}_{-637}	700^{+5304}_{-530}

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

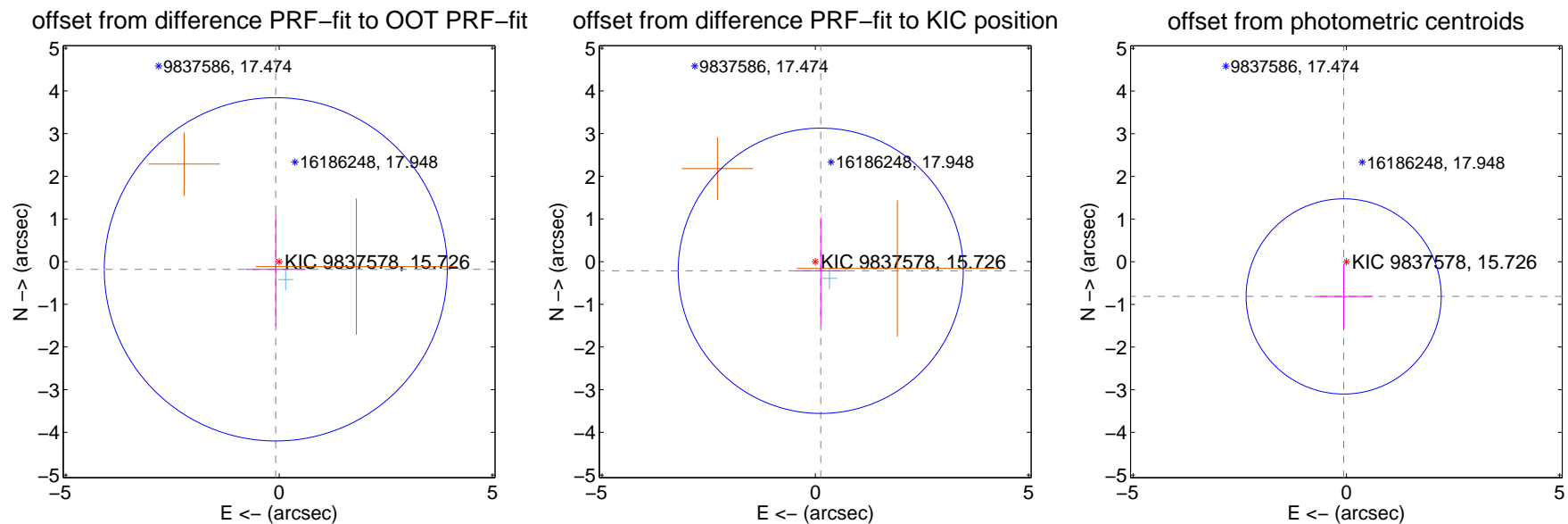
DV Centroid Data

Supplemental centroid analysis for 009837578-06. Kepler magnitude: 15.73. Transit SNR -1.00

There are 1 quarters with good PRF difference image offsets

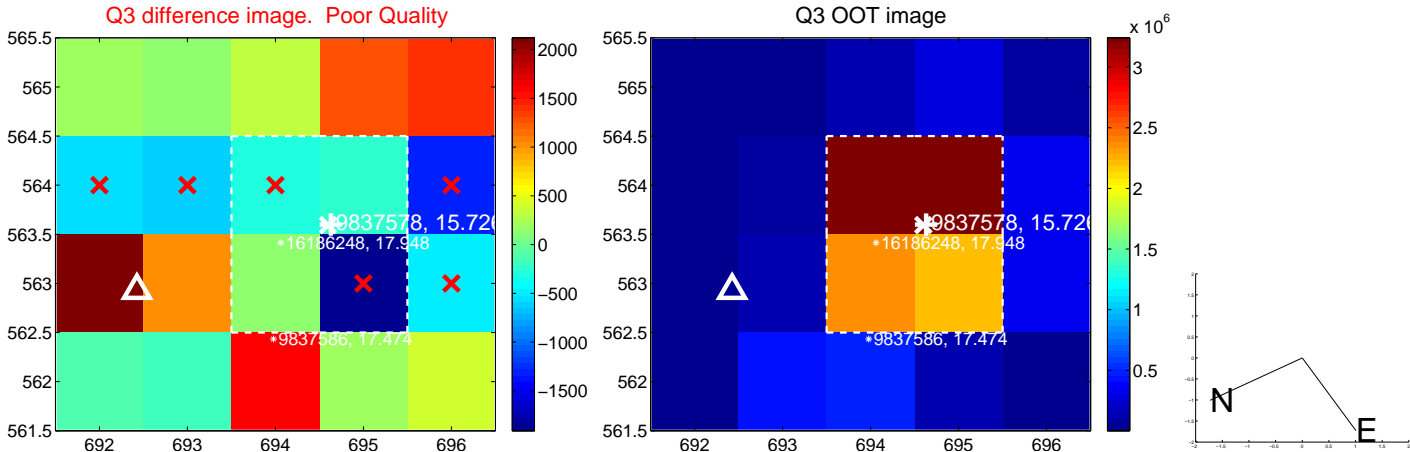
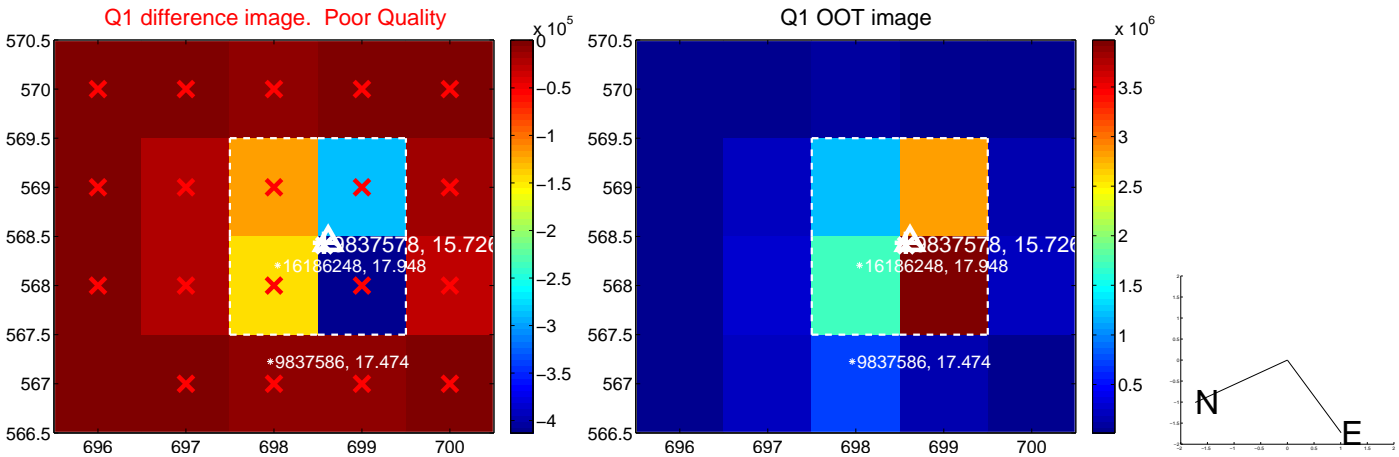
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.196 ± 1.341	0.15	0.079 ± 0.707	-0.180 ± 1.329
PRF-fit source offset from KIC position	0.250 ± 1.114	0.22	-0.128 ± 0.600	-0.214 ± 1.242
photometric centroid source offset	0.82 ± 0.76	1.07	0.06 ± 0.69	-0.81 ± 0.76

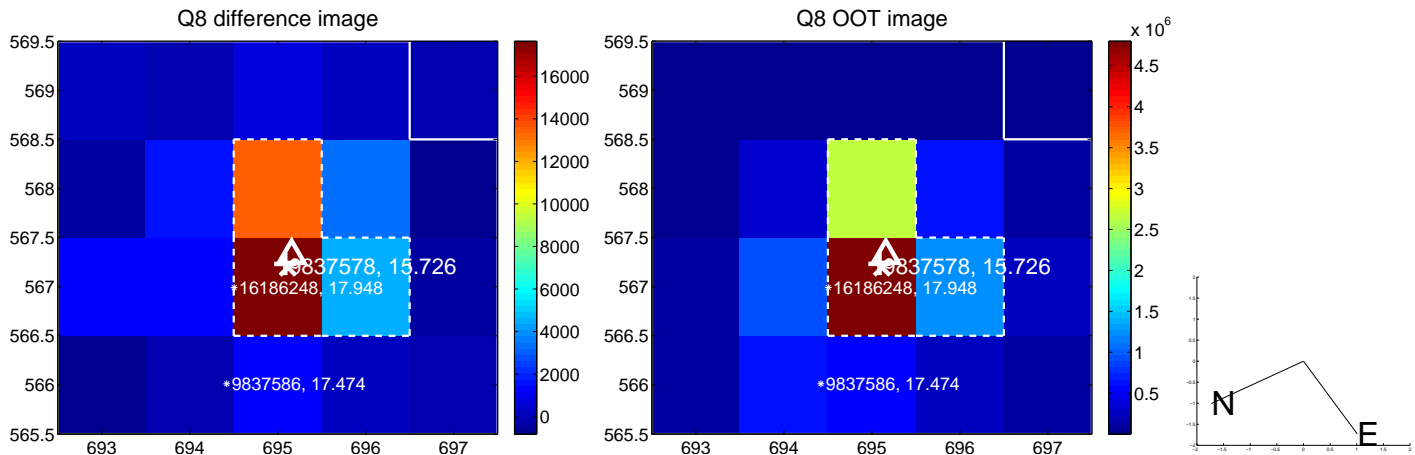
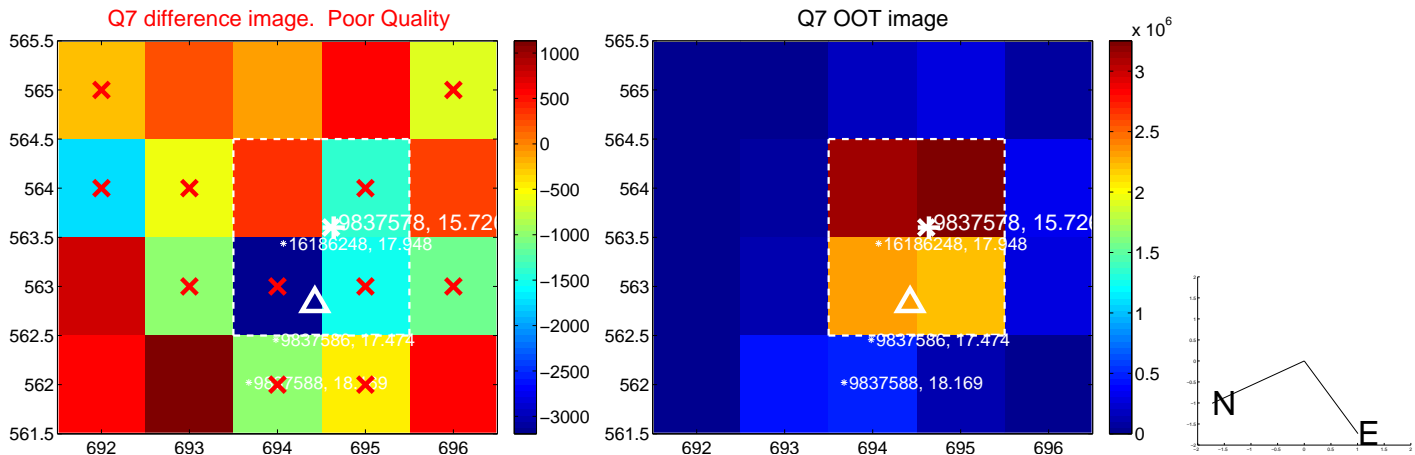
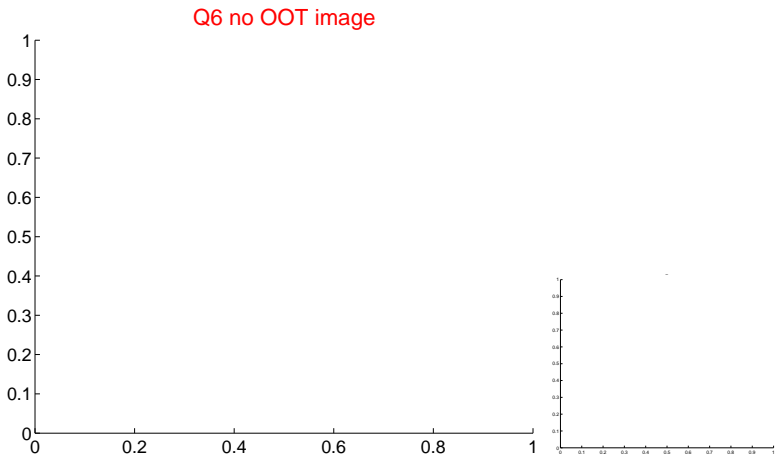
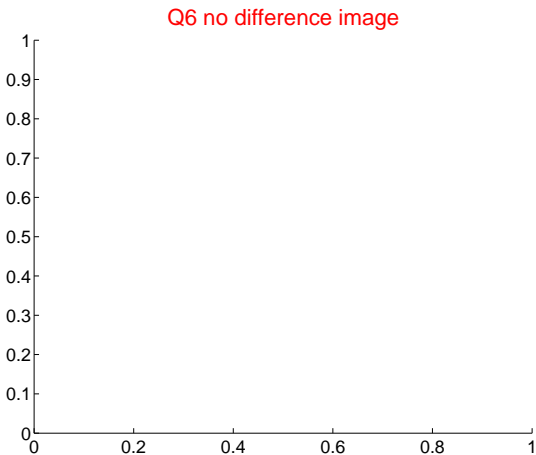
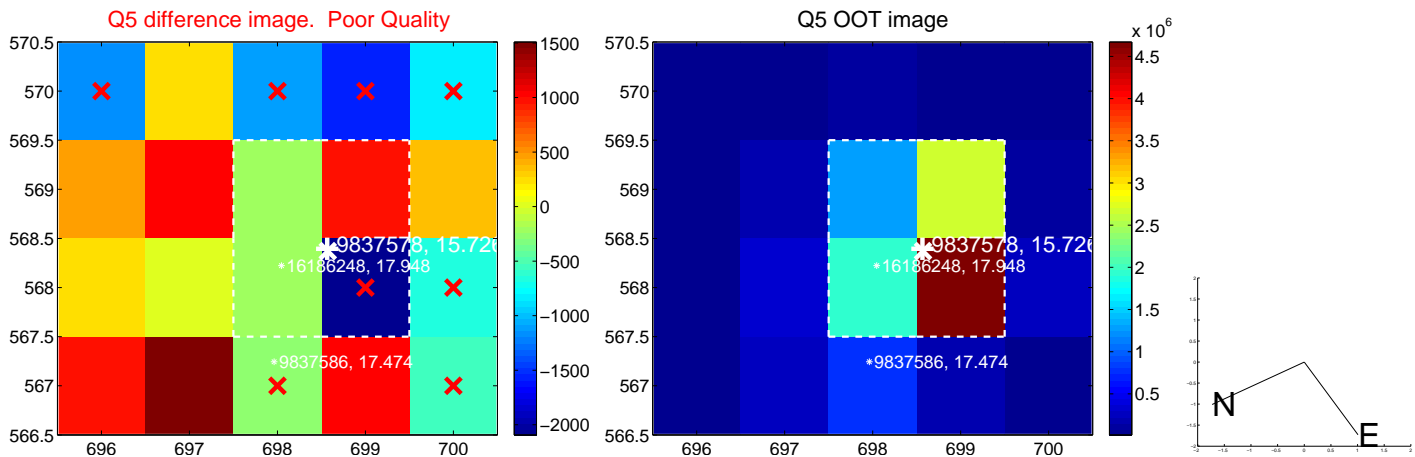


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

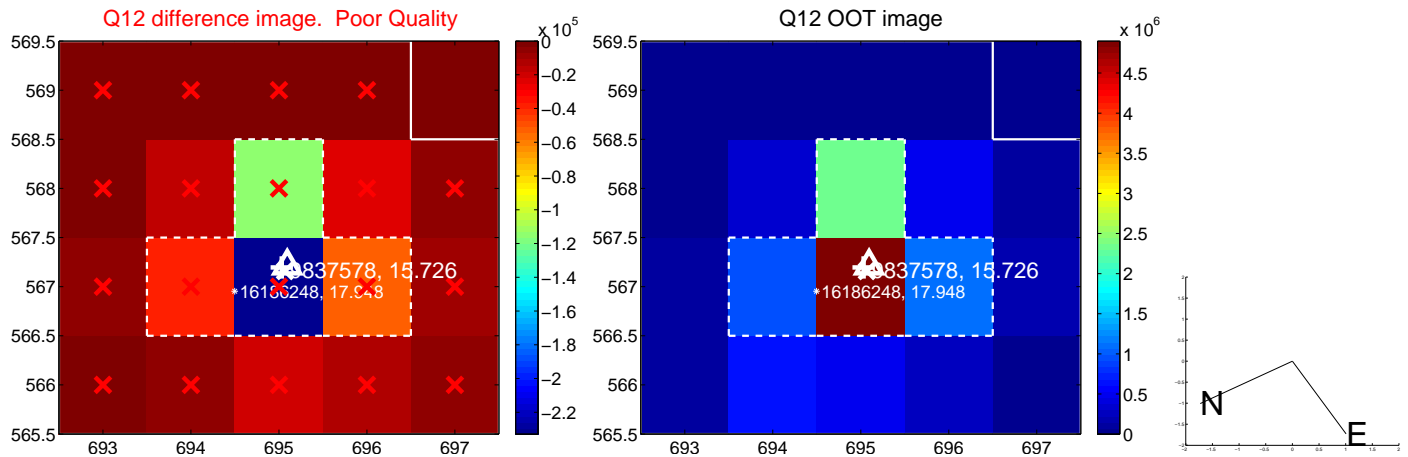
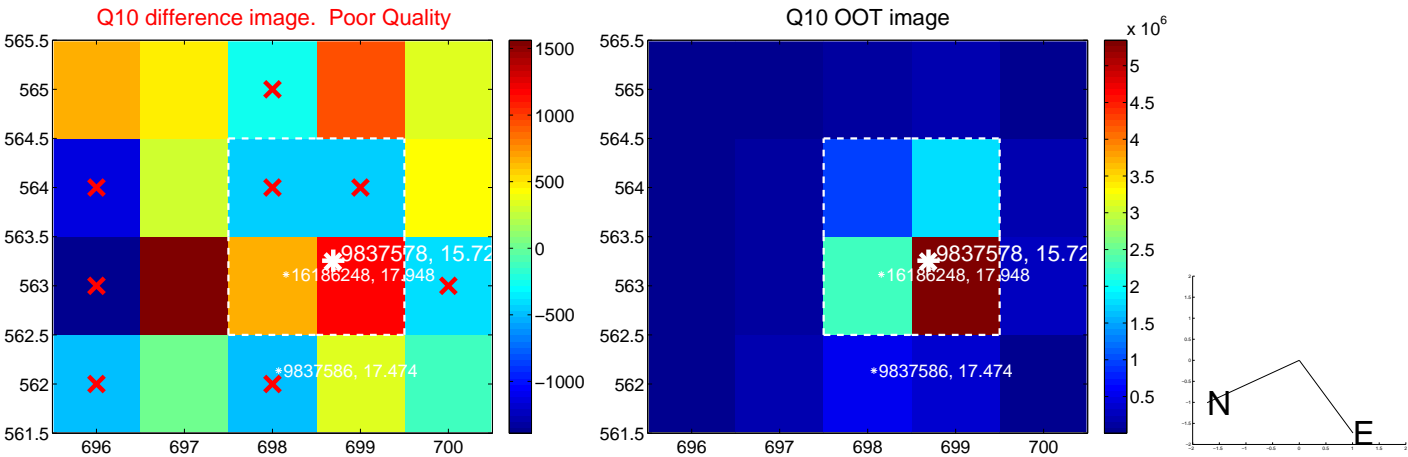
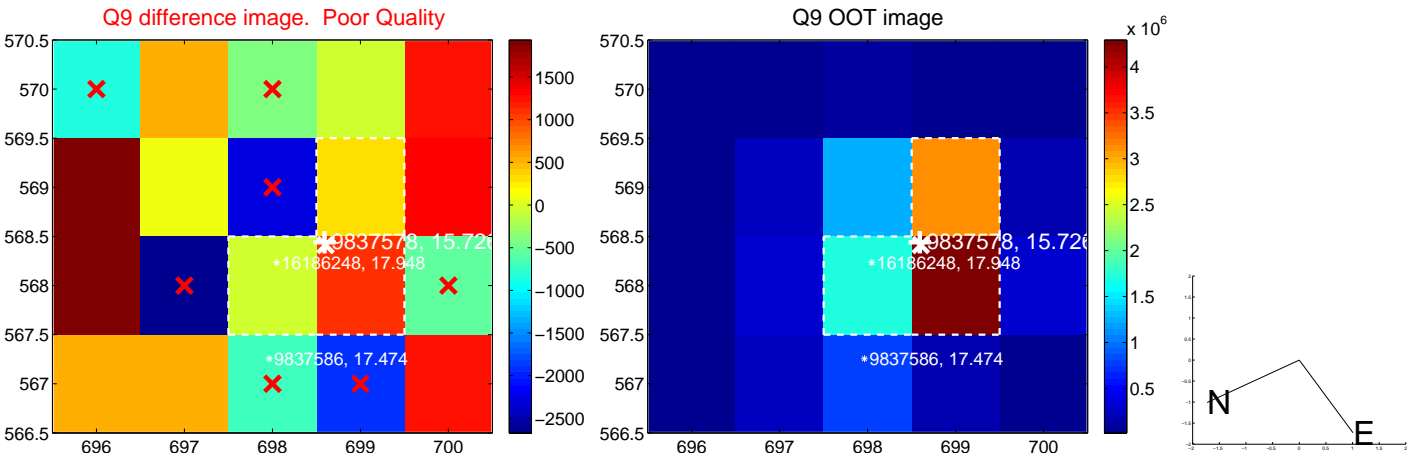
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



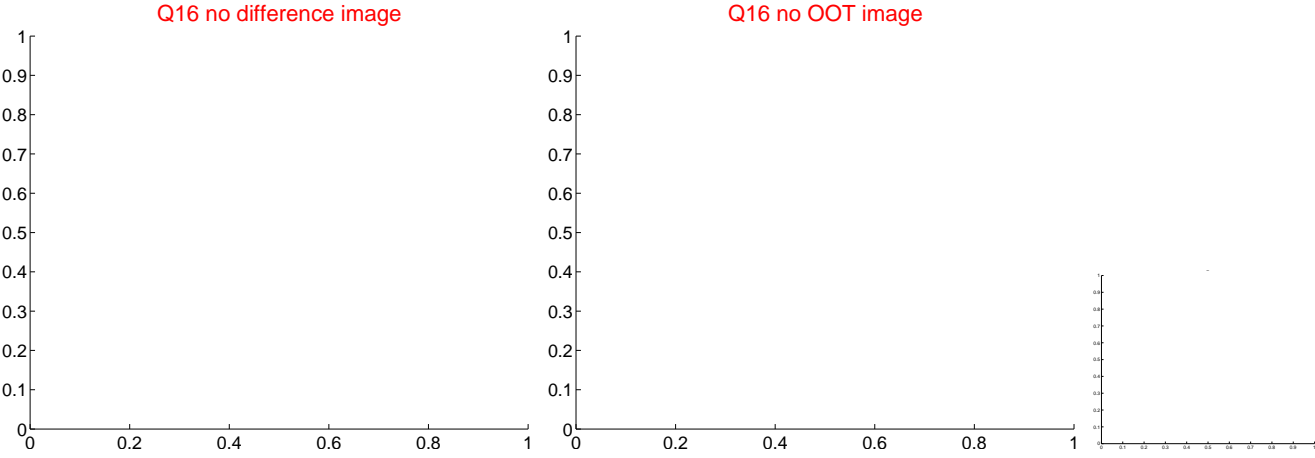
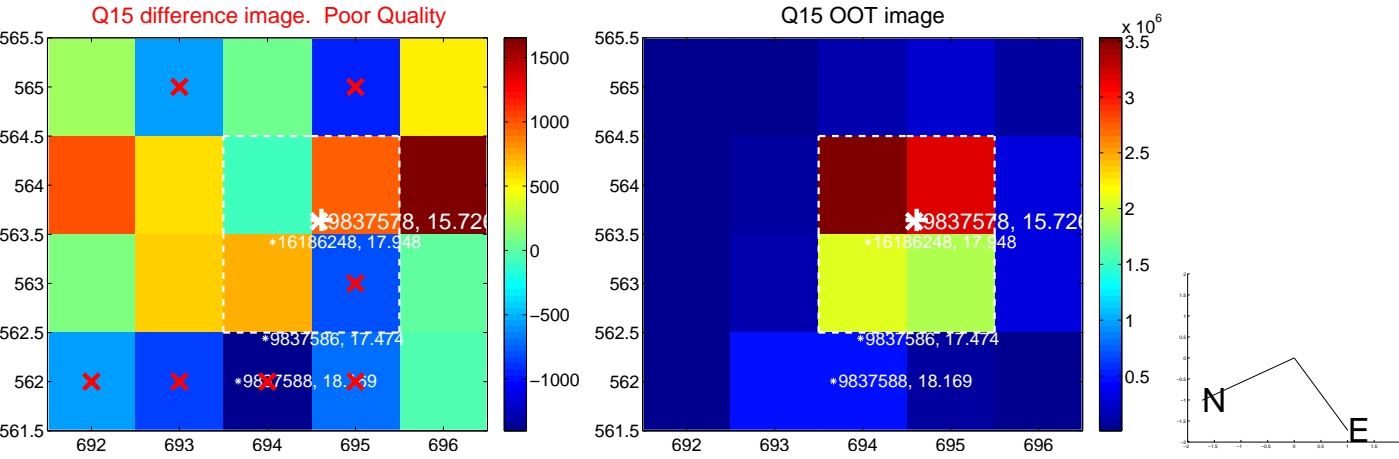
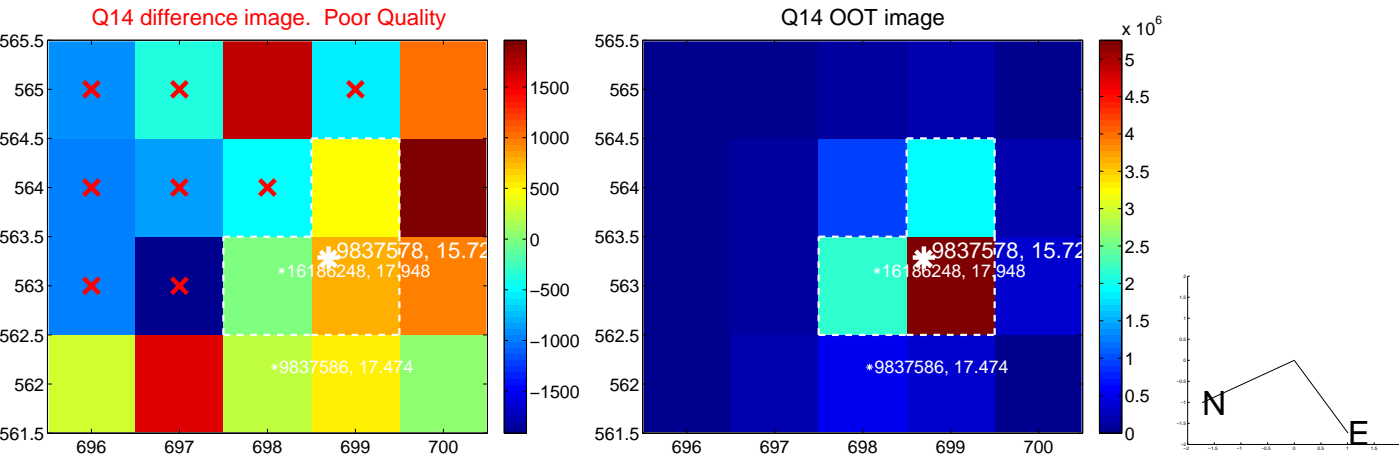
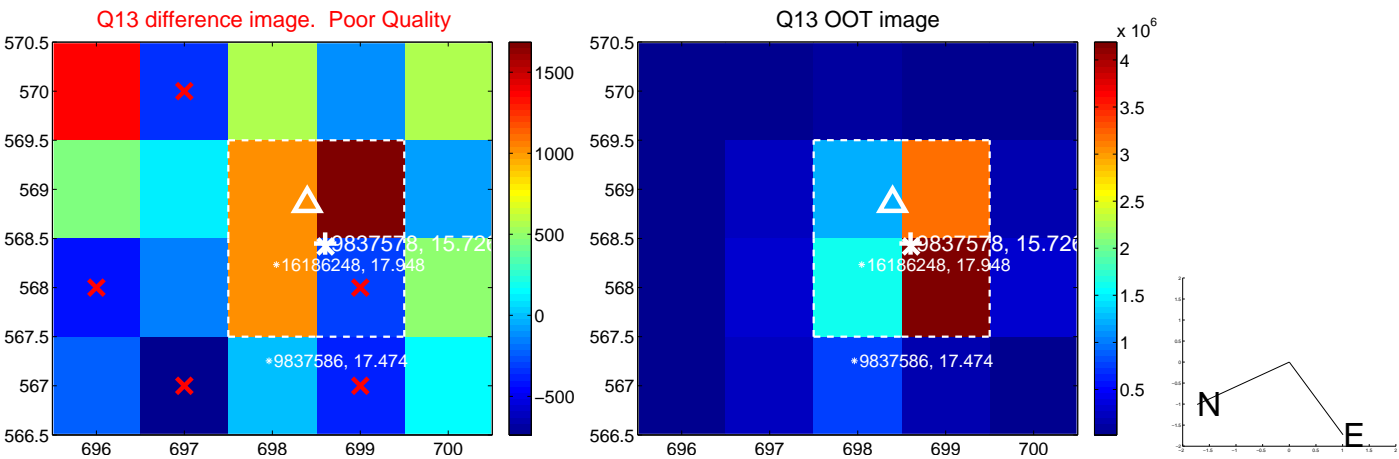
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



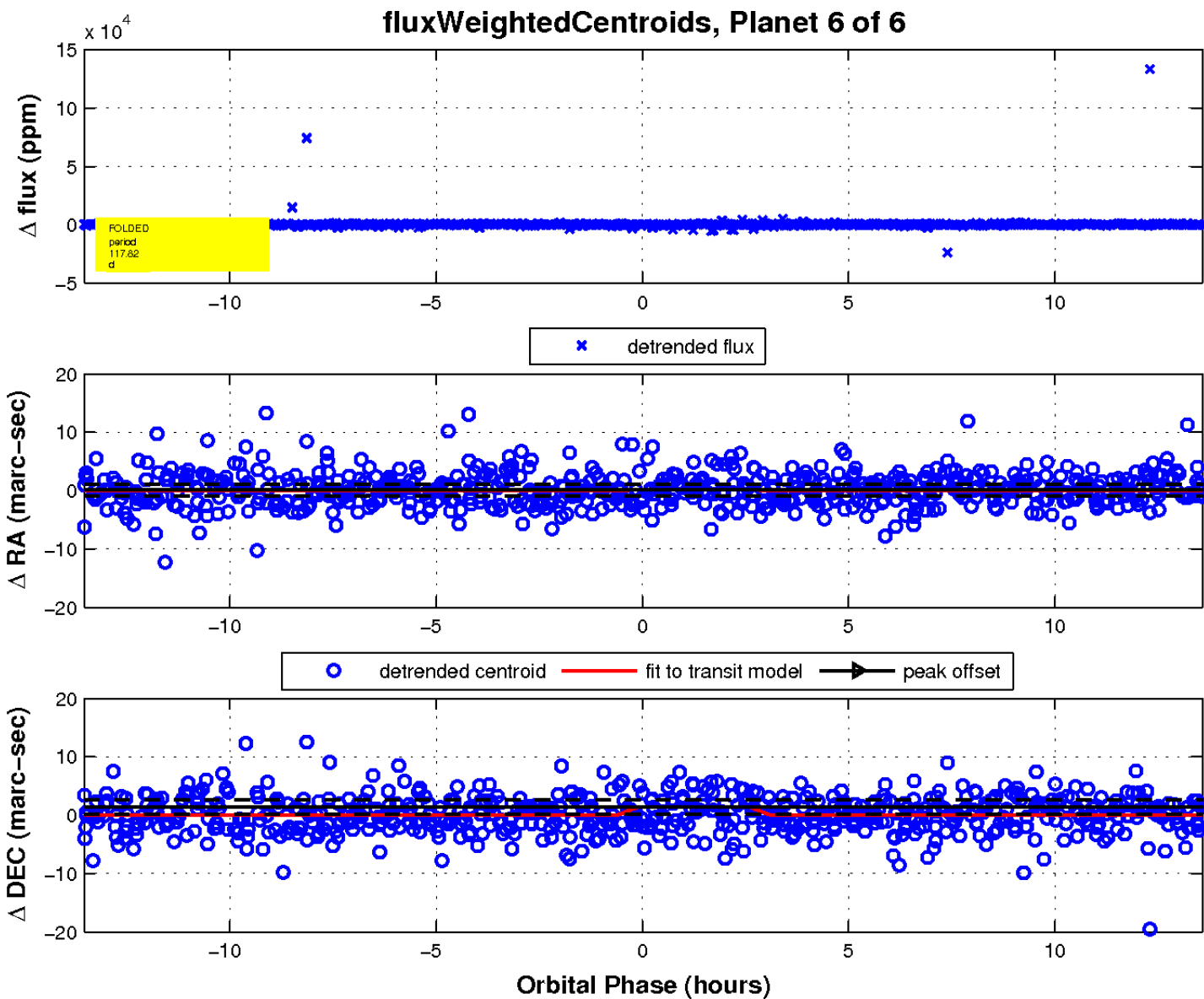
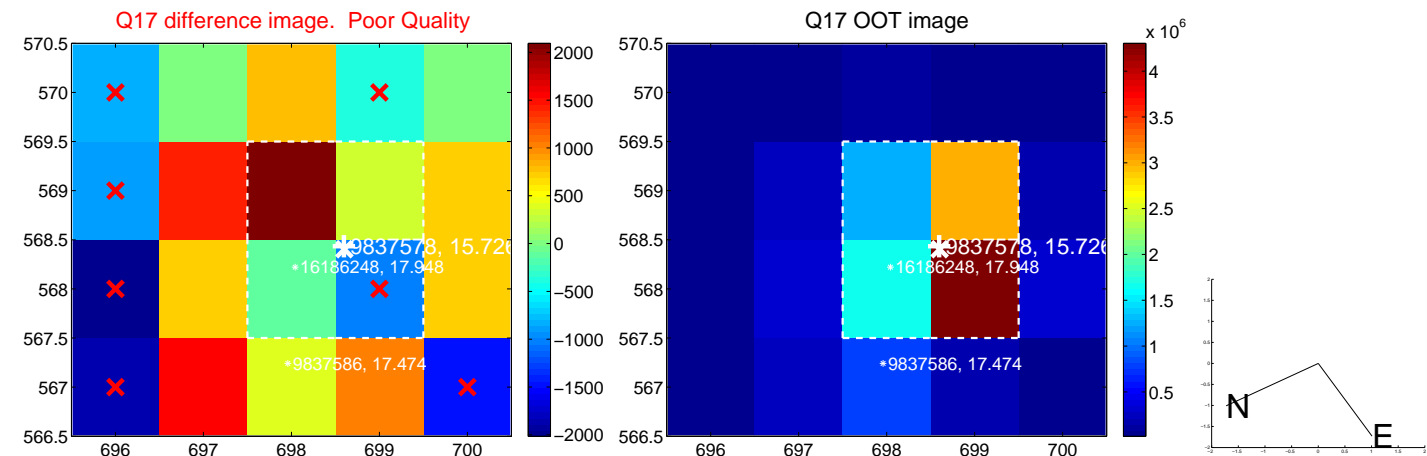
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image

