

KIC 009612178

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})
009612178-01	OBS	No	1.004551	131.654559	14.2	5.380	9.0	6.4	3.73	5720	1.48	25579.25
009612178-02	OBS	No	182.471022	243.026694	285.9	2.616	9.0	7.2	3.73	5720	7.48	24.86
009612178-03	OBS	No	145.043502	233.551262	249.9	2.736	7.5	7.7	3.73	5720	6.59	33.77
009612178-04	OBS	No	51.633778	151.646265	260.6	2.508	7.5	8.1	3.73	5720	7.03	133.85

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009612178-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
009612178-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009612178-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET
009612178-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT

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

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

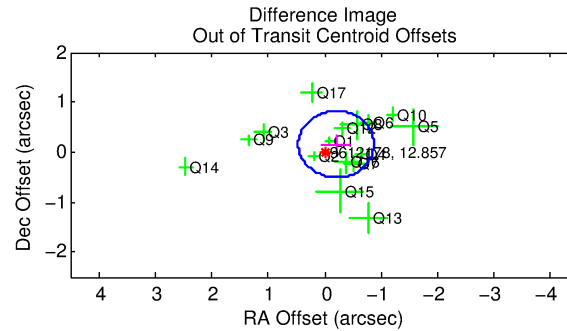
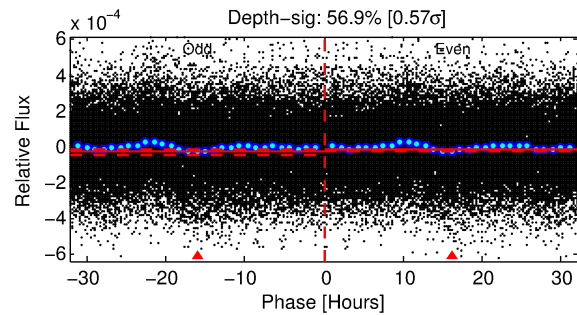
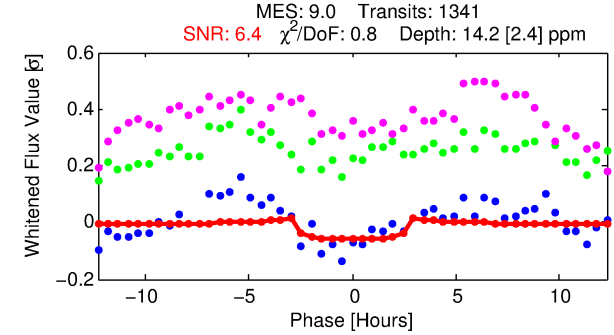
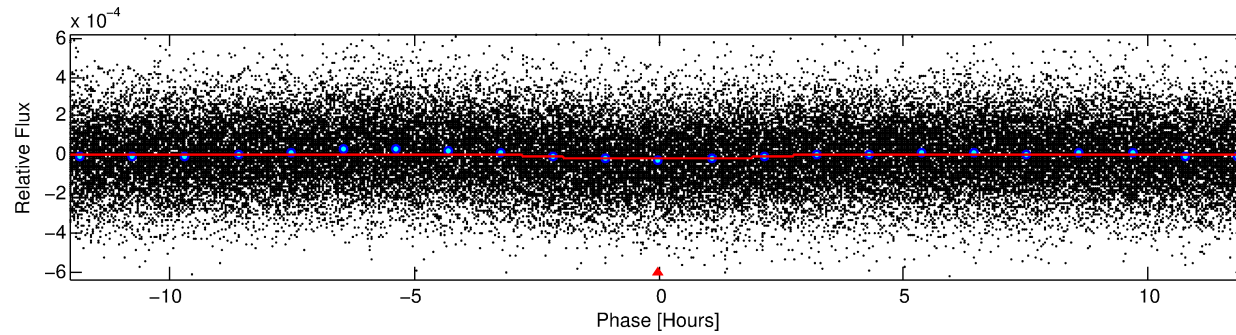
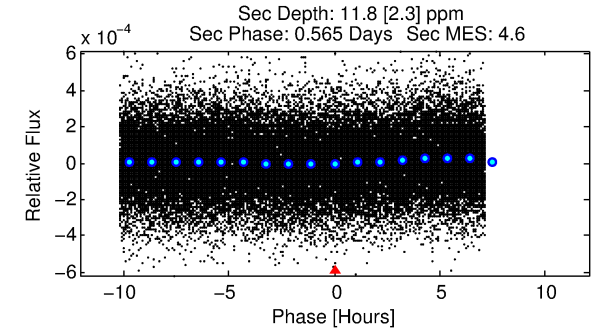
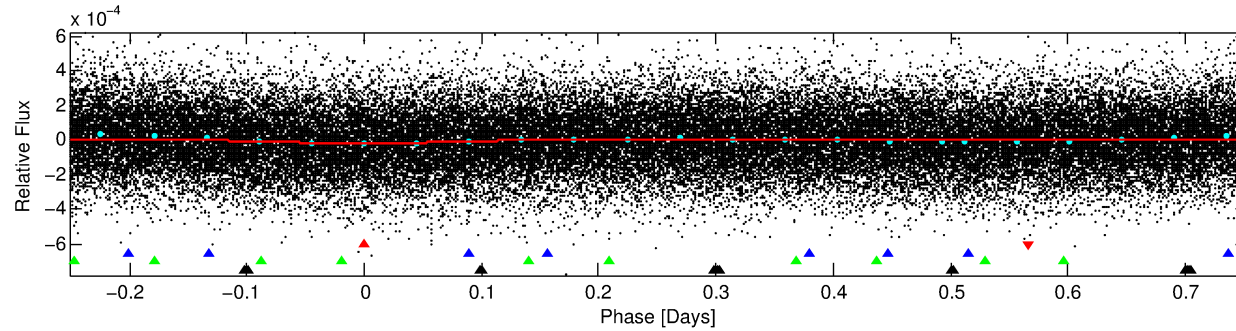
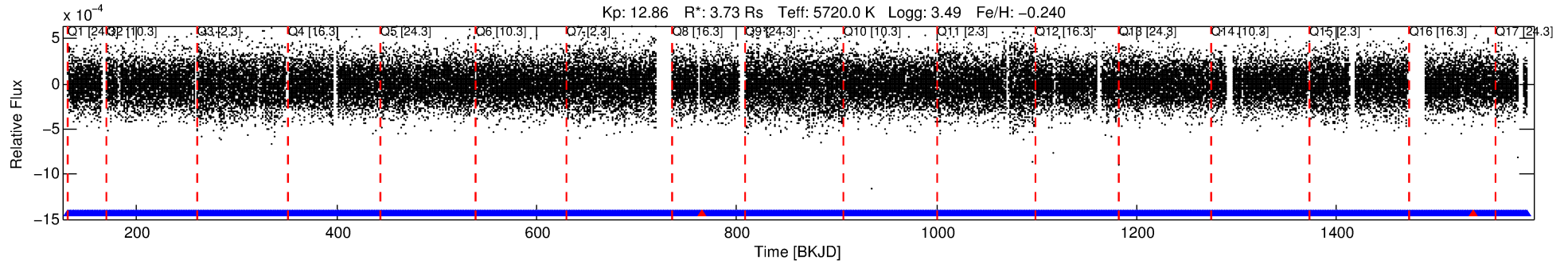
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009612178-01

No Significant Match Found

DV One-Page Summary

KIC: 9612178 Candidate: 1 of 4 Period: 1.005 d



DV Fit Results:

Period = 1.00455 [0.00002] d
Epoch = 131.6546 [0.0065] BKJD
Rp/R* = 0.0036 [0.0016]
a/R* = 1.35 [1.19]
b = 0.65 [1.77]
Seff = 25579.25 [16546.26]
Teq = 3225 [521] K
Rp = 1.48 [0.92] Re
a = 0.0229 [0.0093] AU
Ag = 1.54 [1.66] [0.32σ]
Teff = 5552 [1235] K [1.74σ]

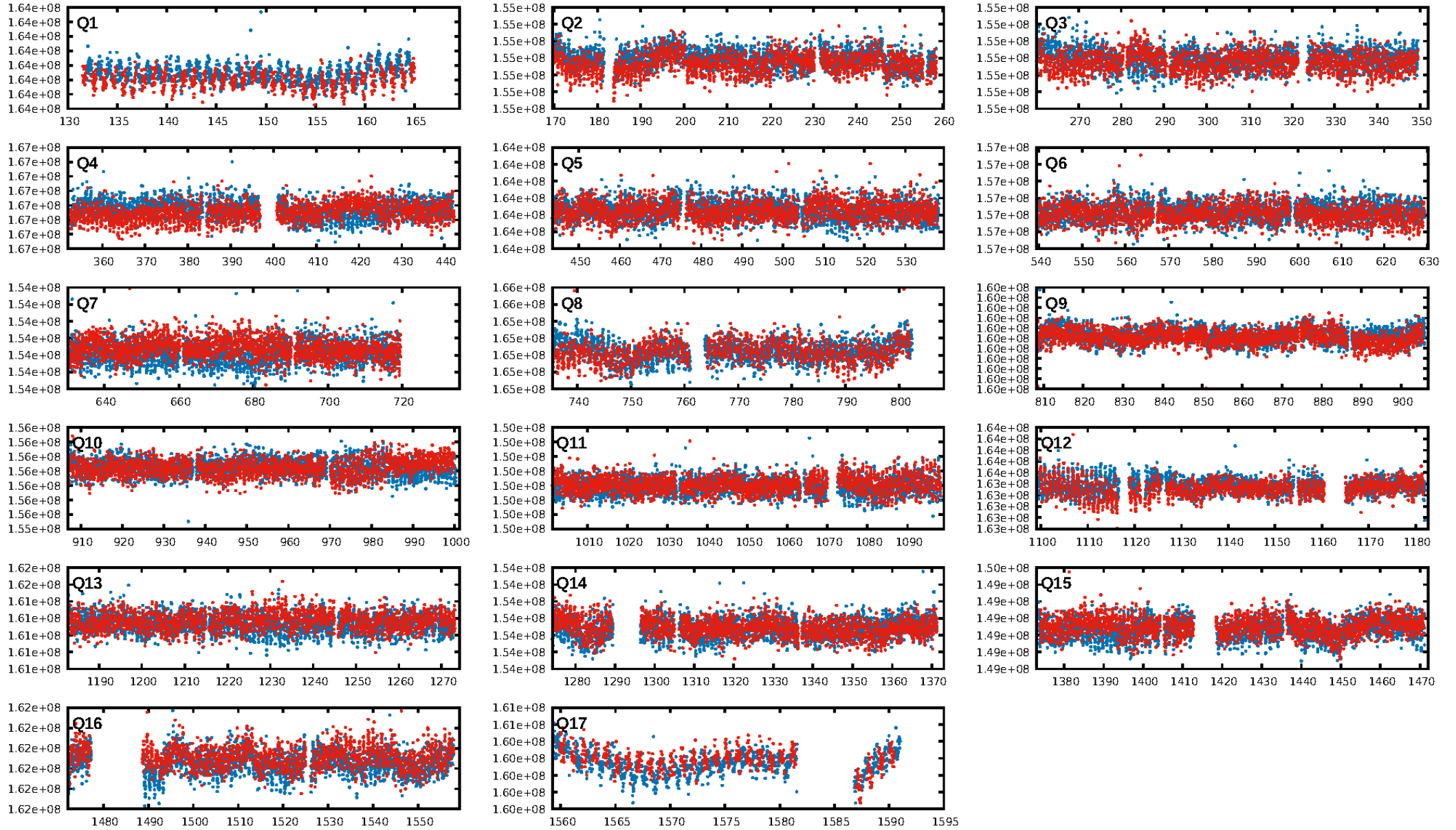
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [204.71σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.62e-13
RollingBand-fgt: 1.00 [1279/1281]
GhostDiagnostic-chr: 10.18
Centroid-sig: N/A
Centroid-so: 2.063 arcsec [1.61σ]
OotOffset-rm: 0.257 arcsec [1.15σ]
OotOffset-st: 4/3/4/5 [16]
KicOffset-rm: 0.280 arcsec [1.17σ]
KicOffset-st: 4/3/4/5 [16]
DiffImageQuality-fgm: 0.69 [11/16]
DiffImageOverlap-fno: 1.00 [17/17]

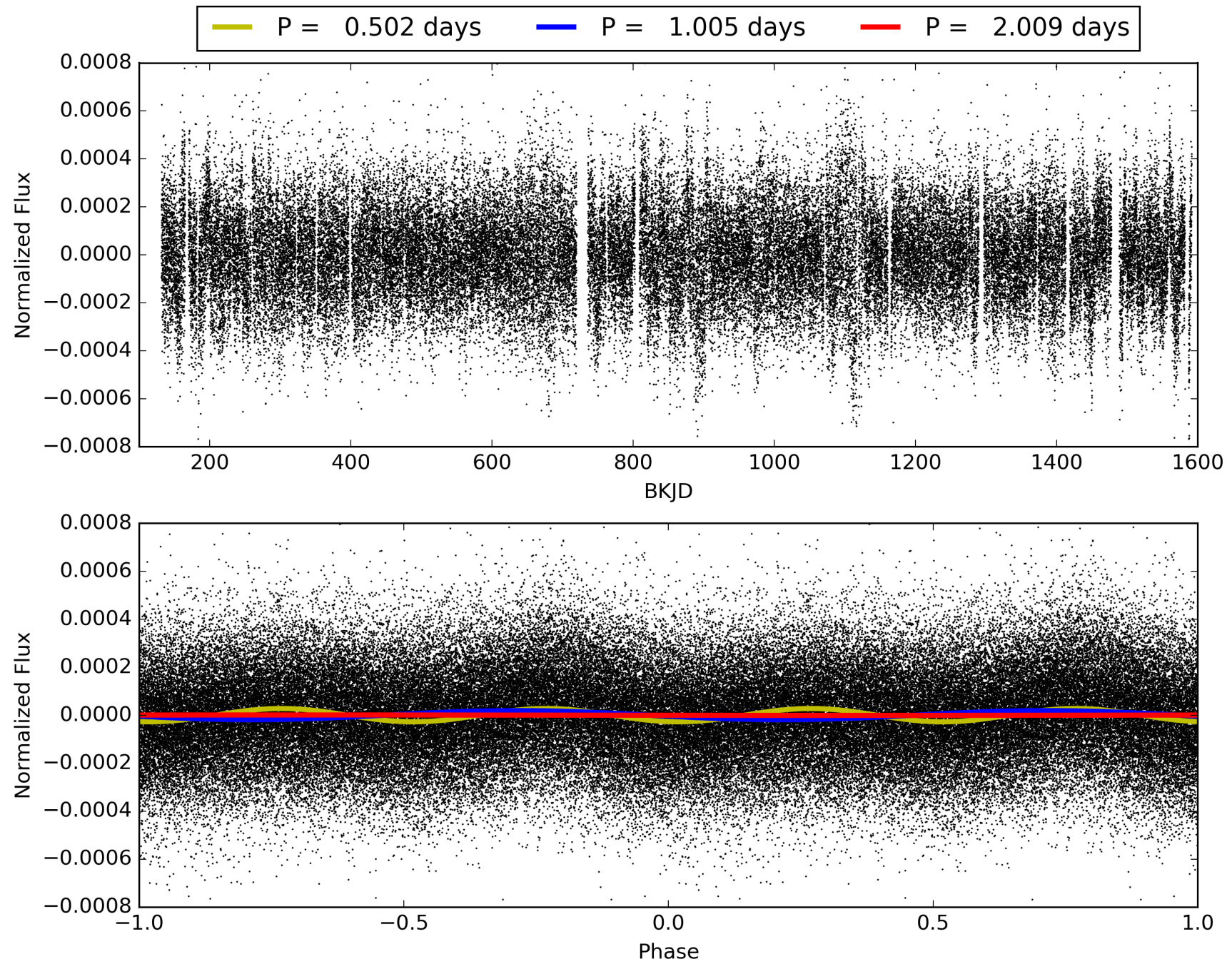
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 17:33:08 Z

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

TCE 009612178-01, PDC Light Curves

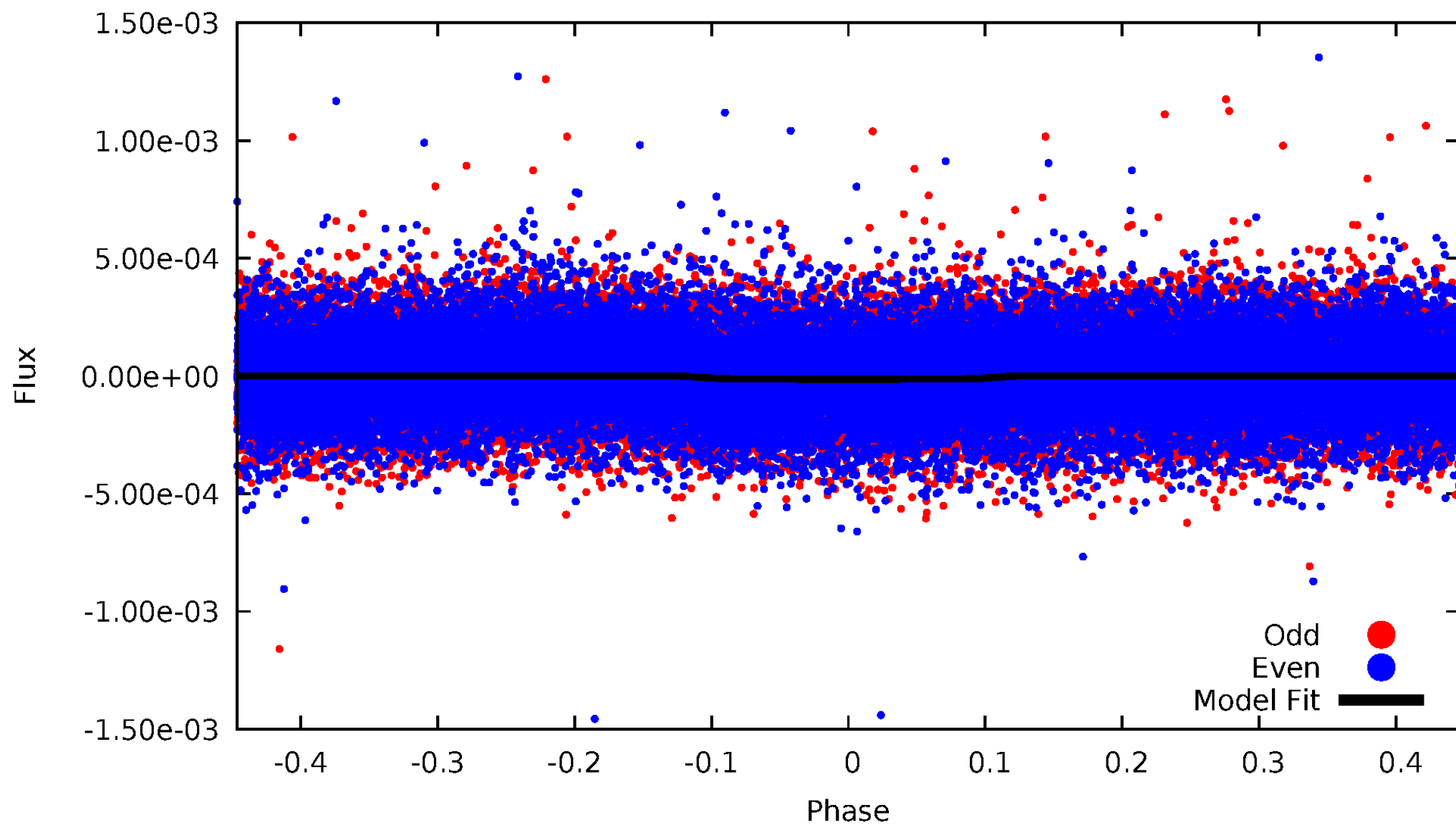


TCE 009612178-01



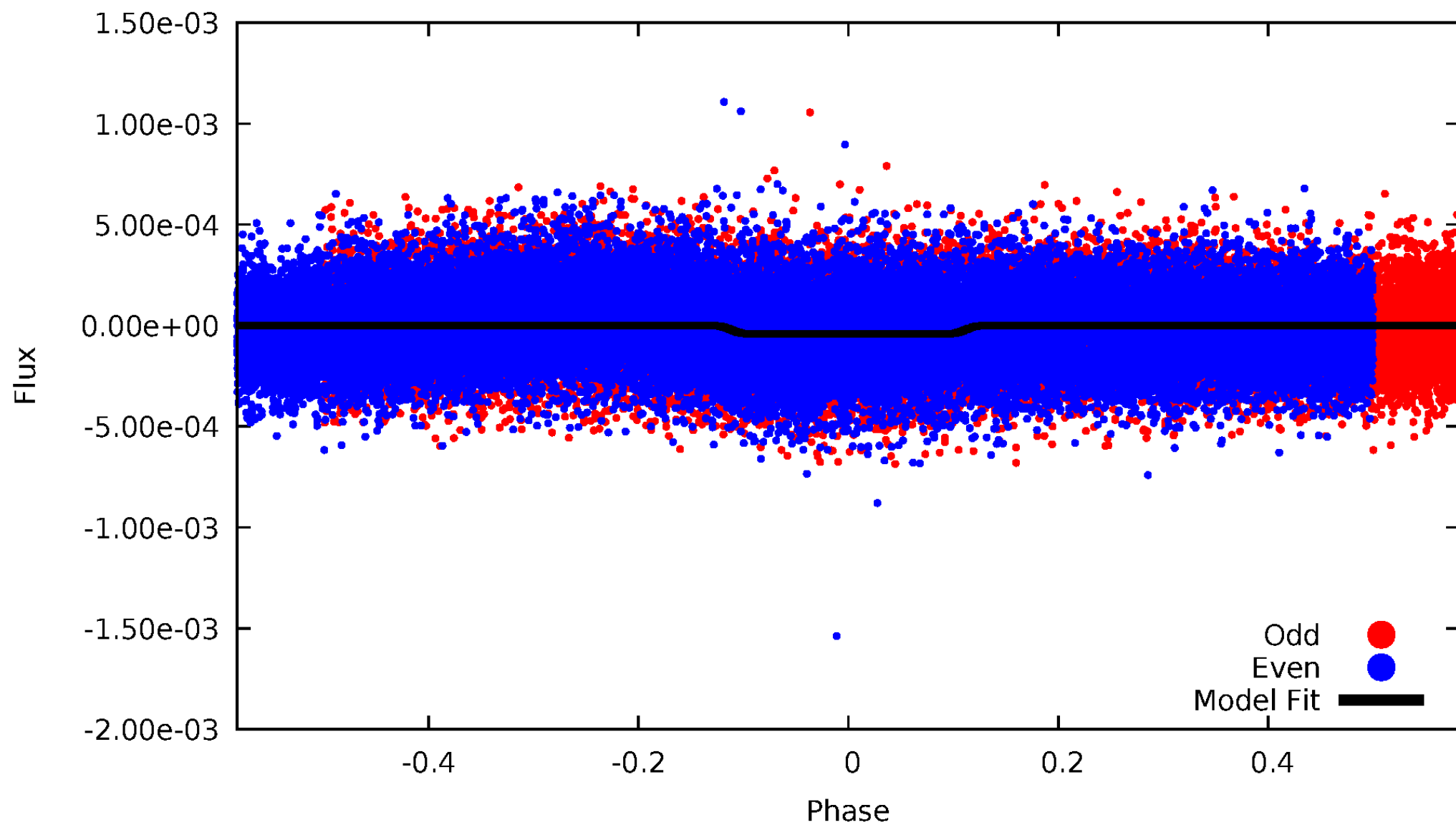
DV Odd/Even

TCE 009612178-01

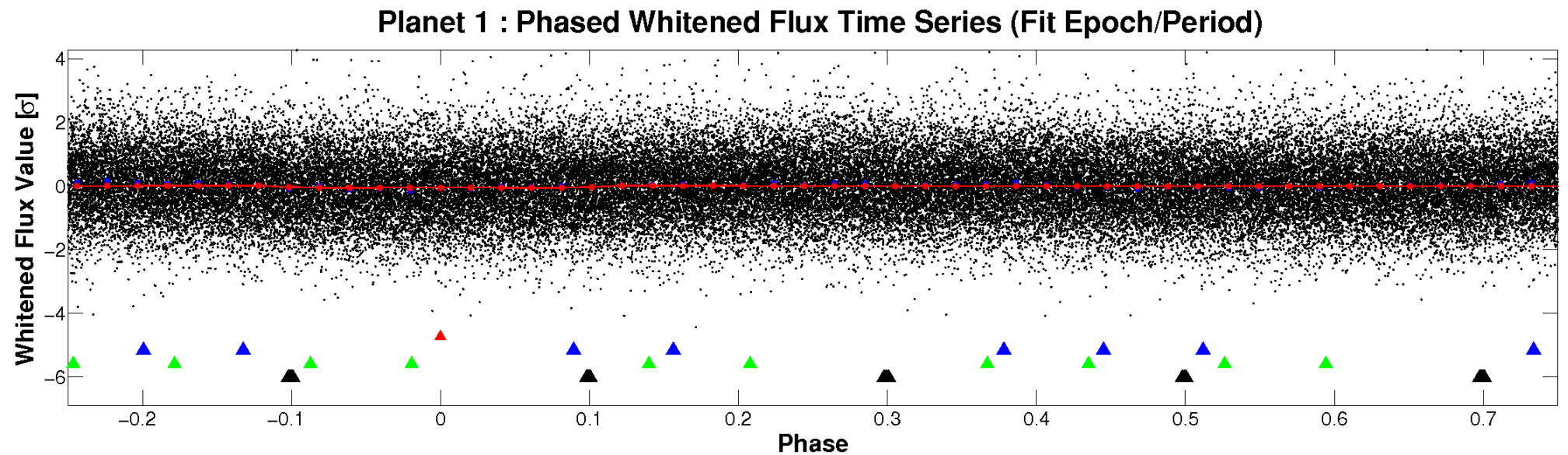
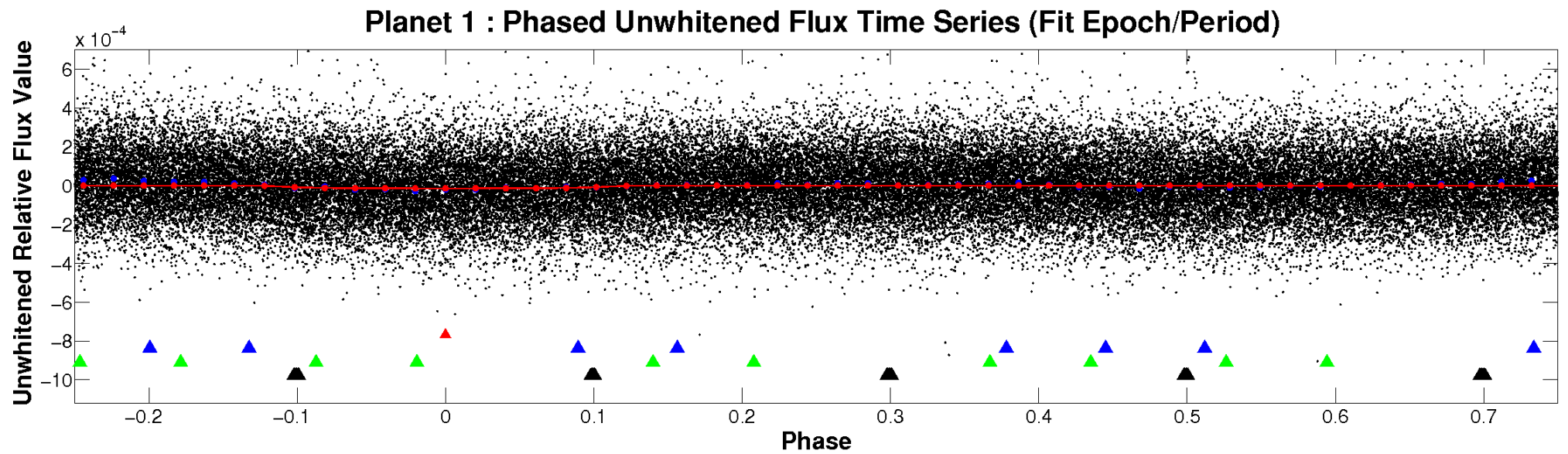


ALT Odd/Even

TCE 009612178-01

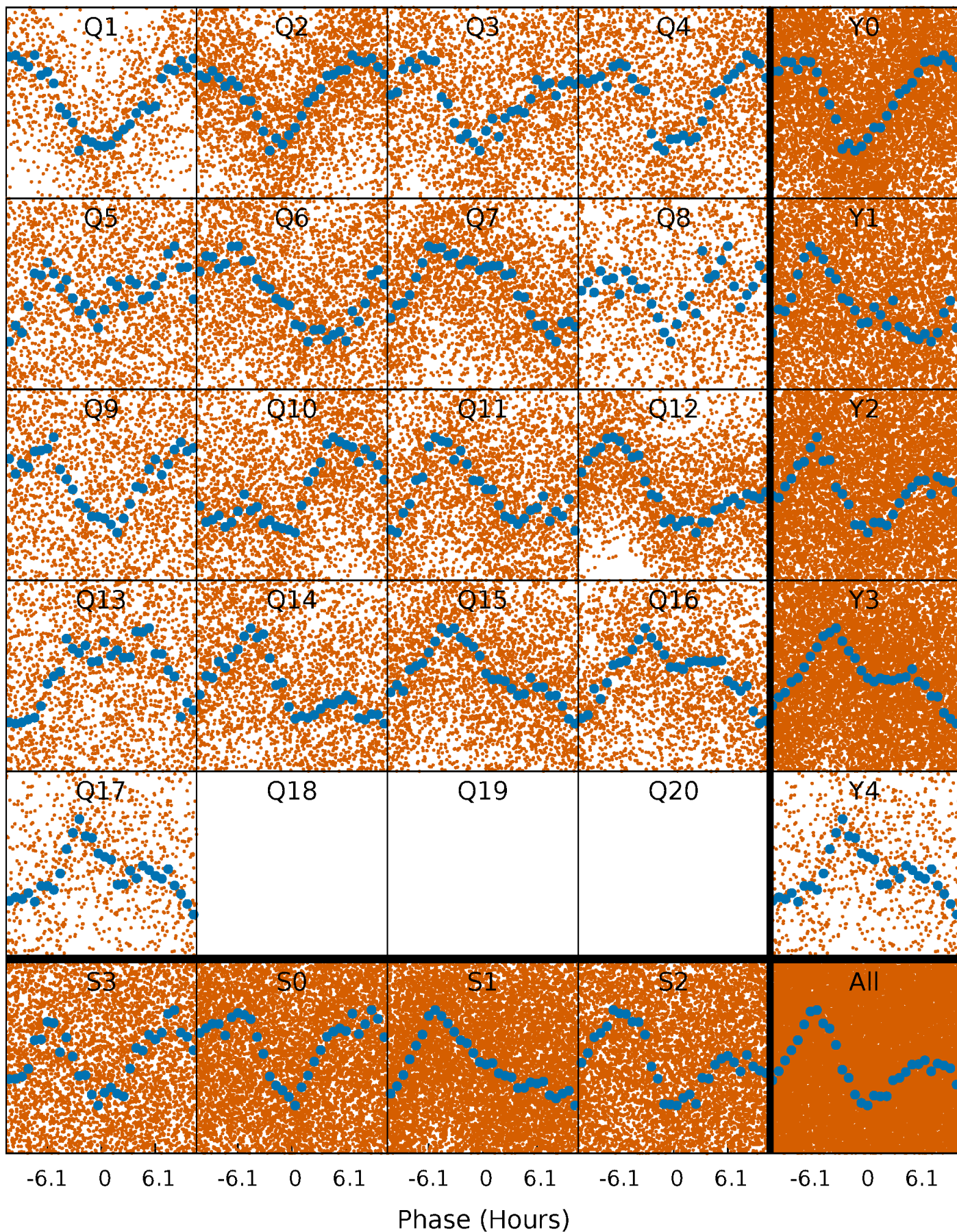


Non-Whitened Vs. Whitened Light Curve



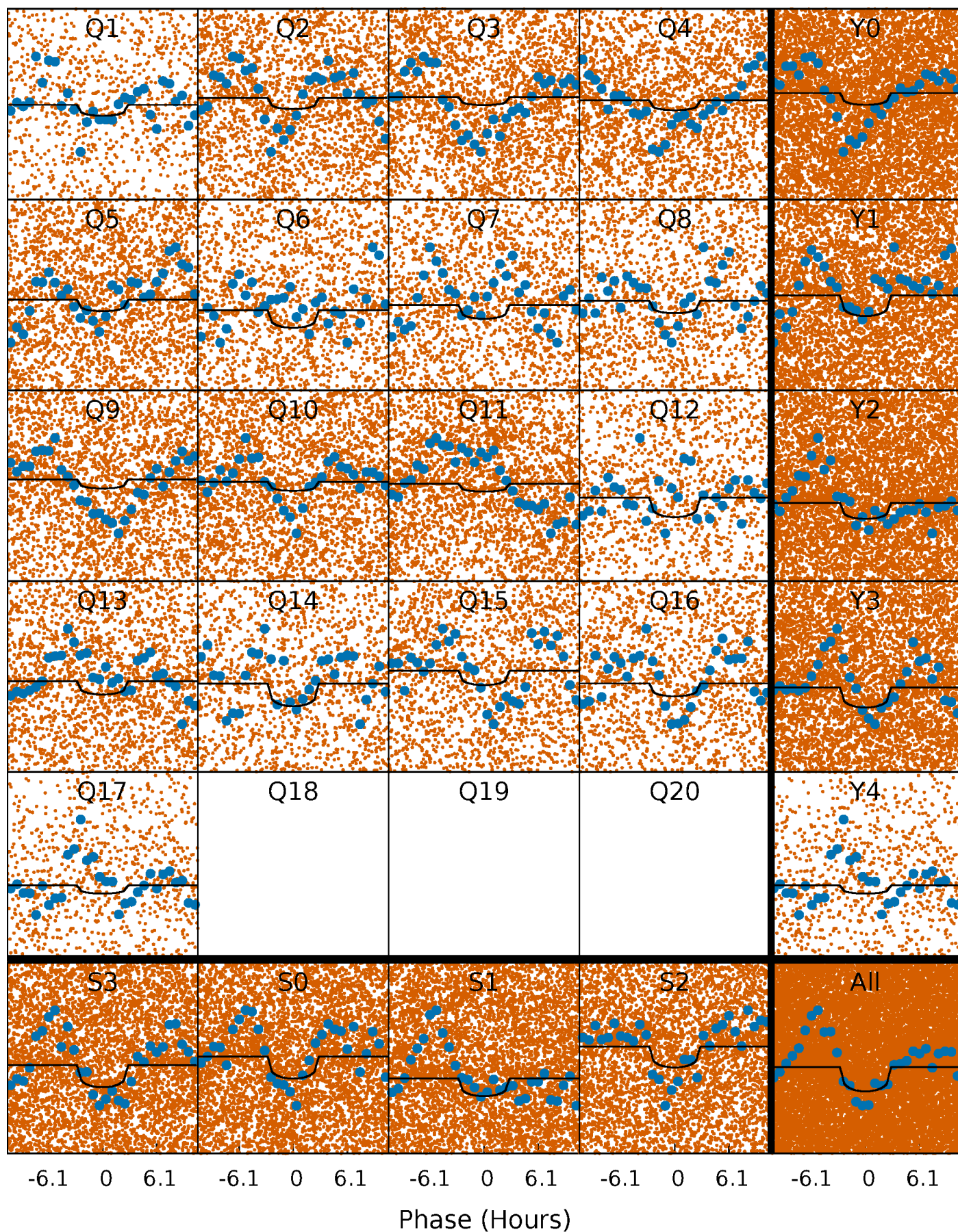
PDC Quarter-Phased Transit Curves

TCE 009612178-01 P= 1.004551 Days $T_0=131.654559$ (BKJD)



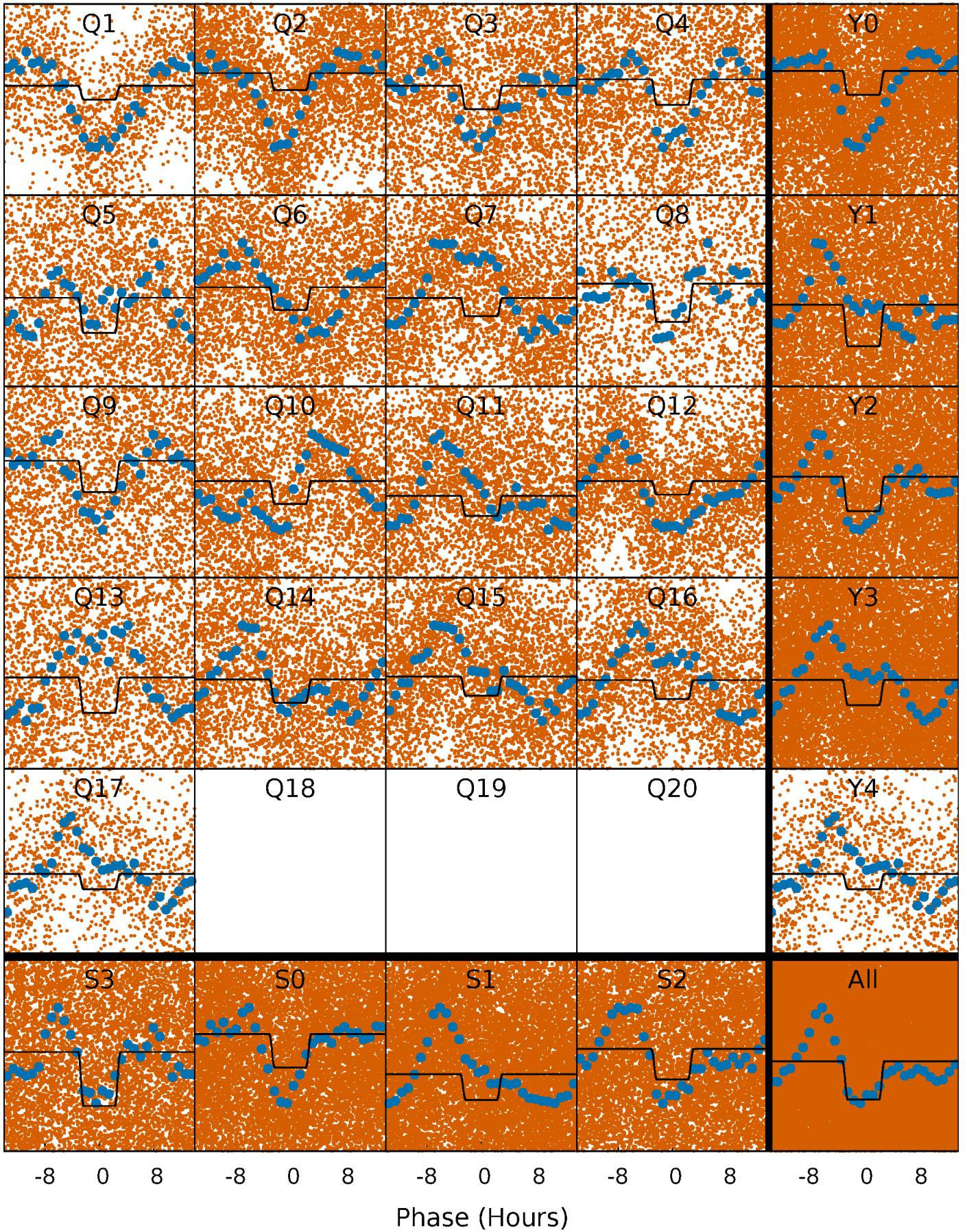
DV Quarter-Phased Transit Curves

TCE 009612178-01 P= 1.004551 Days $T_0=131.654559$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

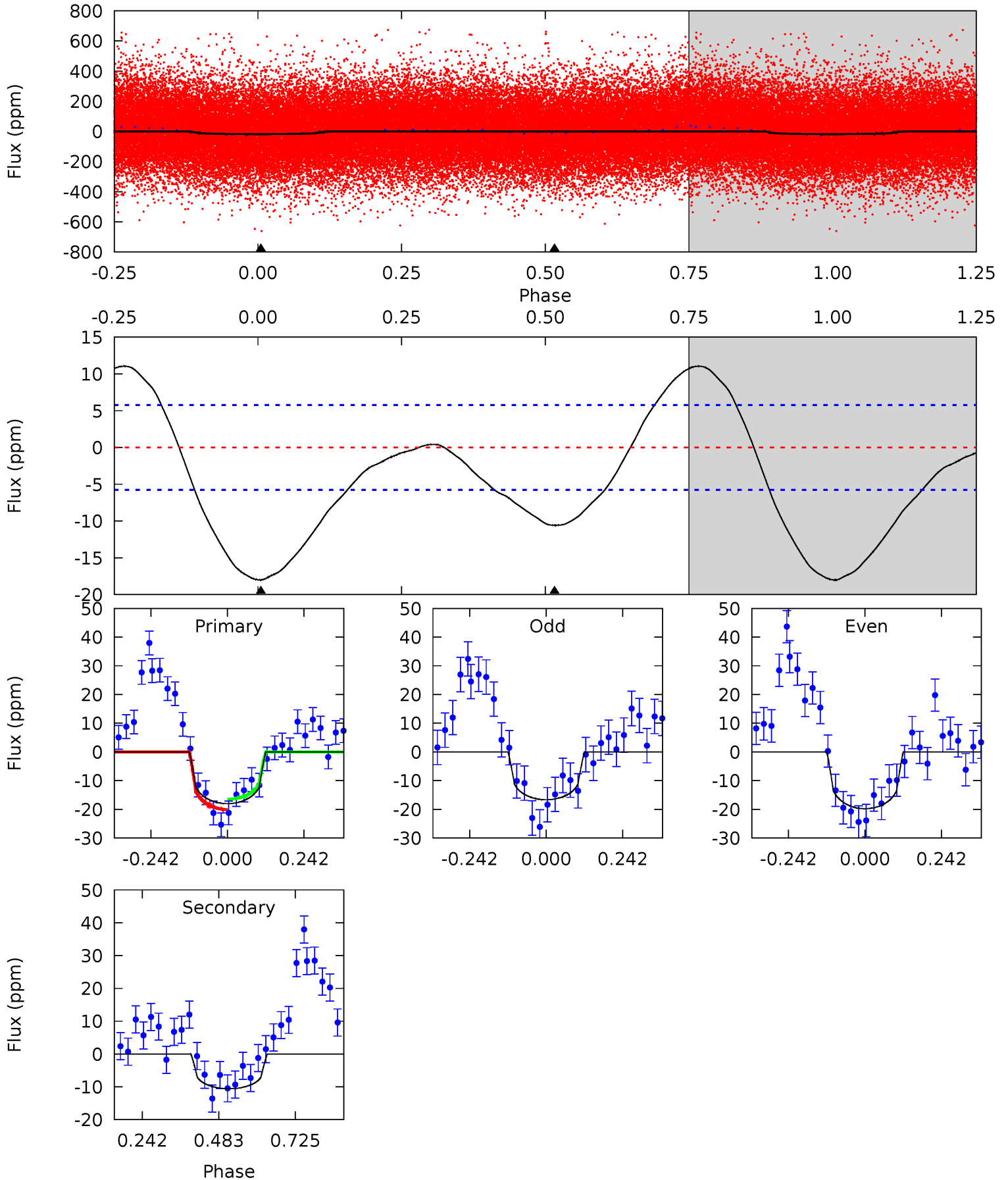
TCE 009612178-01 P= 1.004630 Days $T_0=131.632868$ (BKJD)



DV Model-Shift Uniqueness Test

009612178-01, P = 1.004551 Days, E = 130.650008 Days

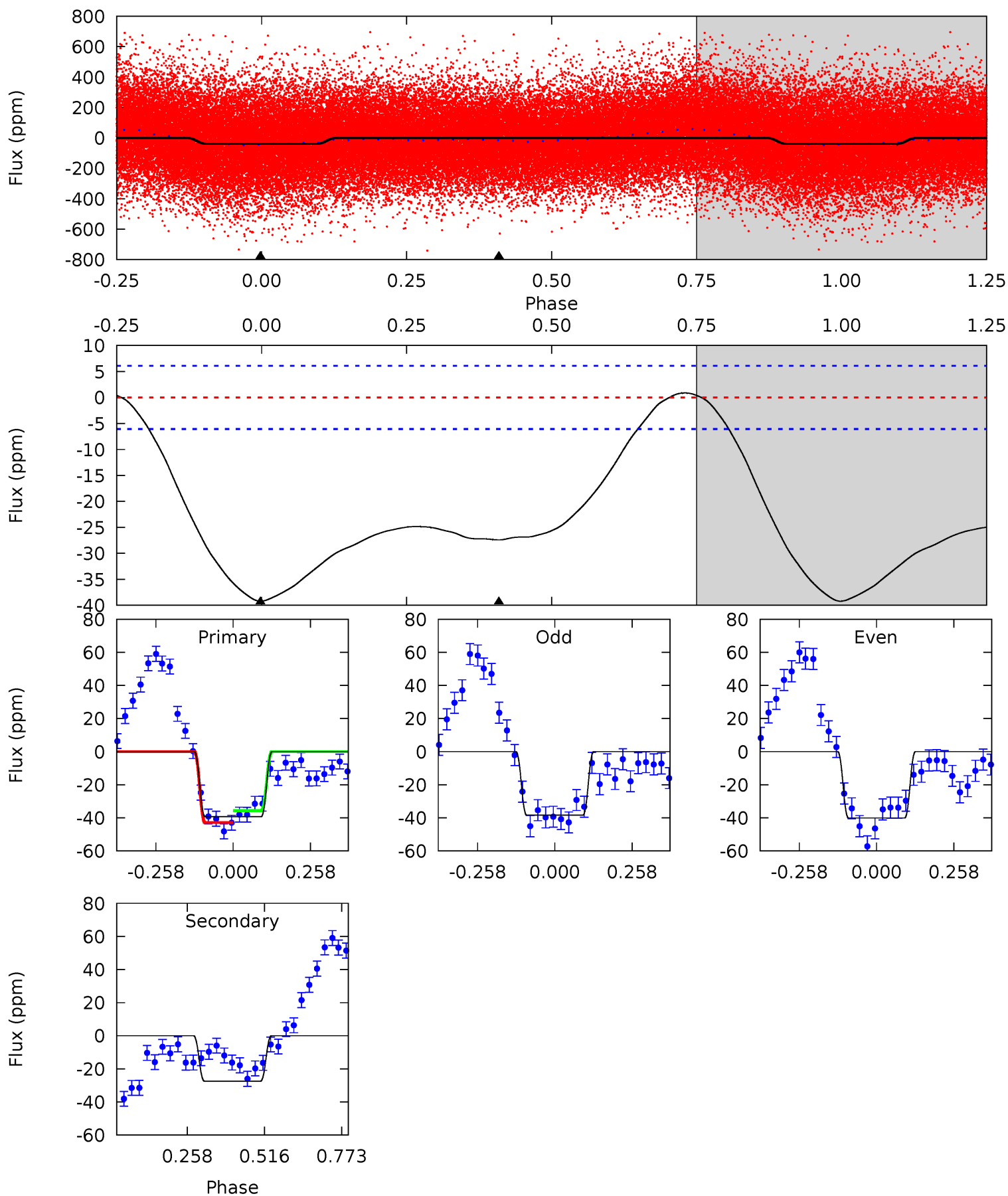
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.7	8.02	0	0	4.38	1.17	4.21	13.7	13.7	8.02	8.02	1.19	1.04	0.38	1.38



Alt Model-Shift Uniqueness Test

009612178-01, P = 1.004630 Days, E = 130.628238 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.1	19.6	0	0	4.36	1.13	1.35	28.1	28.1	19.6	19.6	0.60	1.10	0.02	2.60



Stellar Parameters For KIC 009612178

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5720^{+179}_{-219}	$3.492^{+0.360}_{-0.120}$	$-0.240^{+0.300}_{-0.350}$	$3.733^{+0.718}_{-1.676}$	$1.579^{+0.180}_{-0.540}$	$0.043^{+0.128}_{-0.016}$
	+3%/-4%	+10%/-3%	+125%/-146%	+19%/-45%	+11%/-34%	+300%/-37%
Source	PHO1	FLK73	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 009612178-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-11 ± 1	$1.37^{+0.73}_{-0.60}$	4410^{+324}_{-451}	5083^{+2083}_{-977}	$1.596^{+3.433}_{-0.930}$
Alt.	-27 ± 1	$2.44^{+0.82}_{-0.71}$	4419^{+296}_{-482}	4900^{+724}_{-590}	$1.308^{+1.175}_{-0.539}$

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 $A_{obs} \gg 1.0$

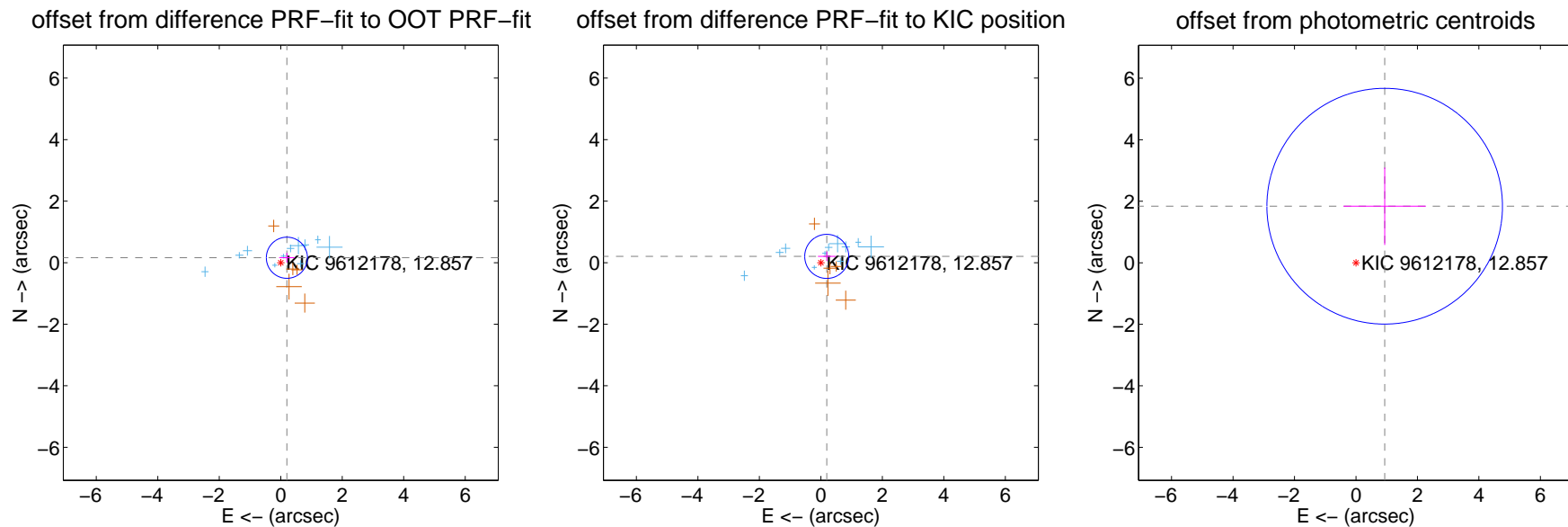
DV Centroid Data

Supplemental centroid analysis for 009612178-01. Kepler magnitude: 12.86. Transit SNR 6.44

There are 11 quarters with good PRF difference image offsets

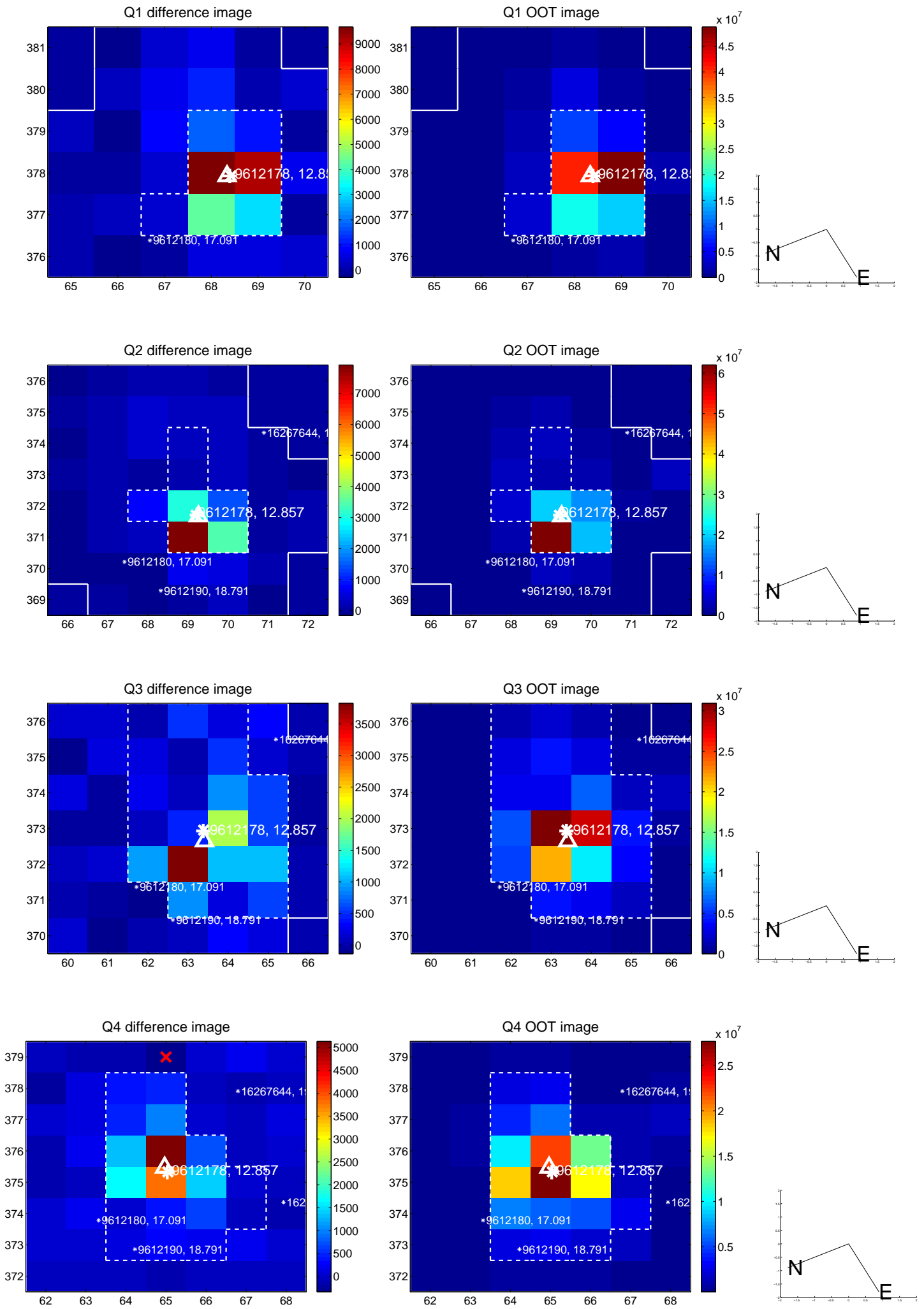
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.257 ± 0.223	1.15	-0.200 ± 0.252	0.161 ± 0.158
PRF-fit source offset from KIC position	0.280 ± 0.239	1.17	-0.191 ± 0.288	0.205 ± 0.154
photometric centroid source offset	2.06 ± 1.28	1.61	-0.93 ± 1.34	1.84 ± 1.26

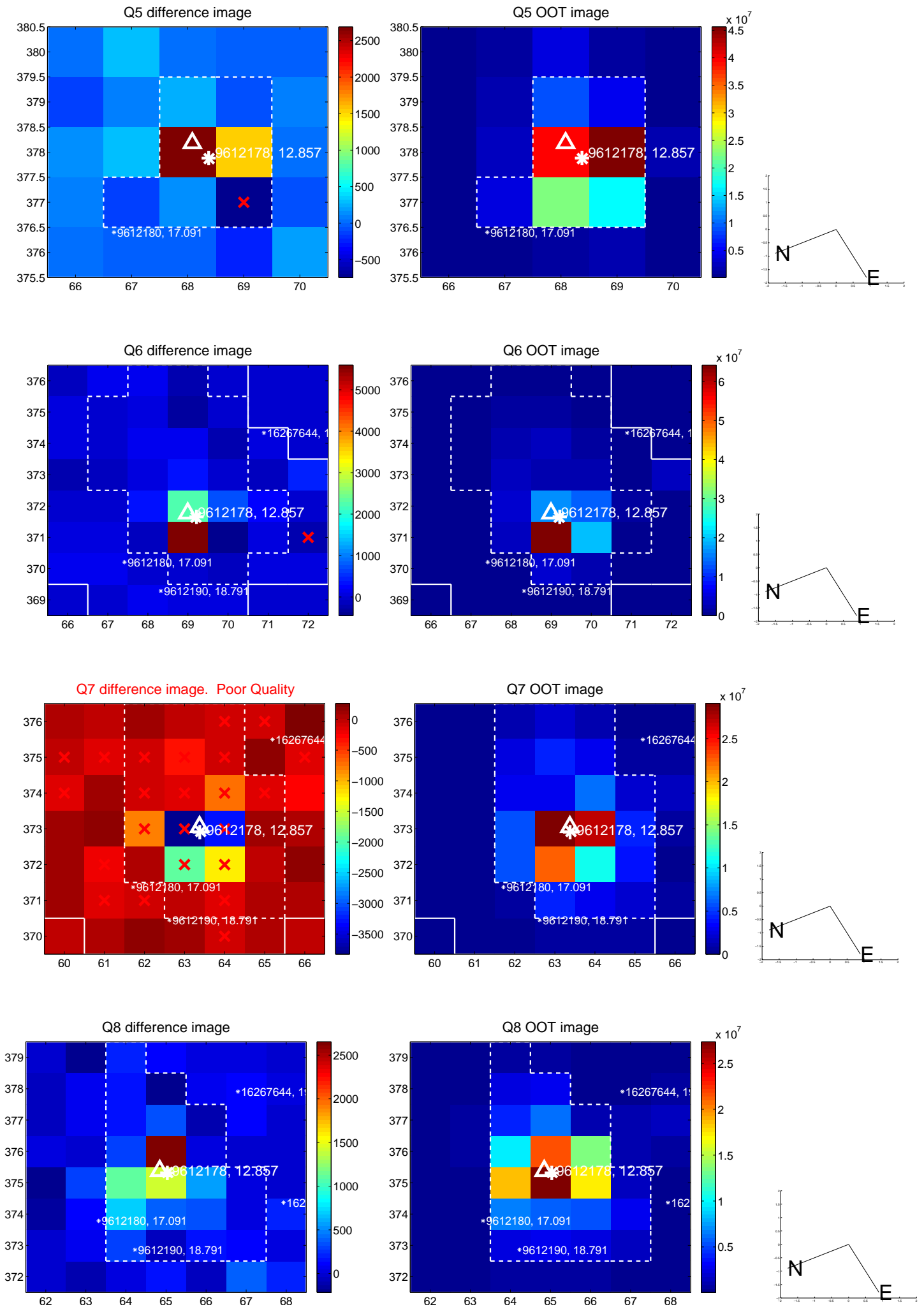


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

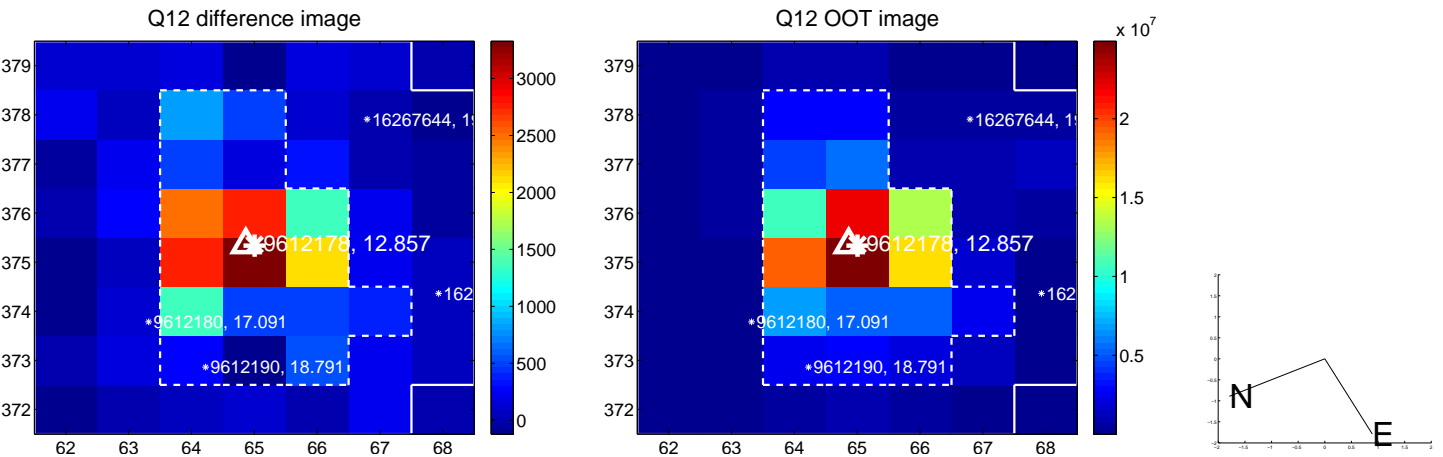
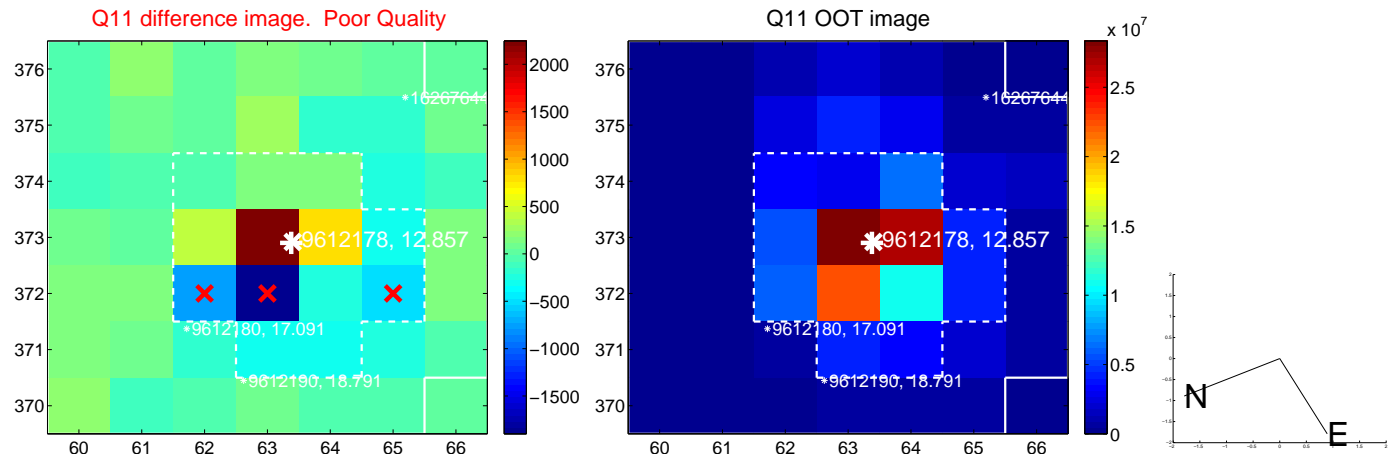
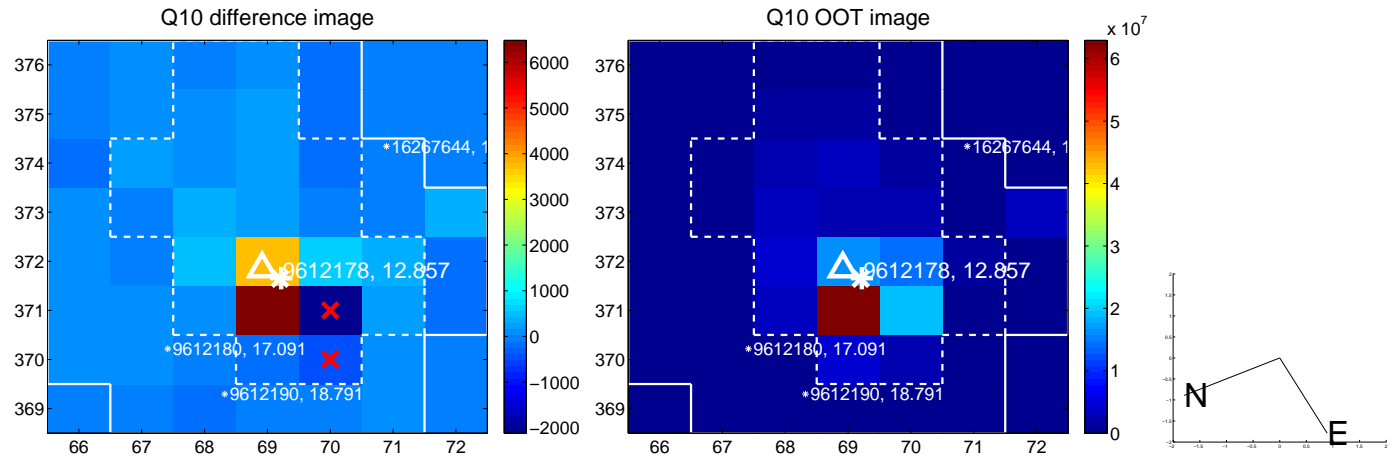
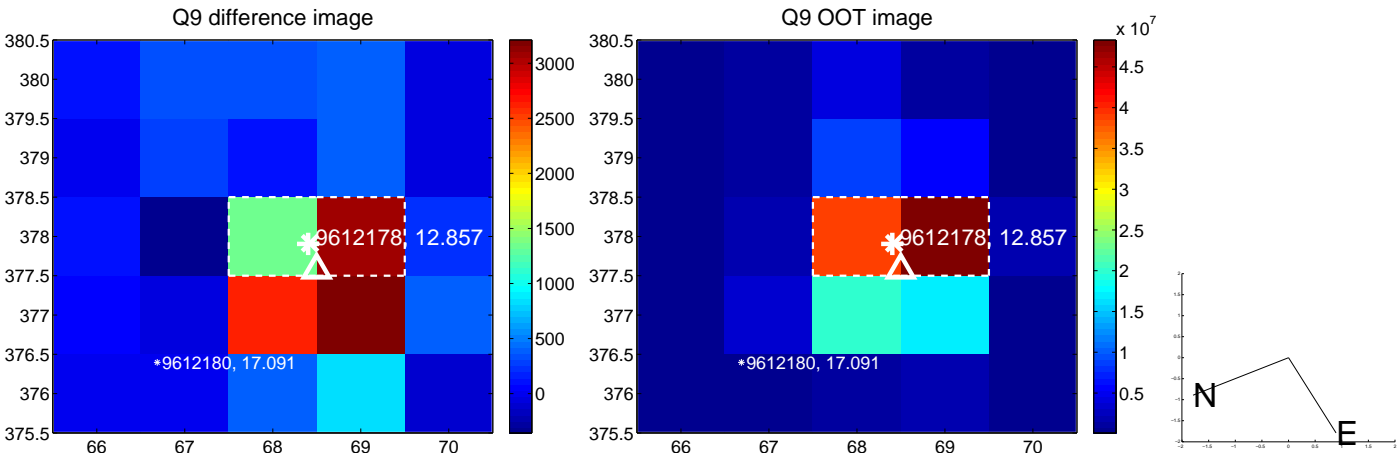
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



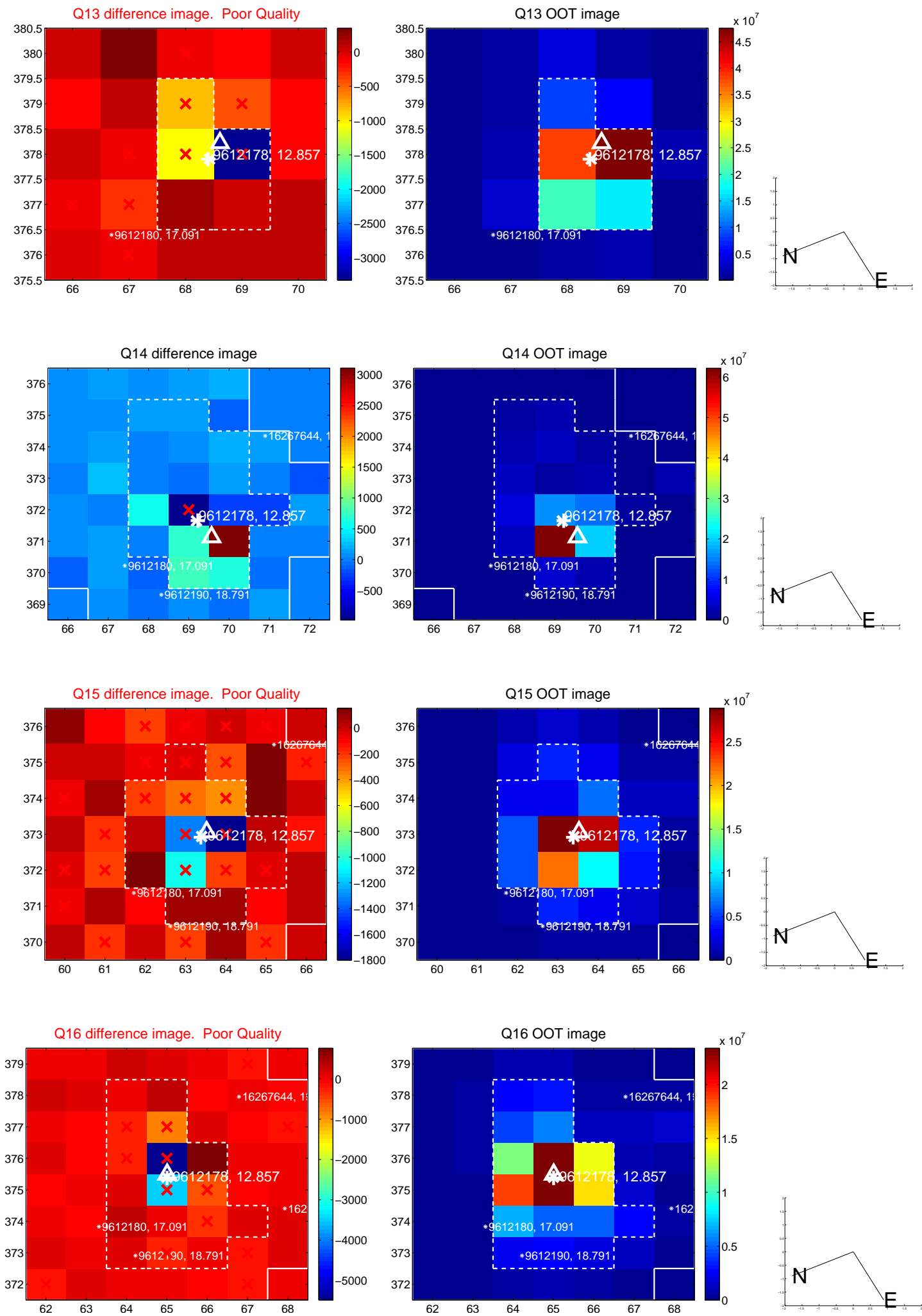
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



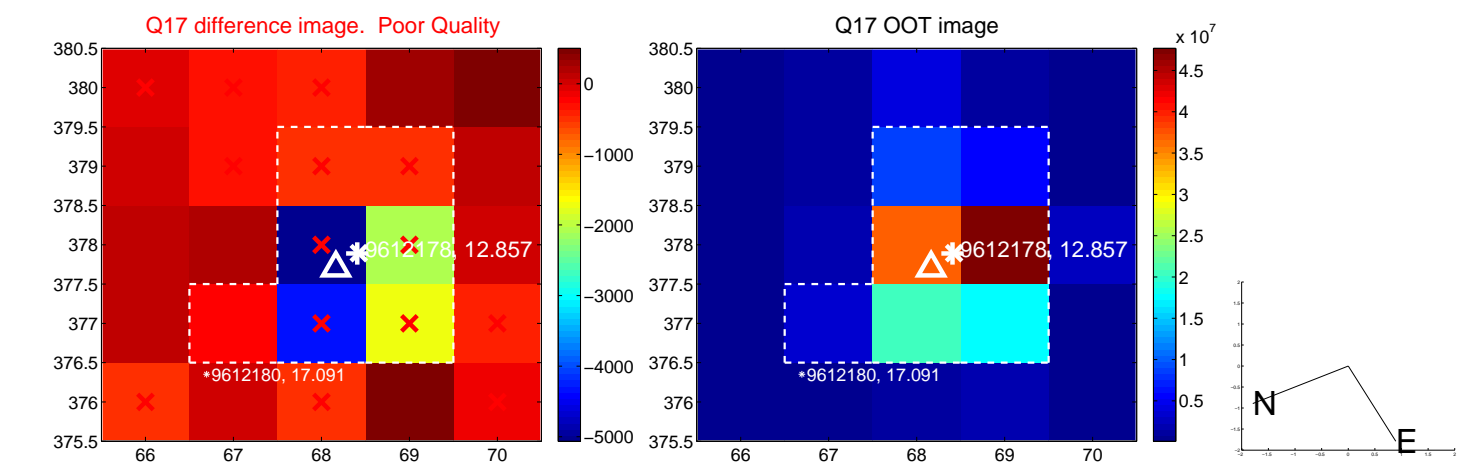
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



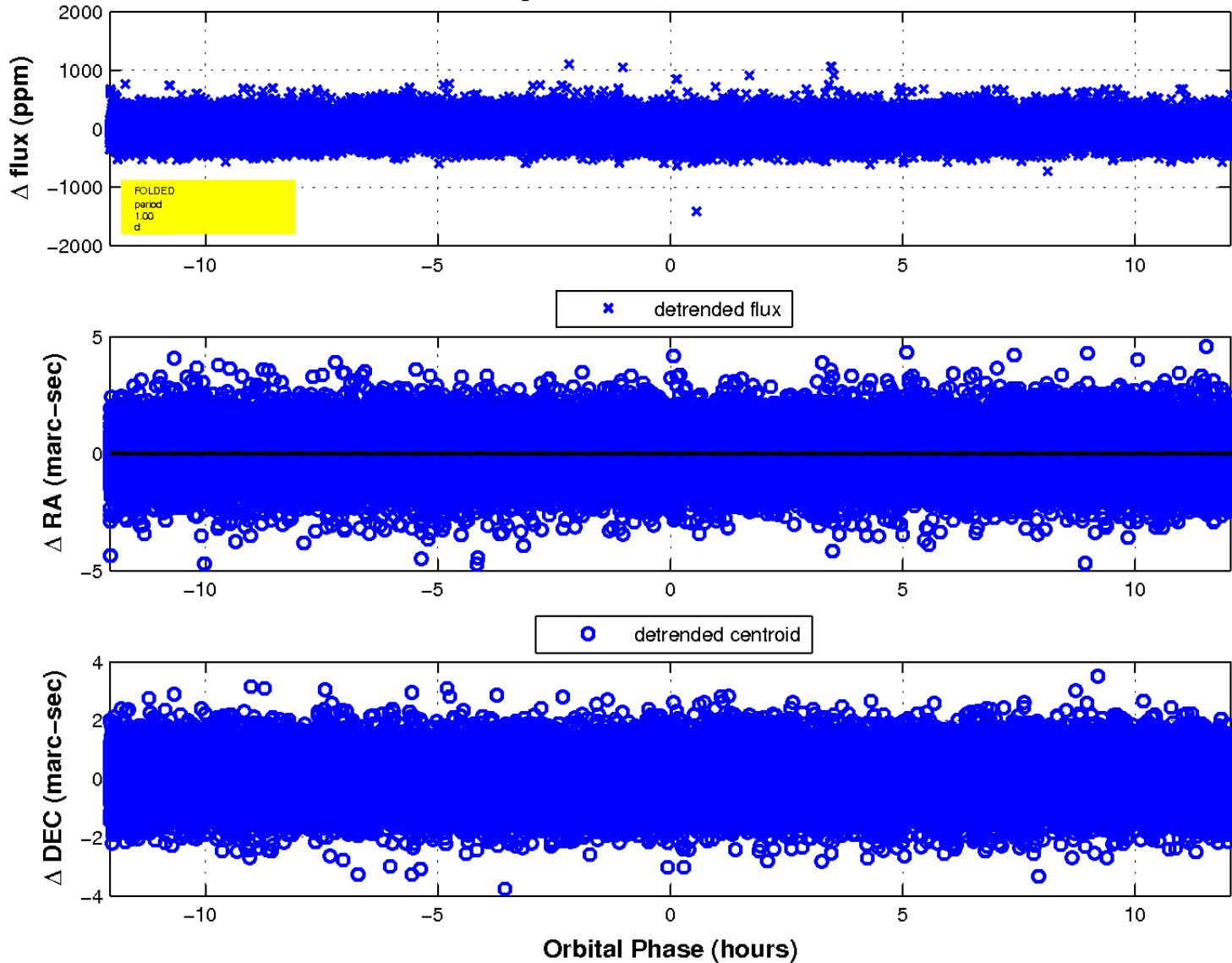
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

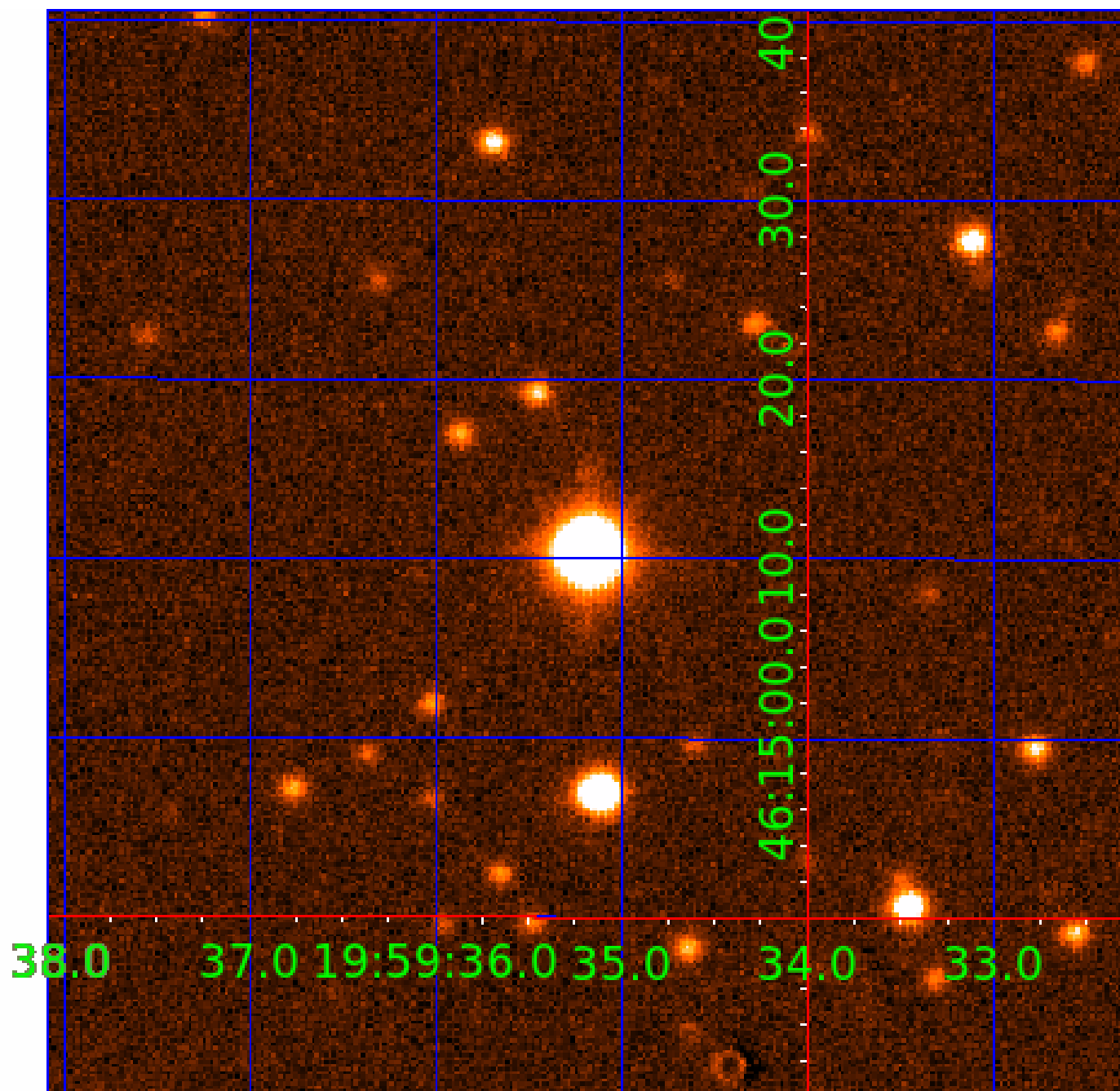


fluxWeightedCentroids, Planet 1 of 4



UKIRT Image

Declination



KIC 009612178

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})
009612178-01	OBS	No	1.004551	131.654559	14.2	5.380	9.0	6.4	3.73	5720	1.48	25579.25
009612178-02	OBS	No	182.471022	243.026694	285.9	2.616	9.0	7.2	3.73	5720	7.48	24.86
009612178-03	OBS	No	145.043502	233.551262	249.9	2.736	7.5	7.7	3.73	5720	6.59	33.77
009612178-04	OBS	No	51.633778	151.646265	260.6	2.508	7.5	8.1	3.73	5720	7.03	133.85

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009612178-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
009612178-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009612178-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET
009612178-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT

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

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

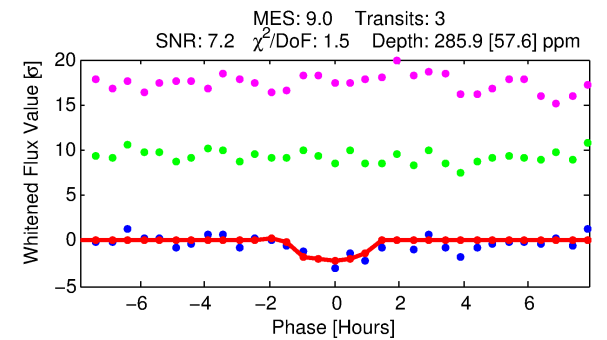
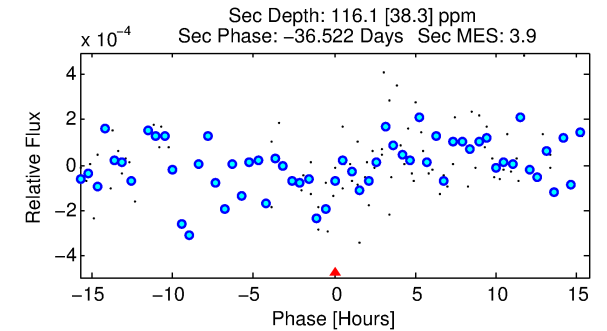
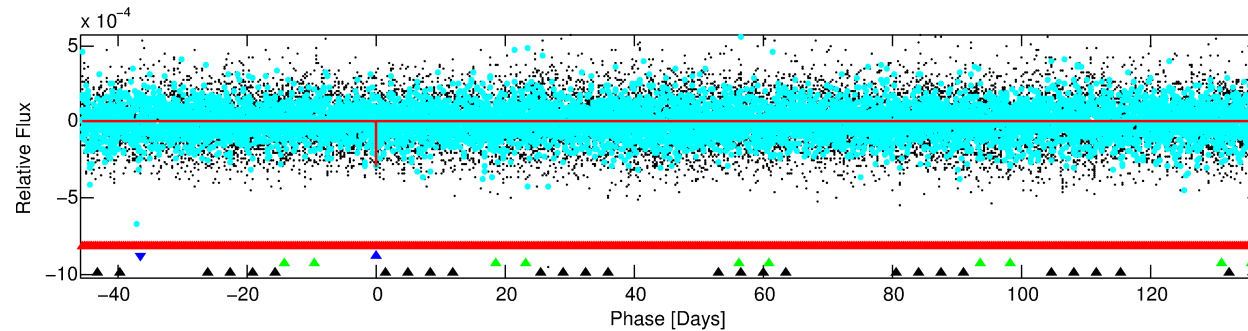
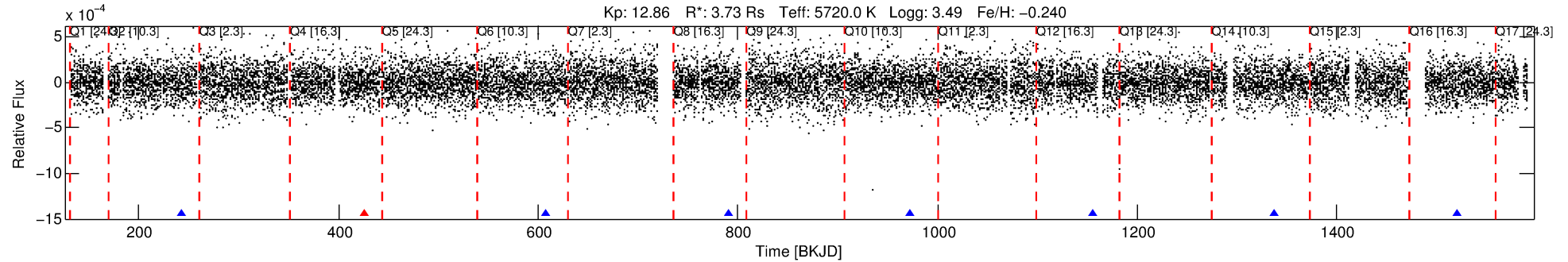
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009612178-02

No Significant Match Found

DV One-Page Summary

KIC: 9612178 Candidate: 2 of 4 Period: 182.471 d

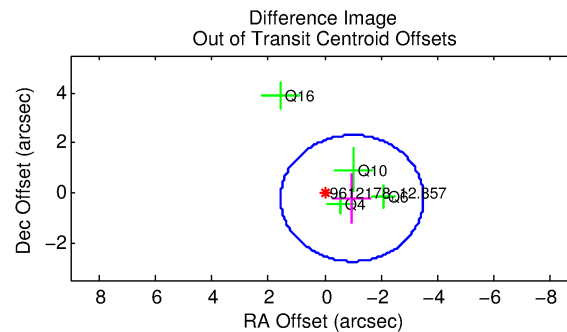
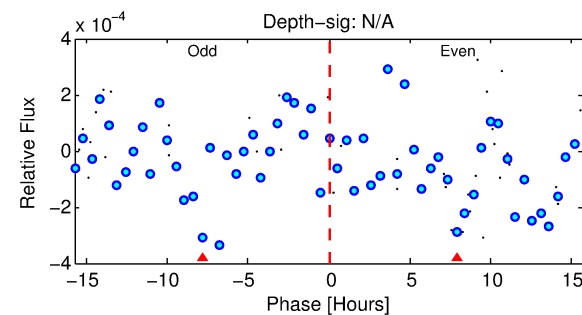
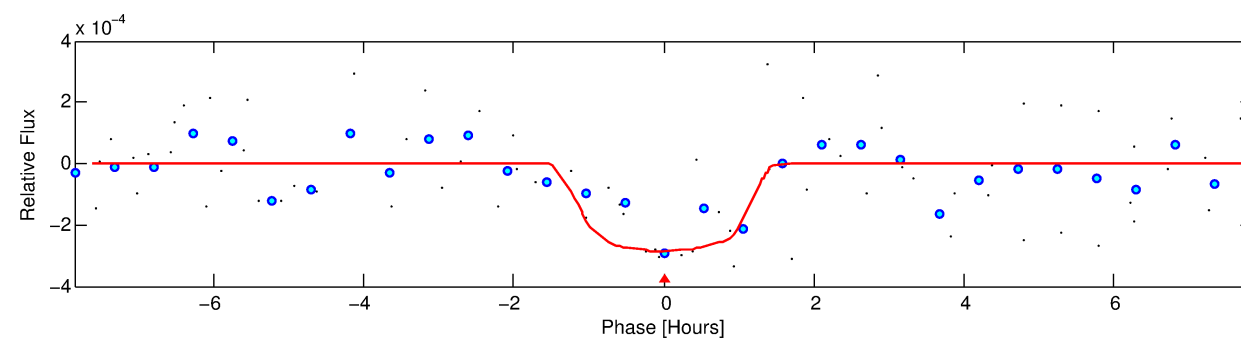


DV Fit Results:

Period = 182.47102 [0.00301] d
Epoch = 243.0267 [0.0098] BKJD
Rp/R* = 0.0184 [0.0163]
a/R* = 254.61 [1099.25]
b = 0.90 [0.93]
Seff = 24.87 [16.08]
Teq = 569 [92] K
Rp = 7.48 [7.43] Re
a = 0.7332 [0.2987] AU
Ag = 613.63 [1172.16] [0.52σ]
Teffp = 4382 [1983] K [1.92σ]

DV Diagnostic Results:

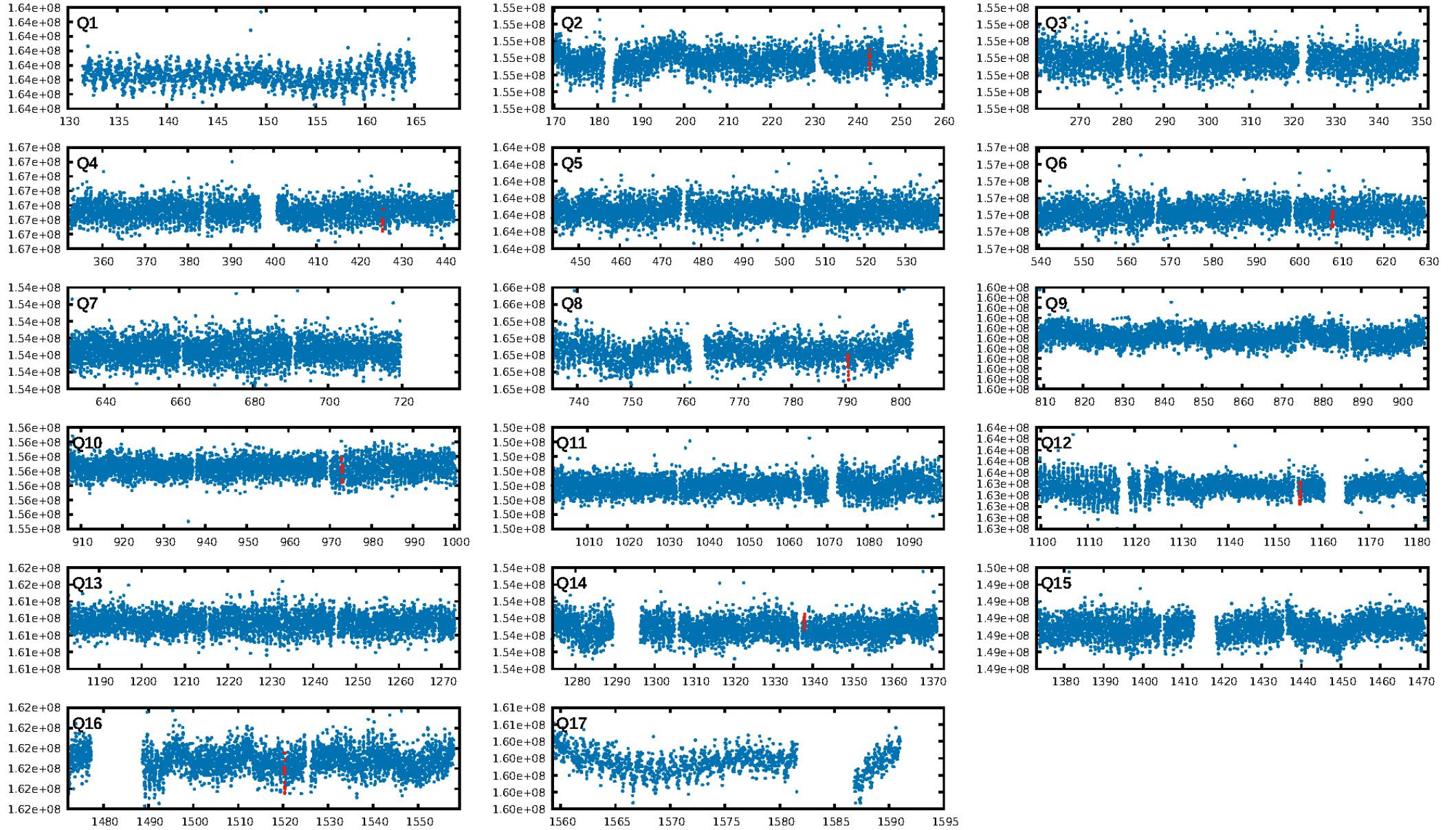
ShortPeriod-sig: 100.0% [237.28σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 13.8%
ModelChiSquareGof-sig: 66.1%
Bootstrap-pfa: 3.27e-10
RollingBand-fgt: 0.67 [2/3]
GhostDiagnostic-chr: -0.8215
Centroid-sig: N/A
Centroid-so: 1.417 arcsec [0.85σ]
OotOffset-rm: 0.997 arcsec [1.18σ]
KicOffset-rm: 0.946 arcsec [0.98σ]
OotOffset-st: 2/0/2/0 [4]
KicOffset-st: 2/0/2/0 [4]
DiffImageQuality-fgm: 0.75 [3/4]
DiffImageOverlap-fno: 0.33 [2/6]



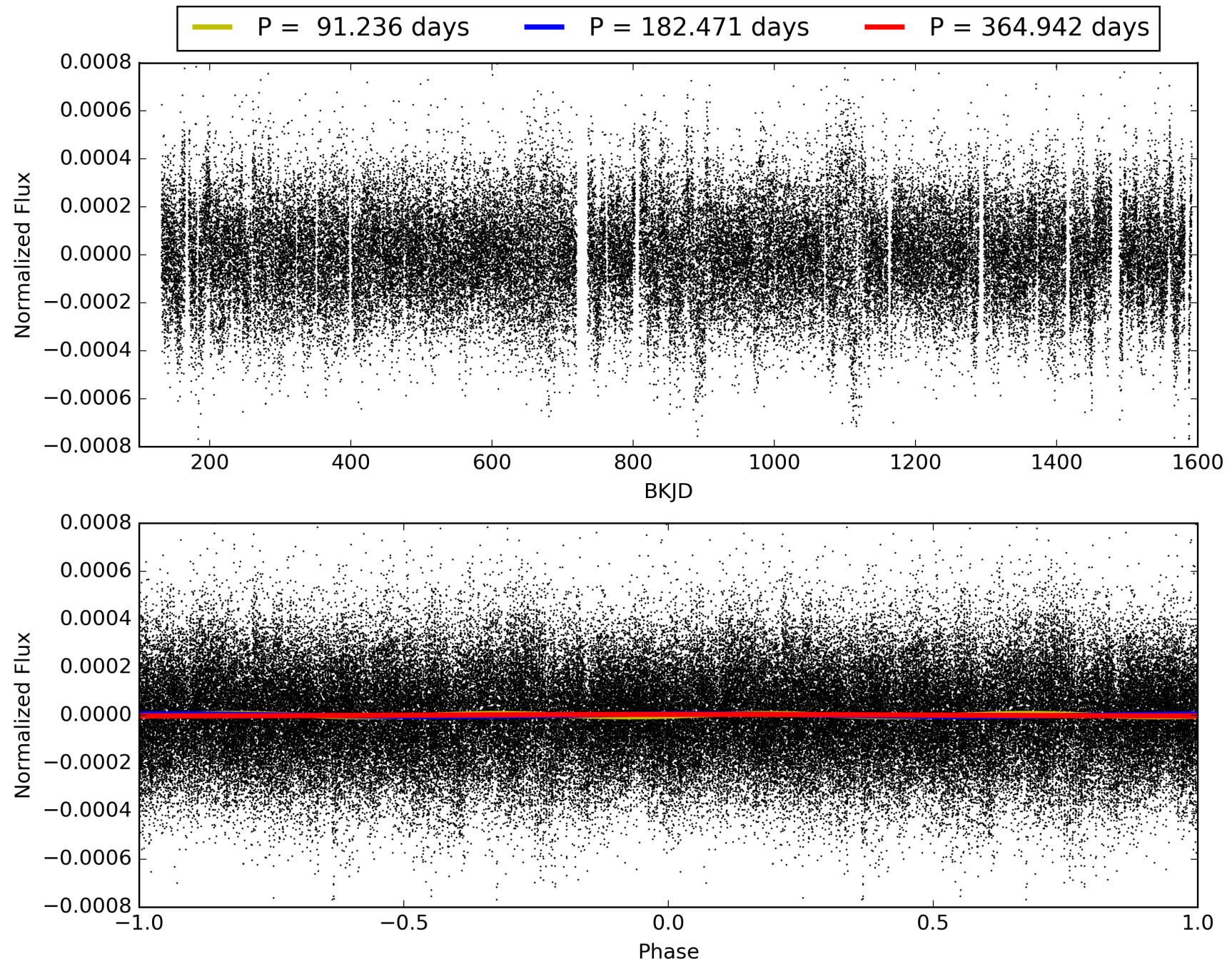
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 17:33:21 Z

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

TCE 009612178-02, PDC Light Curves

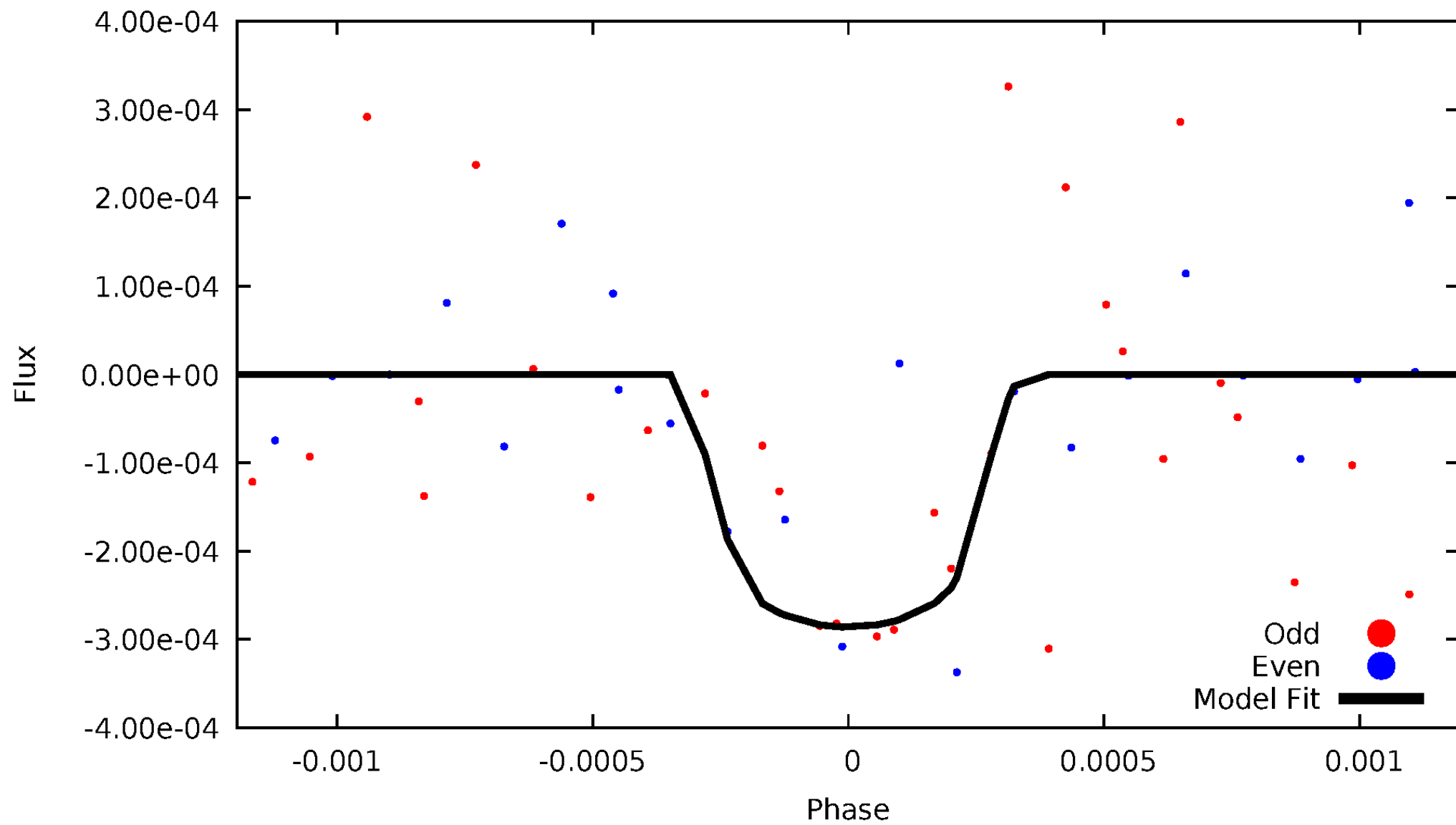


TCE 009612178-02



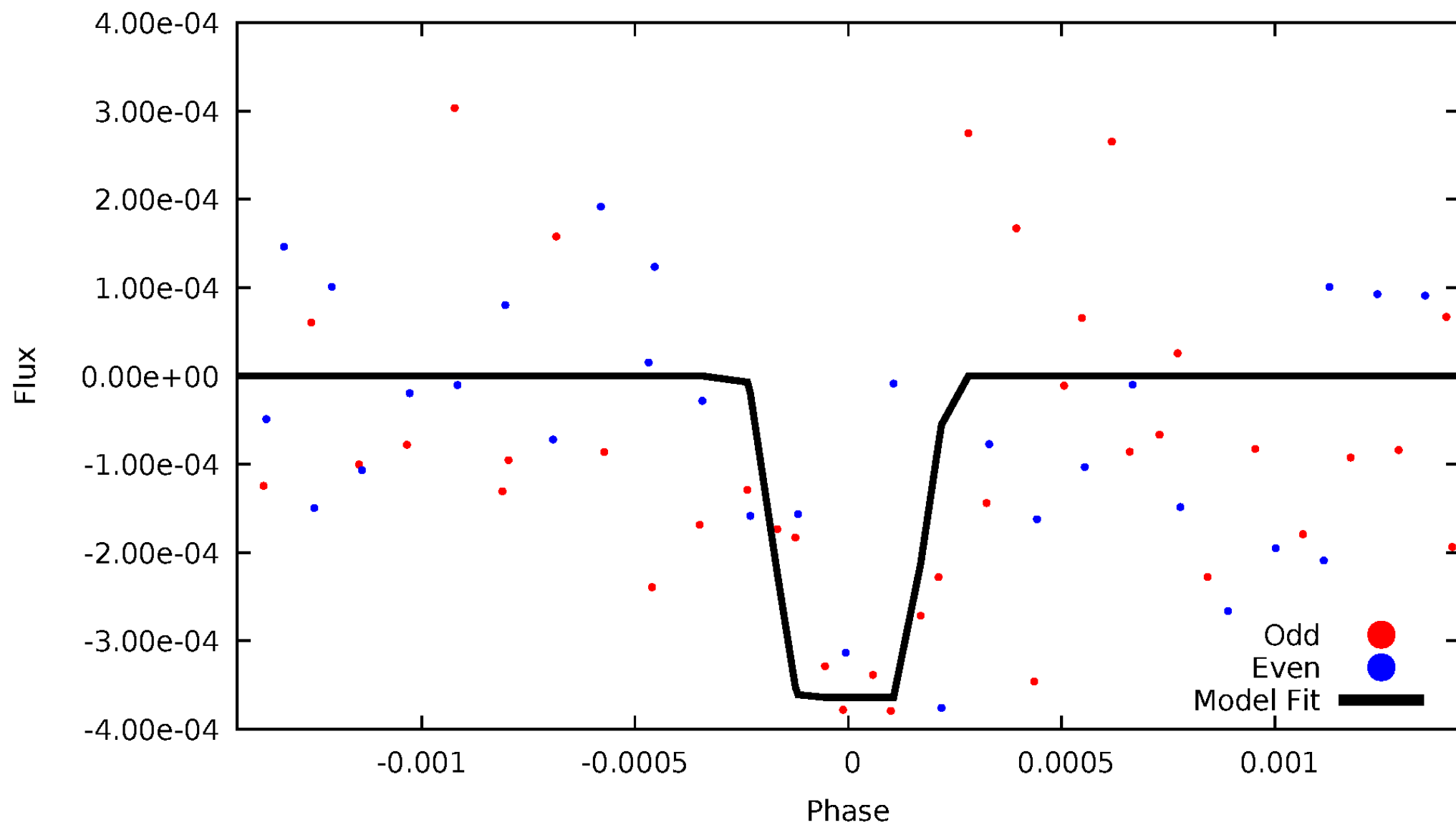
DV Odd/Even

TCE 009612178-02



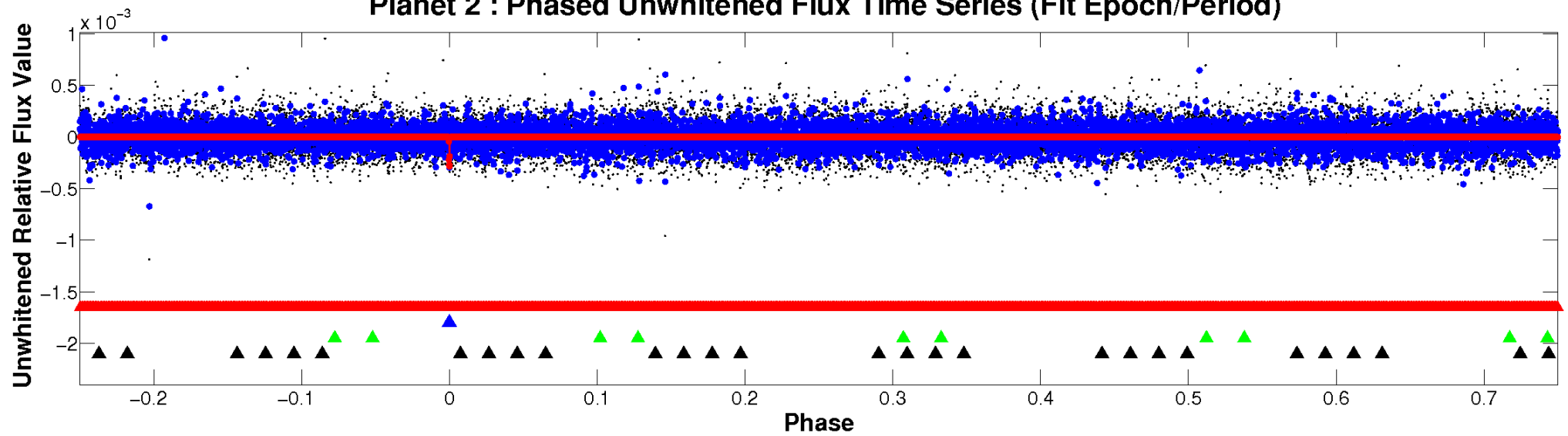
ALT Odd/Even

TCE 009612178-02

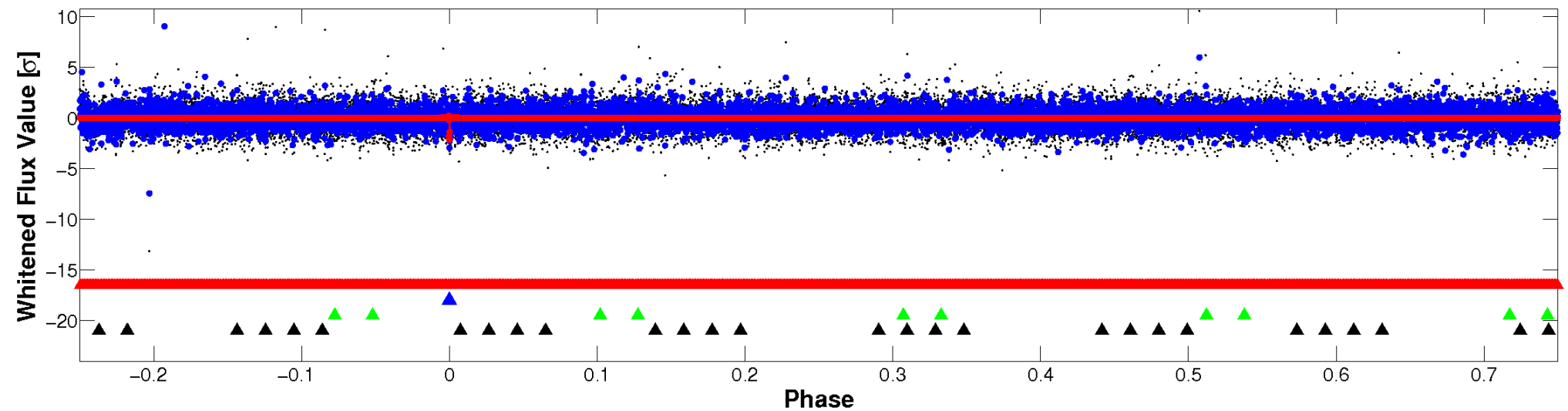


Non-Whitened Vs. Whitened Light Curve

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

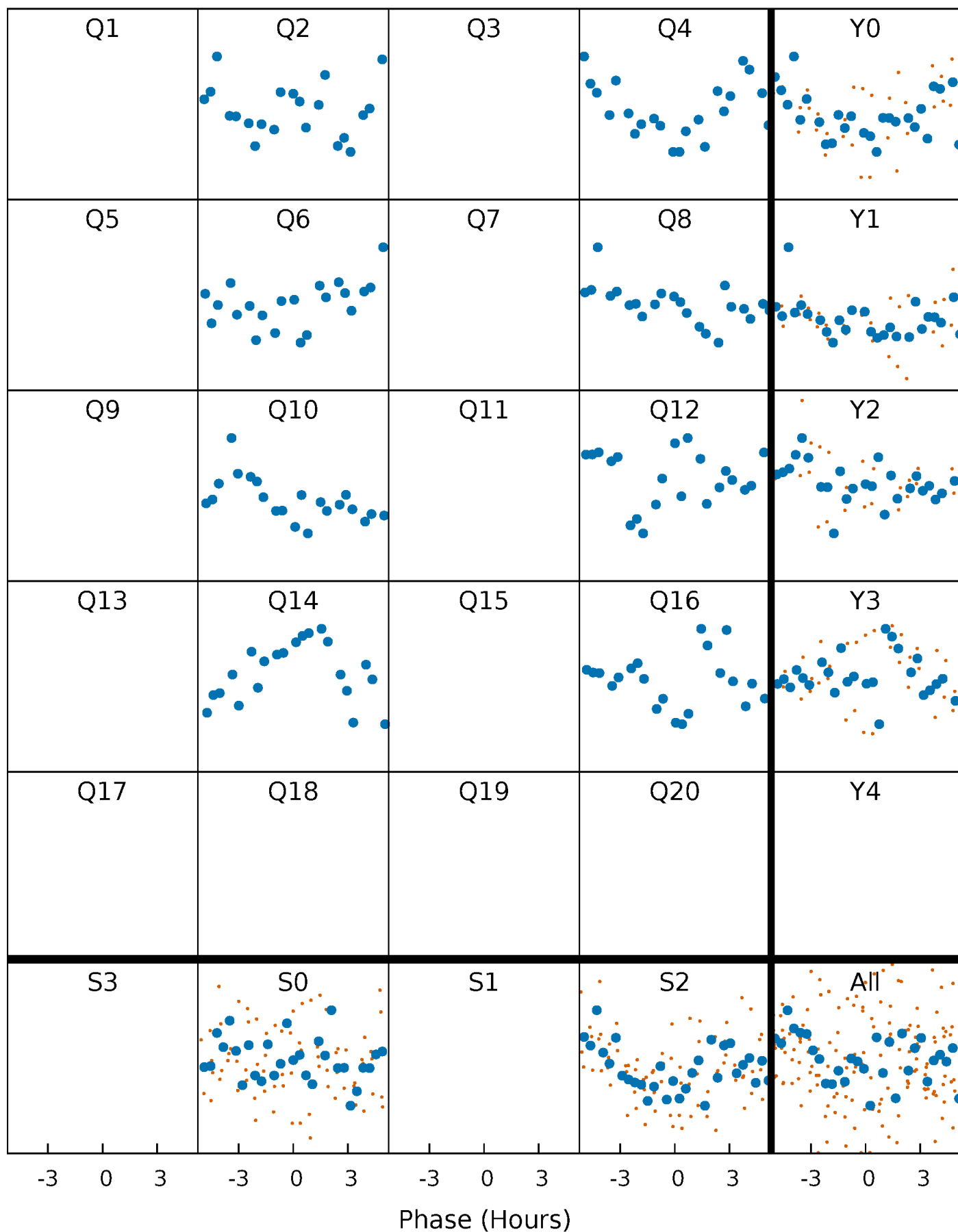


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



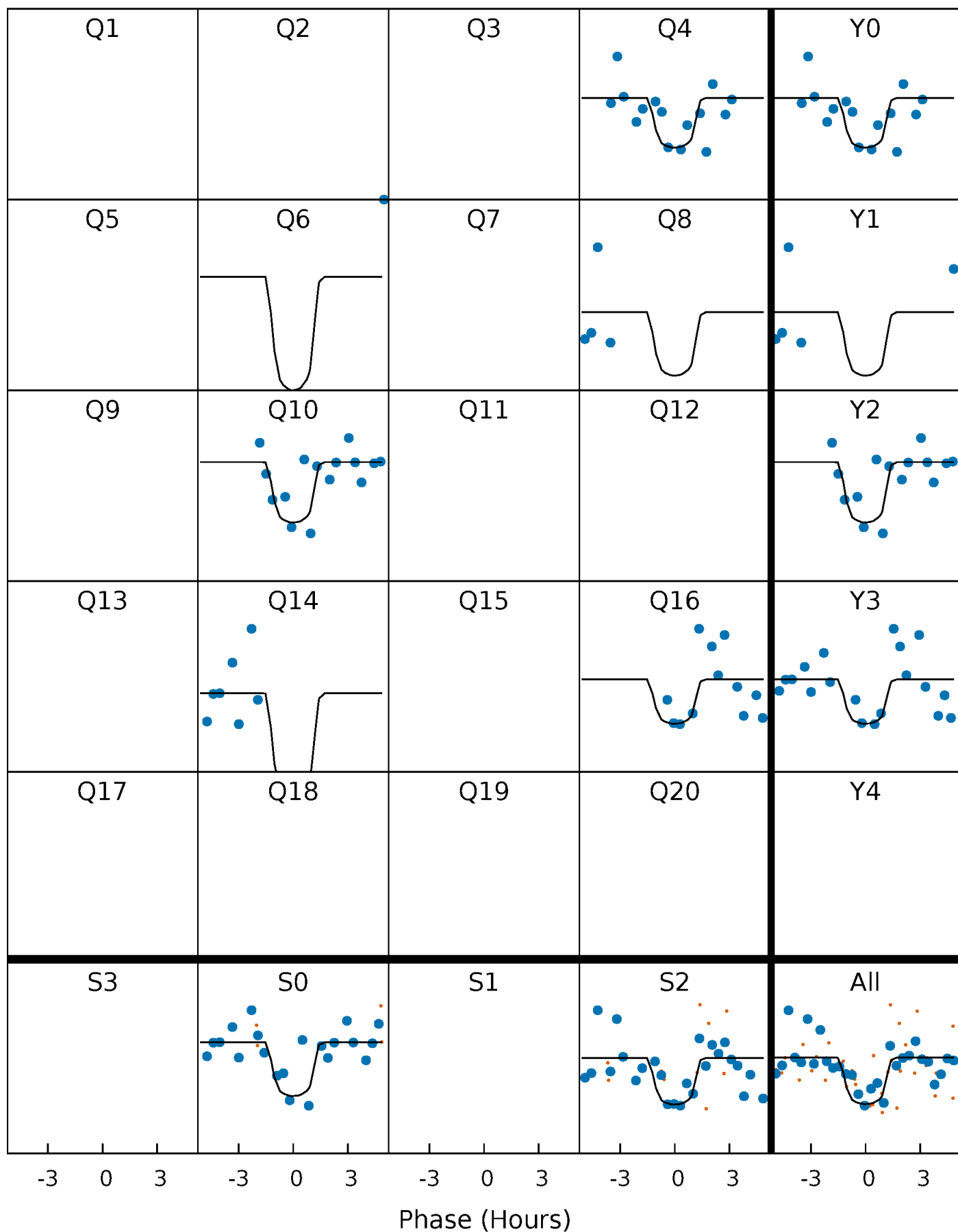
PDC Quarter-Phased Transit Curves

TCE 009612178-02 P=182.471022 Days $T_0=243.026694$ (BKJD)



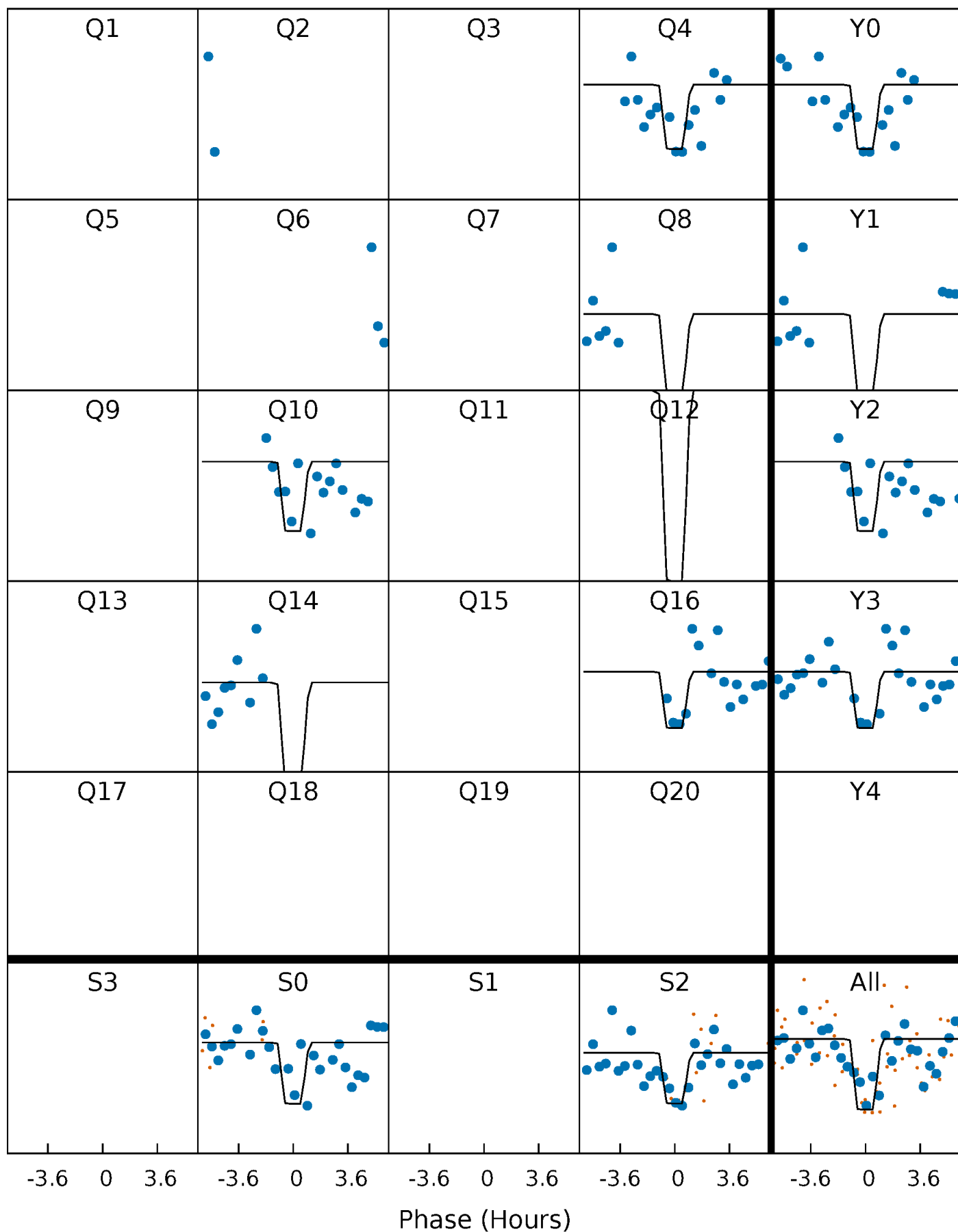
DV Quarter-Phased Transit Curves

TCE 009612178-02 P=182.471022 Days $T_0=243.026694$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

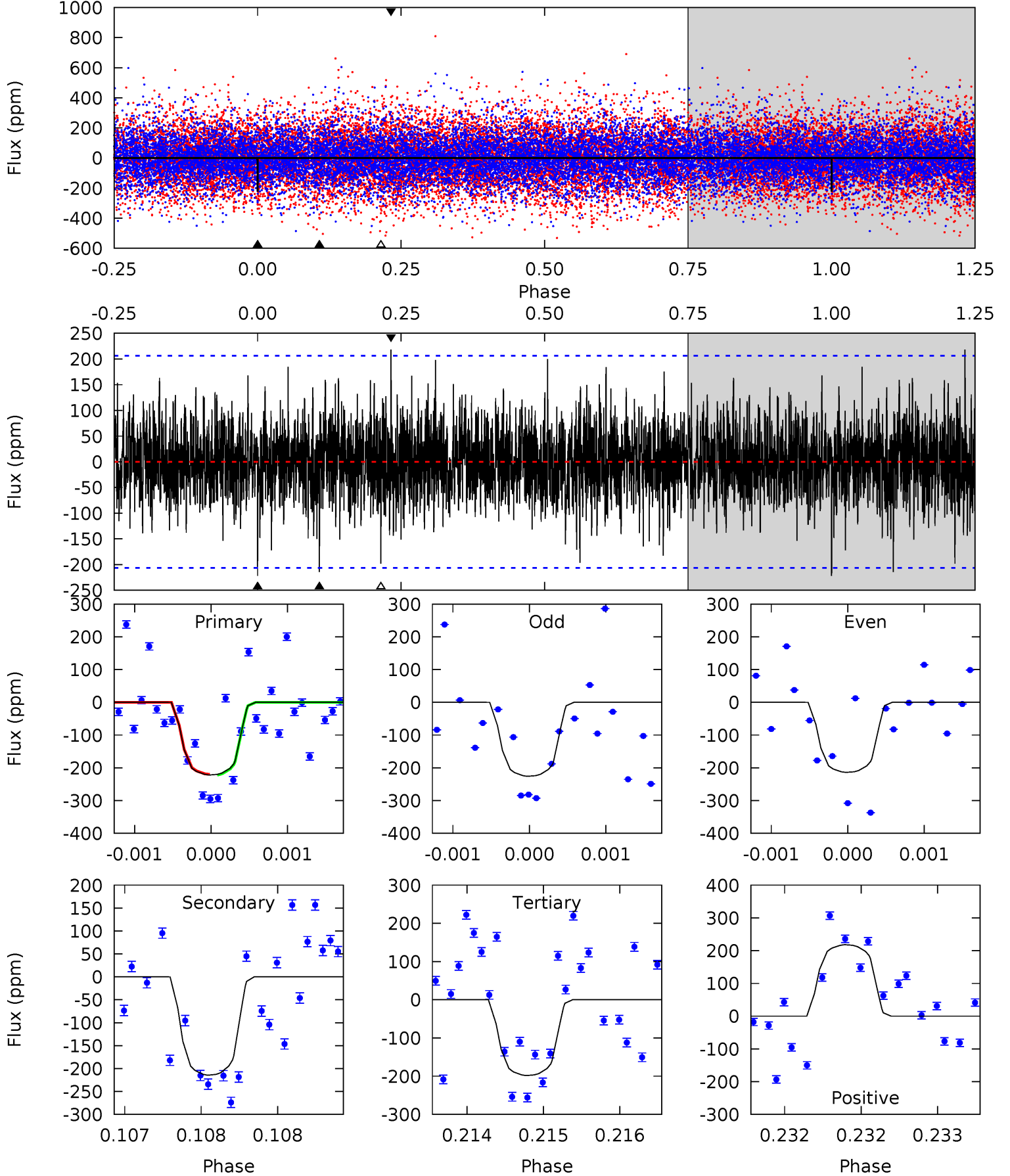
TCE 009612178-02 P=182.473306 Days $T_0=243.016448$ (BKJD)



DV Model-Shift Uniqueness Test

009612178-02, $P = 182.471022$ Days, $E = 60.555672$ Days

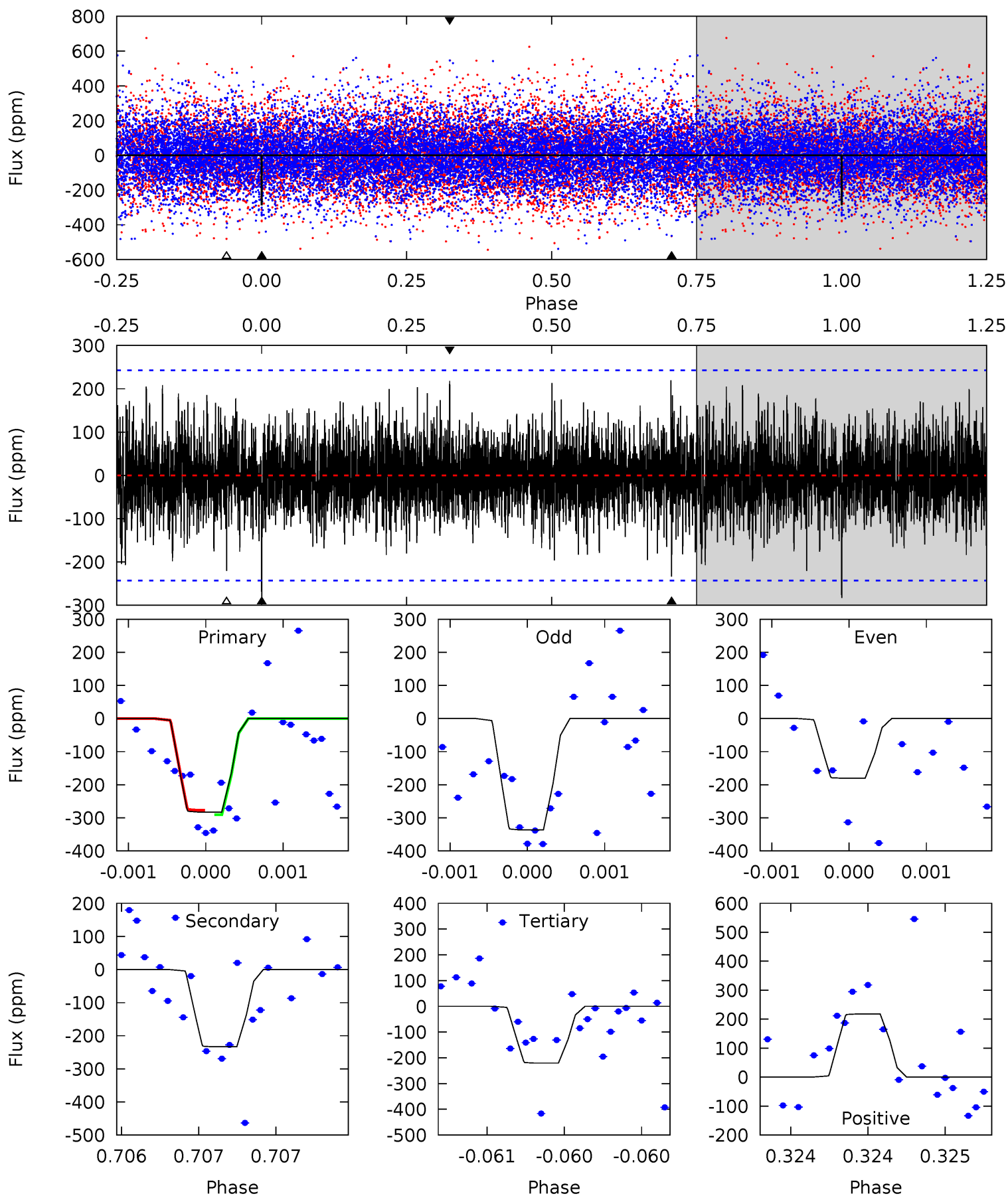
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.94	5.74	5.31	5.84	5.52	3.40	1.44	0.63	0.10	0.44	-0.09	0.16	1.03	0.50	0.03



Alt Model-Shift Uniqueness Test

009612178-02, P = 182.473306 Days, E = 60.543142 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.48	5.36	5.05	5.00	5.57	3.47	1.39	1.43	1.48	0.30	0.36	1.69	0.86	0.44	0.15



Stellar Parameters For KIC 009612178

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5720^{+179}_{-219}	$3.492^{+0.360}_{-0.120}$	$-0.240^{+0.300}_{-0.350}$	$3.733^{+0.718}_{-1.676}$	$1.579^{+0.180}_{-0.540}$	$0.043^{+0.128}_{-0.016}$
	+3%/-4%	+10%/-3%	+125%/-146%	+19%/-45%	+11%/-34%	+300%/-37%
Source	PHO1	FLK73	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 009612178-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-215 ± 37	$7.73^{+5.95}_{-4.69}$	777^{+61}_{-84}	4890^{+2602}_{-914}	1057^{+5233}_{-737}
Alt.	-233 ± 44	$7.86^{+6.47}_{-4.72}$	782^{+57}_{-88}	4942^{+2687}_{-954}	1091^{+5477}_{-764}

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 $A_{obs} \gg 1.0$

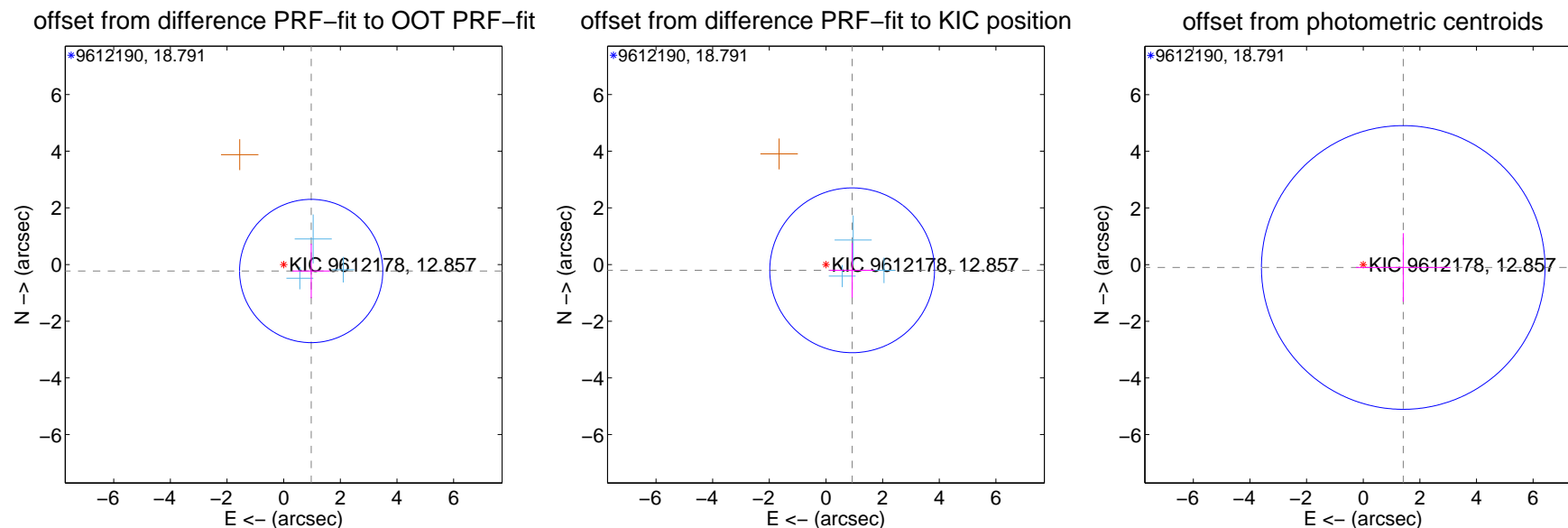
DV Centroid Data

Supplemental centroid analysis for 009612178-02. Kepler magnitude: 12.86. Transit SNR 7.23

There are 3 quarters with good PRF difference image offsets

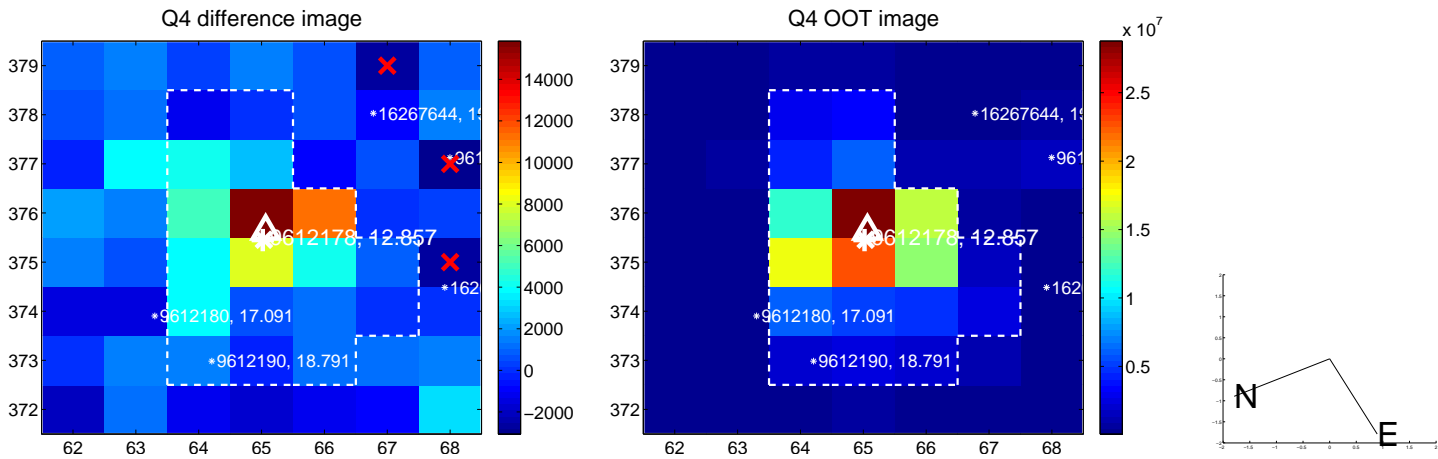
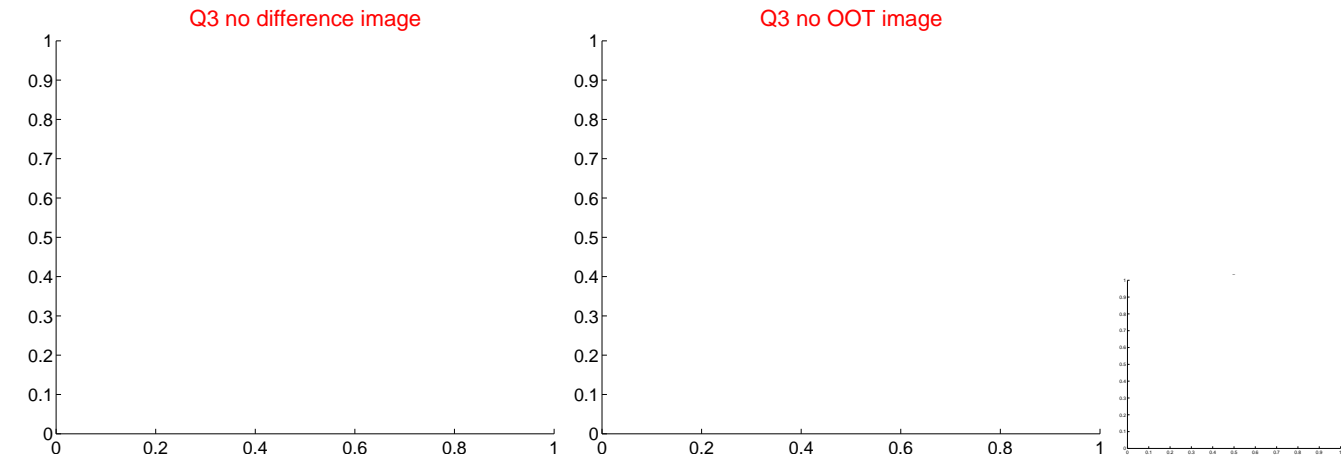
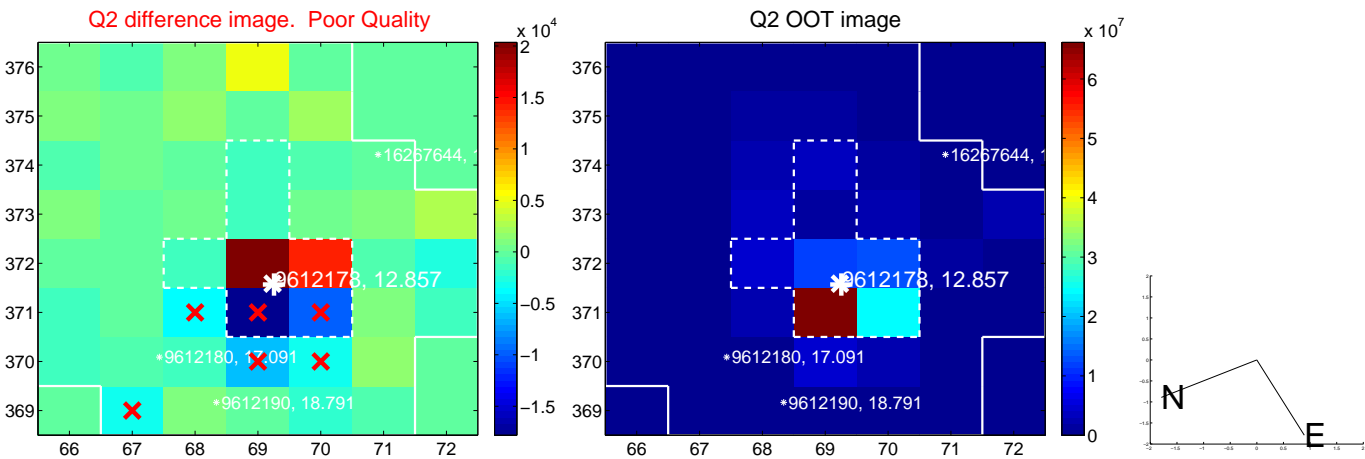
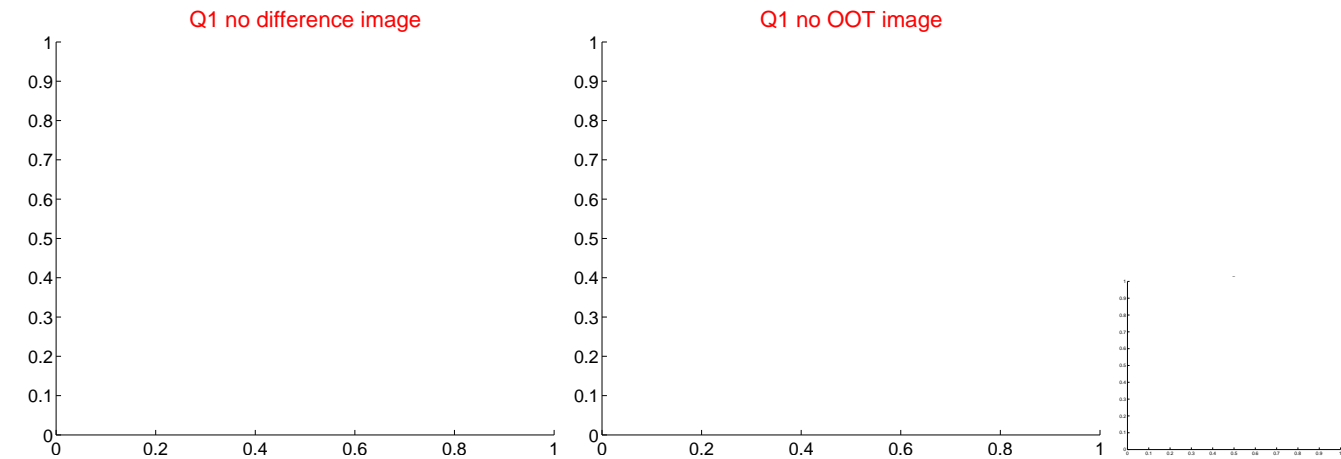
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.997 ± 0.843	1.18	-0.971 ± 0.664	-0.228 ± 0.959
PRF-fit source offset from KIC position	0.946 ± 0.970	0.98	-0.924 ± 0.796	-0.203 ± 0.962
photometric centroid source offset	1.42 ± 1.67	0.85	-1.41 ± 1.67	-0.10 ± 1.21

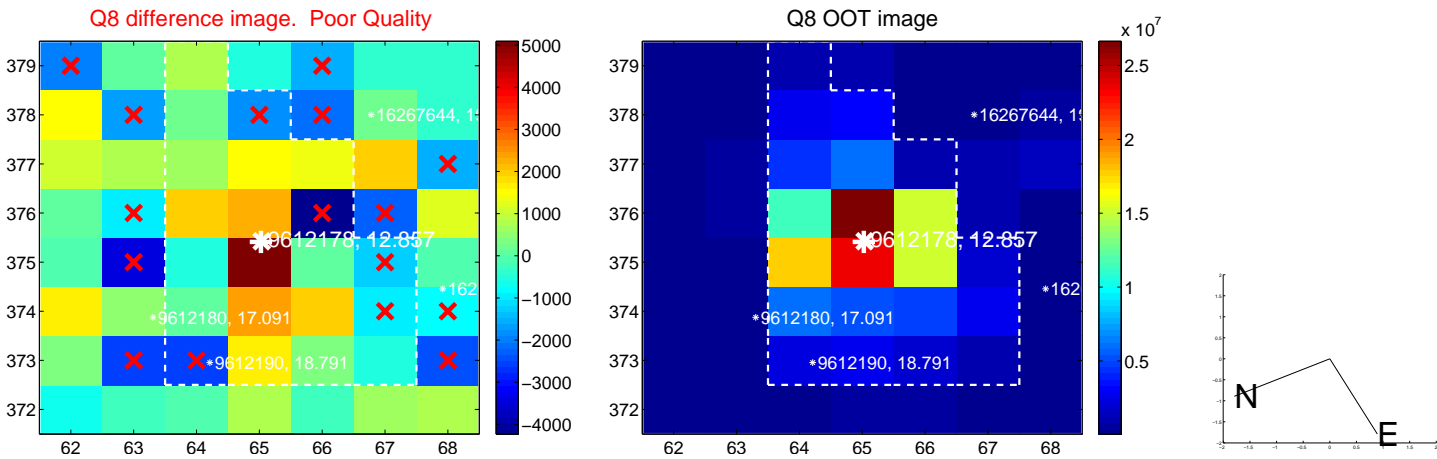
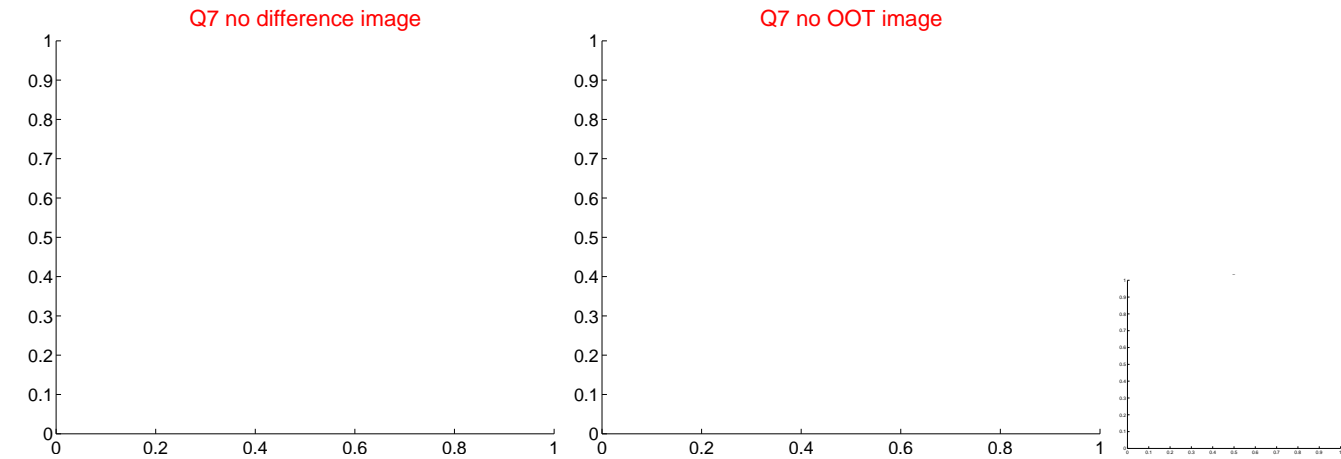
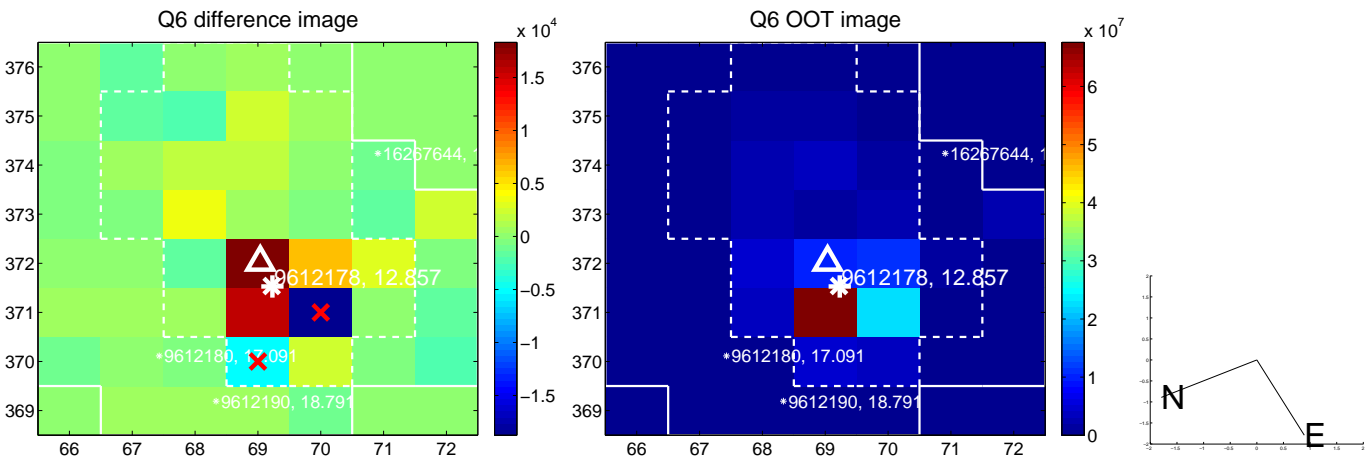
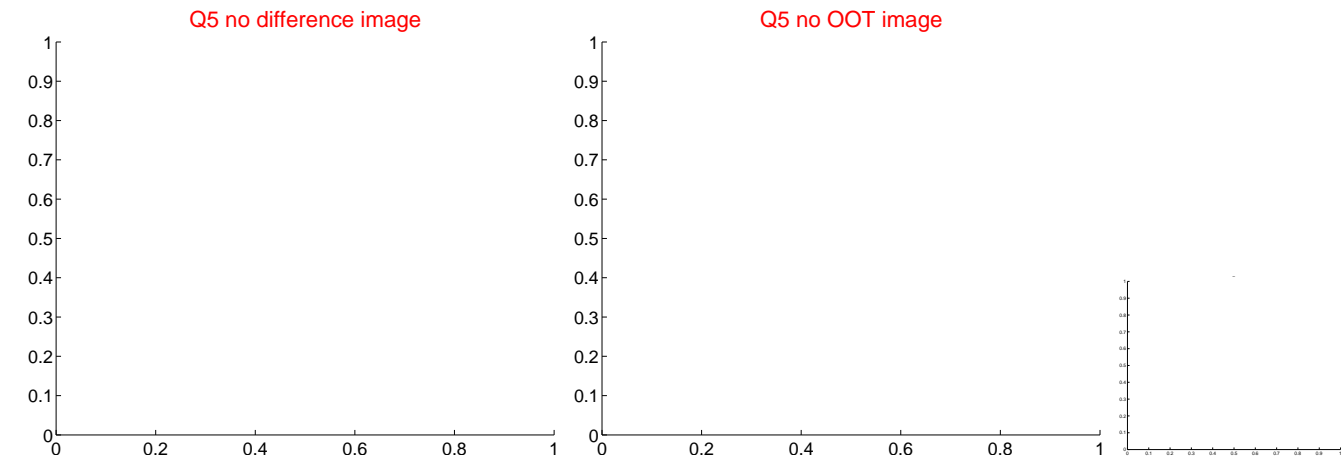


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

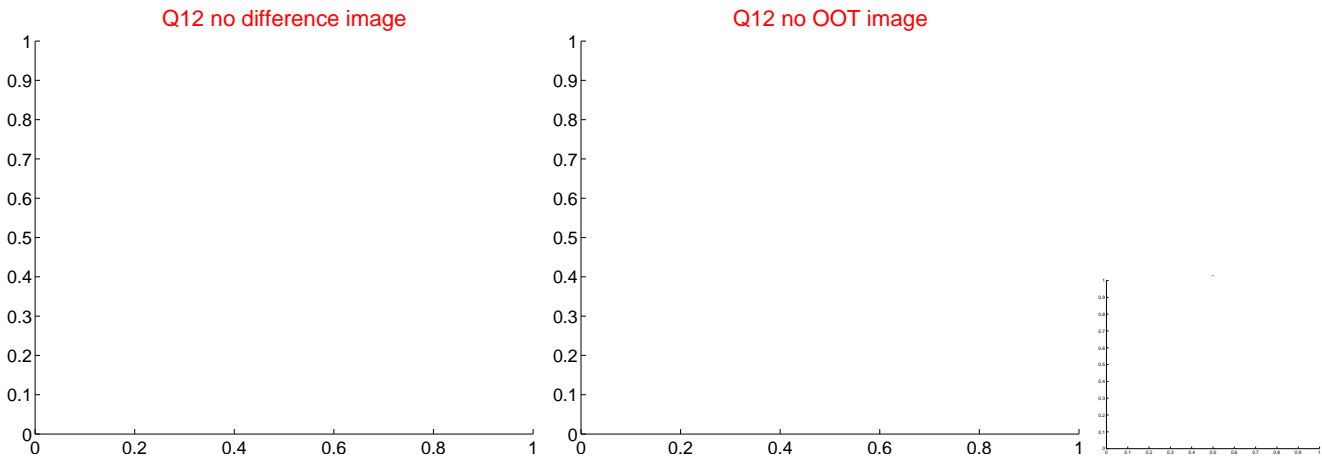
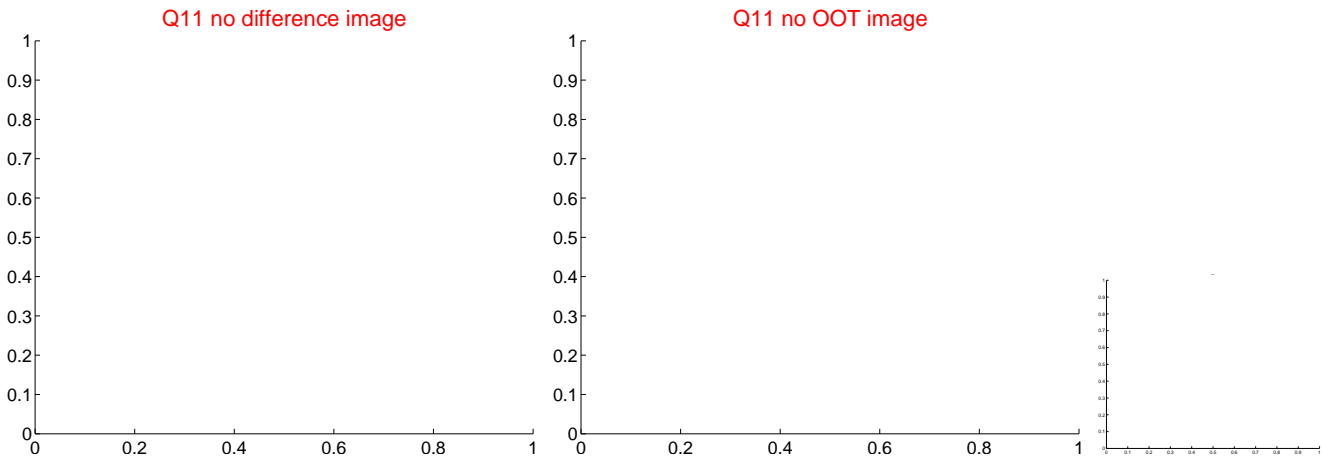
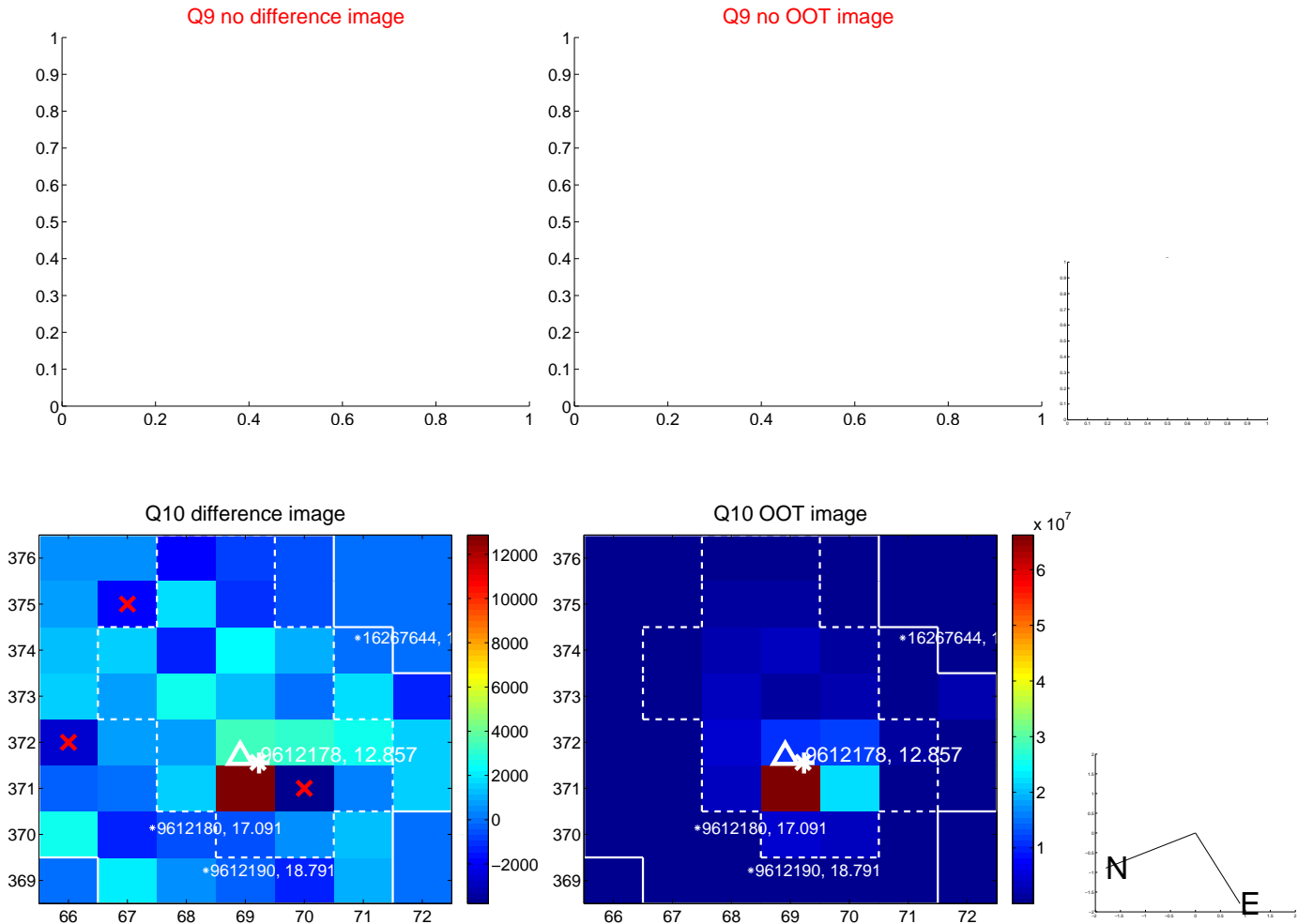
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



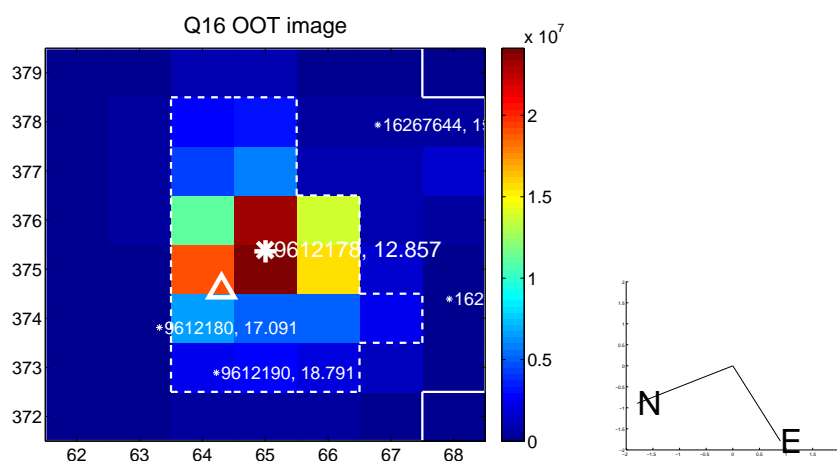
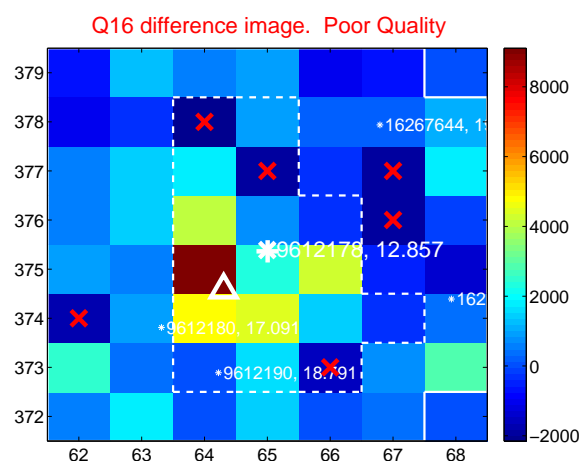
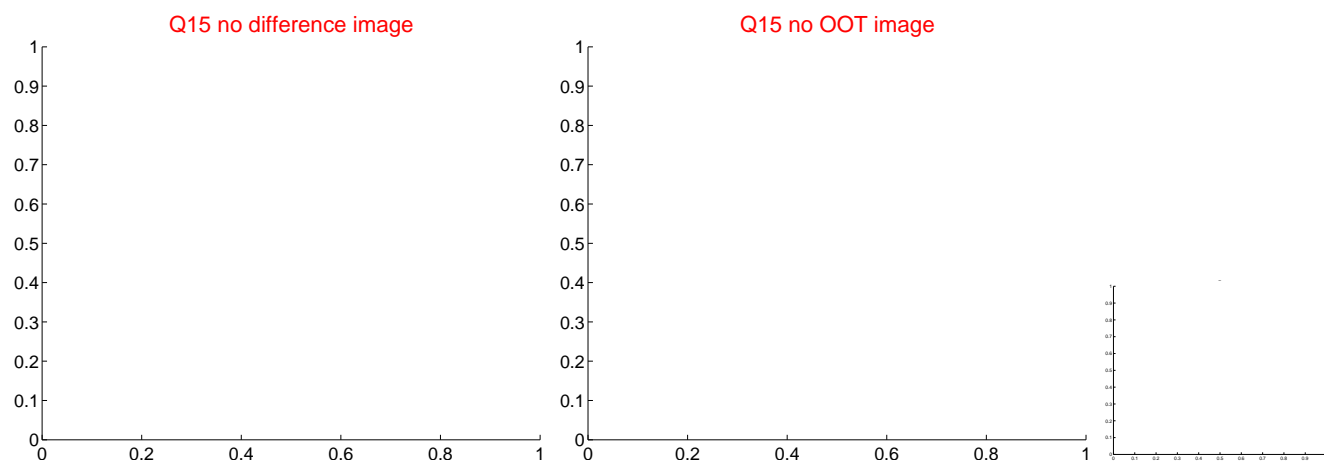
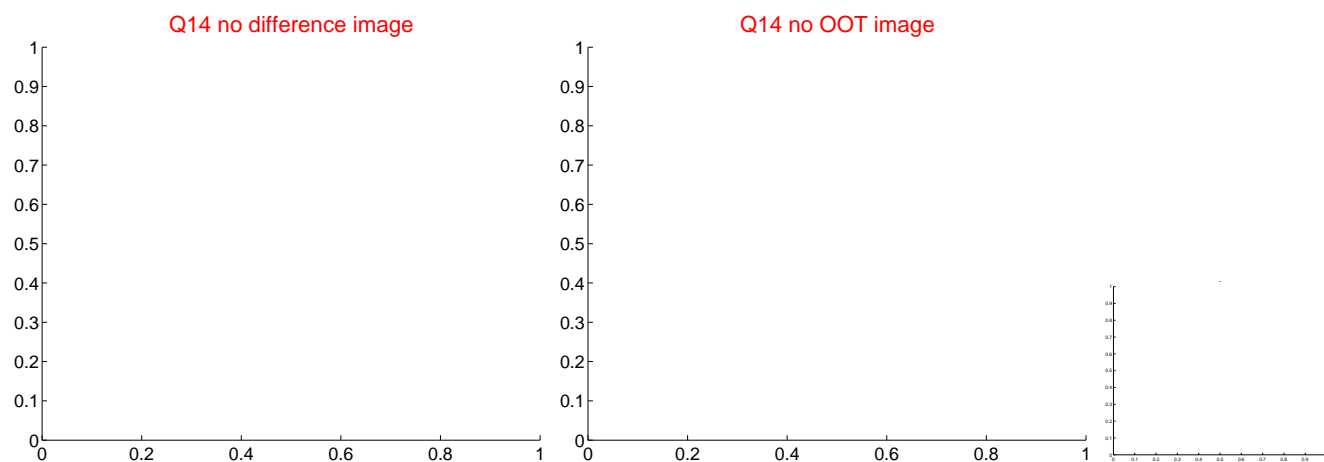
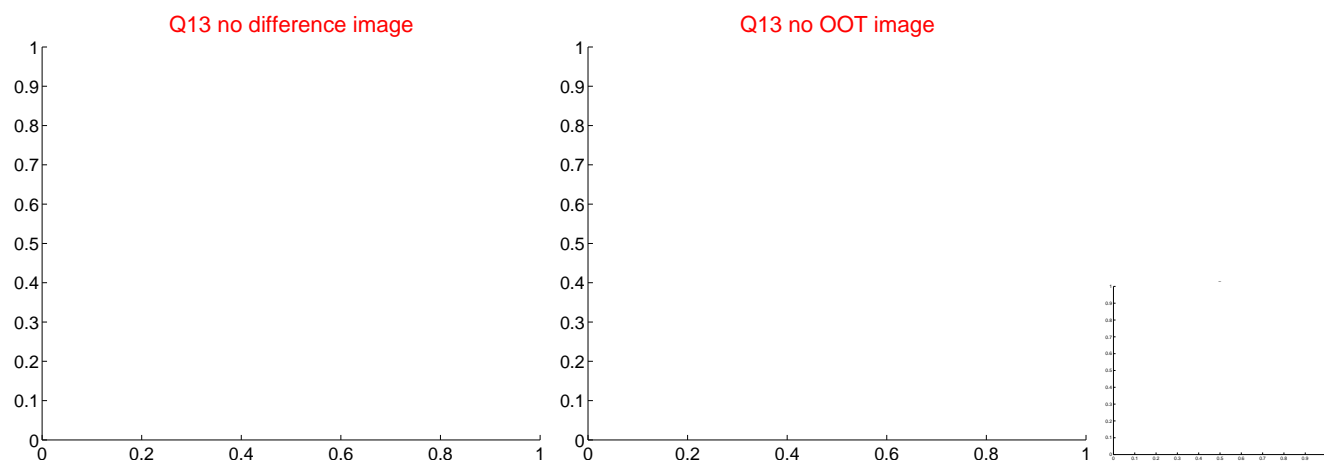
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



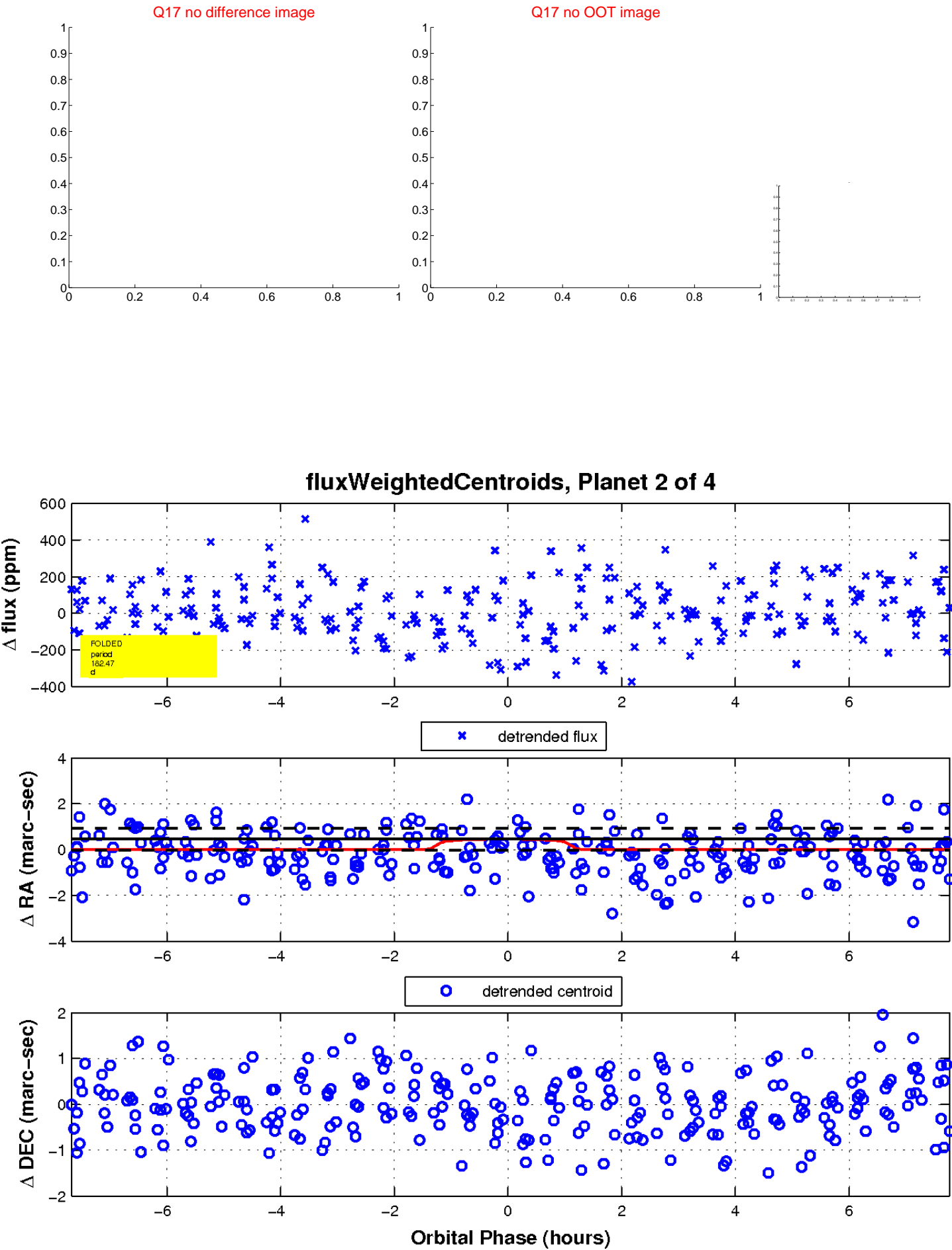
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



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

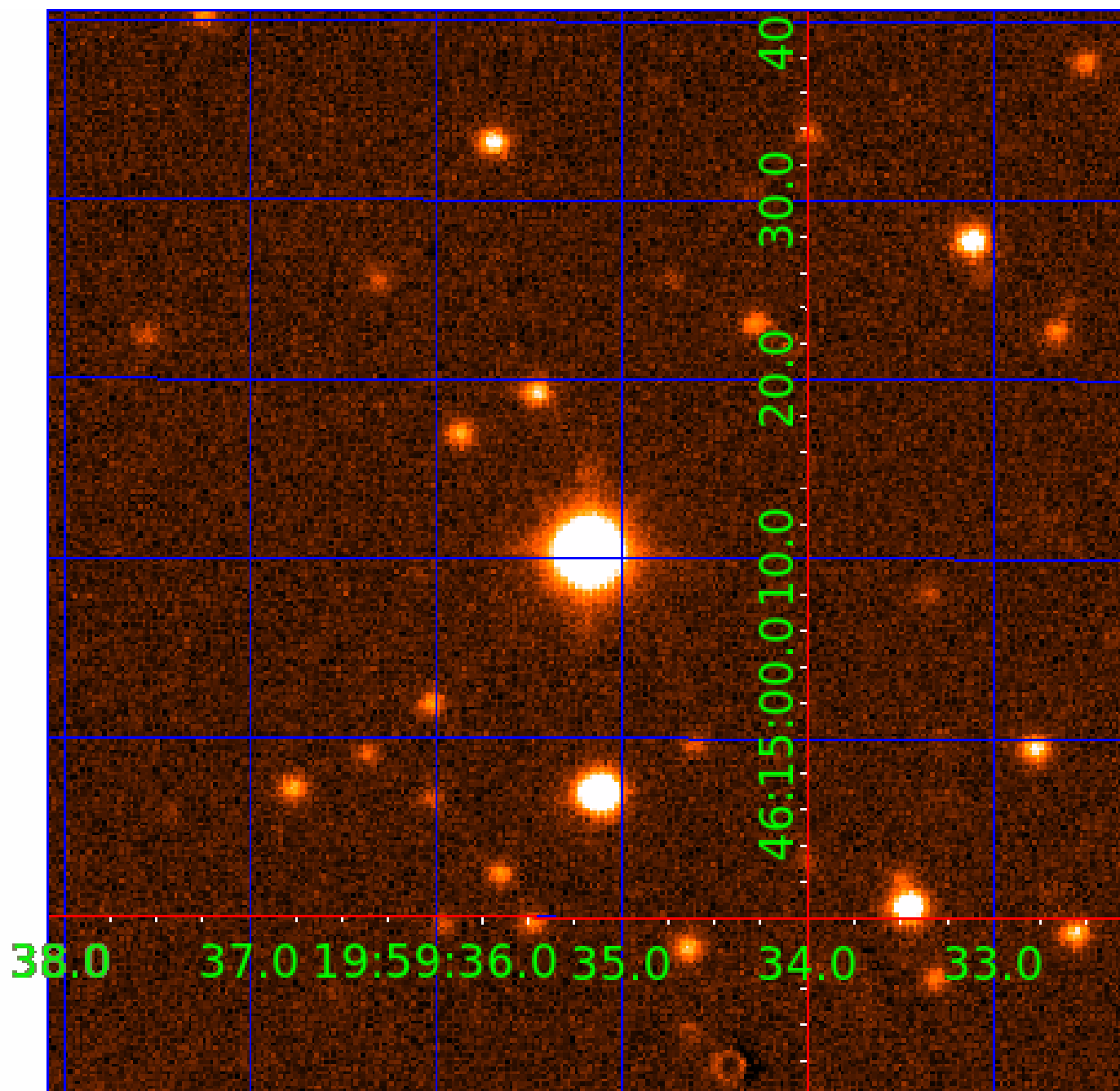


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009612178

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})
009612178-01	OBS	No	1.004551	131.654559	14.2	5.380	9.0	6.4	3.73	5720	1.48	25579.25
009612178-02	OBS	No	182.471022	243.026694	285.9	2.616	9.0	7.2	3.73	5720	7.48	24.86
009612178-03	OBS	No	145.043502	233.551262	249.9	2.736	7.5	7.7	3.73	5720	6.59	33.77
009612178-04	OBS	No	51.633778	151.646265	260.6	2.508	7.5	8.1	3.73	5720	7.03	133.85

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009612178-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
009612178-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009612178-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET
009612178-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT

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

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

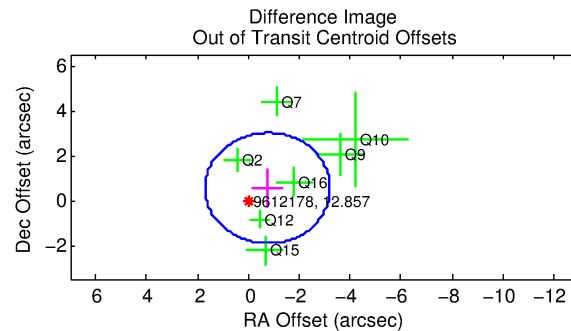
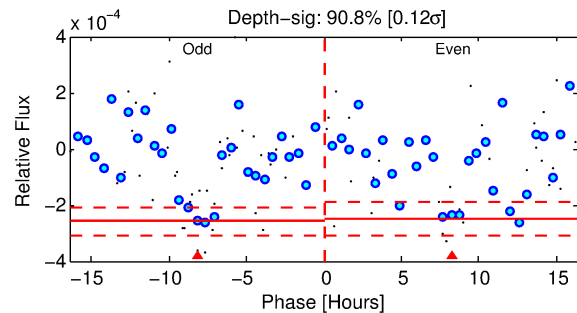
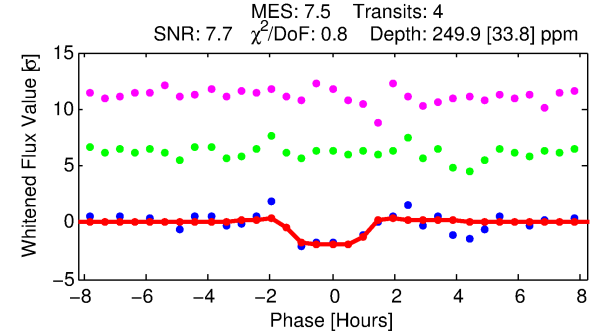
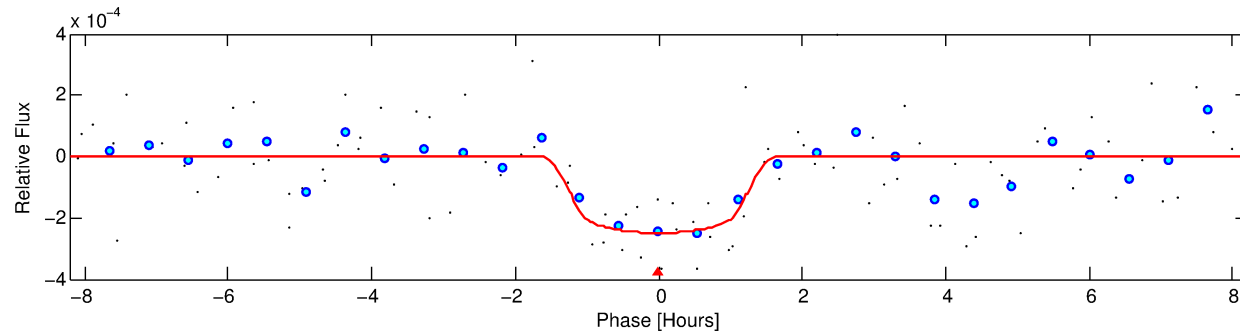
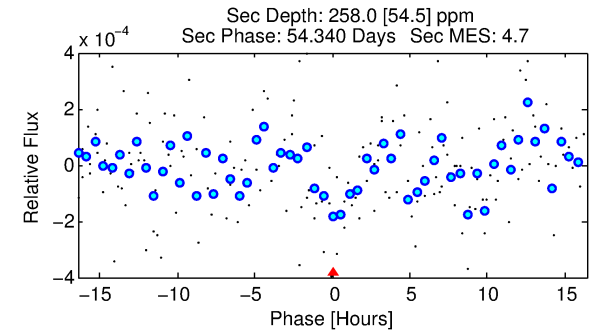
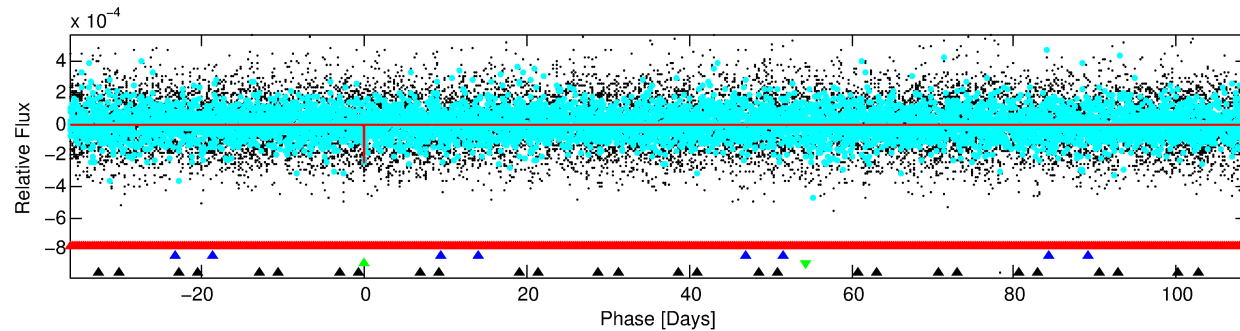
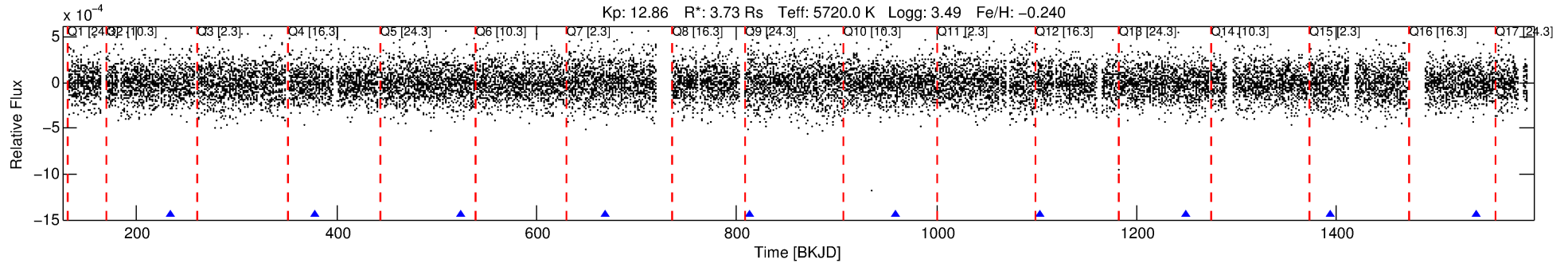
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009612178-03

No Significant Match Found

DV One-Page Summary

KIC: 9612178 Candidate: 3 of 4 Period: 145.044 d



DV Fit Results:

Period = 145.04350 [0.00142] d
Epoch = 233.5513 [0.0059] BKJD
Rp/R* = 0.0162 [0.0218]
a/R* = 246.45 [1555.53]
b = 0.81 [2.68]
Seff = 33.77 [21.84]
Teff = 615 [99] K
Rp = 6.59 [9.35] Re
a = 0.6291 [0.2563] AU
Ag = 1292.48 [3582.94] [0.36 σ]
Teffp = 5698 [3853] K [1.32 σ]

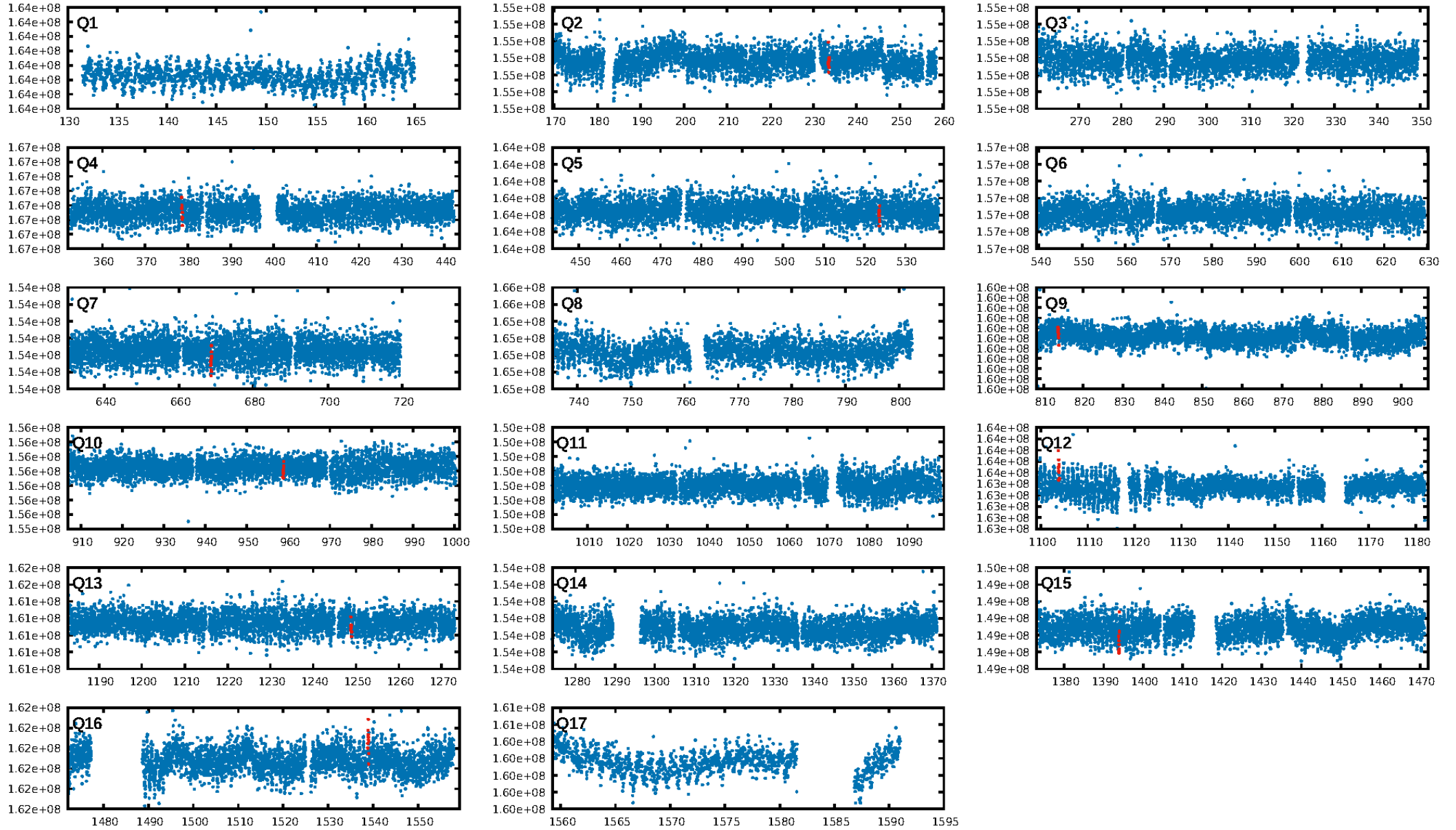
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [603.99 σ]
LongPeriod-sig: 100.0% [237.28 σ]
ModelChiSquare2-sig: 59.1%
ModelChiSquareGof-sig: 99.8%
Bootstrap-pfa: 1.22e-08
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 1.649
Centroid-sig: N/A
Centroid-so: 0.232 arcsec [0.20 σ]
OotOffset-rm: 0.932 arcsec [1.14 σ]
KicOffset-rm: 0.899 arcsec [1.30 σ]
OotOffset-st: 2/2/2/1 [7]
KicOffset-st: 2/2/2/1 [7]
DiffImageQuality-fgm: 0.29 [2/7]
DiffImageOverlap-fno: 0.20 [2/10]

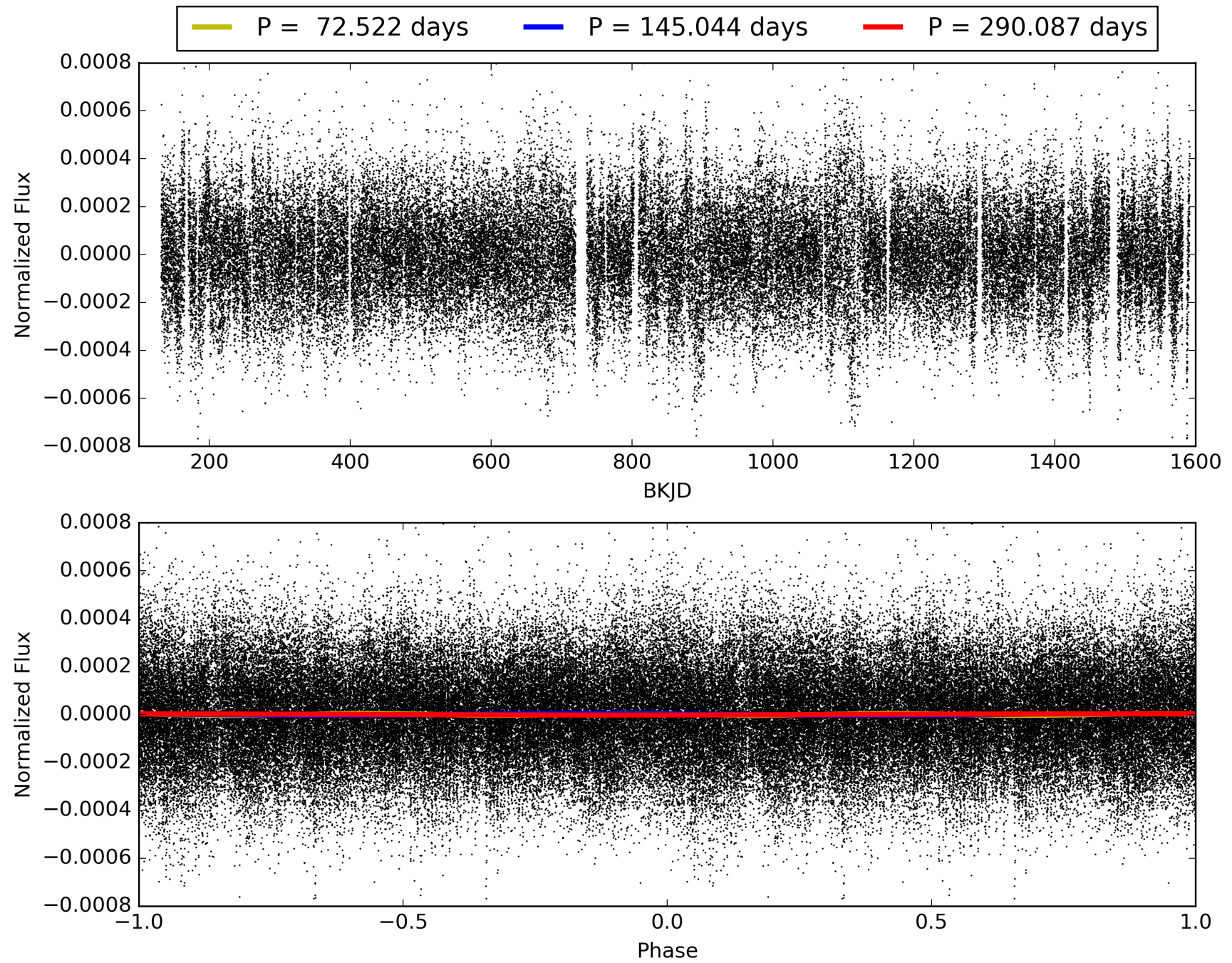
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 17:33:27 Z

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

TCE 009612178-03, PDC Light Curves

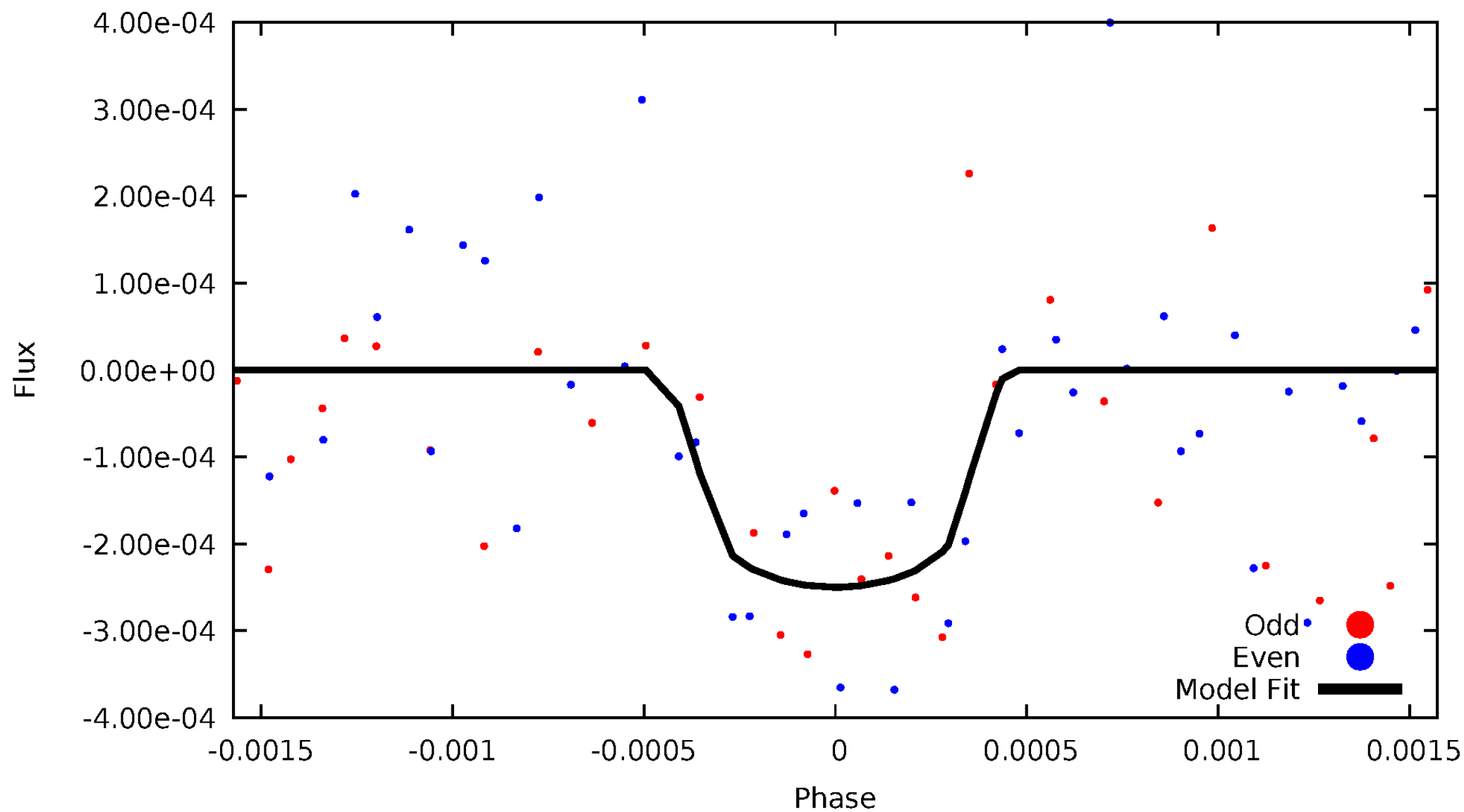


TCE 009612178-03



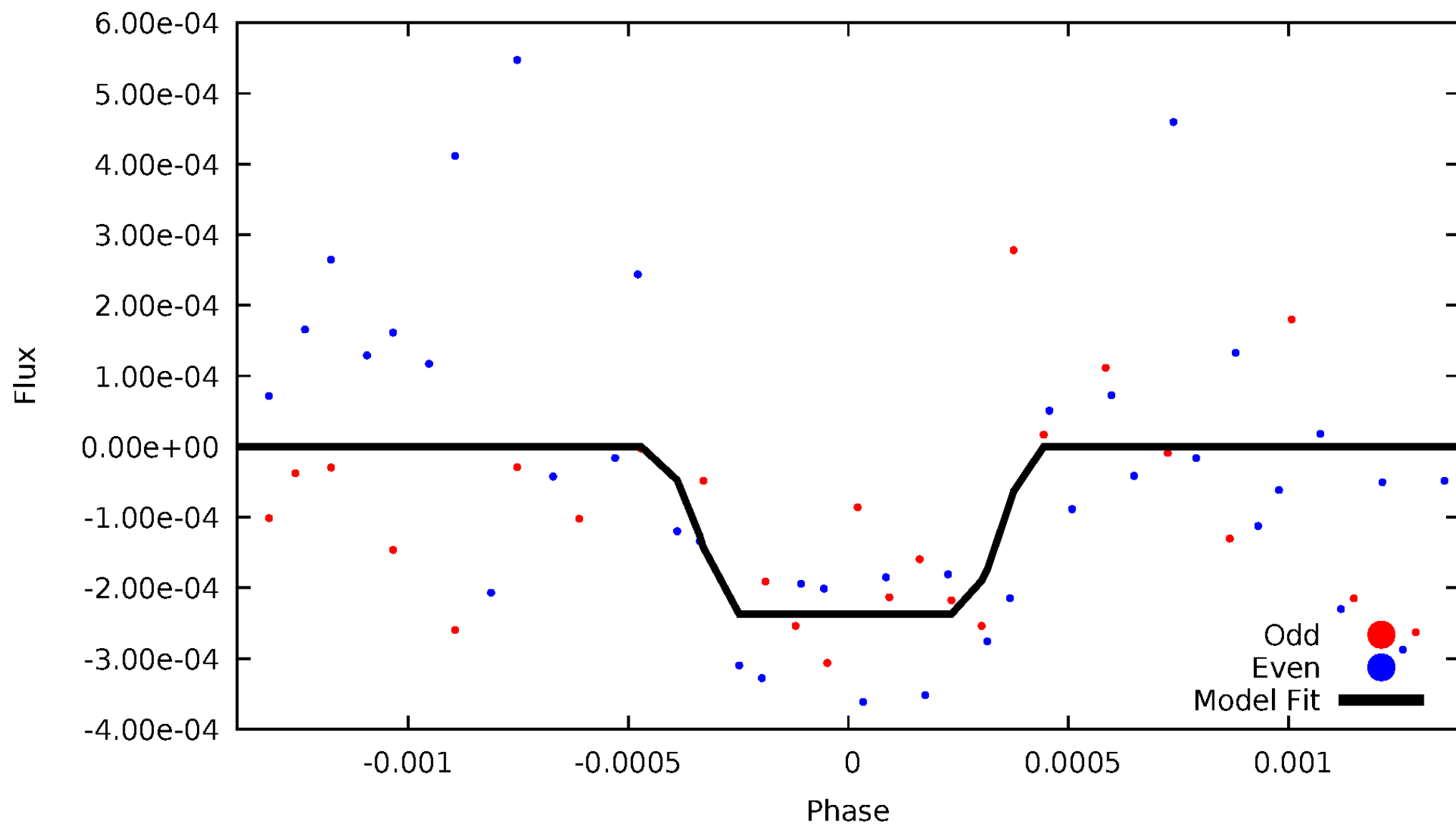
DV Odd/Even

TCE 009612178-03



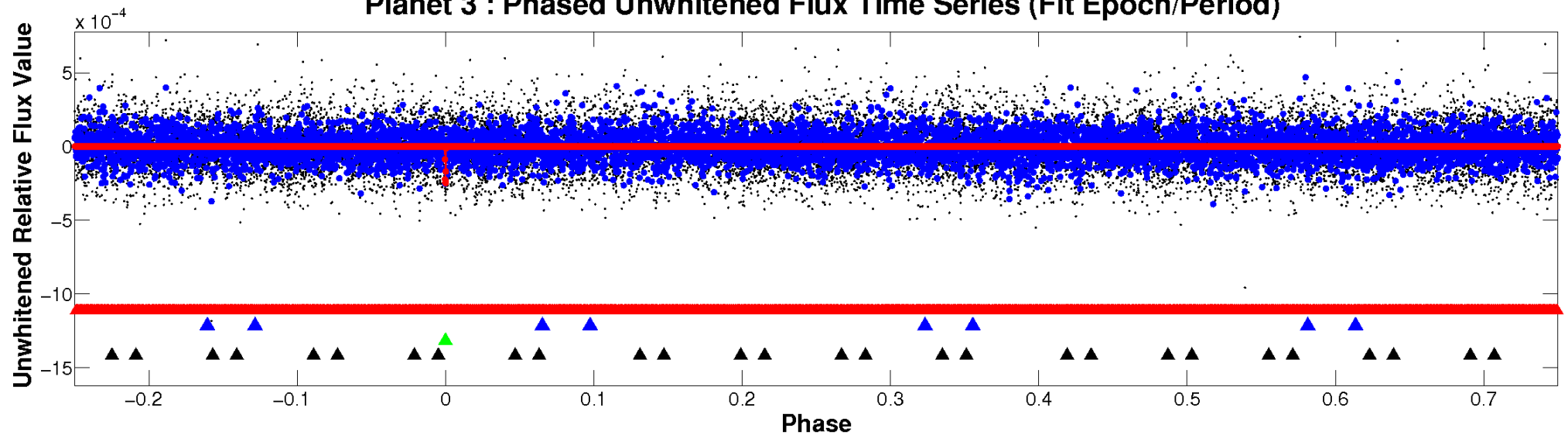
ALT Odd/Even

TCE 009612178-03

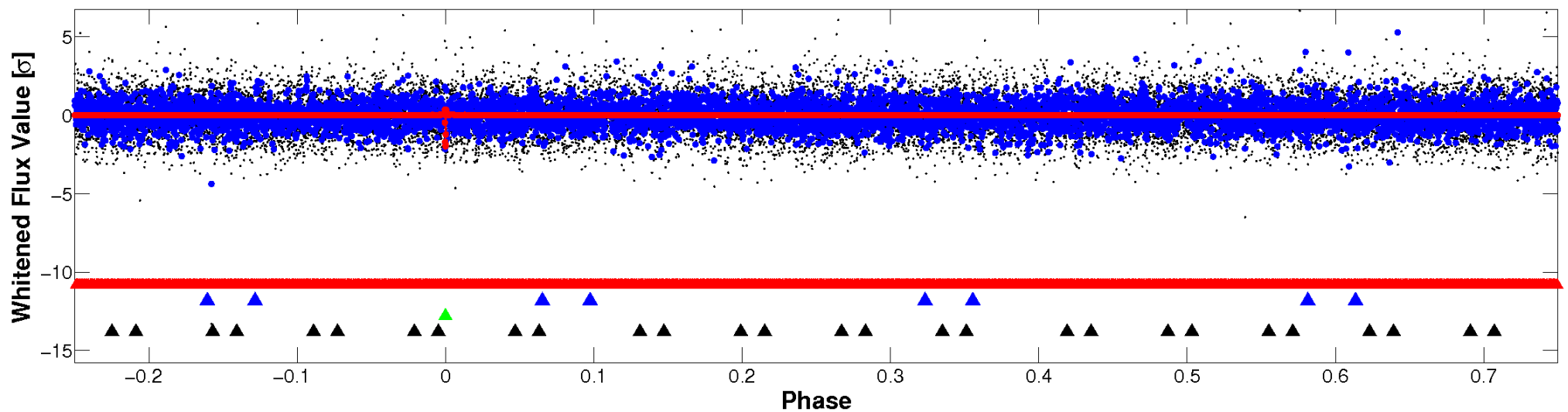


Non-Whitened Vs. Whitened Light Curve

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

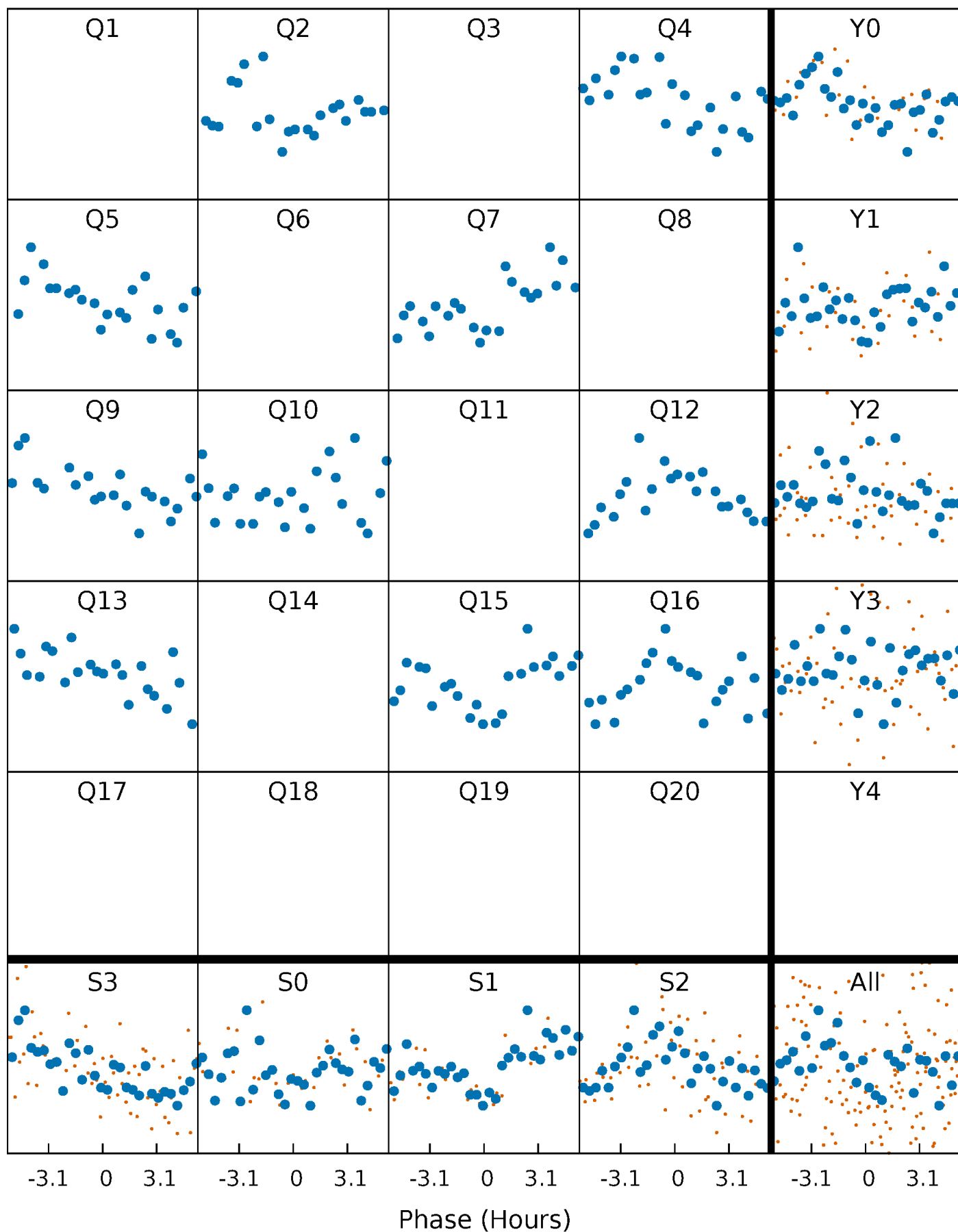


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



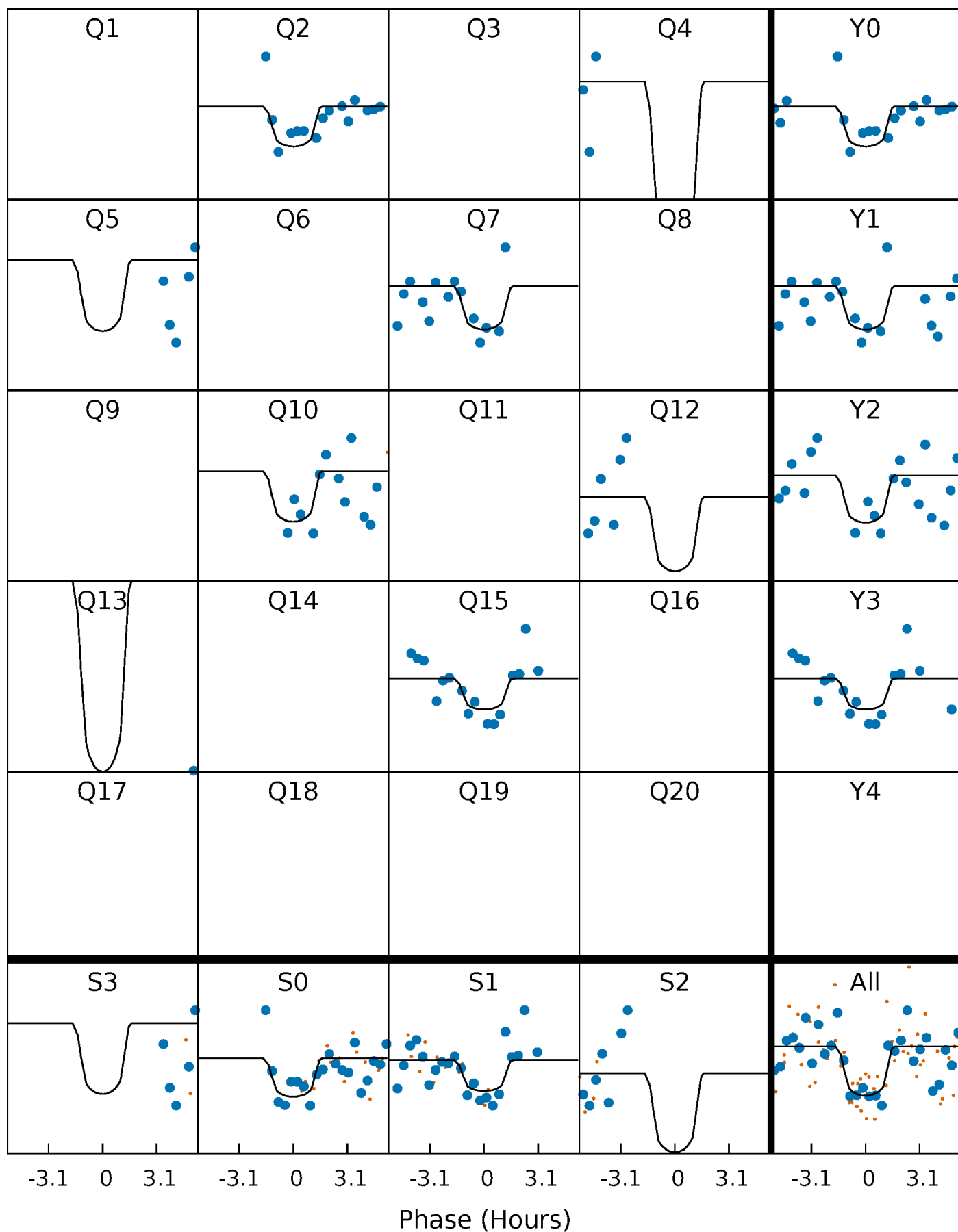
PDC Quarter-Phased Transit Curves

TCE 009612178-03 P=145.043502 Days $T_0=233.551262$ (BKJD)



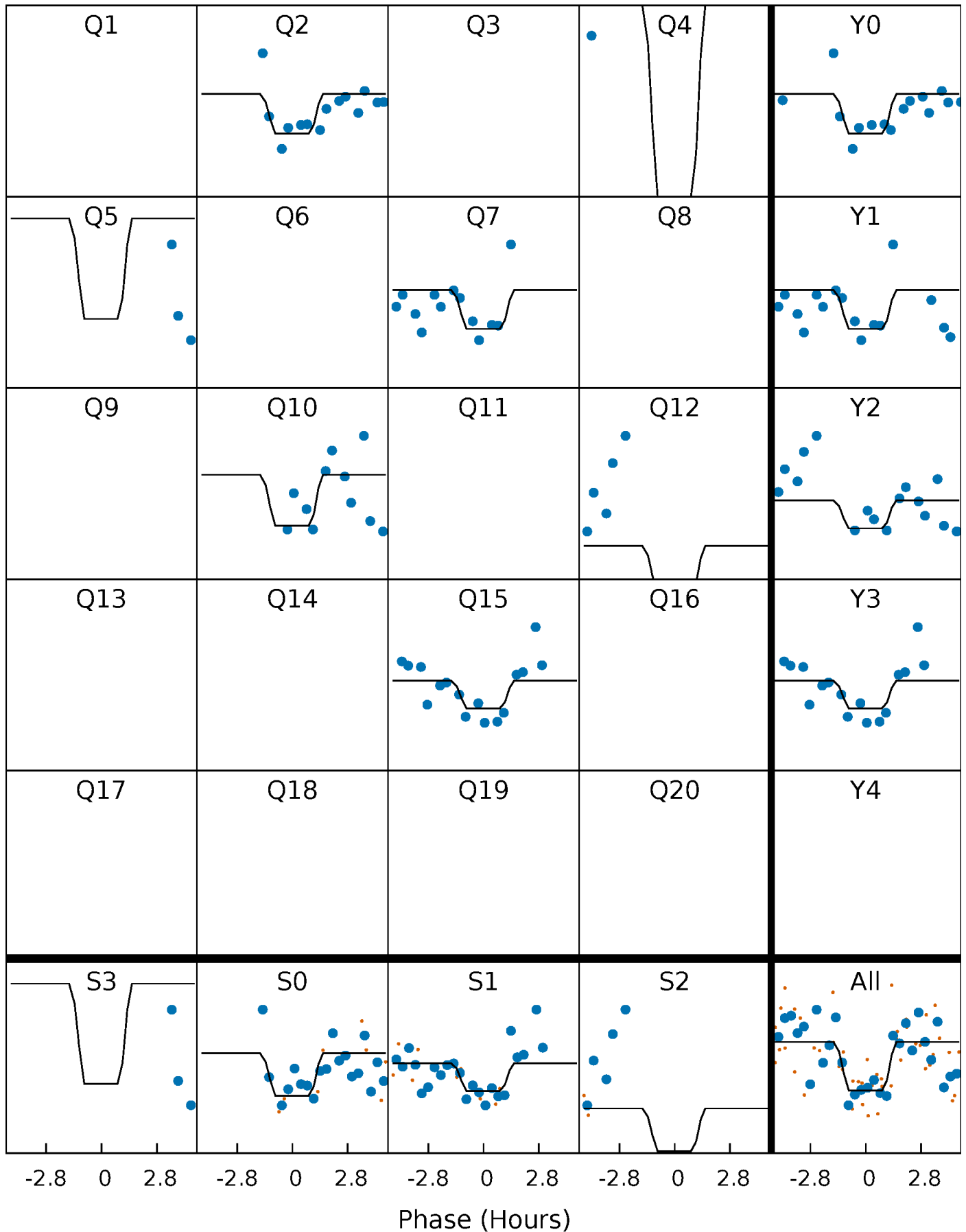
DV Quarter-Phased Transit Curves

TCE 009612178-03 P=145.043502 Days $T_0=233.551262$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

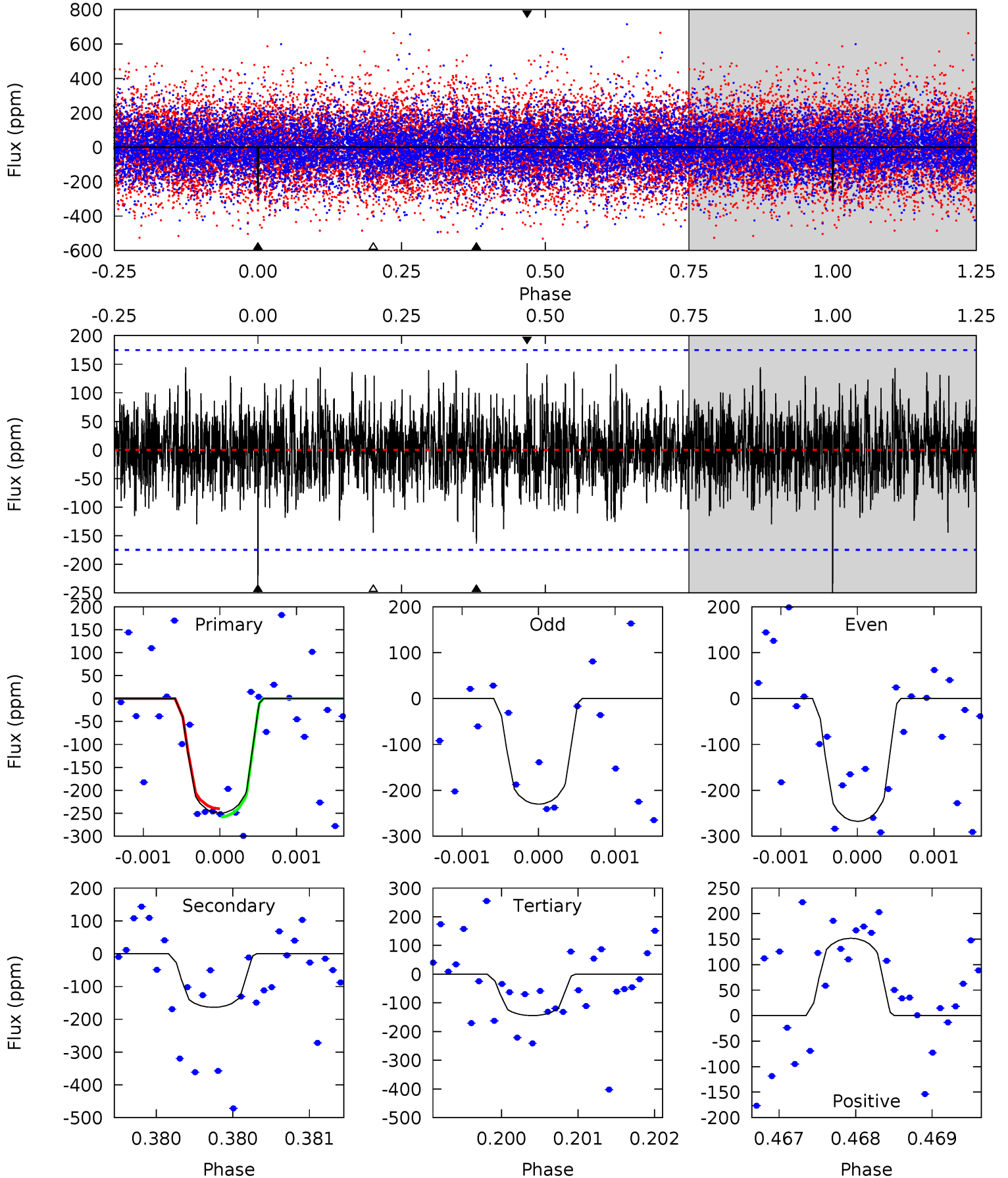
TCE 009612178-03 P=145.043636 Days $T_0=233.547245$ (BKJD)



DV Model-Shift Uniqueness Test

009612178-03, P = 145.043502 Days, E = 88.507760 Days

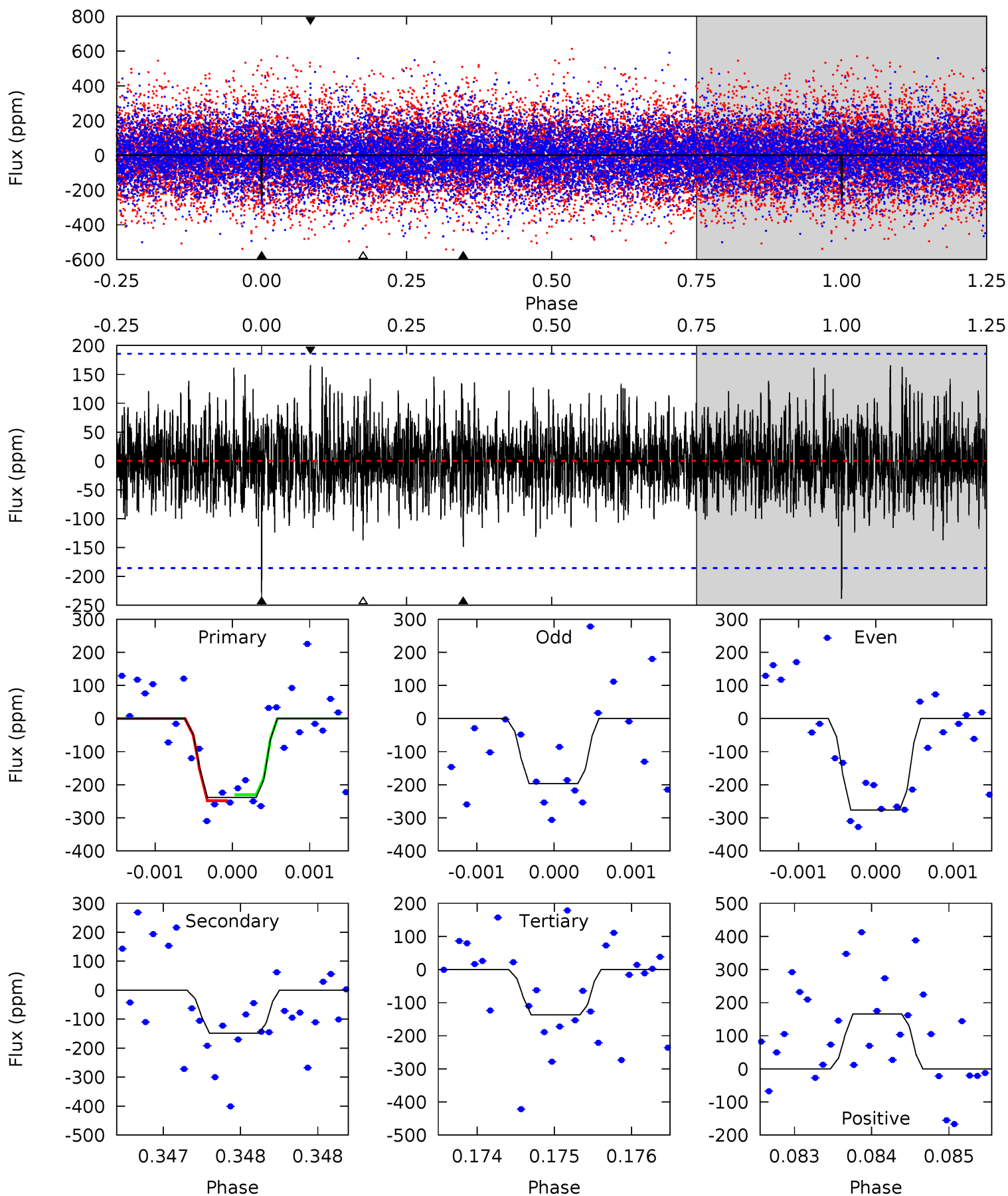
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.84	5.14	4.53	4.76	5.48	3.34	1.39	3.30	3.08	0.60	0.38	0.59	1.08	0.38	0.28



Alt Model-Shift Uniqueness Test

009612178-03, P = 145.043636 Days, E = 88.503609 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.06	4.40	4.05	4.91	5.50	3.37	1.32	3.01	2.15	0.35	-0.50	1.18	1.08	0.41	0.26



Stellar Parameters For KIC 009612178

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5720^{+179}_{-219}	$3.492^{+0.360}_{-0.120}$	$-0.240^{+0.300}_{-0.350}$	$3.733^{+0.718}_{-1.676}$	$1.579^{+0.180}_{-0.540}$	$0.043^{+0.128}_{-0.016}$
	+3%/-4%	+10%/-3%	+125%/-146%	+19%/-45%	+11%/-34%	+300%/-37%
Source	PHO1	FLK73	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 009612178-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-164 ± 32	$8.67^{+8.15}_{-5.32}$	842^{+66}_{-91}	4485^{+2301}_{-934}	453^{+2776}_{-329}
Alt.	-149 ± 34	$8.31^{+7.60}_{-5.63}$	841^{+57}_{-95}	4469^{+2809}_{-951}	452^{+3454}_{-328}

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 $A_{obs} \gg 1.0$

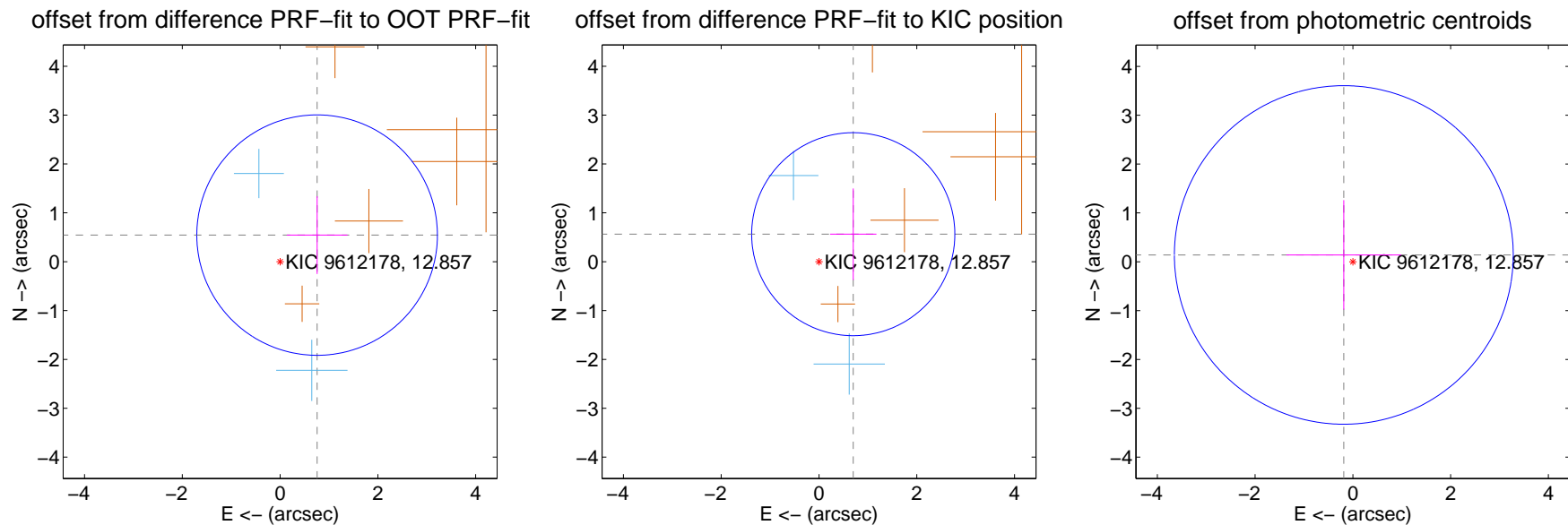
DV Centroid Data

Supplemental centroid analysis for 009612178-03. Kepler magnitude: 12.86. Transit SNR 7.65

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

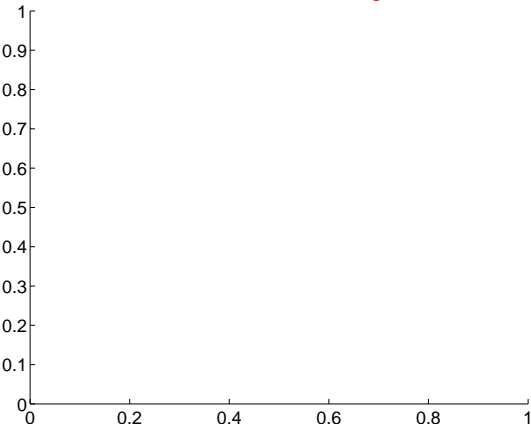
	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.932 ± 0.820	1.14	-0.757 ± 0.619	0.544 ± 0.796
PRF-fit source offset from KIC position	0.899 ± 0.693	1.30	-0.701 ± 0.474	0.563 ± 0.936
photometric centroid source offset	0.23 ± 1.16	0.20	0.19 ± 1.17	0.14 ± 1.12



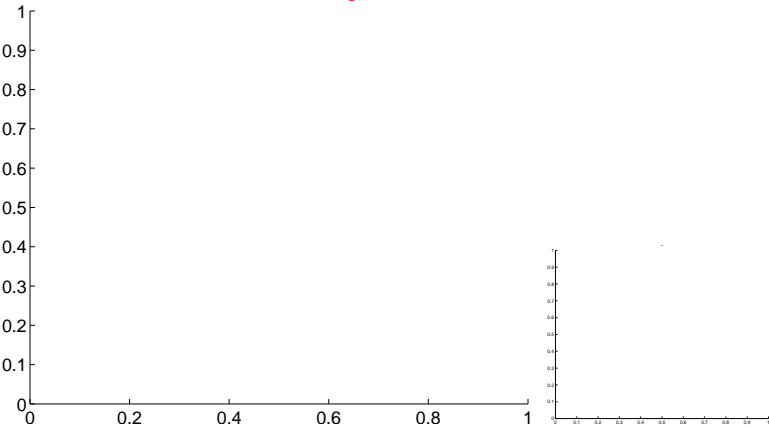
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

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

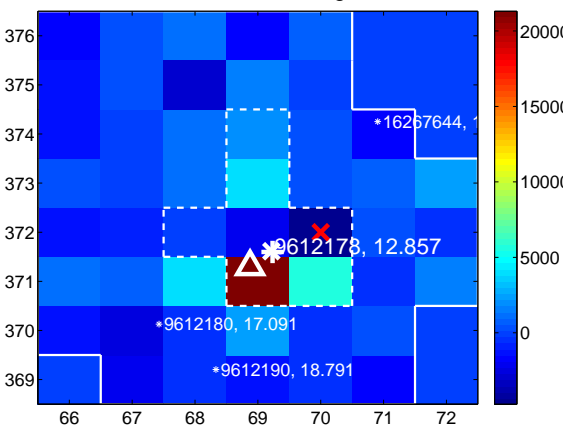
Q1 no difference image



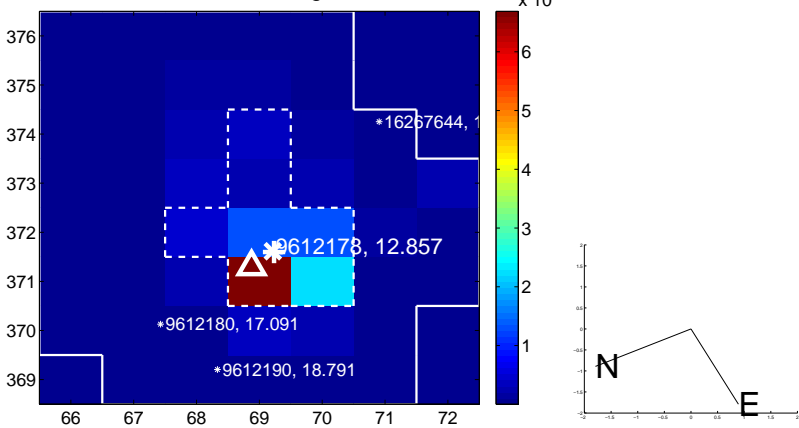
Q1 no OOT image



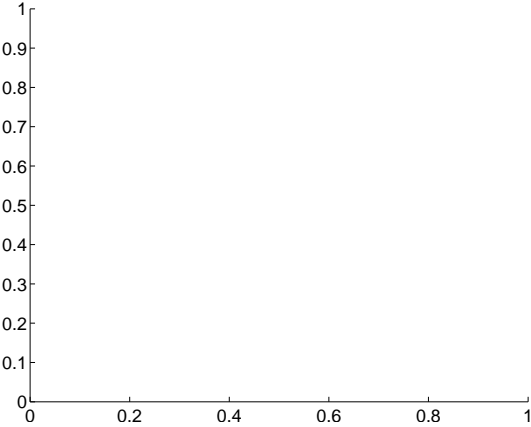
Q2 difference image



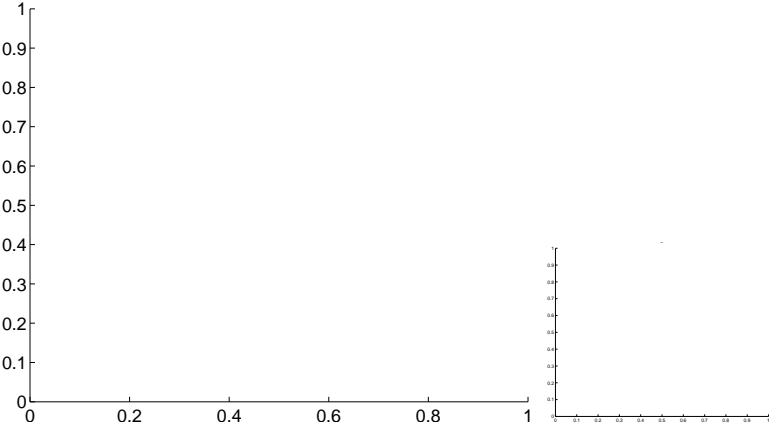
Q2 OOT image



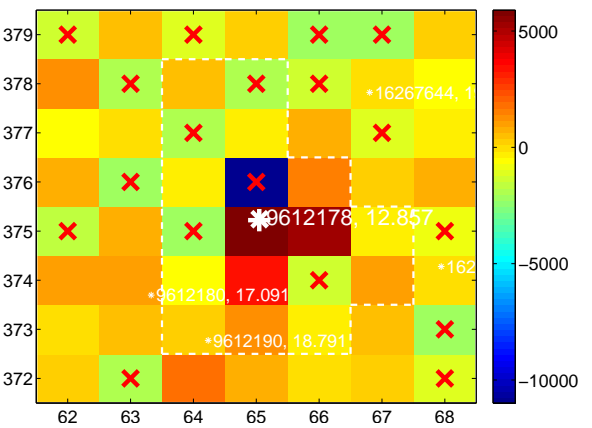
Q3 no difference image



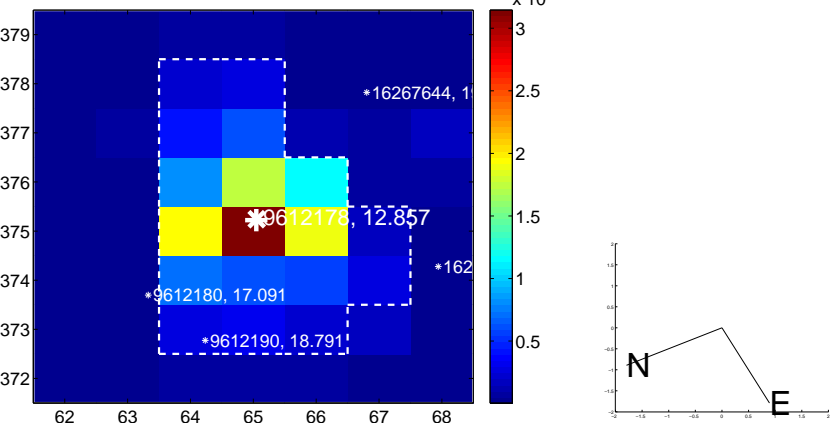
Q3 no OOT image



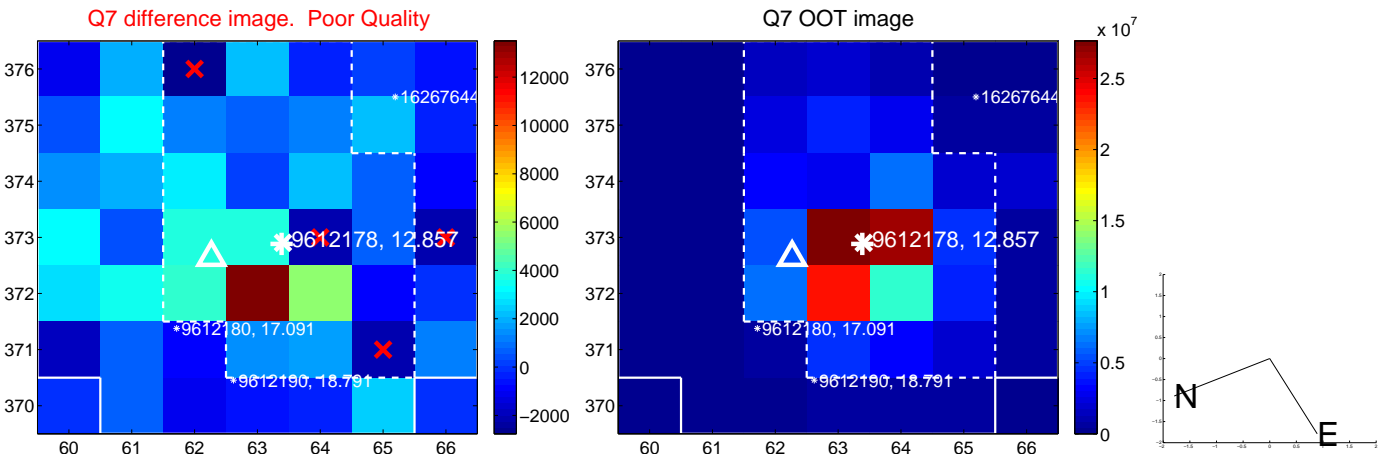
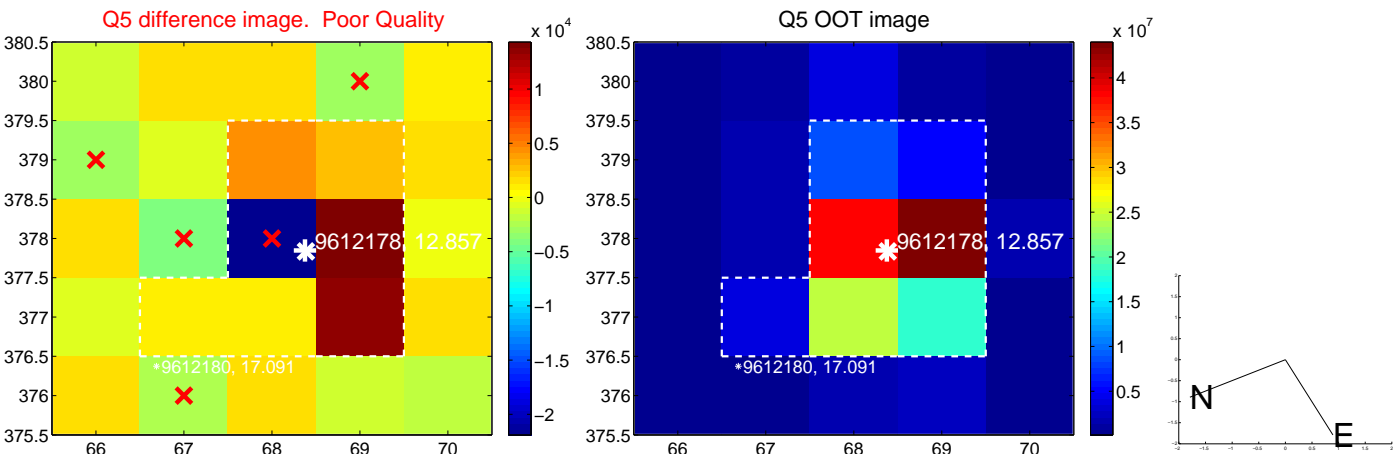
Q4 difference image. Poor Quality



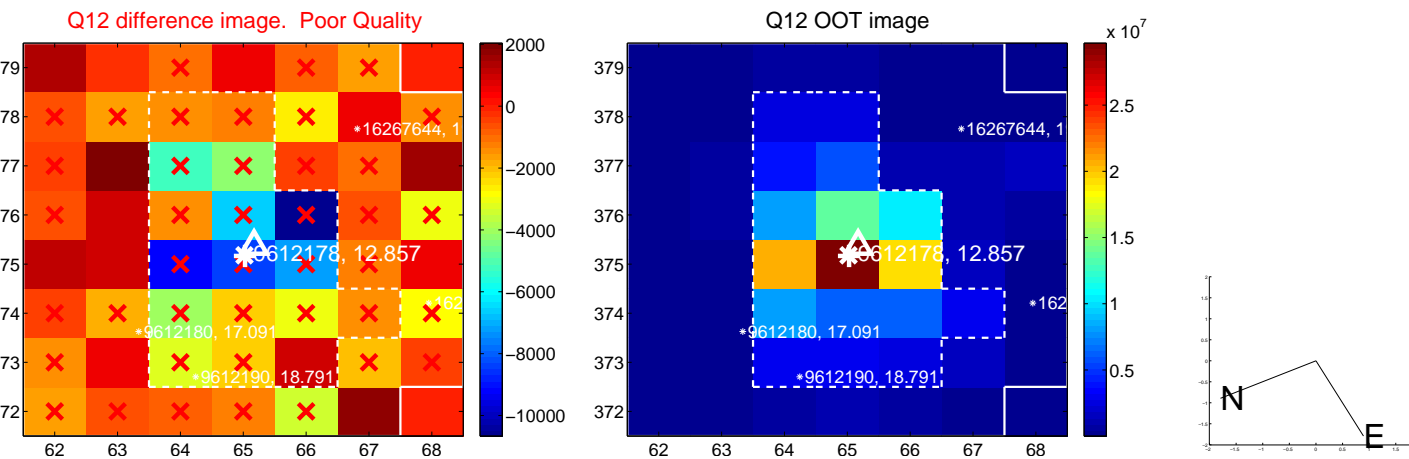
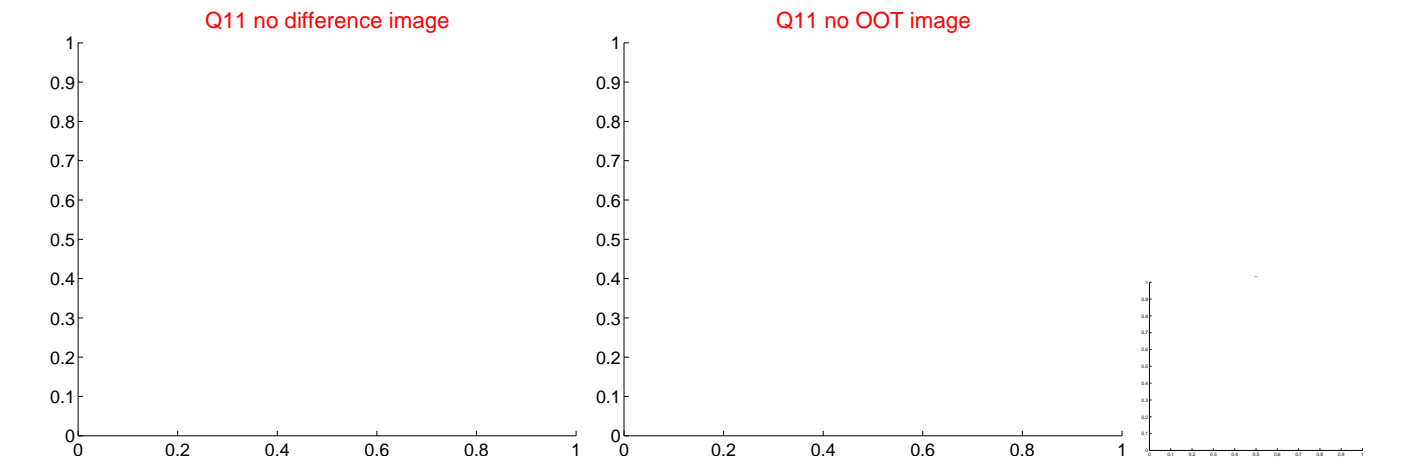
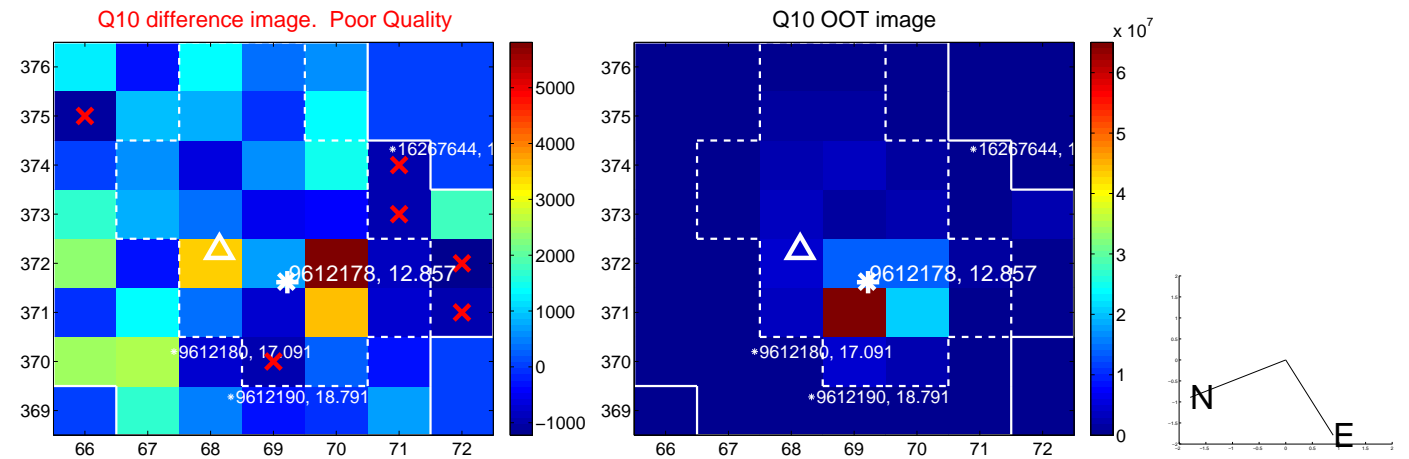
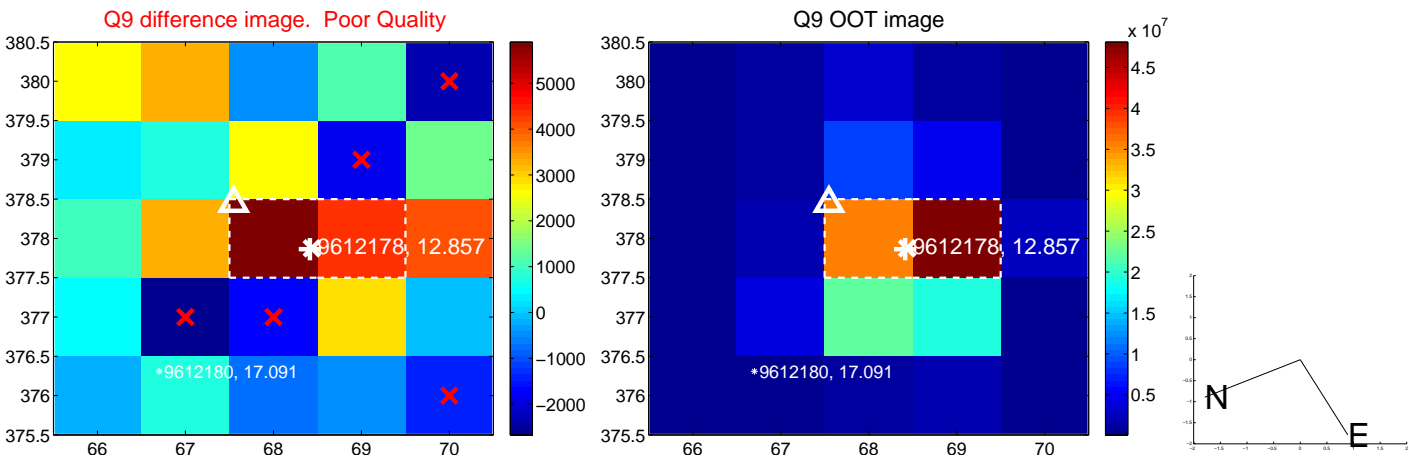
Q4 OOT image



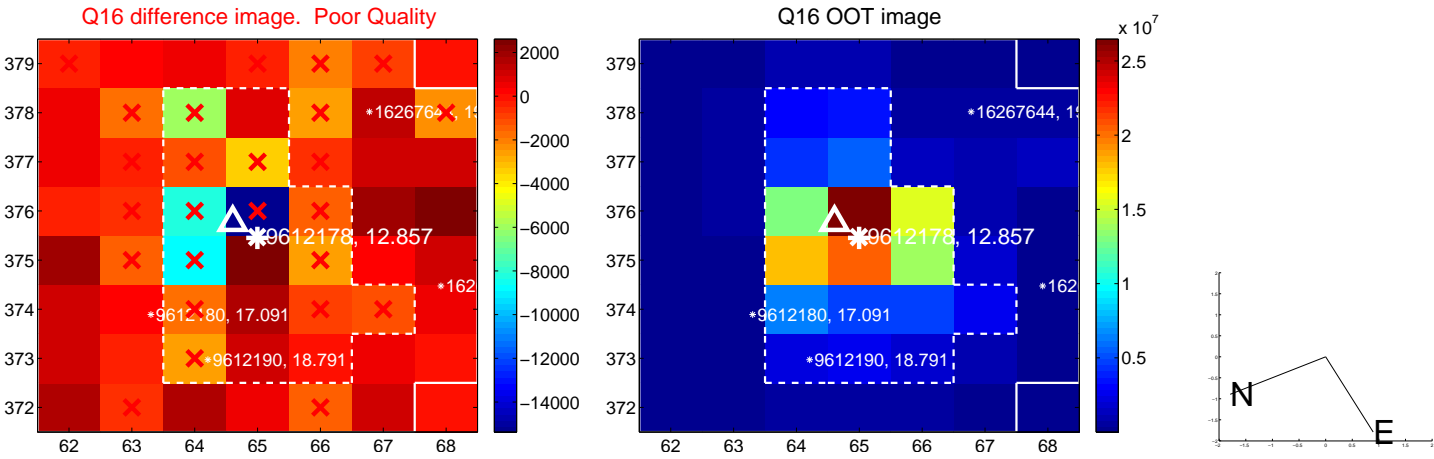
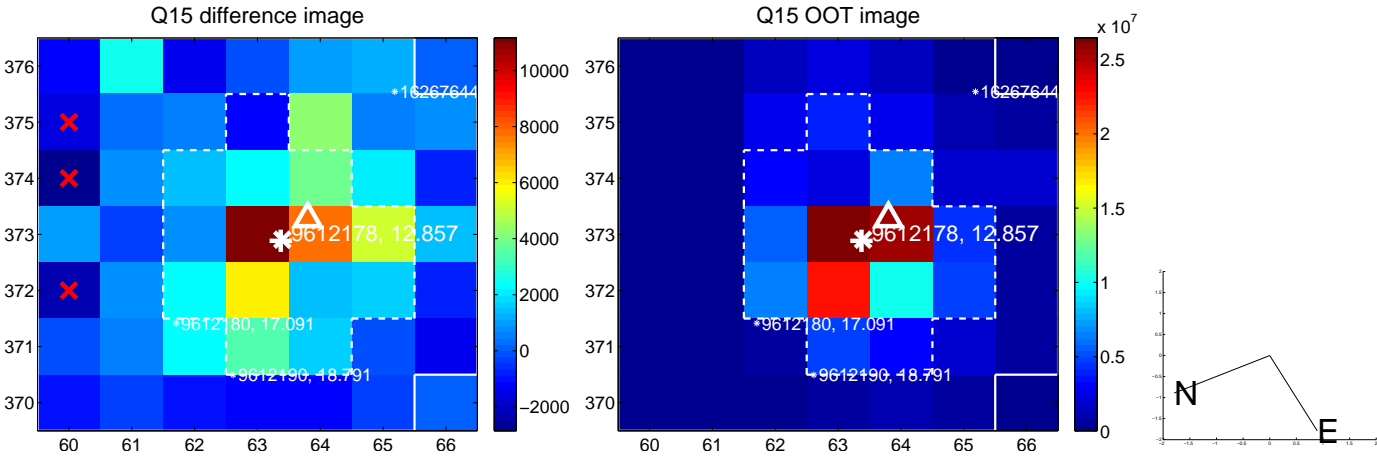
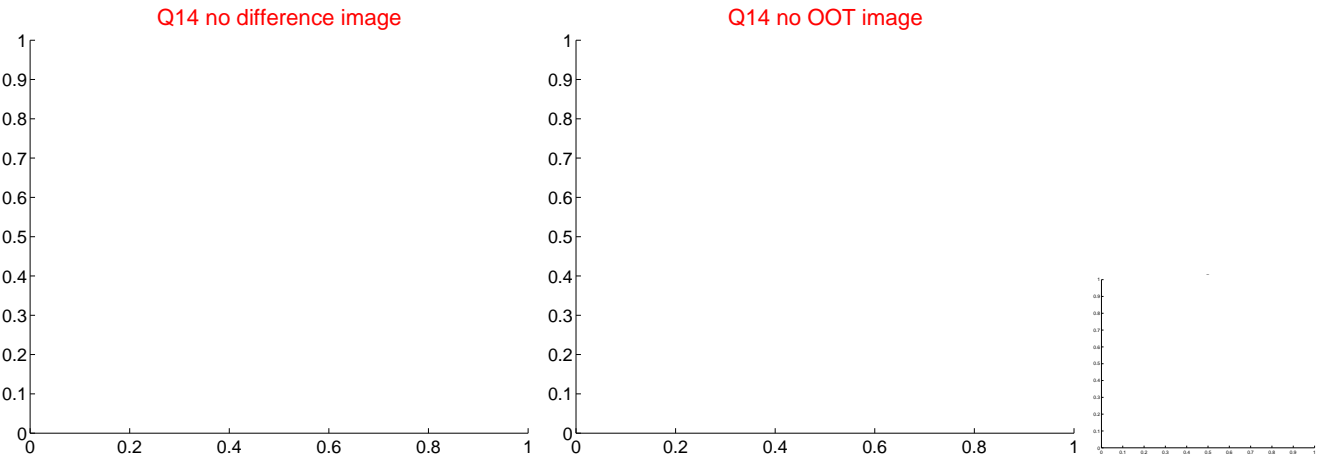
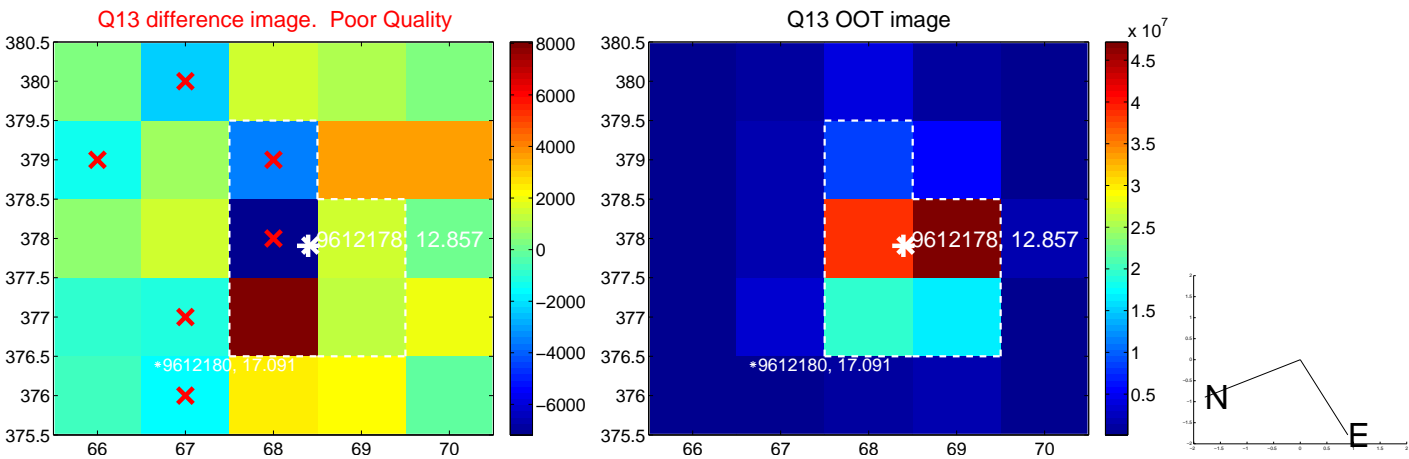
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



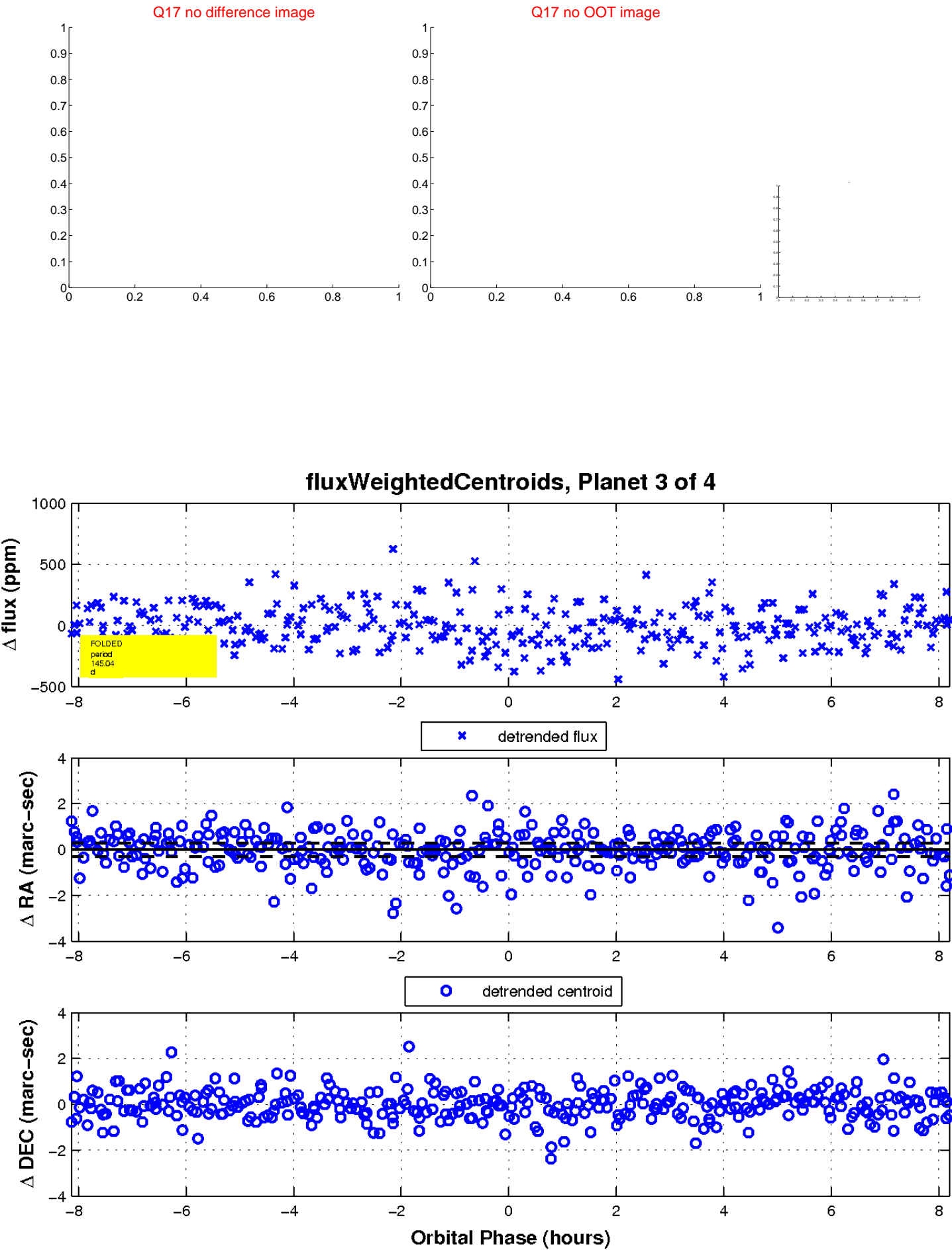
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



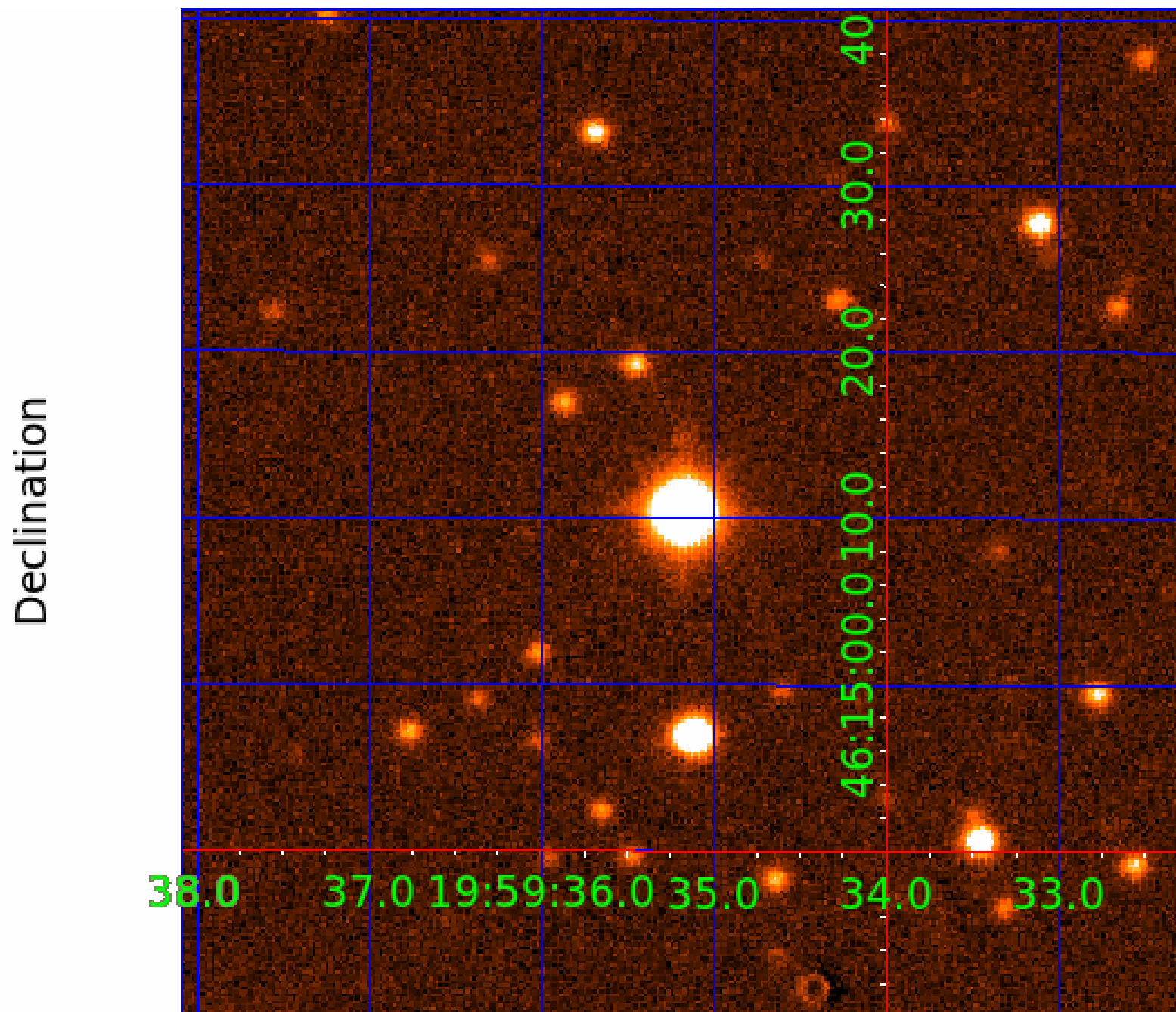
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 009612178

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})
009612178-01	OBS	No	1.004551	131.654559	14.2	5.380	9.0	6.4	3.73	5720	1.48	25579.25
009612178-02	OBS	No	182.471022	243.026694	285.9	2.616	9.0	7.2	3.73	5720	7.48	24.86
009612178-03	OBS	No	145.043502	233.551262	249.9	2.736	7.5	7.7	3.73	5720	6.59	33.77
009612178-04	OBS	No	51.633778	151.646265	260.6	2.508	7.5	8.1	3.73	5720	7.03	133.85

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009612178-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
009612178-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009612178-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET
009612178-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT

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

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

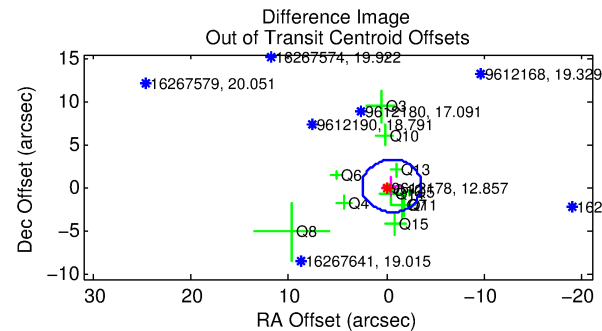
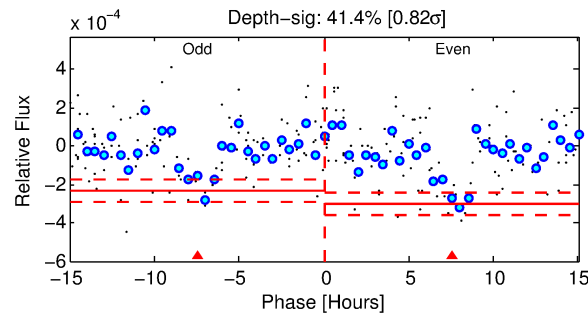
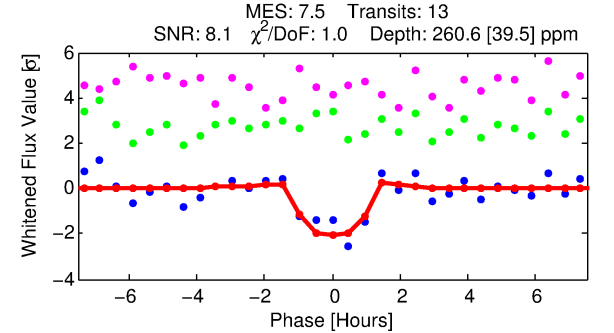
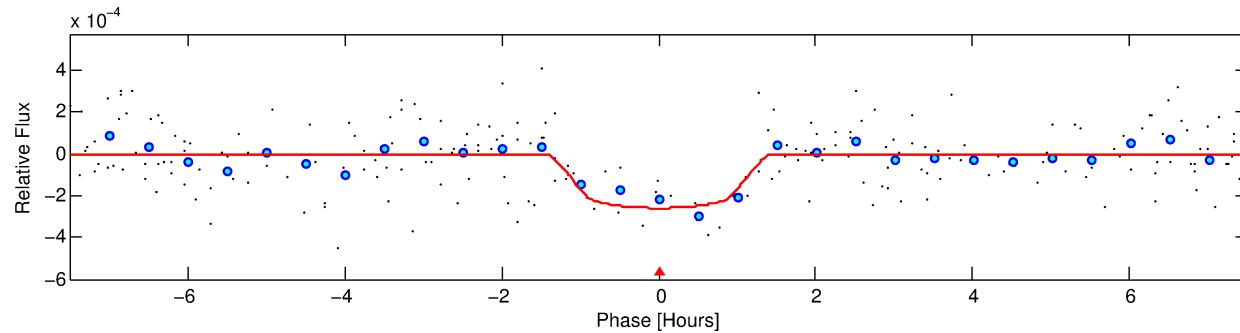
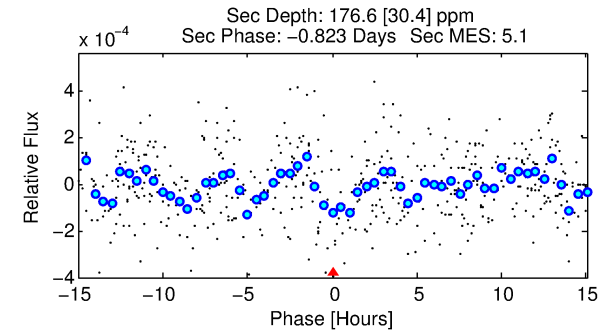
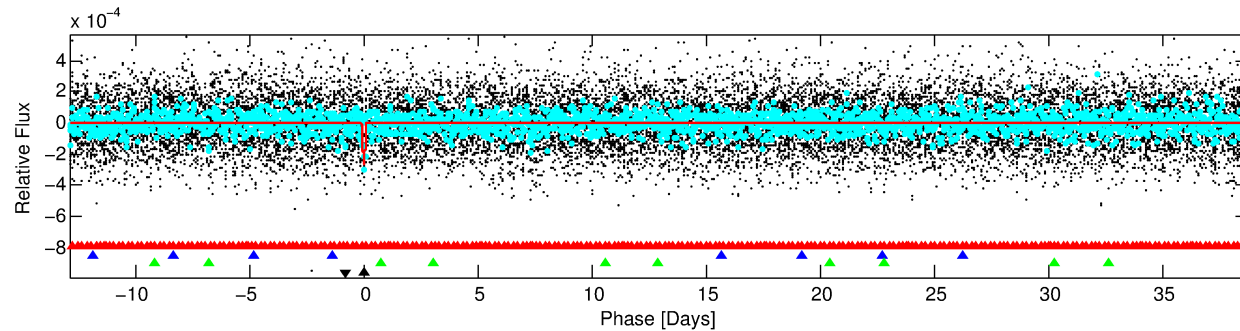
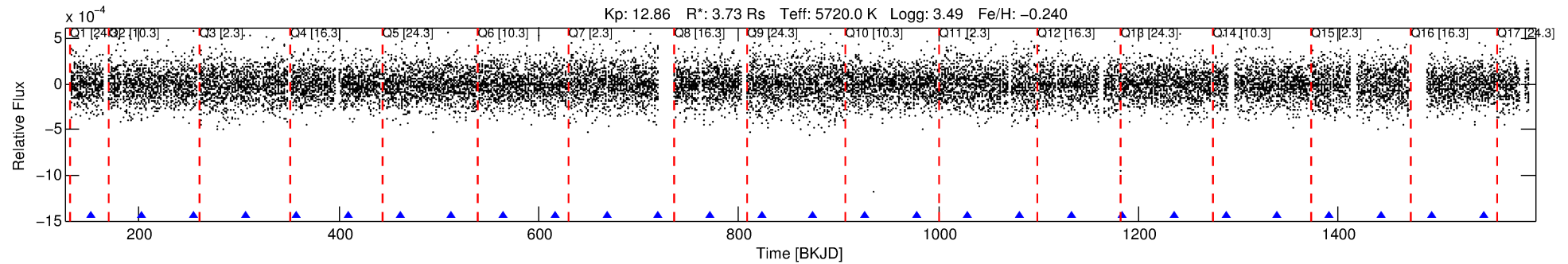
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009612178-04

No Significant Match Found

DV One-Page Summary

KIC: 9612178 Candidate: 4 of 4 Period: 51.634 d



DV Fit Results:

Period = 51.63378 [0.00041] d
Epoch = 151.6463 [0.0066] BKJD
Rp/R* = 0.0173 [0.0120]
a/R* = 79.76 [267.16]
b = 0.88 [0.86]
Seff = 133.85 [86.58]
Teq = 867 [140] K
Rp = 7.03 [5.83] Re
a = 0.3160 [0.1287] AU
Ag = 196.17 [301.64] [0.65σ]
Teffp = 5019 [1771] K [2.34σ]

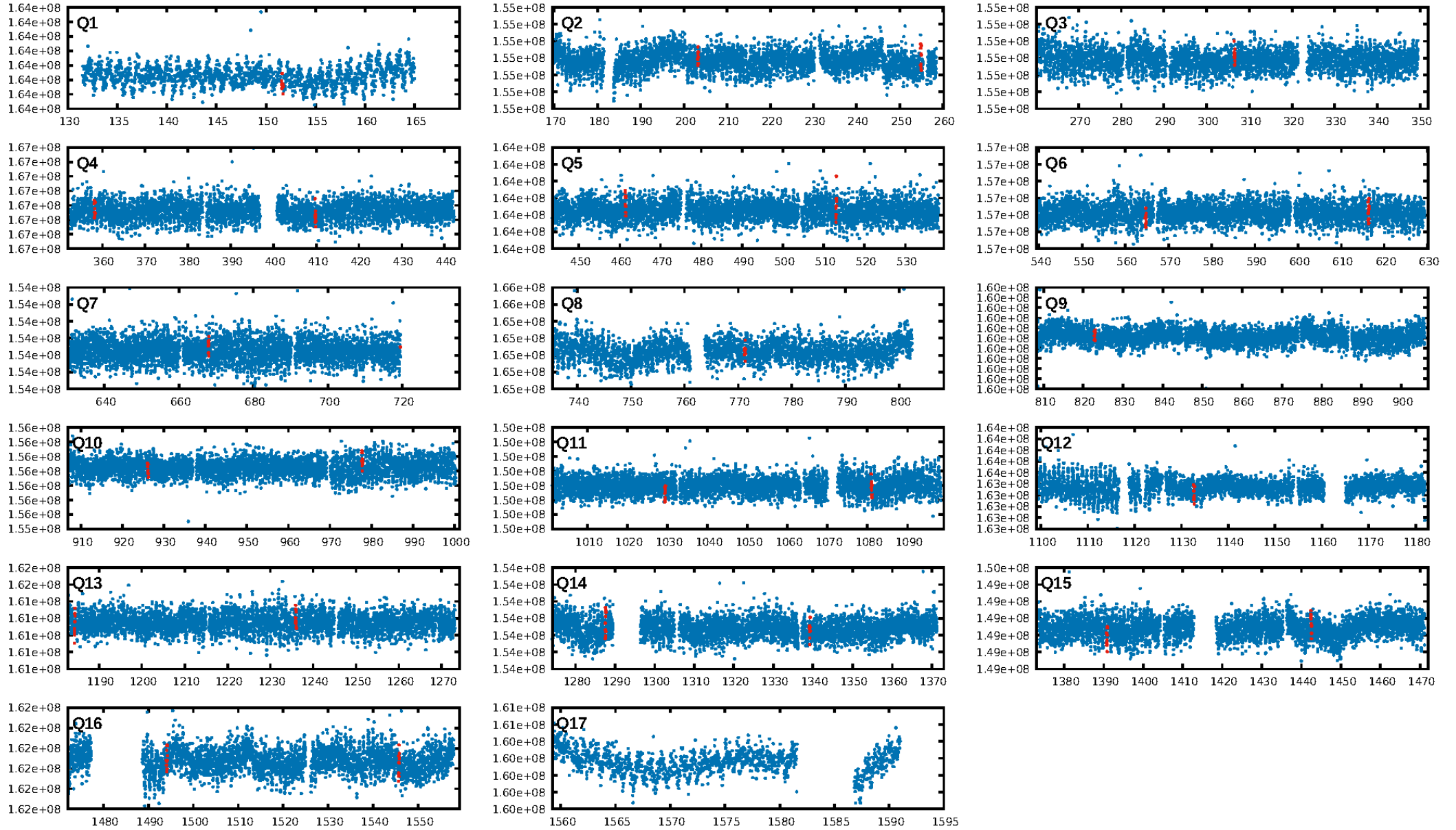
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [204.71σ]
LongPeriod-sig: 100.0% [603.99σ]
ModelChiSquare2-sig: 61.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.14e-08
RollingBand-fgt: 1.00 [13/13]
GhostDiagnostic-chr: -2.283
Centroid-sig: N/A
Centroid-so: 0.482 arcsec [0.63σ]
OotOffset-rm: 0.599 arcsec [0.59σ]
KicOffset-rm: 0.570 arcsec [0.56σ]
OotOffset-st: 3/4/3/2 [12]
KicOffset-st: 3/4/3/2 [12]
DiffImageQuality-fgm: 0.08 [1/12]
DiffImageOverlap-fno: 0.25 [4/16]

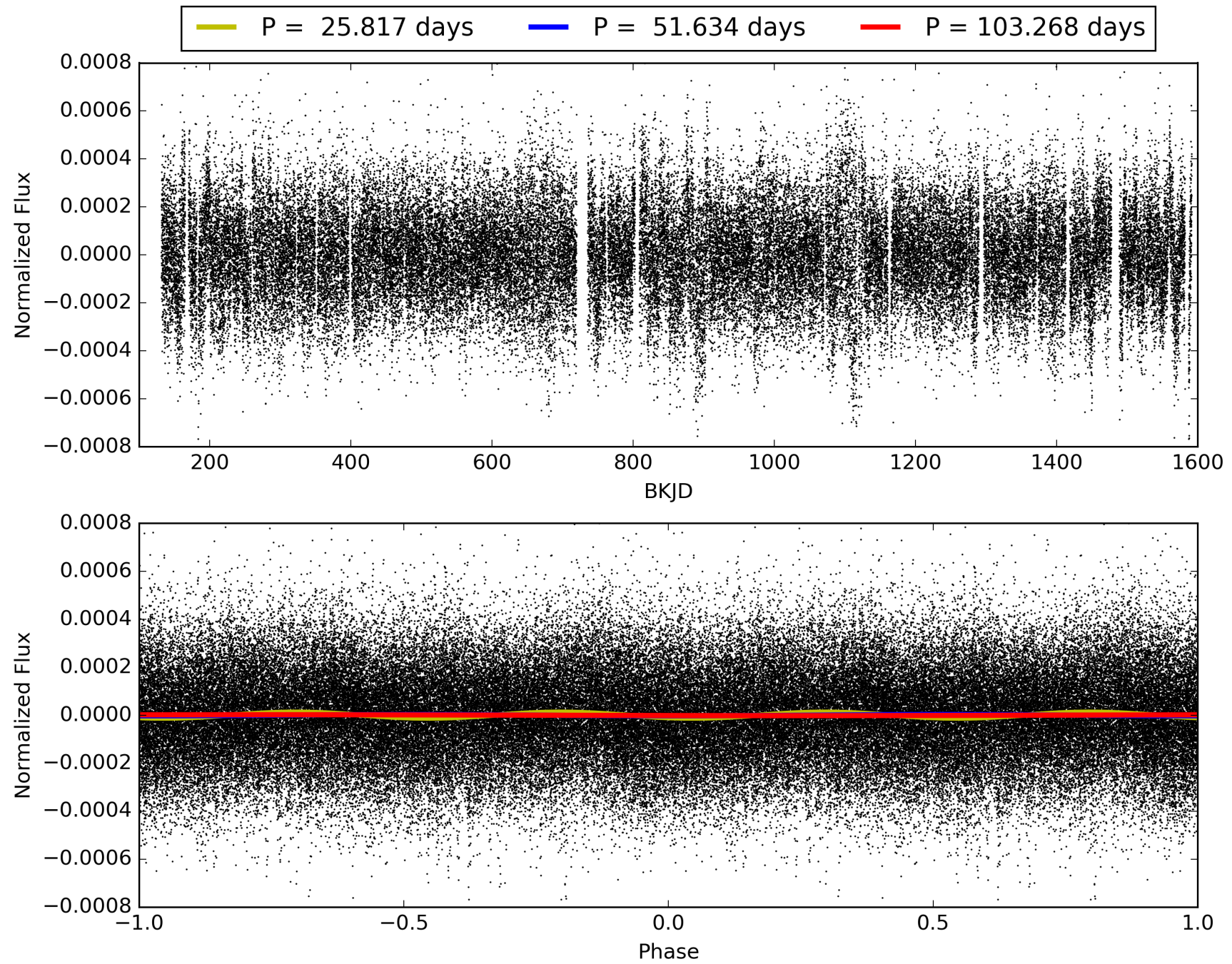
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 17:33:32 Z

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

TCE 009612178-04, PDC Light Curves

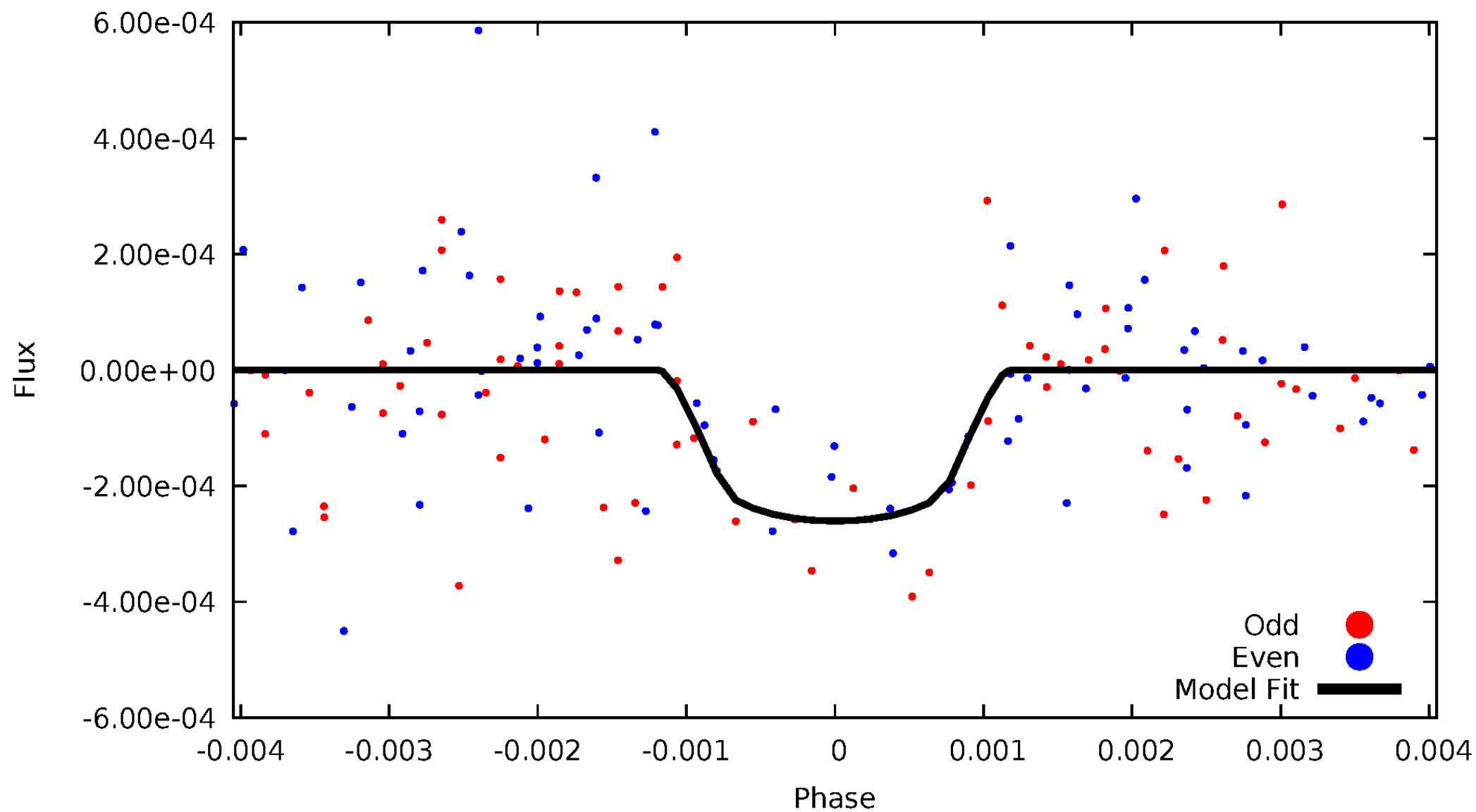


TCE 009612178-04



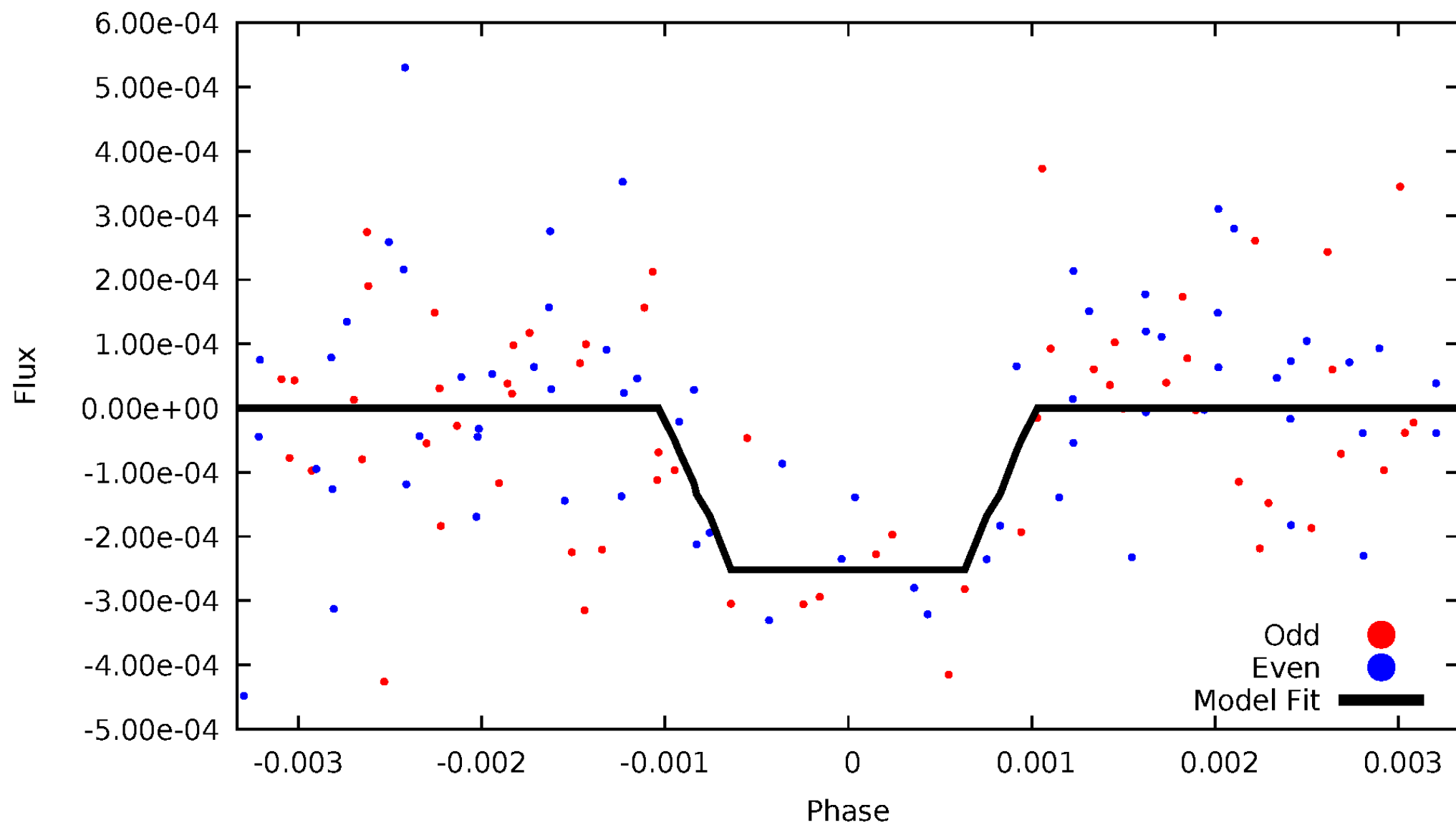
DV Odd/Even

TCE 009612178-04



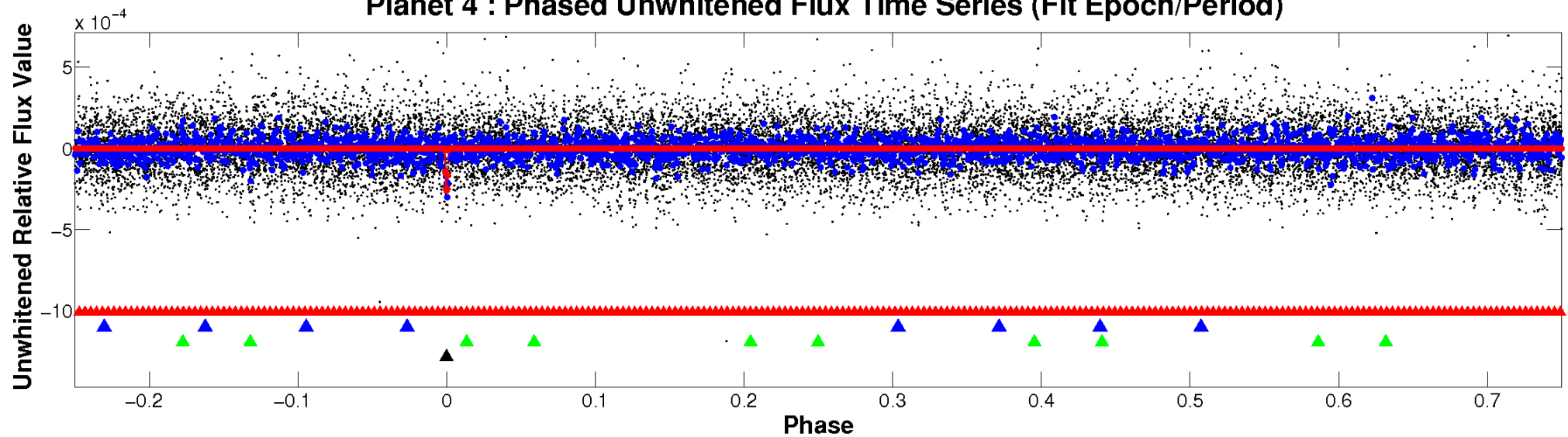
ALT Odd/Even

TCE 009612178-04

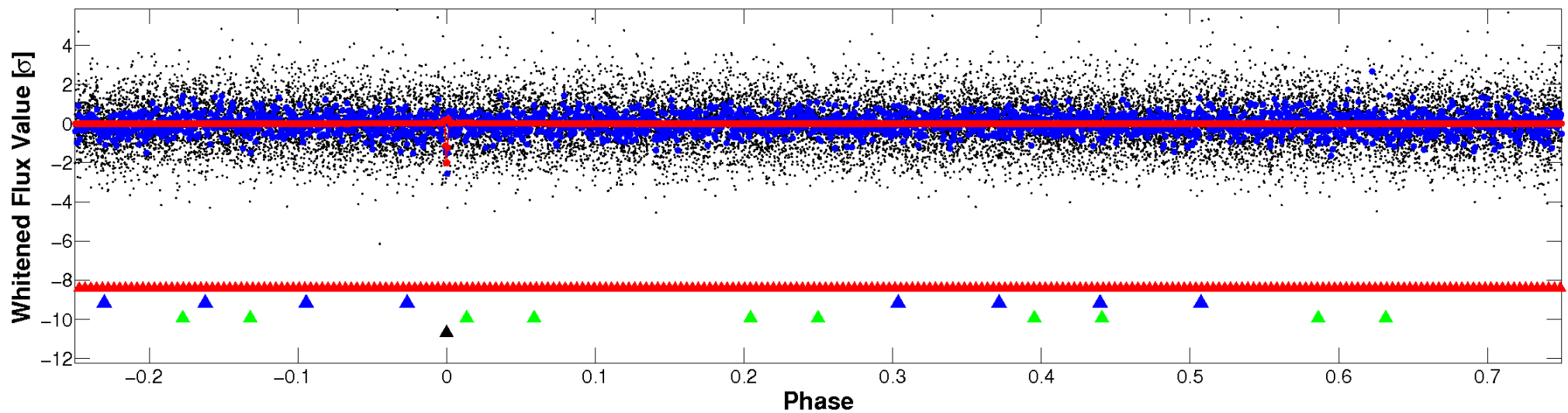


Non-Whitened Vs. Whitened Light Curve

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

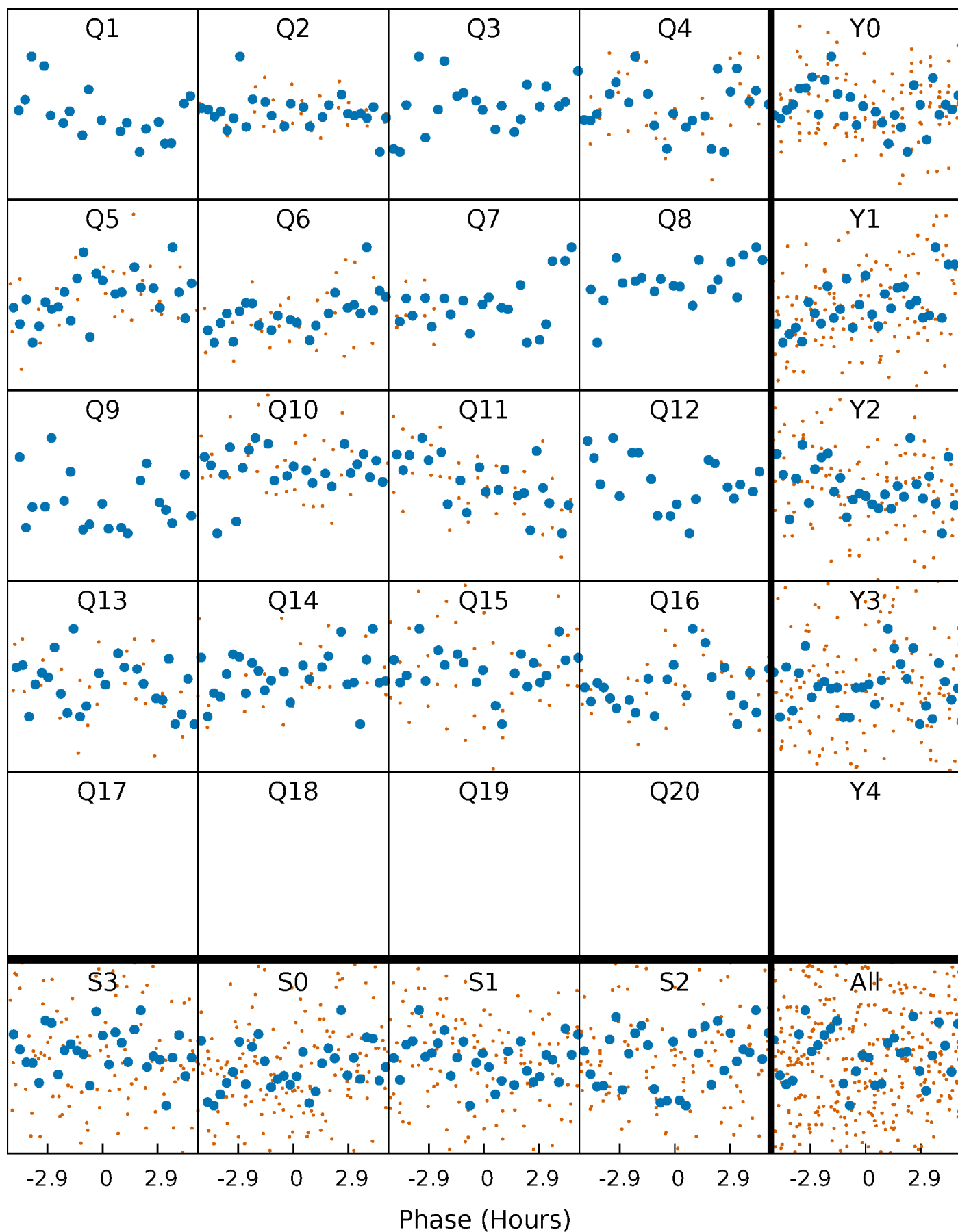


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



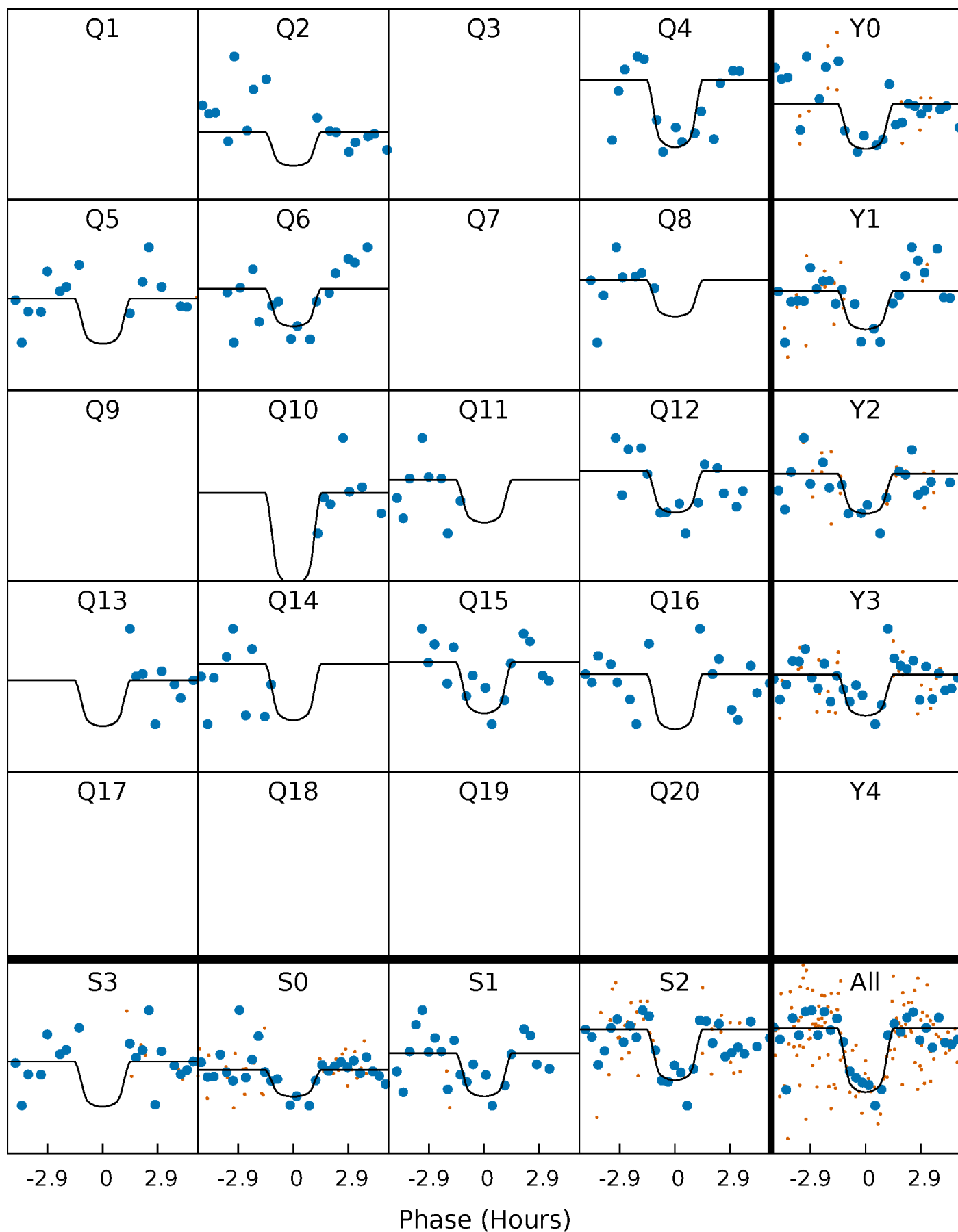
PDC Quarter-Phased Transit Curves

TCE 009612178-04 P= 51.633778 Days $T_0=151.646265$ (BKJD)



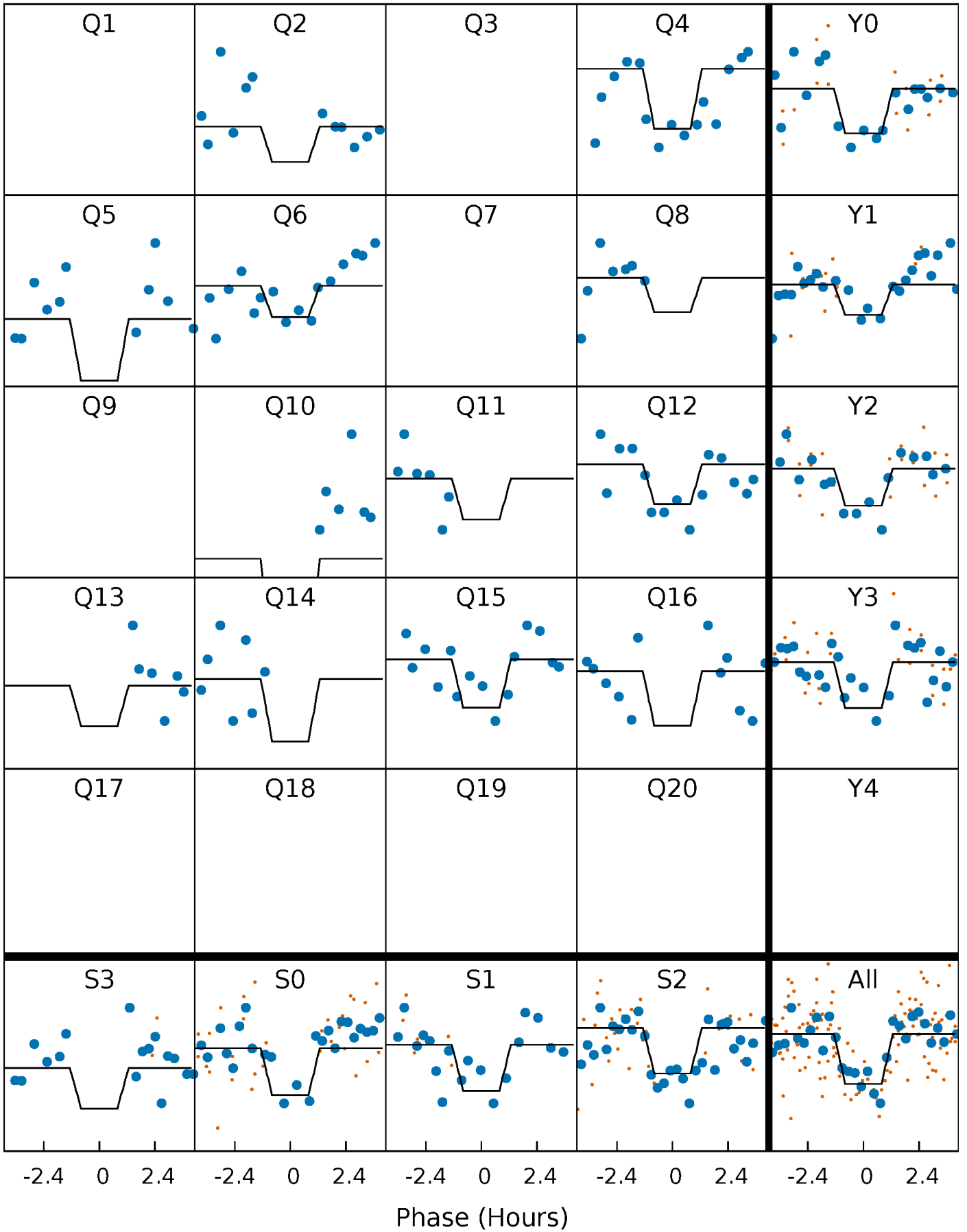
DV Quarter-Phased Transit Curves

TCE 009612178-04 P= 51.633778 Days $T_0=151.646265$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

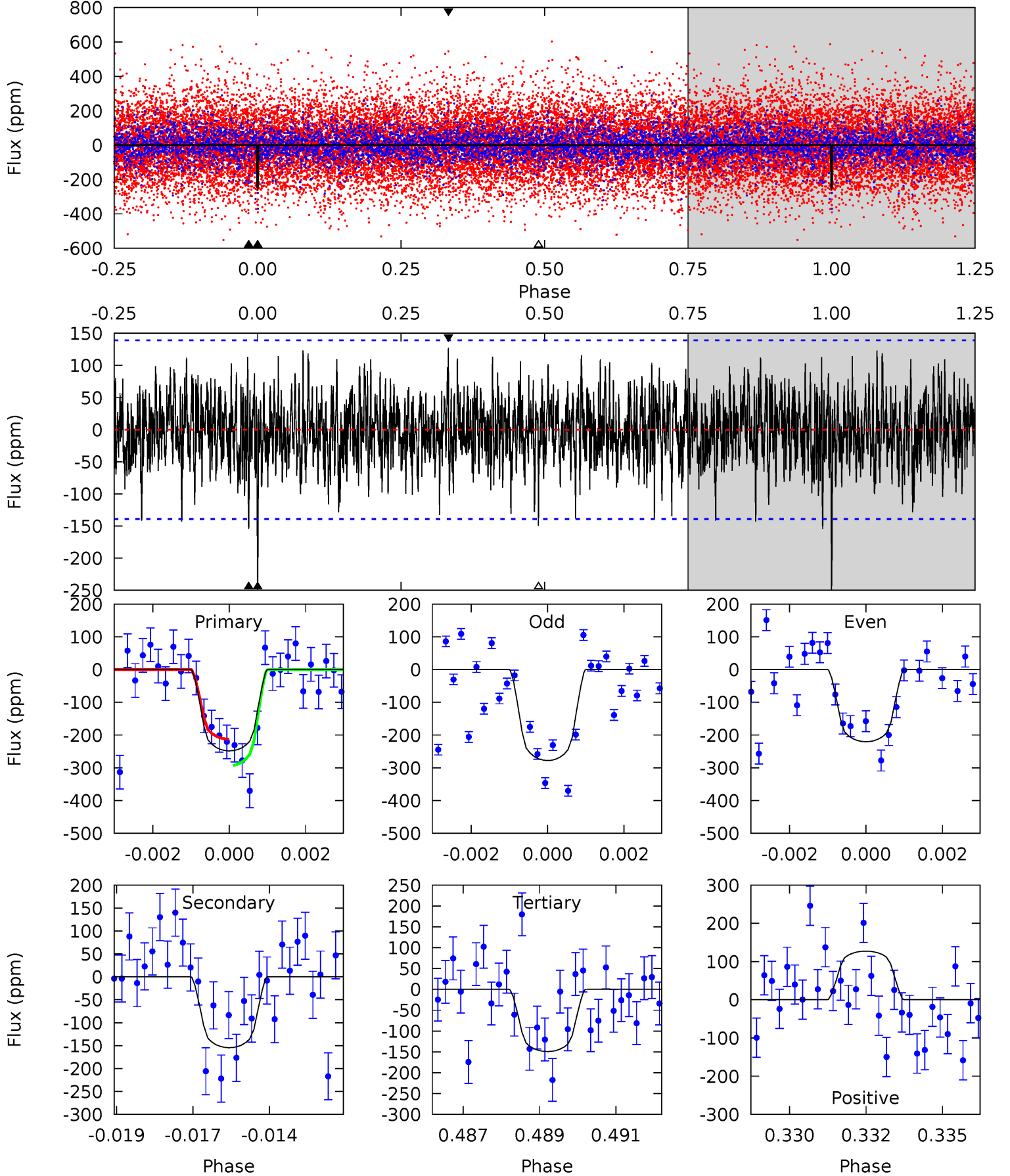
TCE 009612178-04 P= 51.633639 Days $T_0=151.647511$ (BKJD)



DV Model-Shift Uniqueness Test

009612178-04, P = 51.633778 Days, E = 100.012487 Days

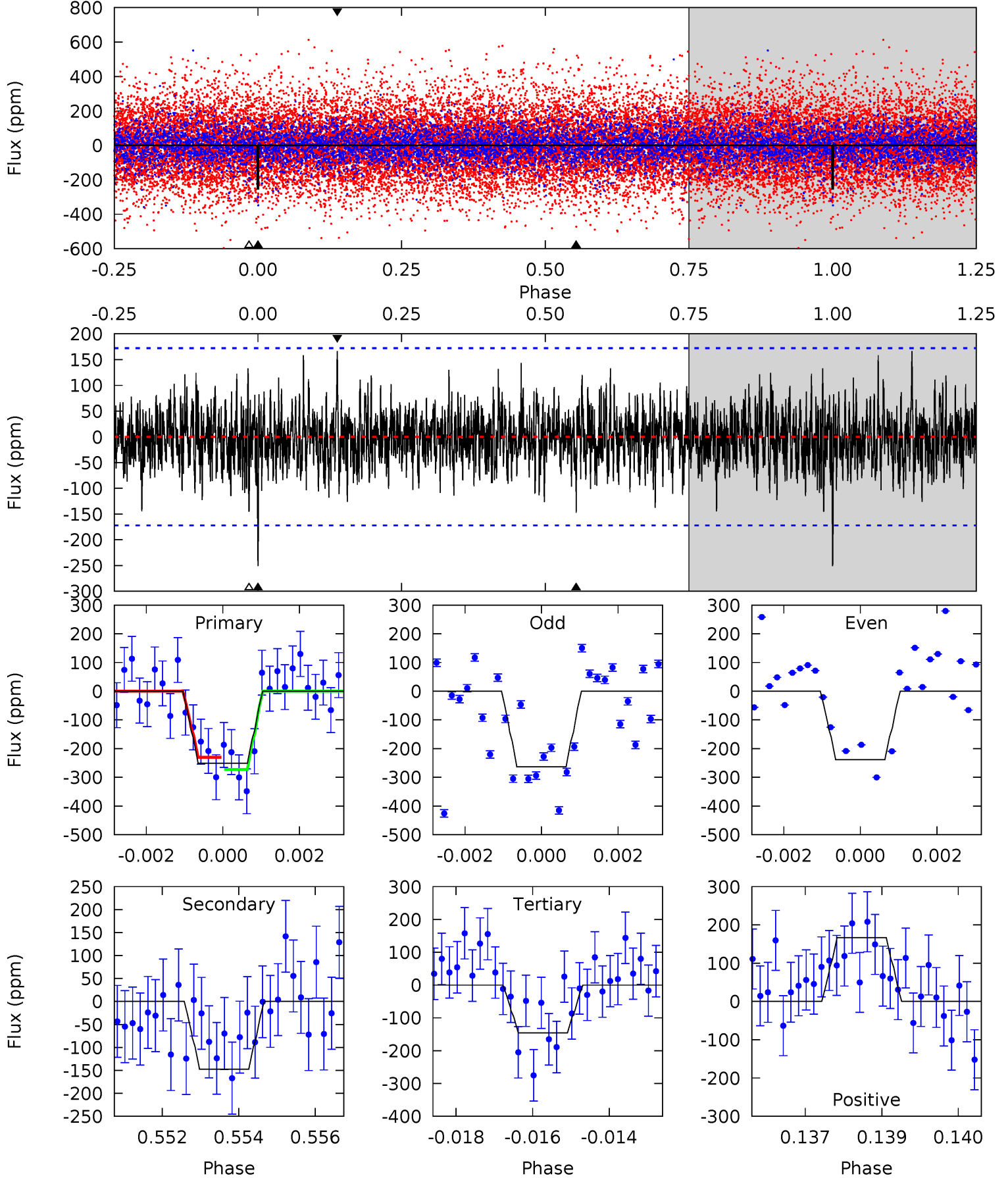
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.46	5.88	5.68	4.85	5.30	3.04	1.59	3.78	4.61	0.20	1.04	1.09	0.98	0.34	1.53



Alt Model-Shift Uniqueness Test

009612178-04, P = 51.633639 Days, E = 100.013872 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.78	4.57	4.51	5.16	5.33	3.09	1.32	3.27	2.63	0.06	-0.59	0.39	1.02	0.40	0.65



Stellar Parameters For KIC 009612178

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5720^{+179}_{-219}	$3.492^{+0.360}_{-0.120}$	$-0.240^{+0.300}_{-0.350}$	$3.733^{+0.718}_{-1.676}$	$1.579^{+0.180}_{-0.540}$	$0.043^{+0.128}_{-0.016}$
	+3%/-4%	+10%/-3%	+125%/-146%	+19%/-45%	+11%/-34%	+300%/-37%
Source	PHO1	FLK73	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 009612178-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-155 ± 26	$6.47^{+5.30}_{-3.86}$	1187^{+92}_{-120}	4847^{+2762}_{-871}	190^{+1071}_{-129}
Alt.	-147 ± 32	$6.33^{+4.72}_{-3.89}$	1193^{+79}_{-128}	4911^{+2291}_{-907}	188^{+1006}_{-122}

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 $A_{obs} \gg 1.0$

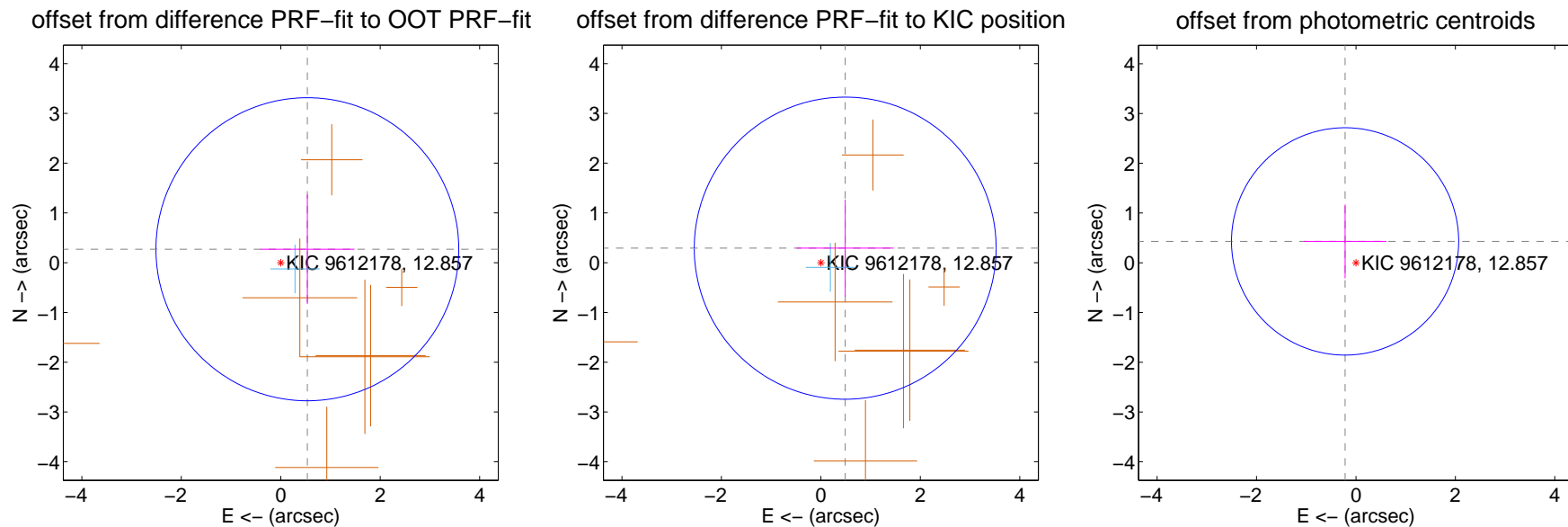
DV Centroid Data

Supplemental centroid analysis for 009612178-04. Kepler magnitude: 12.86. Transit SNR 8.07

There are 1 quarters with good PRF difference image offsets

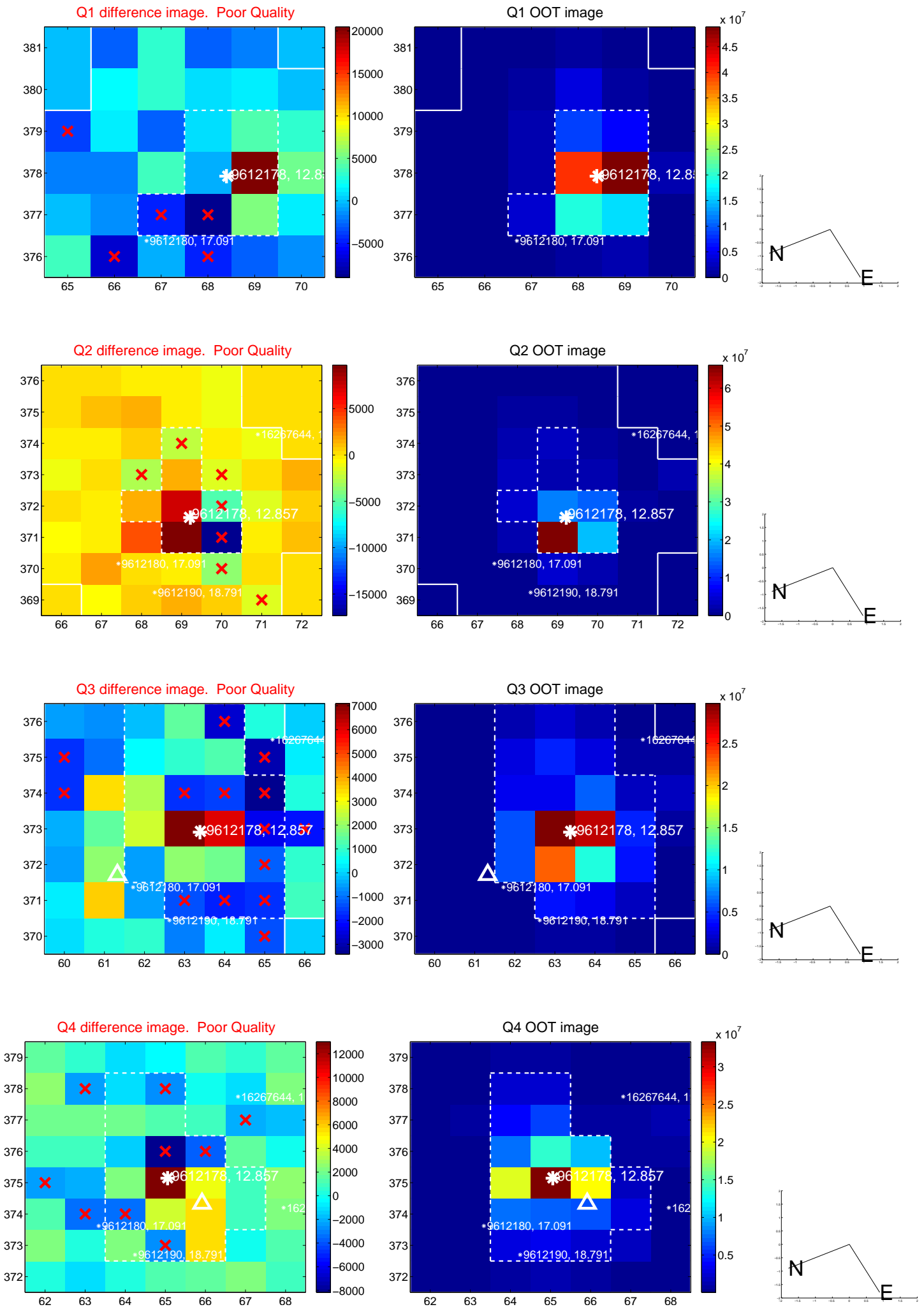
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.599 ± 1.015	0.59	-0.535 ± 0.945	0.270 ± 1.100
PRF-fit source offset from KIC position	0.570 ± 1.012	0.56	-0.490 ± 0.976	0.292 ± 0.973
photometric centroid source offset	0.48 ± 0.76	0.63	0.22 ± 0.83	0.43 ± 0.74

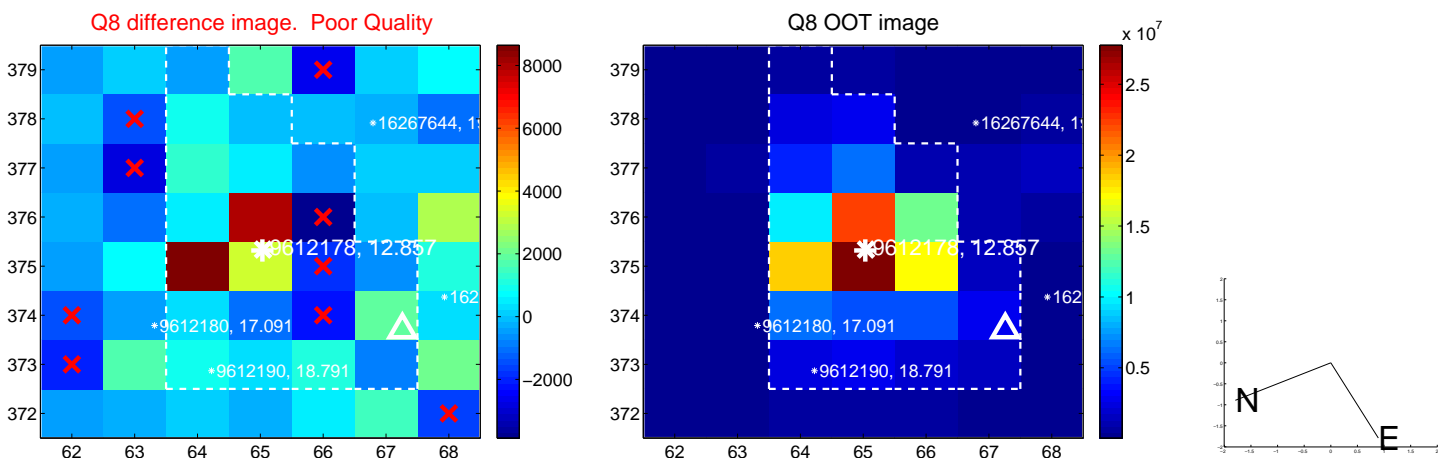
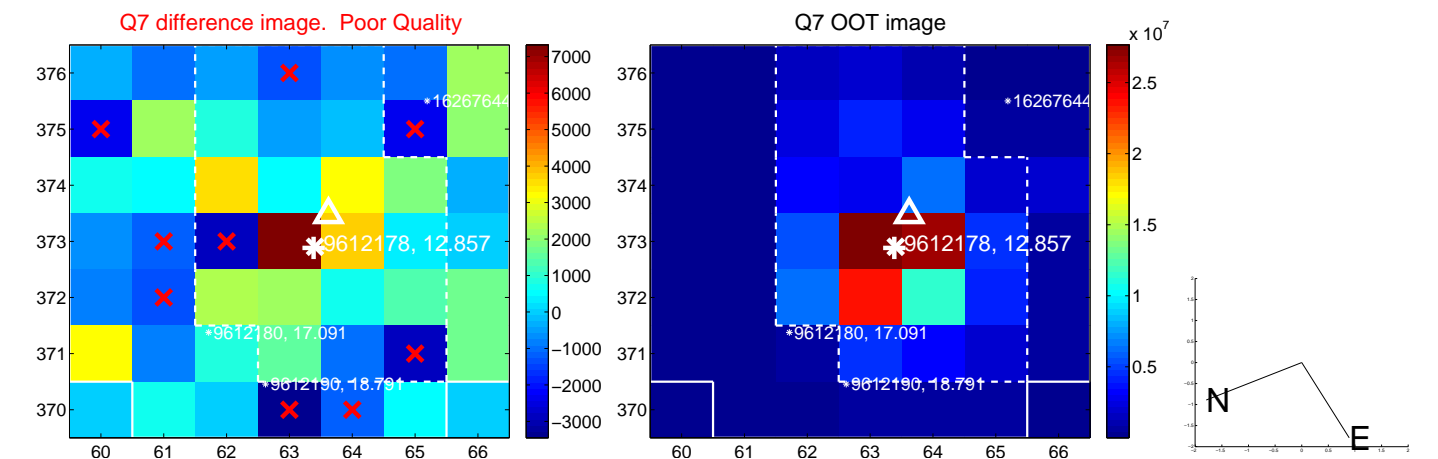
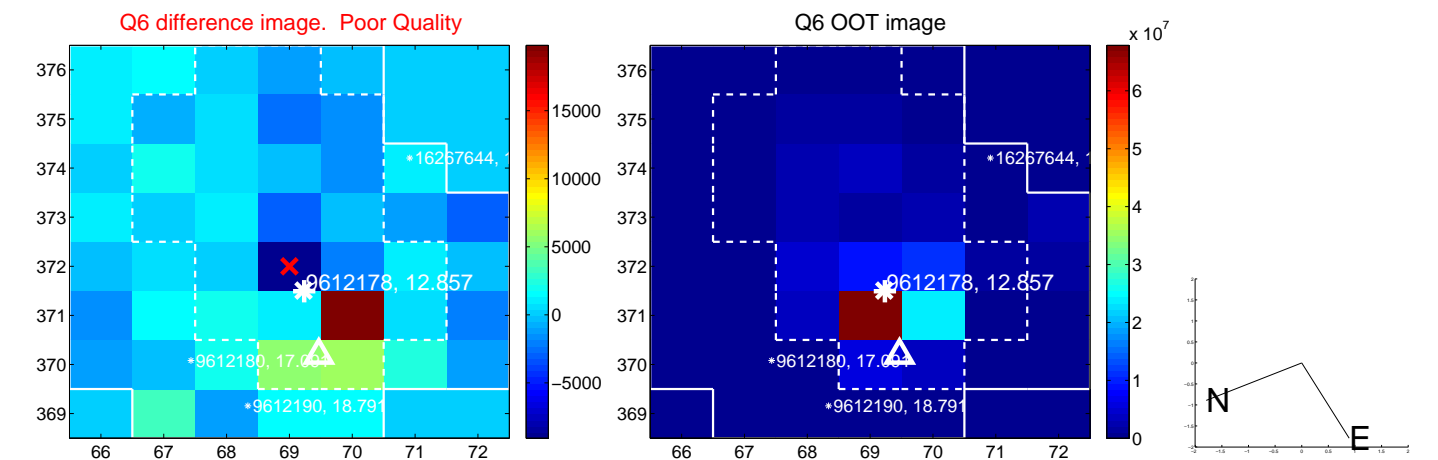
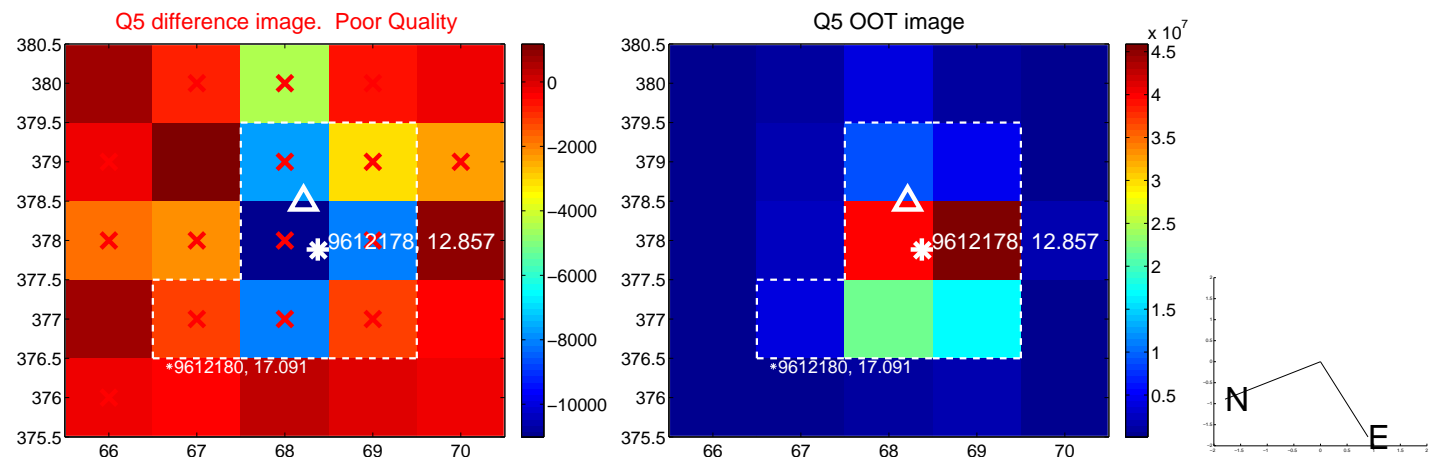


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

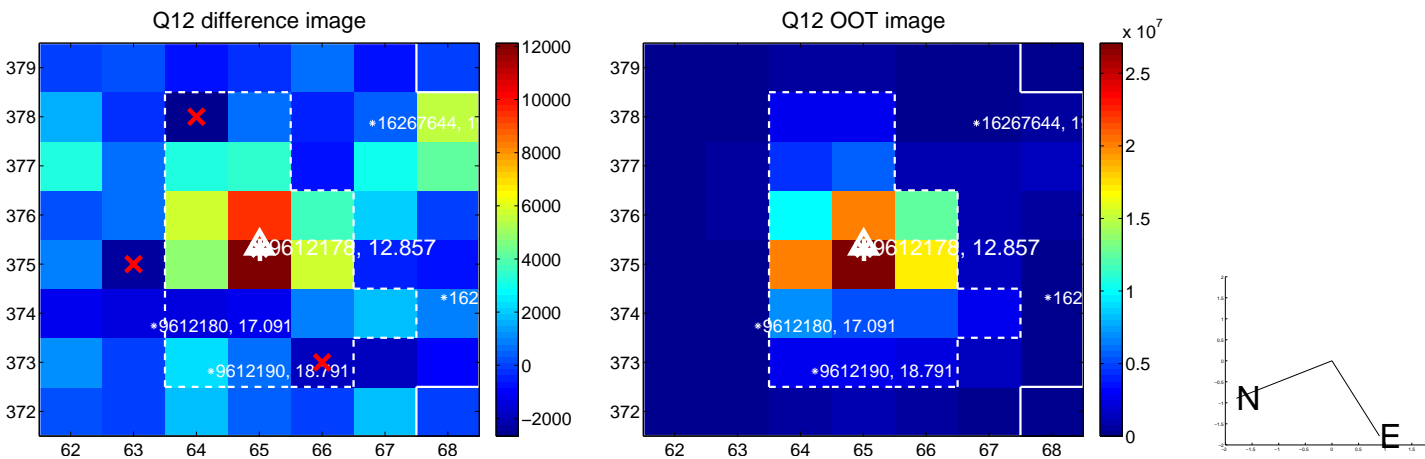
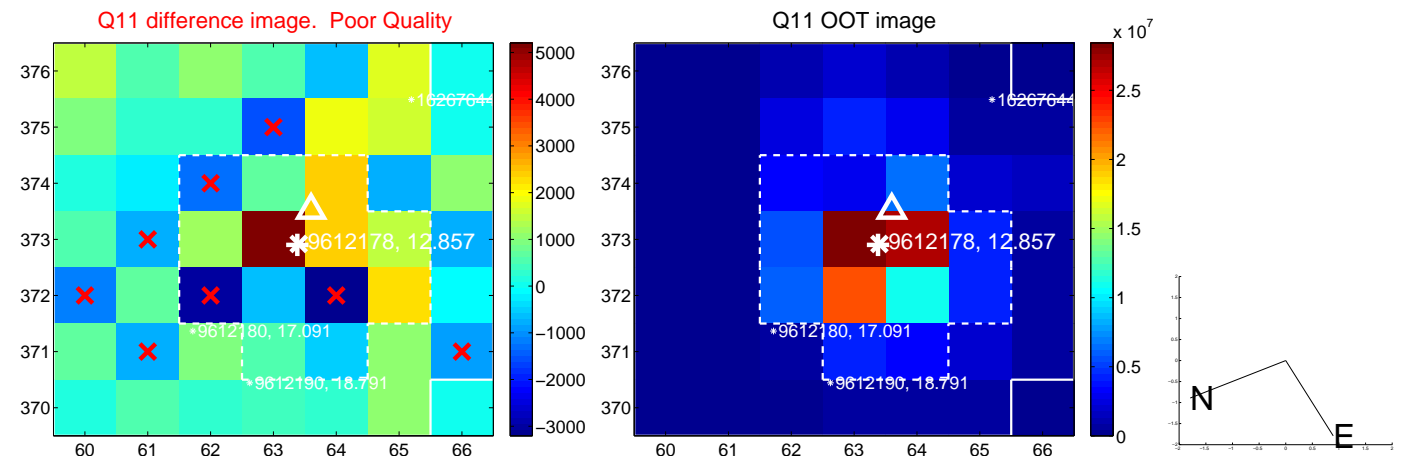
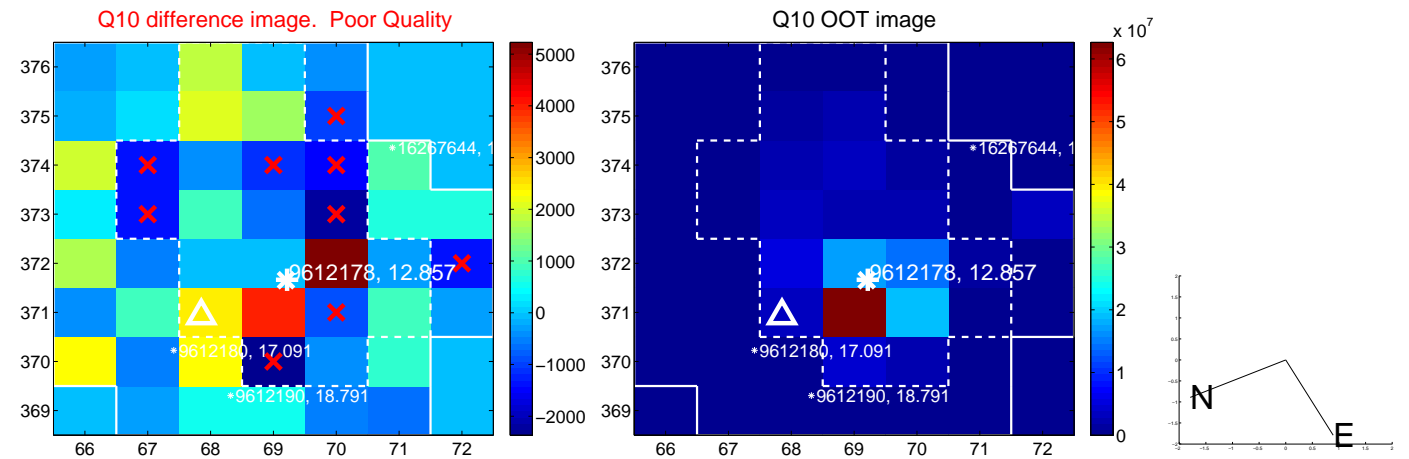
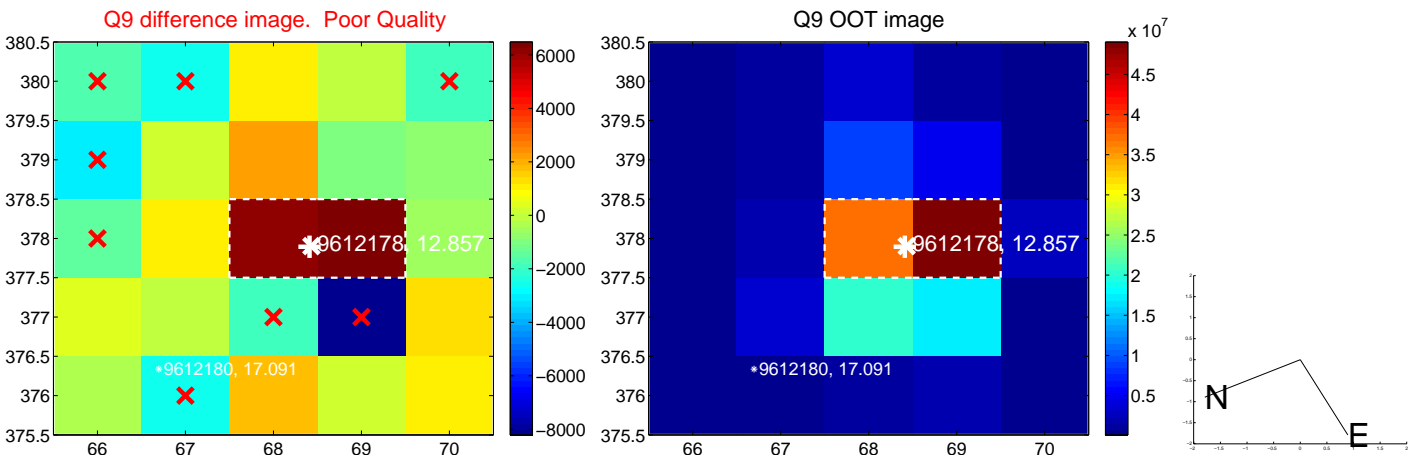
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



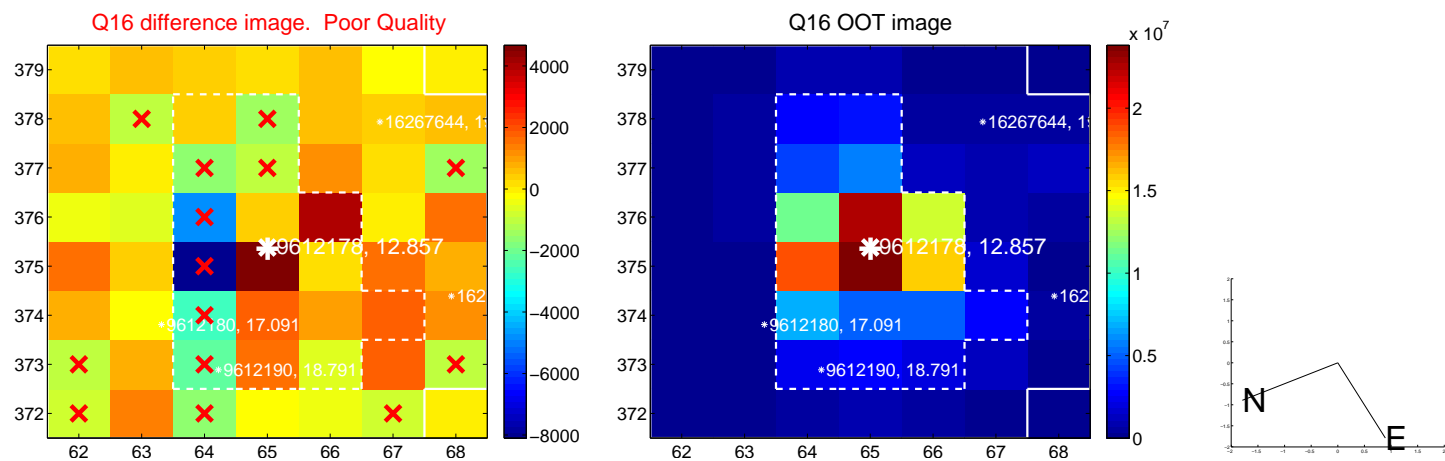
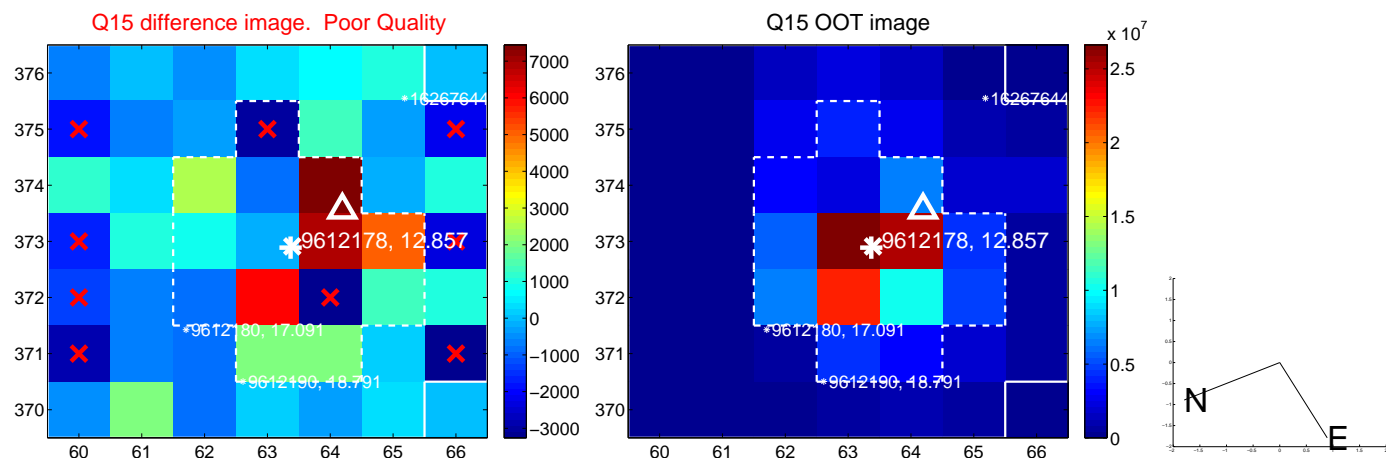
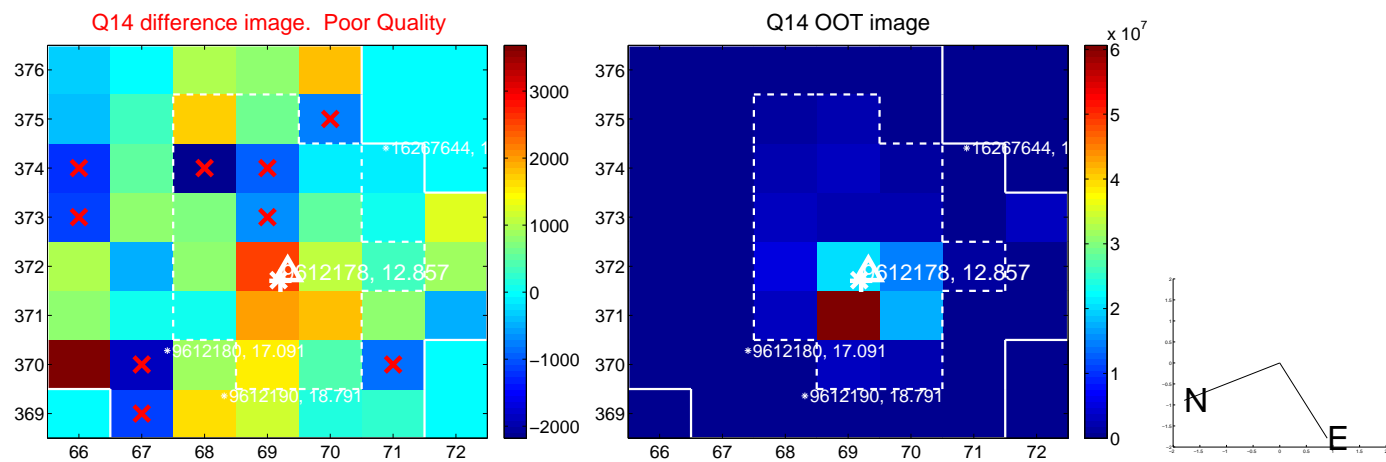
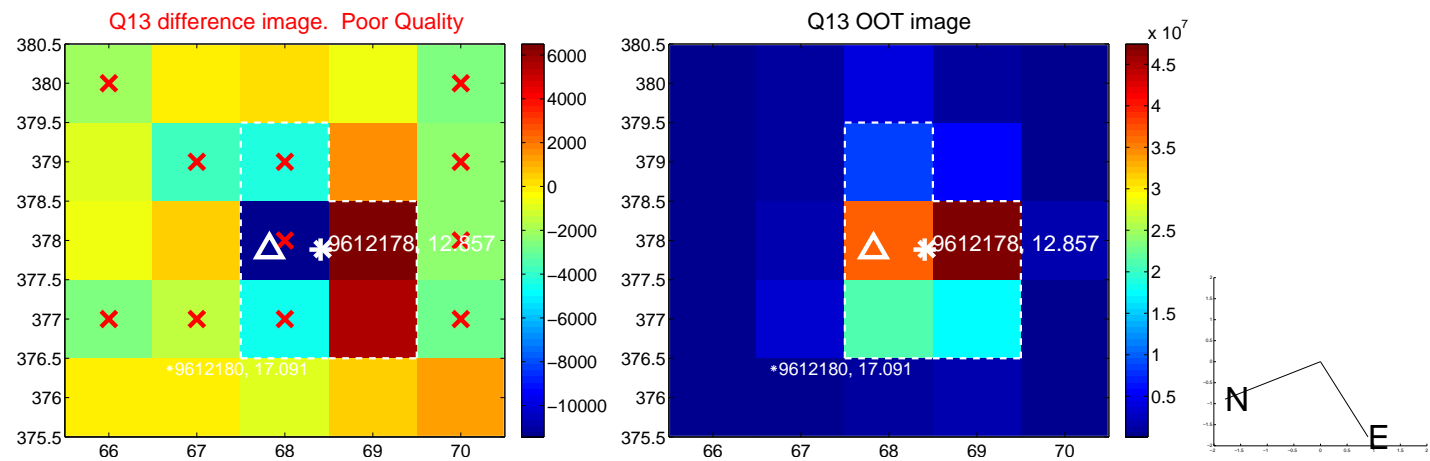
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



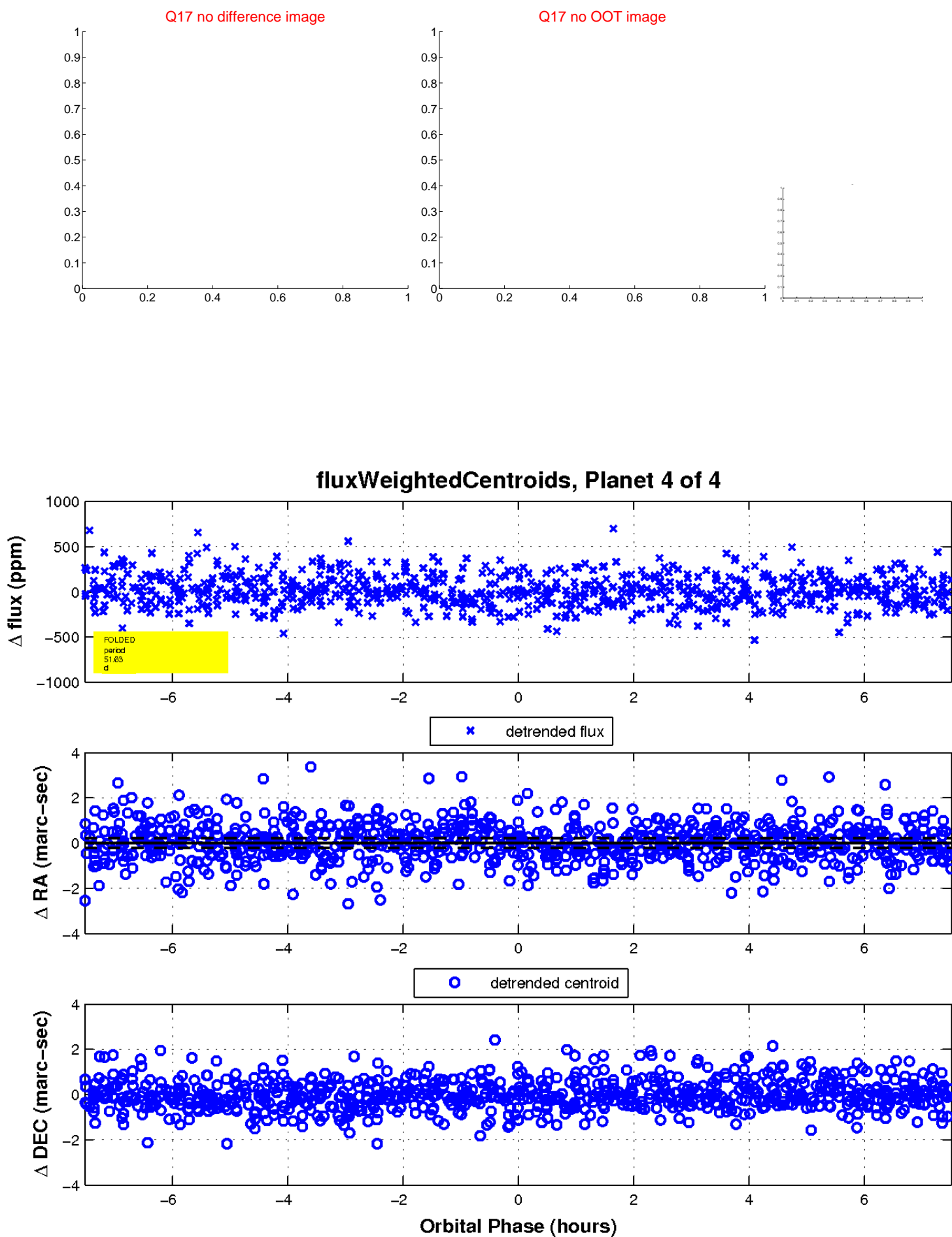
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

