

KIC 008517378

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})
008517378-01	OBS	No	0.869112	132.303886	3.2	5.597	7.7	2.0	2.21	6923	0.40	24015.65
008517378-02	OBS	No	36.610024	152.638459	210.1	1.375	8.8	7.2	2.21	6923	3.65	163.86
008517378-03	OBS	No	78.590219	198.848611	267.1	1.852	9.8	10.2	2.21	6923	4.02	59.17
008517378-04	OBS	No	39.475342	142.375045	176.1	3.589	8.2	9.6	2.21	6923	3.26	148.19

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008517378-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
008517378-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT
008517378-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
008517378-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST

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

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

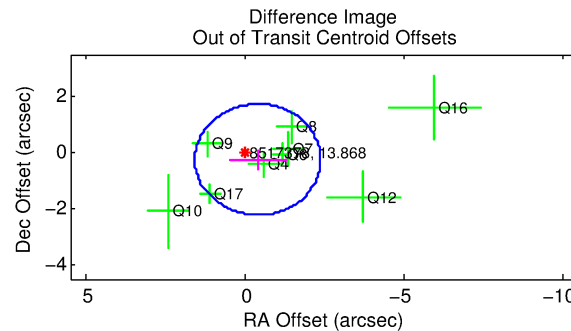
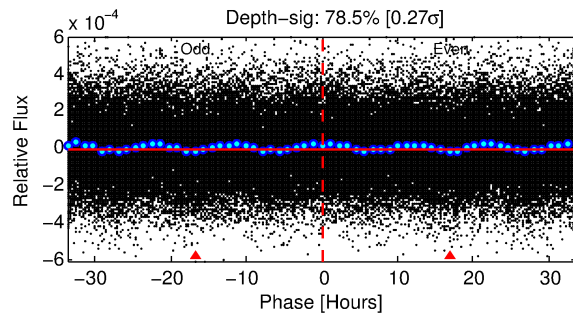
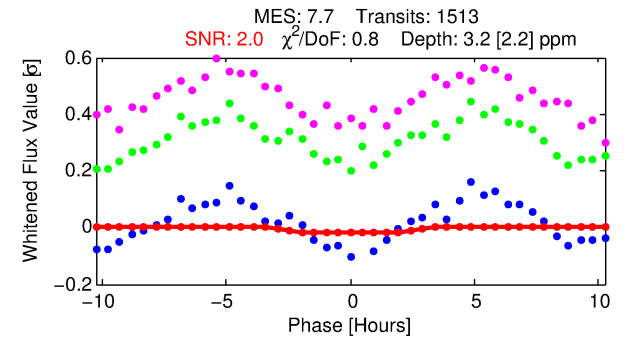
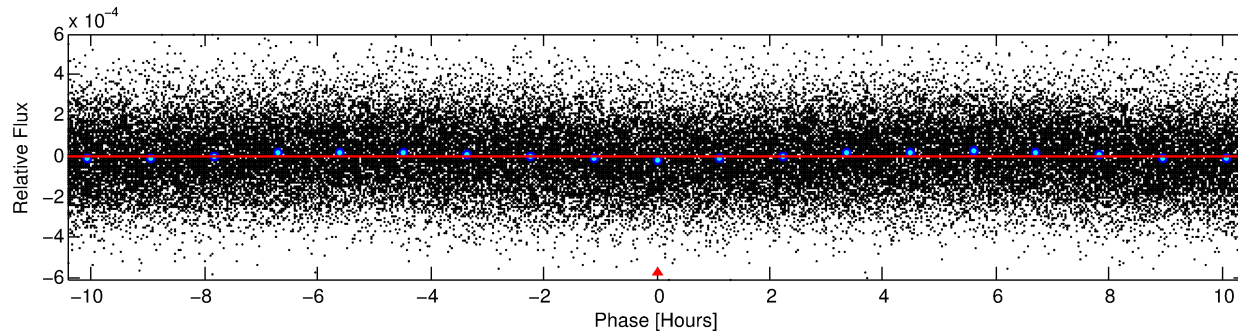
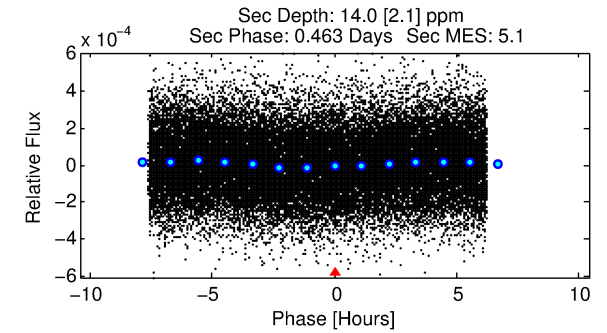
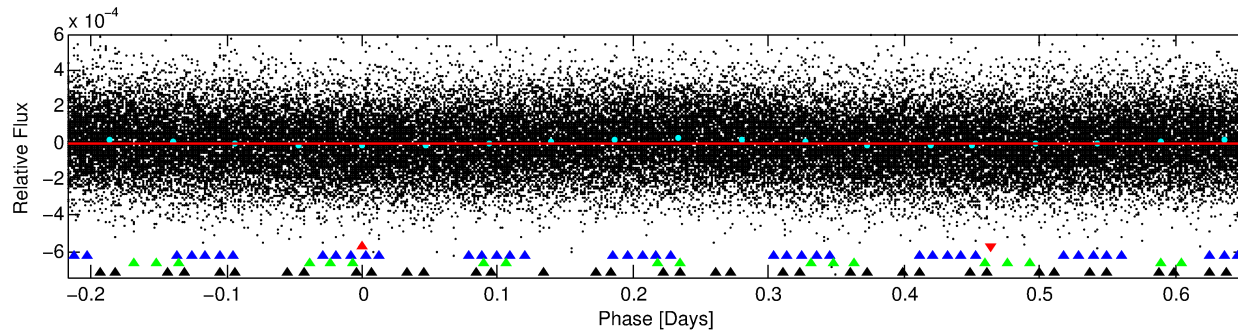
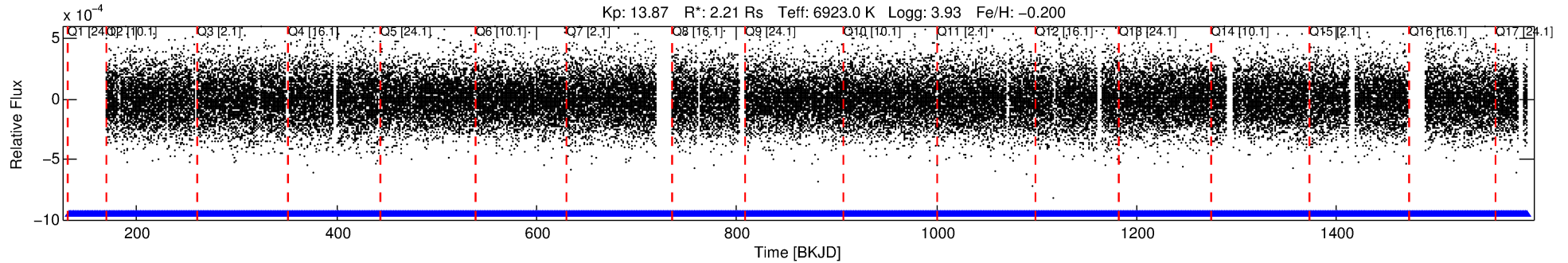
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008517378-01

No Significant Match Found

DV One-Page Summary

KIC: 8517378 Candidate: 1 of 4 Period: 0.869 d



DV Fit Results:

Period = 0.86911 [0.00007] d
Epoch = 132.3039 [0.0277] BKJD
Rp/R* = 0.0016 [0.0077]
a/R* = 1.33 [15.42]
b = 0.17 [153.39]
Seff = 24015.65 [13889.78]
Teq = 3174 [459] K
Rp = 0.40 [1.86] Re
a = 0.0205 [0.0072] AU
Ag = 20.35 [189.97] [0.10σ]
Teffp = 10423 [24292] K [0.30σ]

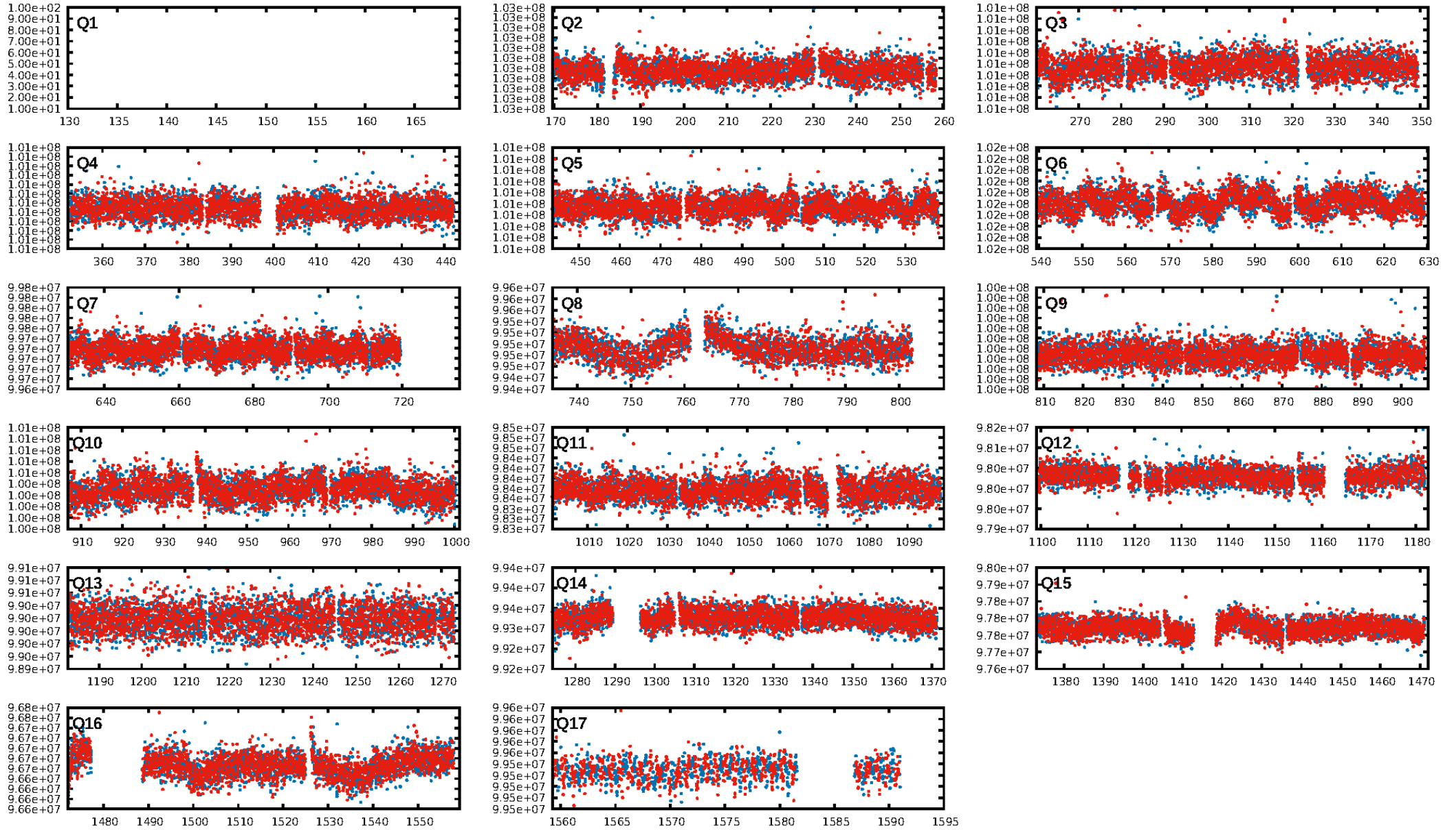
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [148.82σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 3.80e-09
RollingBand-fgt: 1.00 [1482/1482]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: N/A
OotOffset-rm: 0.467 arcsec [0.71σ]
KicOffset-rm: 0.476 arcsec [0.91σ]
OotOffset-st: 2/1/4/2 [9]
KicOffset-st: 2/1/4/2 [9]
DiffImageQuality-fgm: 0.56 [5/9]
DiffImageOverlap-fno: 1.00 [16/16]

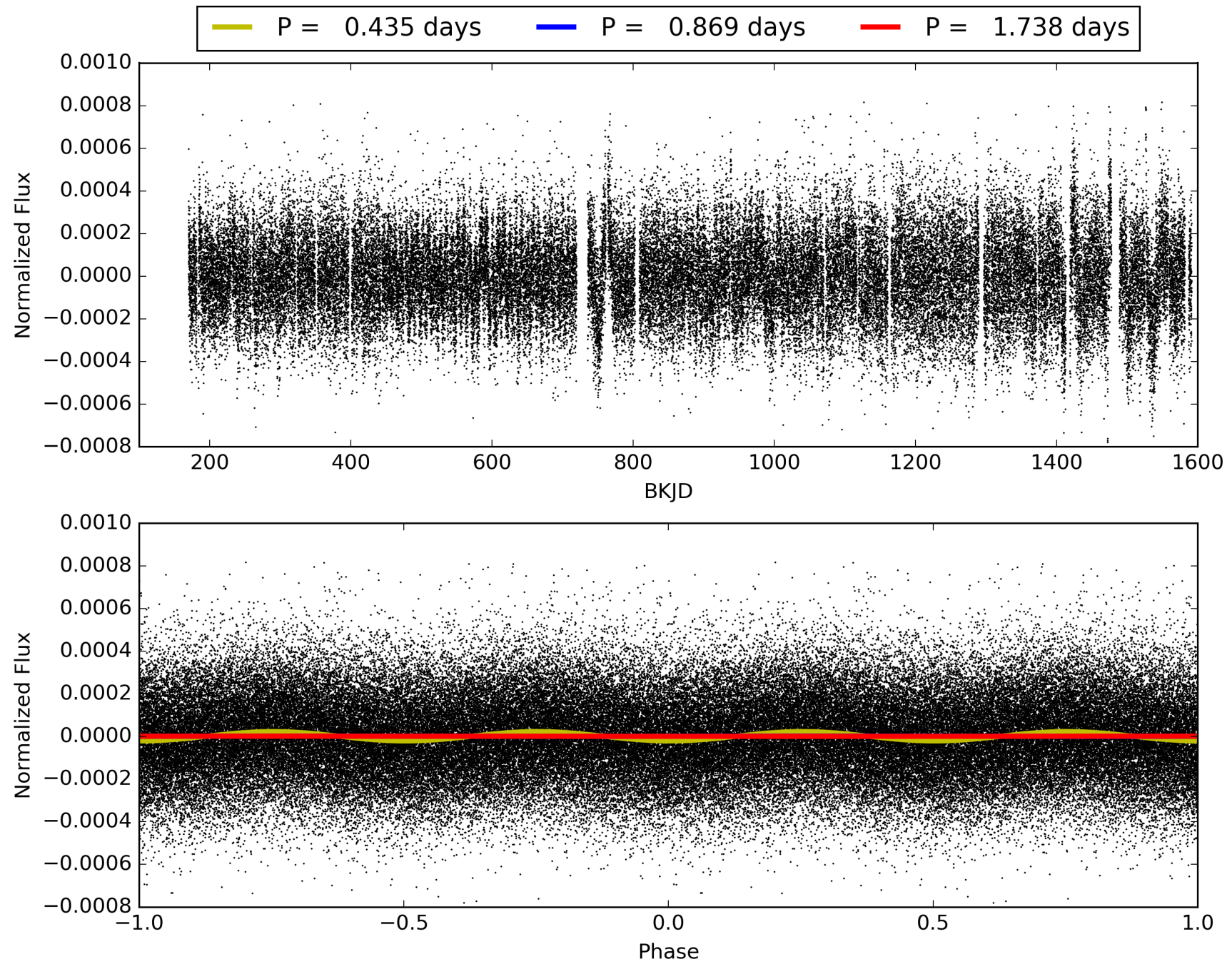
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 008517378-01, PDC Light Curves

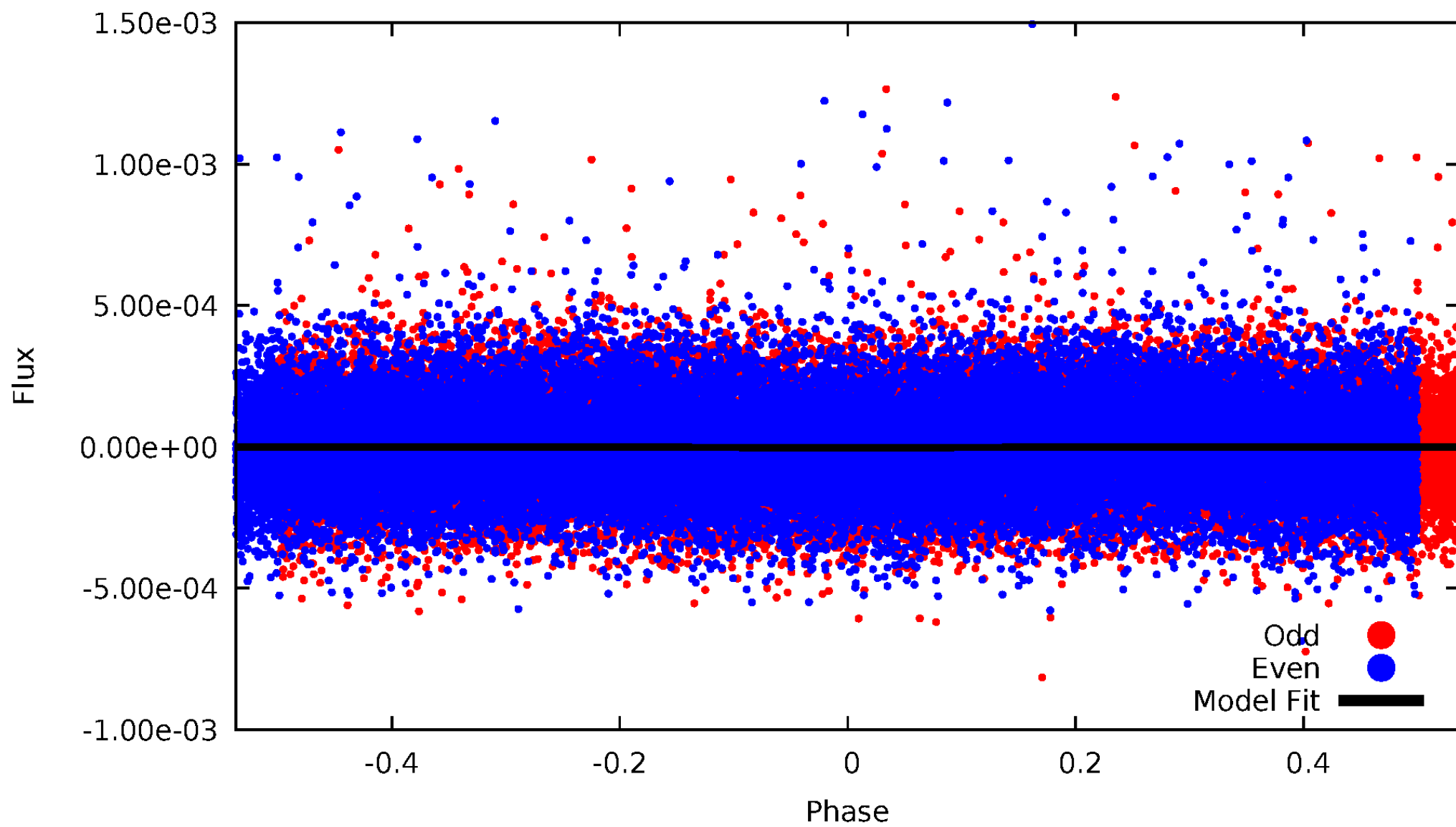


TCE 008517378-01



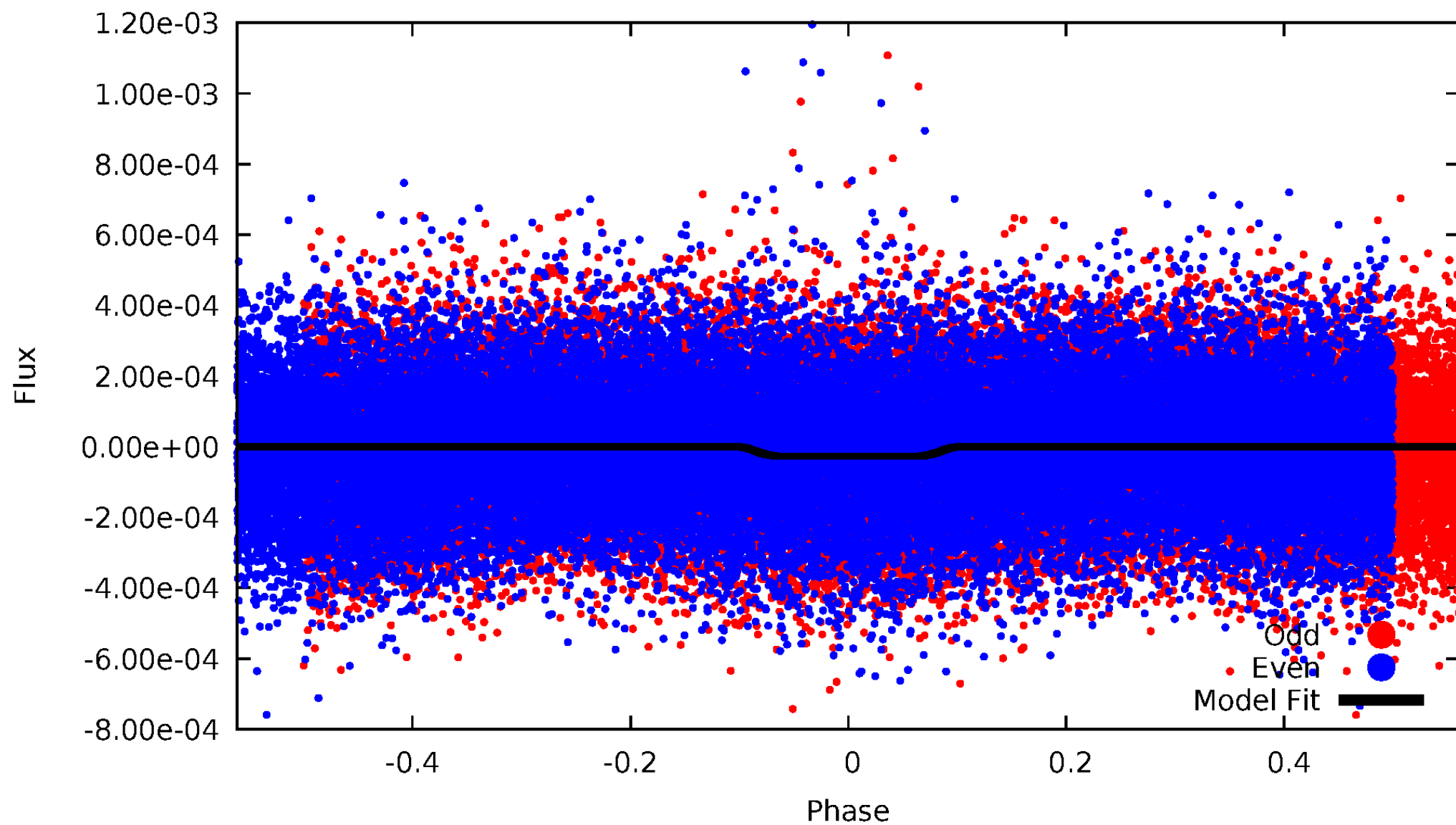
DV Odd/Even

TCE 008517378-01



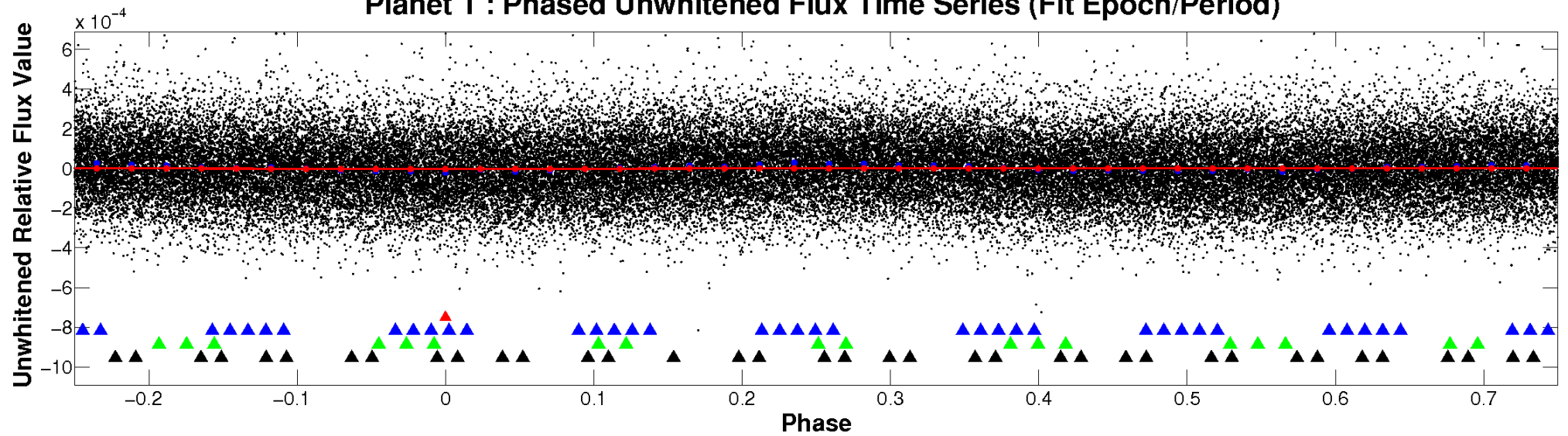
ALT Odd/Even

TCE 008517378-01

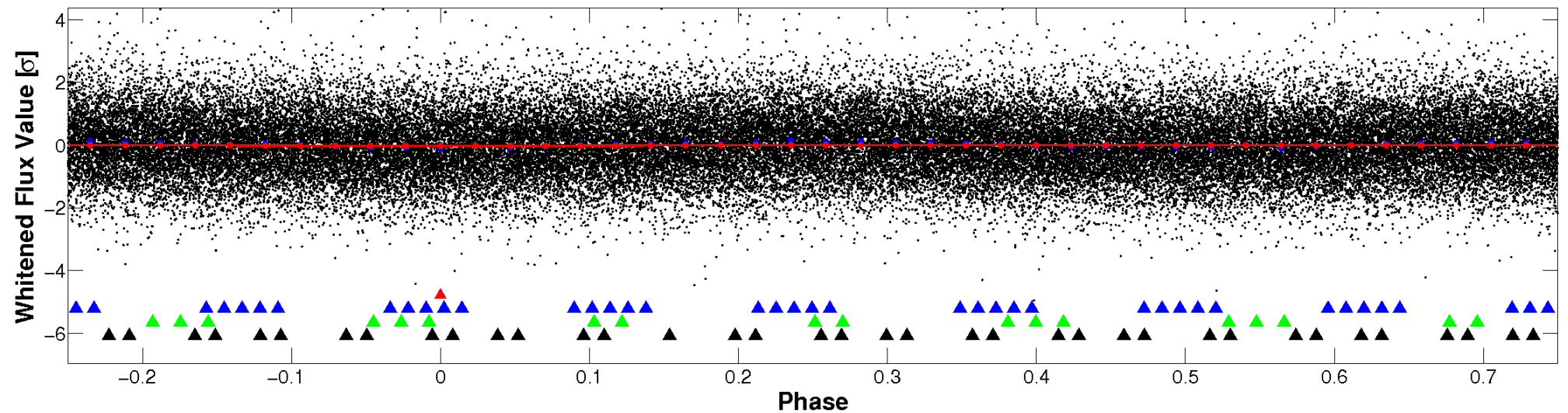


Non-Whitened Vs. Whitened Light Curve

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

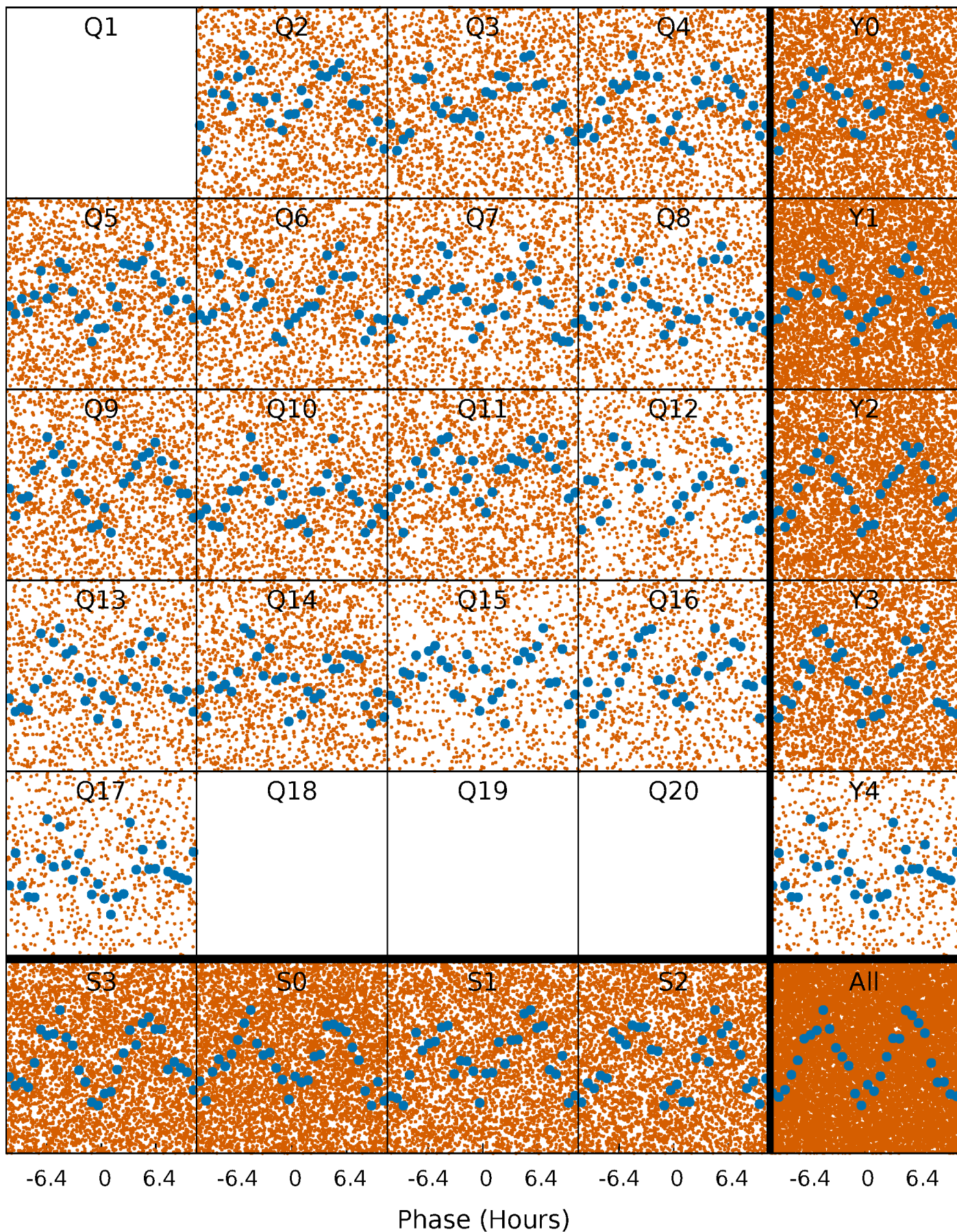


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



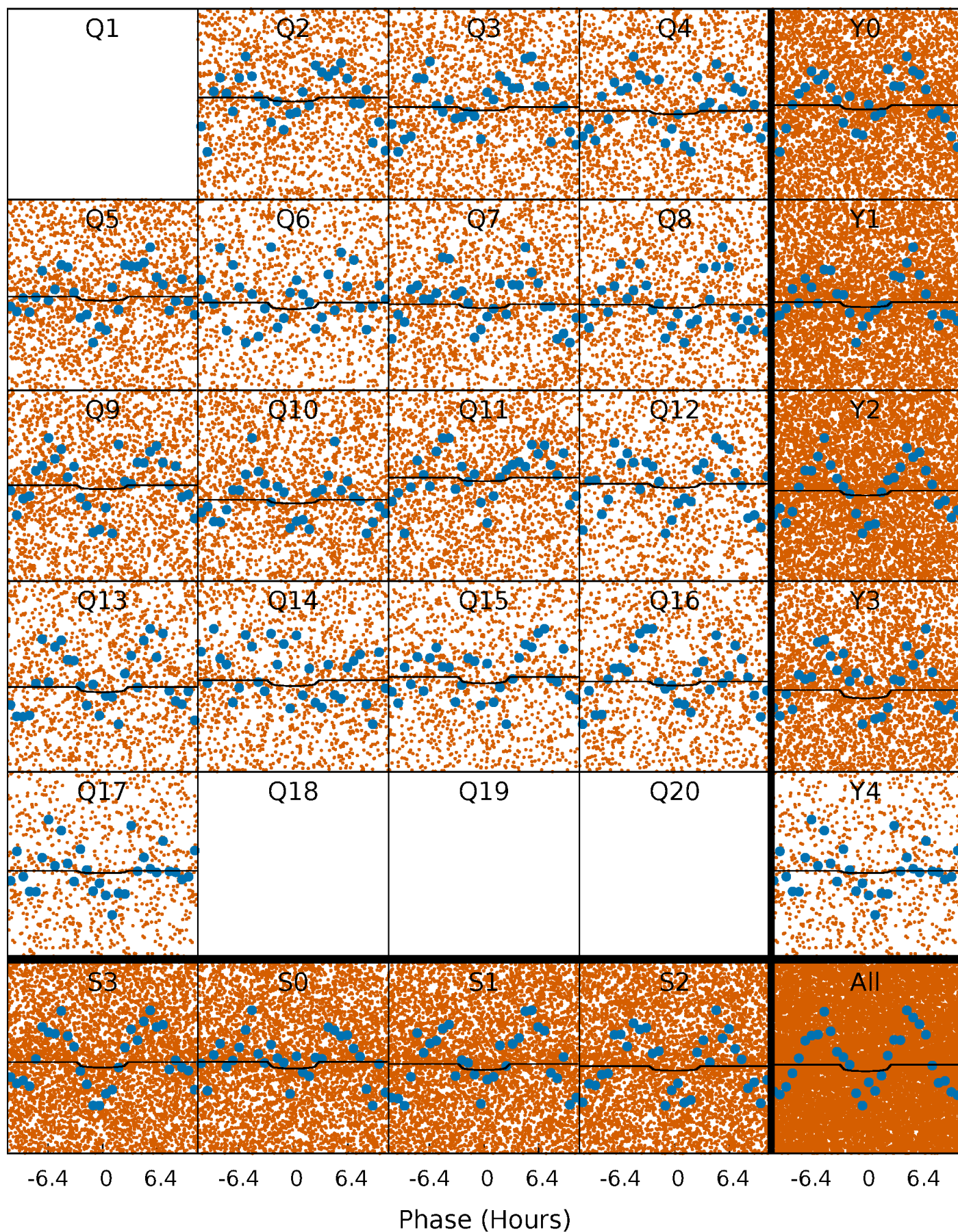
PDC Quarter-Phased Transit Curves

TCE 008517378-01 P= 0.869112 Days $T_0=132.303886$ (BKJD)



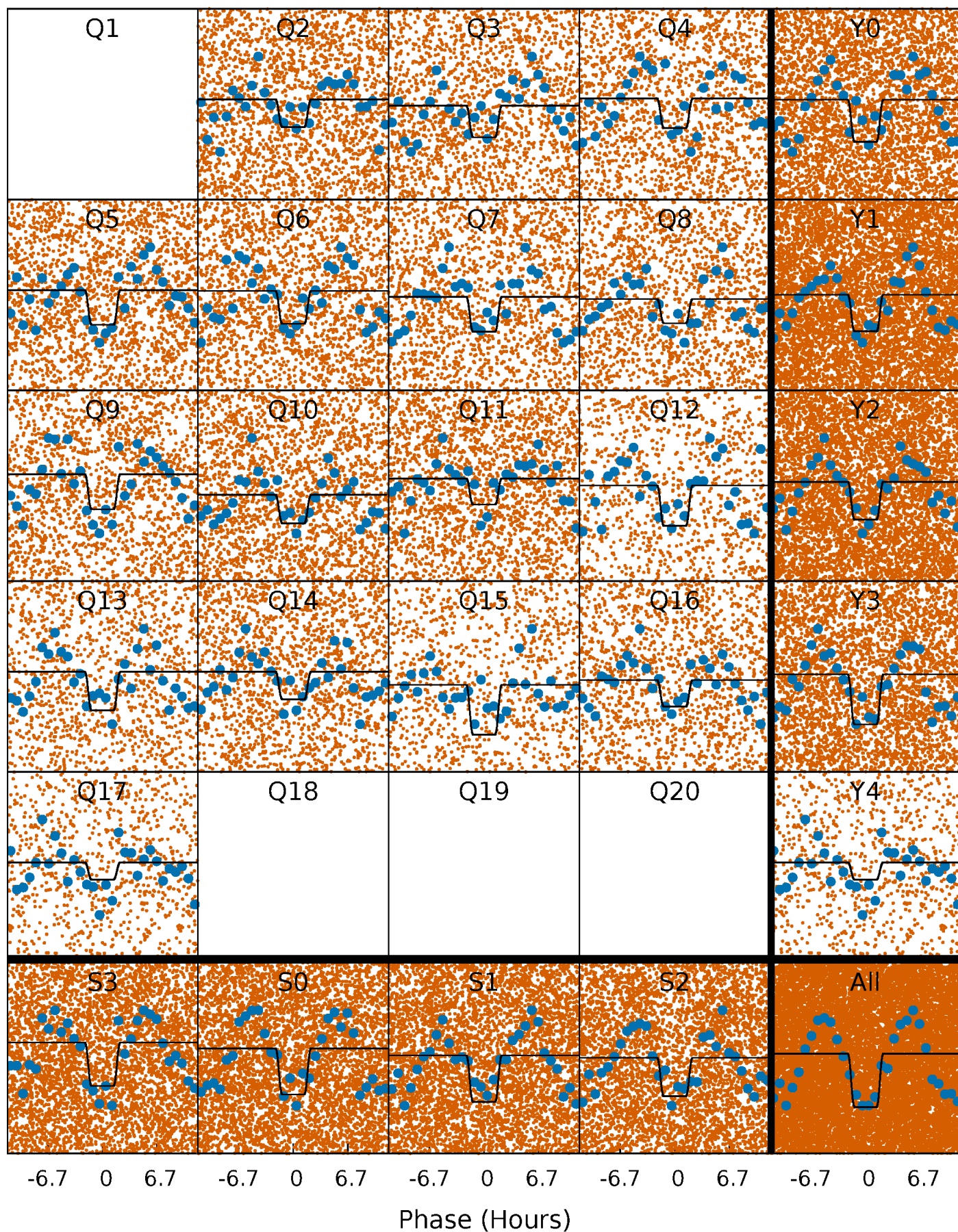
DV Quarter-Phased Transit Curves

TCE 008517378-01 P= 0.869112 Days $T_0=132.303886$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

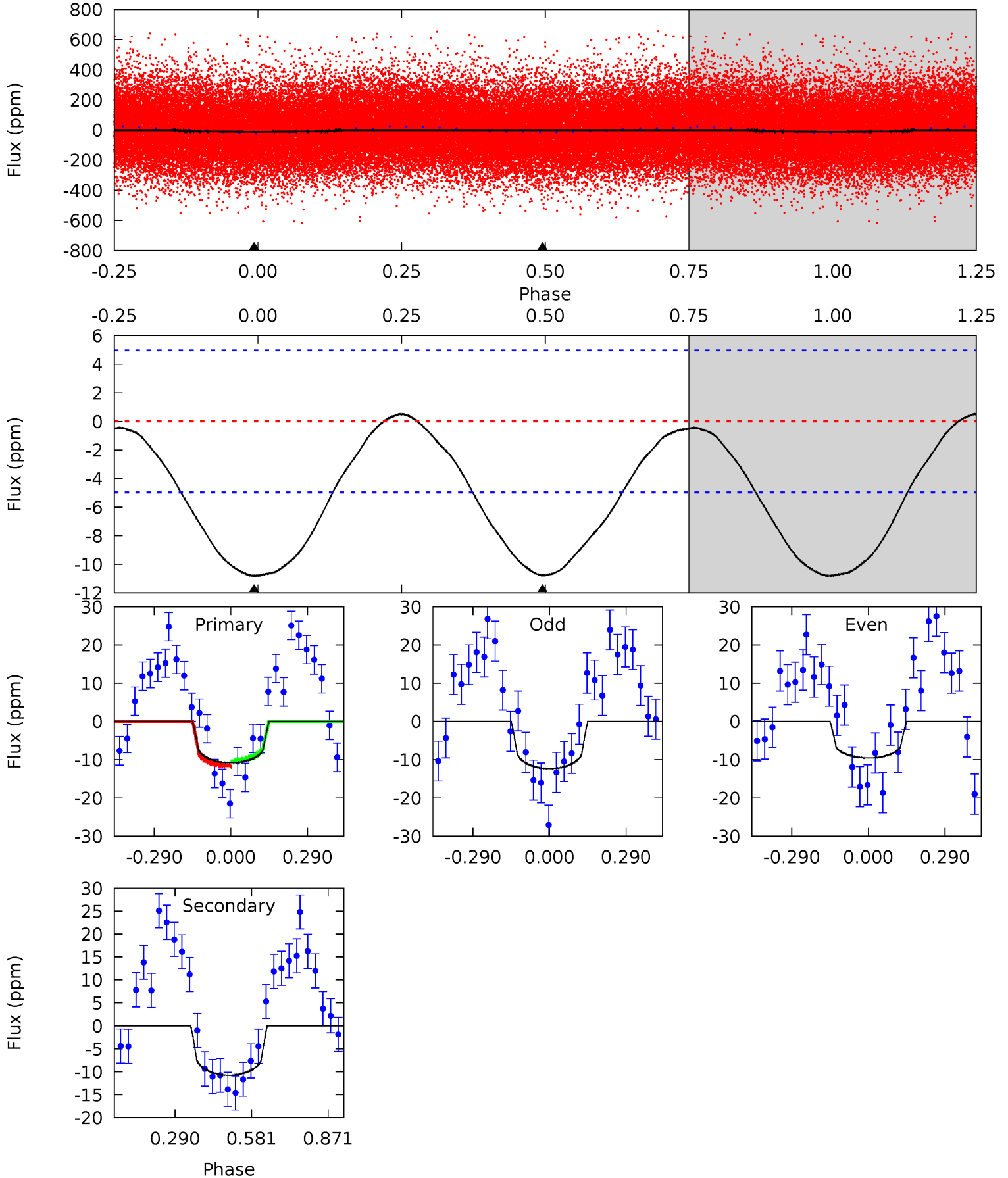
TCE 008517378-01 P= 0.869175 Days $T_0=132.251803$ (BKJD)



DV Model-Shift Uniqueness Test

008517378-01, P = 0.869112 Days, E = 132.303886 Days

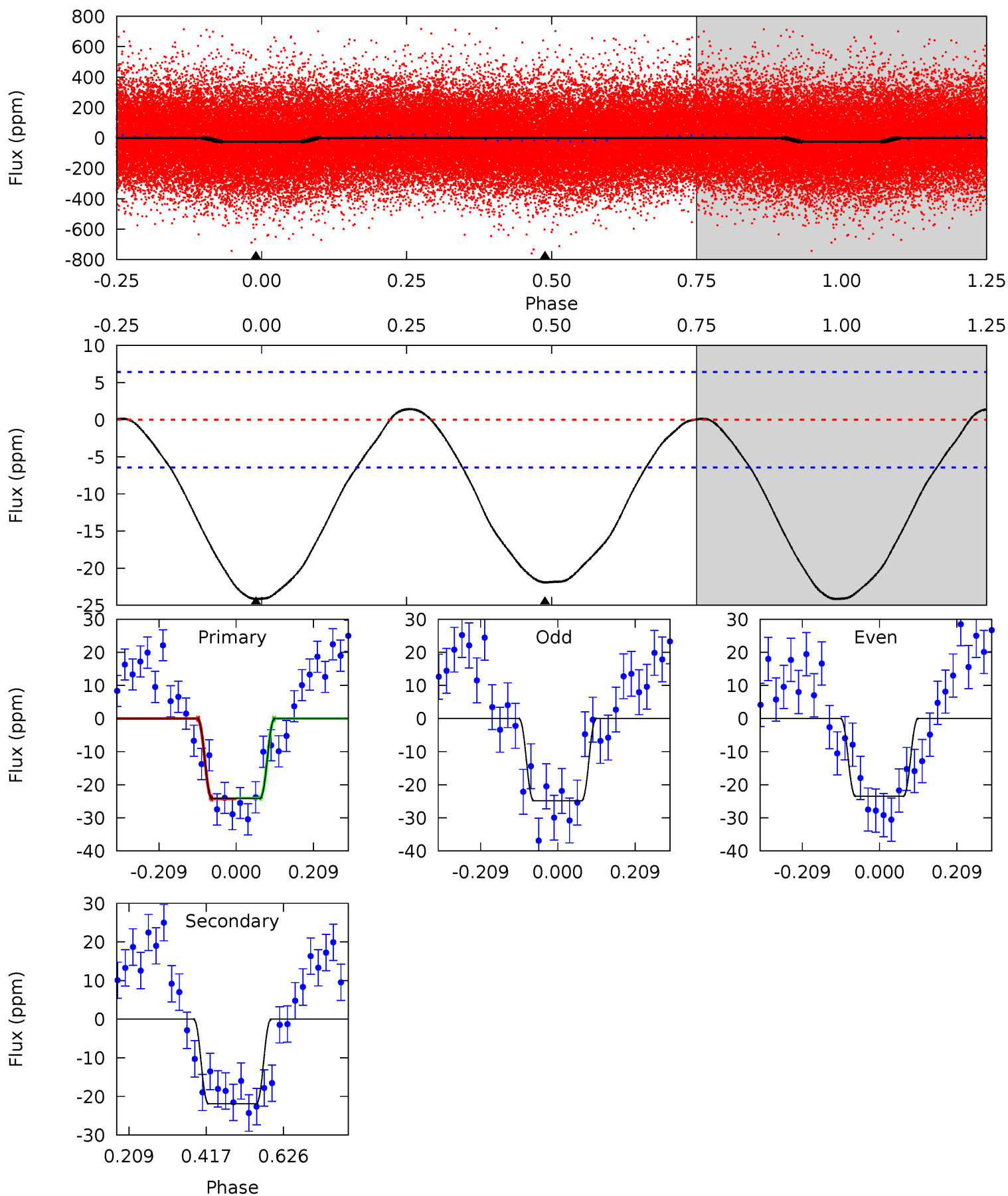
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.44	9.40	0	0	4.34	1.06	0.41	9.44	9.44	9.40	9.40	1.21	1.08	0.05	0.57



Alt Model-Shift Uniqueness Test

008517378-01, P = 0.869175 Days, E = 132.251803 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.5	15.0	0	0	4.41	1.26	0.78	16.5	16.5	15.0	15.0	0.47	1.02	0.06	0.06



Stellar Parameters For KIC 008517378

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6923^{+214}_{-286}	$3.929^{+0.322}_{-0.138}$	$-0.200^{+0.250}_{-0.300}$	$2.212^{+0.555}_{-0.832}$	$1.512^{+0.217}_{-0.326}$	$0.197^{+0.468}_{-0.079}$
	+3%/-4%	+8%/-4%	+125%/-150%	+25%/-38%	+14%/-22%	+238%/-40%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 008517378-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-11 ± 1	$1.34^{+1.52}_{-0.91}$	4339^{+338}_{-411}	4807^{+4665}_{-6926}	$1.335^{+12.539}_{-1.038}$
Alt.	-22 ± 1	$1.65^{+1.68}_{-1.09}$	4333^{+355}_{-430}	5327^{+4736}_{-1867}	$1.786^{+13.896}_{-1.320}$

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

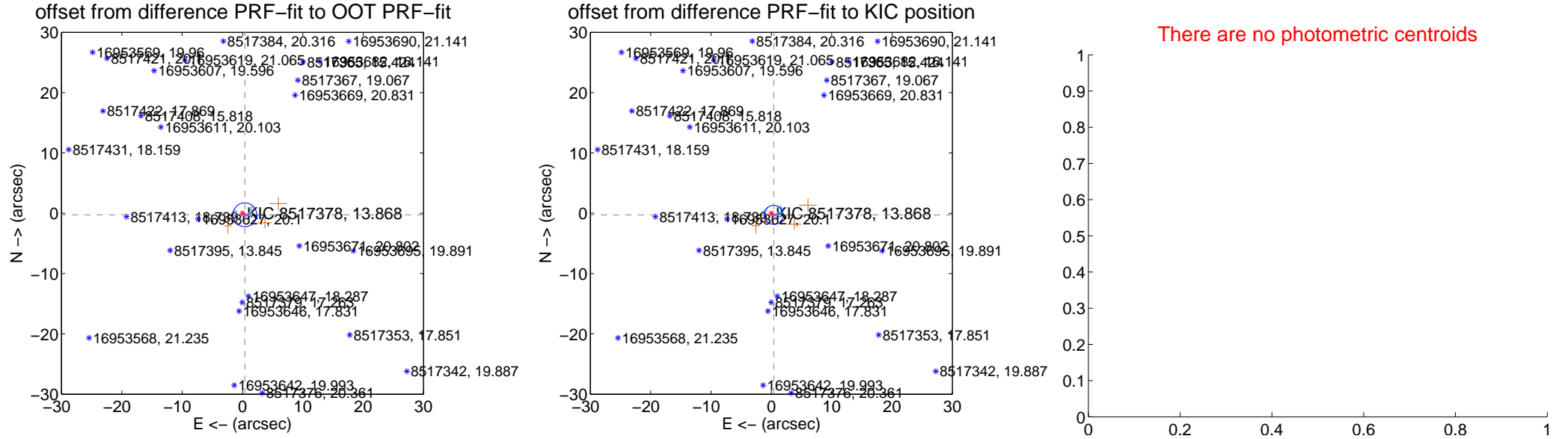
DV Centroid Data

Supplemental centroid analysis for 008517378-01. Kepler magnitude: 13.87. Transit SNR 2.02

There are 5 quarters with good PRF difference image offsets

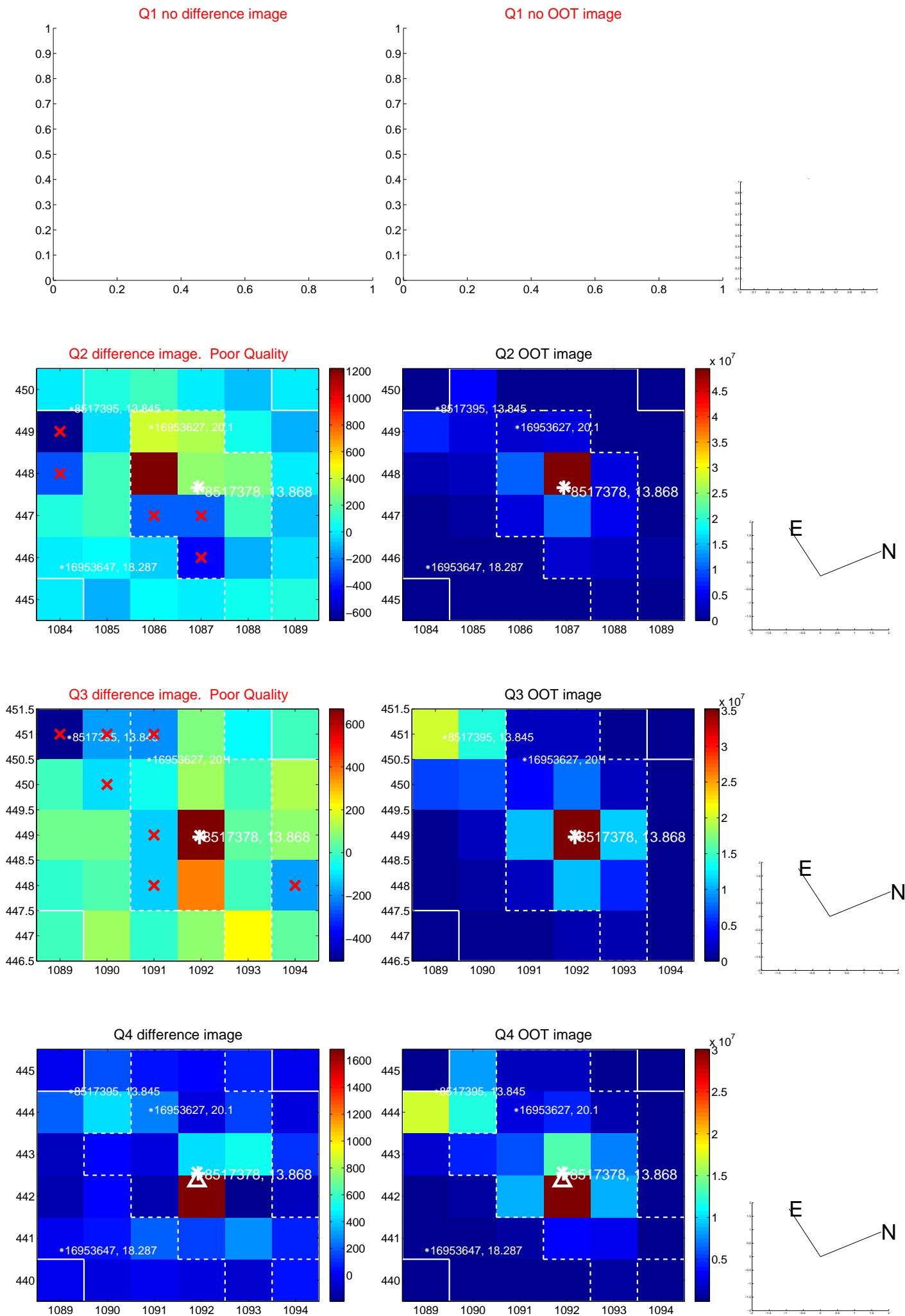
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.467 ± 0.659	0.71	-0.396 ± 0.880	-0.248 ± 0.336
PRF-fit source offset from KIC position	0.476 ± 0.526	0.91	-0.400 ± 0.709	-0.259 ± 0.356
photometric centroid source offset	—	—	—	—

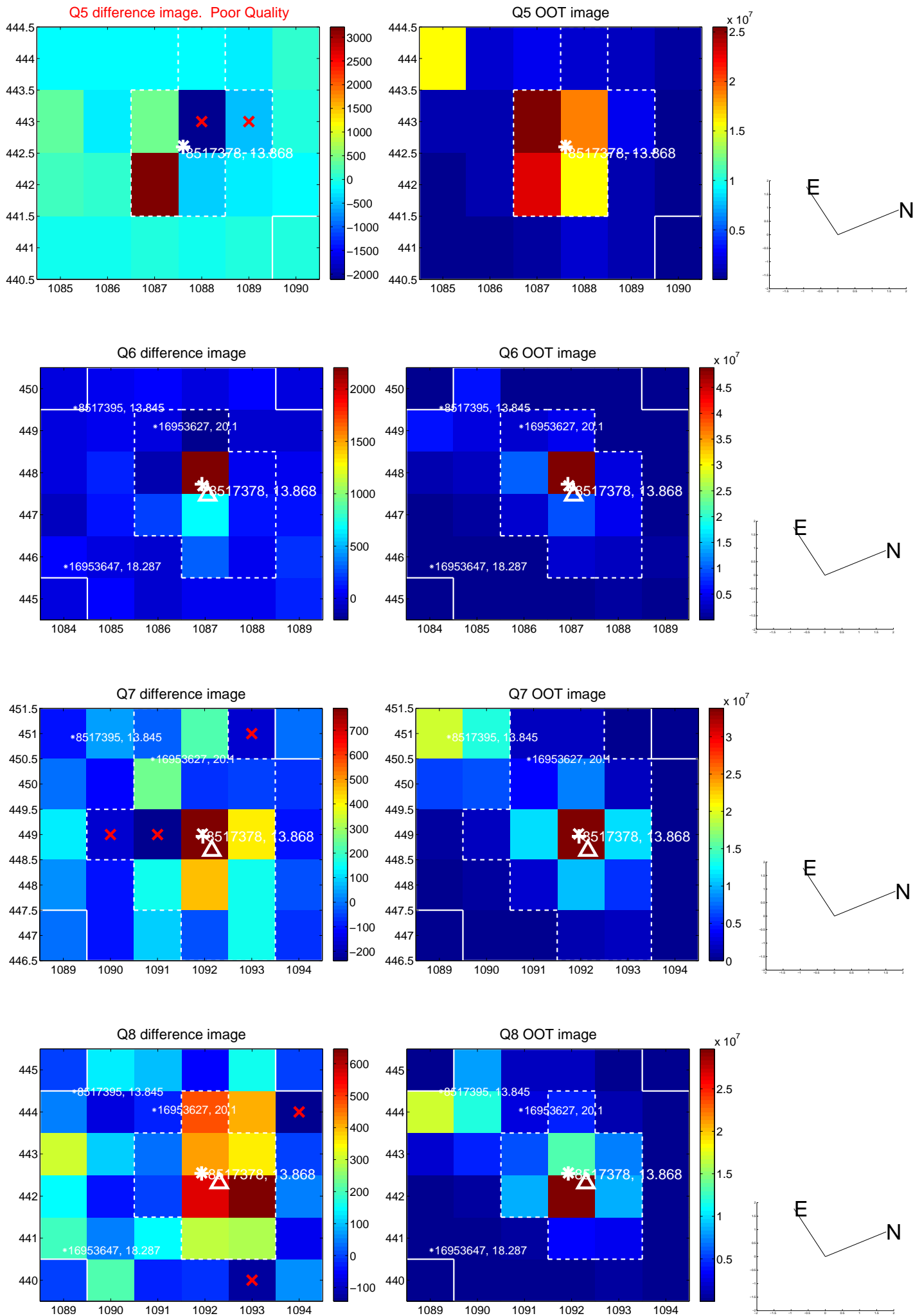


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

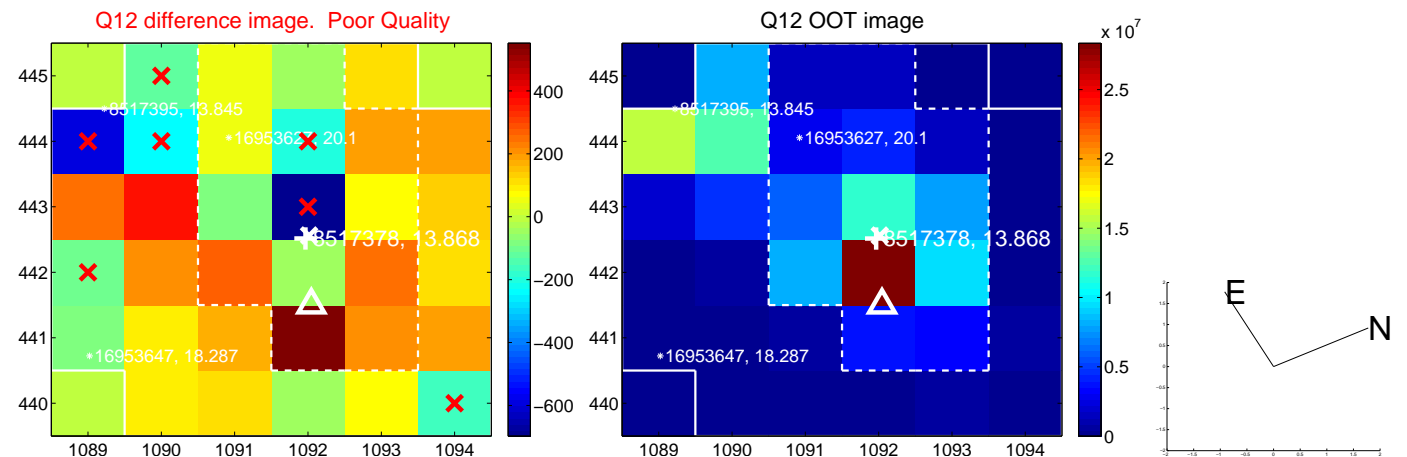
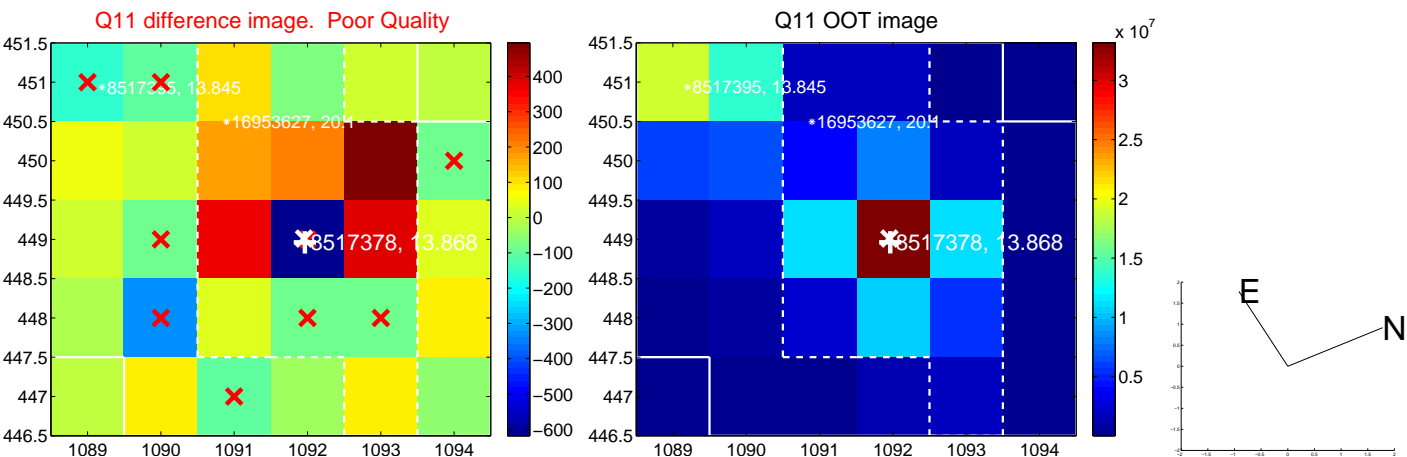
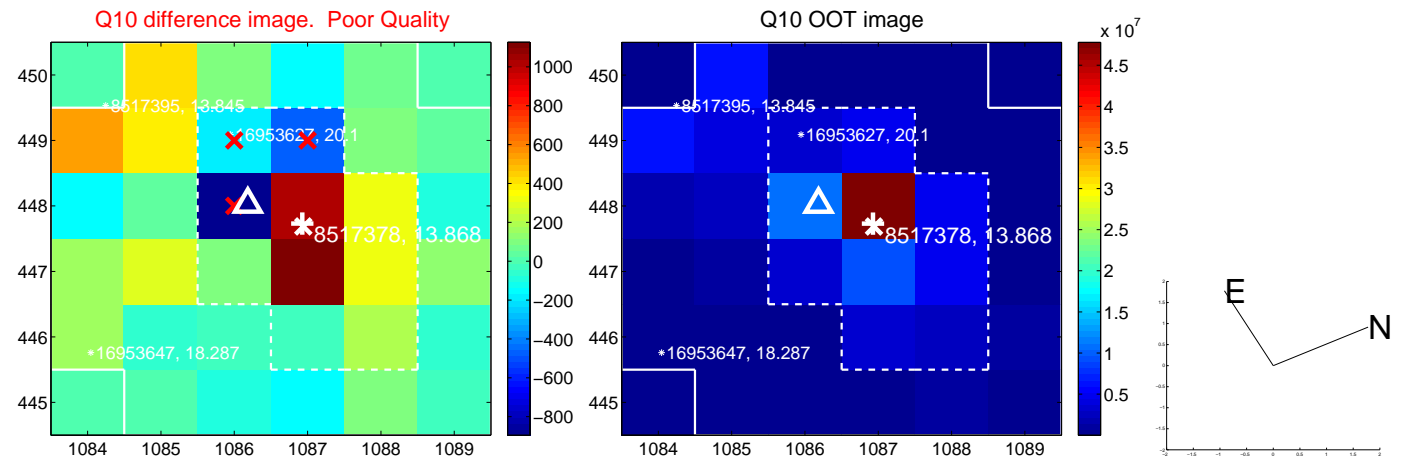
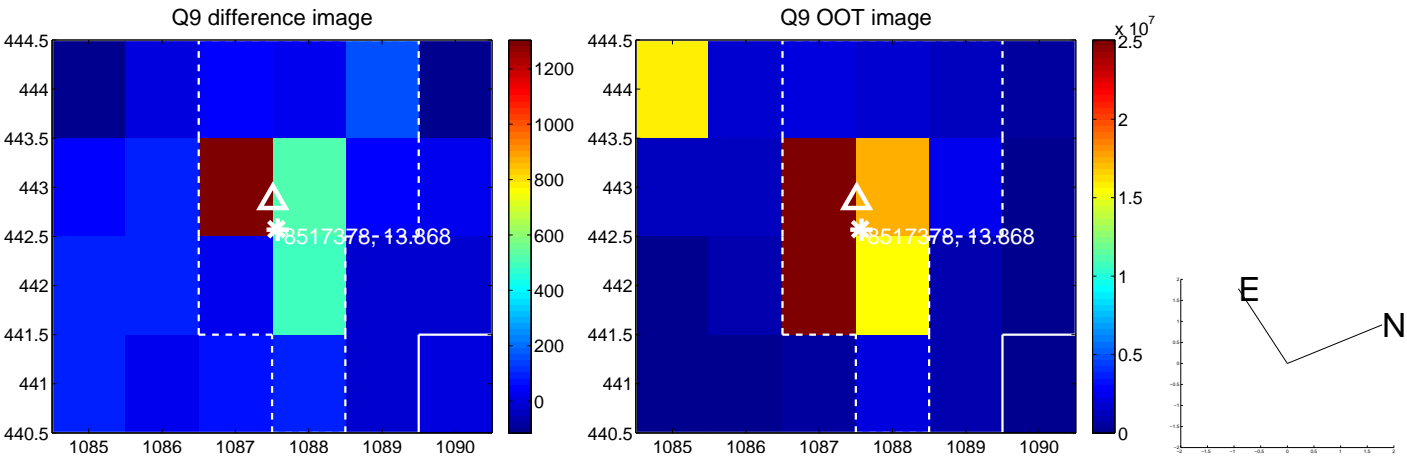
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



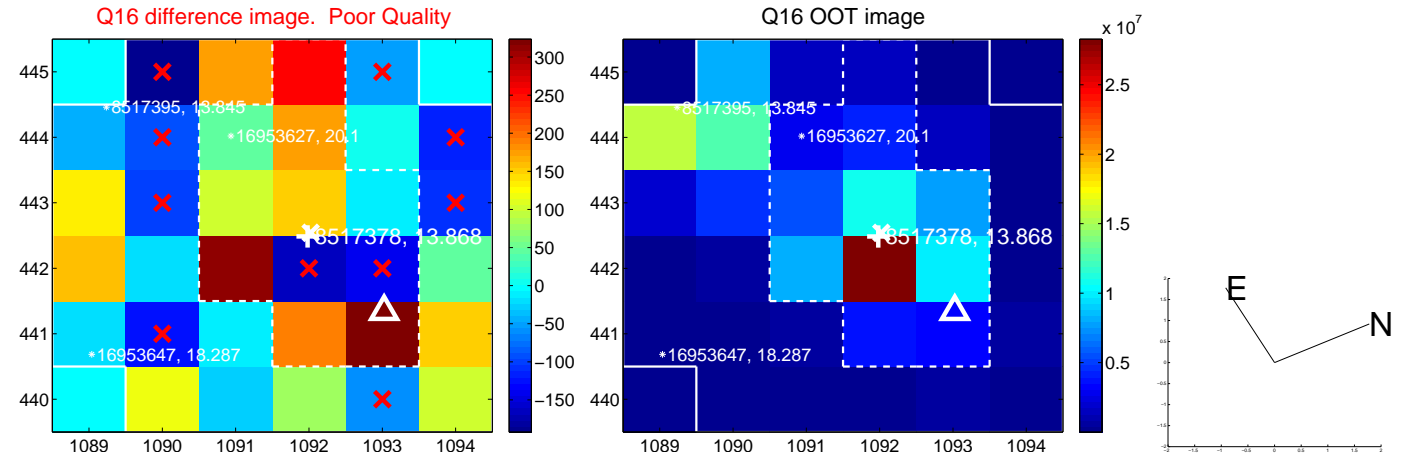
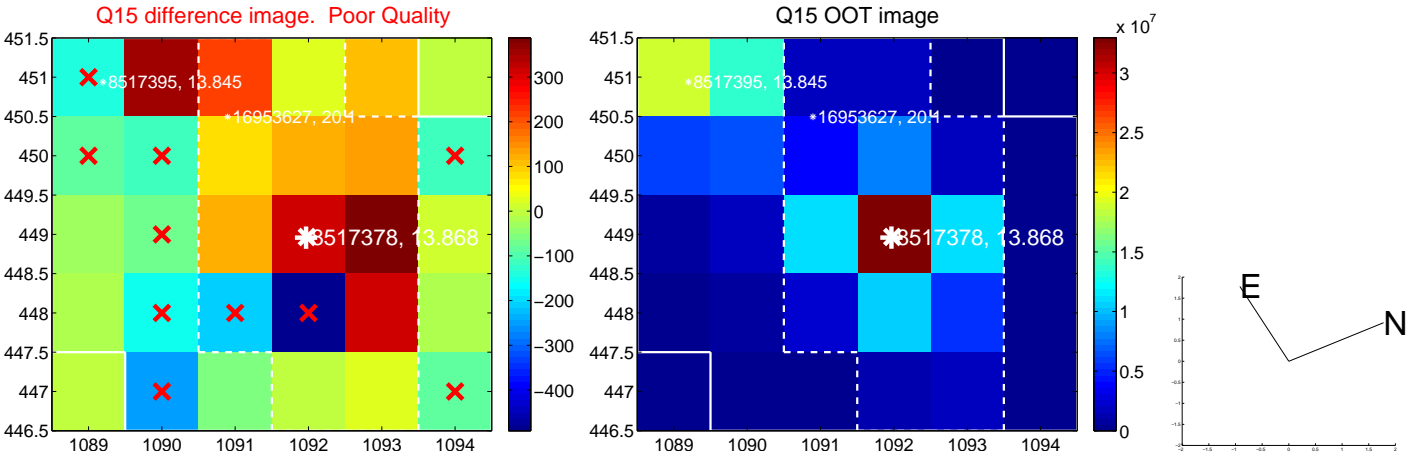
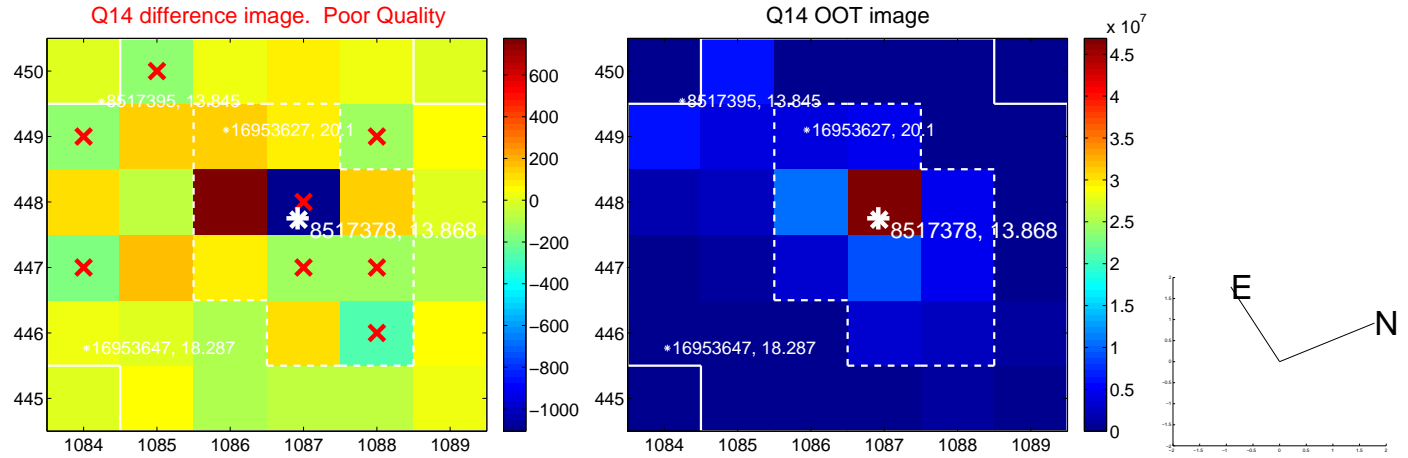
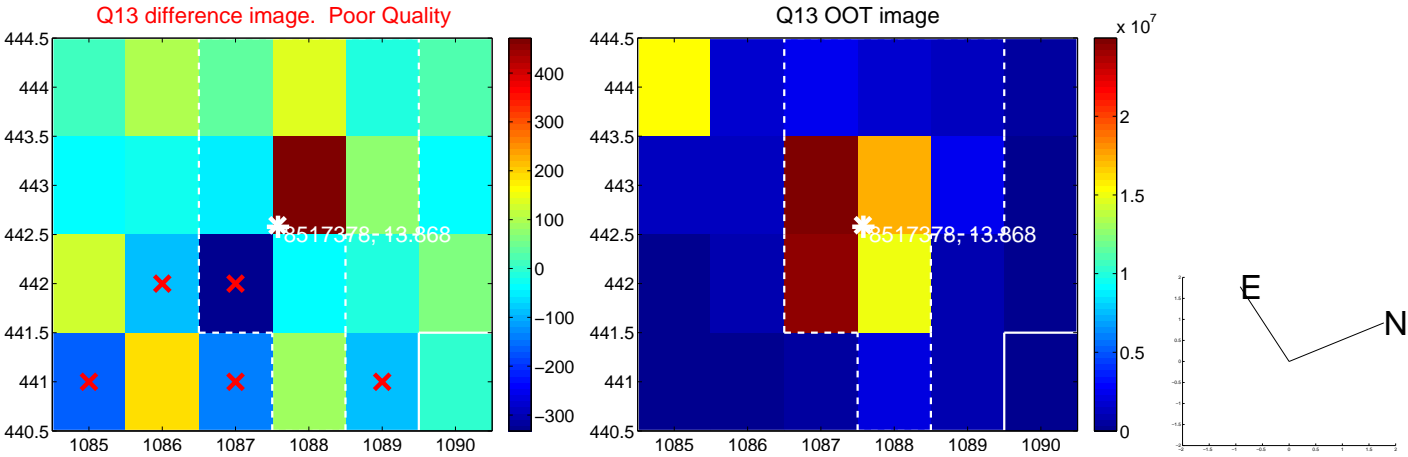
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



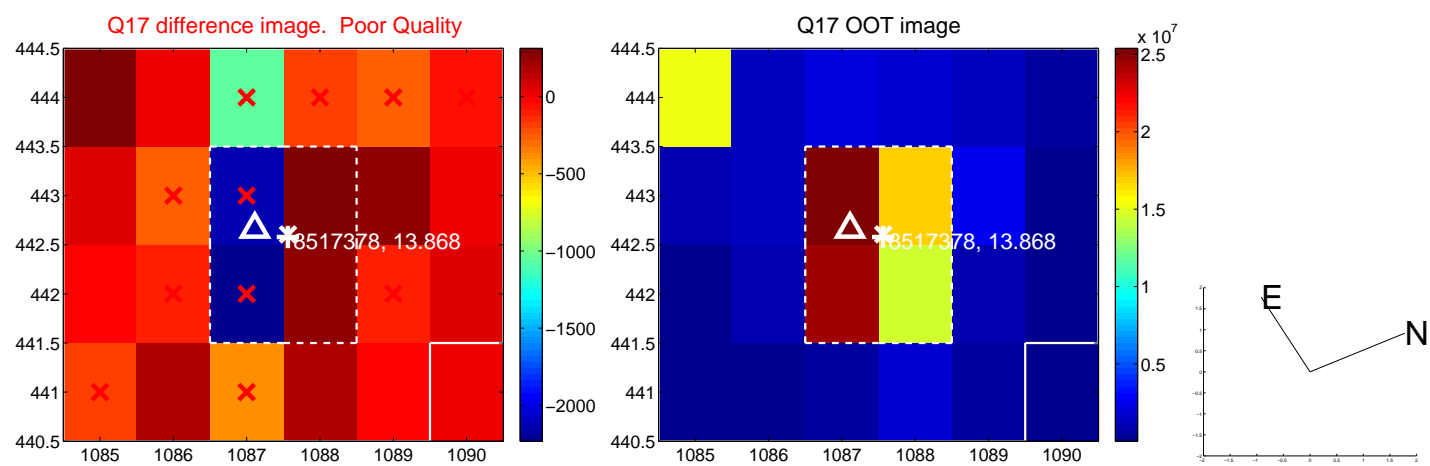
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



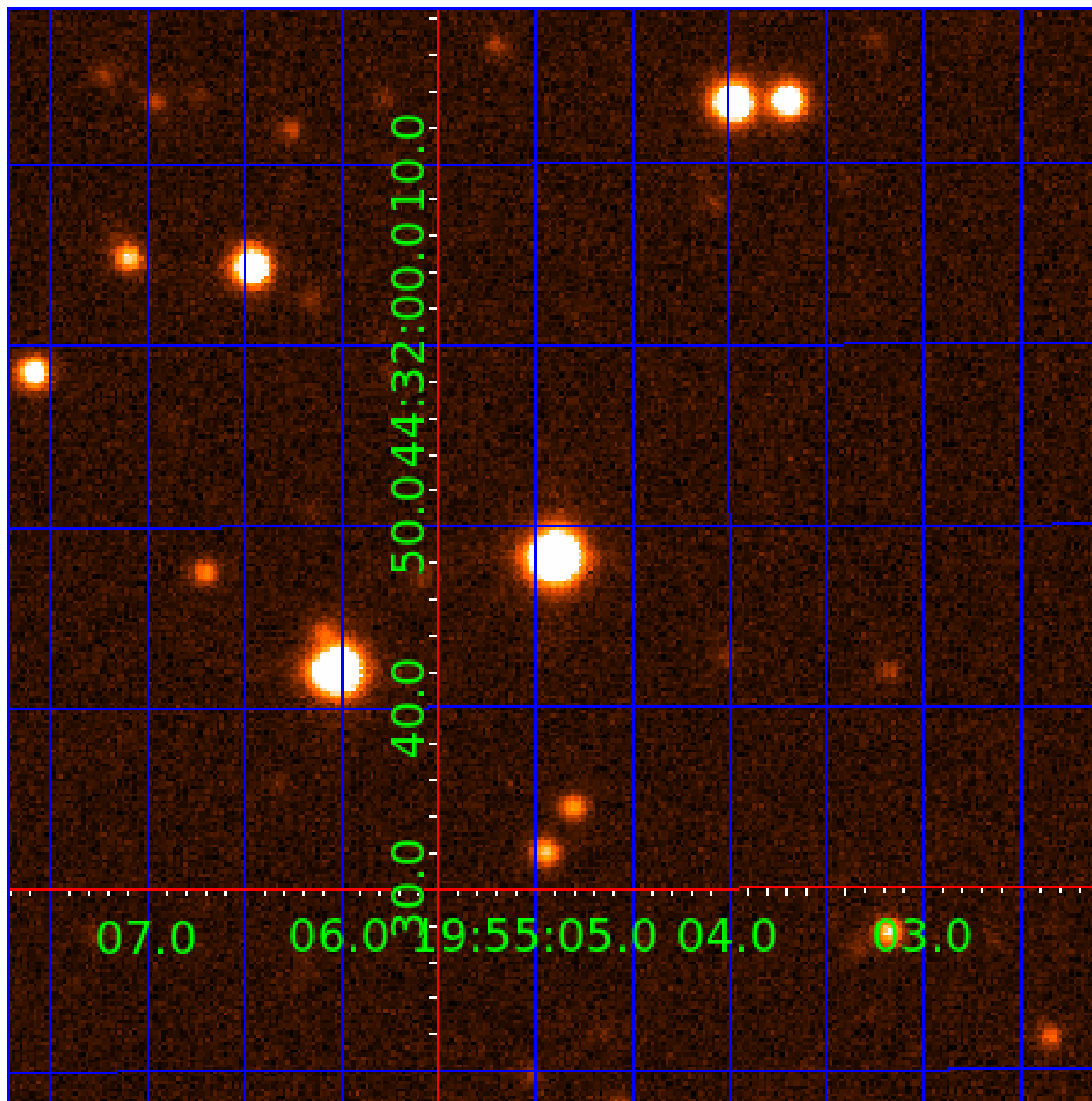
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image

Declination



KIC 008517378

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})
008517378-01	OBS	No	0.869112	132.303886	3.2	5.597	7.7	2.0	2.21	6923	0.40	24015.65
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008517378-03	OBS	No	78.590219	198.848611	267.1	1.852	9.8	10.2	2.21	6923	4.02	59.17
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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008517378-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT
008517378-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
008517378-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST

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

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

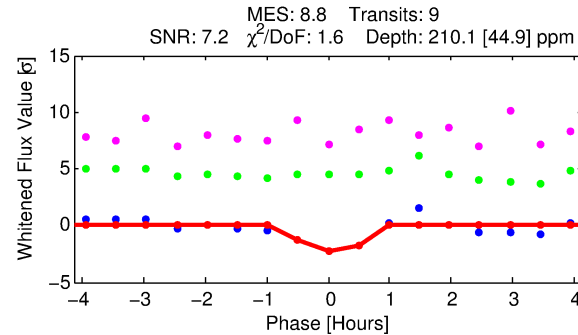
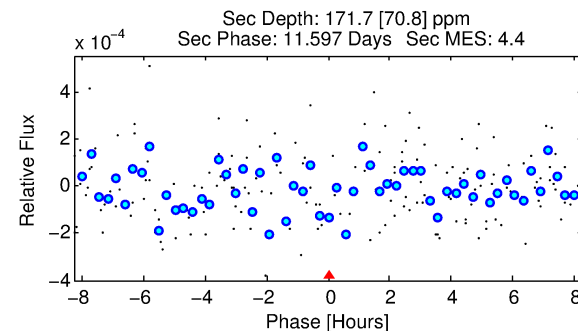
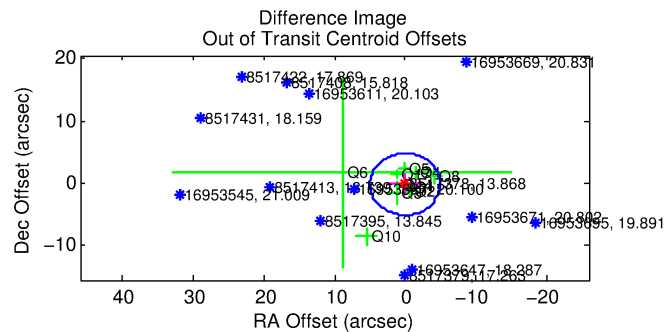
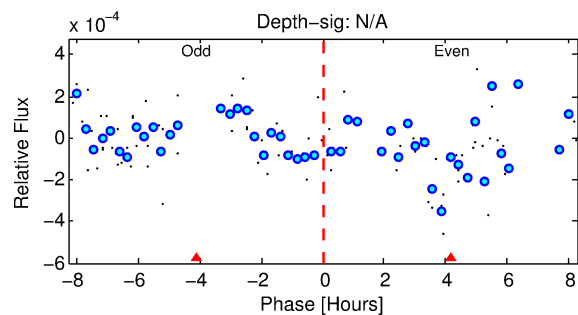
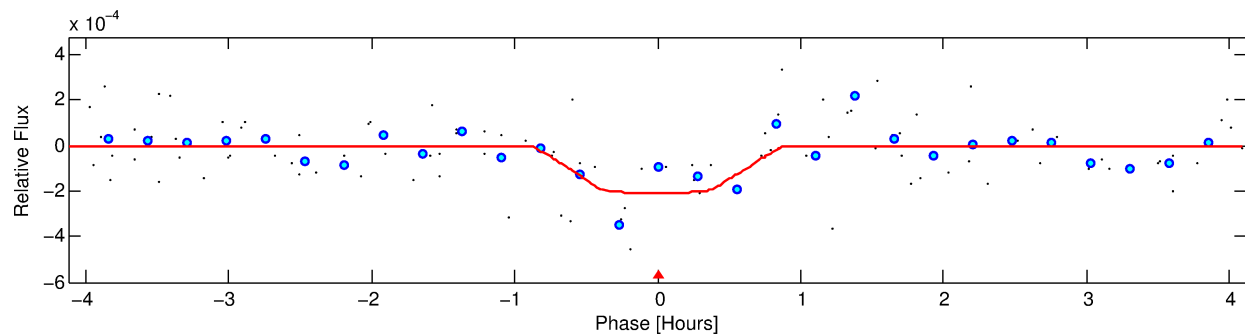
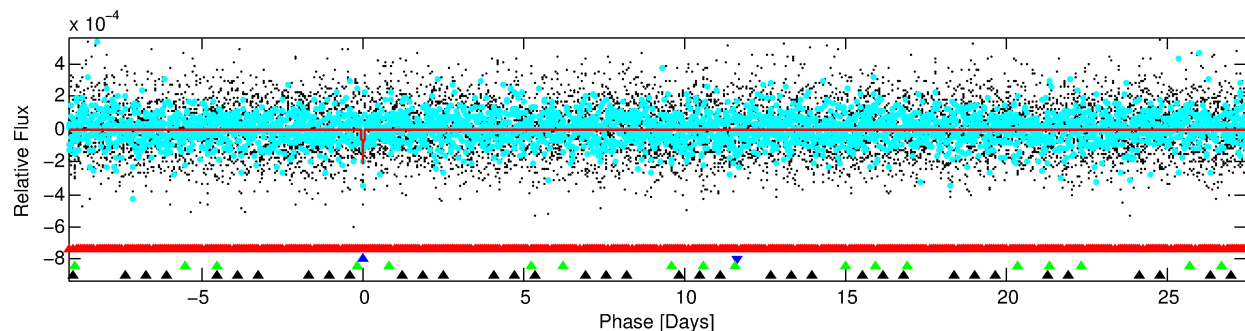
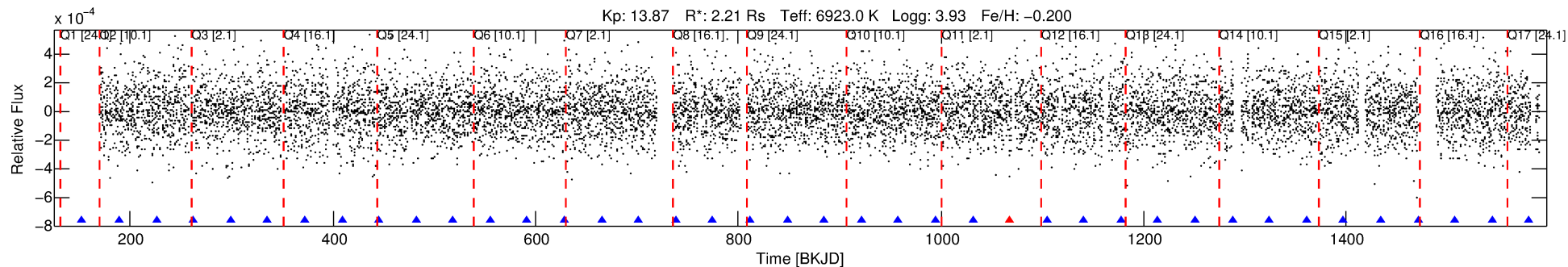
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008517378-02

No Significant Match Found

DV One-Page Summary

KIC: 8517378 Candidate: 2 of 4 Period: 36.610 d



DV Fit Results:

Period = 36.61002 [0.00035] d
Epoch = 152.6385 [0.0062] BKJD
Rp/R* = 0.0151 [0.0186]
a/R* = 109.87 [821.45]
b = 0.86 [2.30]
Seff = 163.86 [94.77]
Teq = 912 [132] K
Rp = 3.64 [4.68] Re
a = 0.2479 [0.0873] AU
Ag = 437.04 [1115.59] [0.39σ]
Teffp = 6449 [4026] K [1.37σ]

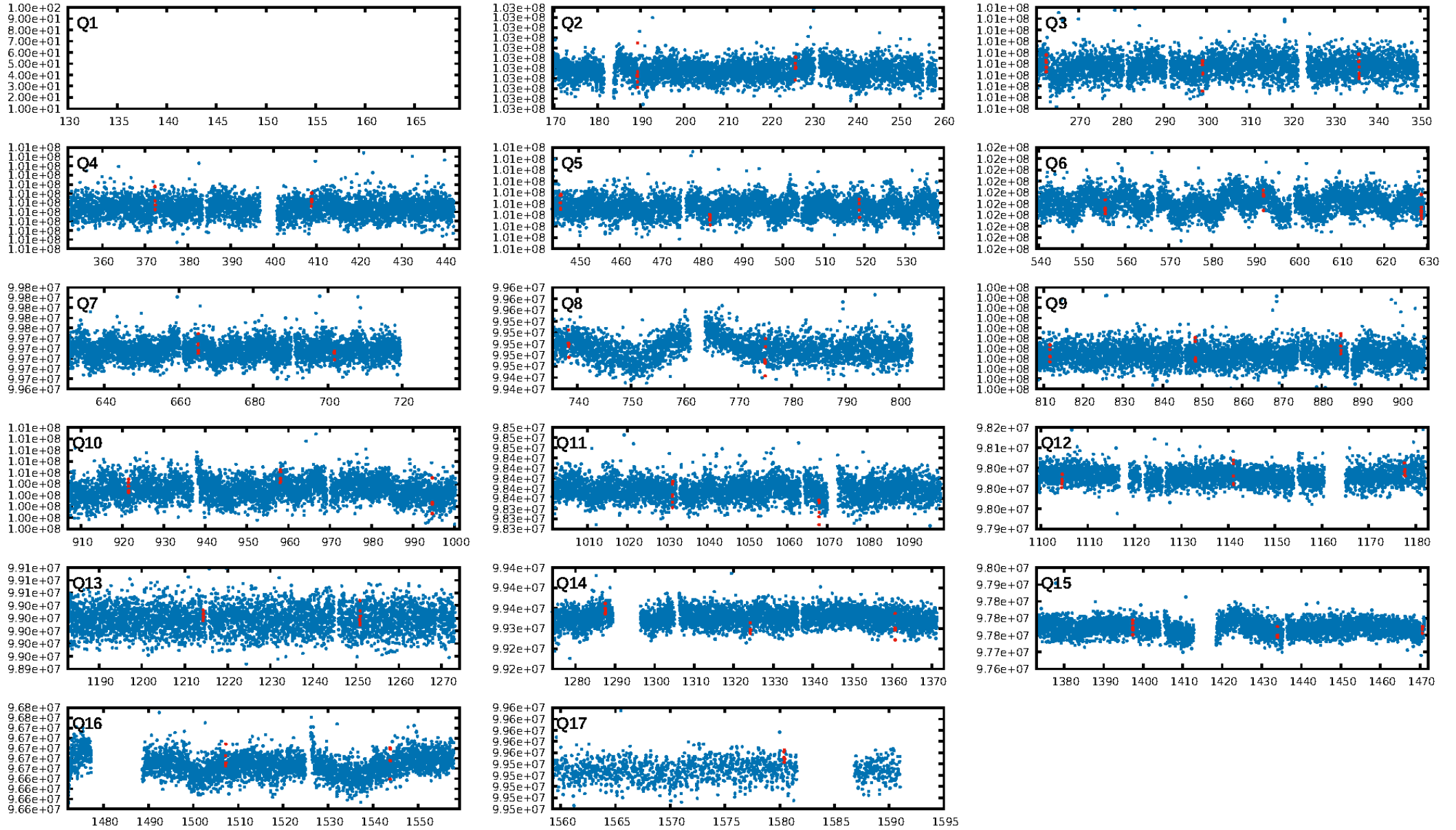
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [148.82σ]
LongPeriod-sig: 100.0% [17.89σ]
ModelChiSquare2-sig: 6.0%
ModelChiSquareGof-sig: 69.0%
Bootstrap-pfa: 1.72e-09
RollingBand-fgt: 0.89 [8/9]
GhostDiagnostic-chr: -2.337
Centroid-sig: 18.5%
Centroid-so: 1.561 arcsec [1.53σ]
OotOffset-rm: 0.164 arcsec [0.10σ]
KicOffset-rm: 0.133 arcsec [0.08σ]
OotOffset-st: 4/2/2/2 [10]
KicOffset-st: 4/2/2/2 [10]
DiffImageQuality-fgm: 0.30 [3/10]
DiffImageOverlap-fno: 0.38 [6/16]

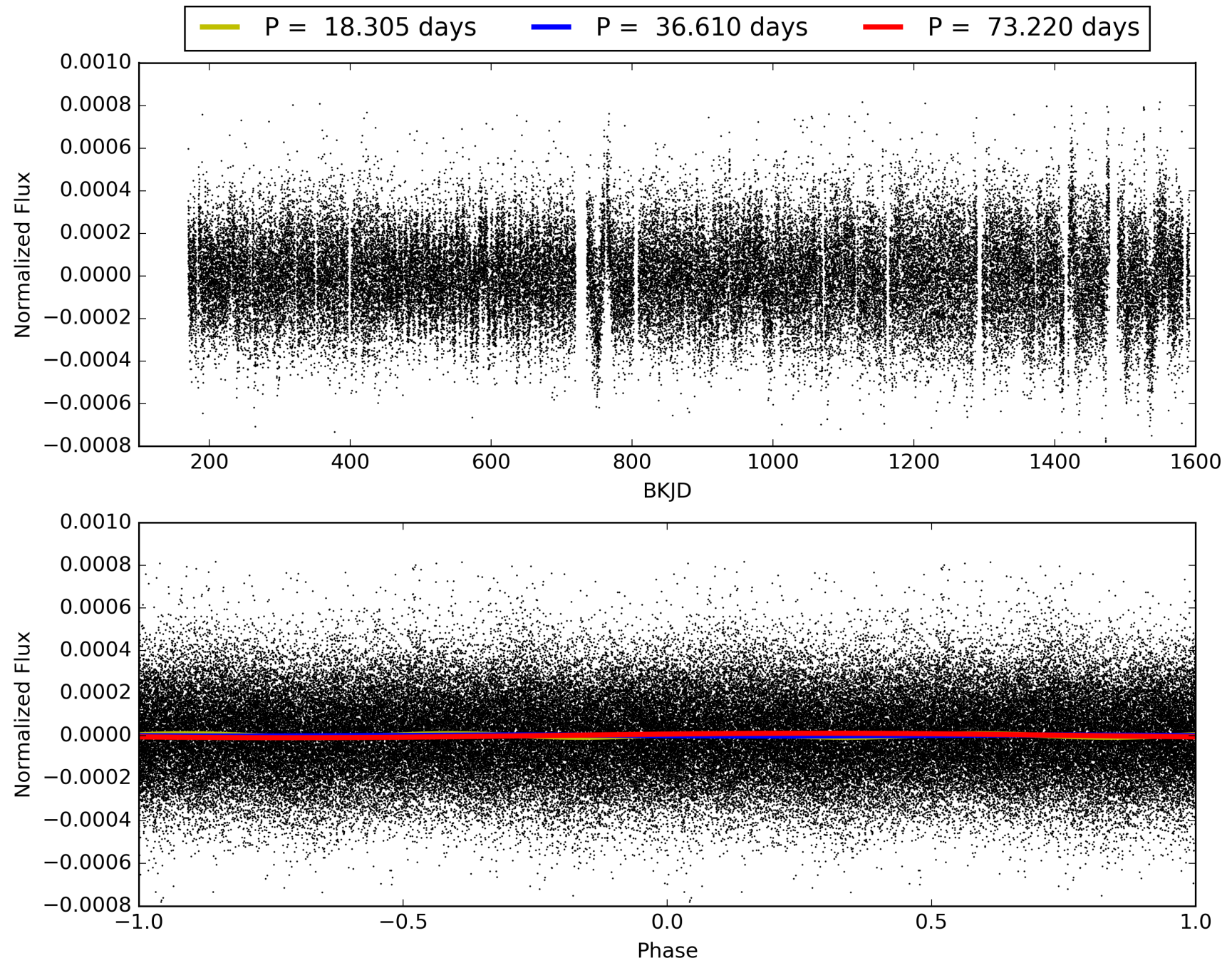
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 03:56:07 Z

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

TCE 008517378-02, PDC Light Curves

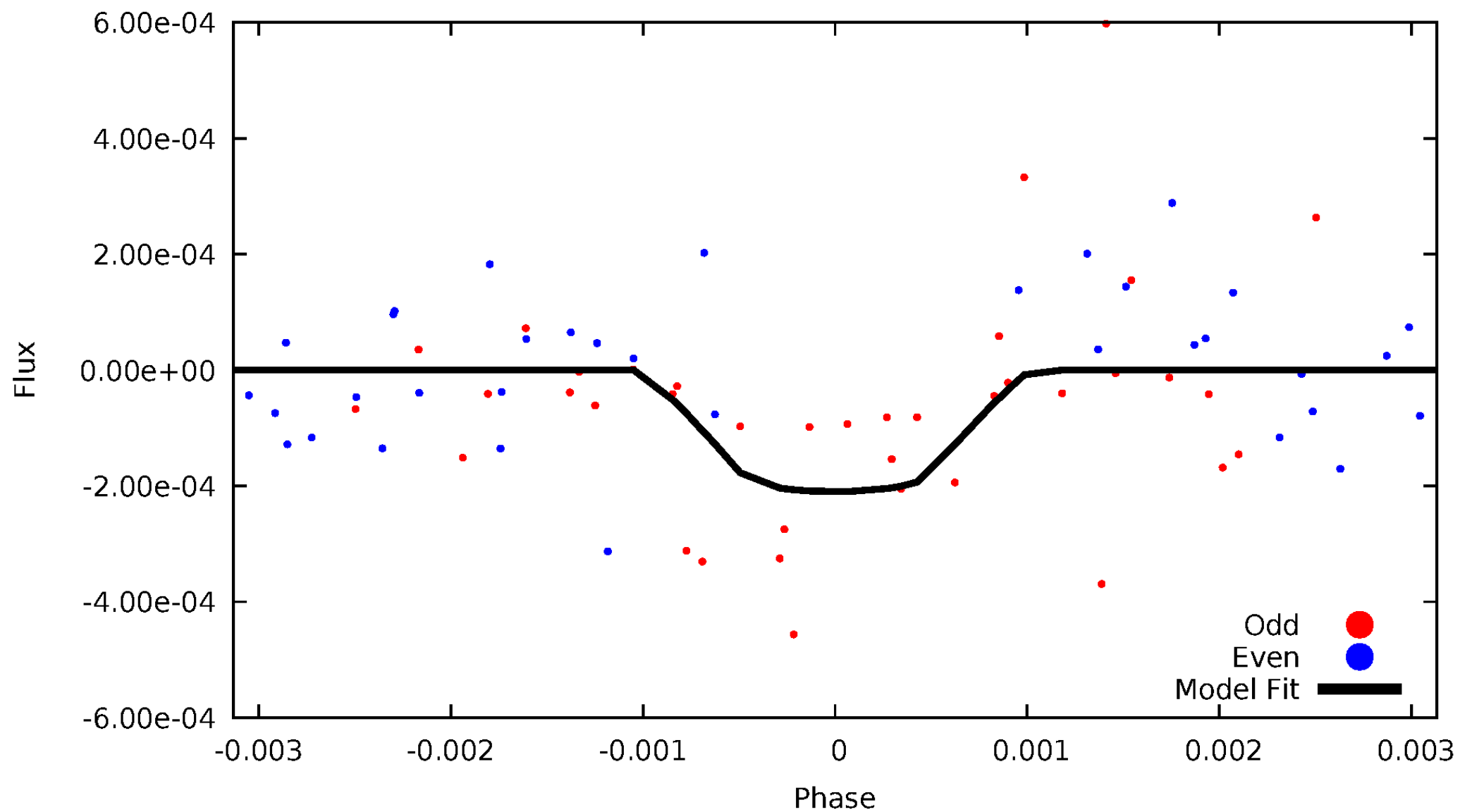


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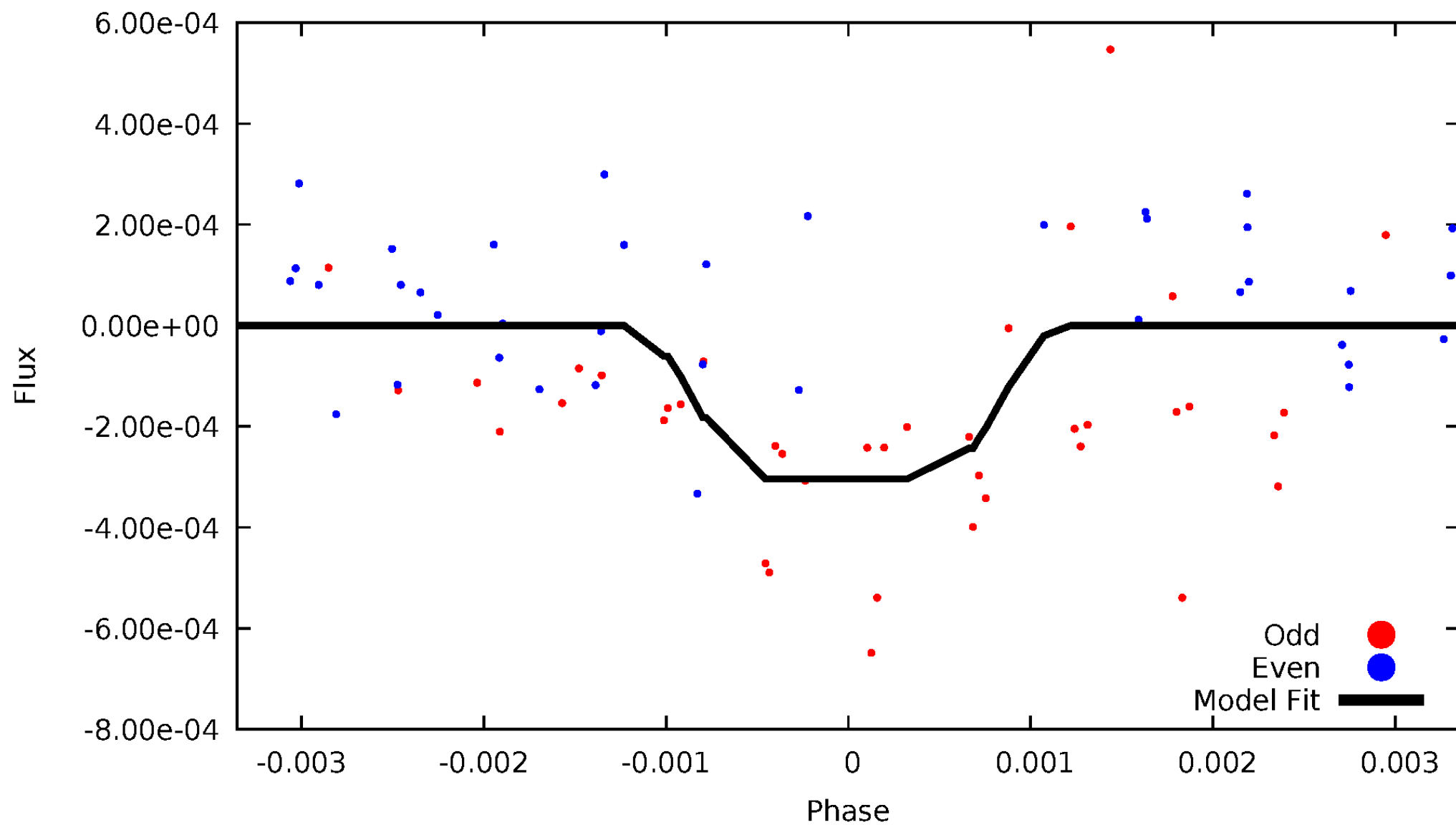
DV Odd/Even

TCE 008517378-02



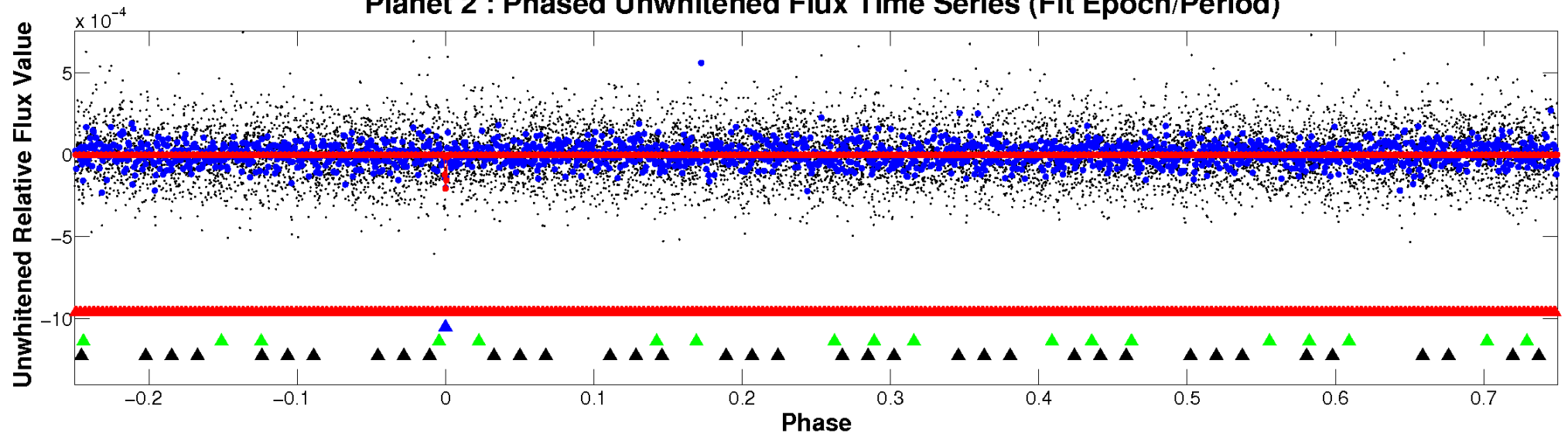
ALT Odd/Even

TCE 008517378-02

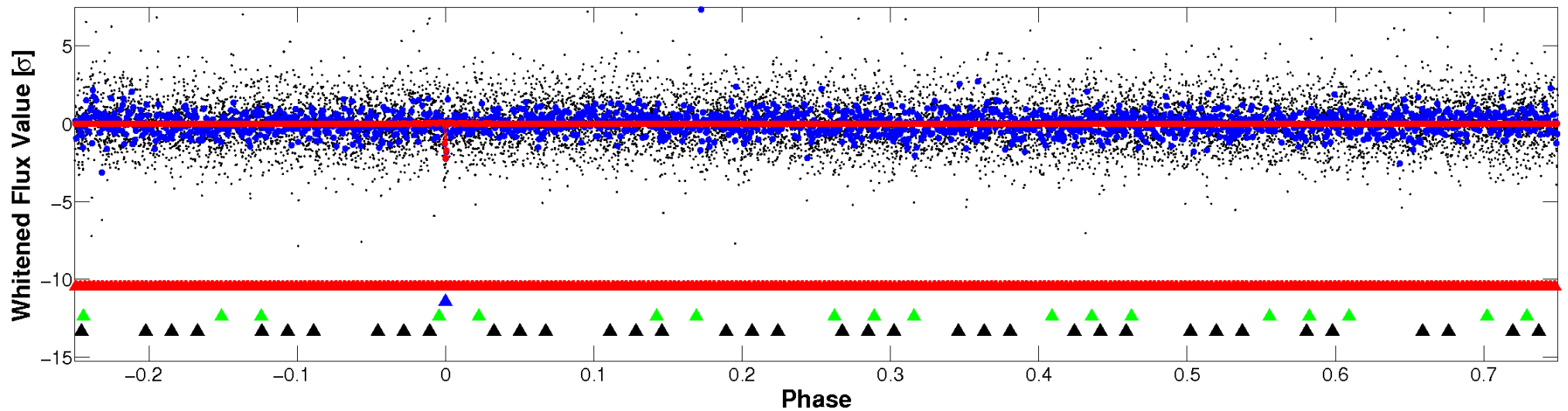


Non-Whitened Vs. Whitened Light Curve

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

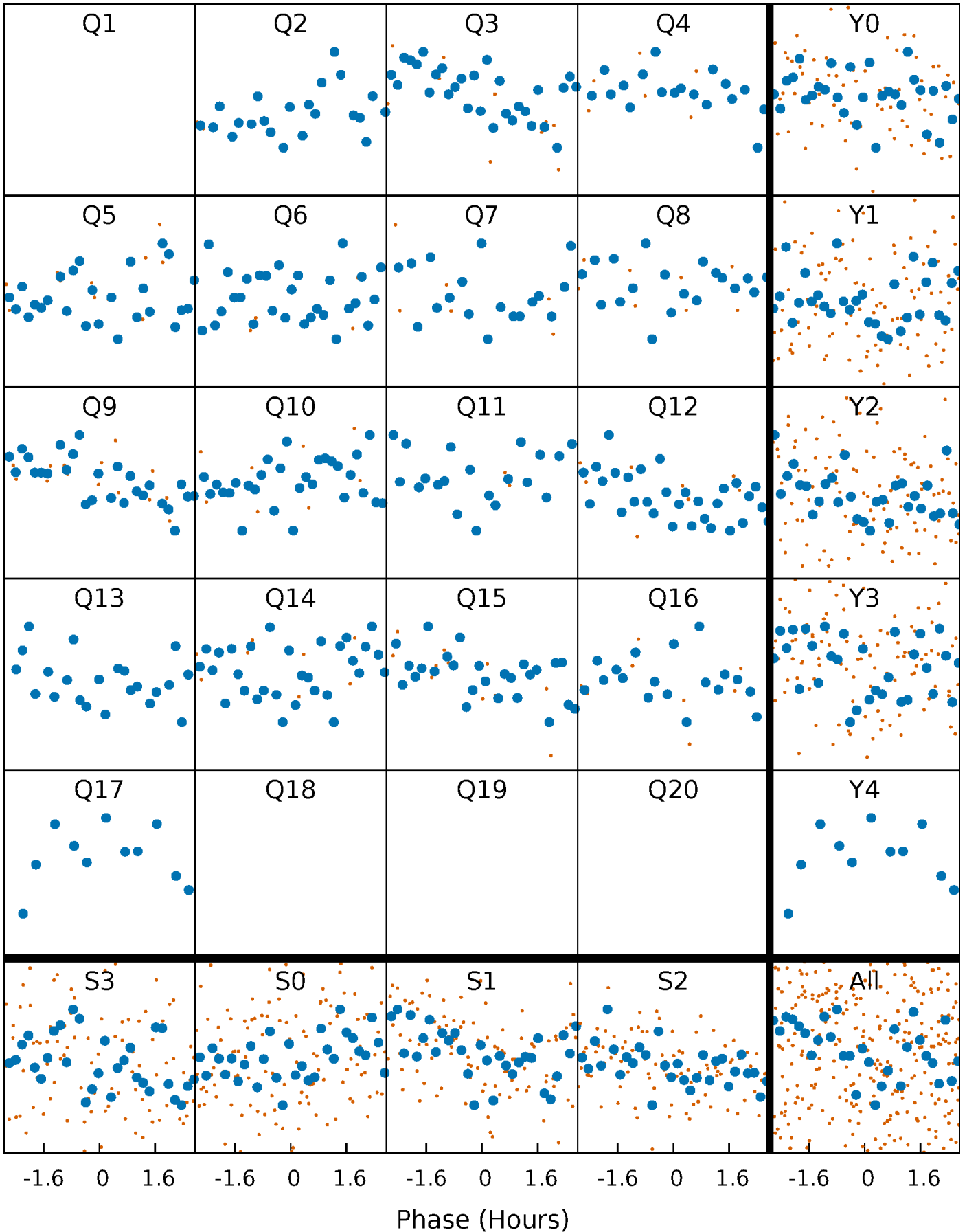


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



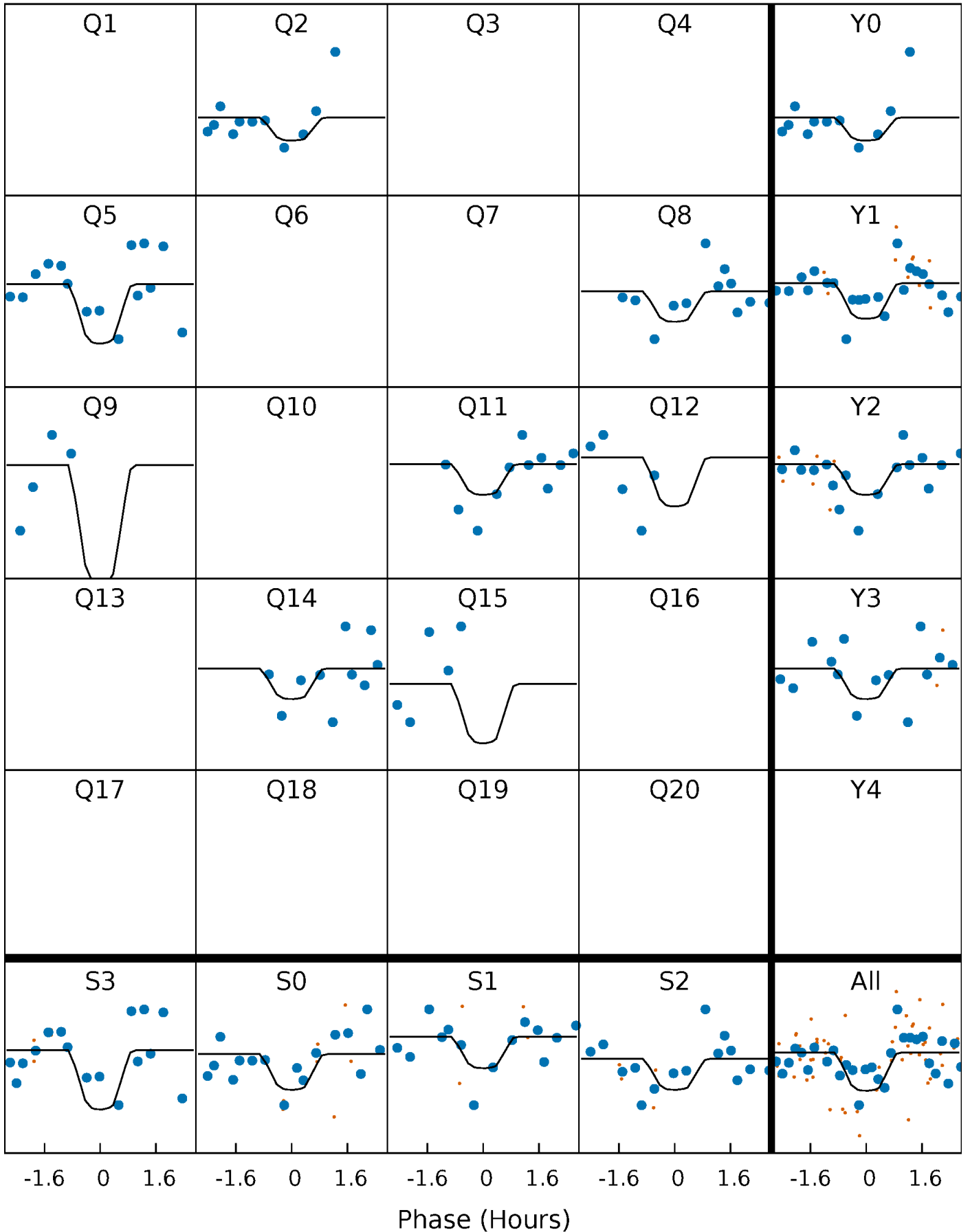
PDC Quarter-Phased Transit Curves

TCE 008517378-02 P= 36.610024 Days $T_0=152.638459$ (BKJD)



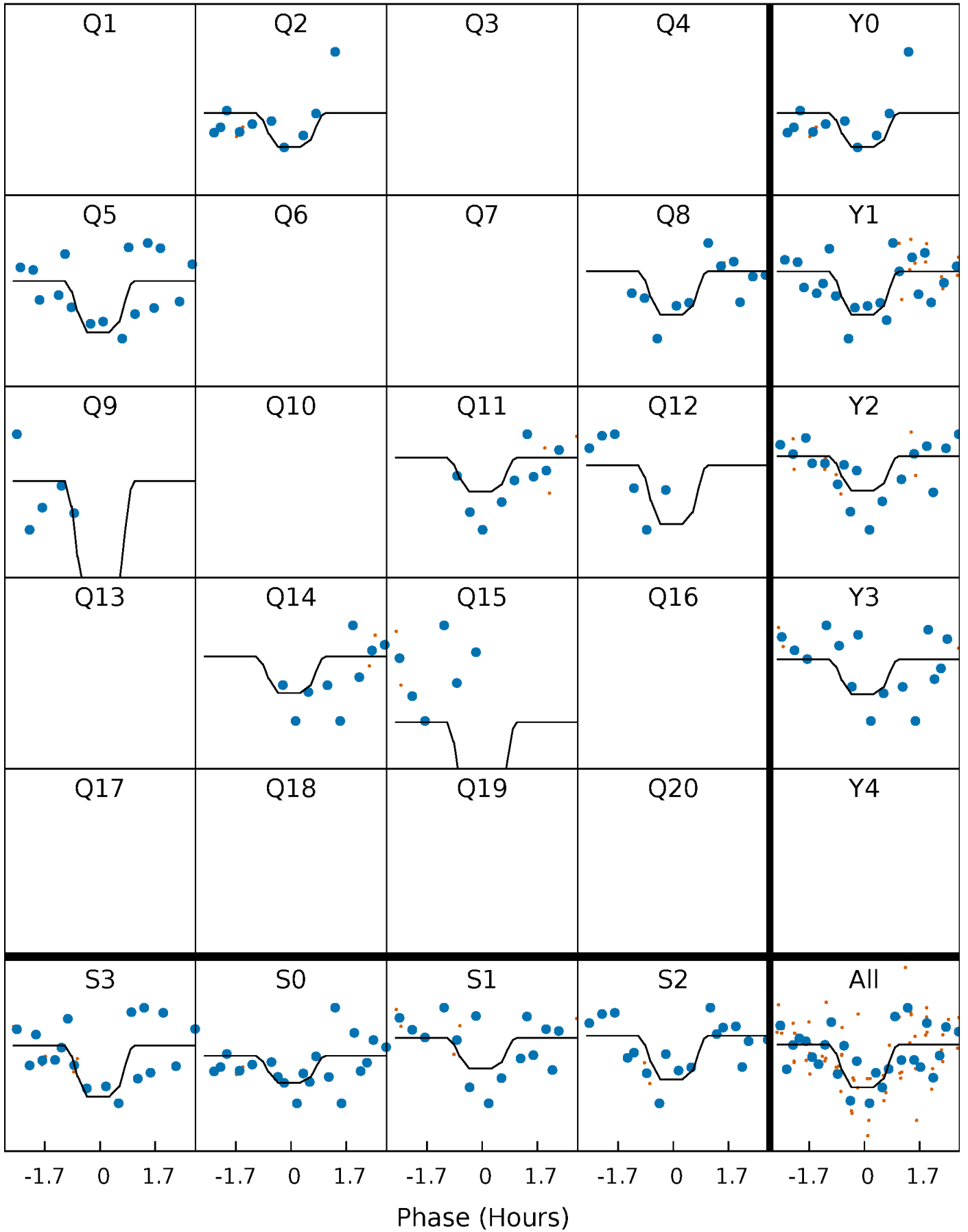
DV Quarter-Phased Transit Curves

TCE 008517378-02 P= 36.610024 Days $T_0=152.638459$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

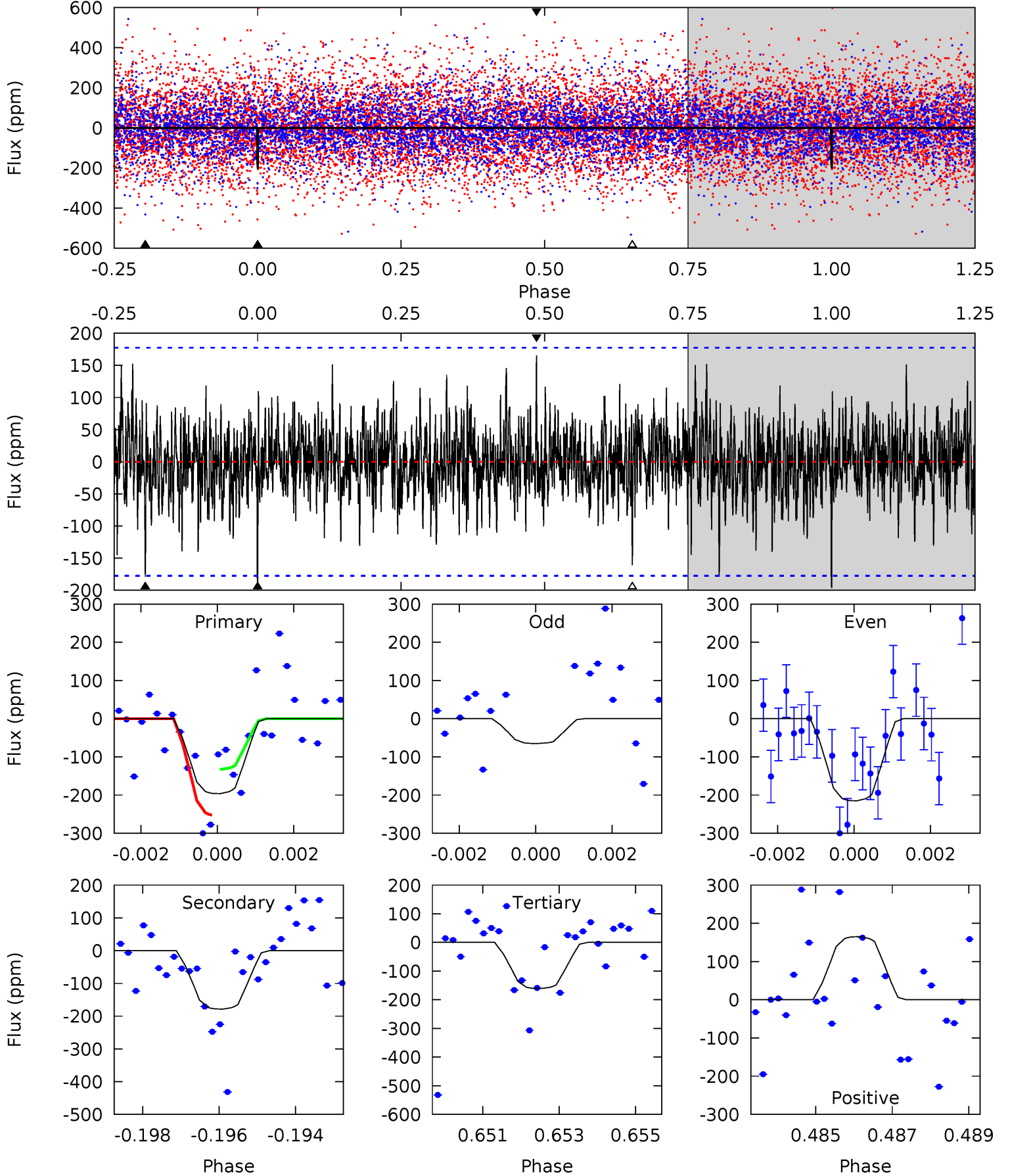
TCE 008517378-02 P= 36.609545 Days $T_0=152.637965$ (BKJD)



DV Model-Shift Uniqueness Test

008517378-02, $P = 36.610024$ Days, $E = 152.638459$ Days

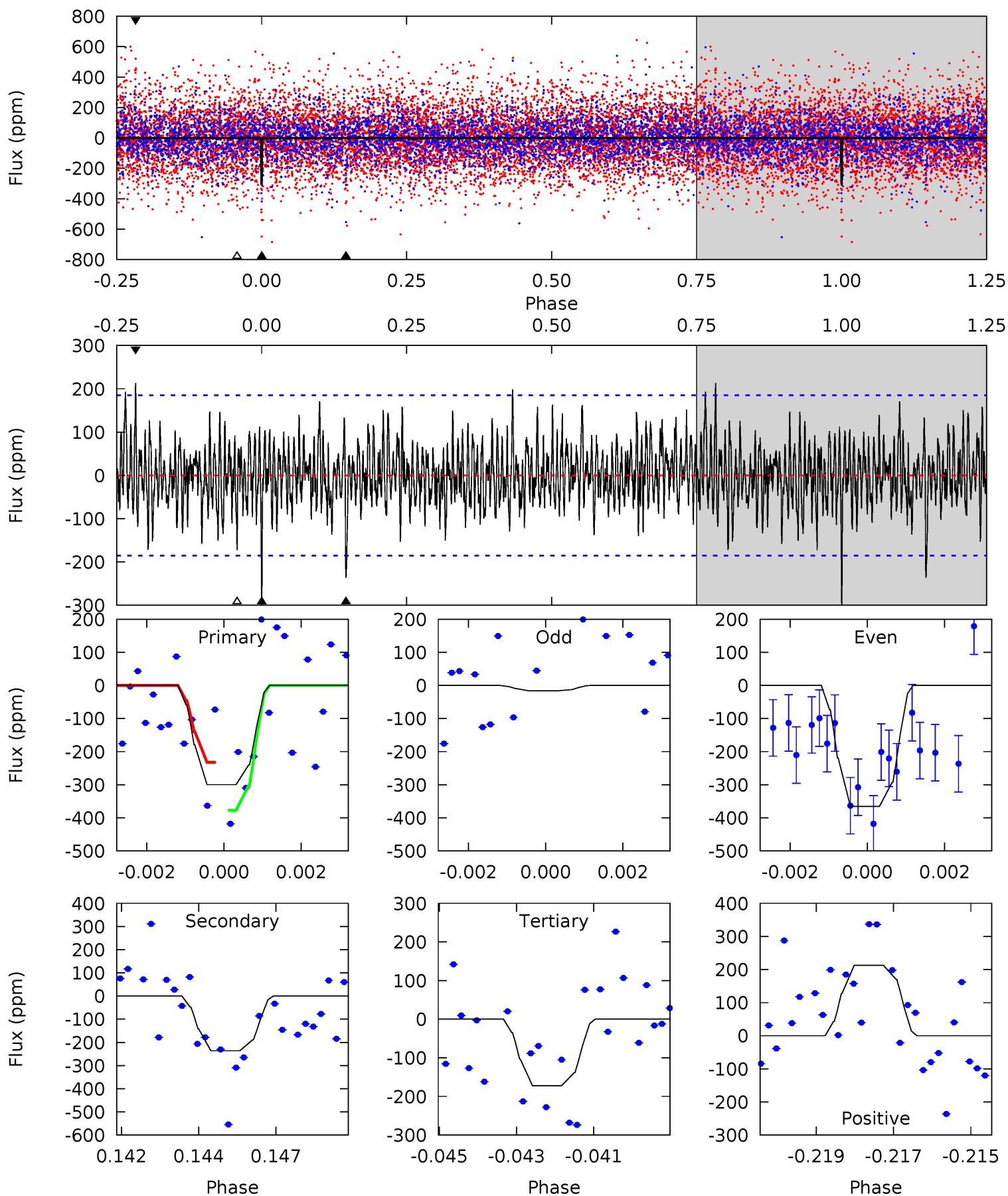
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.91	5.38	4.84	4.97	5.34	3.12	1.31	1.07	0.94	0.54	0.41	1.62	1.06	0.46	1.81



Alt Model-Shift Uniqueness Test

008517378-02, P = 36.609545 Days, E = 152.637965 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.62	6.79	4.96	6.12	5.32	3.08	1.67	3.66	2.50	1.83	0.67	4.21	0.87	0.42	2.08



Stellar Parameters For KIC 008517378

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6923^{+214}_{-286}	$3.929^{+0.322}_{-0.138}$	$-0.200^{+0.250}_{-0.300}$	$2.212^{+0.555}_{-0.832}$	$1.512^{+0.217}_{-0.326}$	$0.197^{+0.468}_{-0.079}$
	+3%/-4%	+8%/-4%	+125%/-150%	+25%/-38%	+14%/-22%	+238%/-40%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 008517378-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-179 ± 33	$4.85^{+3.66}_{-3.05}$	1253^{+95}_{-124}	5467^{+3968}_{-1185}	257^{+1535}_{-180}
Alt.	-236 ± 35	$4.69^{+4.01}_{-3.15}$	1248^{+99}_{-121}	5874^{+5470}_{-1330}	355^{+2958}_{-253}

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

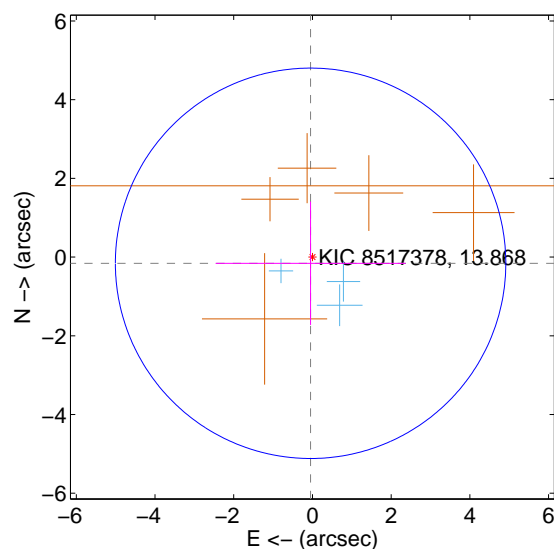
Supplemental centroid analysis for 008517378-02. Kepler magnitude: 13.87. Transit SNR 7.23

There are 3 quarters with good PRF difference image offsets

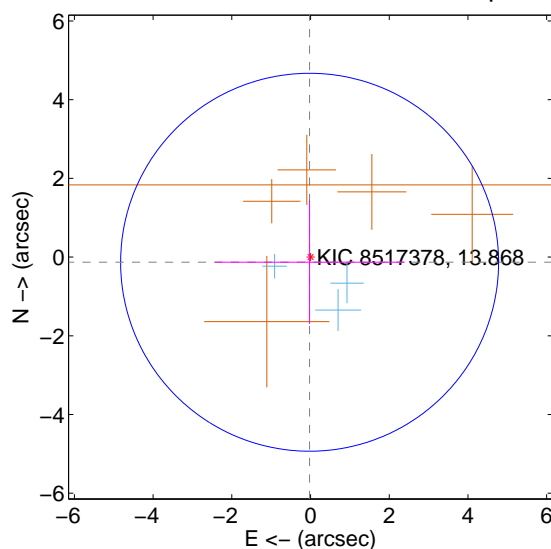
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.164 ± 1.654	0.10	0.047 ± 2.414	-0.158 ± 1.568
PRF-fit source offset from KIC position	0.133 ± 1.601	0.08	0.023 ± 2.414	-0.131 ± 1.568
photometric centroid source offset	1.56 ± 1.02	1.53	1.55 ± 1.02	0.19 ± 0.90

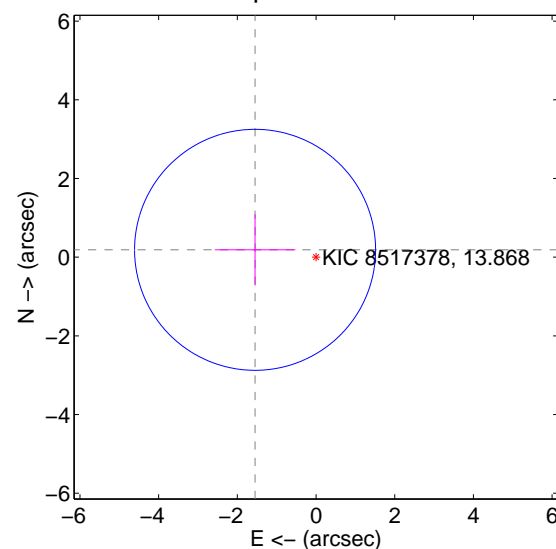
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

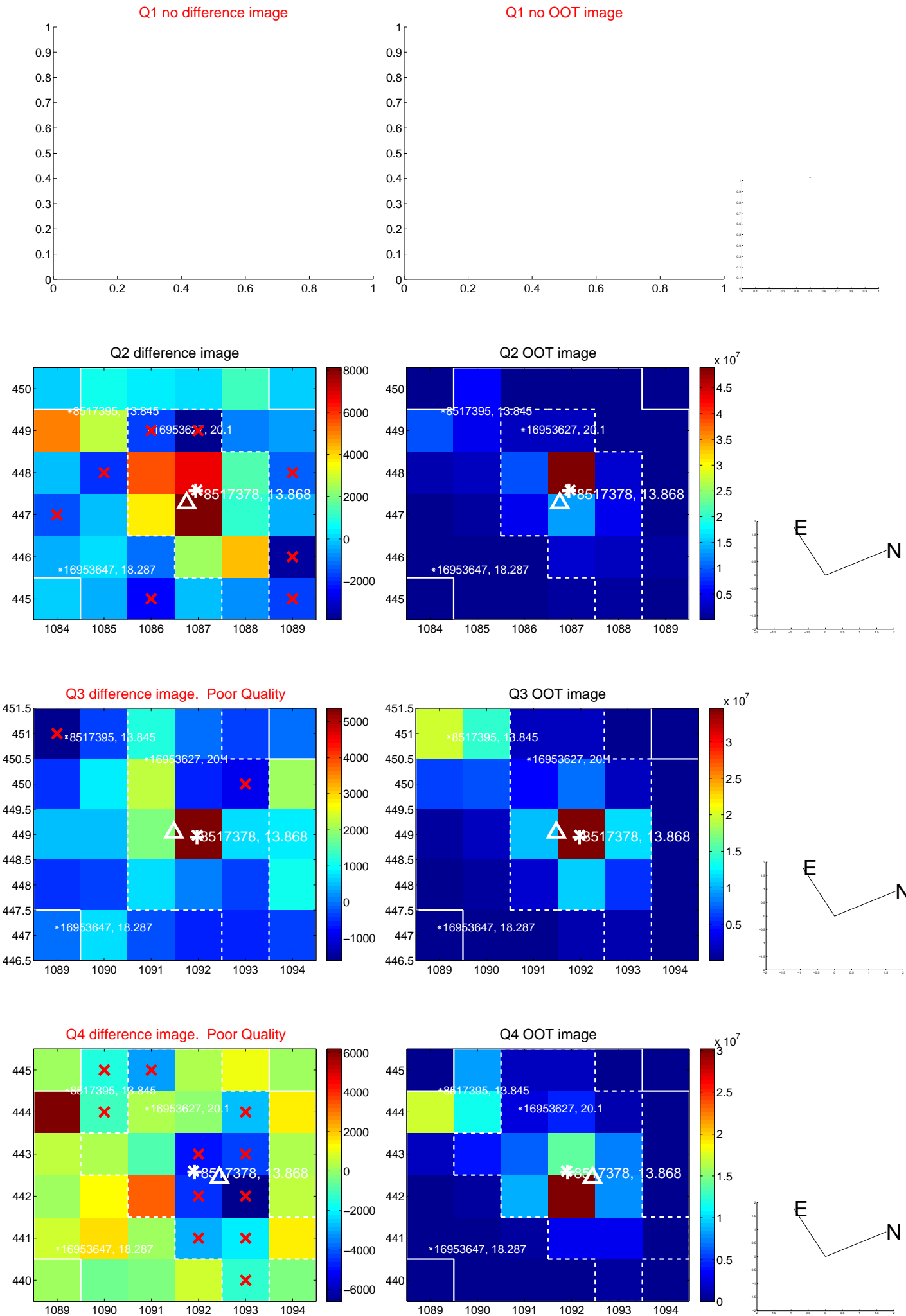


offset from photometric centroids

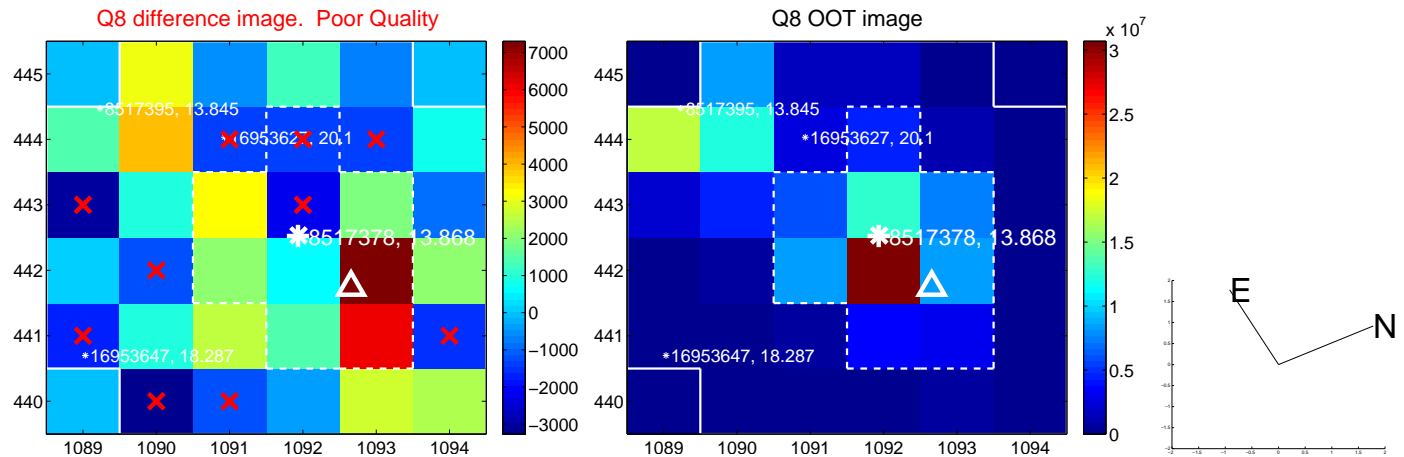
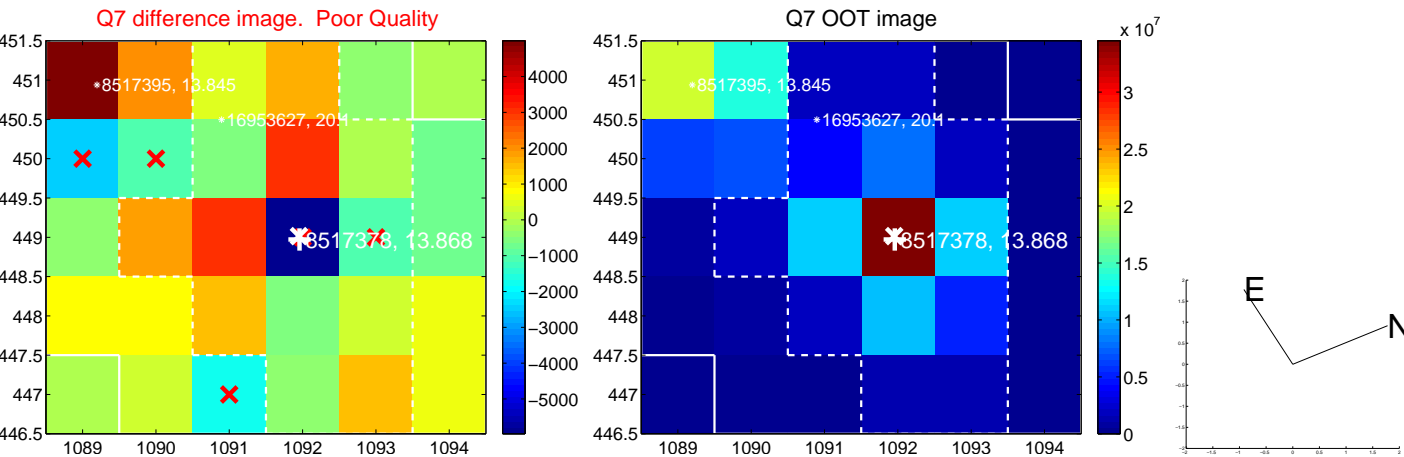
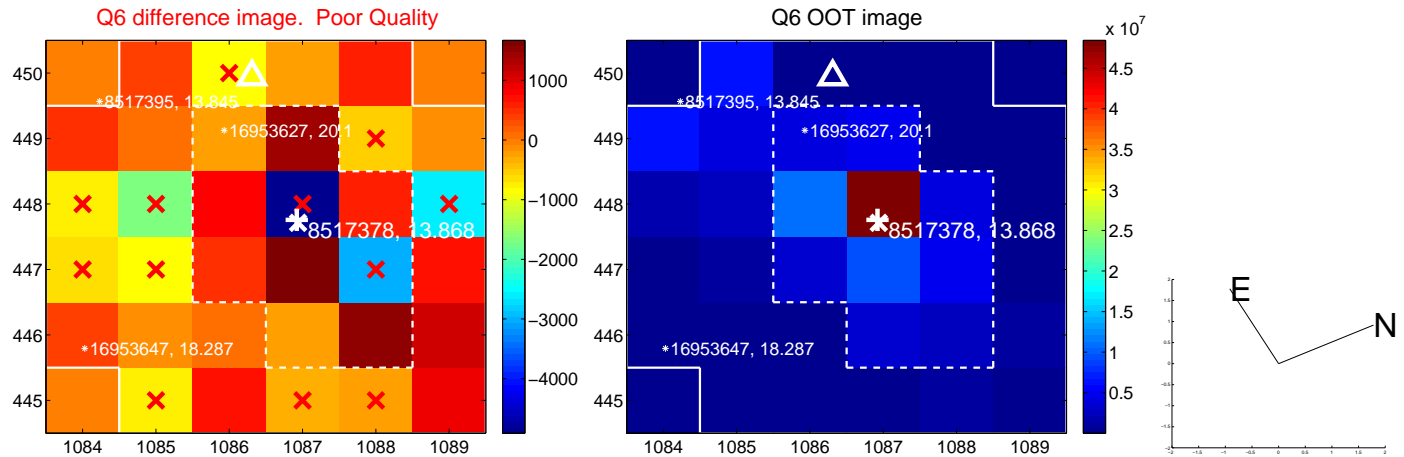
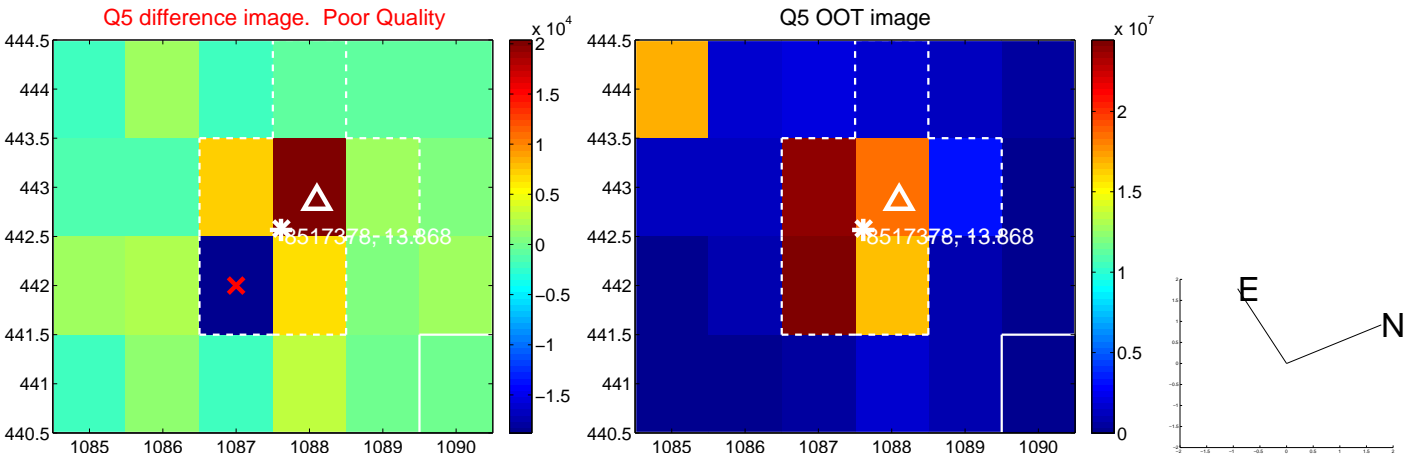


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

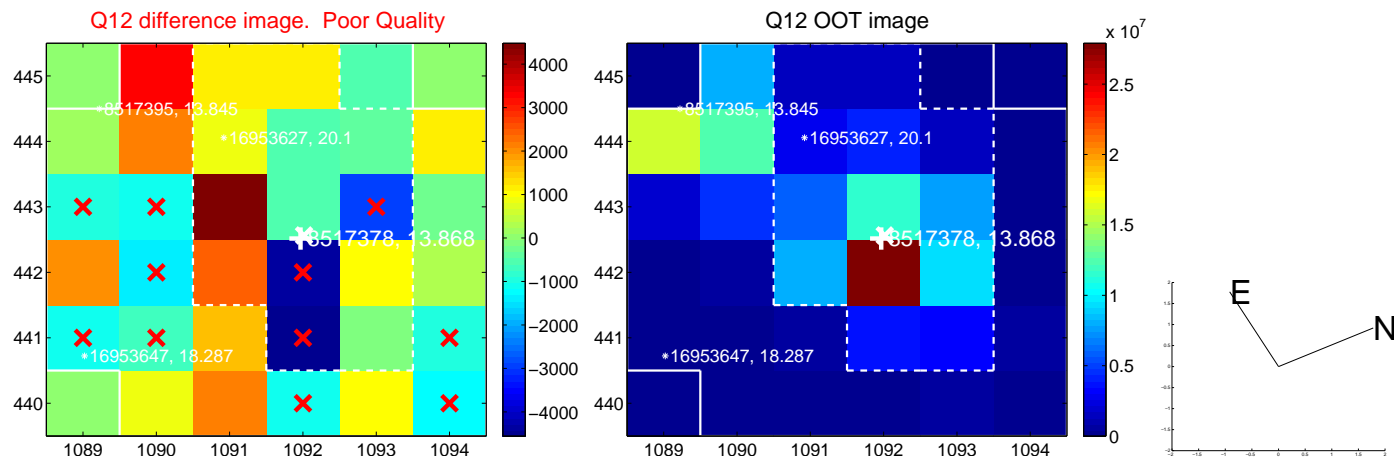
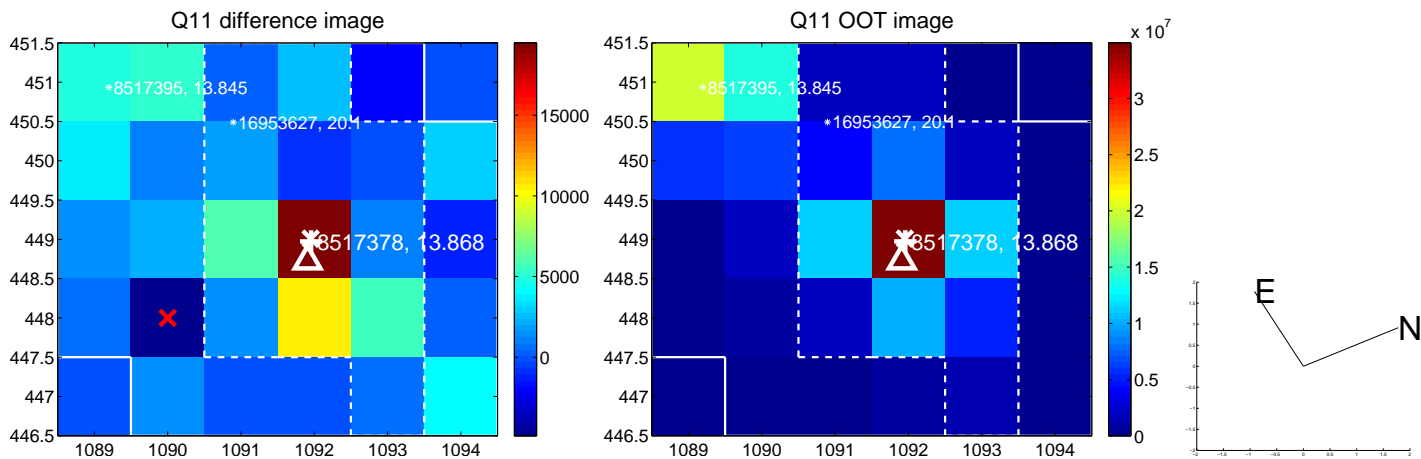
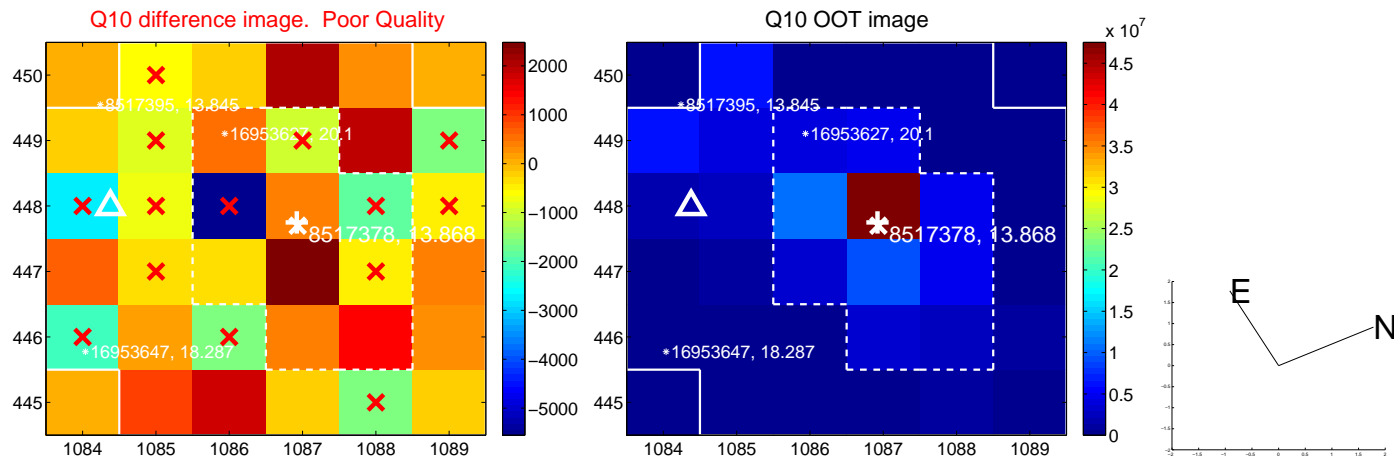
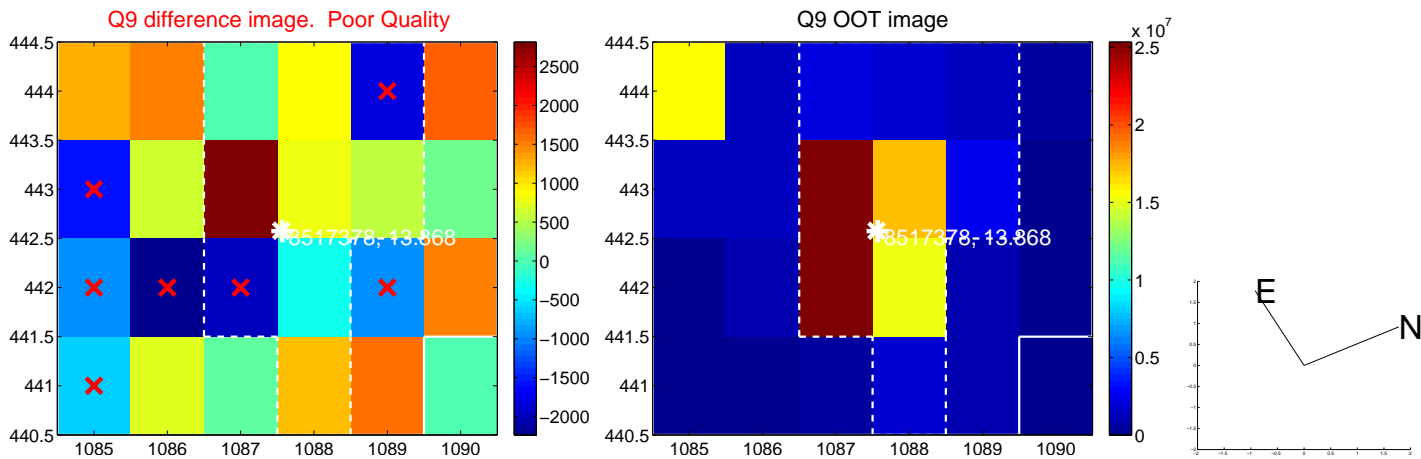
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



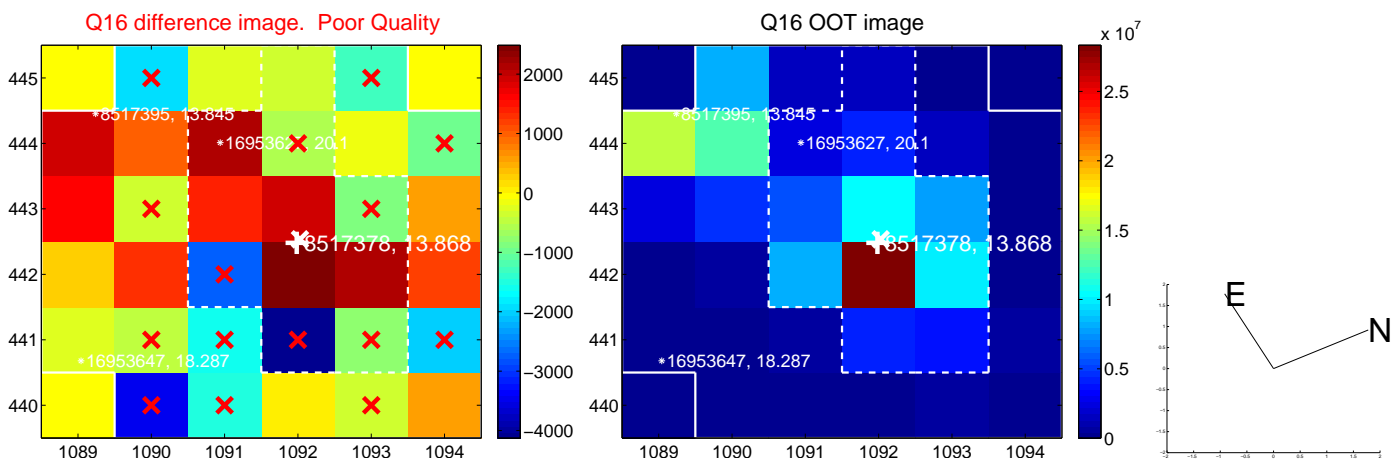
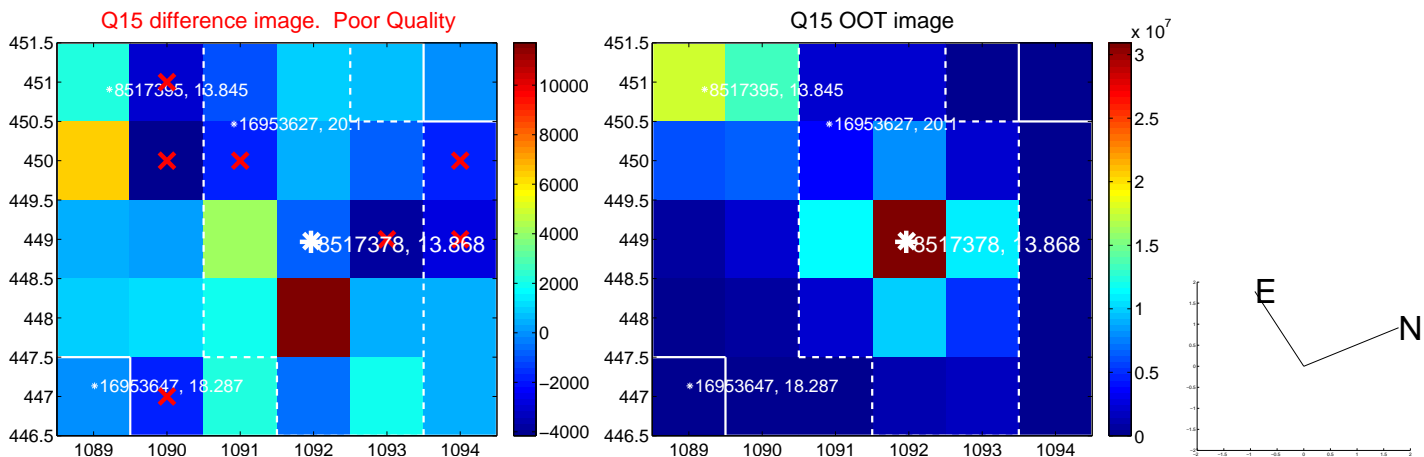
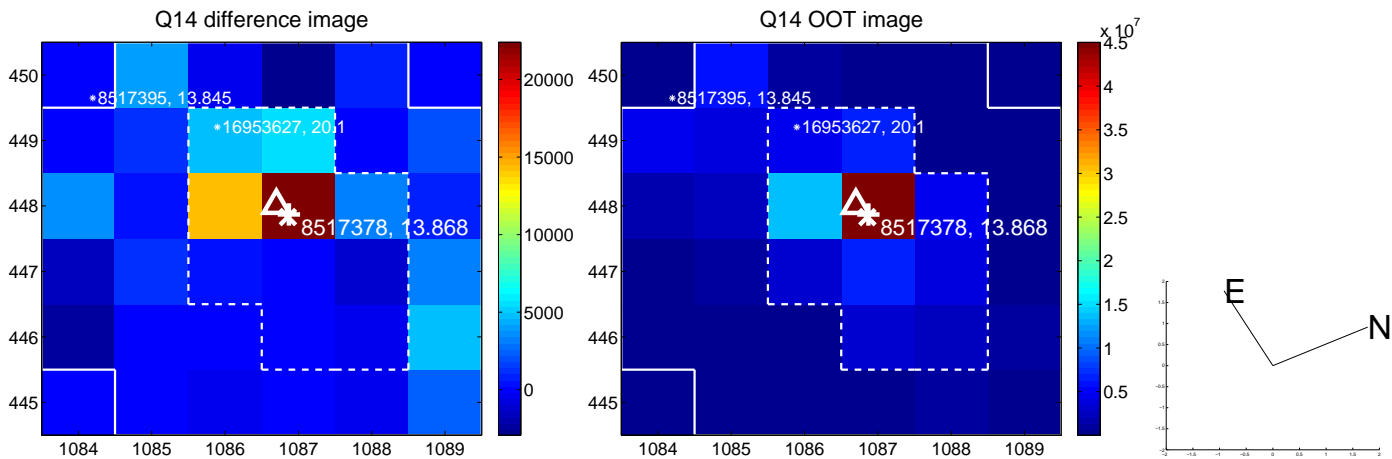
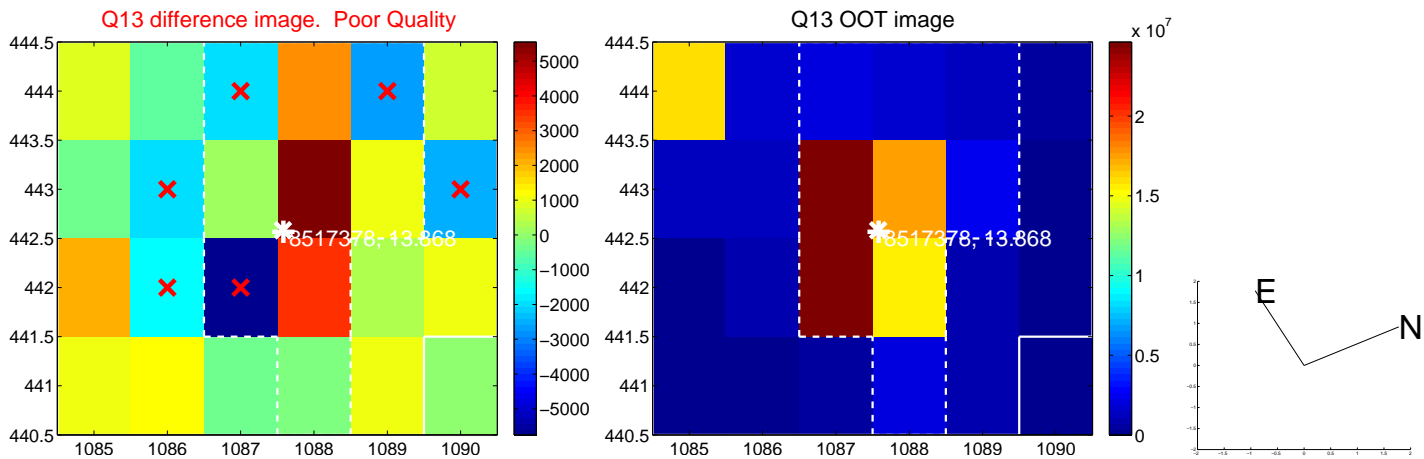
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



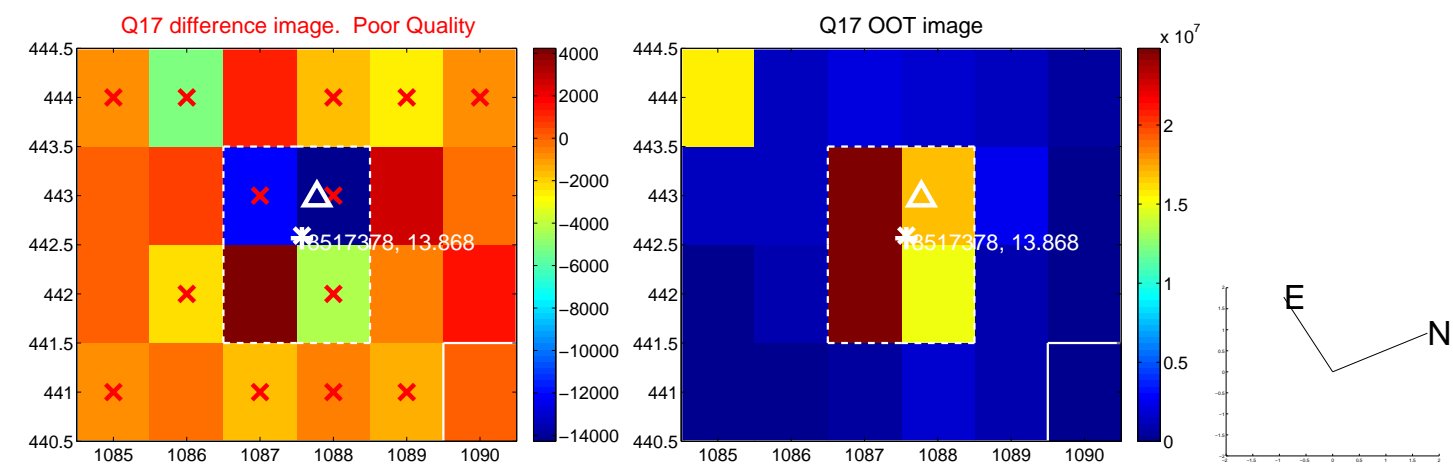
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



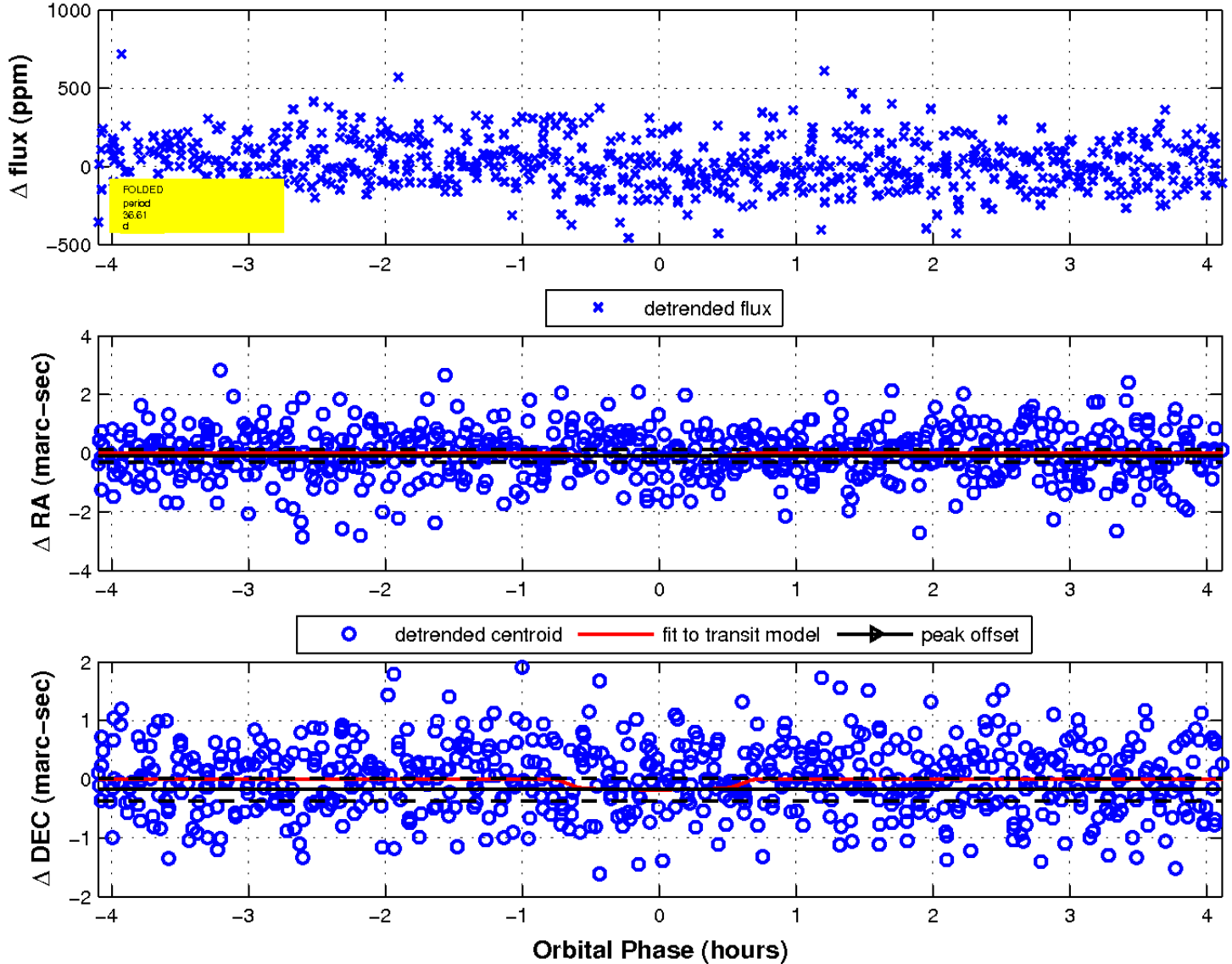
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

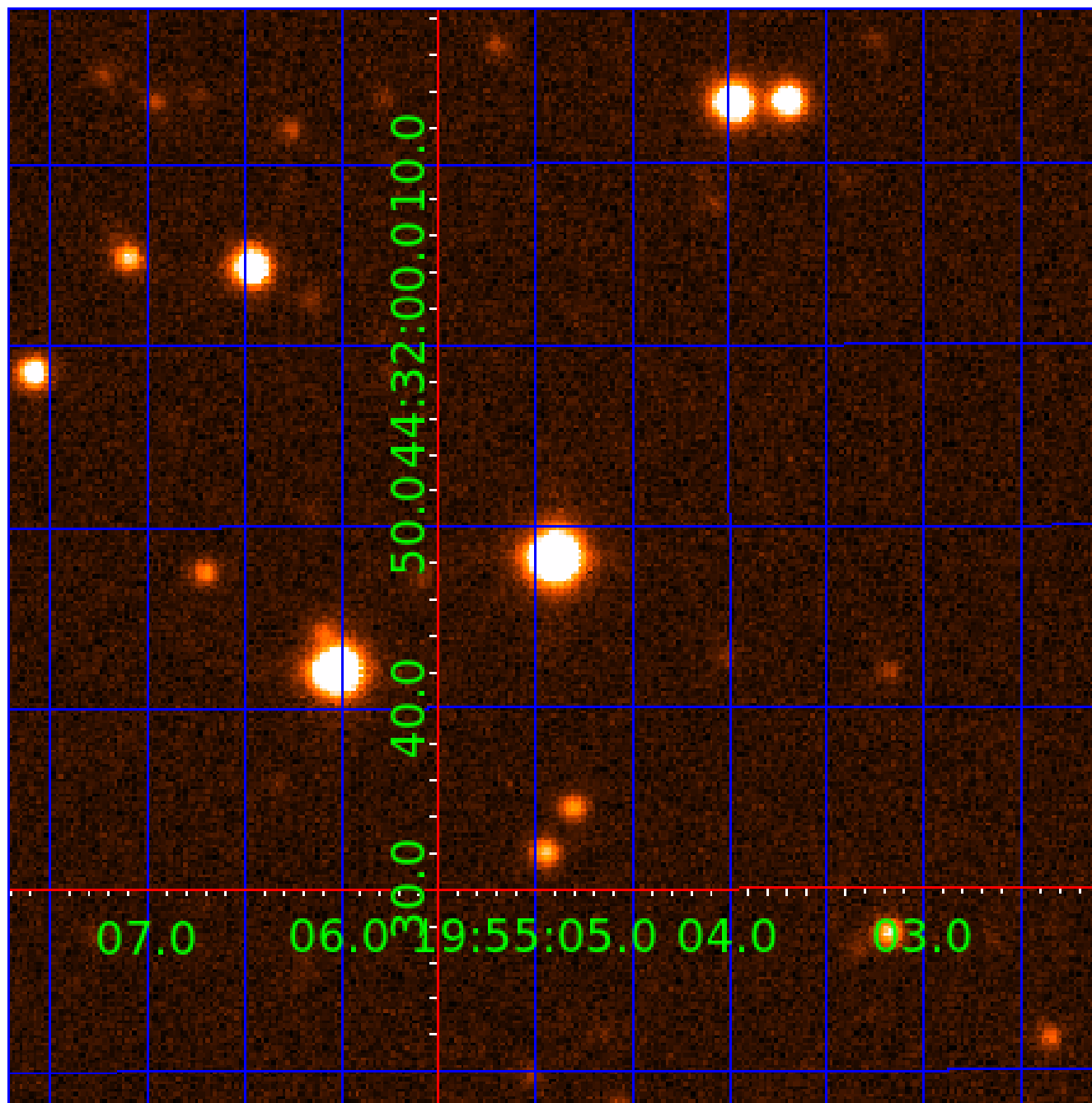


fluxWeightedCentroids, Planet 2 of 4



UKIRT Image

Declination



KIC 008517378

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})
008517378-01	OBS	No	0.869112	132.303886	3.2	5.597	7.7	2.0	2.21	6923	0.40	24015.65
008517378-02	OBS	No	36.610024	152.638459	210.1	1.375	8.8	7.2	2.21	6923	3.65	163.86
008517378-03	OBS	No	78.590219	198.848611	267.1	1.852	9.8	10.2	2.21	6923	4.02	59.17
008517378-04	OBS	No	39.475342	142.375045	176.1	3.589	8.2	9.6	2.21	6923	3.26	148.19

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008517378-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
008517378-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT
008517378-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
008517378-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST

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

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

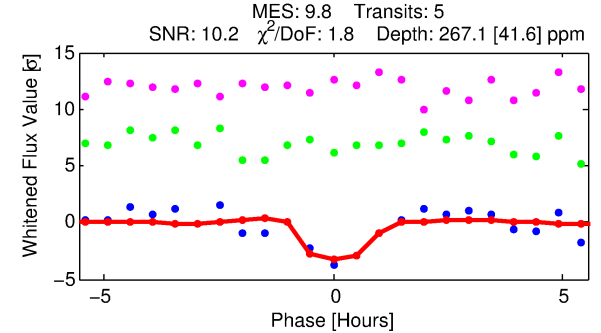
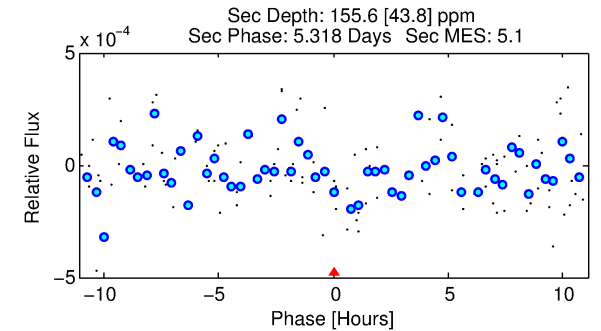
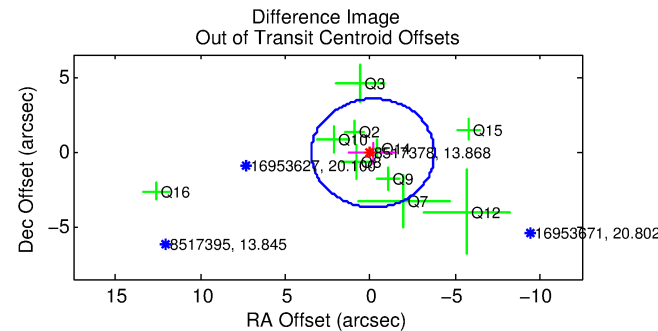
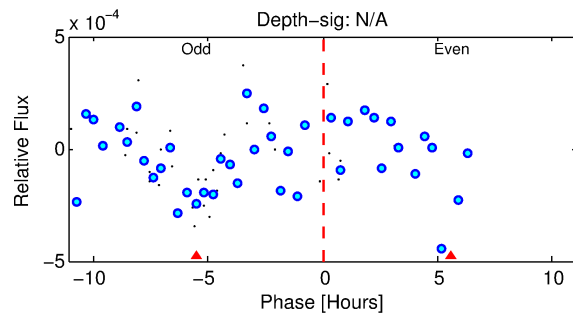
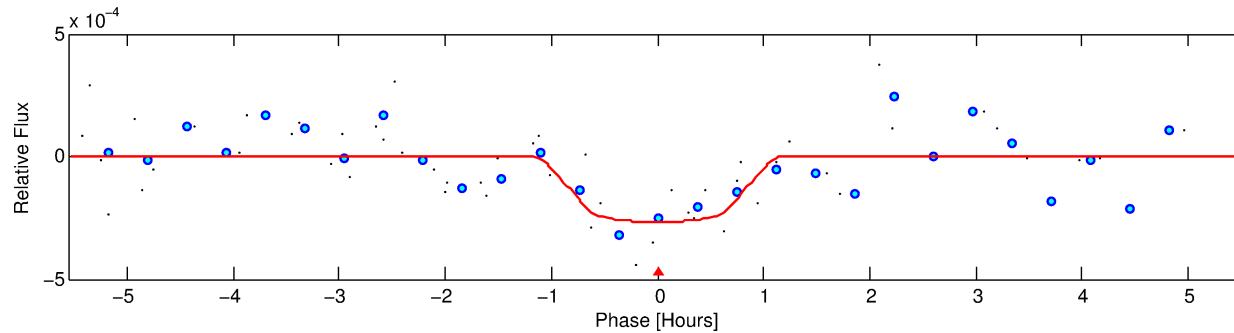
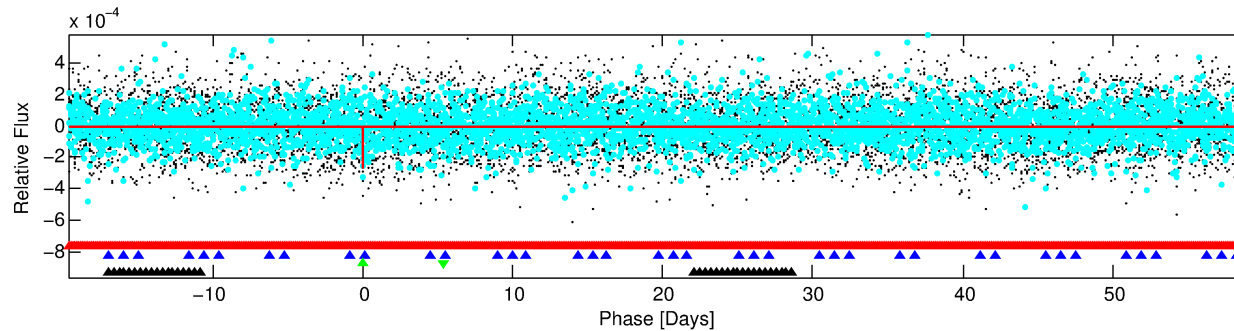
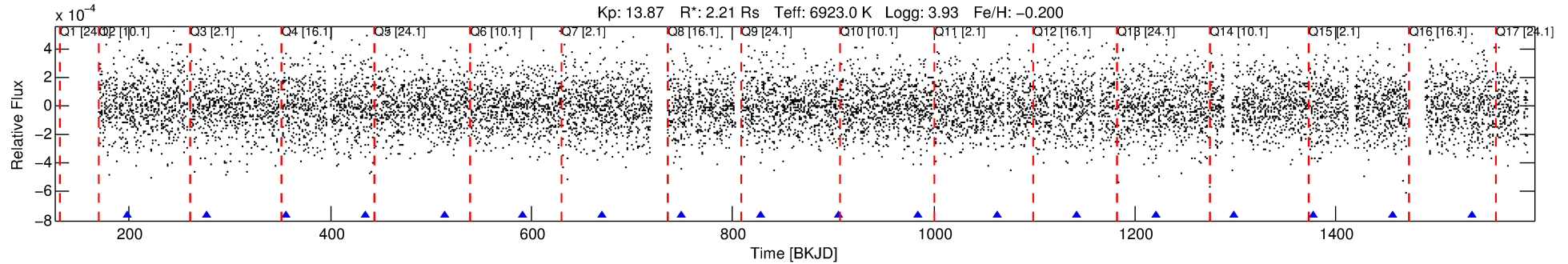
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008517378-03

No Significant Match Found

DV One-Page Summary

KIC: 8517378 Candidate: 3 of 4 Period: 78.590 d



DV Fit Results:

Period = 78.59022 [0.00068] d
Epoch = 198.8486 [0.0079] BKJD
Rp/R* = 0.0167 [0.0162]
a/R* = 196.83 [1147.76]
b = 0.82 [2.41]
Seff = 59.17 [34.22]
Teq = 707 [102] K
Rp = 4.02 [4.18] Re
a = 0.4125 [0.1452] AU
Ag = 901.73 [1837.59] [0.49σ]
Teffp = 5992 [2948] K [1.79σ]

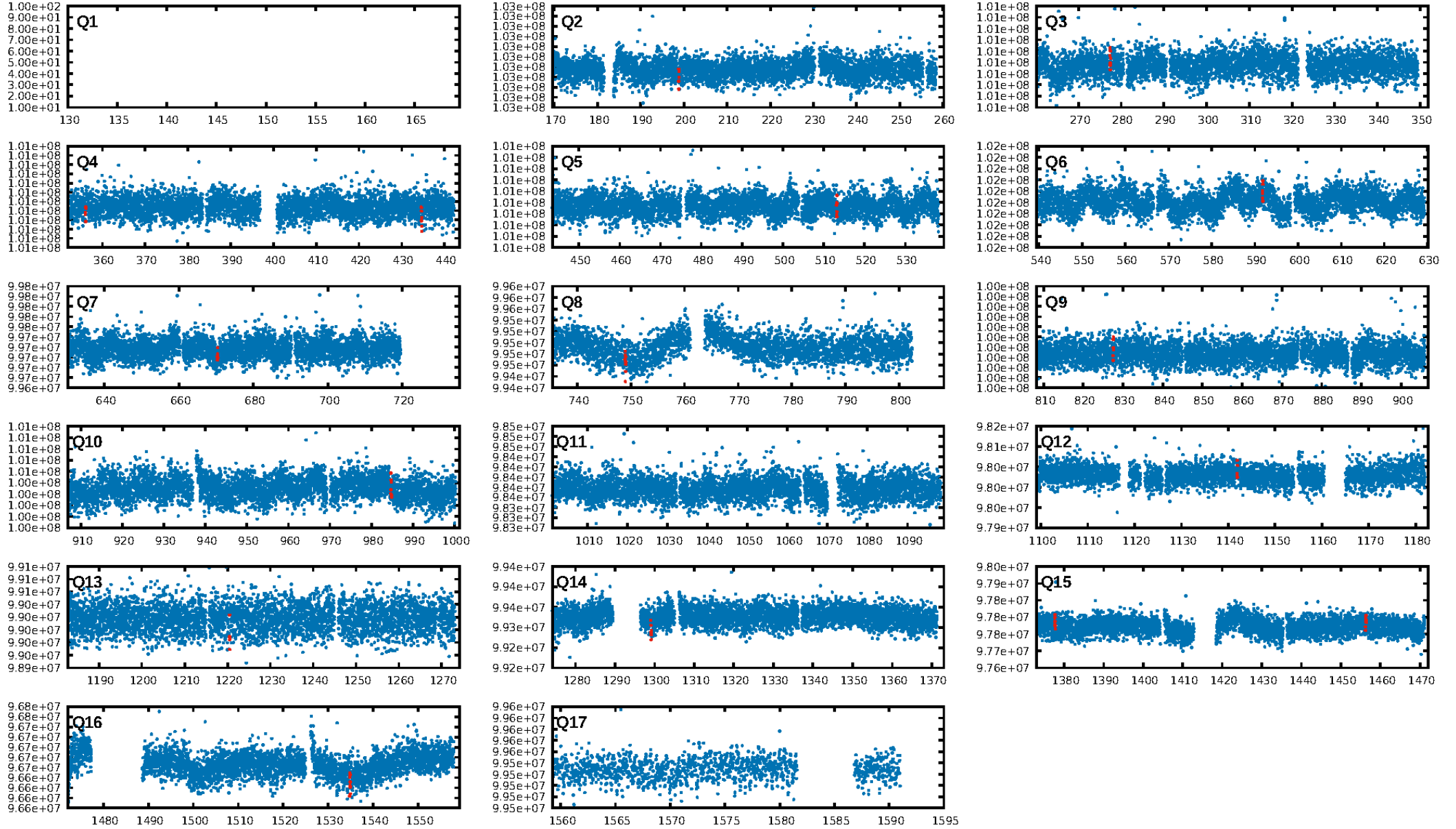
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [232.44σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 50.6%
ModelChiSquareGof-sig: 75.0%
Bootstrap-pfa: 6.24e-11
RollingBand-fgt: 1.00 [5/5]
GhostDiagnostic-chr: 3.806
Centroid-sig: 22.2%
Centroid-so: 2.532 arcsec [2.32σ]
OotOffset-rm: 0.199 arcsec [0.16σ]
OotOffset-st: 3/3/3/1 [10]
KicOffset-rm: 0.251 arcsec [0.20σ]
KicOffset-st: 3/3/3/1 [10]
DiffImageQuality-fgm: 0.30 [3/10]
DiffImageOverlap-fno: 0.23 [3/13]

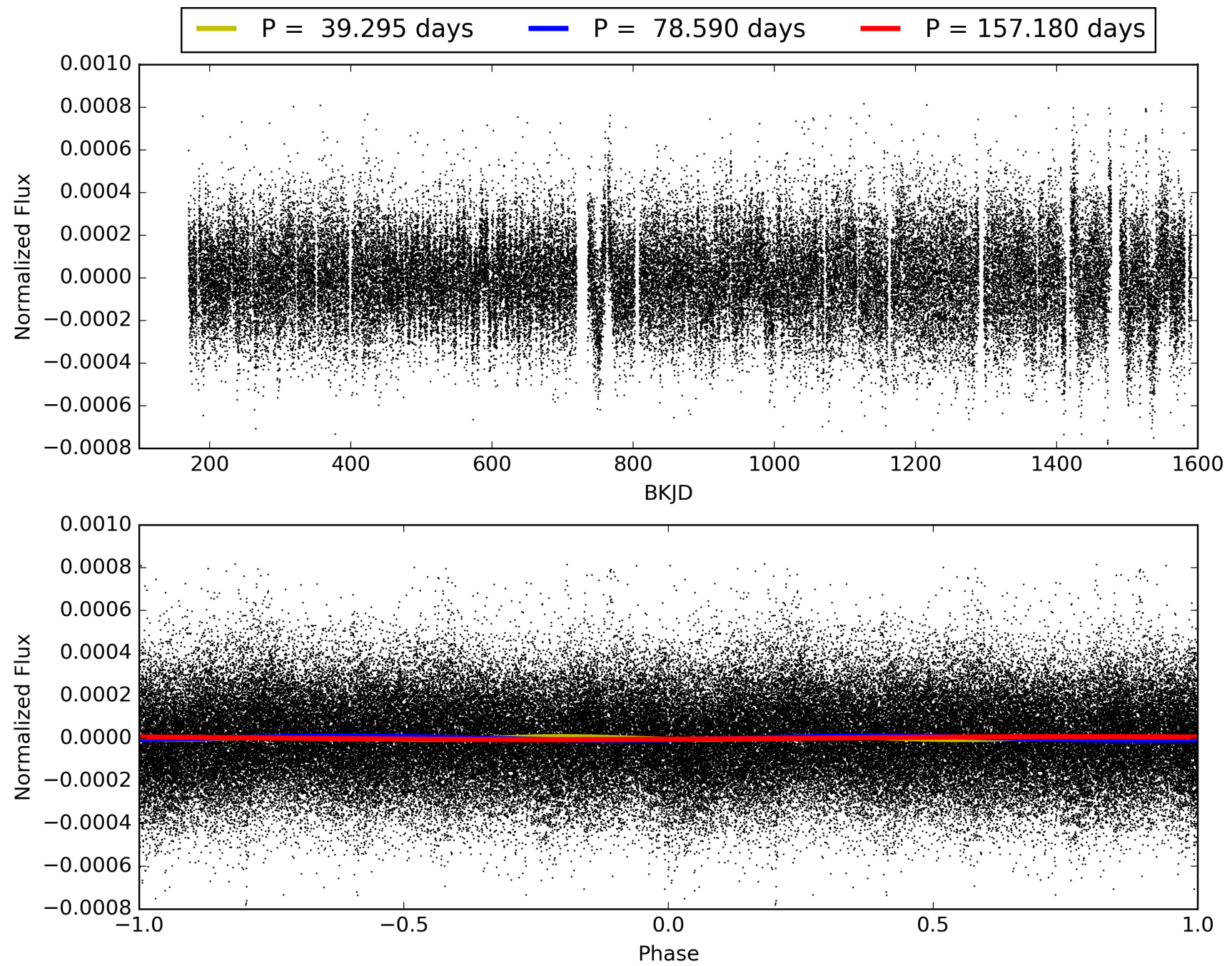
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 03:56:11 Z

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

TCE 008517378-03, PDC Light Curves

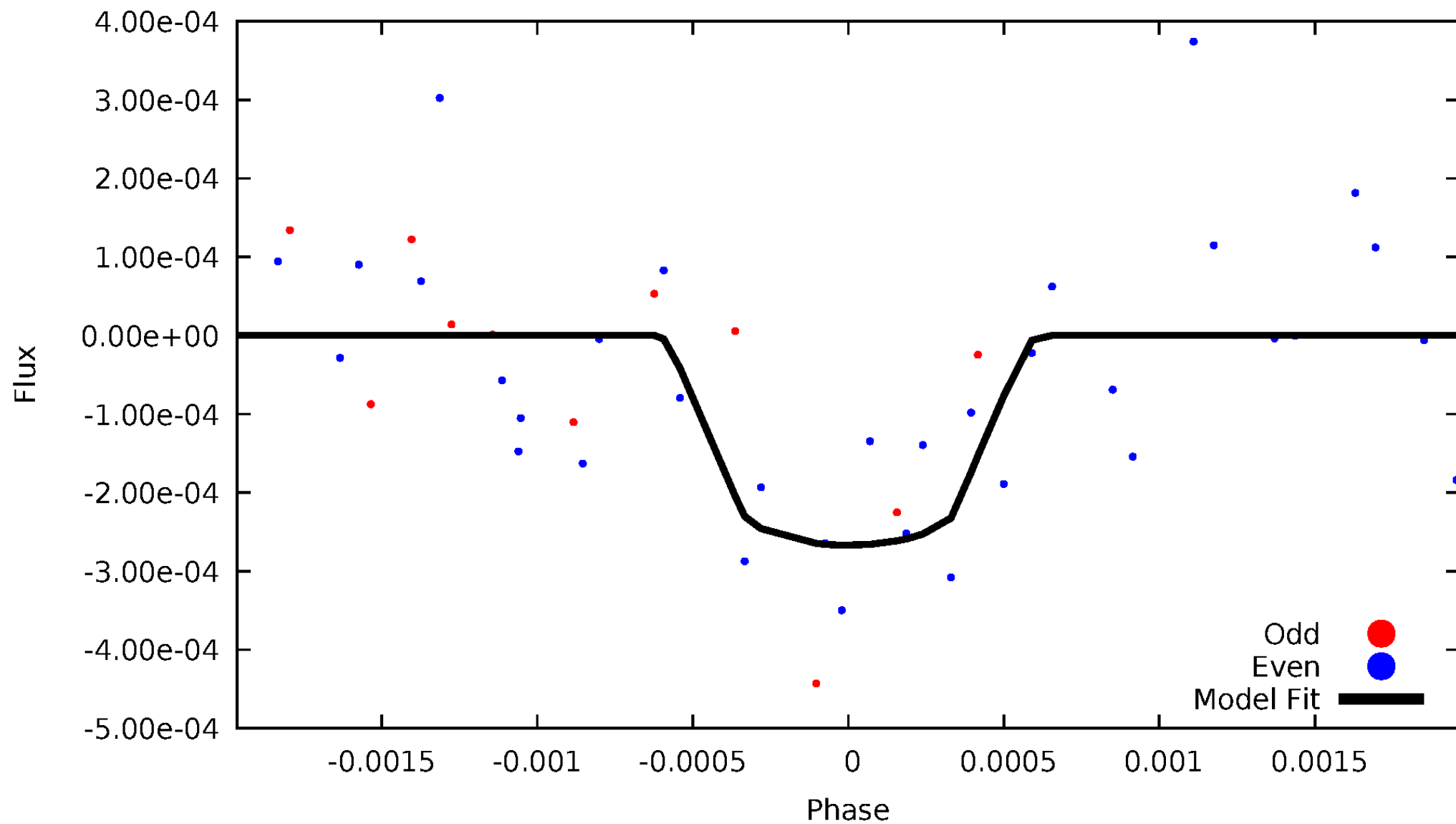


TCE 008517378-03



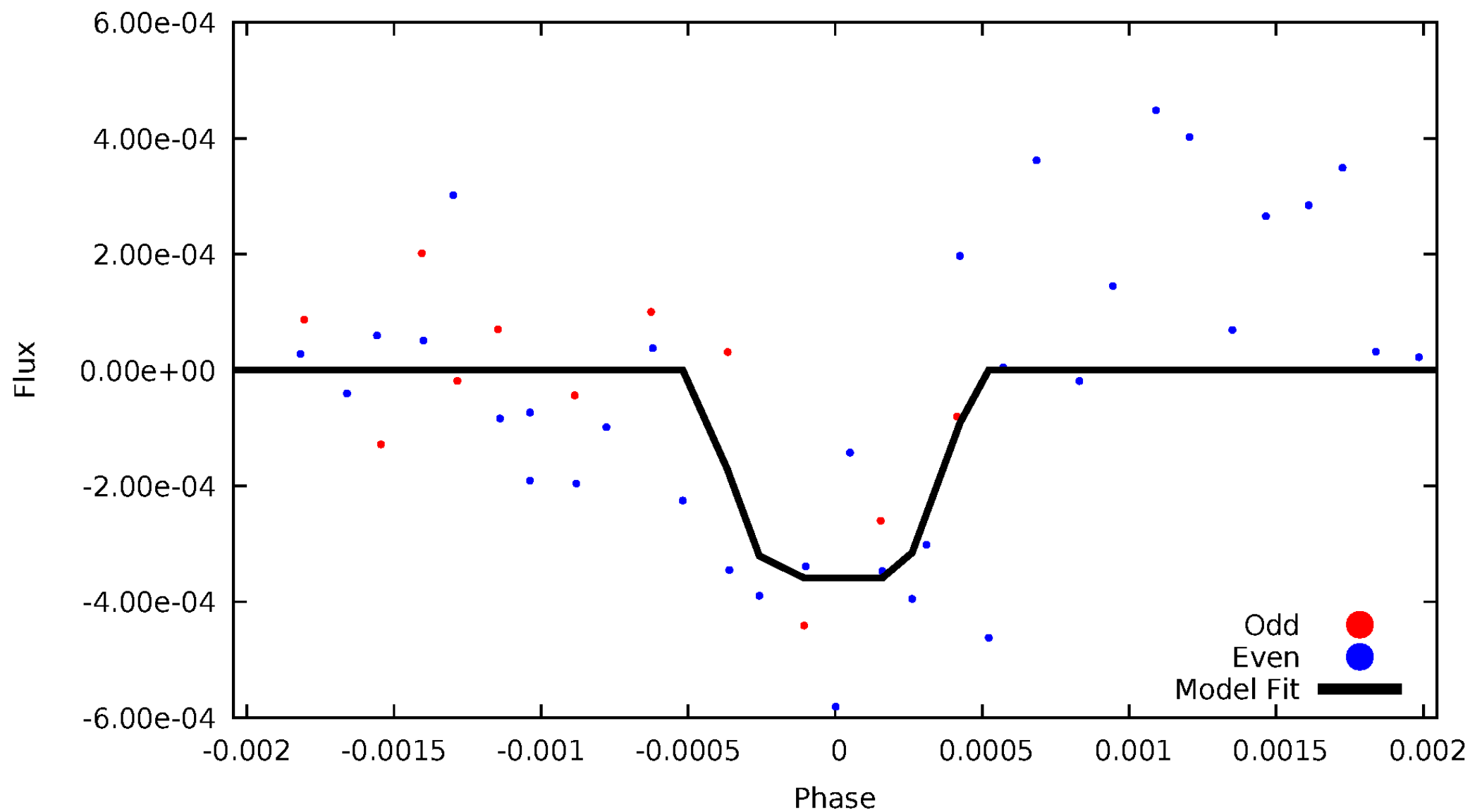
DV Odd/Even

TCE 008517378-03



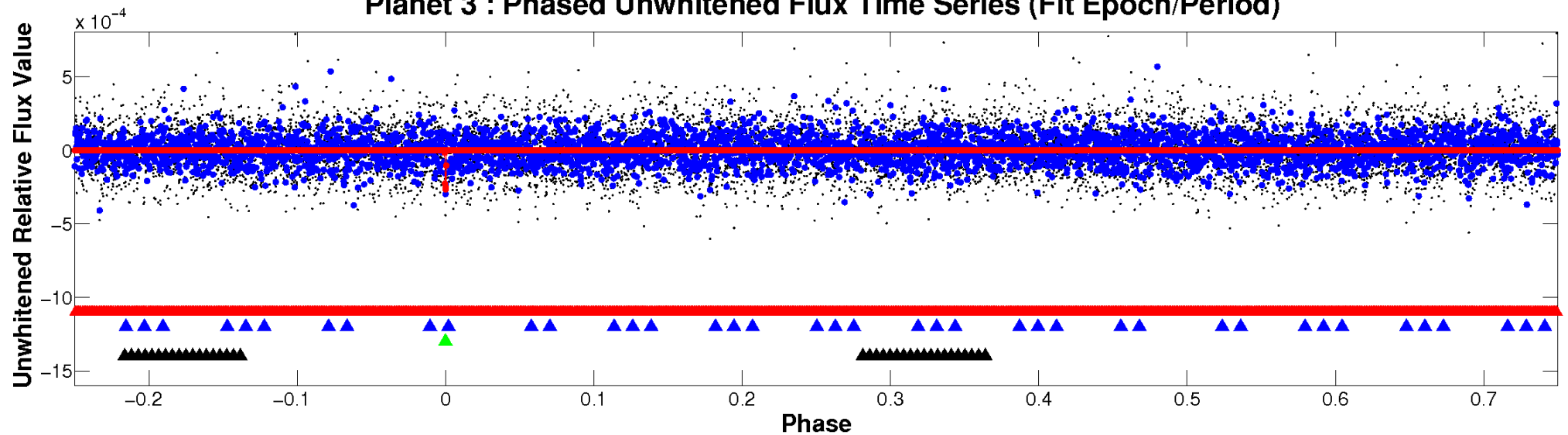
ALT Odd/Even

TCE 008517378-03

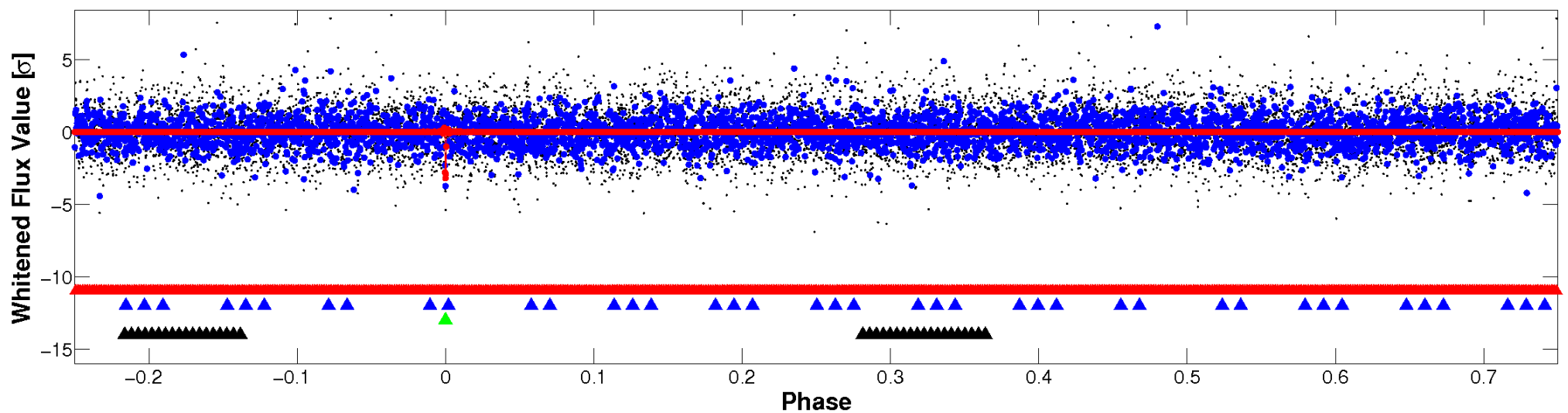


Non-Whitened Vs. Whitened Light Curve

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

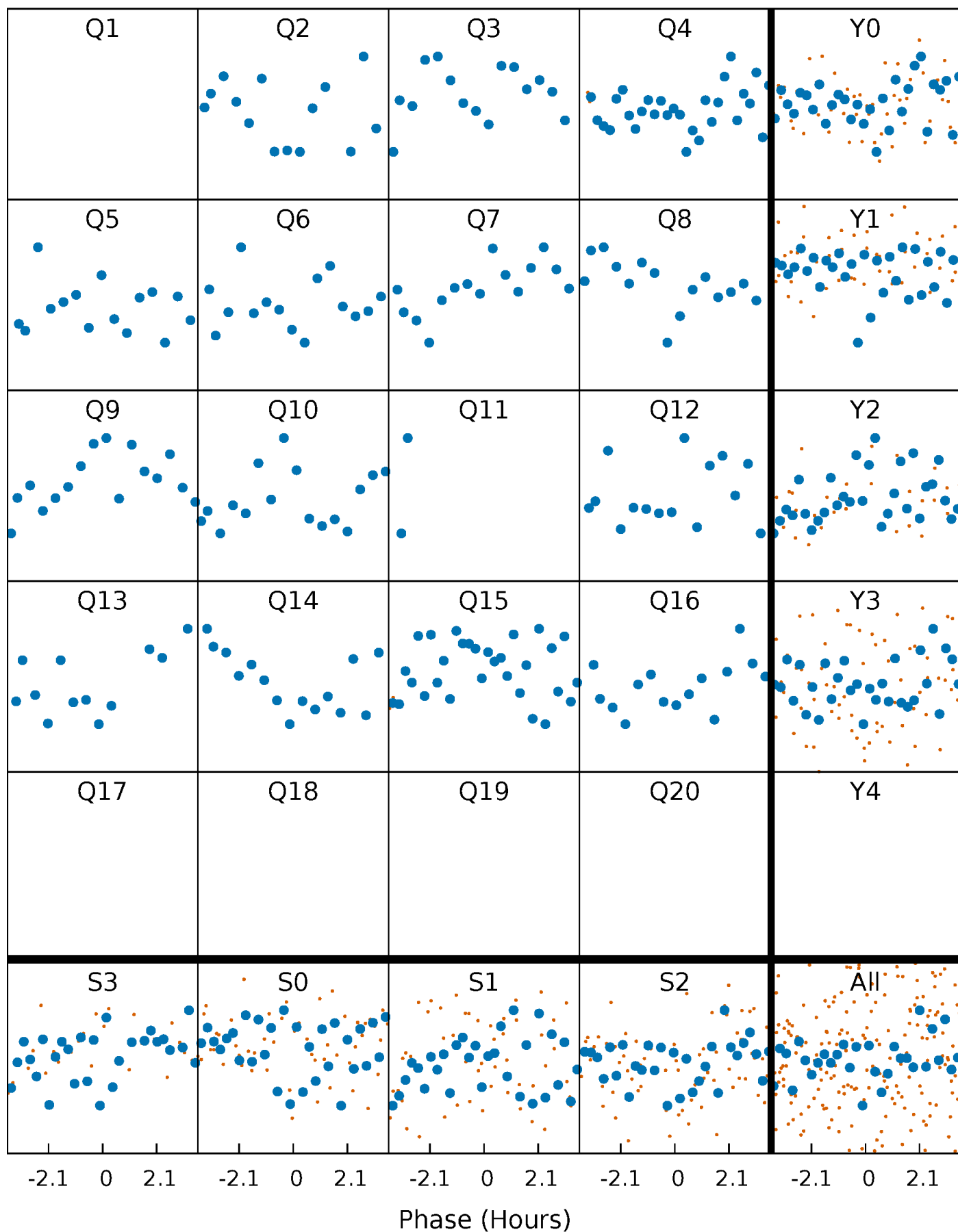


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



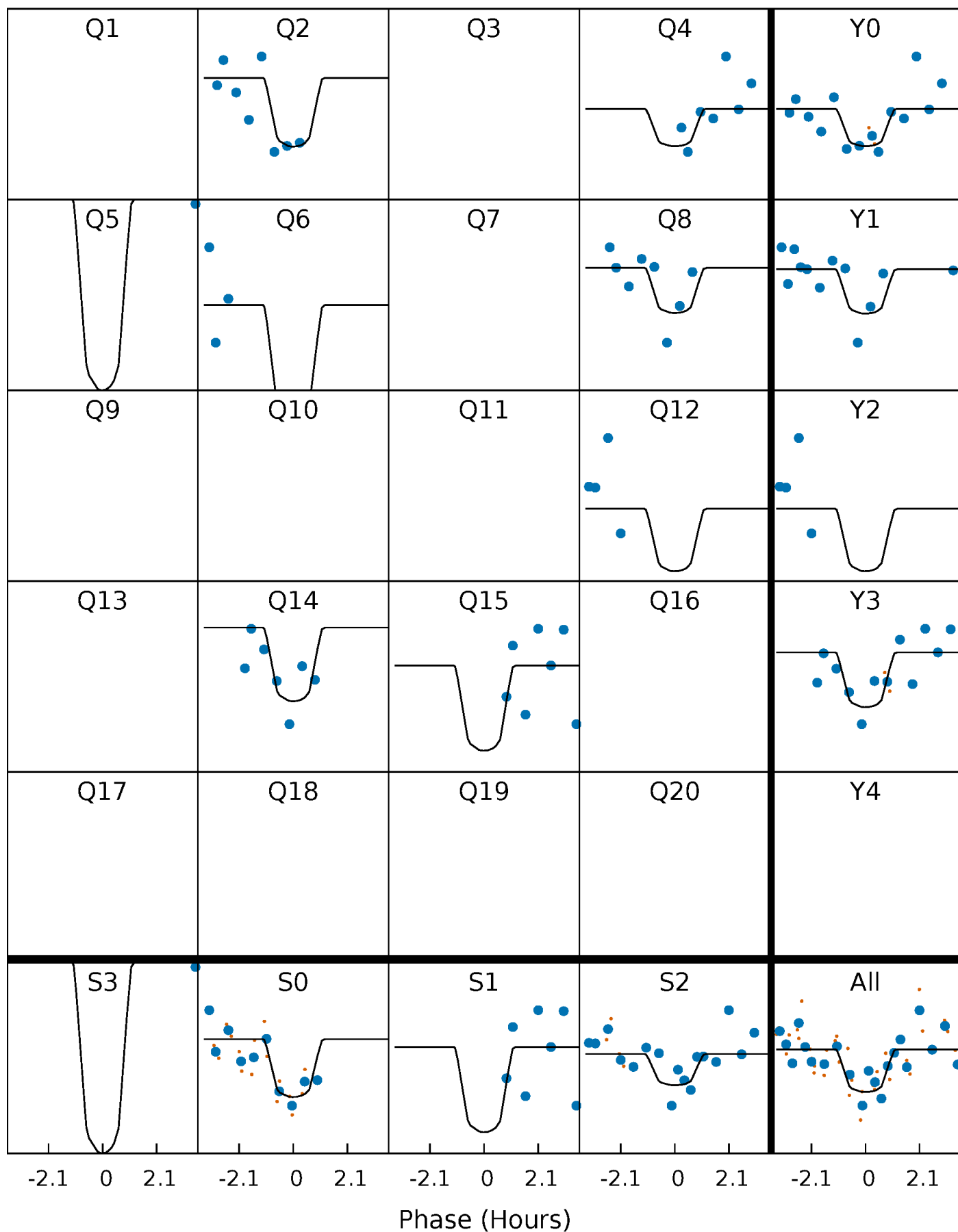
PDC Quarter-Phased Transit Curves

TCE 008517378-03 P= 78.590219 Days $T_0=198.848611$ (BKJD)



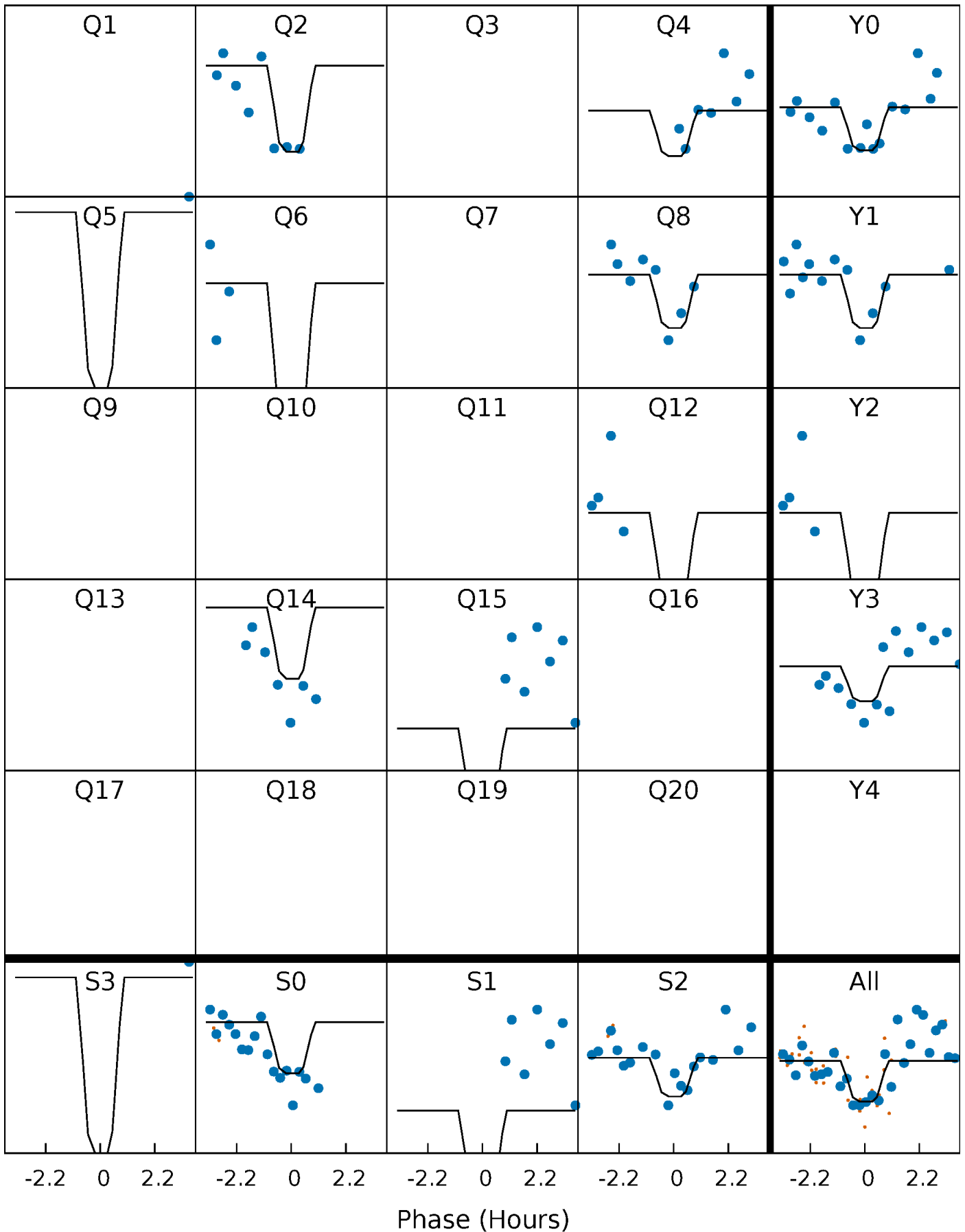
DV Quarter-Phased Transit Curves

TCE 008517378-03 P= 78.590219 Days $T_0=198.848611$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

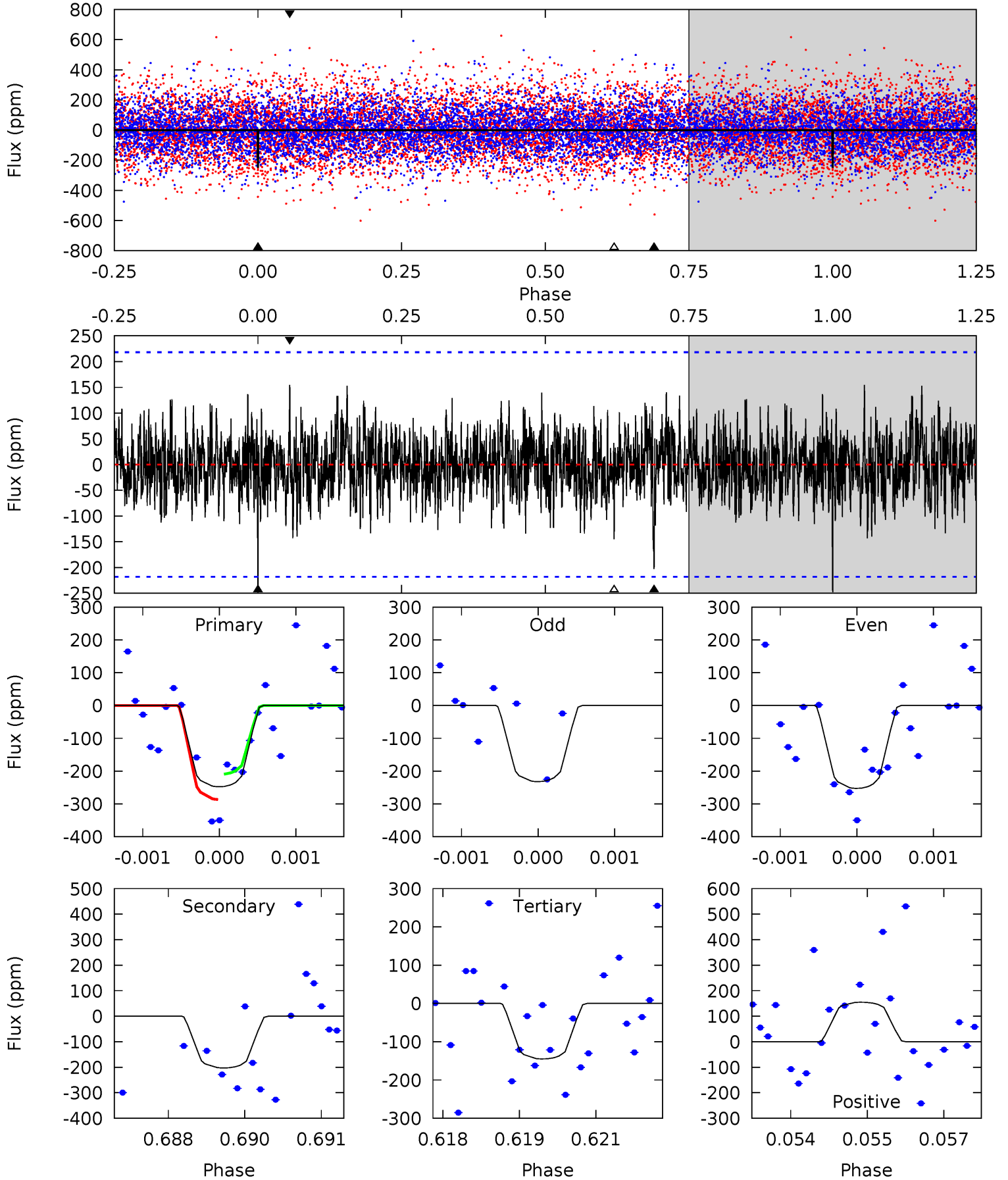
TCE 008517378-03 P= 78.589944 Days $T_0=198.850673$ (BKJD)



DV Model-Shift Uniqueness Test

008517378-03, P = 78.590219 Days, E = 120.258392 Days

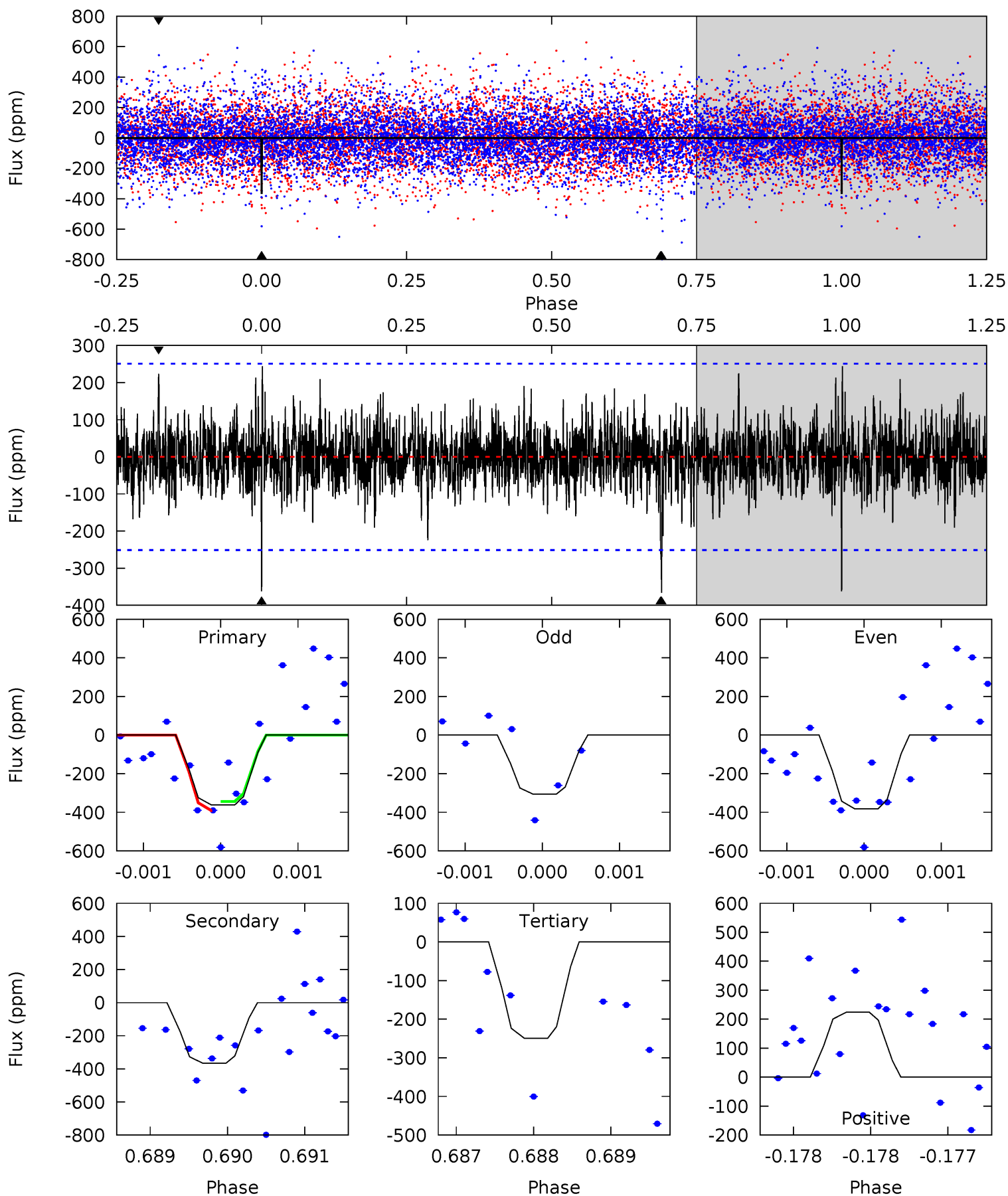
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.17	5.05	3.61	3.85	5.43	3.26	1.17	2.56	2.32	1.44	1.19	0.24	1.02	0.38	0.95



Alt Model-Shift Uniqueness Test

008517378-03, P = 78.589944 Days, E = 120.260729 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.90	7.97	5.44	4.88	5.47	3.32	1.31	2.45	3.01	2.53	3.09	0.74	1.03	0.40	0.49



Stellar Parameters For KIC 008517378

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6923^{+214}_{-286}	$3.929^{+0.322}_{-0.138}$	$-0.200^{+0.250}_{-0.300}$	$2.212^{+0.555}_{-0.832}$	$1.512^{+0.217}_{-0.326}$	$0.197^{+0.468}_{-0.079}$
	+3%/-4%	+8%/-4%	+125%/-150%	+25%/-38%	+14%/-22%	+238%/-40%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 008517378-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-203 ± 40	$4.38^{+3.82}_{-2.62}$	963^{+76}_{-93}	5779^{+3860}_{-1325}	947^{+5096}_{-675}
Alt.	-366 ± 46	$4.72^{+3.63}_{-2.84}$	971^{+76}_{-94}	6619^{+5069}_{-1523}	1536^{+7886}_{-1056}

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

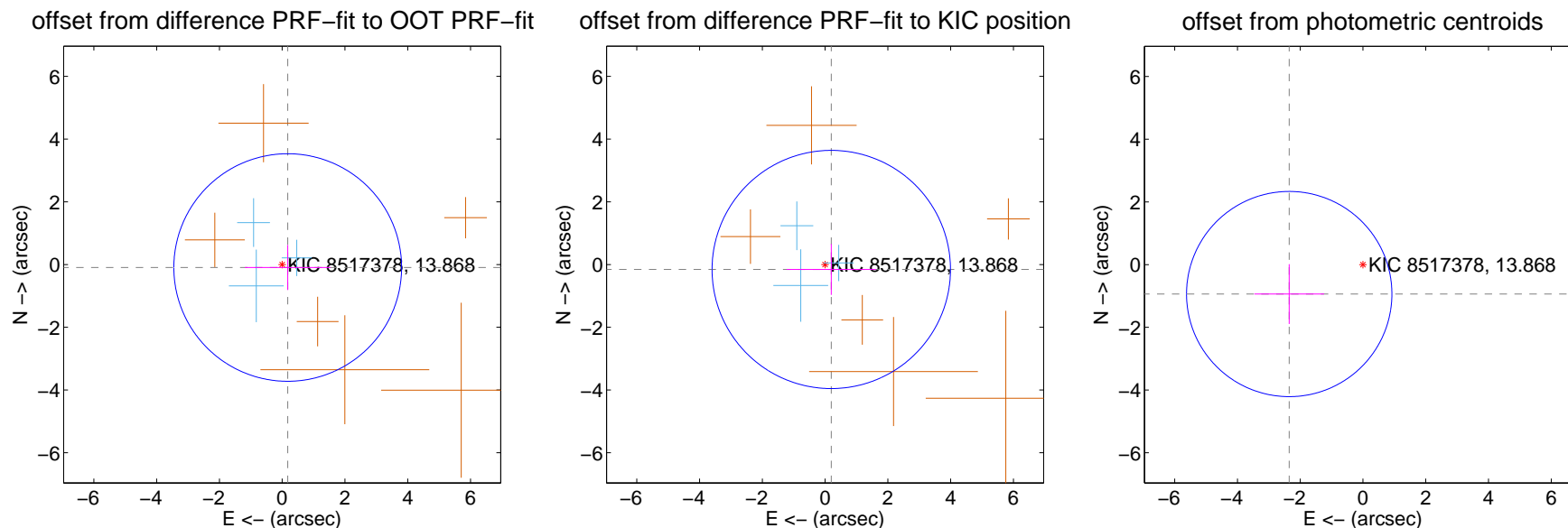
DV Centroid Data

Supplemental centroid analysis for 008517378-03. Kepler magnitude: 13.87. Transit SNR 10.21

There are 3 quarters with good PRF difference image offsets

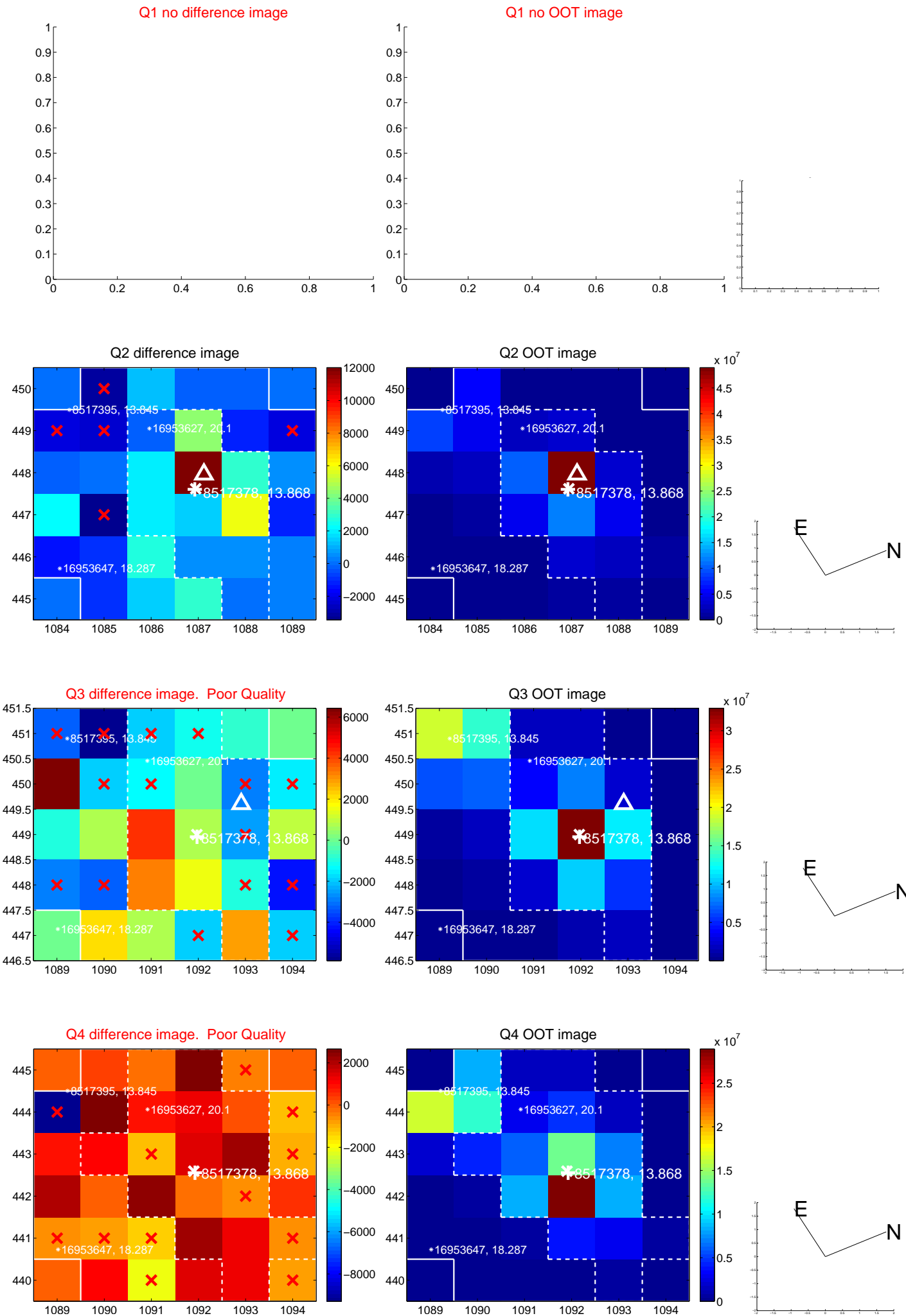
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.199 ± 1.209	0.16	-0.175 ± 1.365	-0.095 ± 0.719
PRF-fit source offset from KIC position	0.251 ± 1.266	0.20	-0.196 ± 1.425	-0.157 ± 0.810
photometric centroid source offset	2.53 ± 1.09	2.32	2.35 ± 1.11	-0.94 ± 0.95

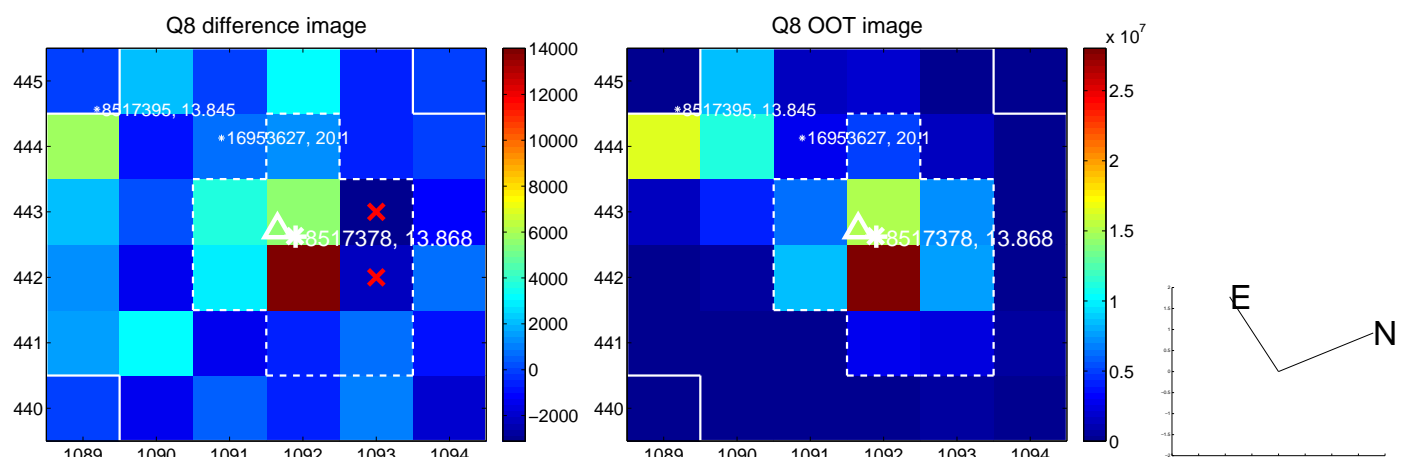
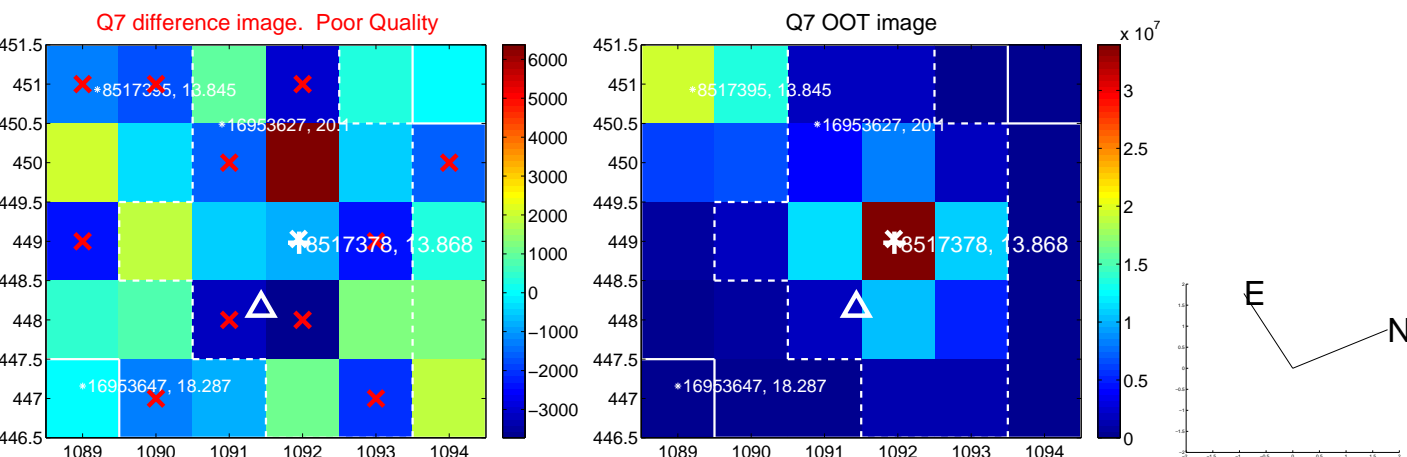
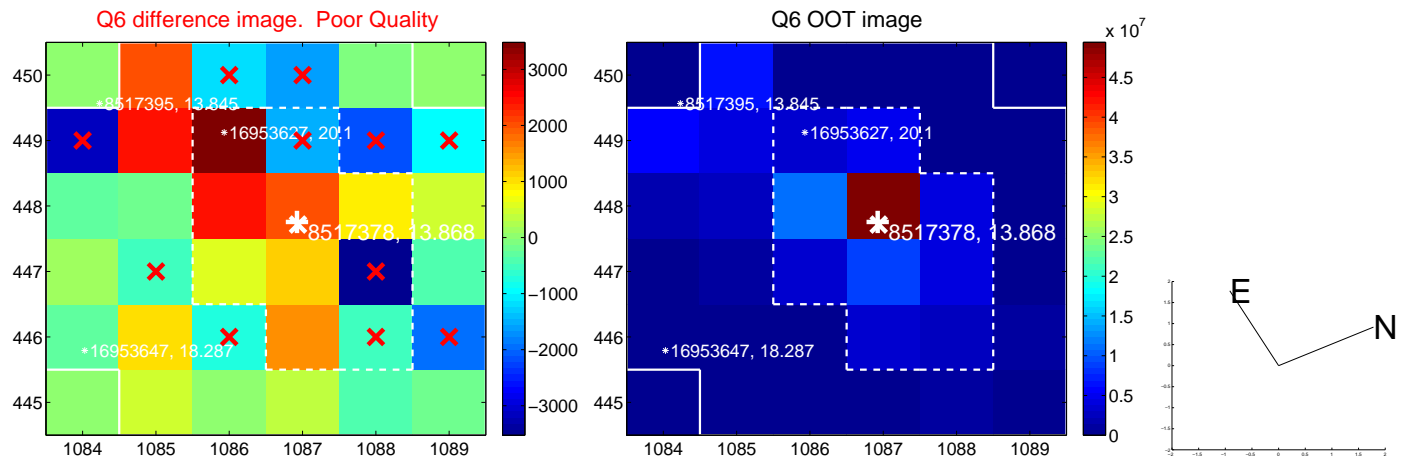
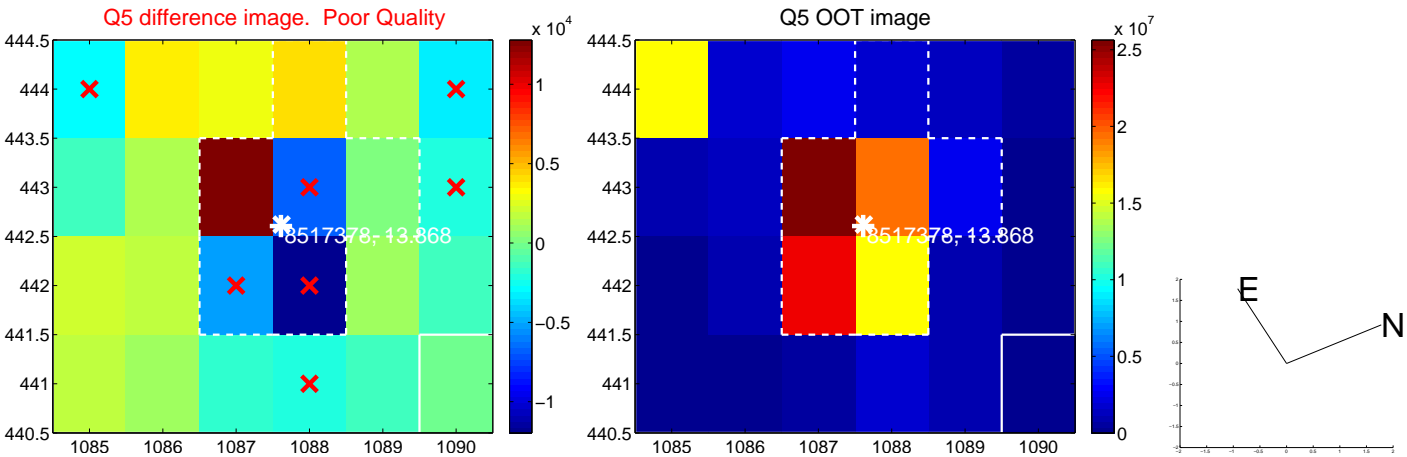


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

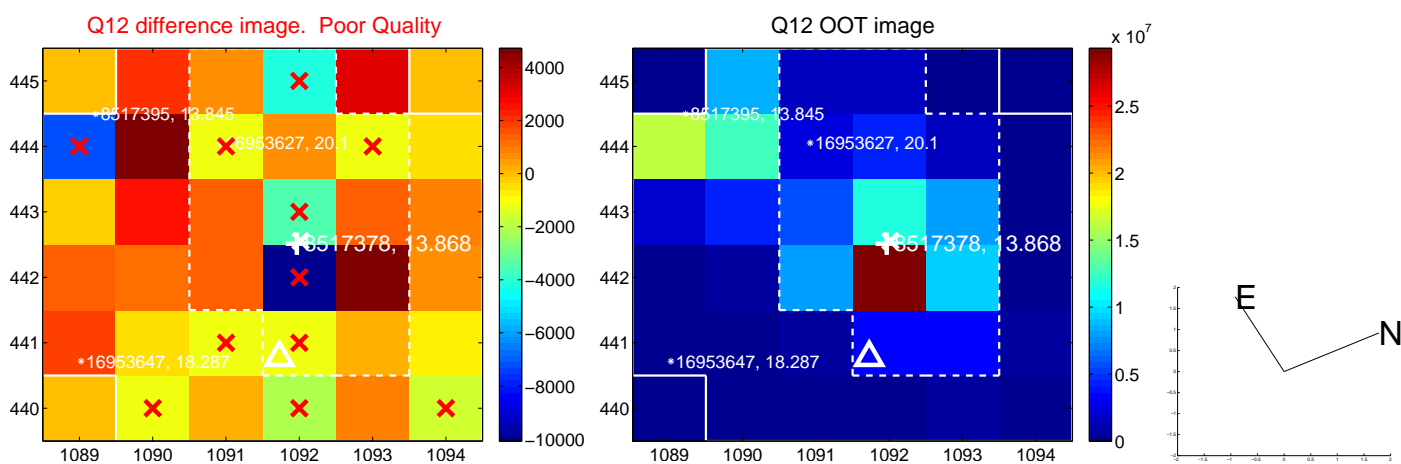
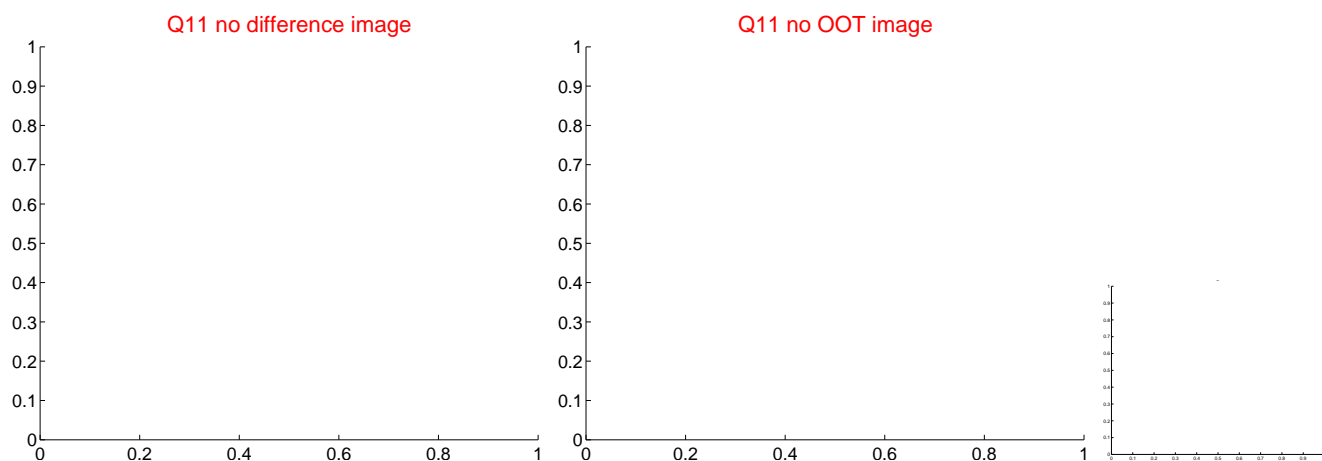
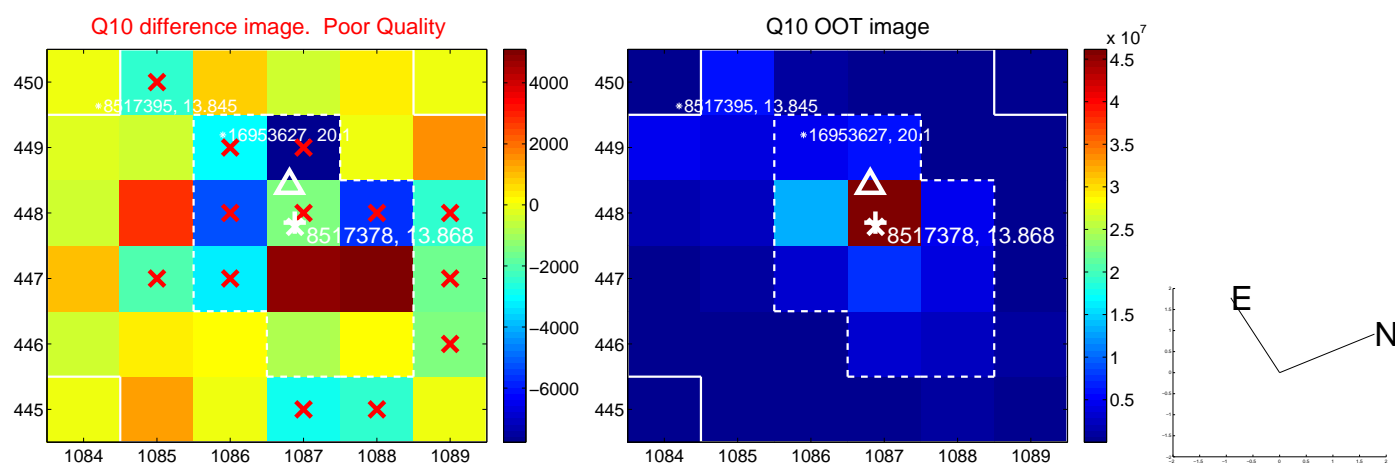
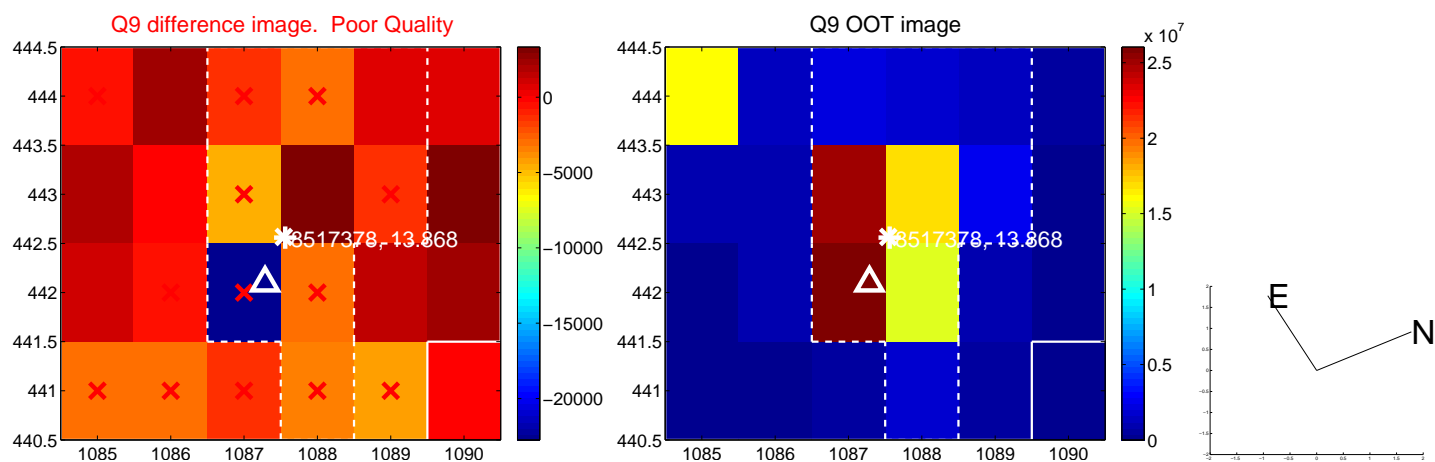
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



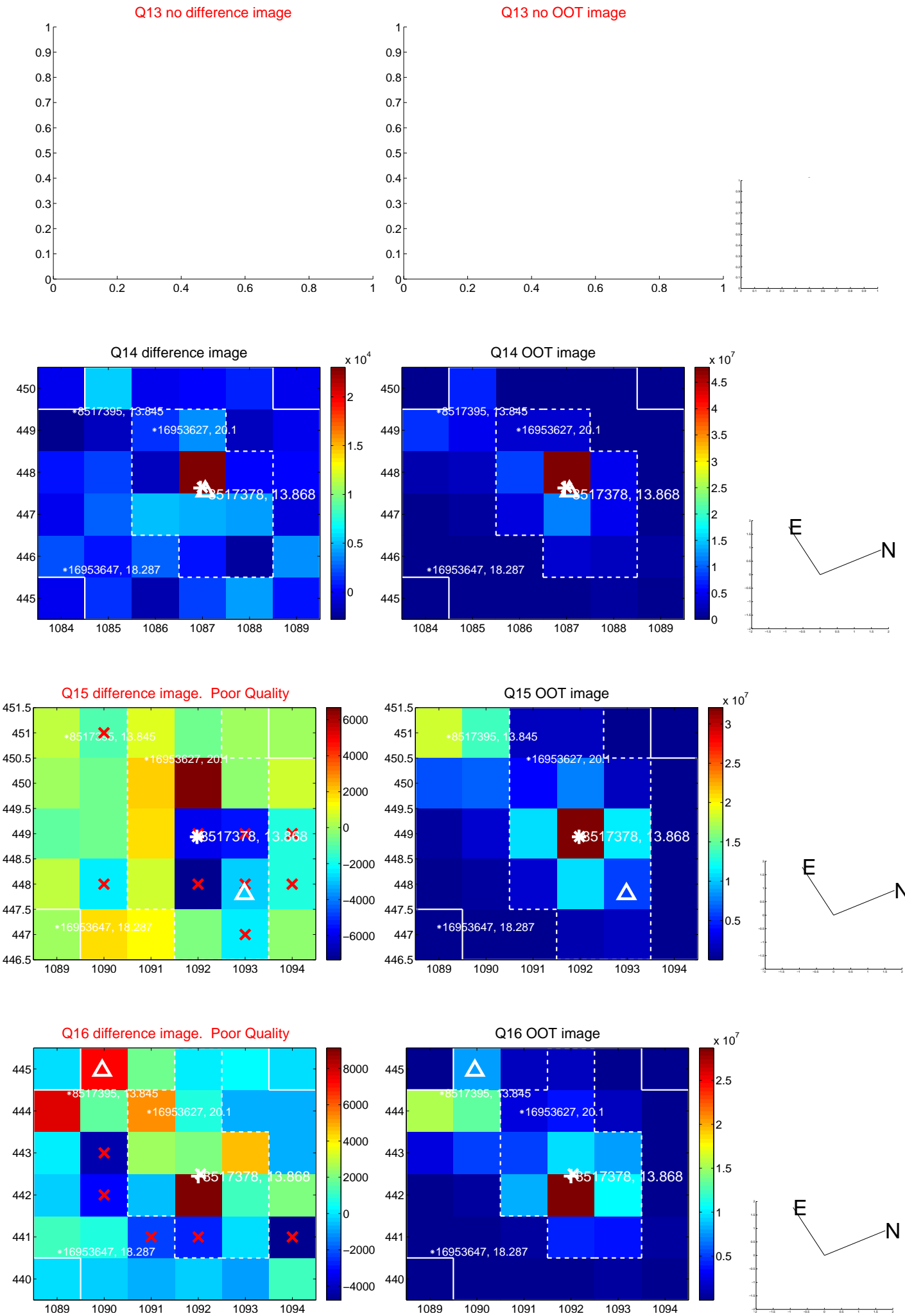
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



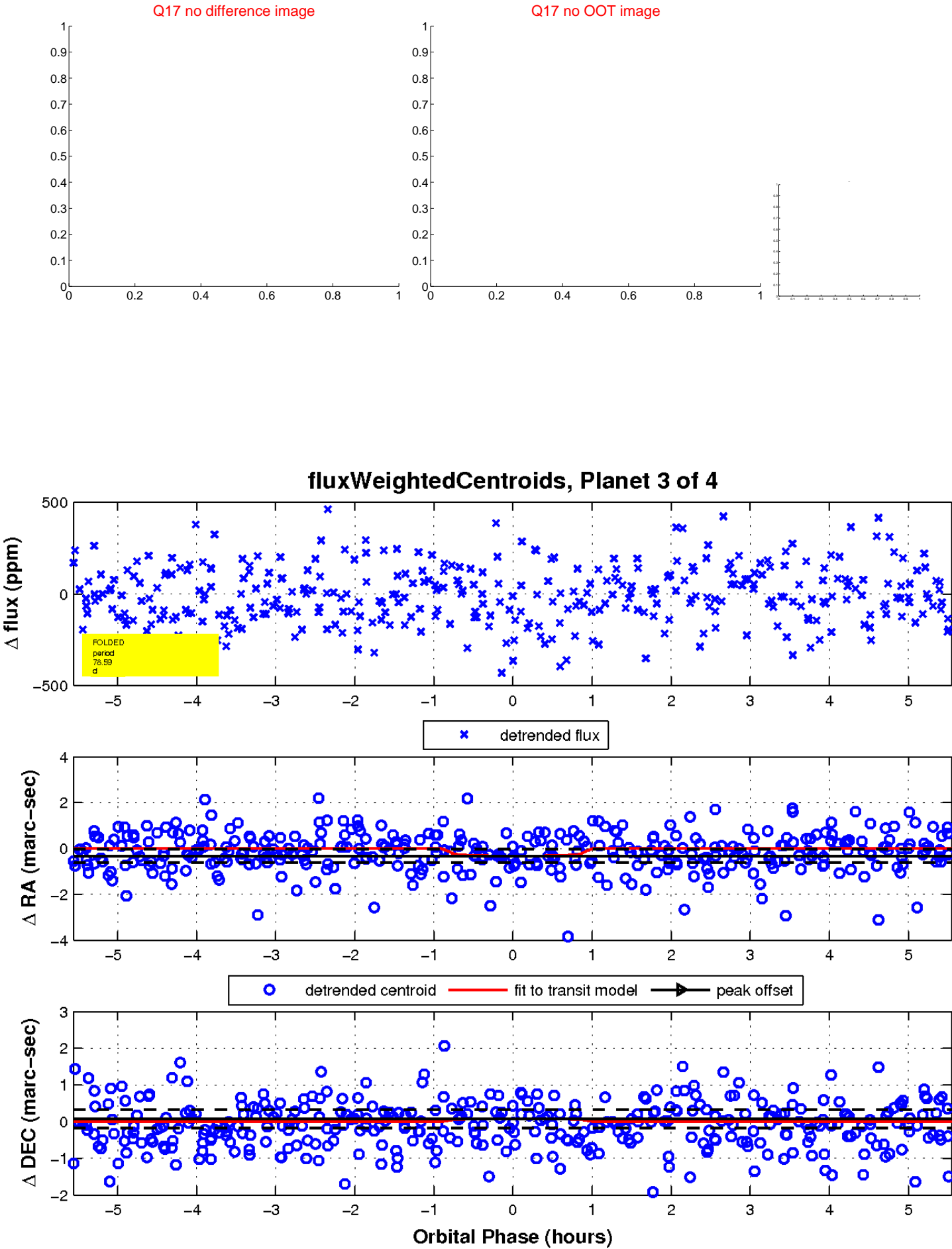
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

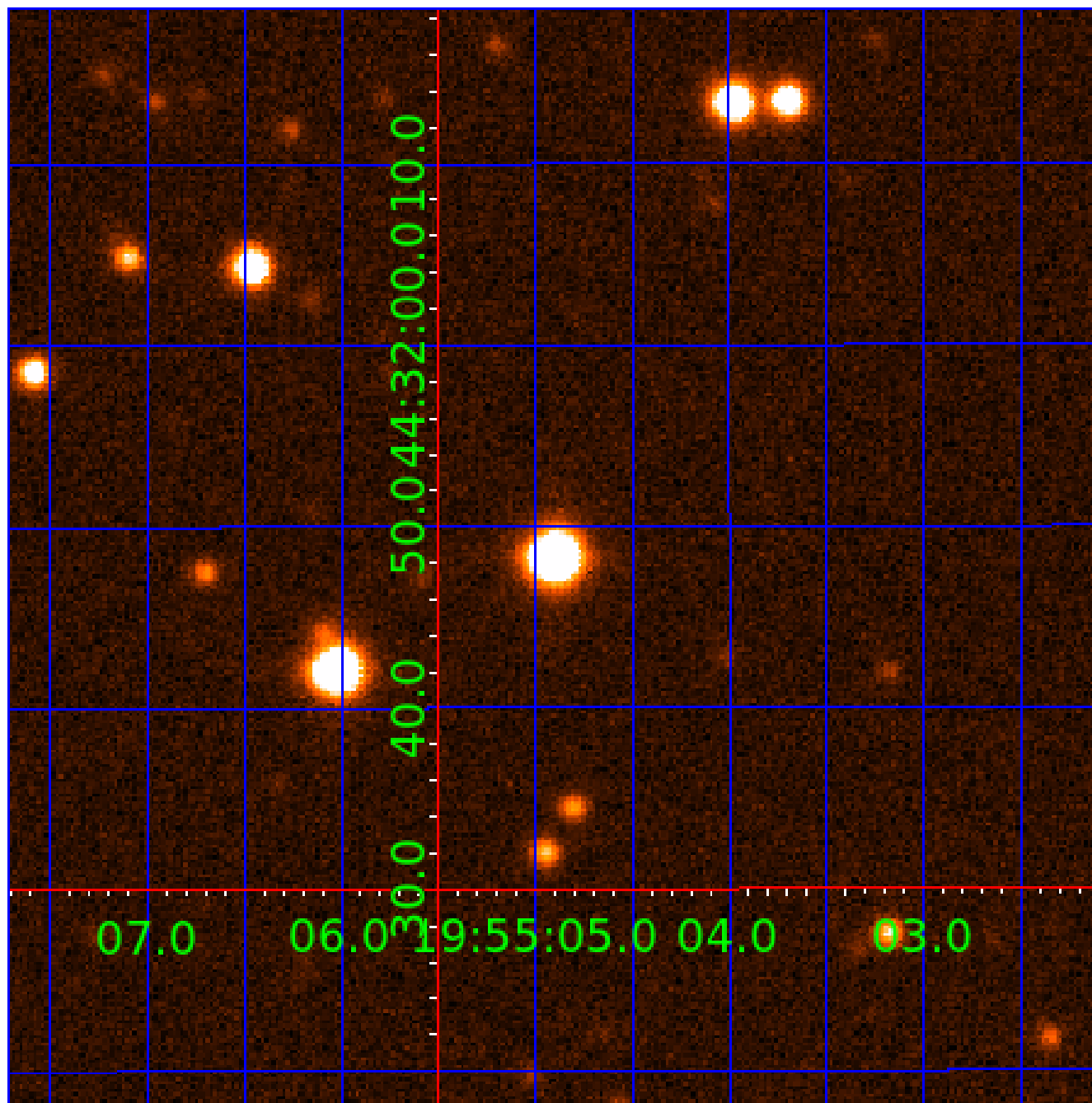


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008517378

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})
008517378-01	OBS	No	0.869112	132.303886	3.2	5.597	7.7	2.0	2.21	6923	0.40	24015.65
008517378-02	OBS	No	36.610024	152.638459	210.1	1.375	8.8	7.2	2.21	6923	3.65	163.86
008517378-03	OBS	No	78.590219	198.848611	267.1	1.852	9.8	10.2	2.21	6923	4.02	59.17
008517378-04	OBS	No	39.475342	142.375045	176.1	3.589	8.2	9.6	2.21	6923	3.26	148.19

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008517378-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
008517378-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT
008517378-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
008517378-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST

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

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

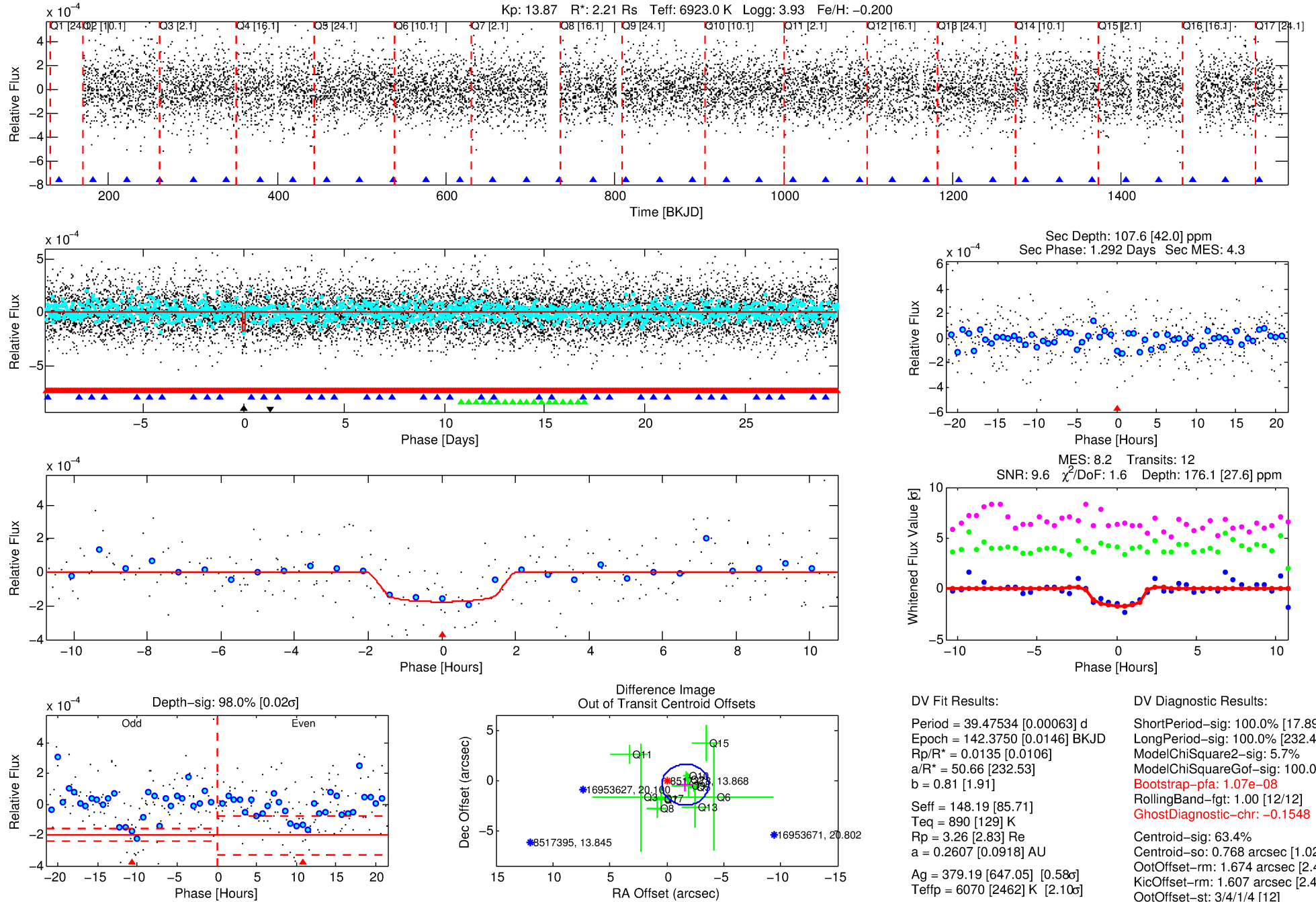
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008517378-04

No Significant Match Found

DV One-Page Summary

KIC: 8517378 Candidate: 4 of 4 Period: 39.475 d



DV Fit Results:

Period = 39.47534 [0.00063] d
Epoch = 142.3750 [0.0146] BKJD
Rp/R* = 0.0135 [0.0106]
a/R* = 50.66 [232.53]
b = 0.81 [1.91]
Seff = 148.19 [85.71]
Teq = 890 [129] K
Rp = 3.26 [2.83] Re
a = 0.2607 [0.0918] AU
Ag = 379.19 [647.05] [0.58σ]
Teffp = 6070 [2462] K [2.10σ]

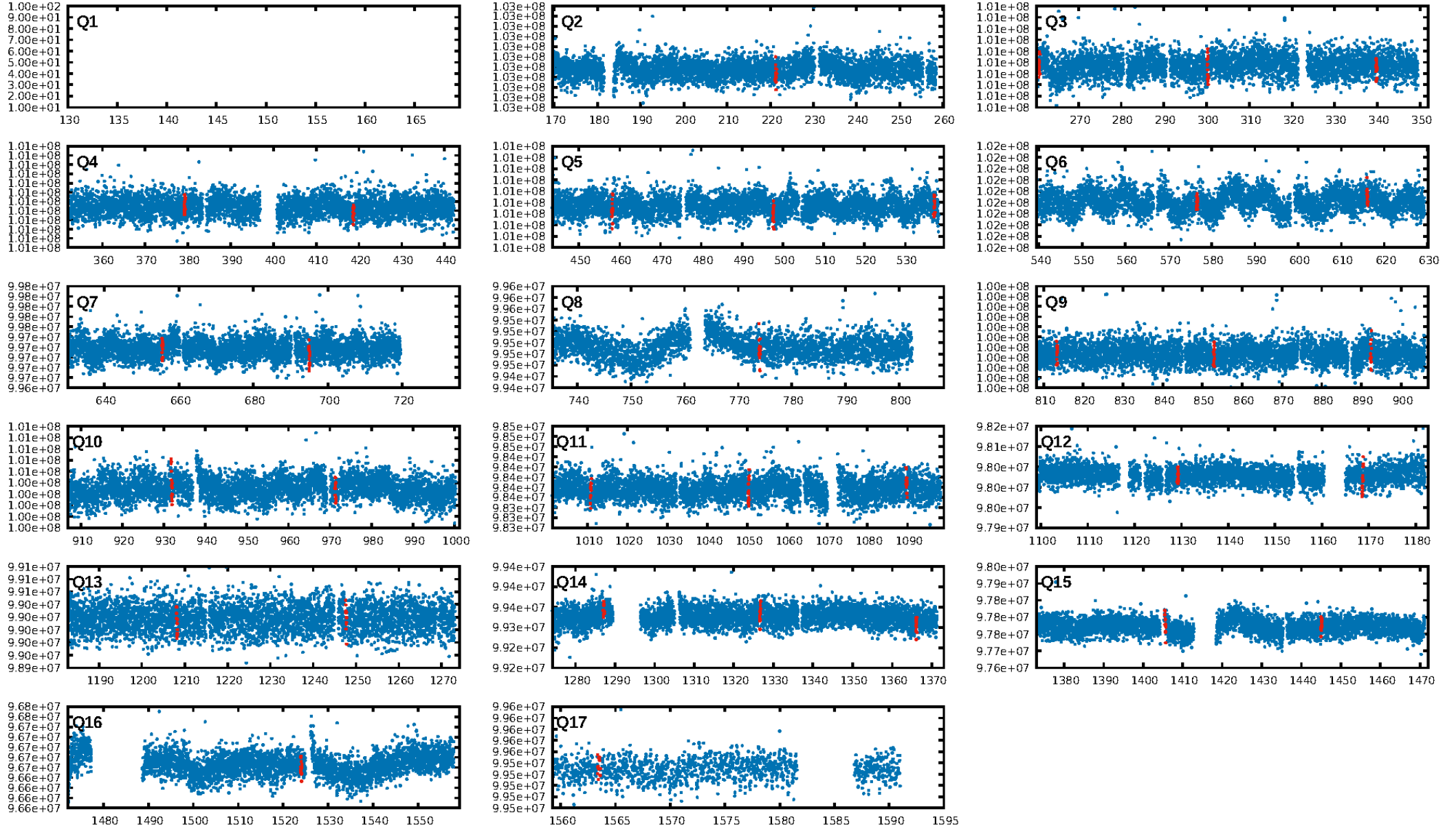
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [17.89σ]
LongPeriod-sig: 100.0% [232.44σ]
ModelChiSquare2-sig: 5.7%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.07e-08
RollingBand-fgt: 1.00 [12/12]
GhostDiagnostic-chr: -0.1548
Centroid-sig: 63.4%
Centroid-so: 0.768 arcsec [1.02σ]
OotOffset-rm: 1.674 arcsec [2.47σ]
KicOffset-rm: 1.607 arcsec [2.45σ]
OotOffset-st: 3/4/1/4 [12]
KicOffset-st: 3/4/1/4 [12]
DiffImageQuality-fgm: 0.17 [2/12]
DiffImageOverlap-fno: 0.00 [0/16]

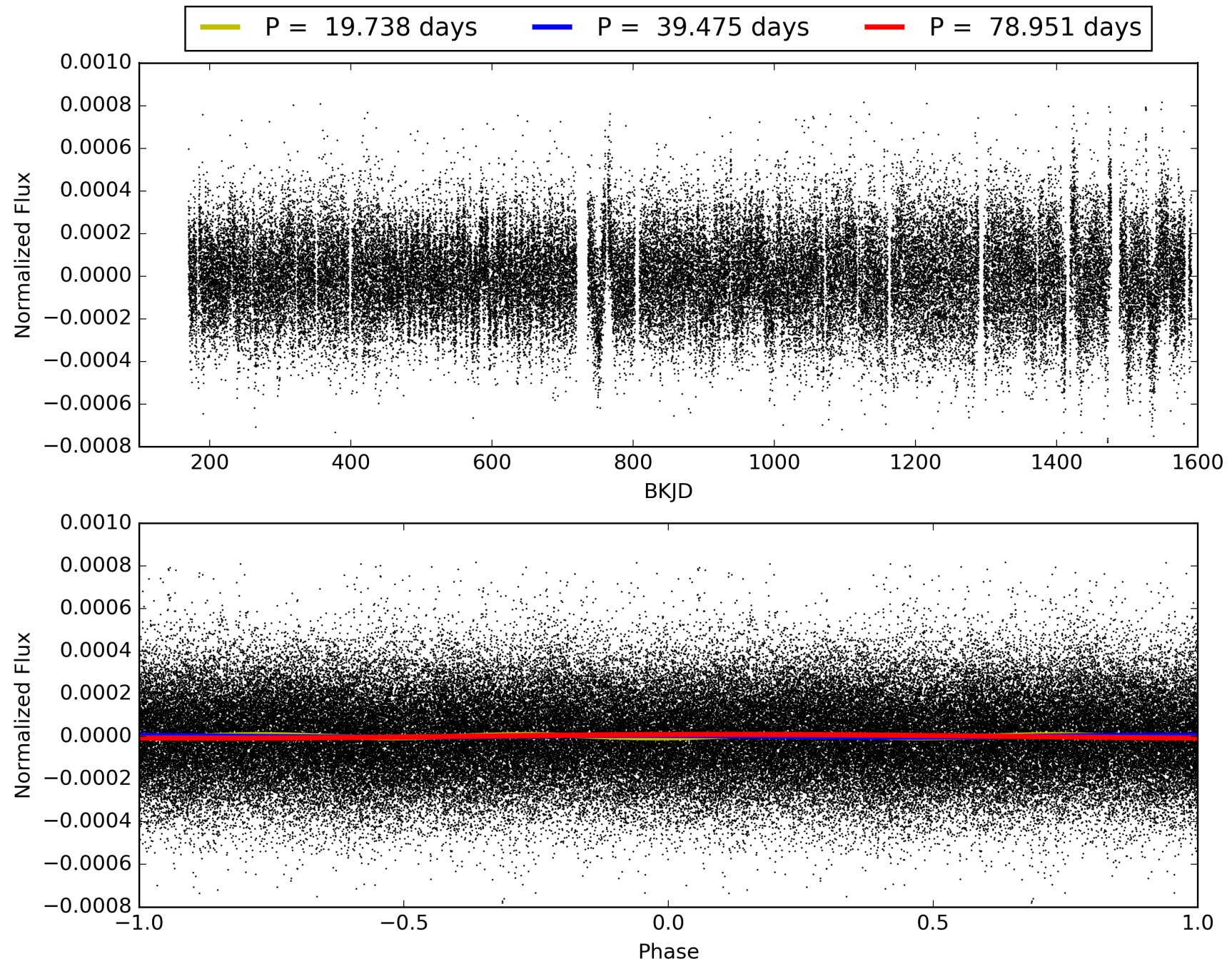
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 03:56:14 Z

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

TCE 008517378-04, PDC Light Curves

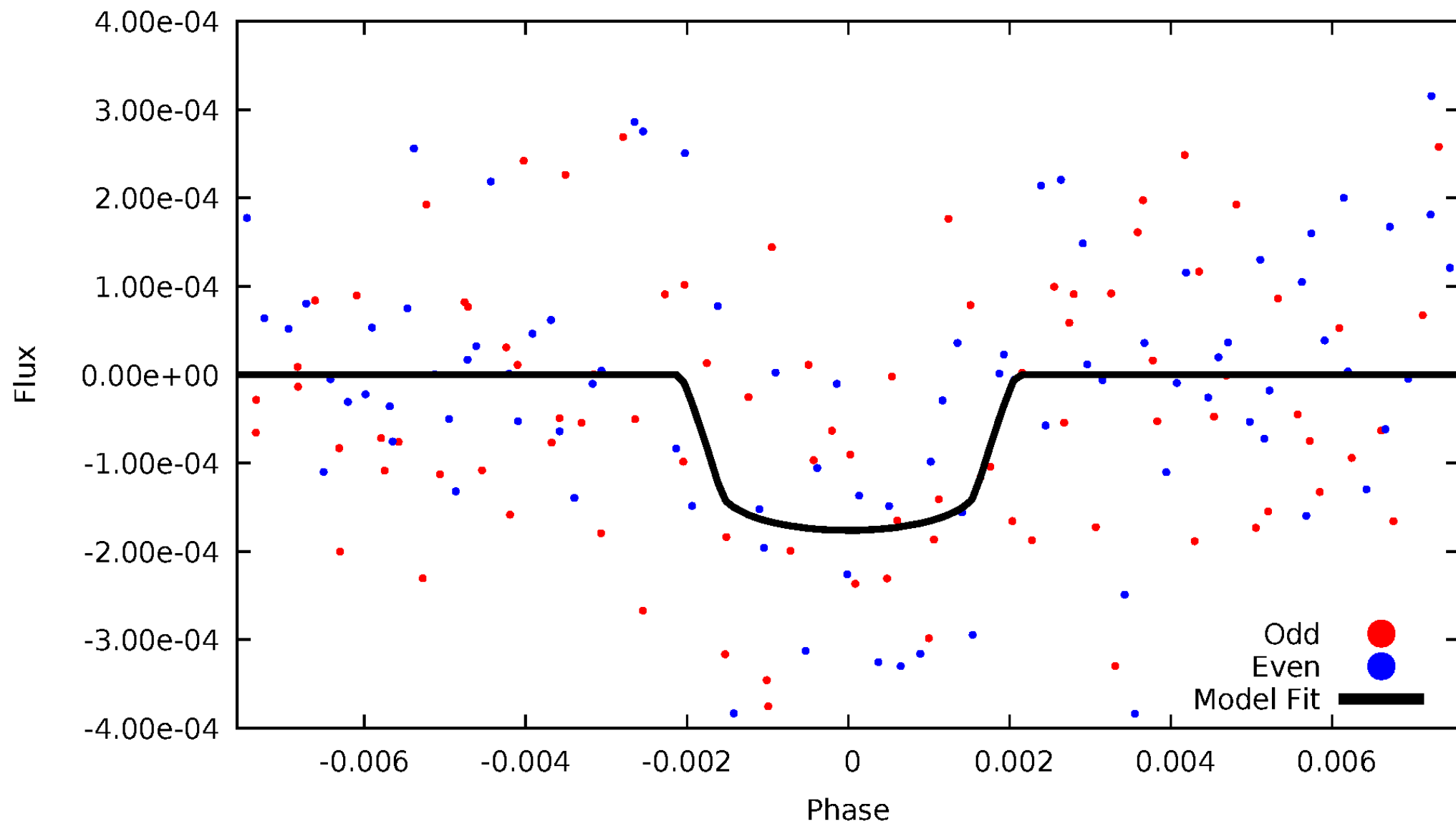


TCE 008517378-04



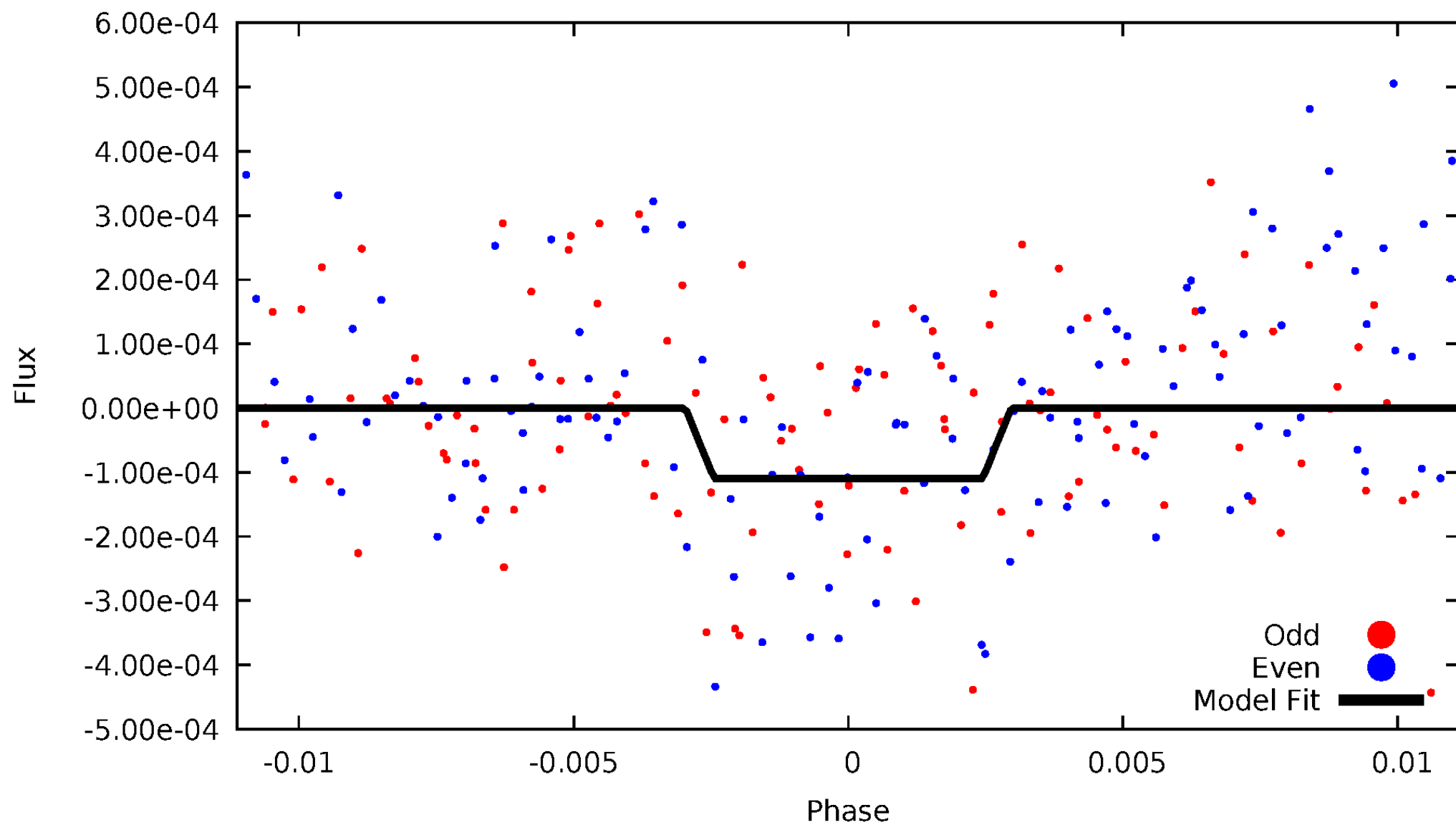
DV Odd/Even

TCE 008517378-04



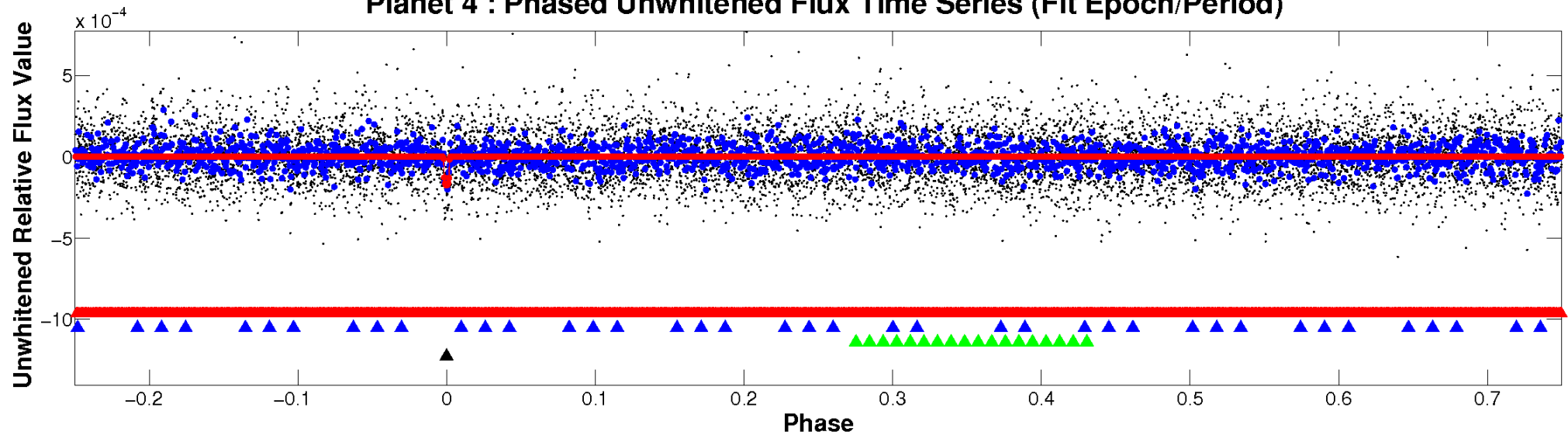
ALT Odd/Even

TCE 008517378-04

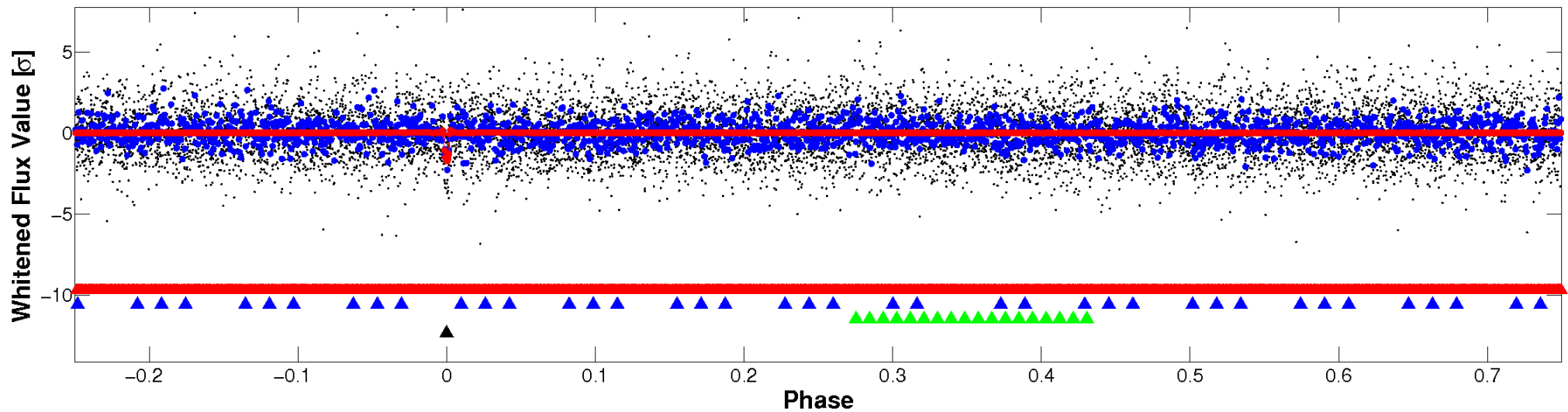


Non-Whitened Vs. Whitened Light Curve

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

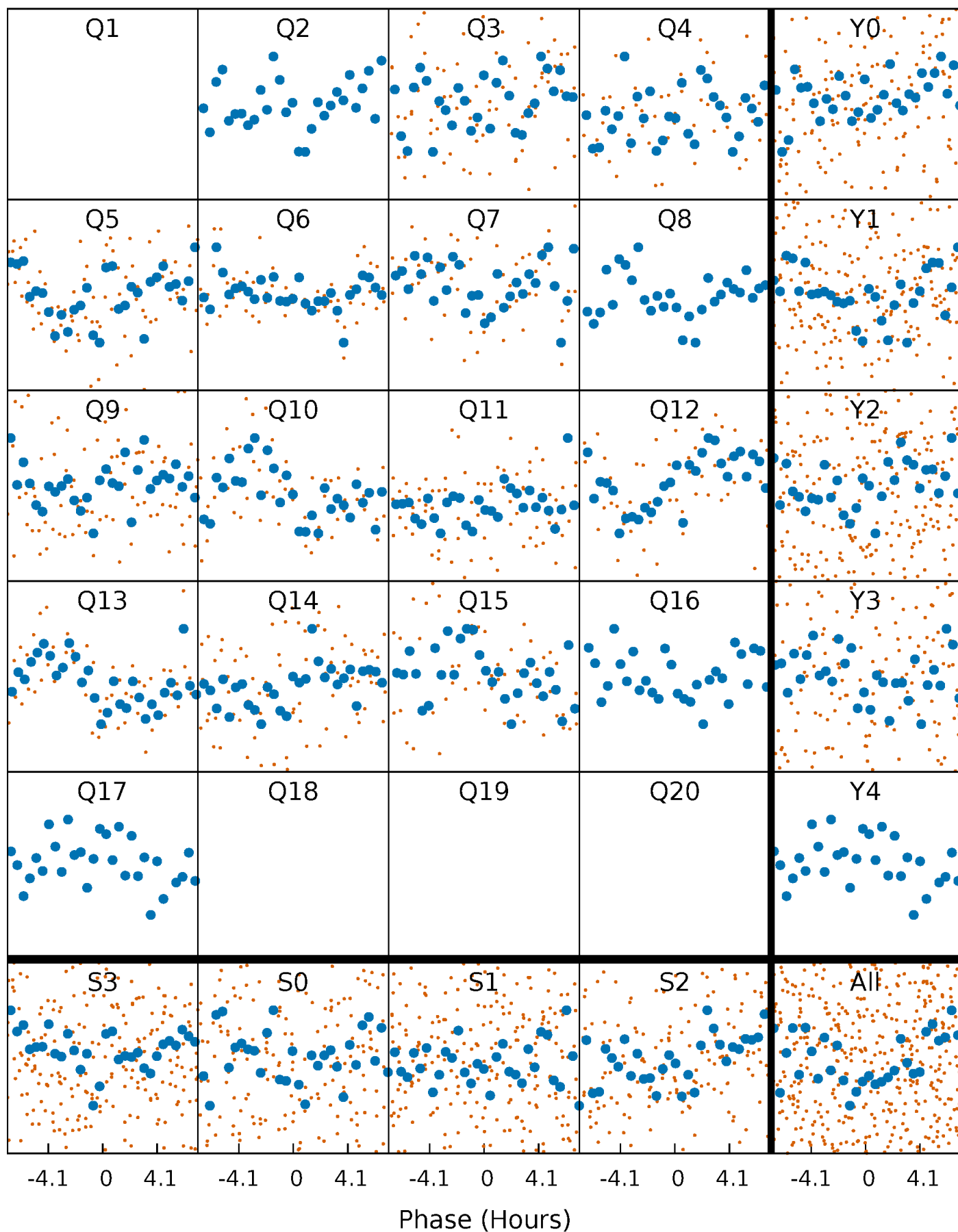


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



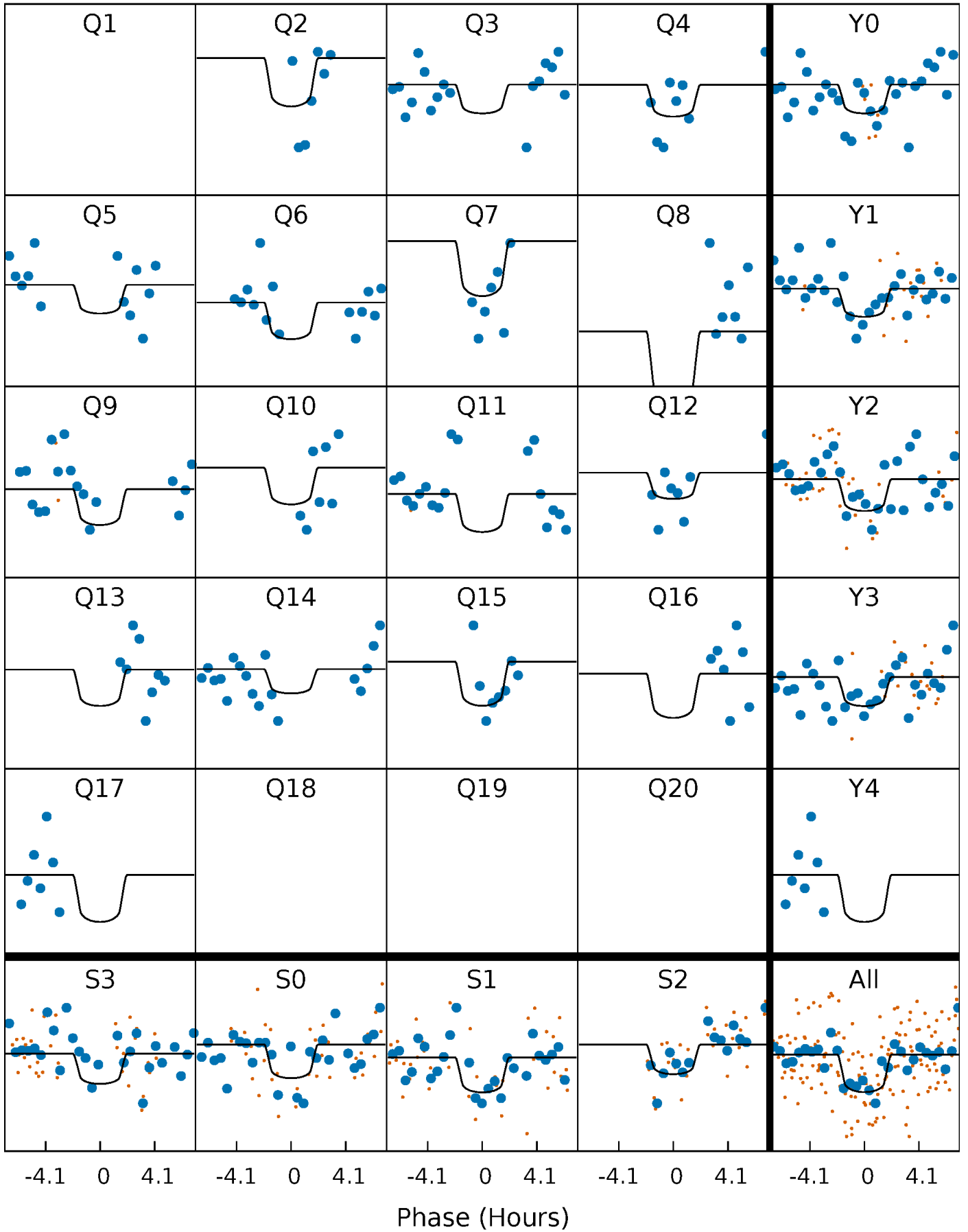
PDC Quarter-Phased Transit Curves

TCE 008517378-04 P= 39.475342 Days $T_0=142.375045$ (BKJD)



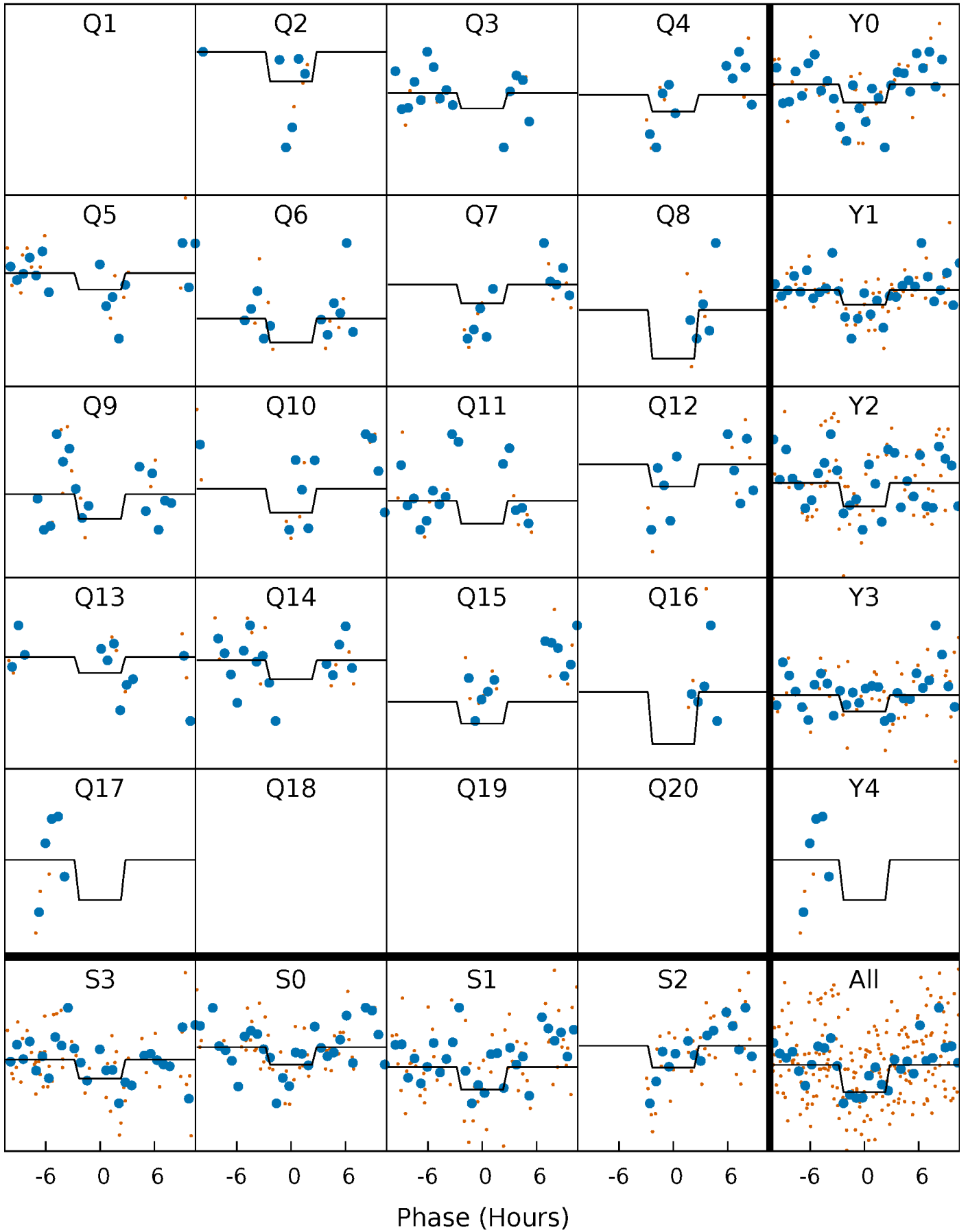
DV Quarter-Phased Transit Curves

TCE 008517378-04 P= 39.475342 Days $T_0=142.375045$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

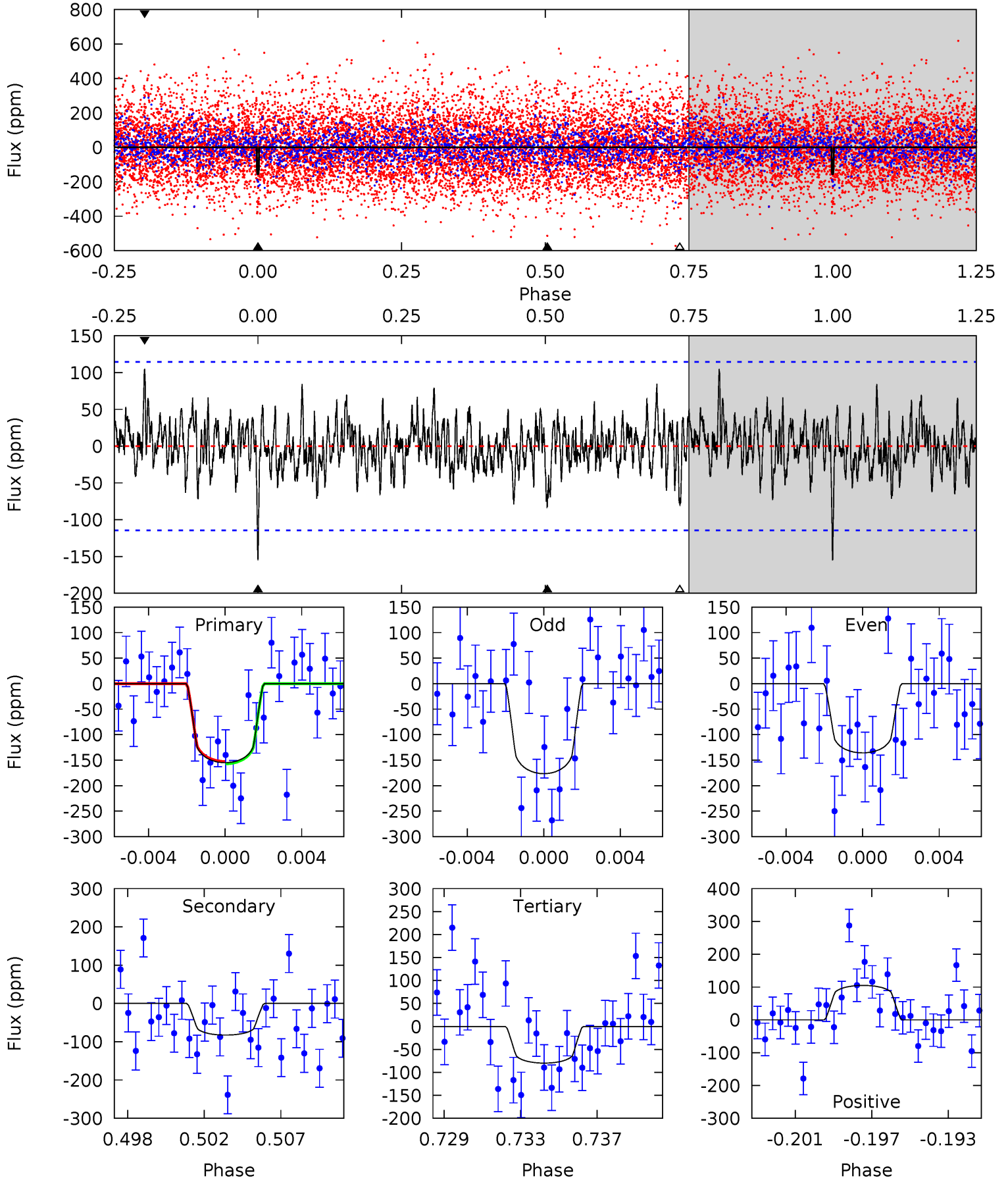
TCE 008517378-04 $P = 39.475236$ Days $T_0 = 142.417369$ (BKJD)



DV Model-Shift Uniqueness Test

008517378-04, P = 39.475342 Days, E = 142.375045 Days

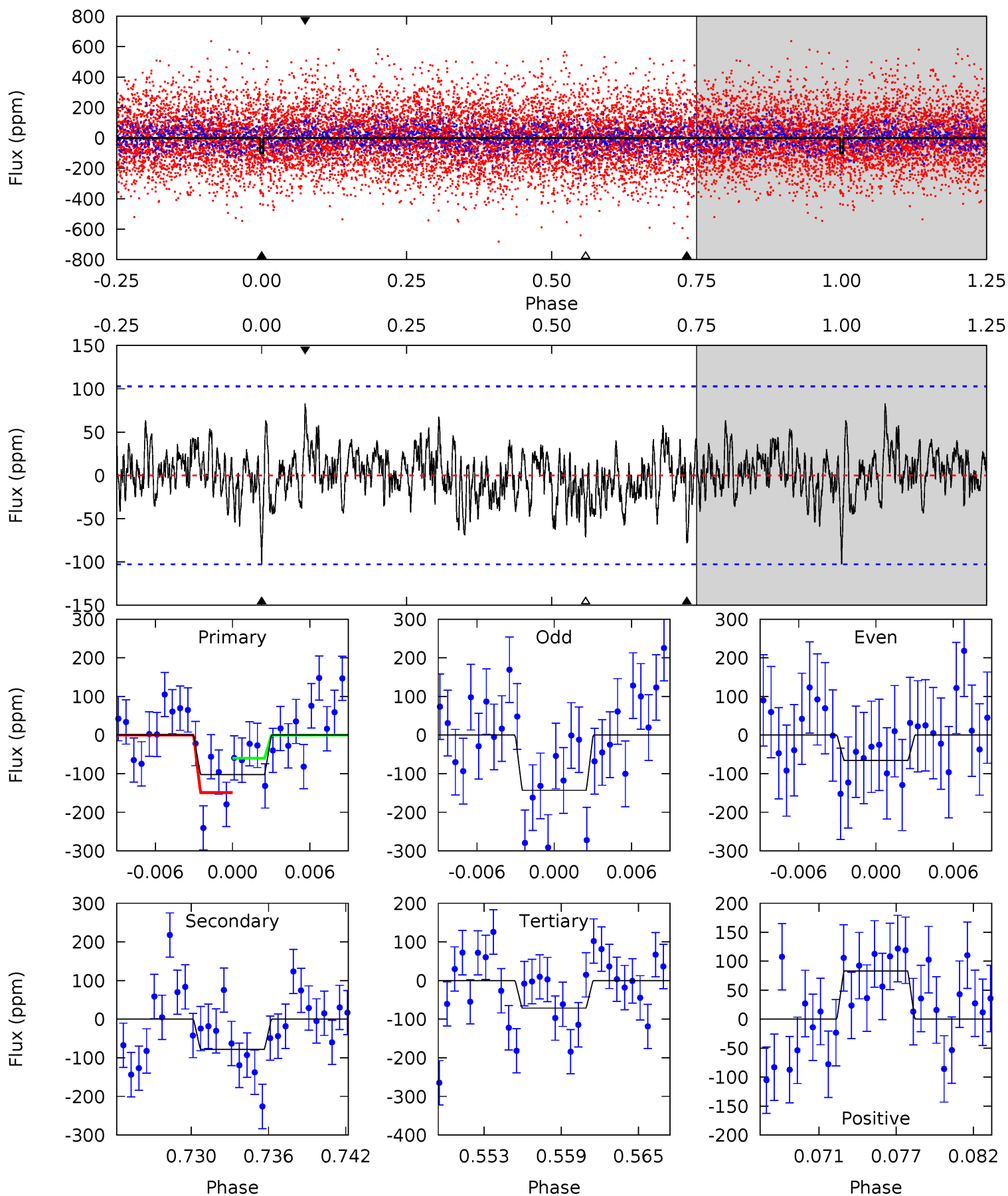
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.02	3.74	3.62	4.75	5.19	2.86	1.23	3.40	2.27	0.12	-1.01	0.92	0.80	0.40	0.10



Alt Model-Shift Uniqueness Test

008517378-04, P = 39.475236 Days, E = 142.417369 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.11	3.89	3.56	4.14	5.13	2.75	1.21	1.56	0.98	0.33	-0.24	1.93	1.25	0.45	2.22



Stellar Parameters For KIC 008517378

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6923^{+214}_{-286}	$3.929^{+0.322}_{-0.138}$	$-0.200^{+0.250}_{-0.300}$	$2.212^{+0.555}_{-0.832}$	$1.512^{+0.217}_{-0.326}$	$0.197^{+0.468}_{-0.079}$
	+3%/-4%	+8%/-4%	+125%/-150%	+25%/-38%	+14%/-22%	+238%/-40%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 008517378-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-83 ± 22	$3.38^{+2.36}_{-2.04}$	1219^{+97}_{-120}	5358^{+3244}_{-1044}	270^{+1397}_{-181}
Alt.	-78 ± 20	$2.77^{+2.38}_{-1.70}$	1219^{+104}_{-121}	5698^{+4386}_{-1245}	358^{+1951}_{-258}

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

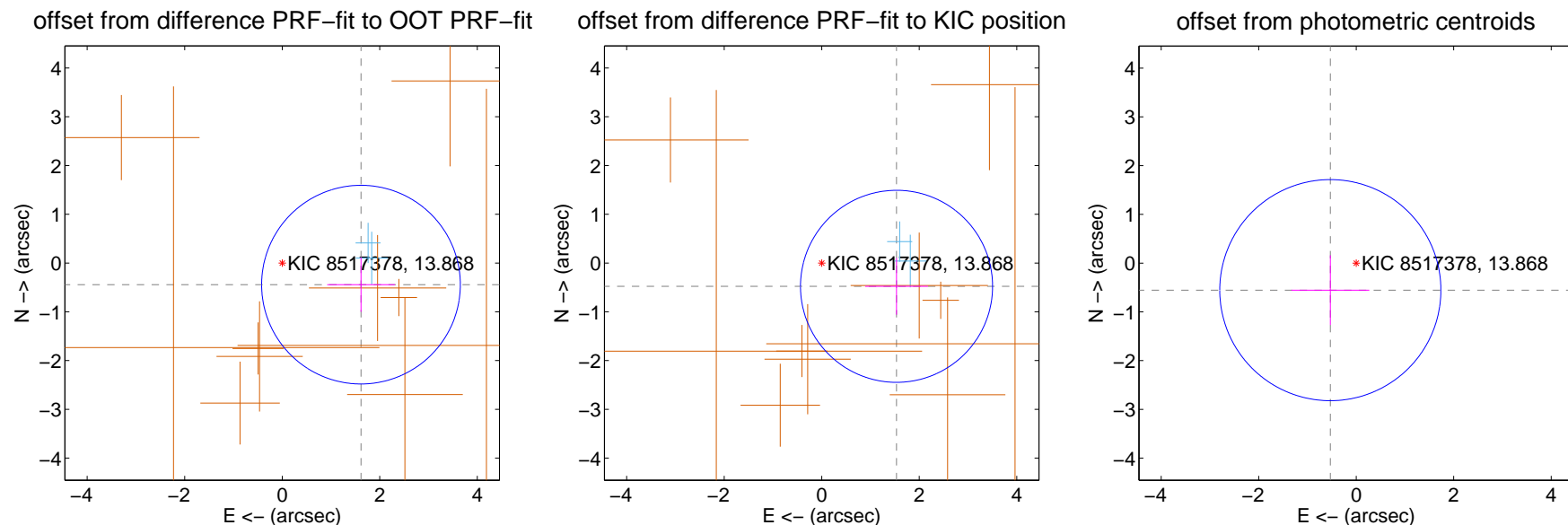
DV Centroid Data

Supplemental centroid analysis for 008517378-04. Kepler magnitude: 13.87. Transit SNR 9.58

There are 2 quarters with good PRF difference image offsets

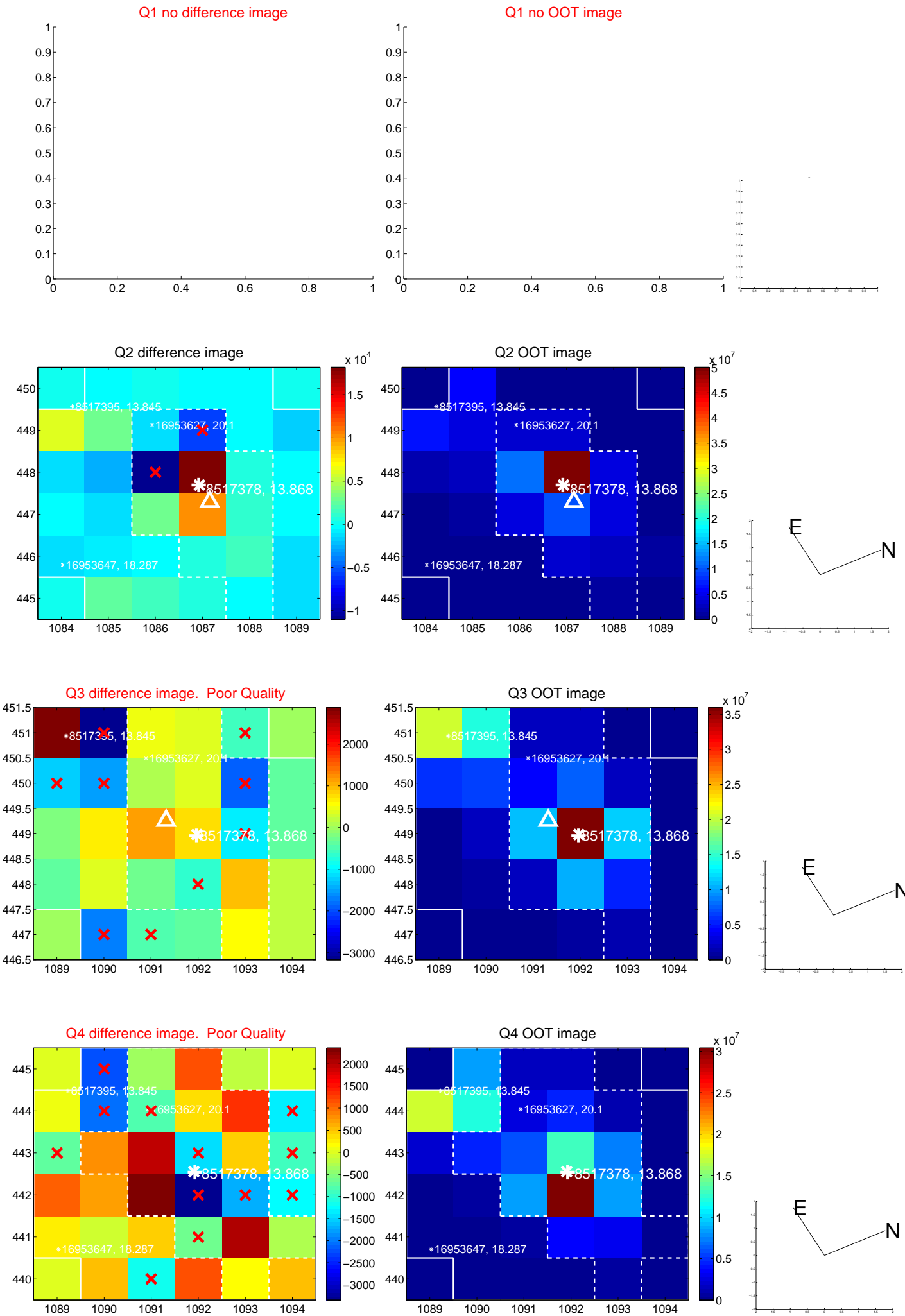
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.674 ± 0.679	2.47	-1.615 ± 0.694	-0.443 ± 0.557
PRF-fit source offset from KIC position	1.607 ± 0.656	2.45	-1.534 ± 0.644	-0.477 ± 0.581
photometric centroid source offset	0.77 ± 0.76	1.02	0.53 ± 0.80	-0.55 ± 0.71

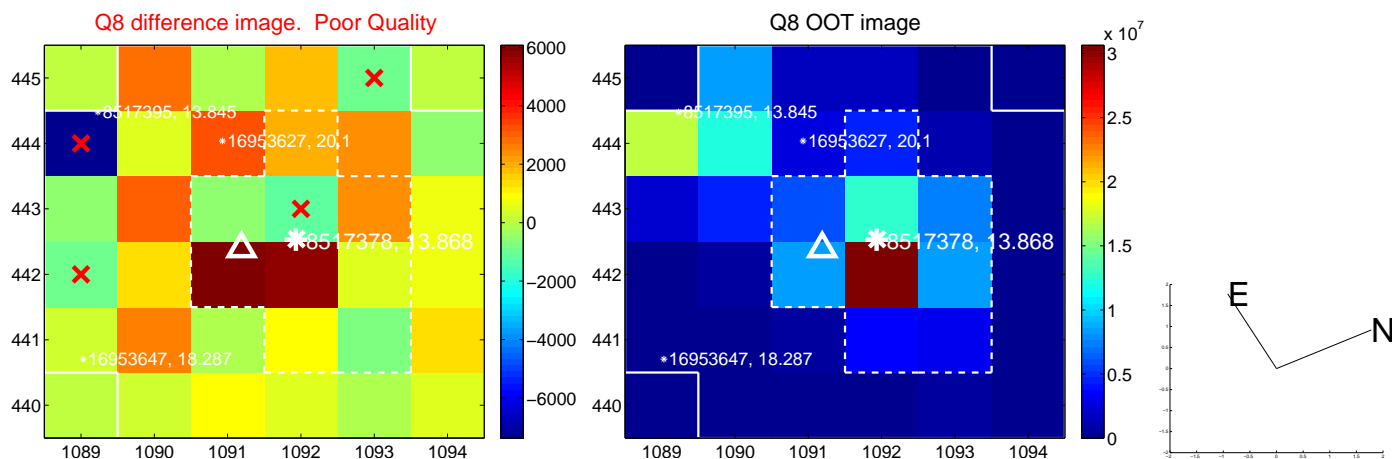
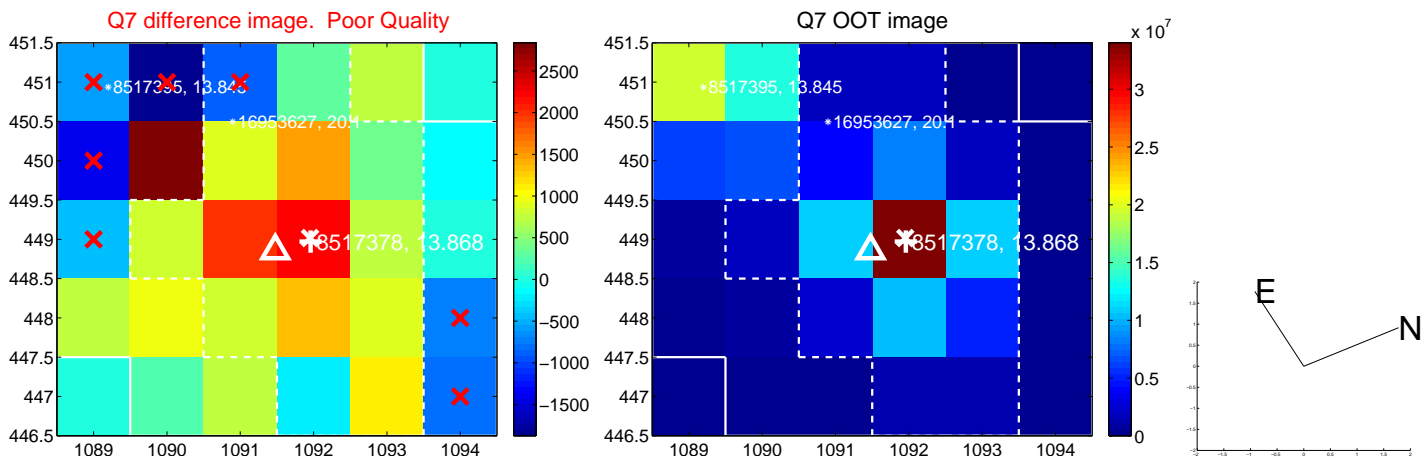
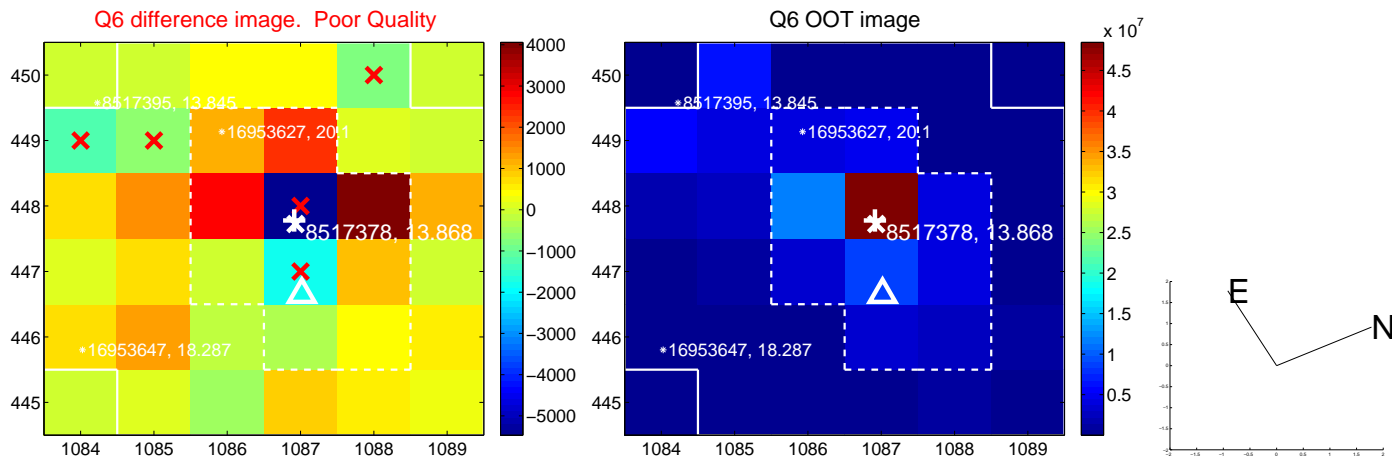
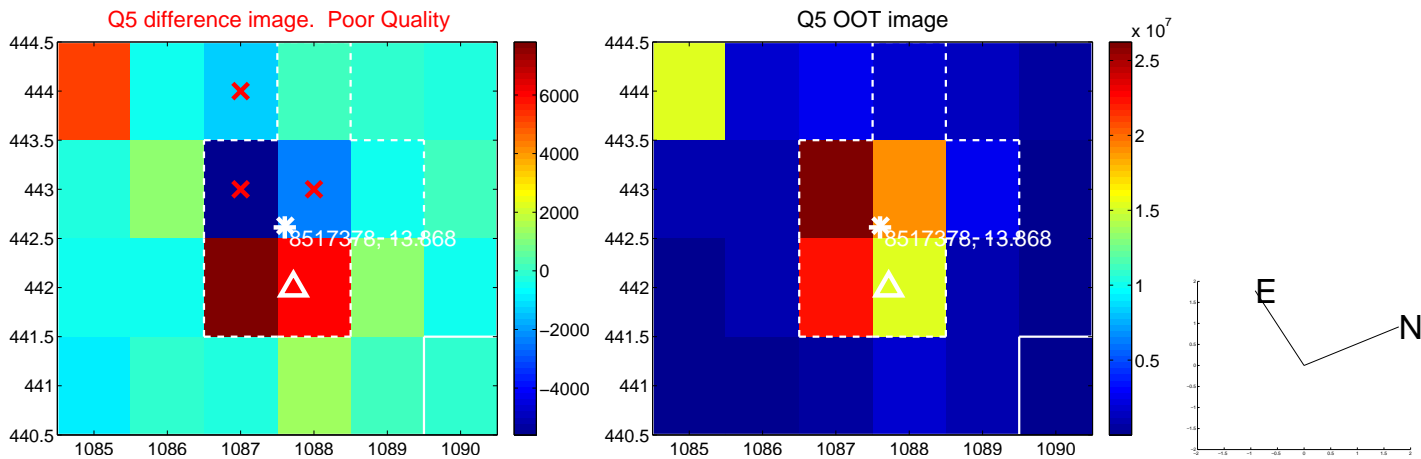


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

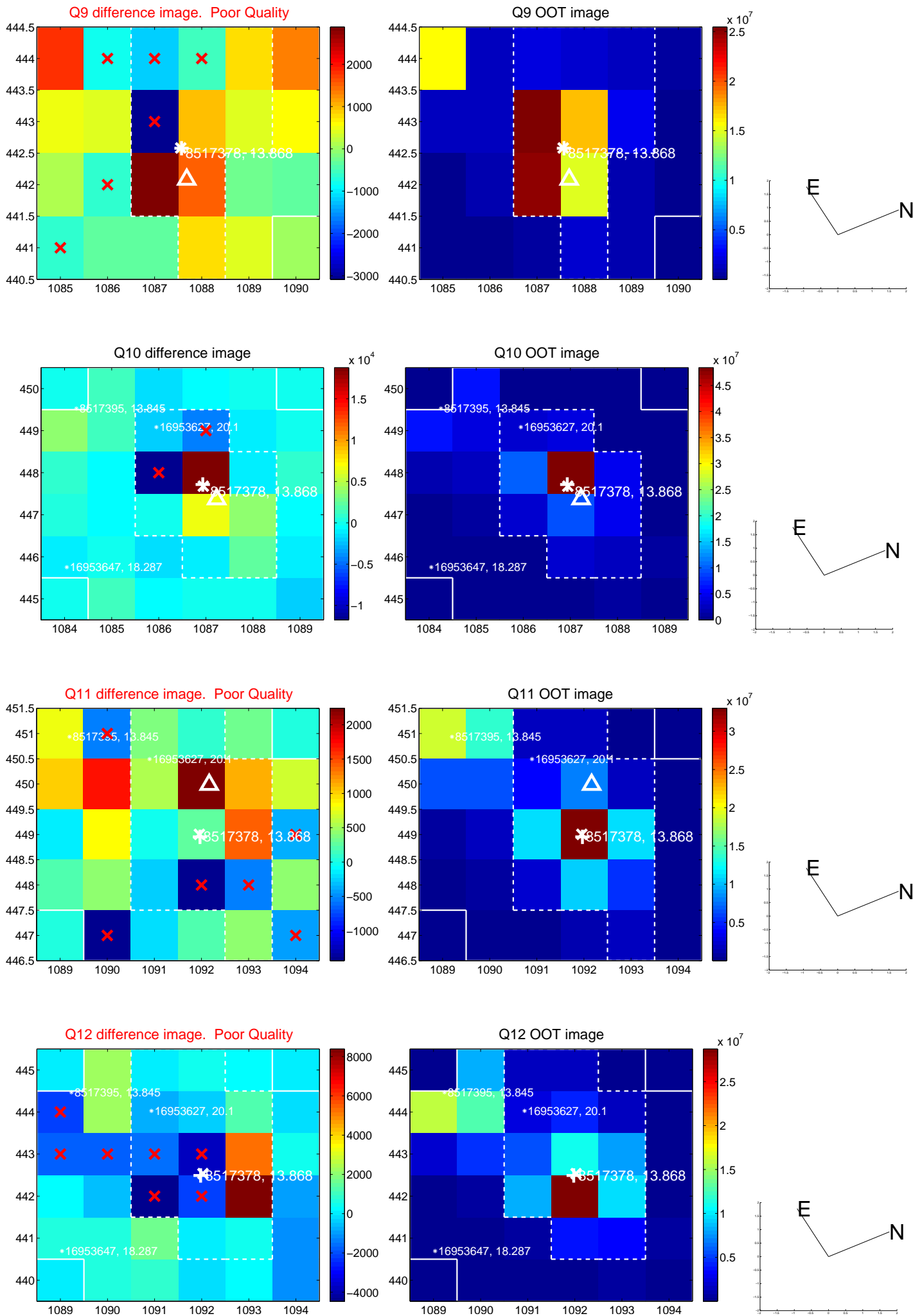
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



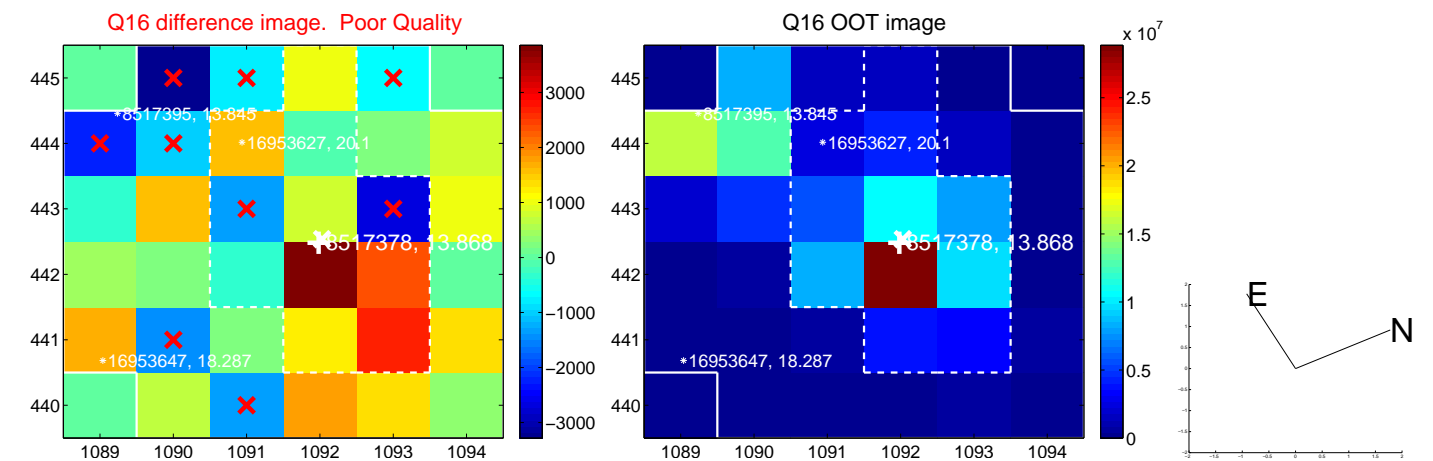
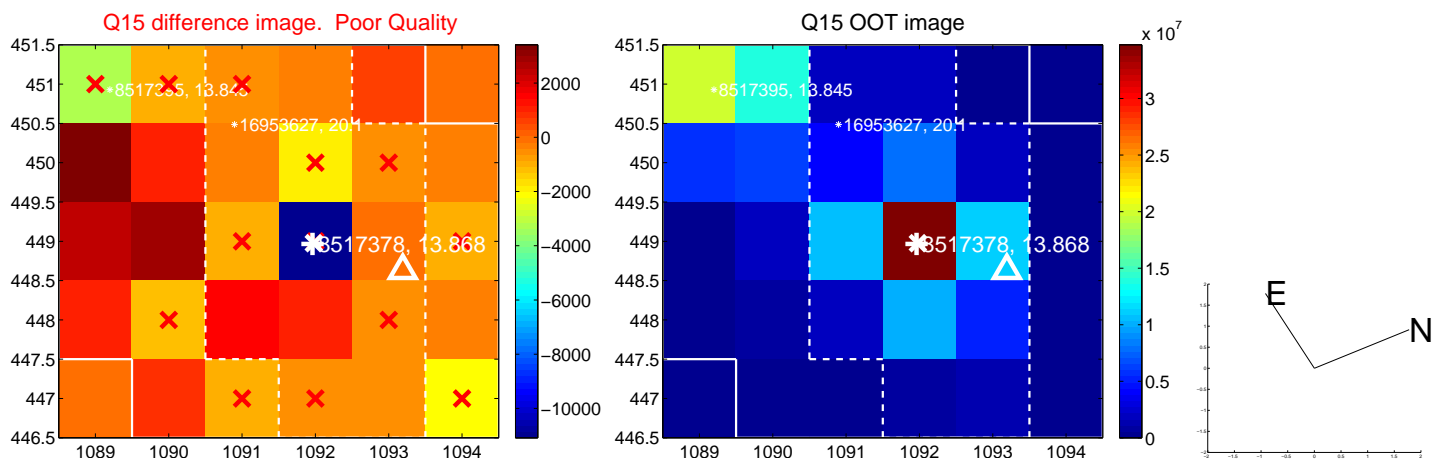
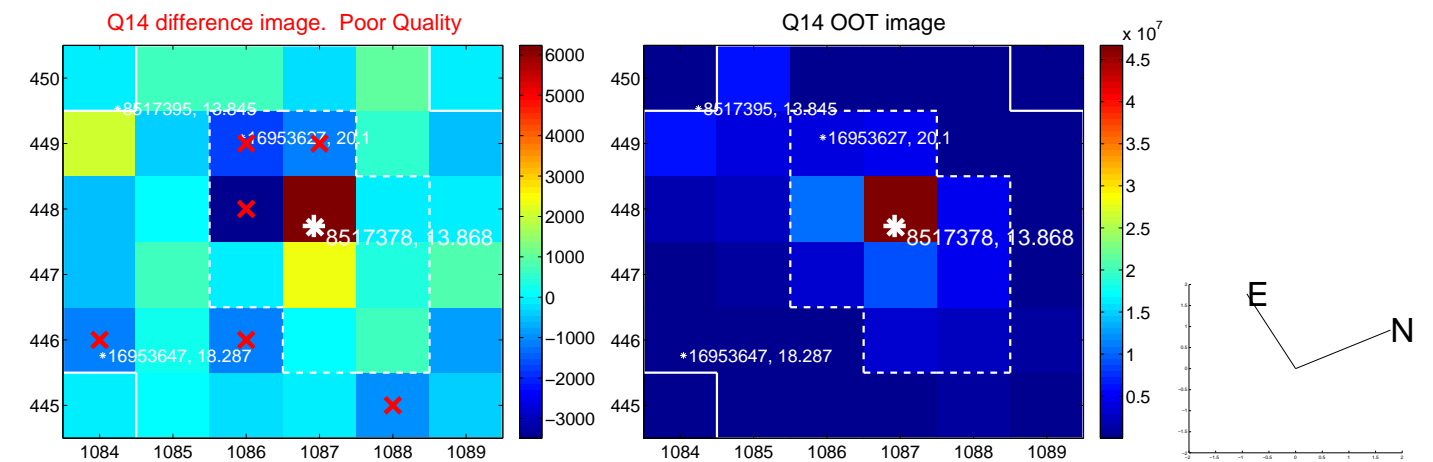
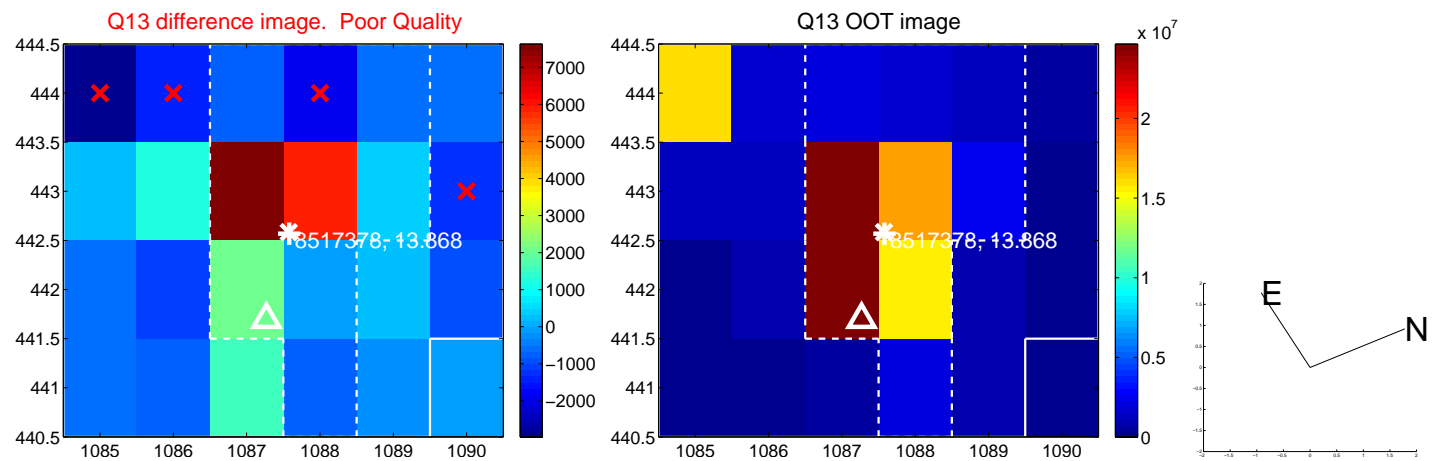
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



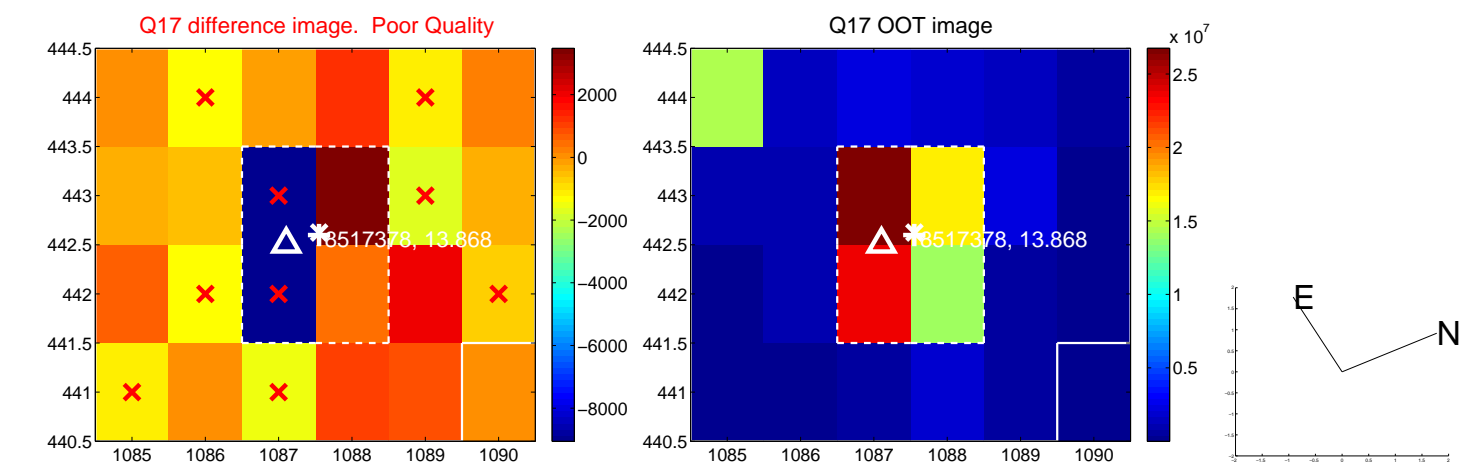
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



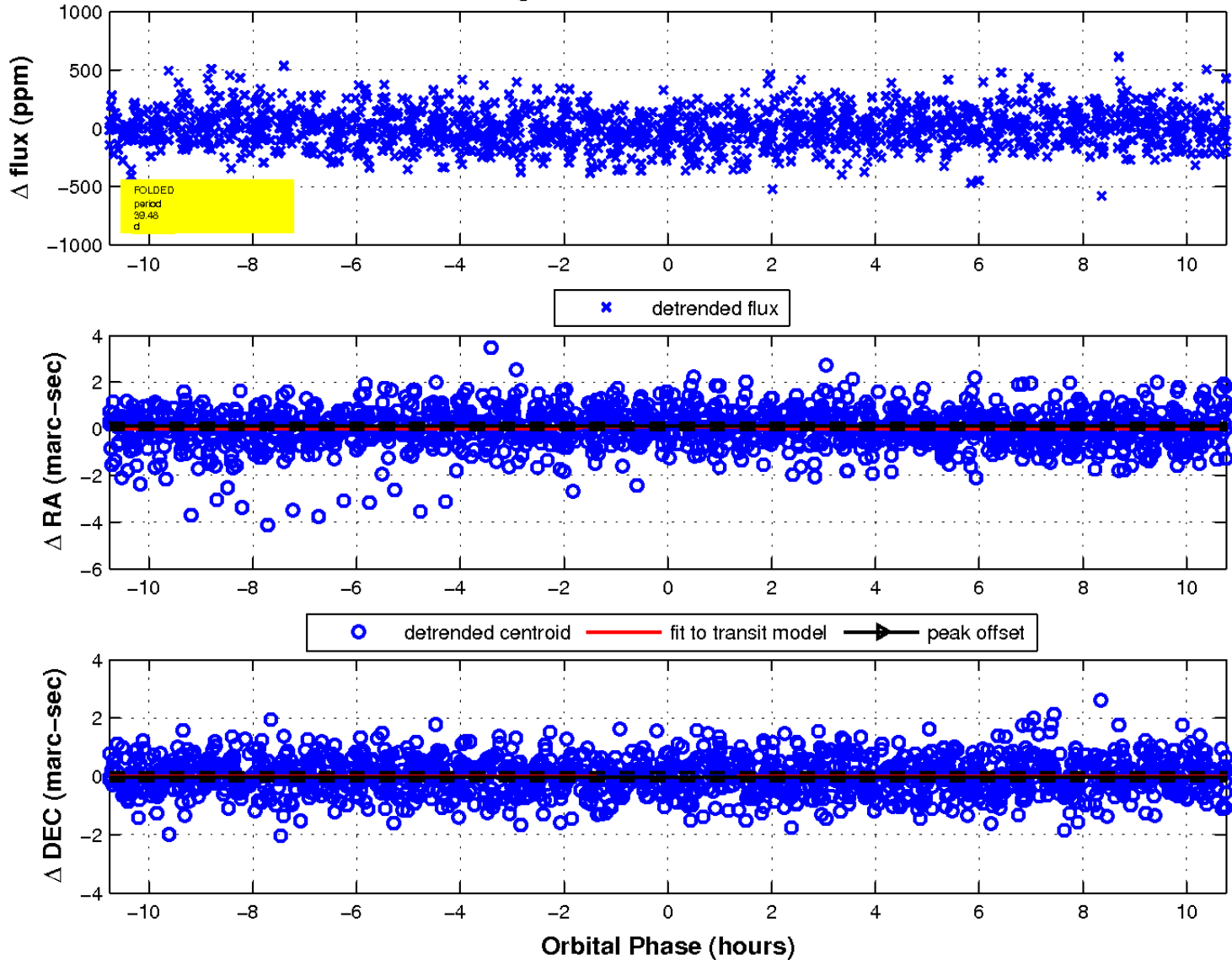
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

