

KIC 004180401

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})
004180401-01	OBS	2709.01	15.412582	144.976948	714.9	4.002	24.2	25.6	0.86	5240	3.60	34.62
004180401-02	OBS	No	15.412864	139.123050	229.6	3.056	9.0	9.1	0.86	5240	1.51	34.62

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004180401-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST
004180401-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET—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.

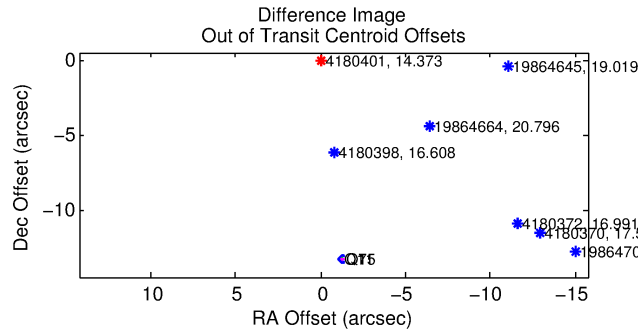
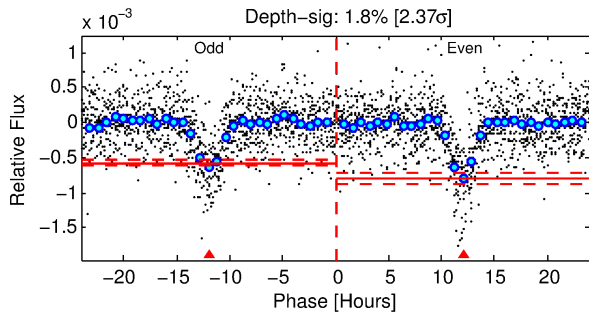
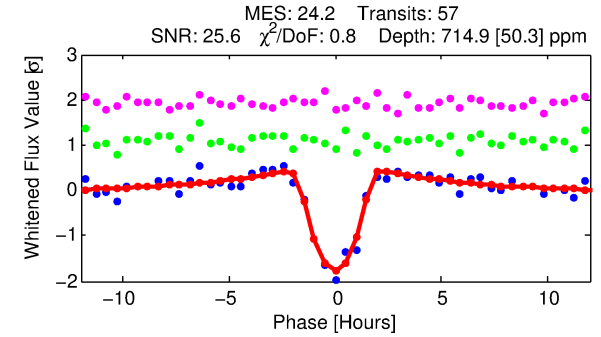
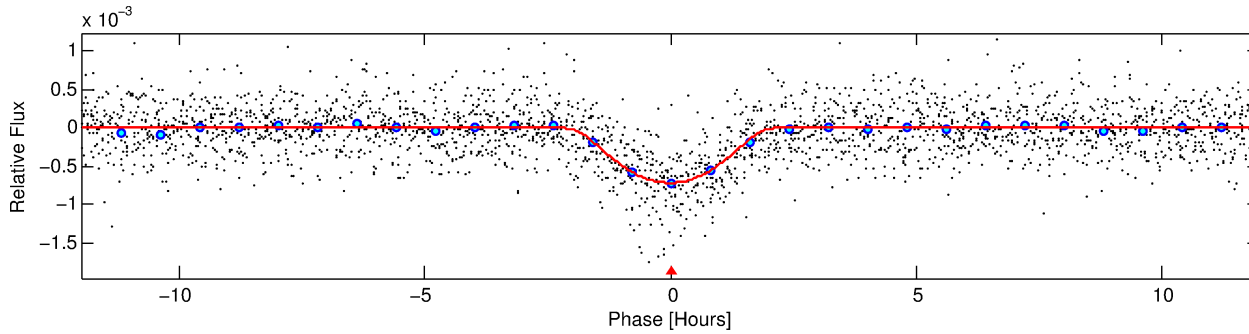
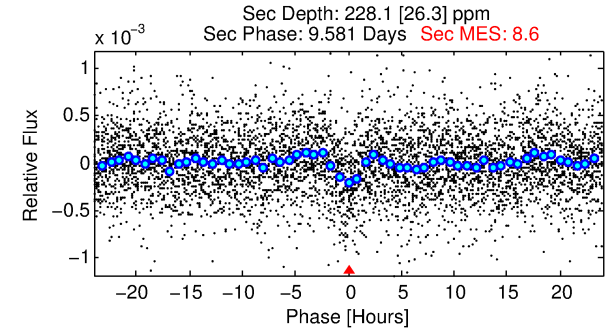
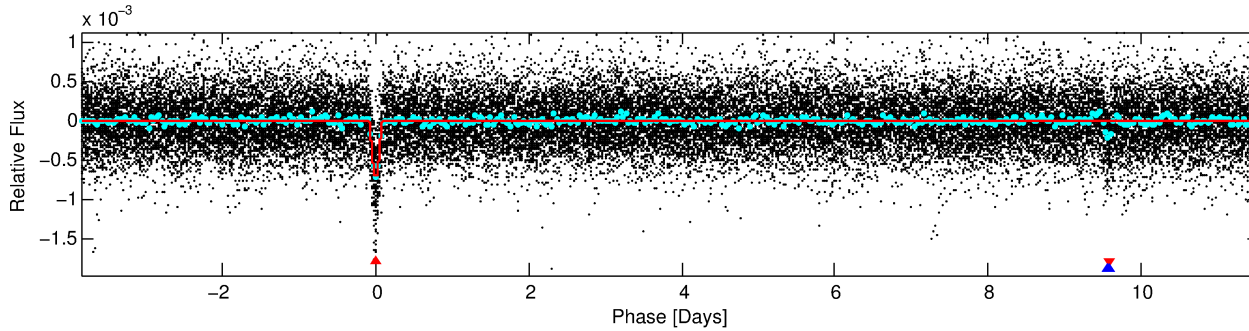
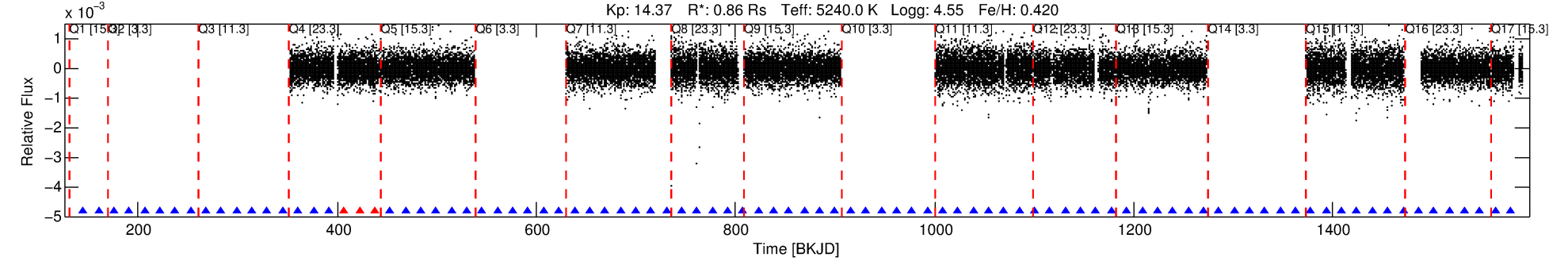
Ephemeris Match Information For 004180401-01

No Significant Match Found

DV One-Page Summary

KIC: 4180401 Candidate: 1 of 2 Period: 15.413 d
KOI: K02709.01 Corr: 0.980

Kp: 14.37 R*: 0.86 Rs Teff: 5240.0 K Logg: 4.55 Fe/H: 0.420



DV Fit Results:

Period = 15.41258 [0.00006] d
Epoch = 144.9769 [0.0036] BKJD
Rp/R* = 0.0385 [0.0150]
a/R* = 10.17 [1.68]
b = 0.98 [0.03]
Seff = 34.62 [8.89]
Teq = 619 [40] K
Rp = 3.60 [1.51] Re
a = 0.1196 [0.0168] AU
Ag = 138.54 [112.90] [1.22 sigma]
Teff = 3281 [656] K [4.05 sigma]

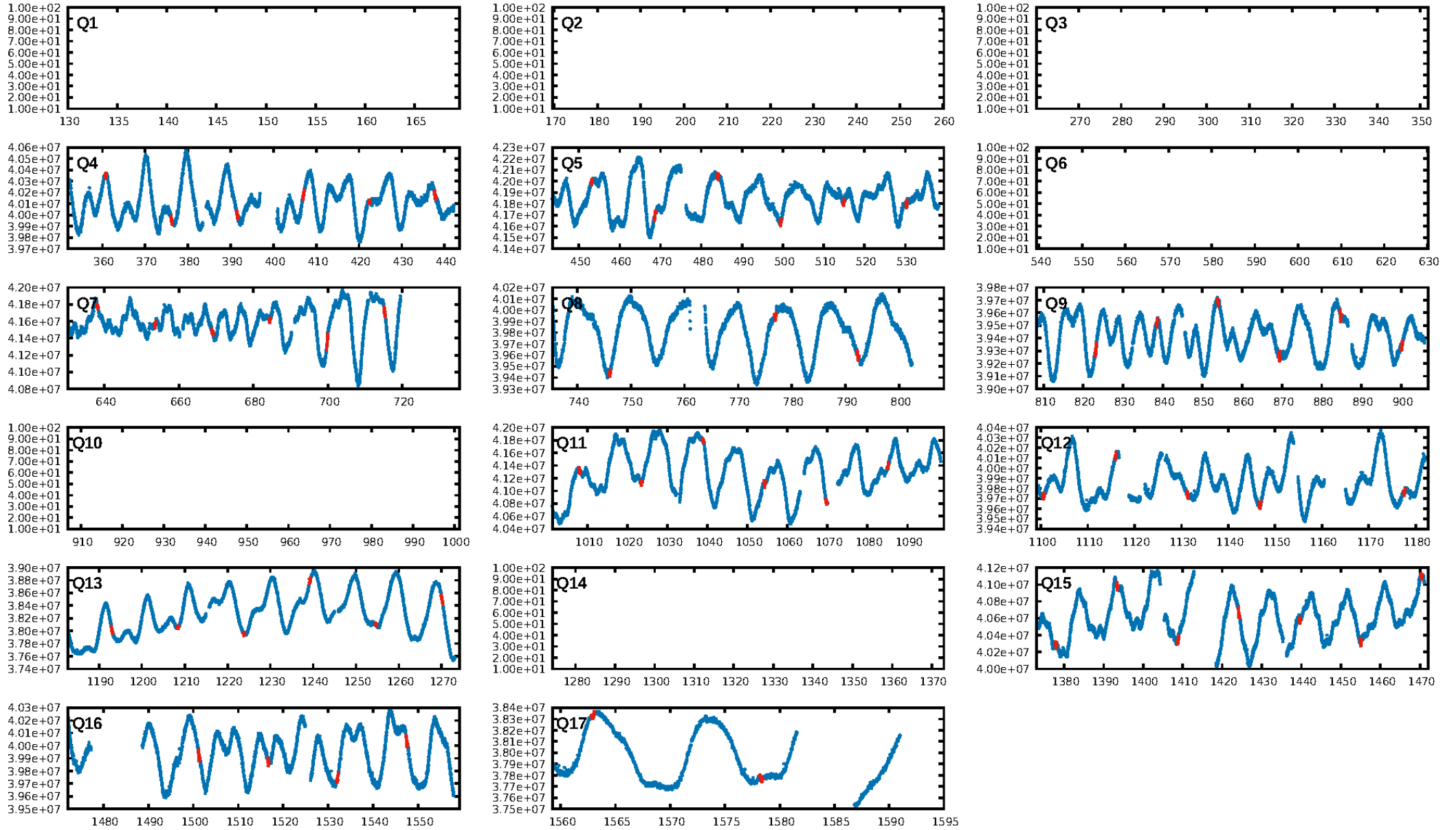
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.1% [0.00 sigma]
ModelChiSquare2-sig: 39.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 4.73e-119
RollingBand-fgt: 0.95 [52/55]
GhostDiagnostic-chr: -0.2002
Centroid-sig: 0.0%
Centroid-so: 13.348 arcsec [19.55 sigma]
OotOffset-rm: 13.384 arcsec [181.89 sigma]
KicOffset-rm: 7.272 arcsec [106.31 sigma]
OotOffset-st: 0/3/0/0 [3]
KicOffset-st: 0/3/2/4 [9]
DiffImageQuality-fgm: 0.56 [5/9]
DiffImageOverlap-fno: 1.00 [11/11]

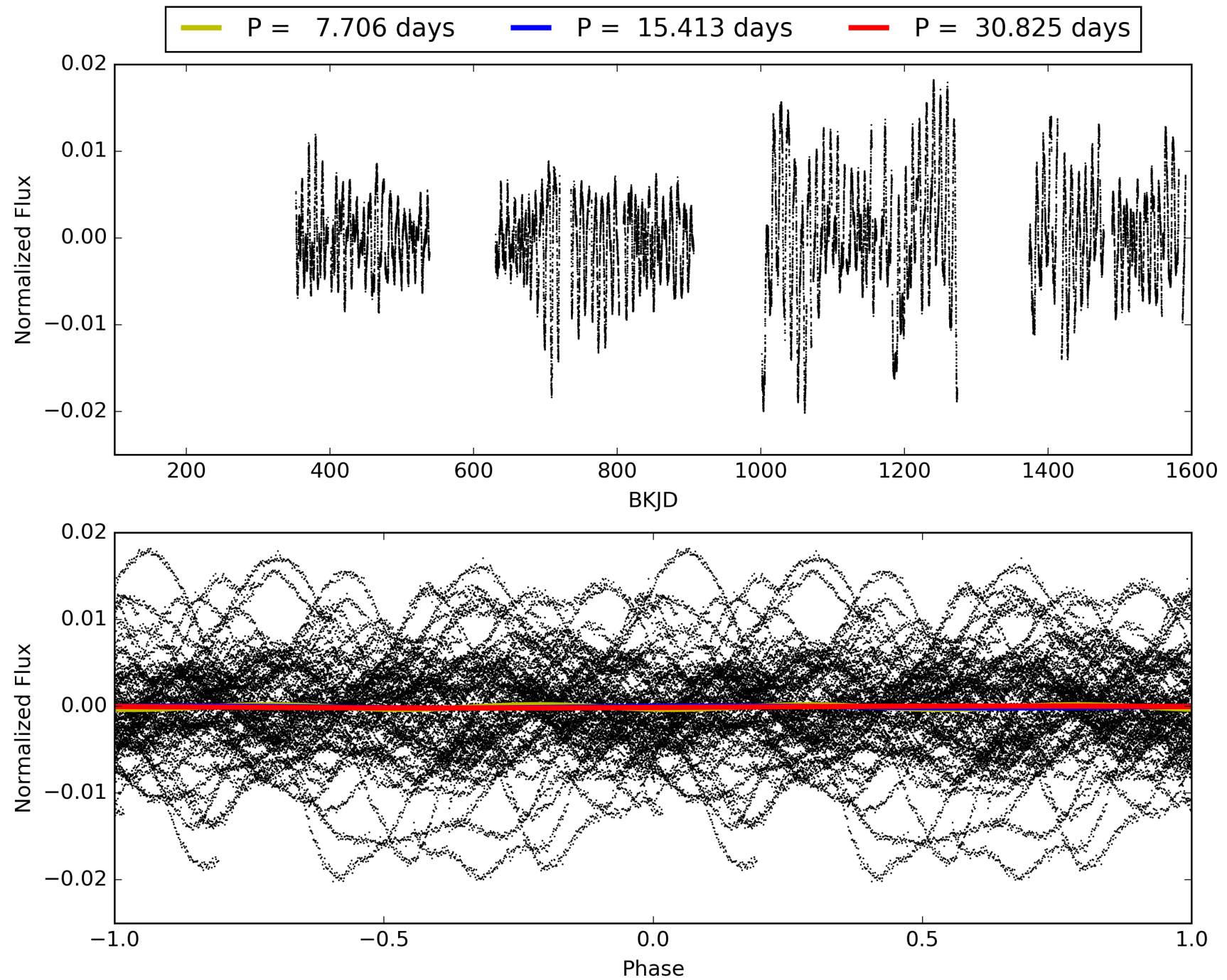
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 00:17:33 Z

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

TCE 004180401-01, PDC Light Curves

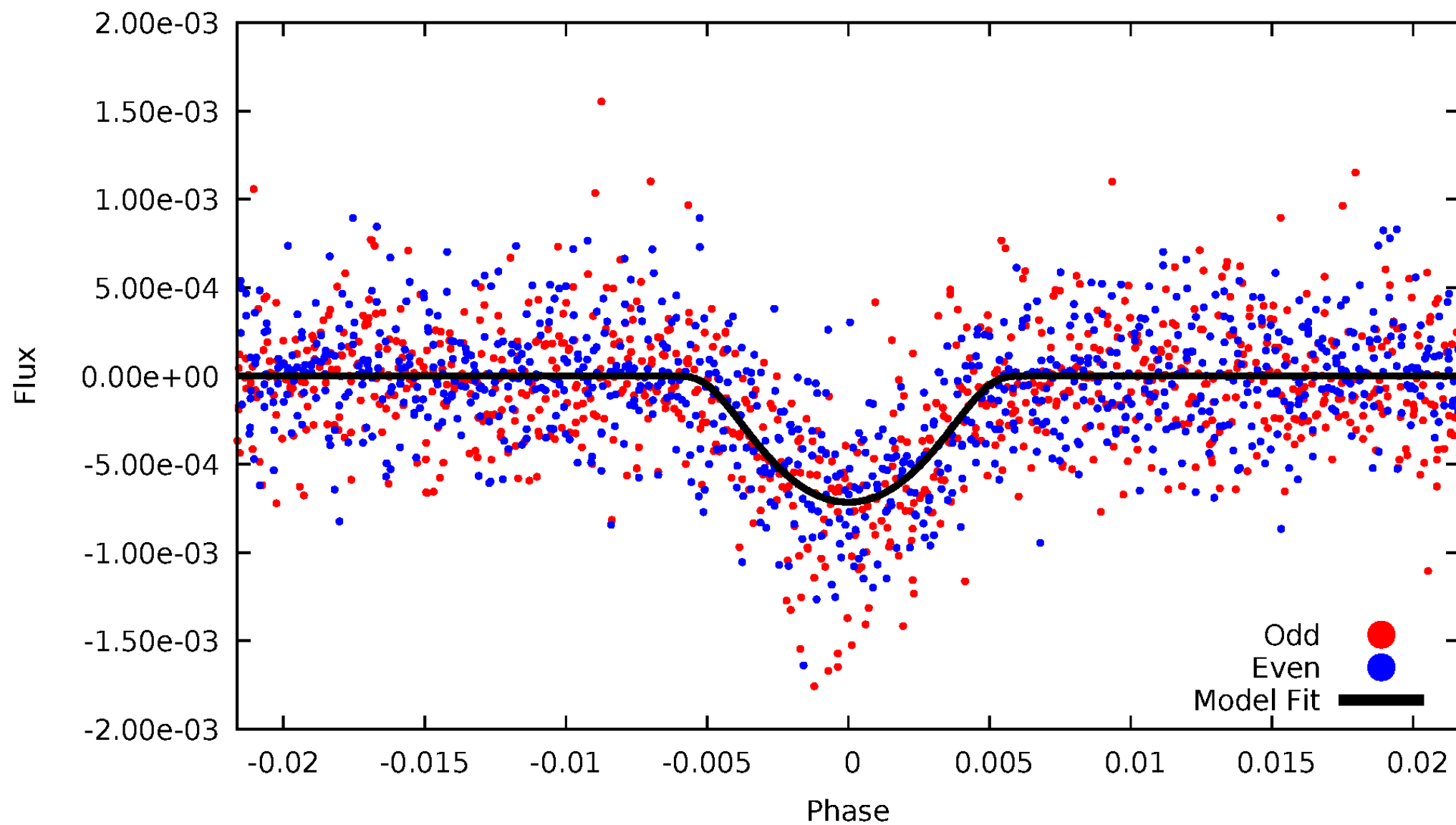


TCE 004180401-01



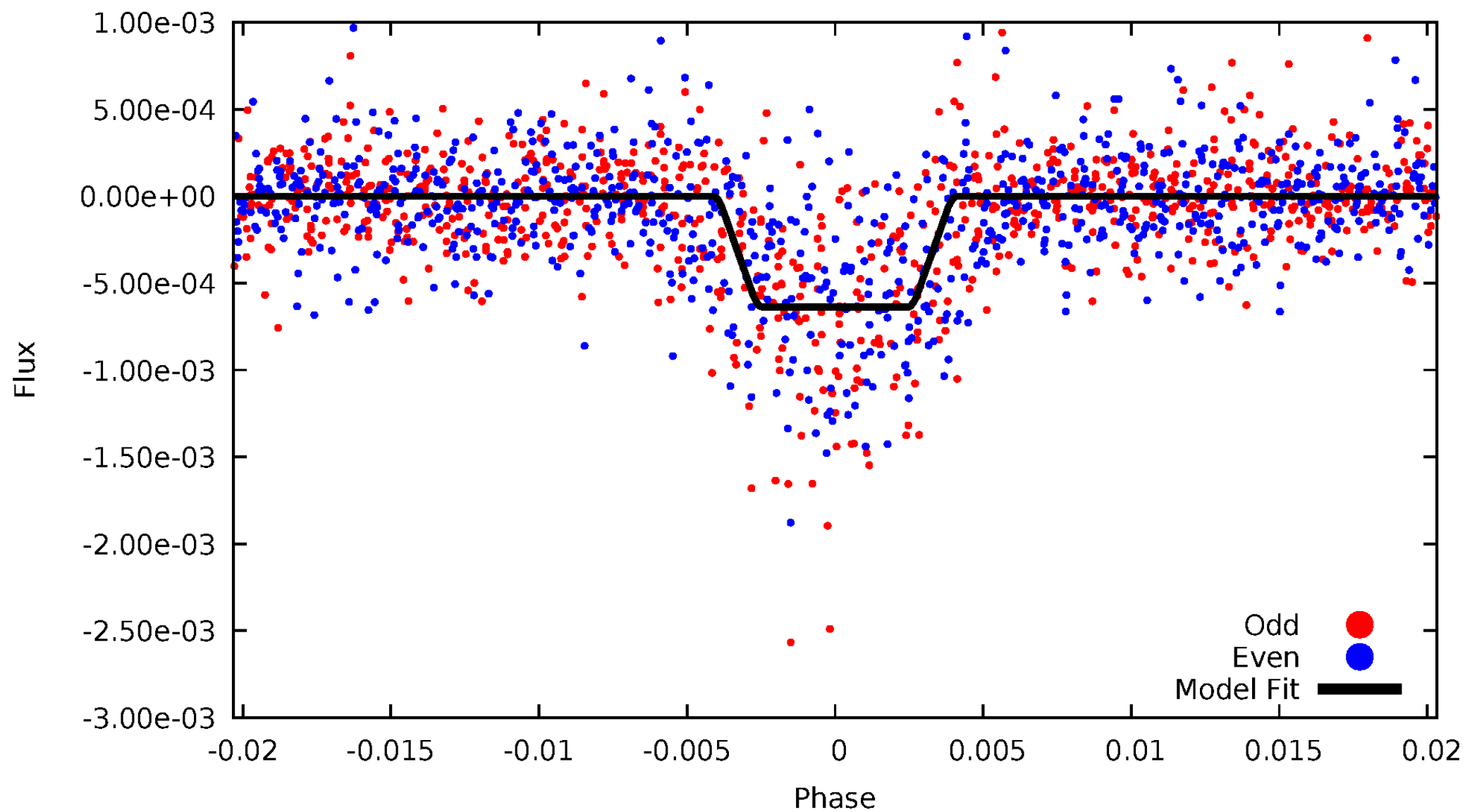
DV Odd/Even

TCE 004180401-01



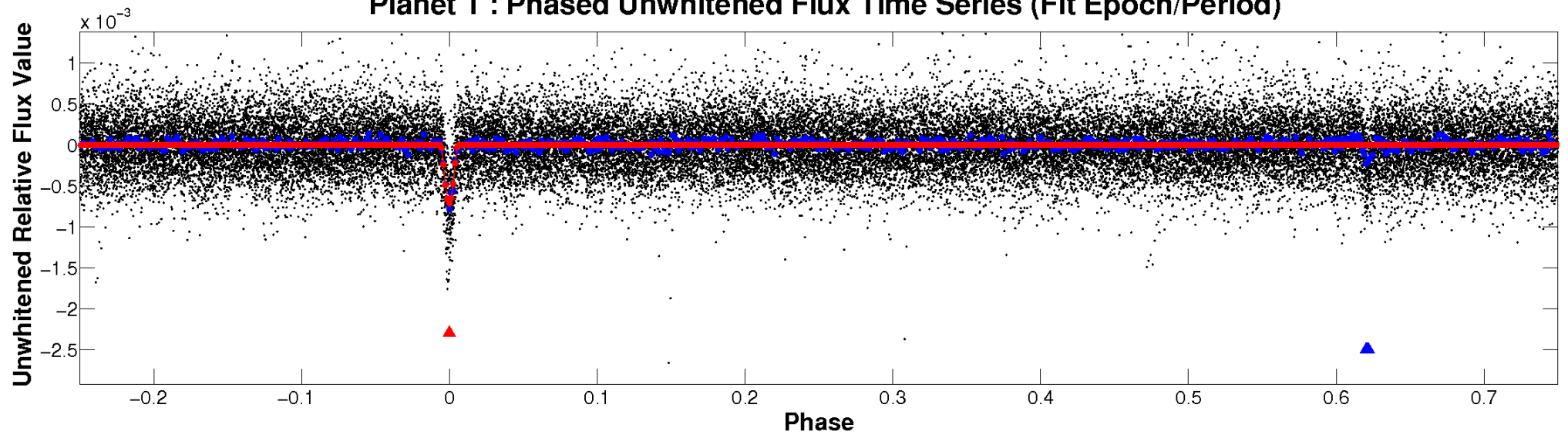
ALT Odd/Even

TCE 004180401-01

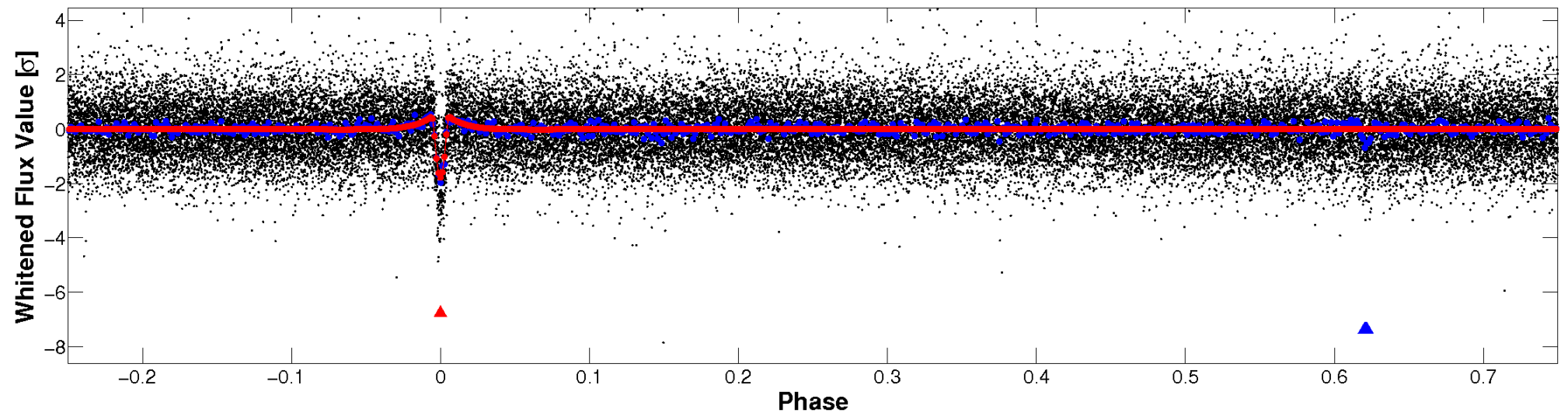


Non-Whitened Vs. Whitened Light Curve

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

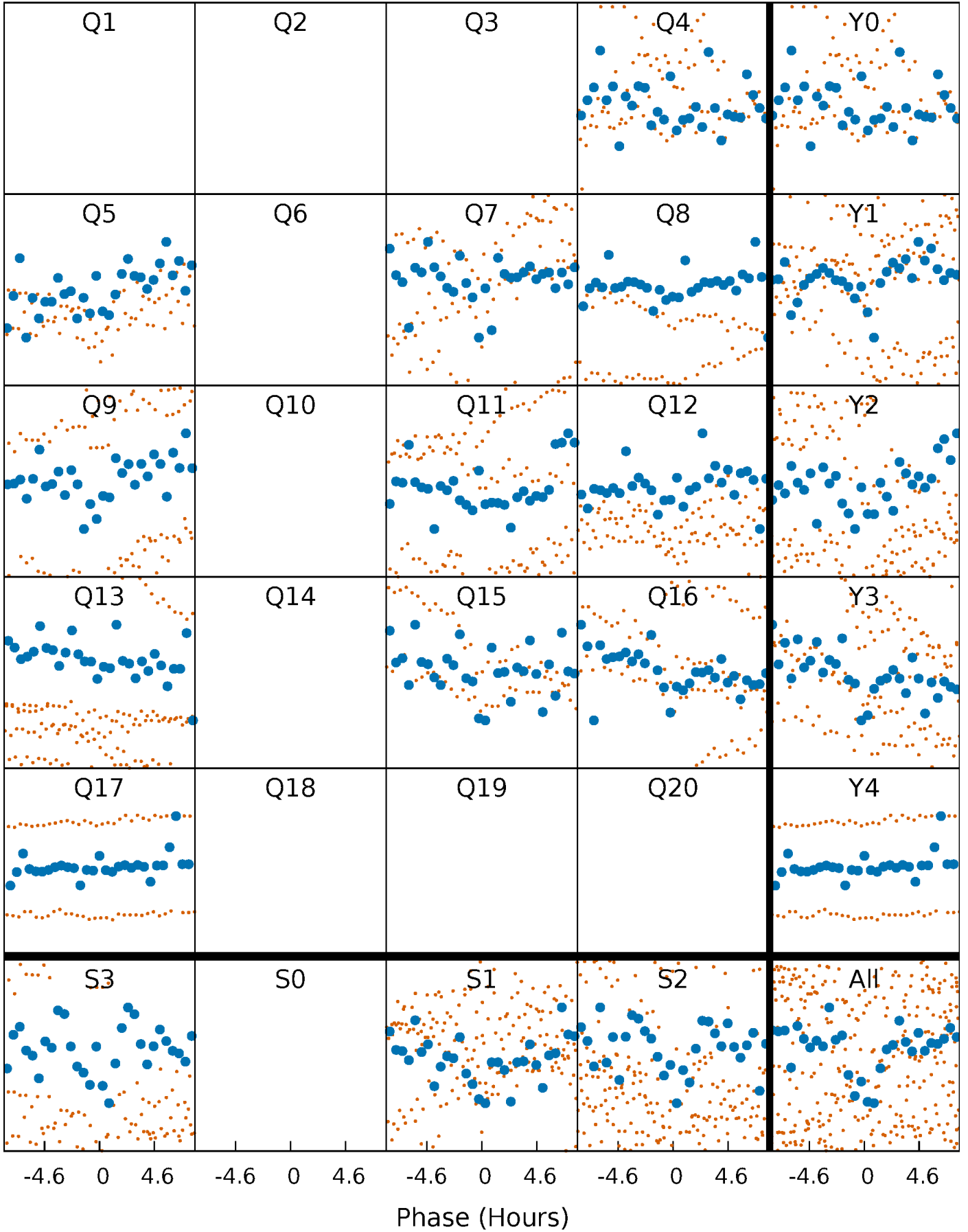


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



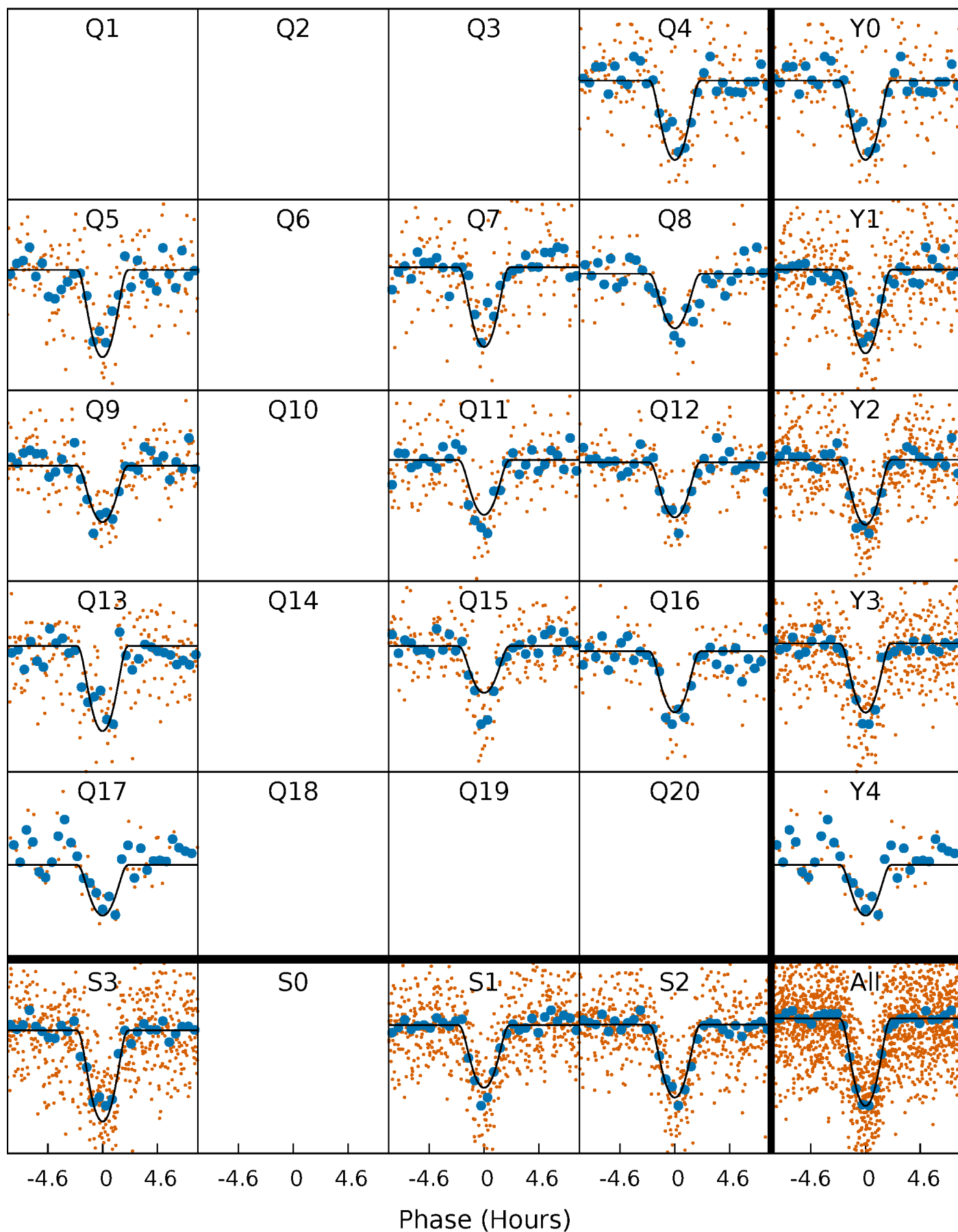
PDC Quarter-Phased Transit Curves

TCE 004180401-01 P= 15.412582 Days $T_0=144.976948$ (BKJD)



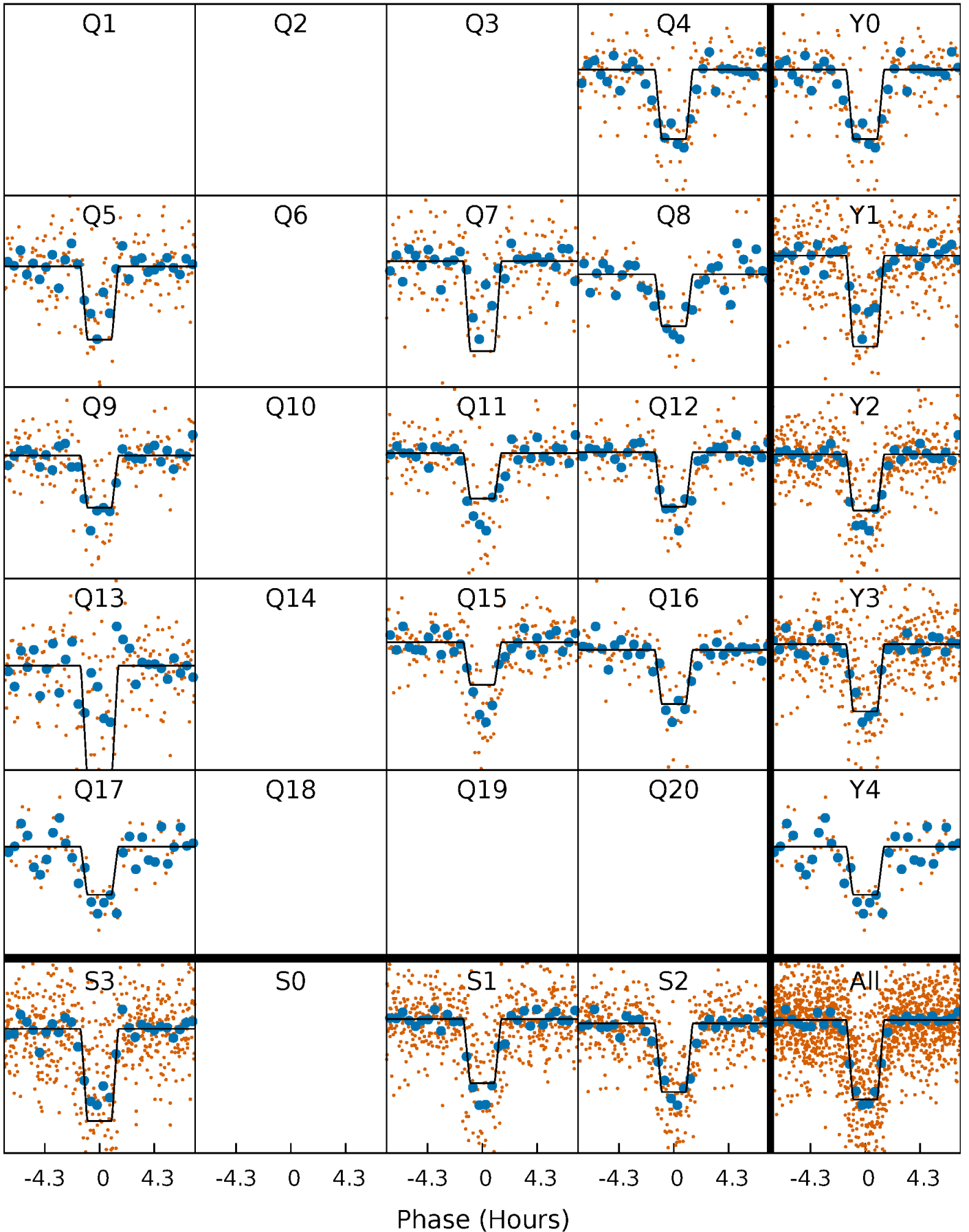
DV Quarter-Phased Transit Curves

TCE 004180401-01 $P = 15.412582$ Days $T_0 = 144.976948$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

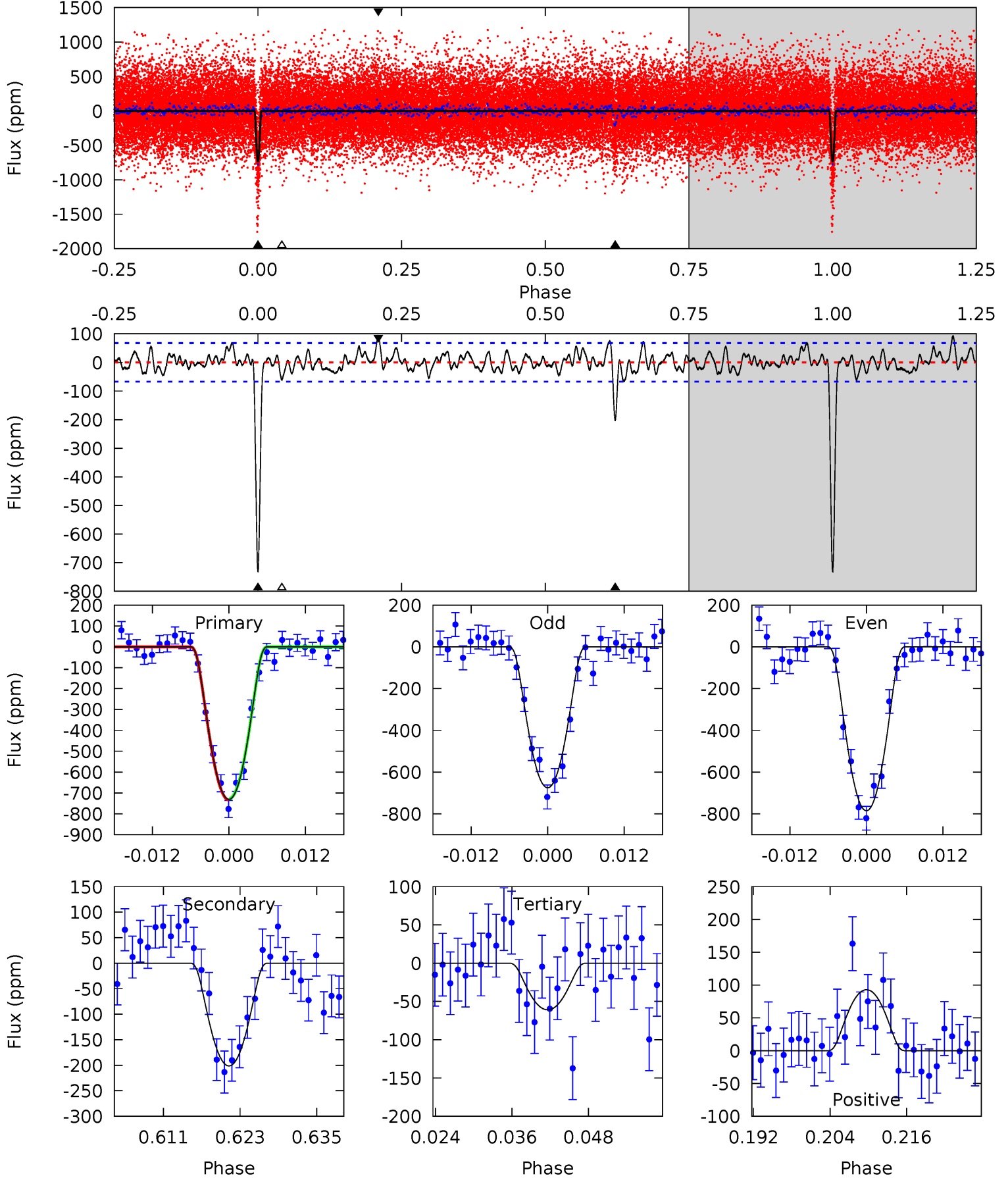
TCE 004180401-01 P= 15.412425 Days $T_0=144.983230$ (BKJD)



DV Model-Shift Uniqueness Test

004180401-01, P = 15.412582 Days, E = 144.976948 Days

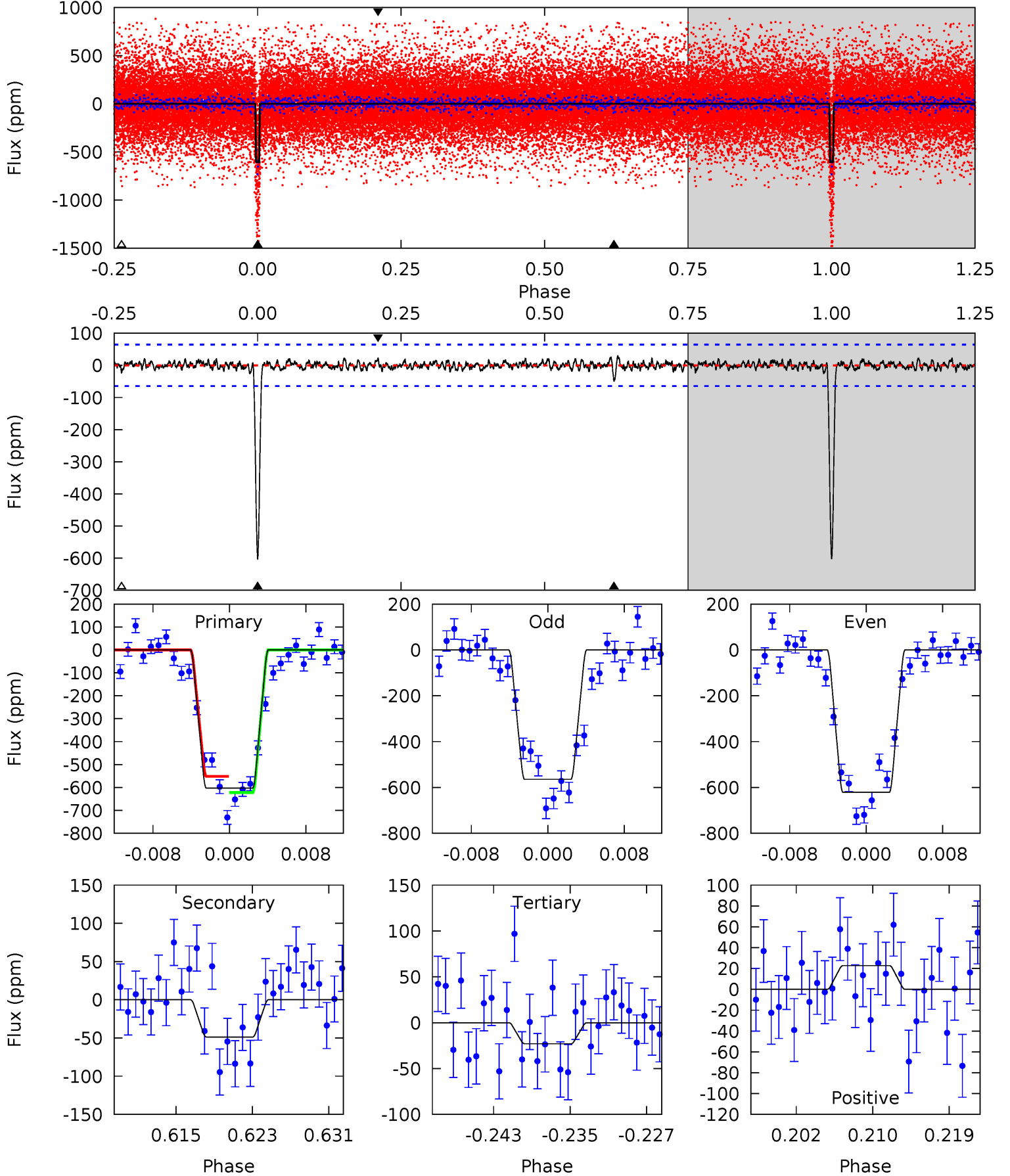
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
54.1	14.9	4.51	6.87	4.99	2.51	1.85	49.6	47.2	10.4	8.02	4.08	1.02	0.11	0.19



Alt Model-Shift Uniqueness Test

004180401-01, $P = 15.412425$ Days, $E = 144.983230$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
47.4	3.83	1.81	1.79	5.07	2.65	0.65	45.6	45.6	2.02	2.04	2.22	1.12	0.05	2.79



Stellar Parameters For KIC 004180401

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5240^{+189}_{-173}	$4.555^{+0.030}_{-0.120}$	$0.420^{+0.050}_{-0.300}$	$0.856^{+0.136}_{-0.063}$	$0.958^{+0.046}_{-0.101}$	$2.153^{+0.321}_{-0.735}$
	+4%/-3%	+1%/-3%	+12%/-71%	+16%/-7%	+5%/-11%	+15%/-34%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 004180401-01 / KOI 2709.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-201 ± 14	$3.64^{+1.42}_{-1.49}$	879^{+45}_{-37}	3625^{+688}_{-377}	116^{+211}_{-57}
Alt.	-49 ± 13	$2.44^{+1.47}_{-1.19}$	879^{+44}_{-38}	3276^{+776}_{-423}	61^{+181}_{-38}

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 $A_{obs} \gg 1.0$

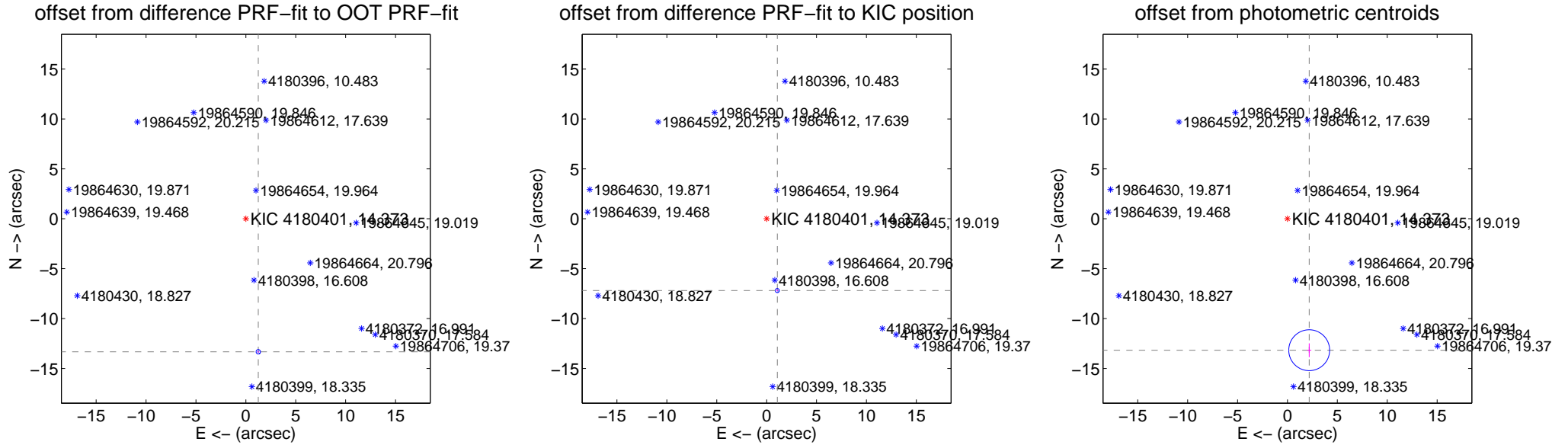
DV Centroid Data

Supplemental centroid analysis for 004180401-01. Kepler magnitude: 14.37. Transit SNR 25.55

There are 5 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 6.05 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	13.384 ± 0.074	181.89	-1.244 ± 0.076	-13.326 ± 0.074
PRF-fit source offset from KIC position	7.272 ± 0.068	106.31	-1.070 ± 0.069	-7.192 ± 0.068
photometric centroid source offset	13.35 ± 0.68	19.55	-2.18 ± 0.21	-13.17 ± 0.69



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.

Q1 no difference image



Q1 no OOT image



Q2 no difference image



Q2 no OOT image



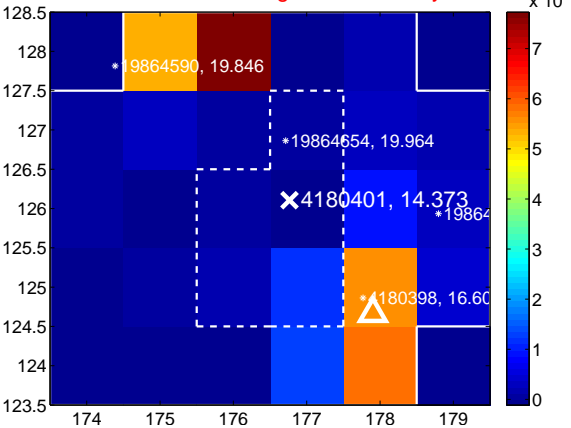
Q3 no difference image



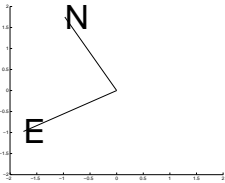
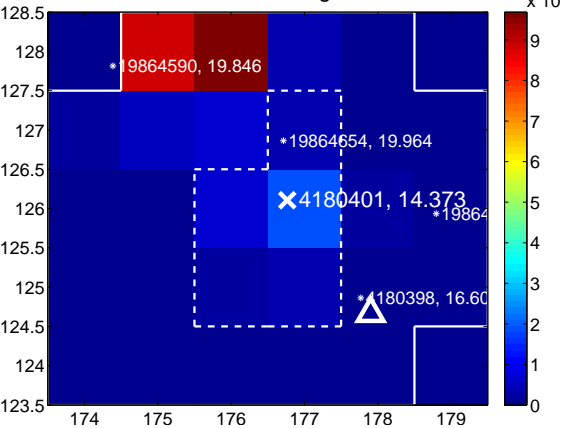
Q3 no OOT image



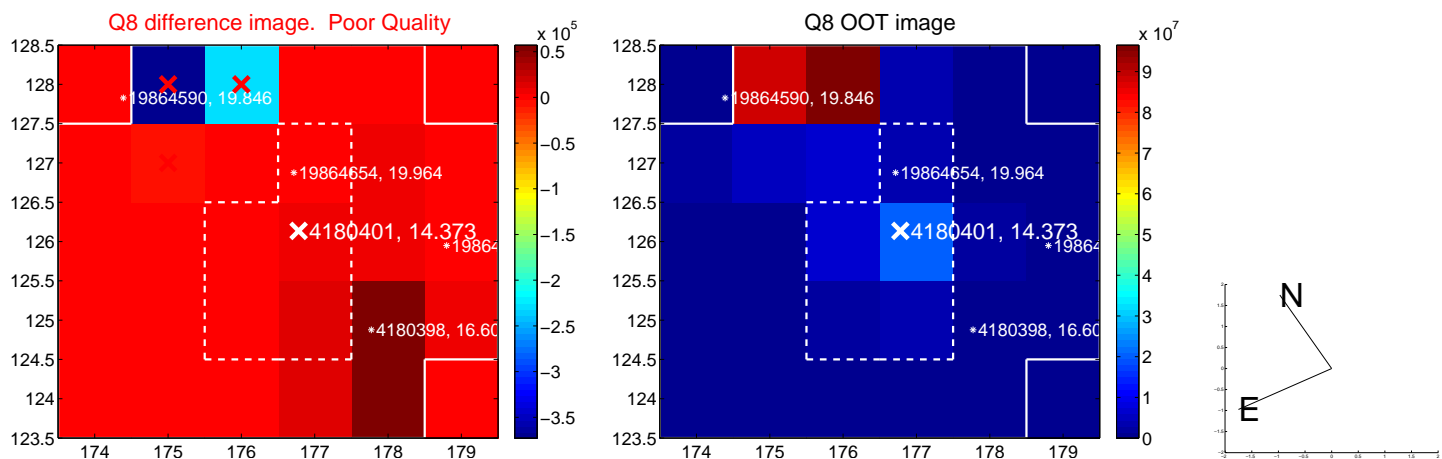
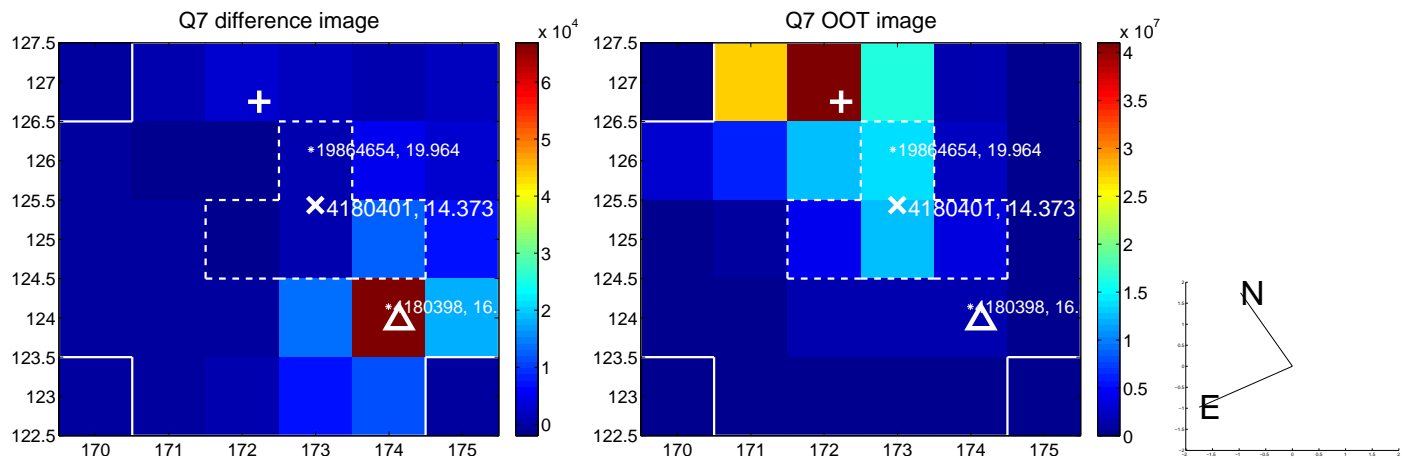
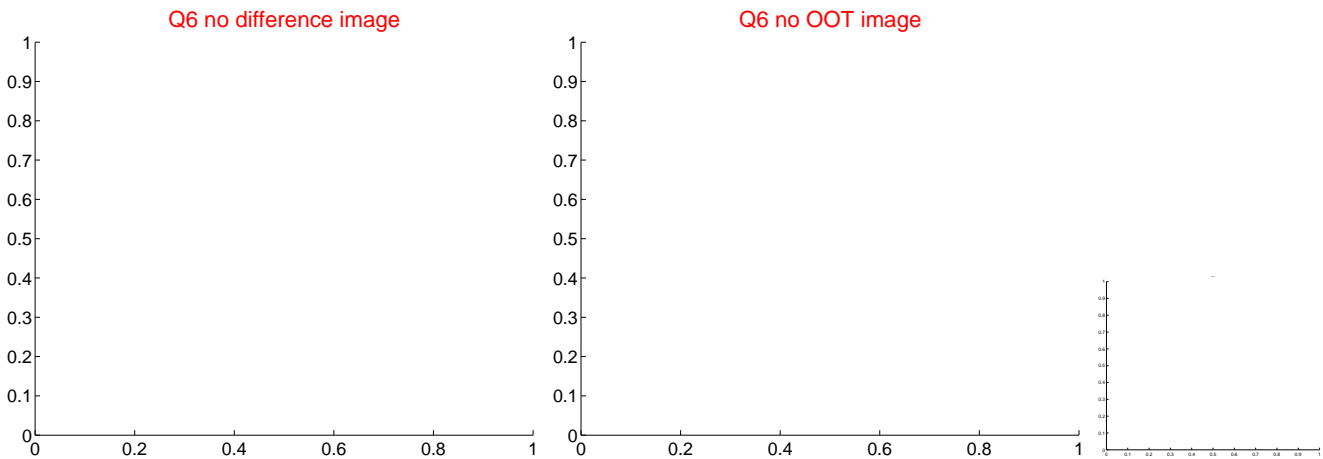
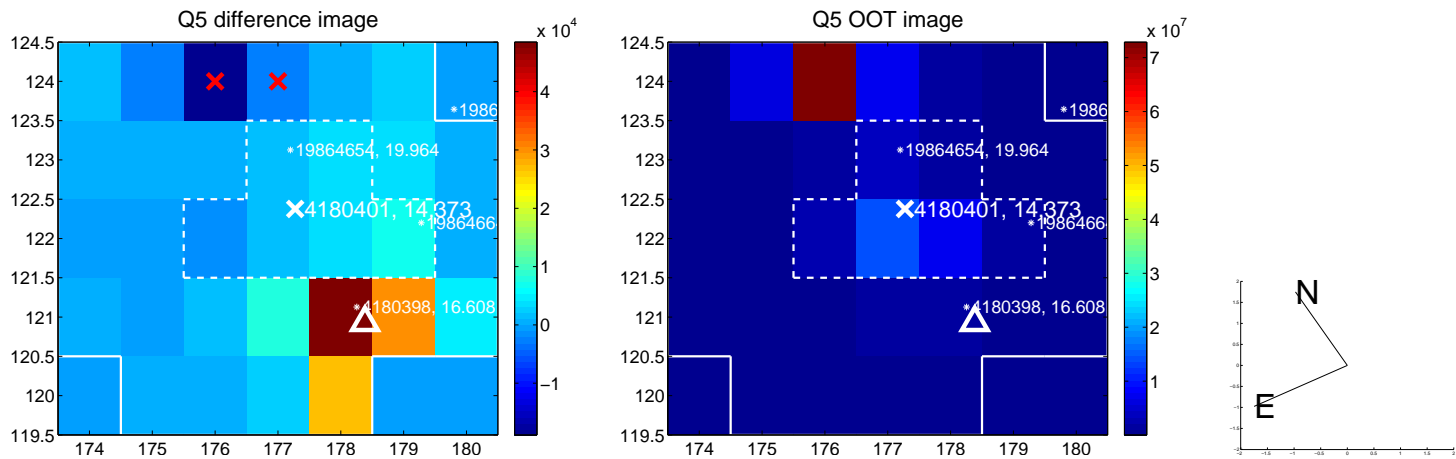
Q4 difference image. Poor Quality



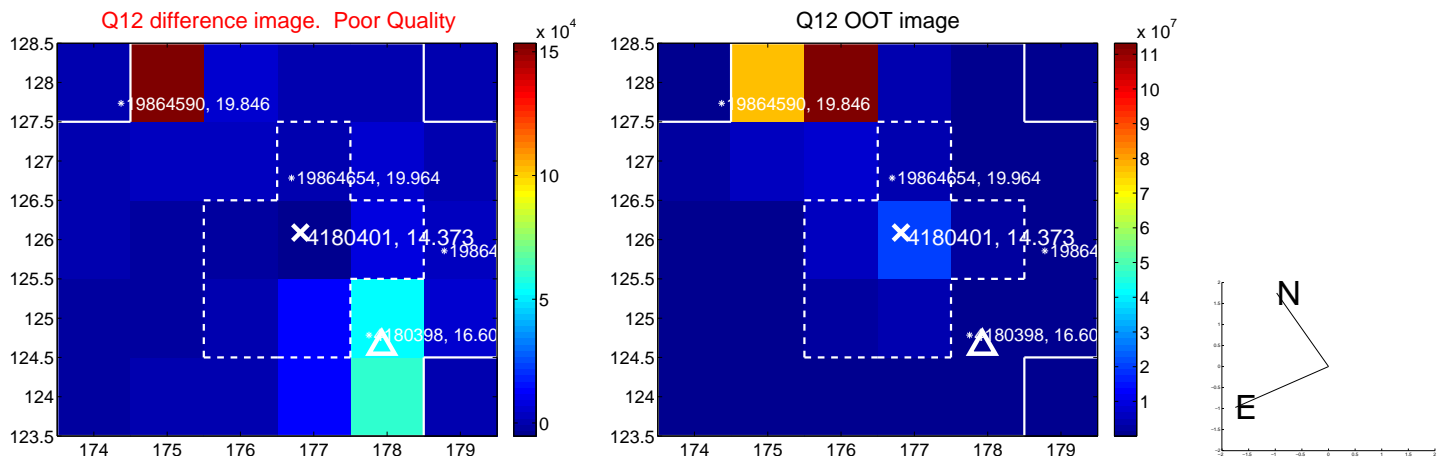
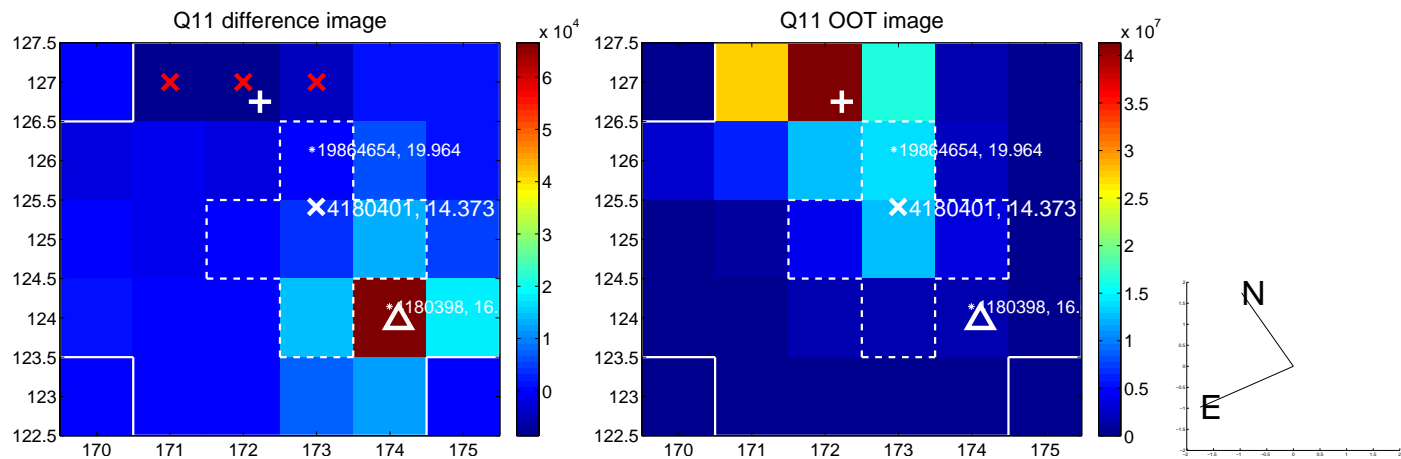
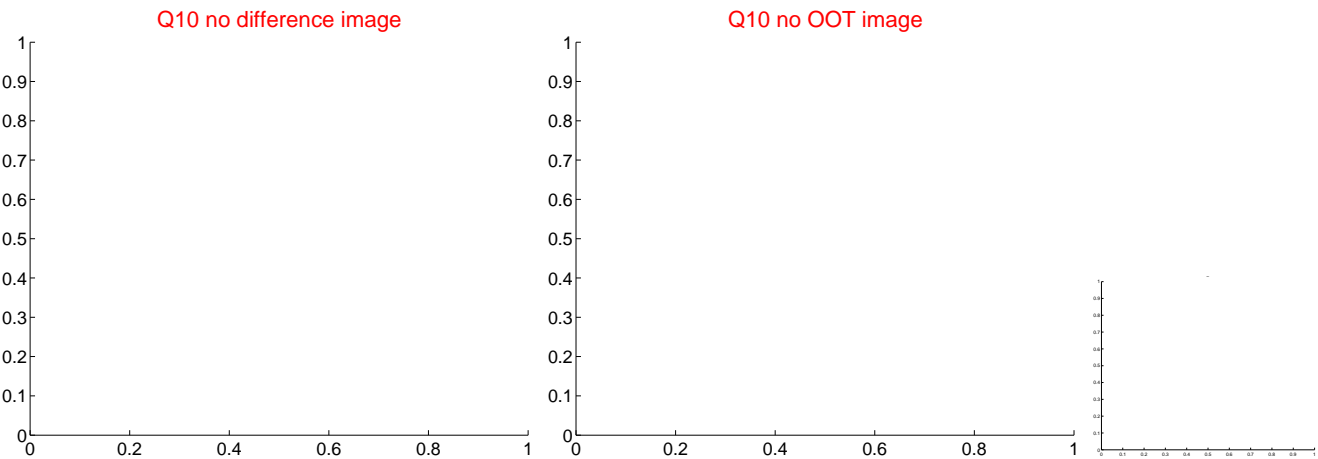
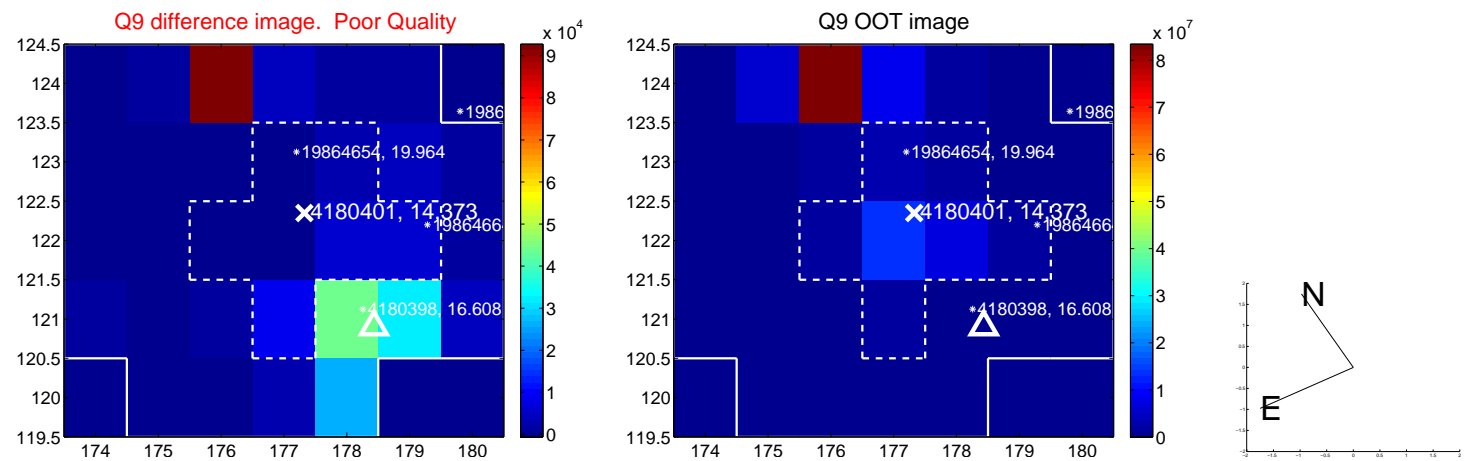
Q4 OOT image



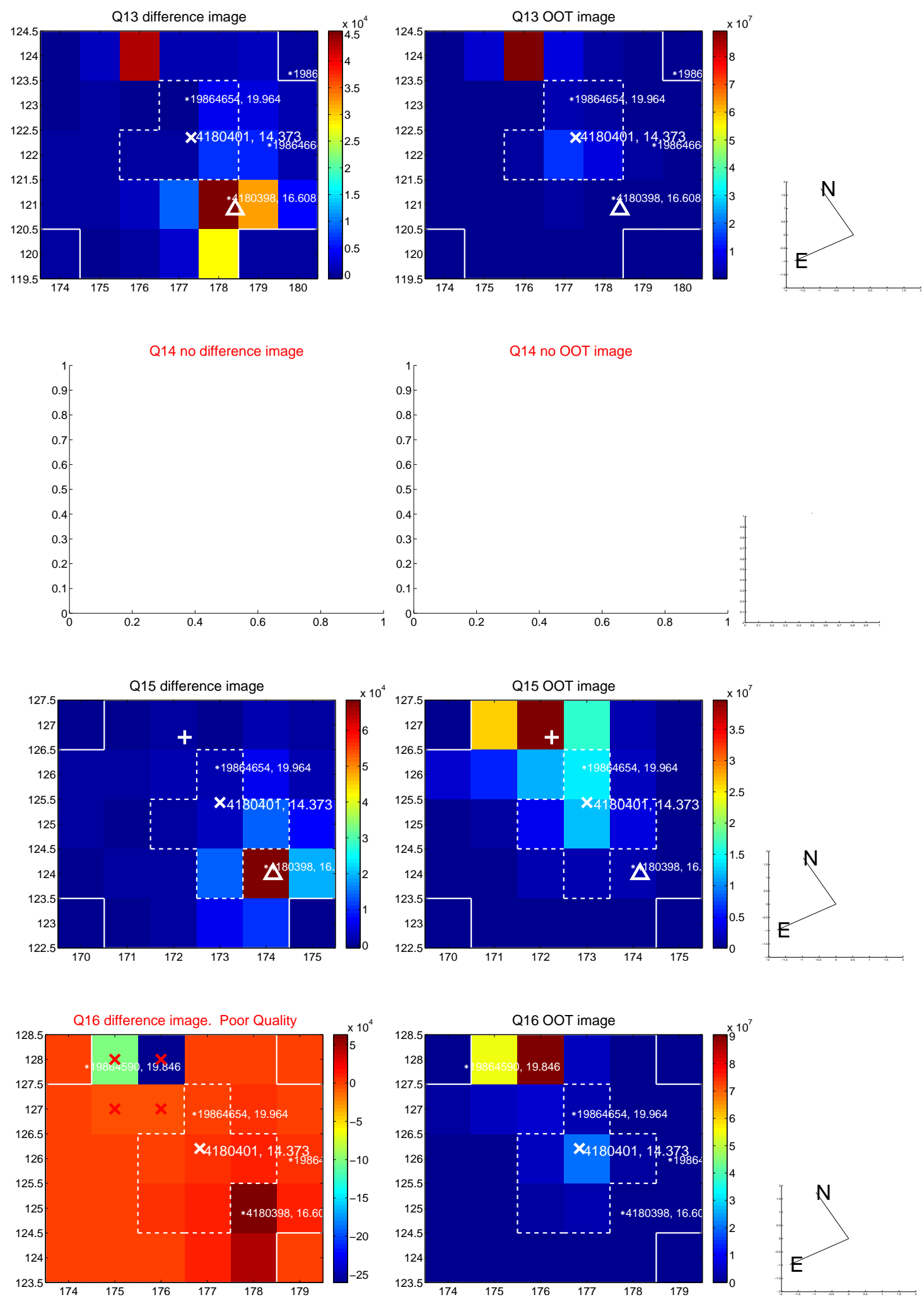
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



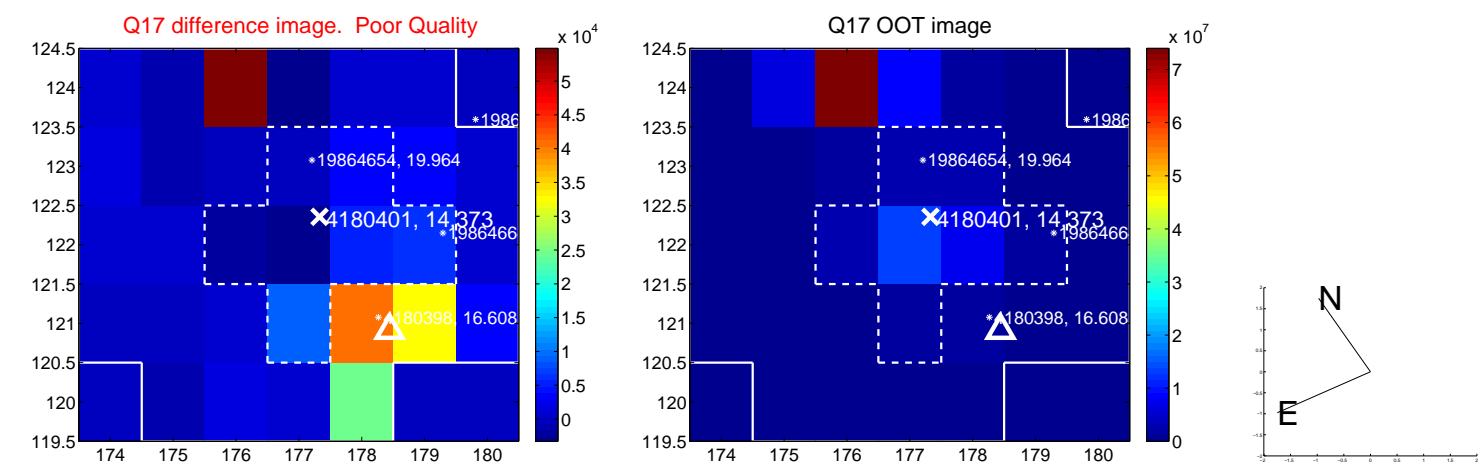
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



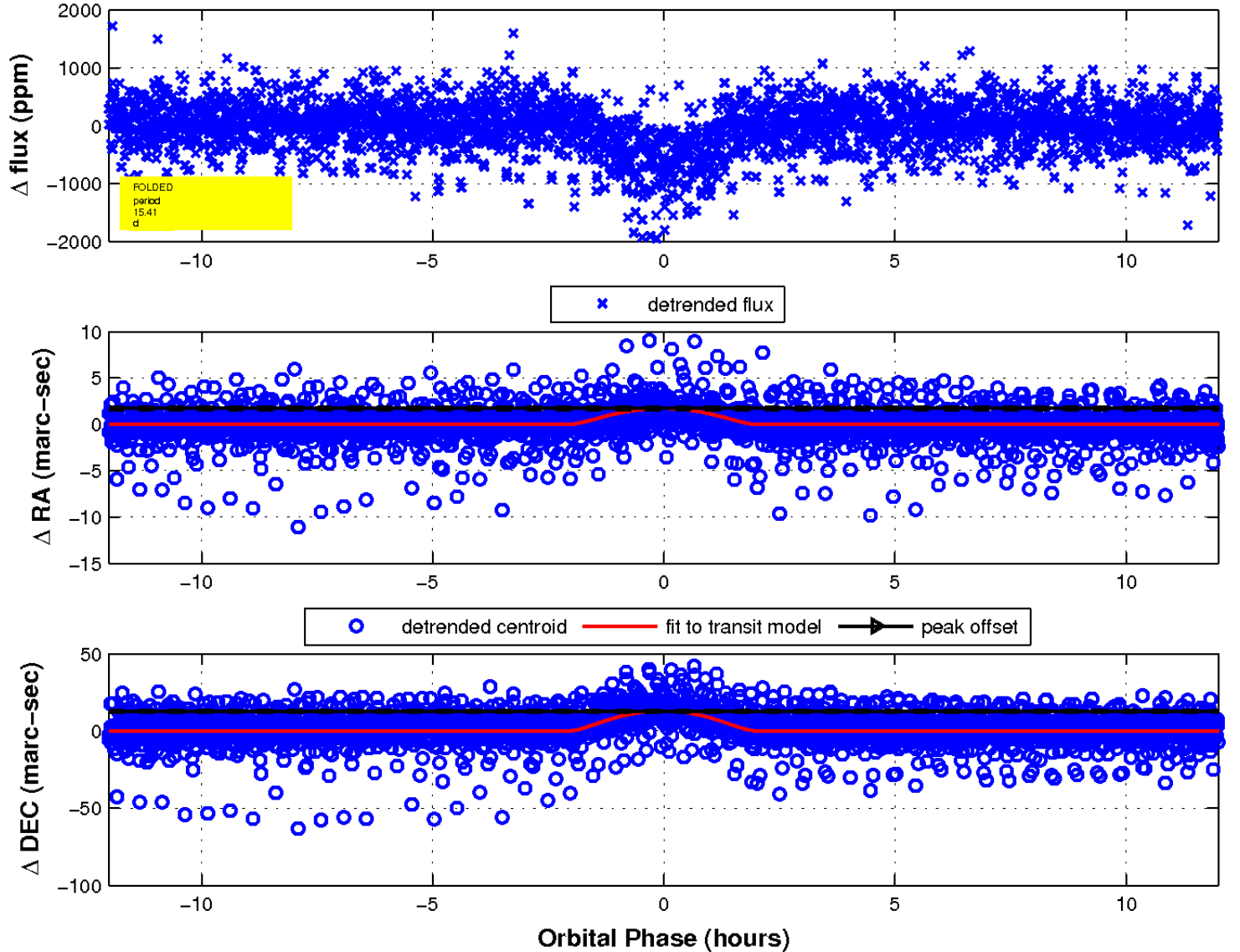
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



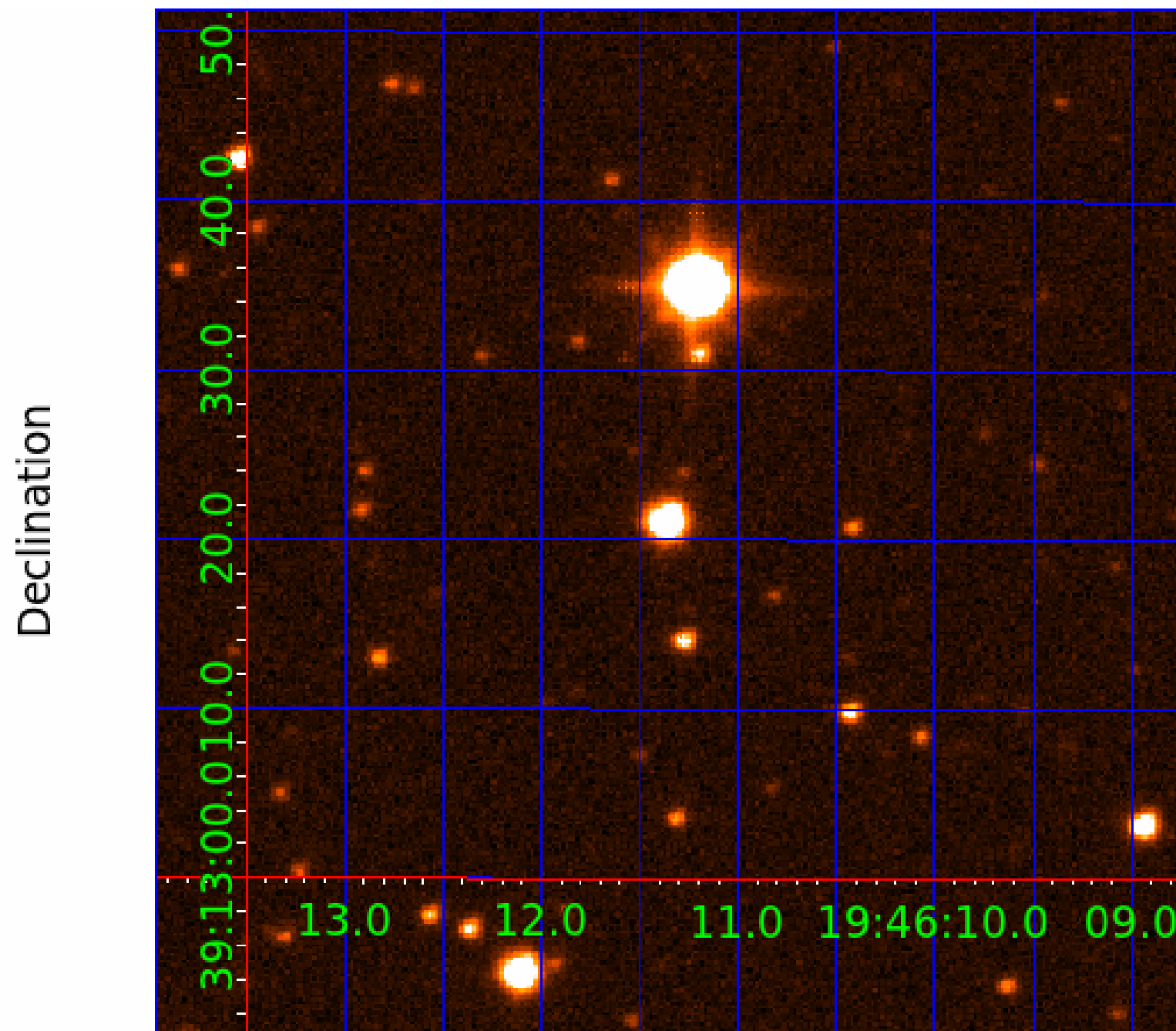
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 2



UKIRT Image



KIC 004180401

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})
004180401-01	OBS	2709.01	15.412582	144.976948	714.9	4.002	24.2	25.6	0.86	5240	3.60	34.62
004180401-02	OBS	No	15.412864	139.123050	229.6	3.056	9.0	9.1	0.86	5240	1.51	34.62

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004180401-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST
004180401-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET—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 004180401-02

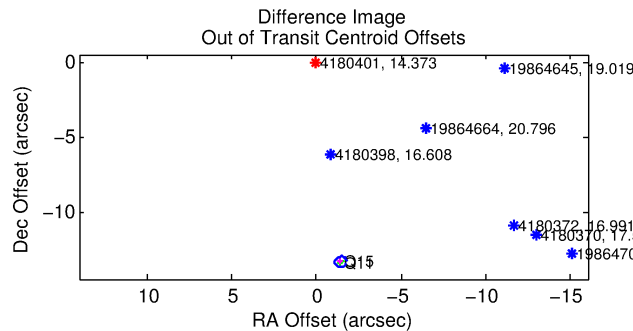
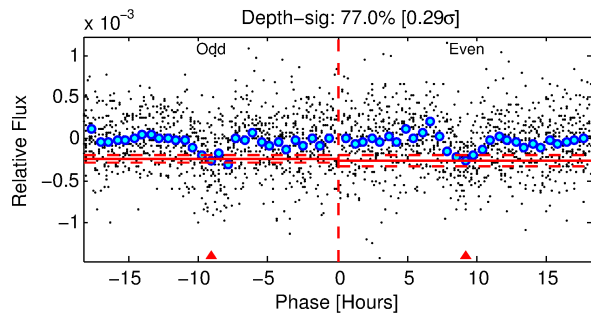
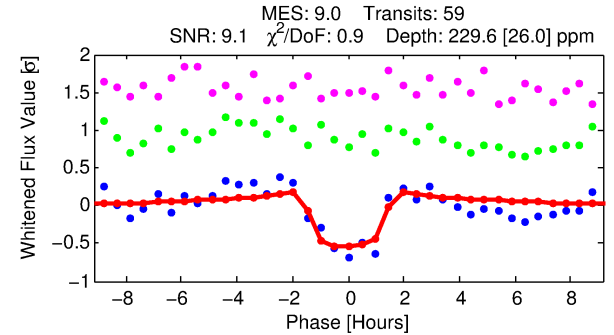
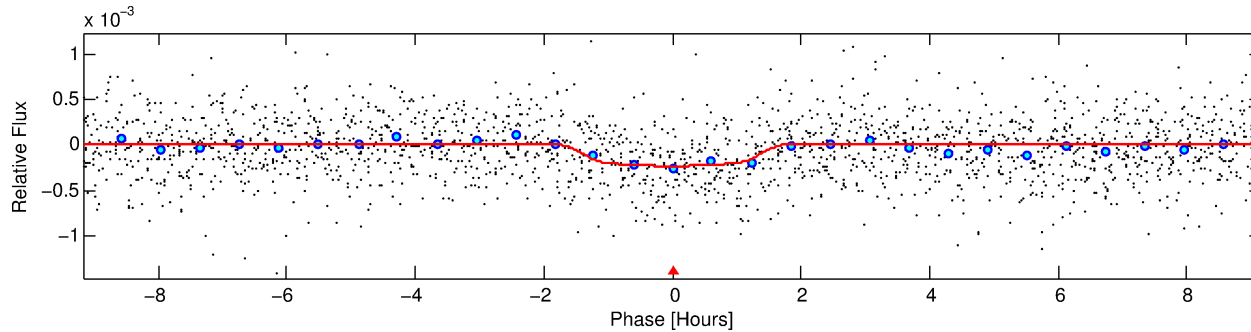
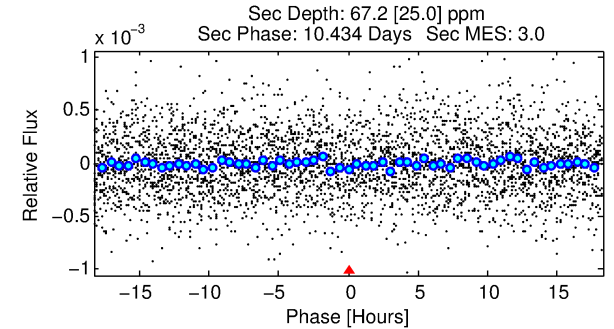
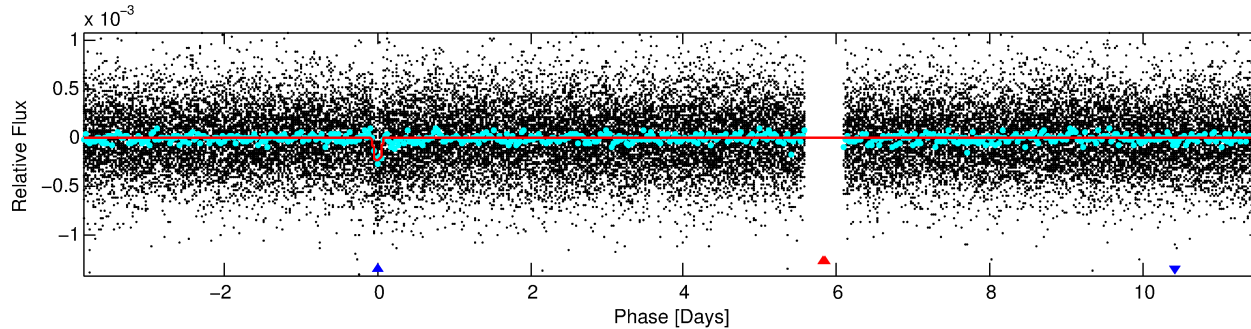
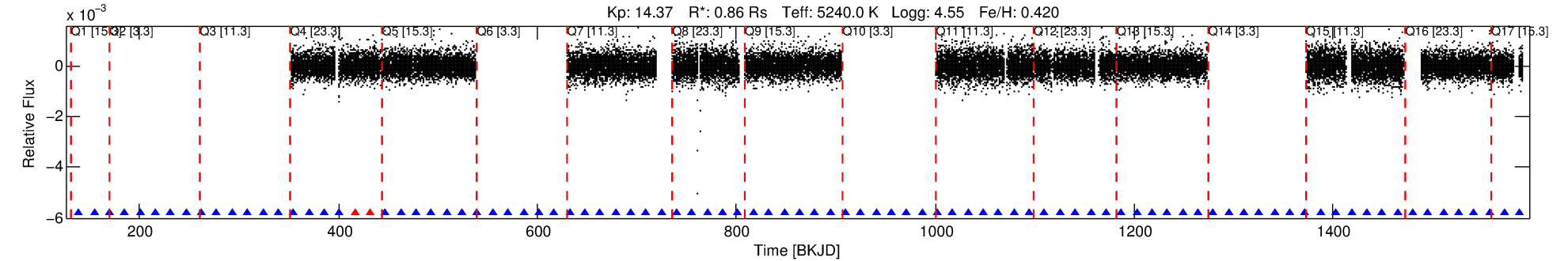
No Significant Match Found

DV One-Page Summary

KIC: 4180401 Candidate: 2 of 2 Period: 15.413 d

KOI: K02709 Corr: No Ephemeris Match

Kp: 14.37 R*: 0.86 Rs Teff: 5240.0 K Logg: 4.55 Fe/H: 0.420



DV Fit Results:

Period = 15.41286 [0.00014] d
Epoch = 139.1230 [0.0079] BKJD
Rp/R* = 0.0162 [0.0128]
a/R* = 20.96 [63.93]
b = 0.86 [0.96]
Seff = 34.62 [8.89]
Teq = 619 [40] K
Rp = 1.51 [1.22] Re
a = 0.1196 [0.0168] AU
Ag = 230.56 [378.34] [0.61σ]
Teff = 3726 [1522] K [2.04σ]

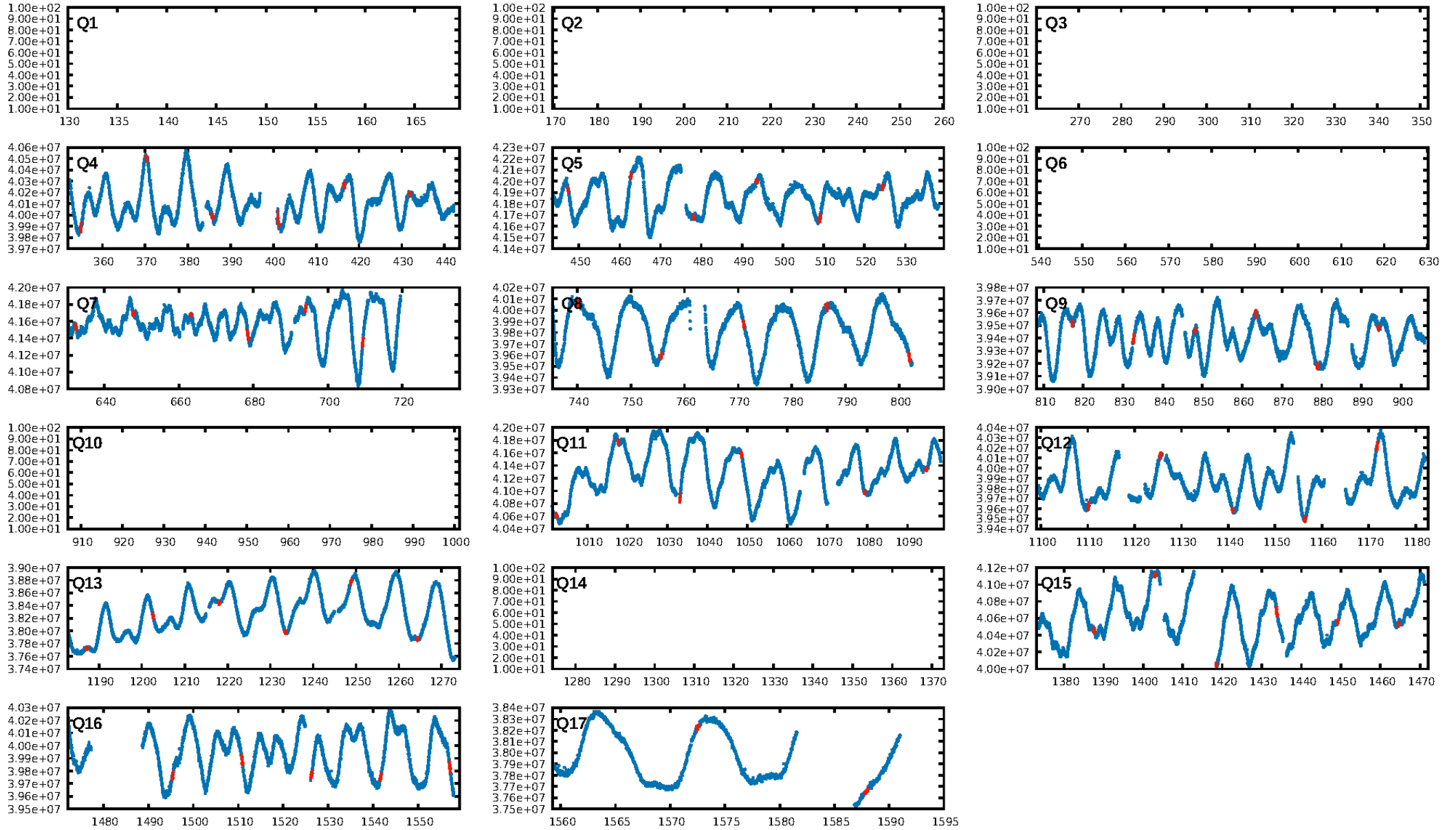
DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 91.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 3.03e-18
RollingBand-fgt: 0.96 [55/57]
GhostDiagnostic-chr: -0.1671
Centroid-sig: 0.0%
Centroid-so: 12.891 arcsec [6.83σ]
OotOffset-rm: 13.434 arcsec [110.47σ]
KicOffset-rm: 7.244 arcsec [76.55σ]
OotOffset-st: 0/2/0/0 [2]
KicOffset-st: 0/2/0/3 [5]
DiffImageQuality-fgm: 0.60 [3/5]
DiffImageOverlap-fno: 1.00 [11/11]

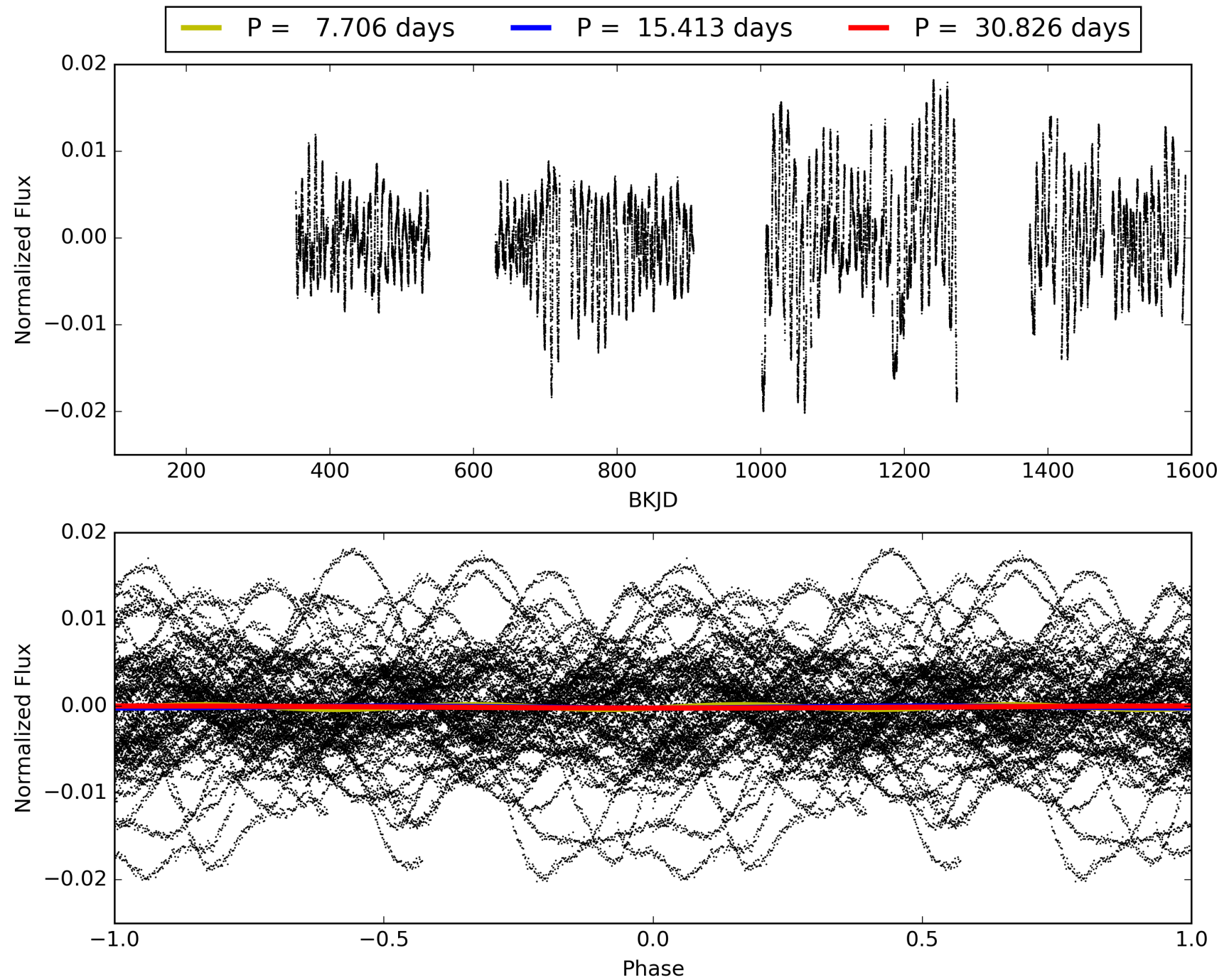
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 00:17:39 Z

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

TCE 004180401-02, PDC Light Curves

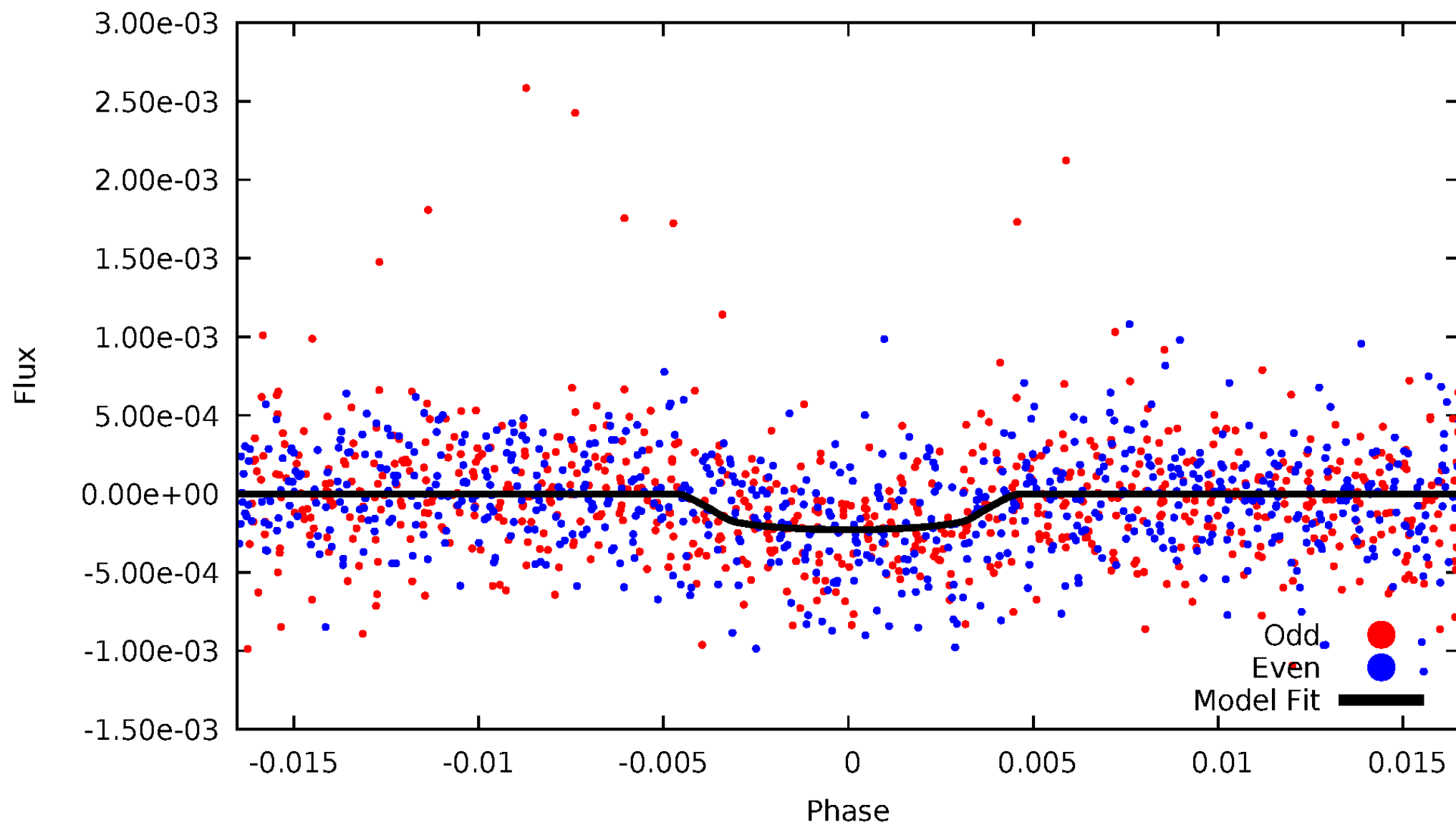


TCE 004180401-02



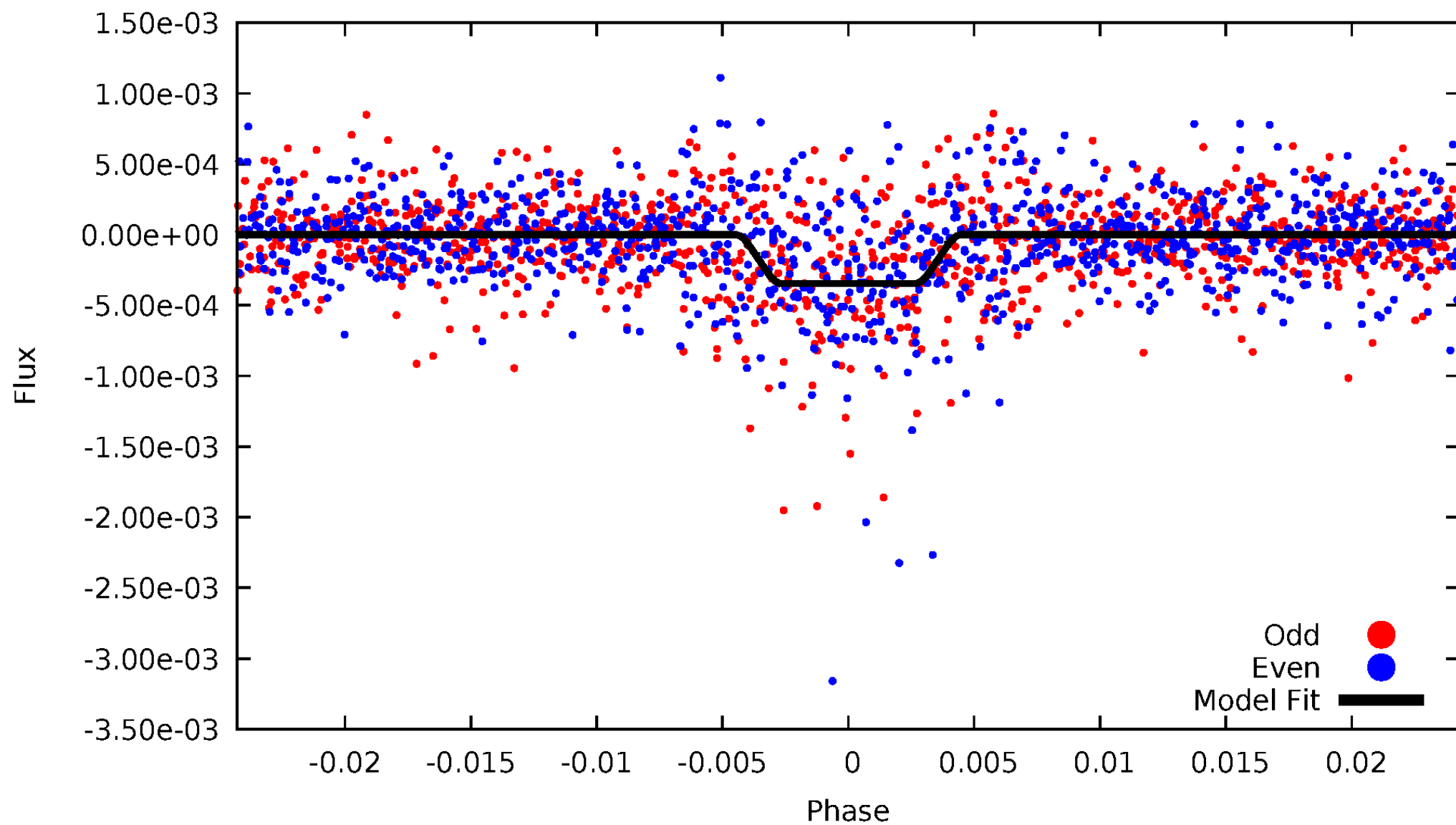
DV Odd/Even

TCE 004180401-02



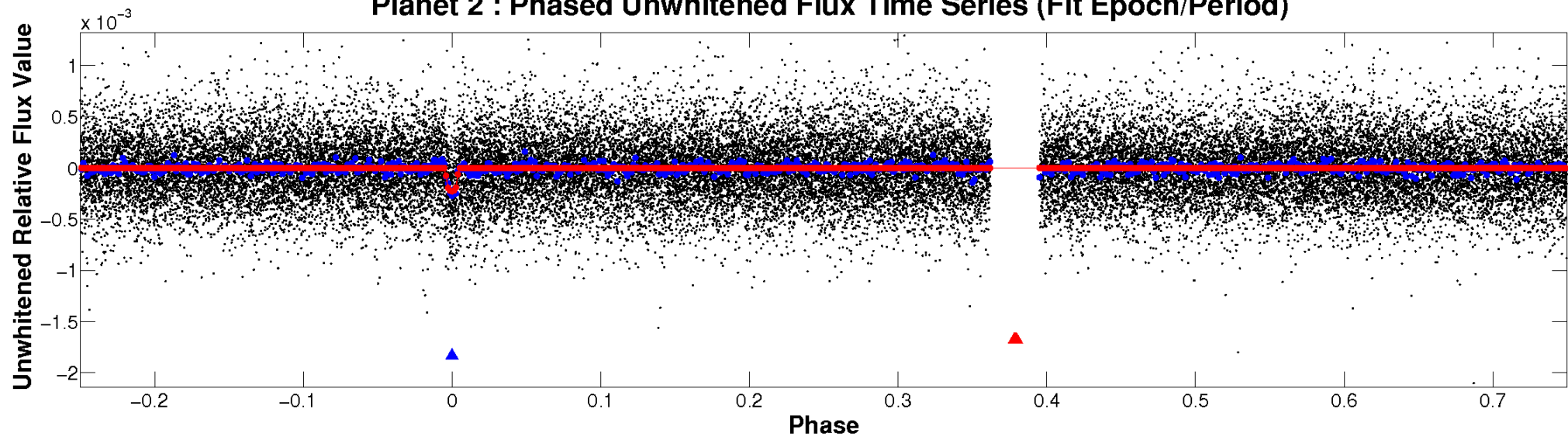
ALT Odd/Even

TCE 004180401-02

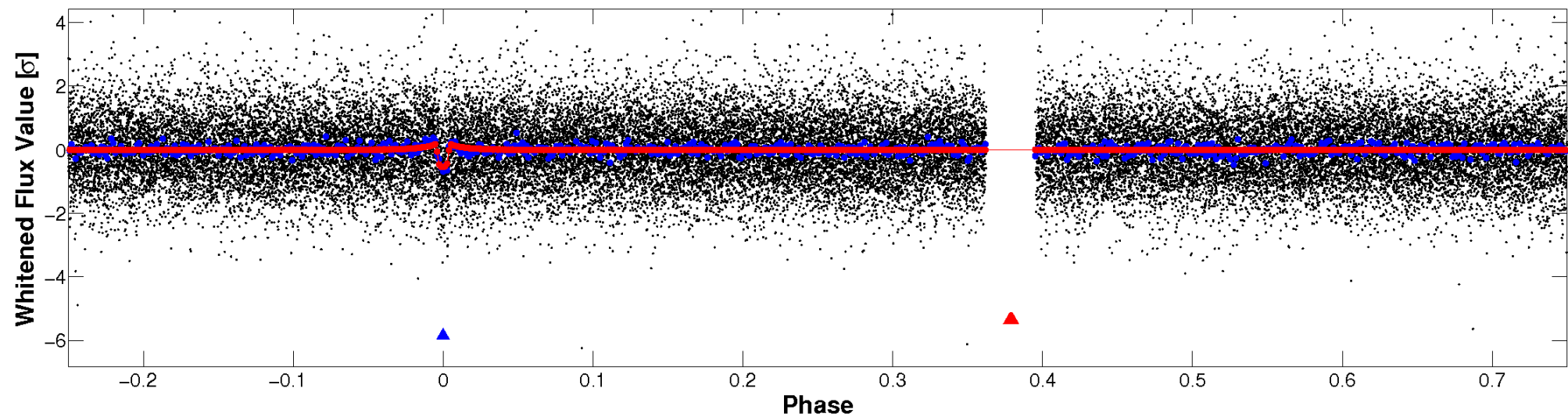


Non-Whitened Vs. Whitened Light Curve

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

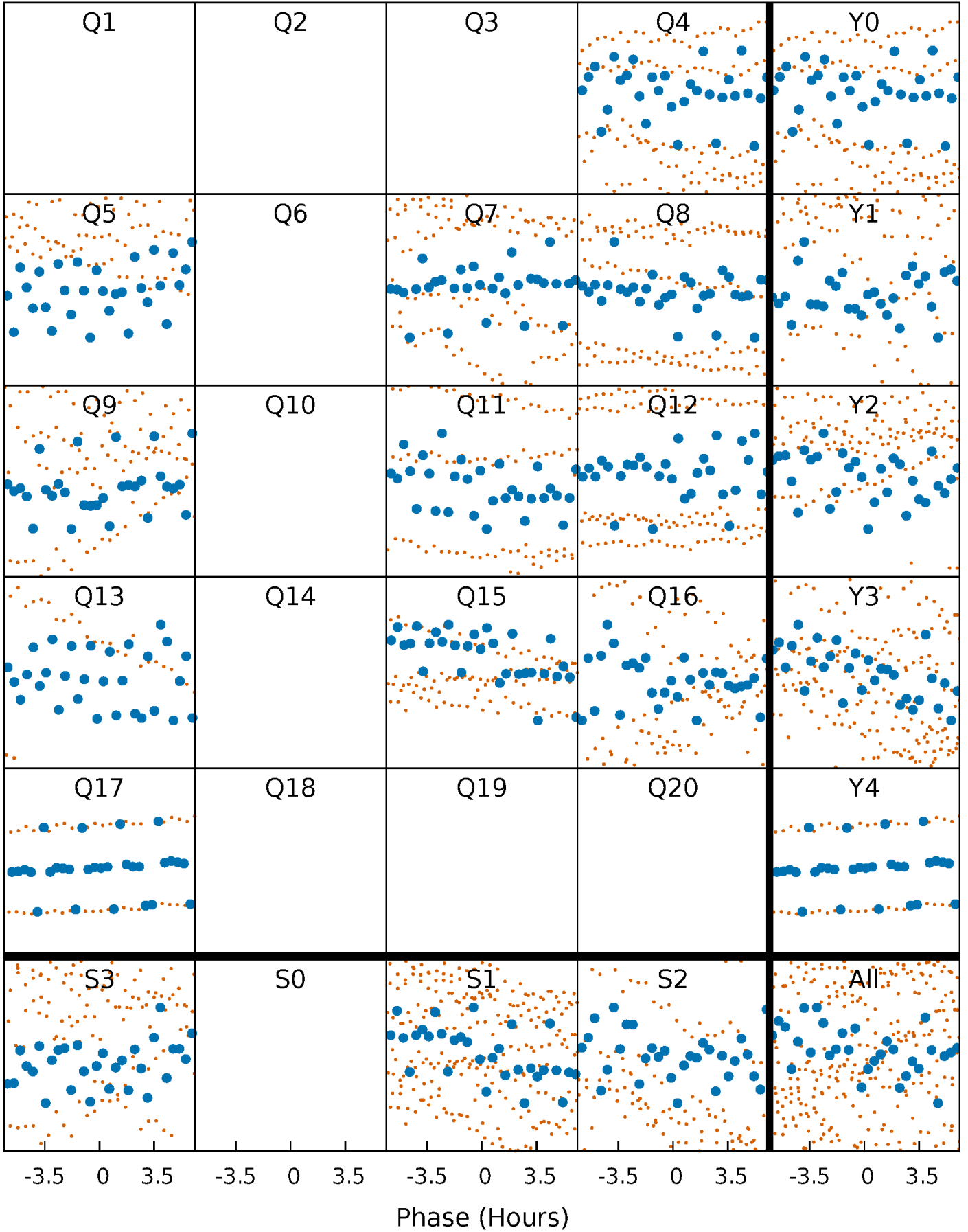


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



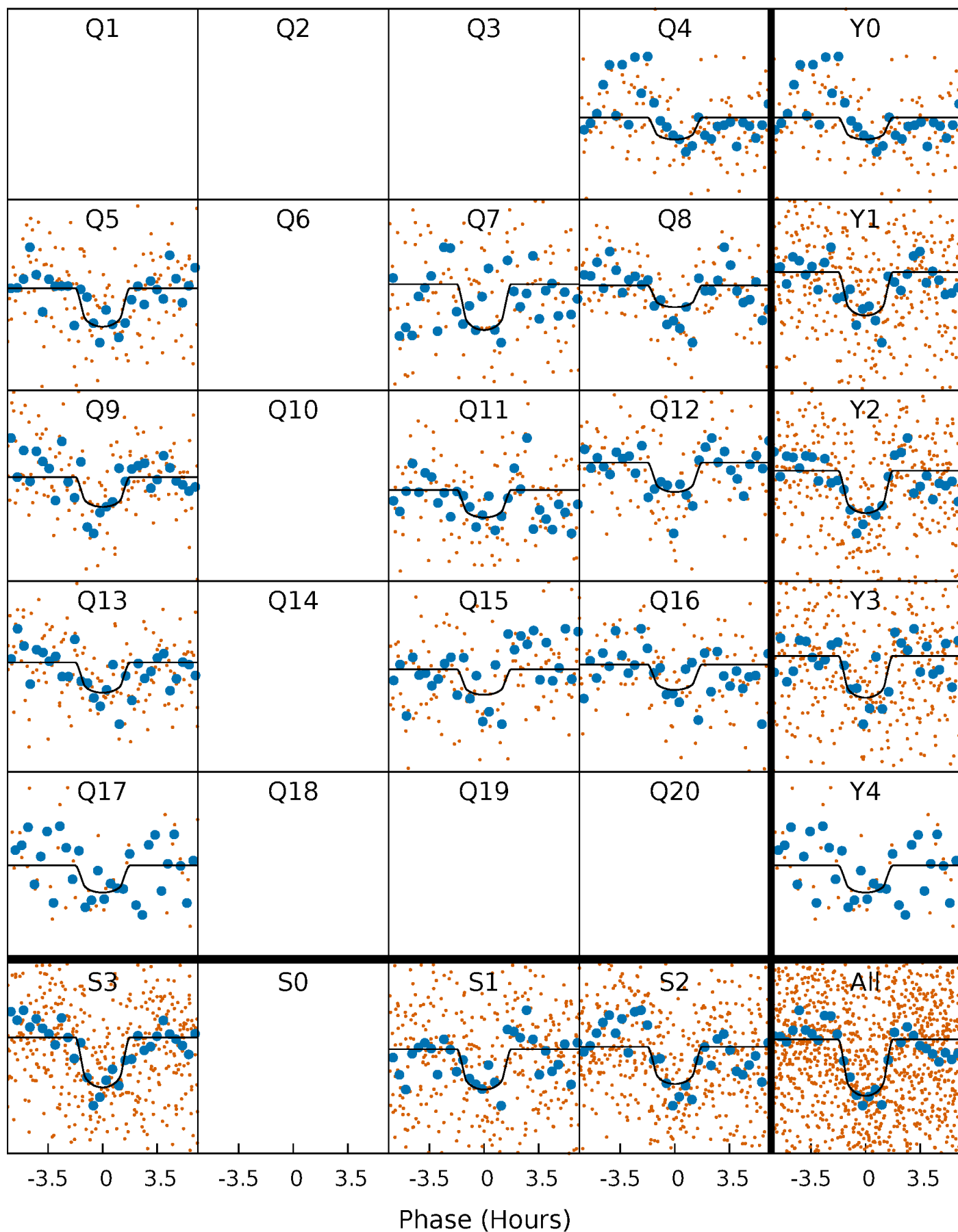
PDC Quarter-Phased Transit Curves

TCE 004180401-02 $P = 15.412864$ Days $T_0 = 139.123050$ (BKJD)



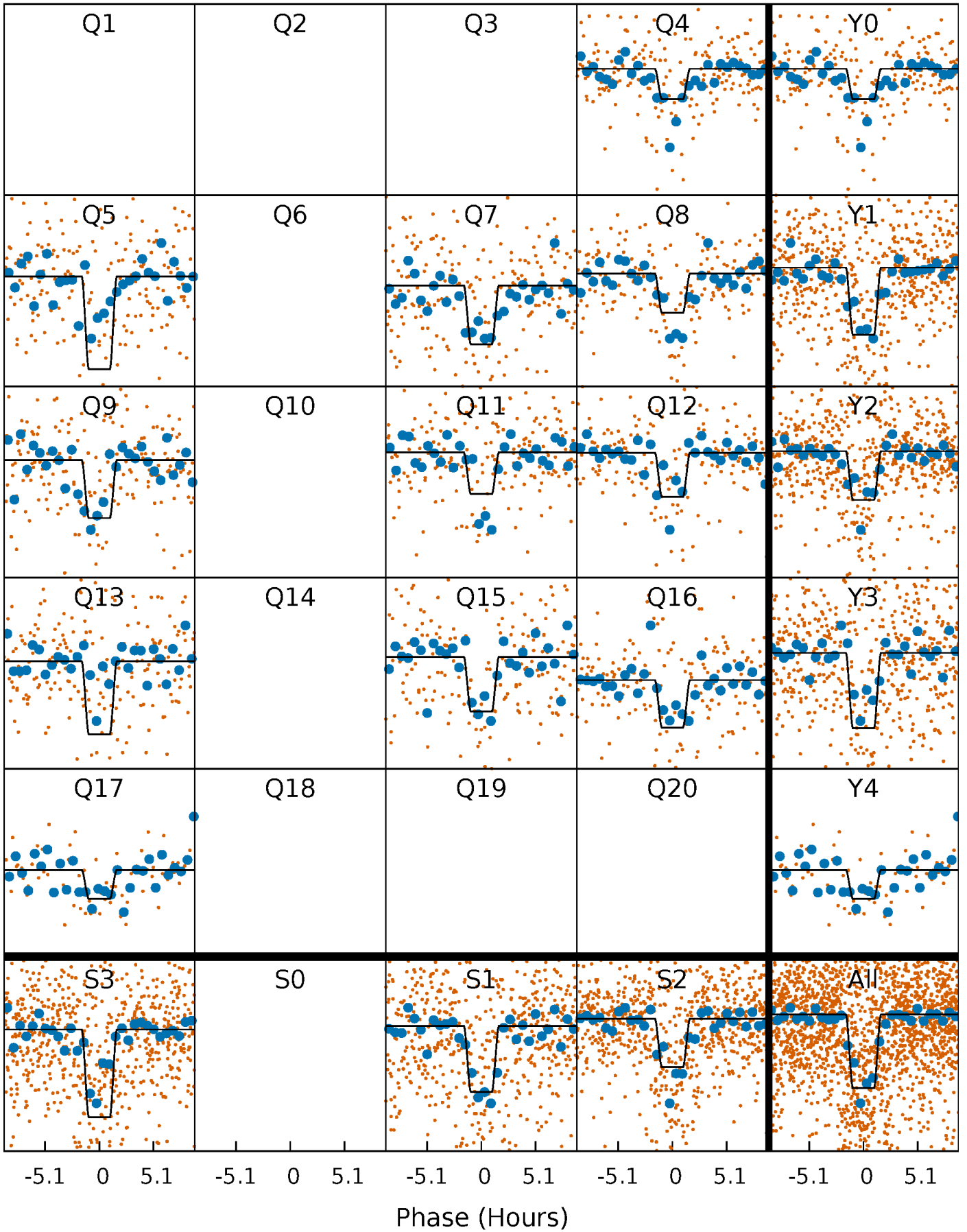
DV Quarter-Phased Transit Curves

TCE 004180401-02 $P = 15.412864$ Days $T_0 = 139.123050$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

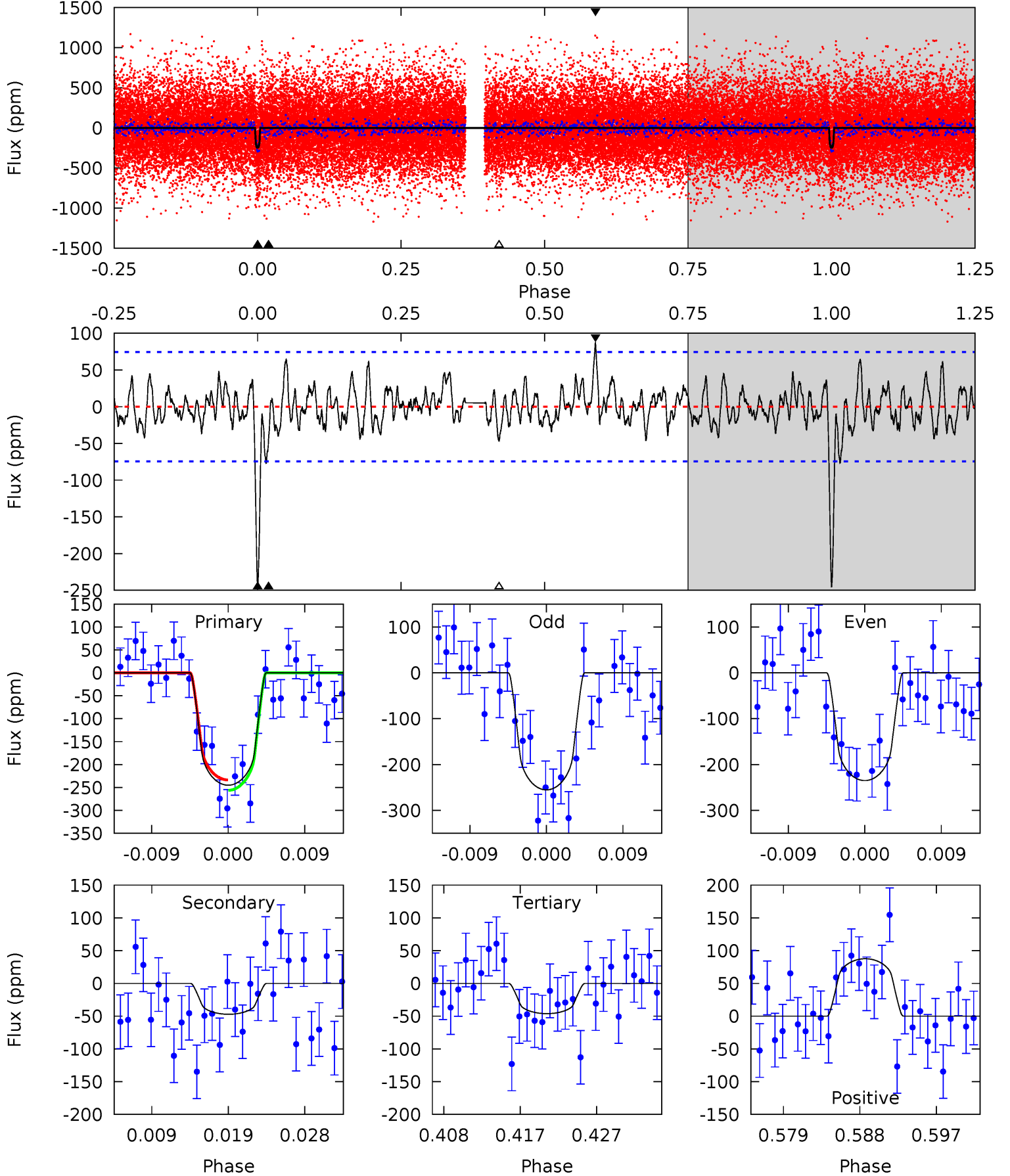
TCE 004180401-02 P= 15.412781 Days $T_0=139.132028$ (BKJD)



DV Model-Shift Uniqueness Test

004180401-02, $P = 15.412864$ Days, $E = 139.123050$ Days

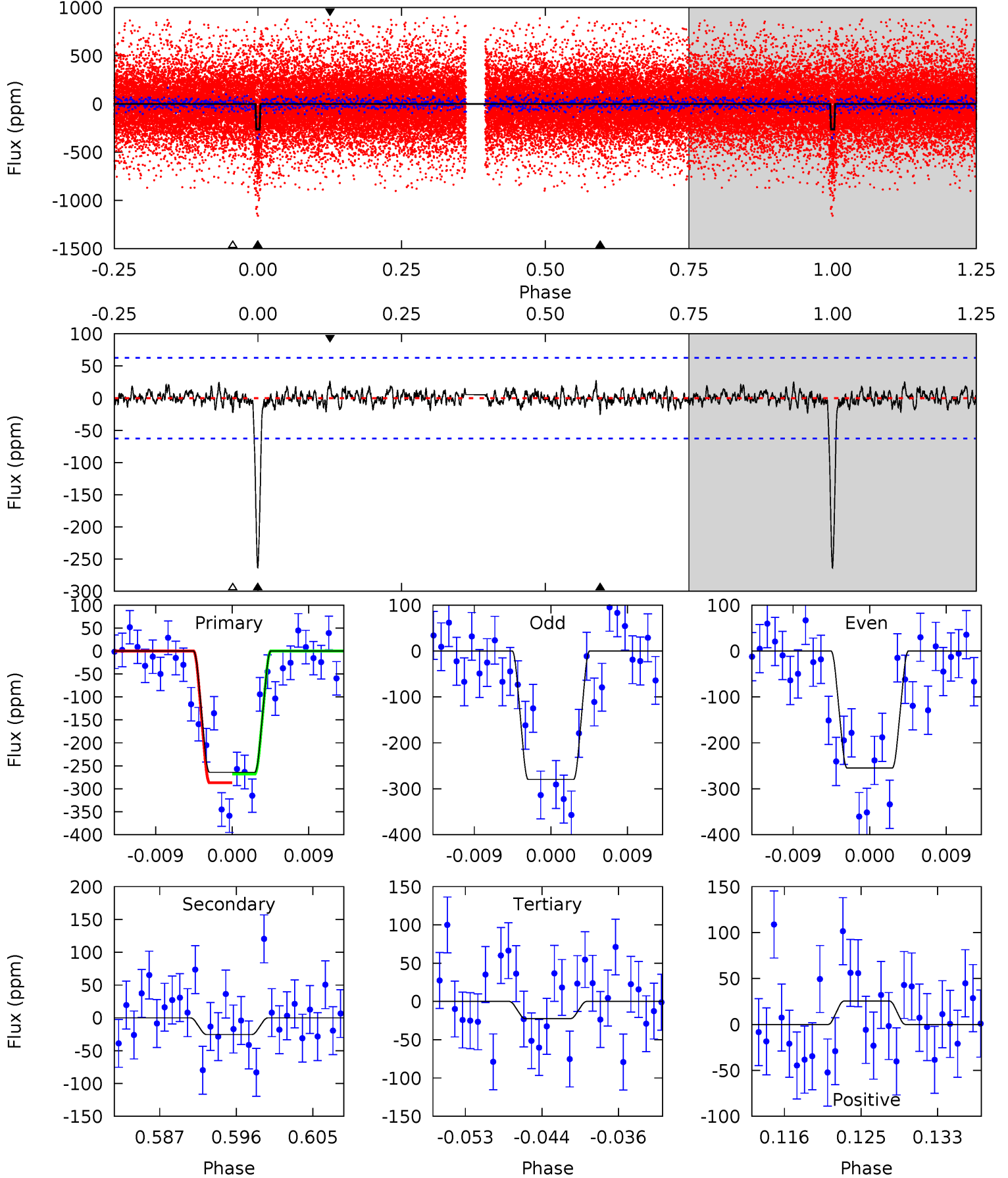
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.6	3.19	3.13	5.93	5.04	2.59	1.41	13.5	10.7	0.06	-2.74	0.69	0.96	0.26	0.77



Alt Model-Shift Uniqueness Test

004180401-02, $P = 15.412781$ Days, $E = 139.132028$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.3	2.04	1.80	2.05	5.05	2.62	0.62	19.5	19.2	0.24	-0.01	1.01	1.11	0.09	0.78



Stellar Parameters For KIC 004180401

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5240^{+189}_{-173}	$4.555^{+0.030}_{-0.120}$	$0.420^{+0.050}_{-0.300}$	$0.856^{+0.136}_{-0.063}$	$0.958^{+0.046}_{-0.101}$	$2.153^{+0.321}_{-0.735}$
	+4%/-3%	+1%/-3%	+12%/-71%	+16%/-7%	+5%/-11%	+15%/-34%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 004180401-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-47 ± 15	$1.65^{+1.17}_{-1.02}$	878^{+41}_{-36}	3675^{+1636}_{-589}	129^{+703}_{-86}
Alt.	-25 ± 12	$1.94^{+1.10}_{-0.95}$	877^{+45}_{-37}	3151^{+843}_{-477}	49^{+157}_{-34}

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 $A_{obs} \gg 1.0$

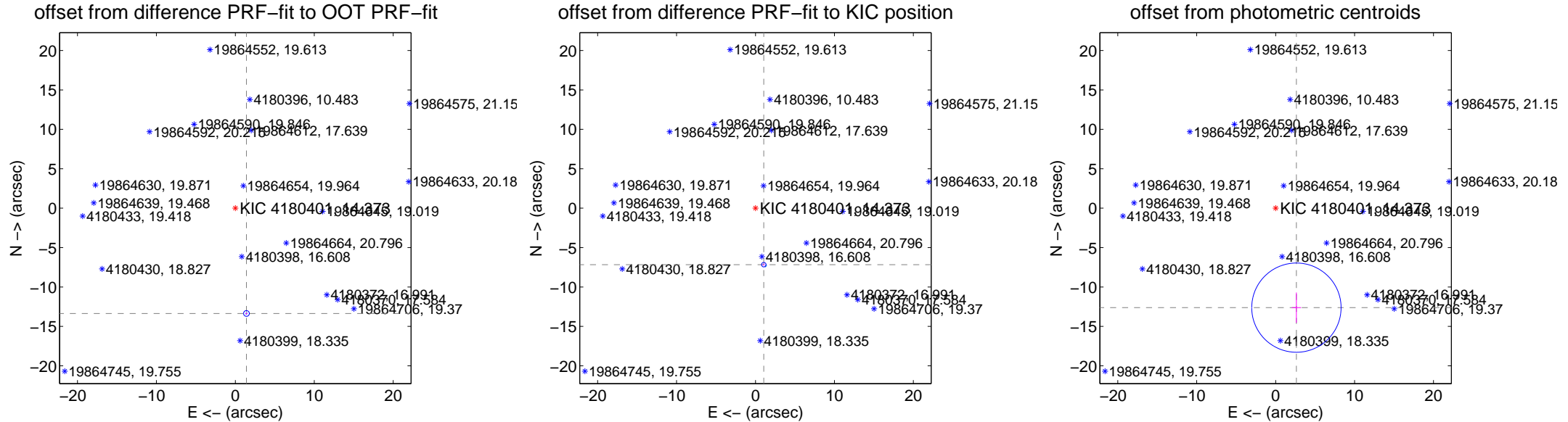
DV Centroid Data

Supplemental centroid analysis for 004180401-02. Kepler magnitude: 14.37. Transit SNR 9.06

There are 3 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 6.06 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	13.434 ± 0.122	110.47	-1.408 ± 0.114	-13.360 ± 0.122
PRF-fit source offset from KIC position	7.244 ± 0.095	76.55	-1.052 ± 0.094	-7.168 ± 0.090
photometric centroid source offset	12.89 ± 1.89	6.83	-2.63 ± 0.59	-12.62 ± 1.92



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

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

Q1 no difference image



Q1 no OOT image



Q2 no difference image



Q2 no OOT image



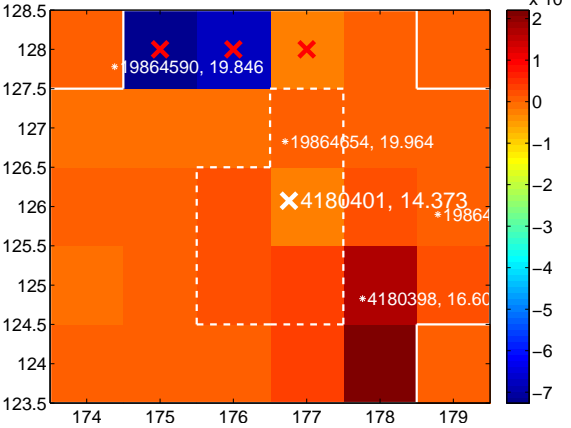
Q3 no difference image



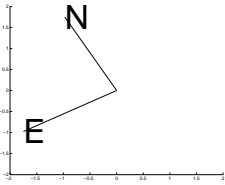
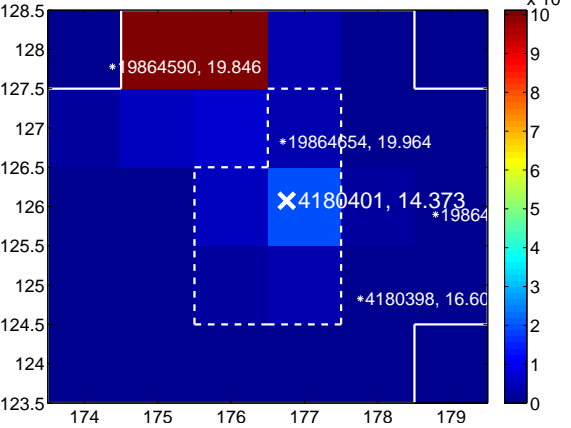
Q3 no OOT image



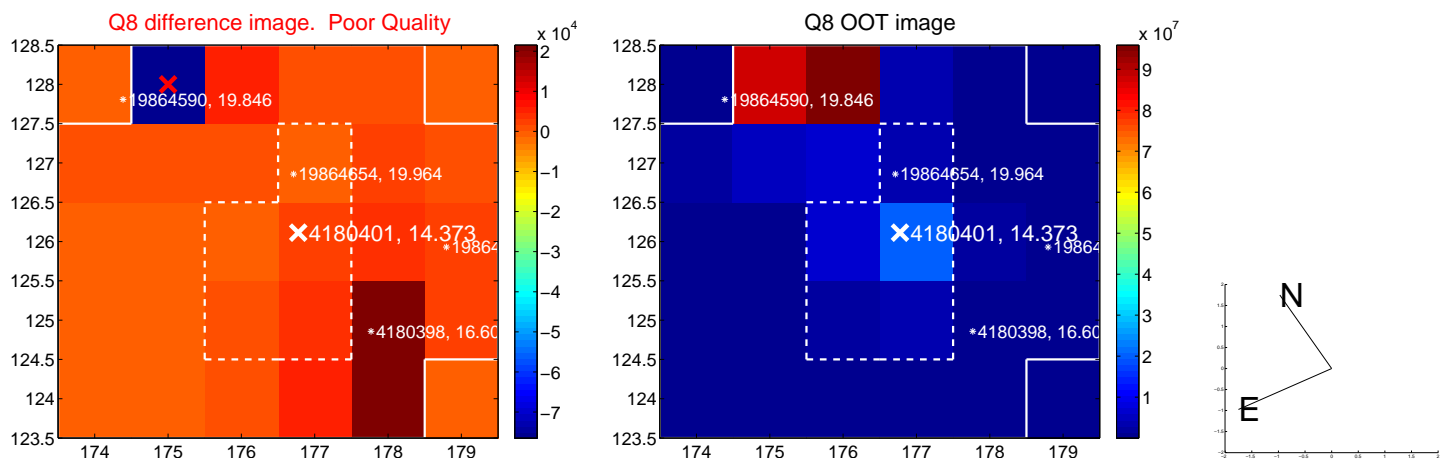
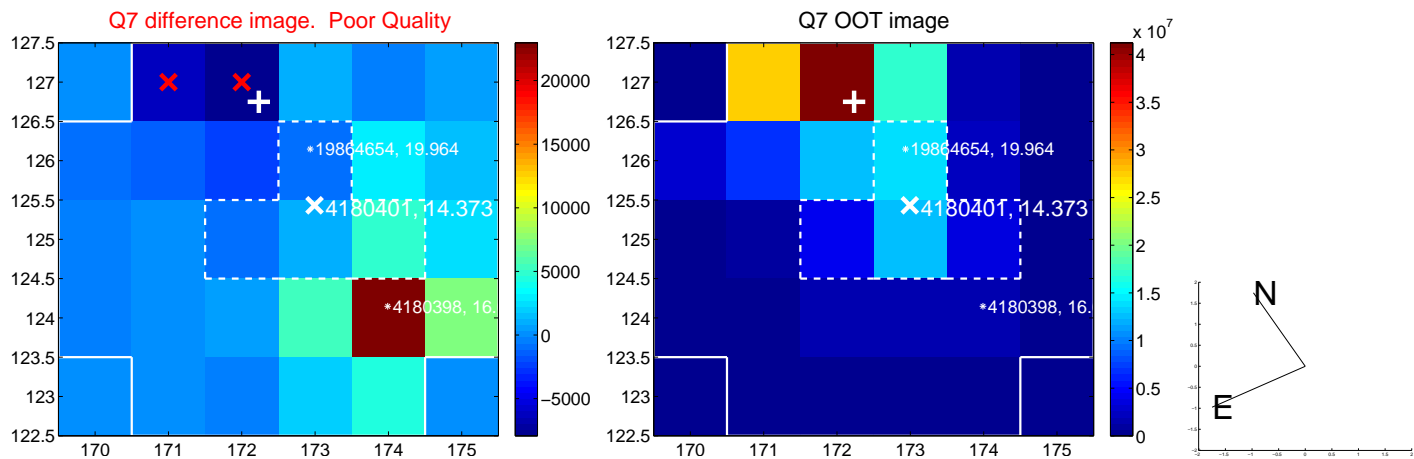
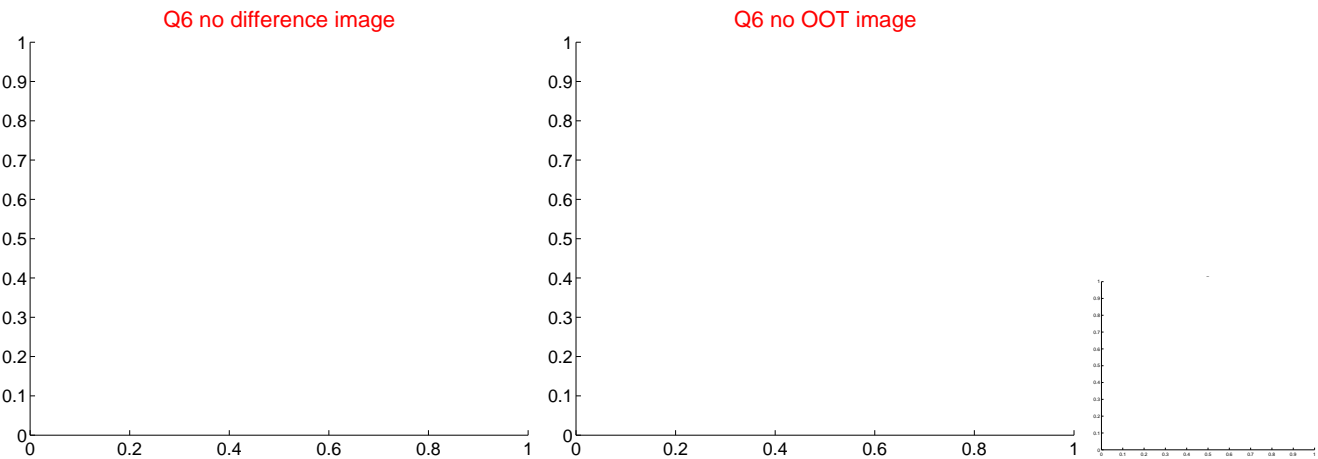
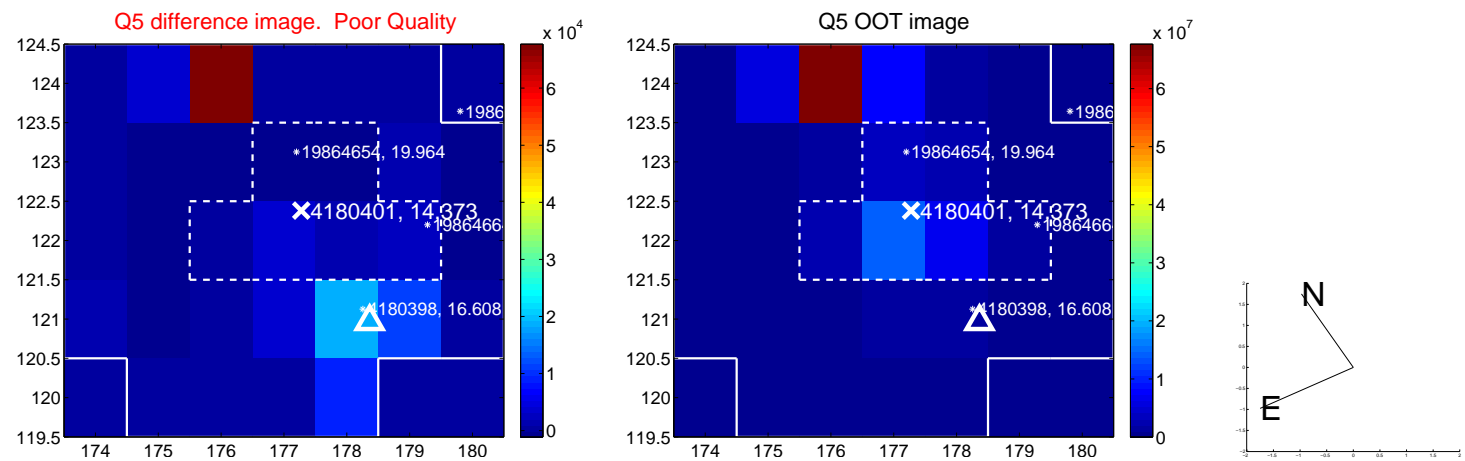
Q4 difference image. Poor Quality



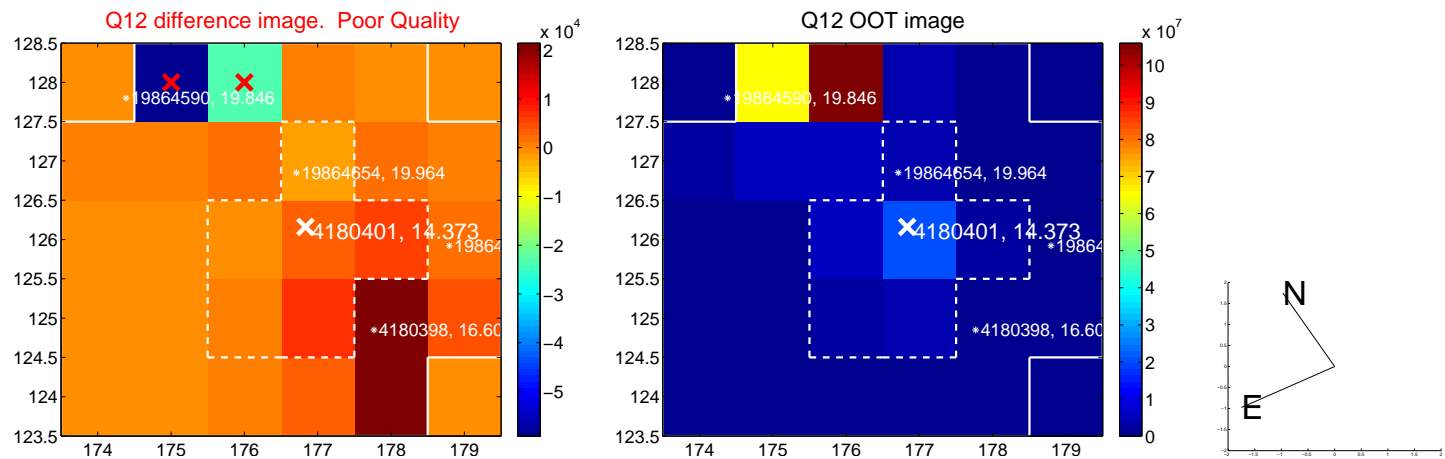
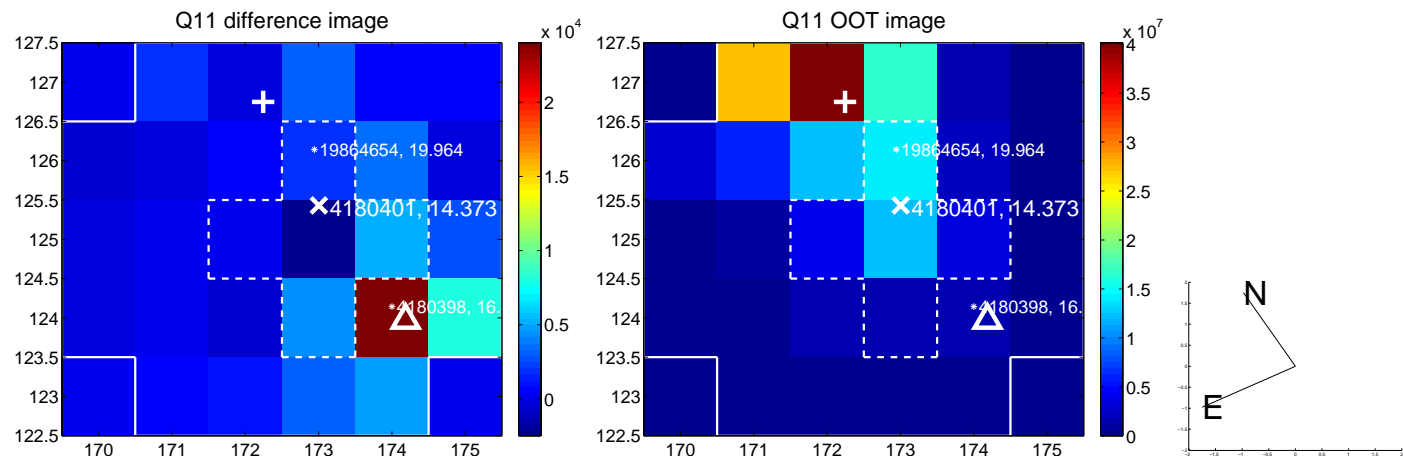
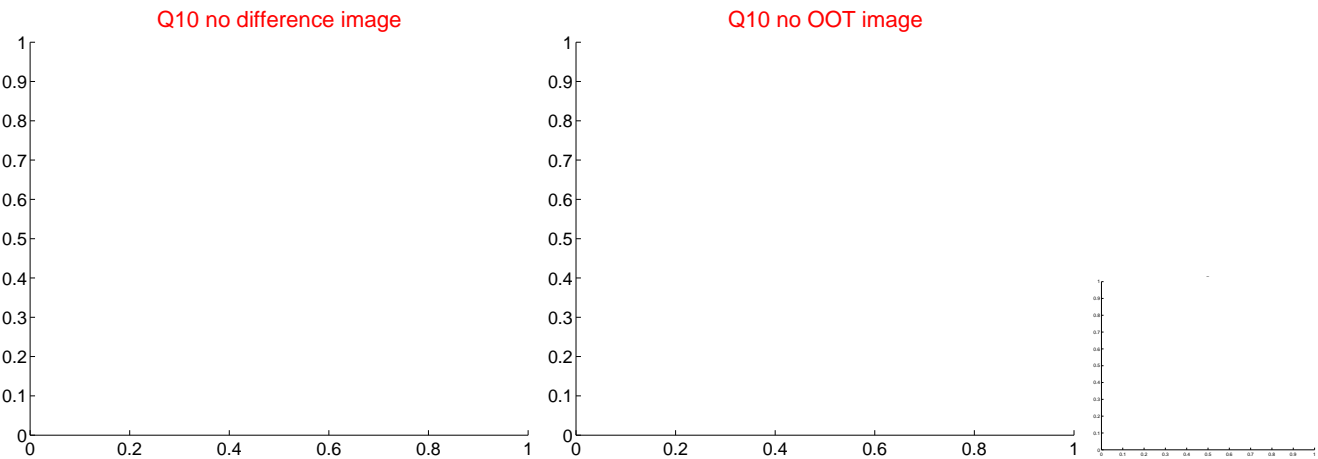
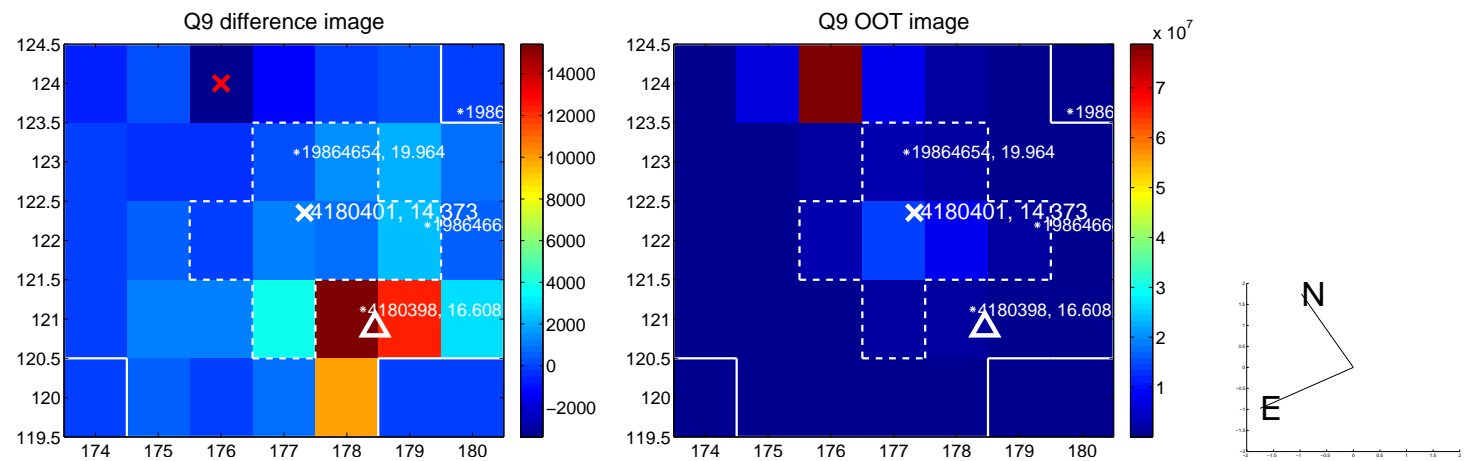
Q4 OOT image



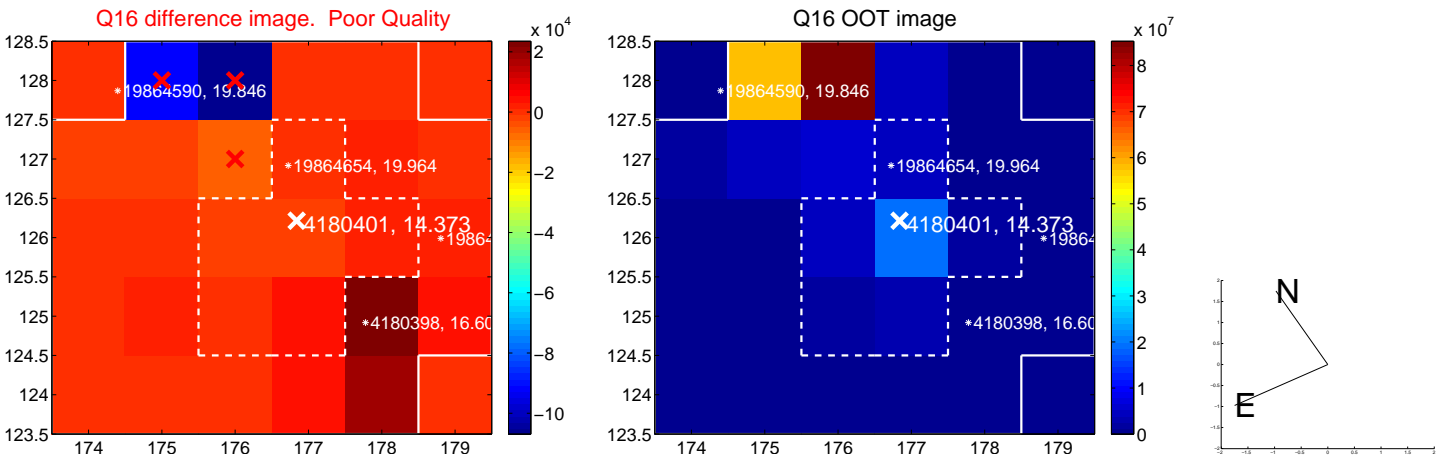
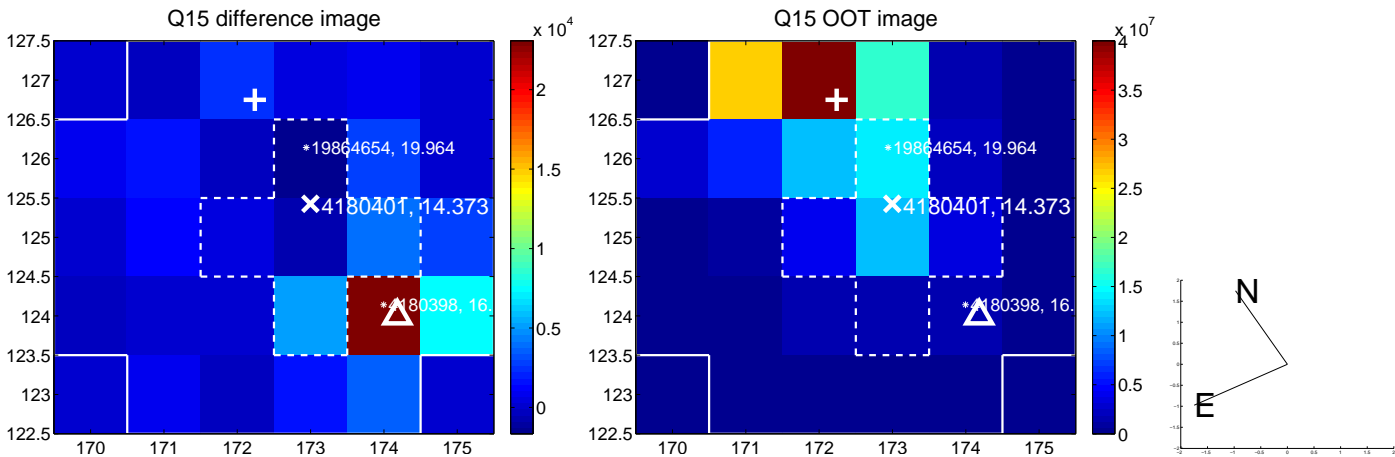
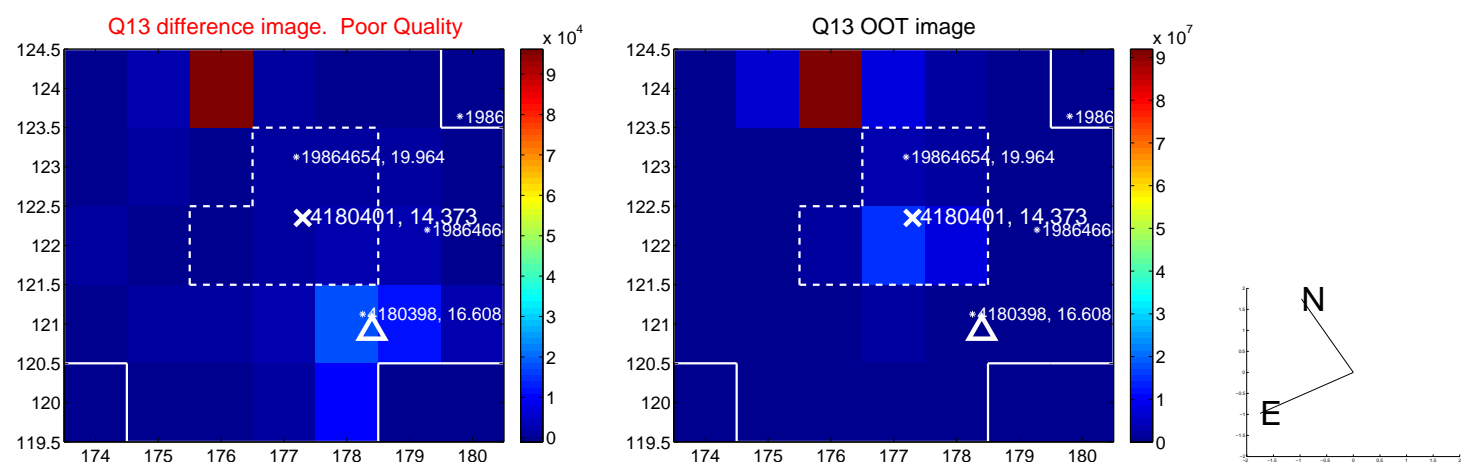
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



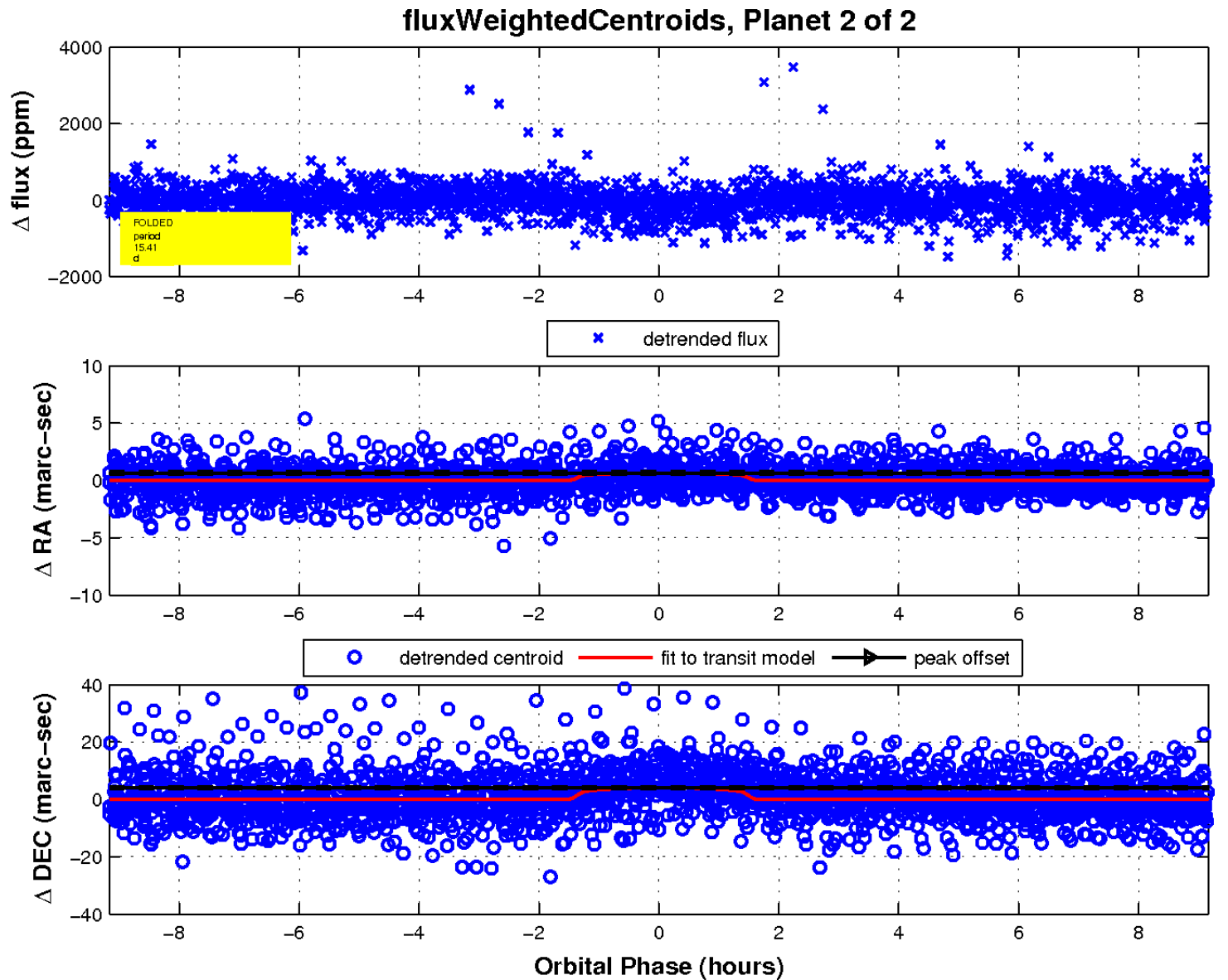
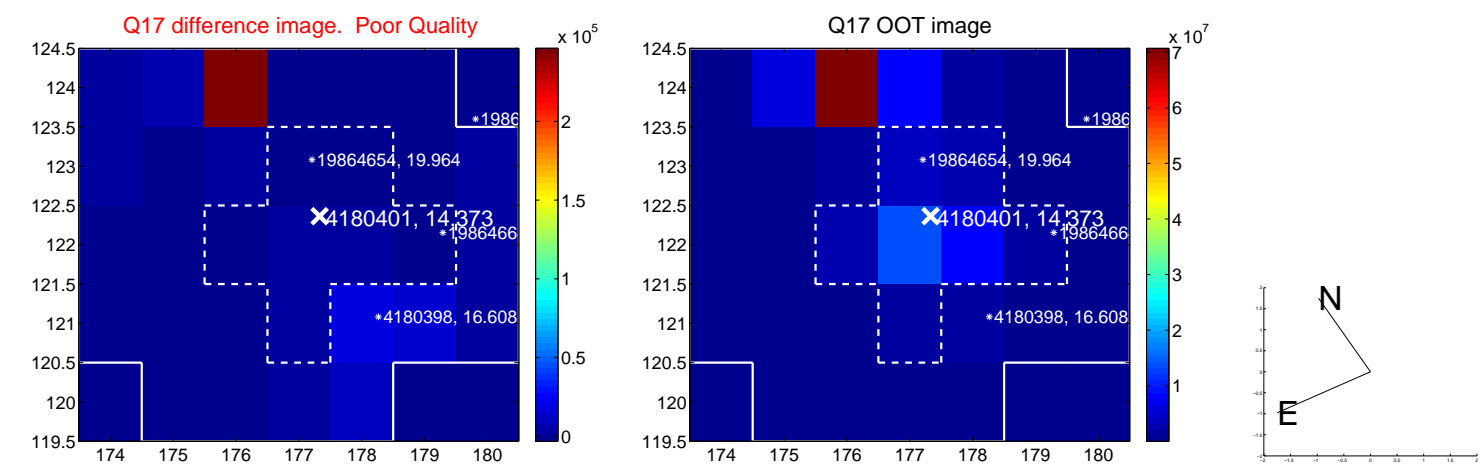
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

