

KIC 010402172

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})
010402172-01	OBS	No	373.060101	137.320116	950.8	13.789	7.3	7.2	0.74	5635	2.90	0.55
010402172-02	OBS	No	412.159807	186.689774	1076.5	31.189	8.5	9.6	0.74	5635	3.16	0.48
010402172-03	OBS	No	375.593915	296.148030	1304.4	21.174	7.5	8.0	0.74	5635	3.39	0.54
010402172-04	OBS	No	226.022403	346.609243	877.5	3.046	7.2	6.7	0.74	5635	2.35	1.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010402172-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—CENT_FEW_DIFFS
010402172-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010402172-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—CENT_FEW_DIFFS
010402172-04	OBS	FP	0.08	1	0	0	0	MOD_NONUNIQ_ALT—CENT_FEW_DIFFS

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

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

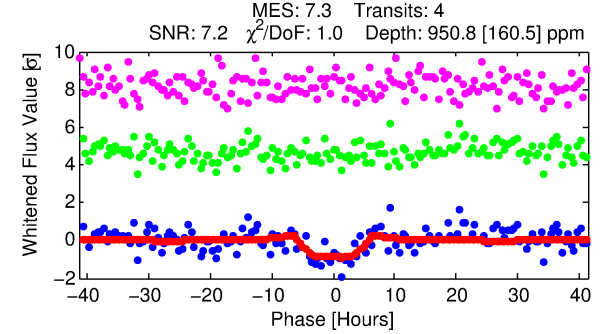
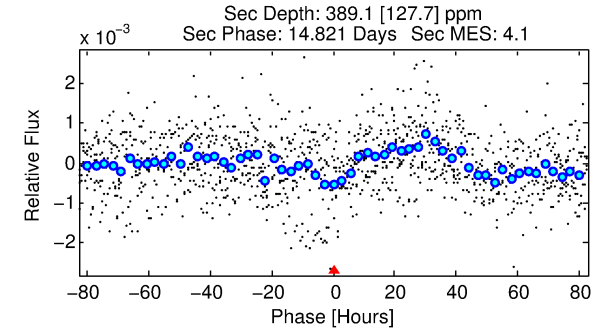
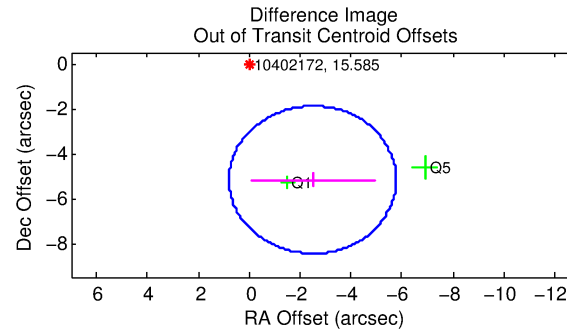
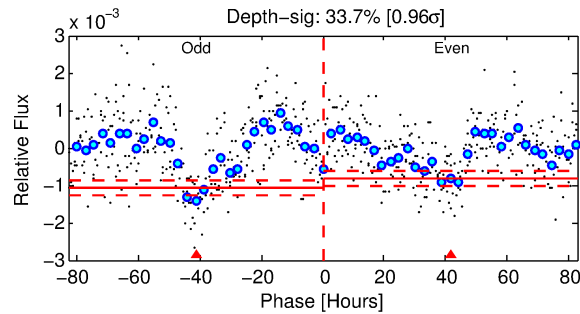
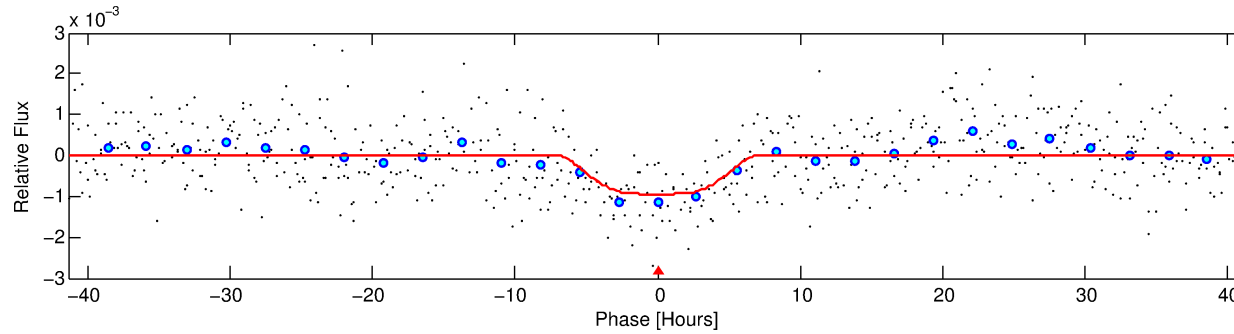
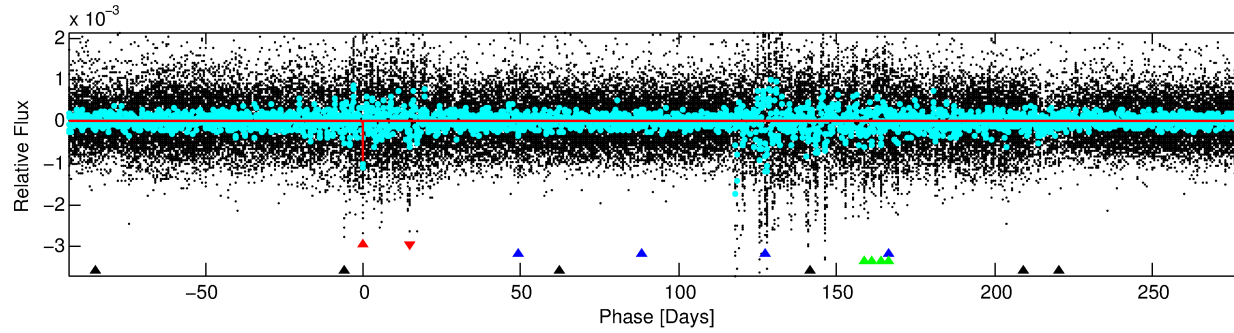
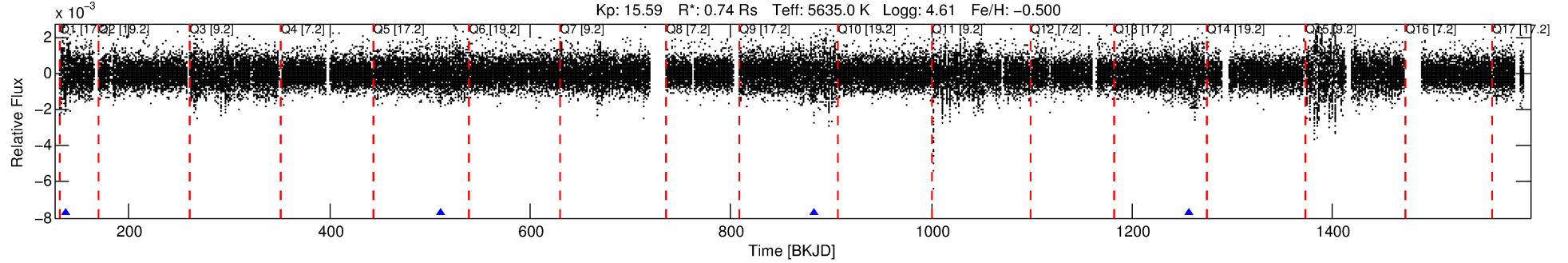
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010402172-01

No Significant Match Found

DV One-Page Summary

KIC: 10402172 Candidate: 1 of 4 Period: 373.060 d



DV Fit Results:

Period = 373.06010 [0.01686] d
Epoch = 137.3201 [0.0302] BKJD
Rp/R* = 0.0360 [0.0041]
a/R* = 84.38 [19.31]
b = 0.95 [0.03]
Seff = 0.55 [0.14]
Teq = 219 [14] K
Rp = 2.89 [0.63] Re
a = 0.9459 [0.1496] AU
Ag = 22859.31 [10556.50] [2.17σ]
Teff = 4172 [435] K [9.09σ]

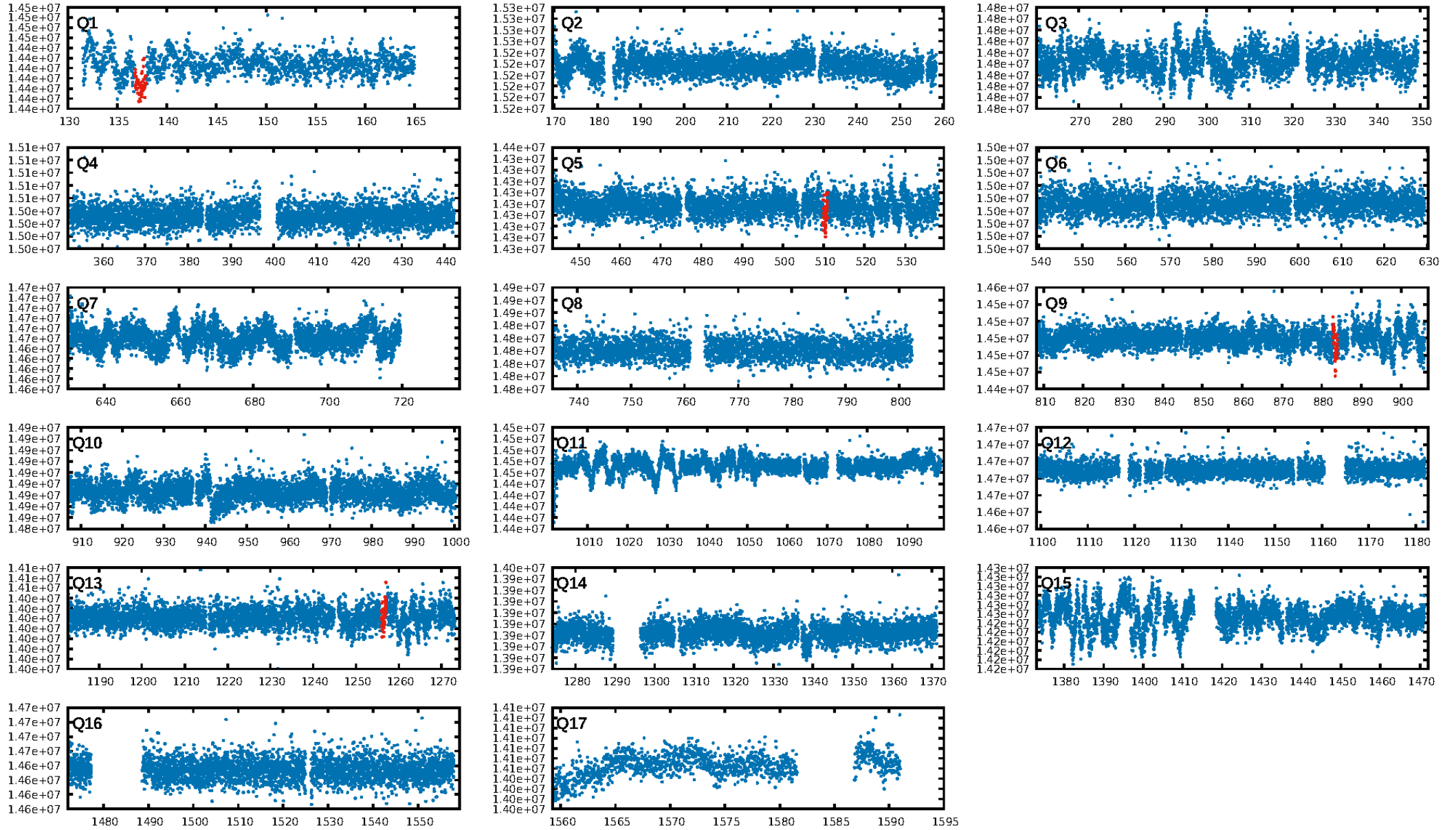
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [249.90σ]
LongPeriod-sig: 98.4% [2.41σ]
ModelChiSquare2-sig: 31.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.41e-07
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 32.6
Centroid-sig: 5.7%
Centroid-so: 4.352 arcsec [1.71σ]
OotOffset-rm: 5.743 arcsec [5.24σ]
KicOffset-rm: 5.639 arcsec [4.95σ]
OotOffset-st: 0/0/0/2 [2]
KicOffset-st: 0/0/0/2 [2]
DiffImageQuality-fgm: 0.00 [0/2]
DiffImageOverlap-fno: 1.00 [4/4]

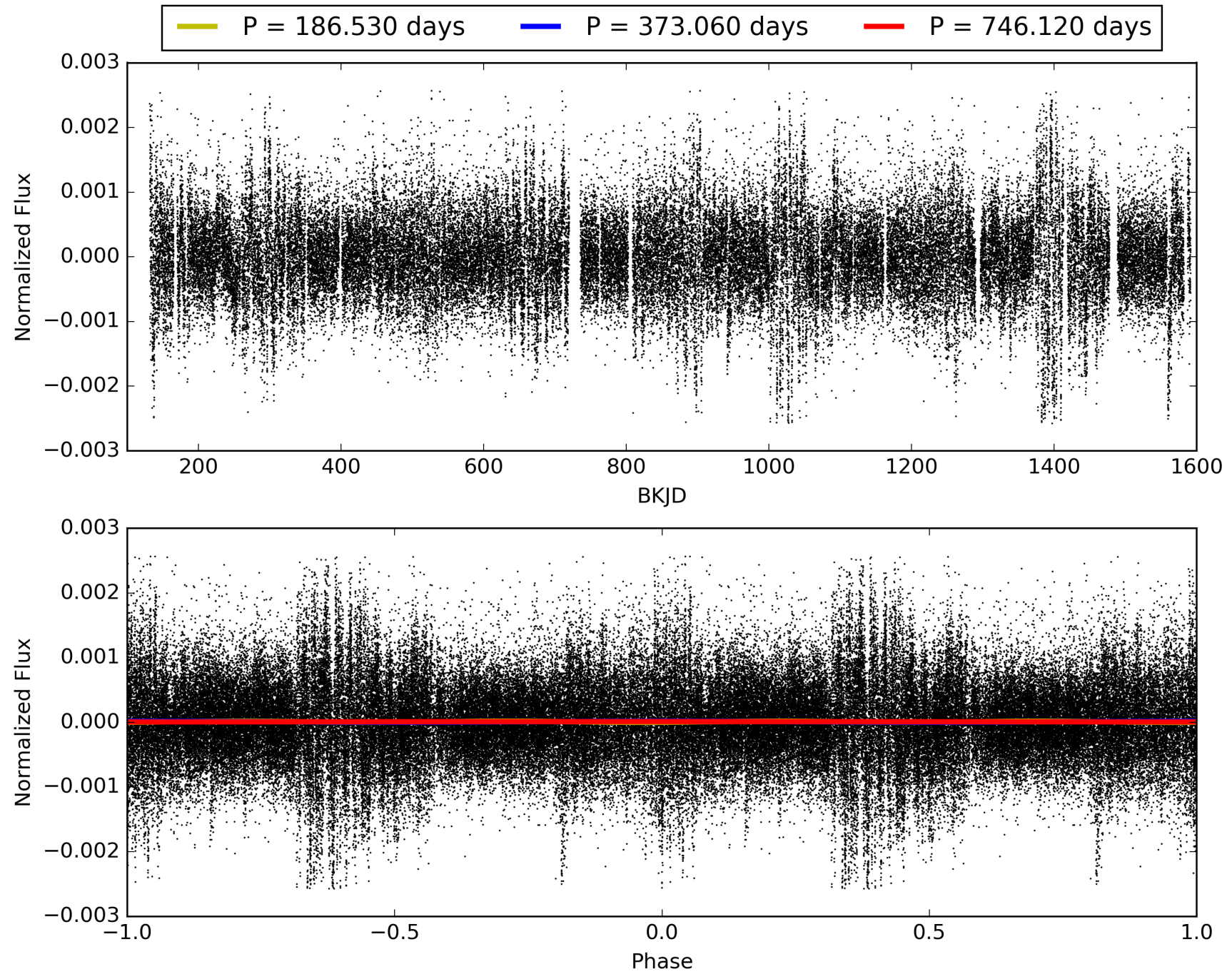
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 09:52:09 Z

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

TCE 010402172-01, PDC Light Curves

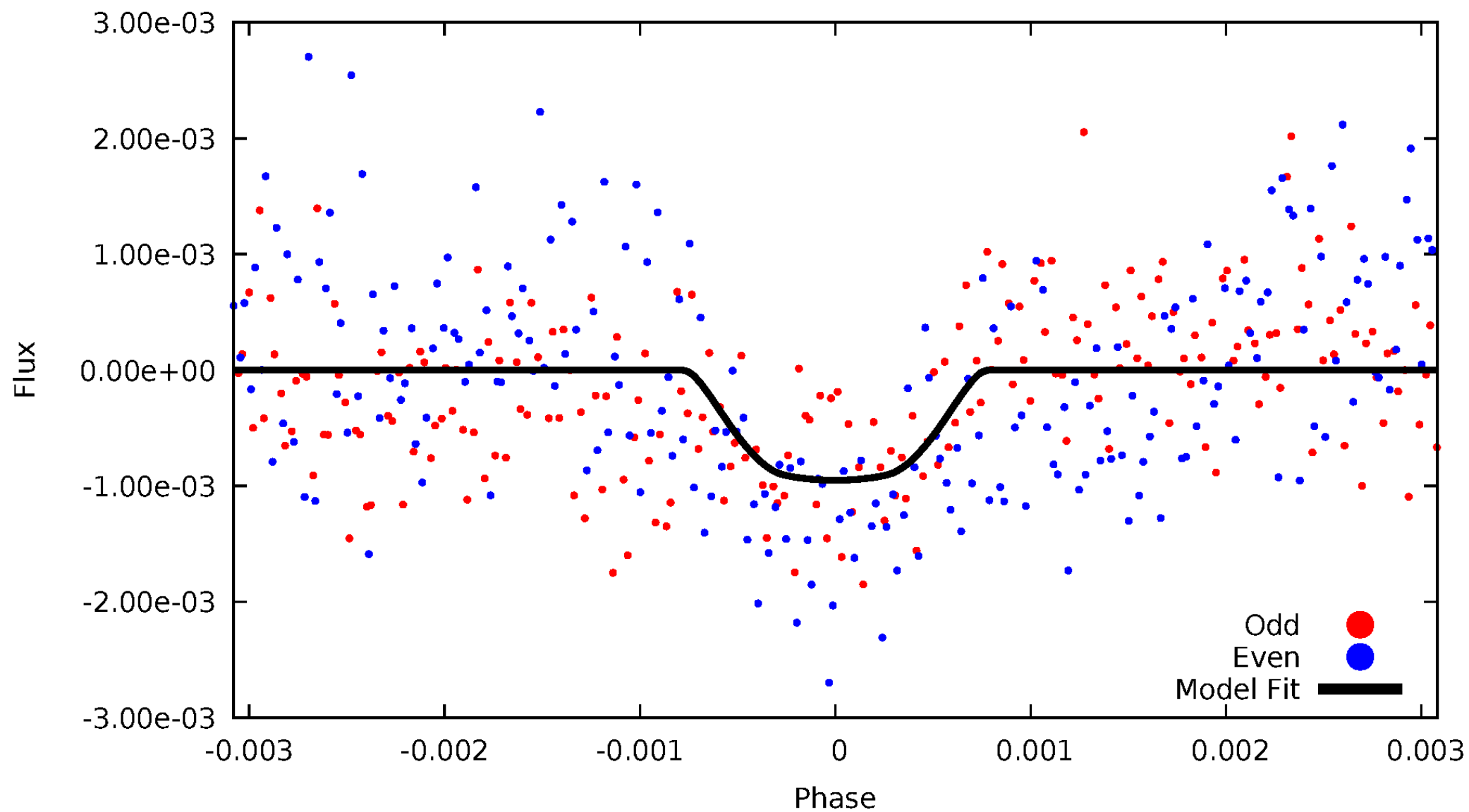


TCE 010402172-01



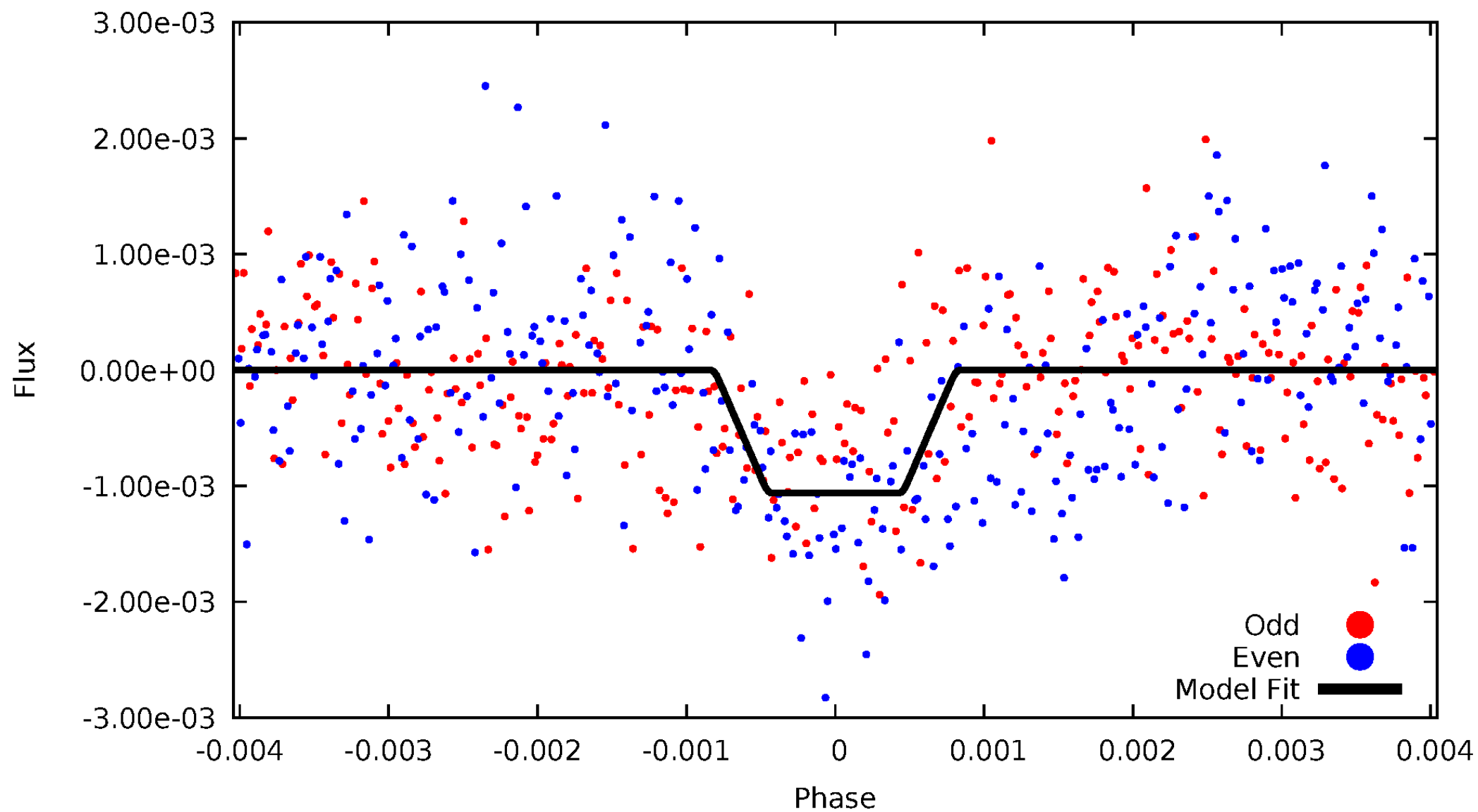
DV Odd/Even

TCE 010402172-01



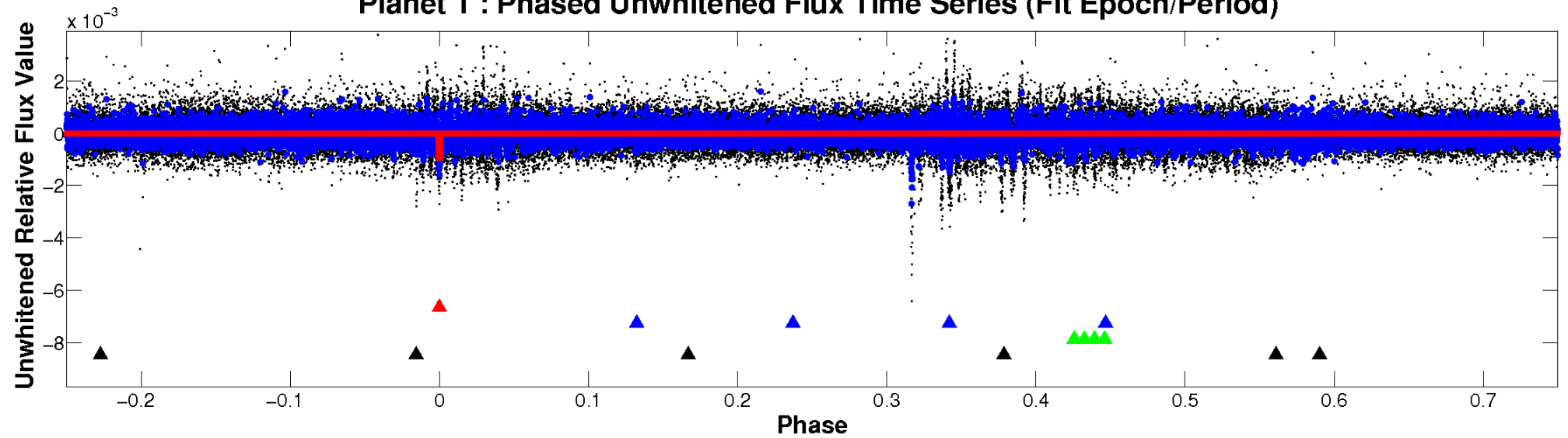
ALT Odd/Even

TCE 010402172-01

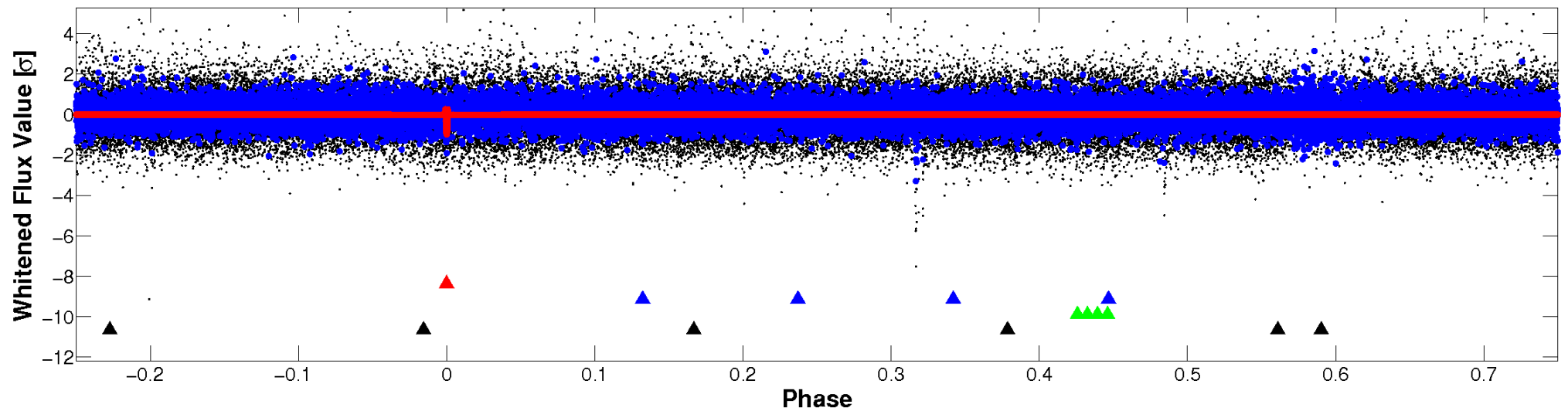


Non-Whitened Vs. Whitened Light Curve

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

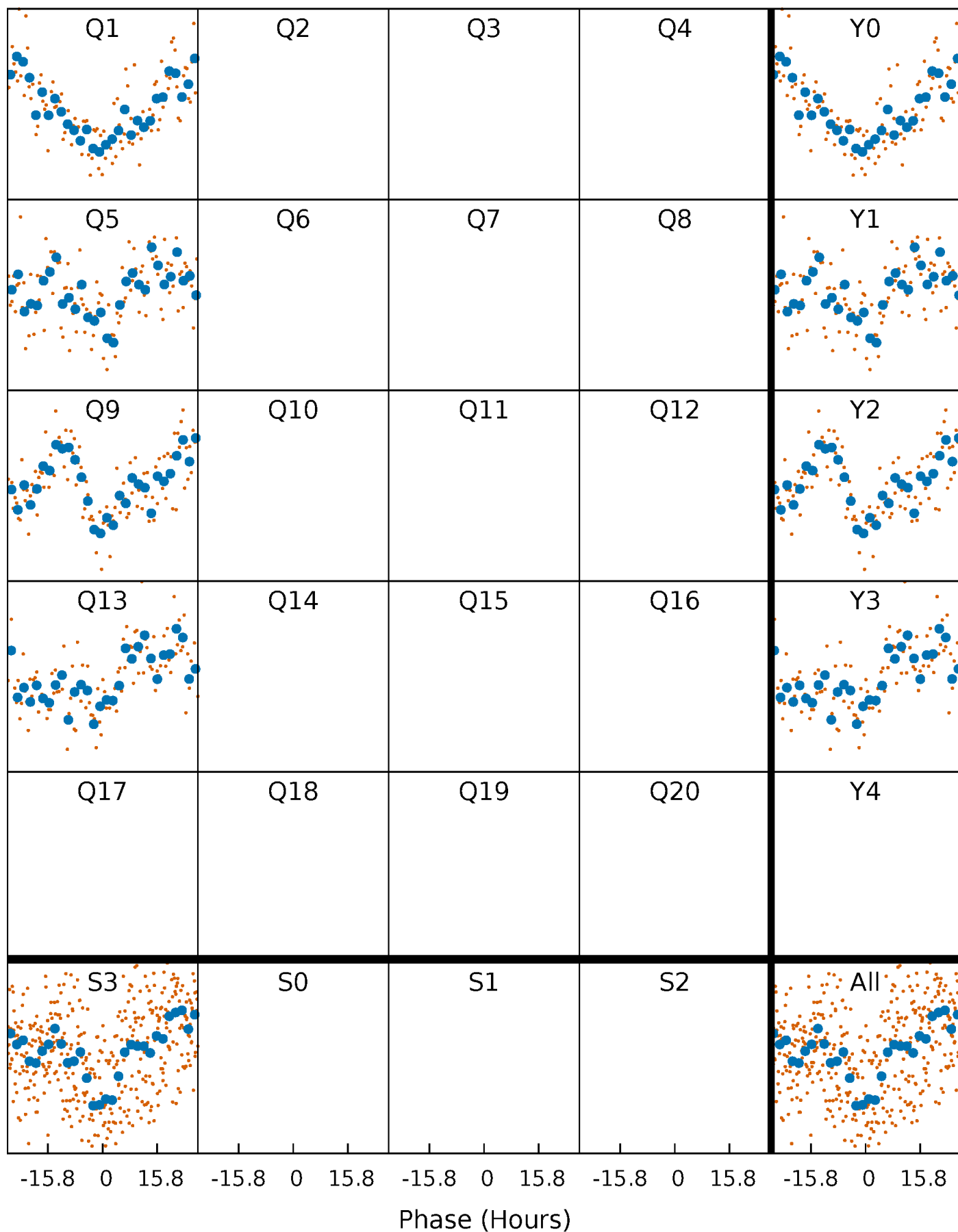


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



PDC Quarter-Phased Transit Curves

TCE 010402172-01 P=373.060101 Days $T_0=137.320116$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 010402172-01 $P=373.060101$ Days $T_0=137.320116$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

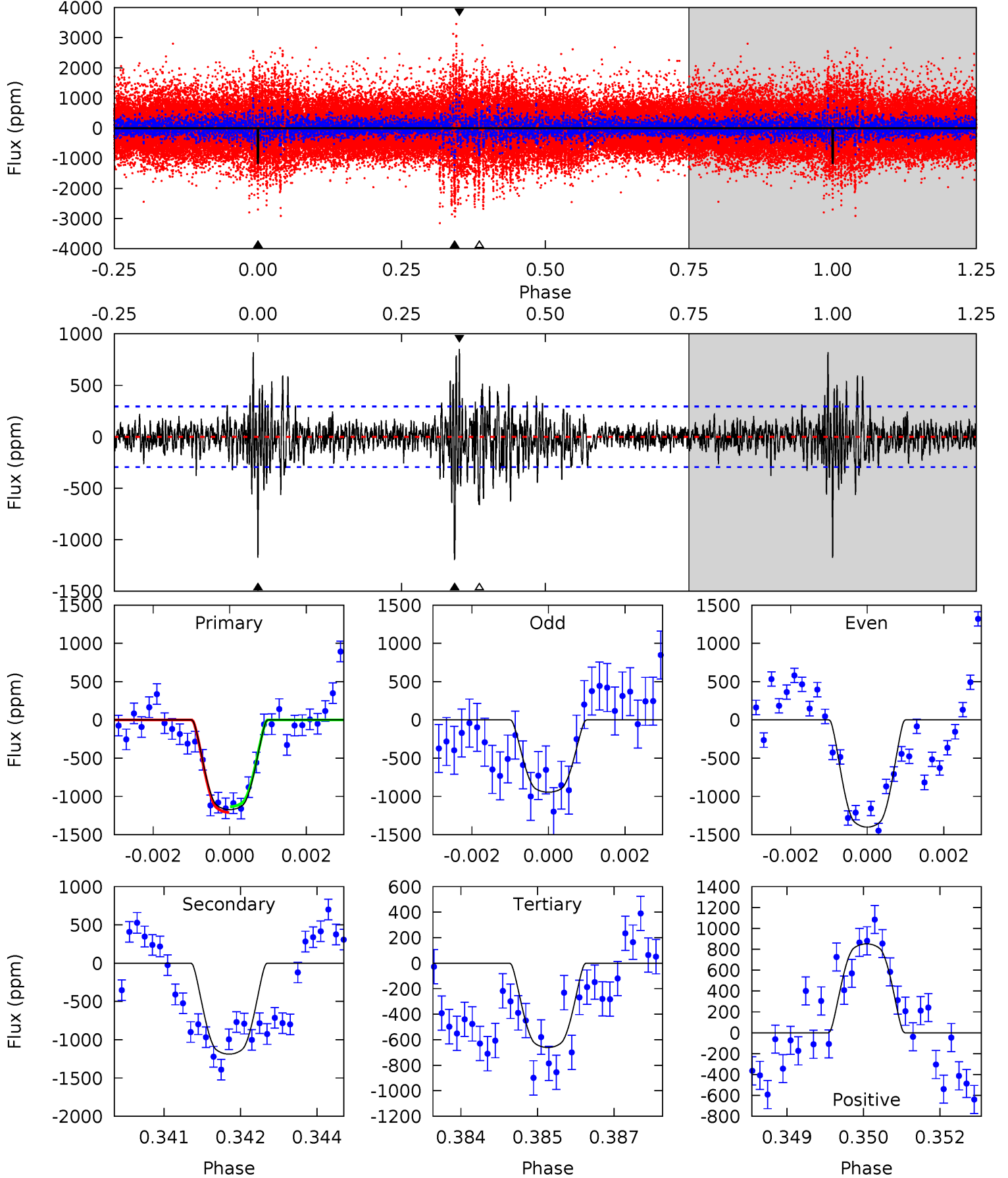
TCE 010402172-01 P=373.130428 Days $T_0=137.191533$ (BKJD)



DV Model-Shift Uniqueness Test

010402172-01, P = 373.060101 Days, E = 137.320116 Days

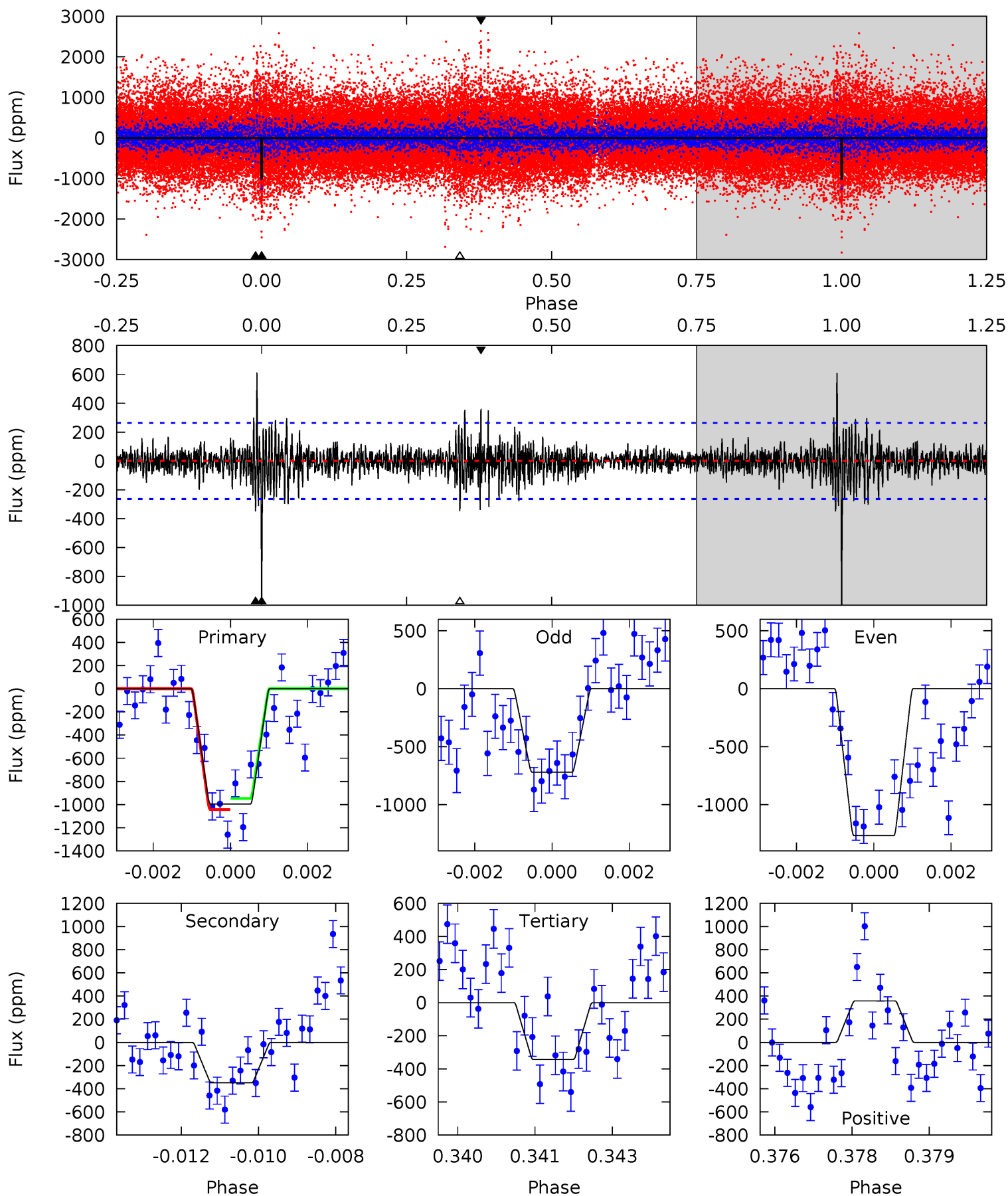
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.4	21.7	12.1	15.5	5.37	3.16	2.80	9.35	5.87	9.62	6.14	4.14	0.97	0.42	0.68



Alt Model-Shift Uniqueness Test

010402172-01, P = 373.130428 Days, E = 137.191533 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.2	7.09	6.97	7.26	5.36	3.15	1.57	13.2	12.9	0.12	-0.17	5.55	0.92	0.38	0.98



Stellar Parameters For KIC 010402172

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5635^{+169}_{-152}	$4.612^{+0.032}_{-0.128}$	$-0.500^{+0.300}_{-0.300}$	$0.737^{+0.137}_{-0.055}$	$0.839^{+0.078}_{-0.096}$	$2.954^{+0.470}_{-1.109}$
	+3%/-3%	+1%/-3%	+60%/-60%	+19%/-7%	+9%/-11%	+16%/-38%
Source	PHO1	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 010402172-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-1188 ± 55	$3.02^{+0.45}_{-0.39}$	312^{+16}_{-12}	5522^{+381}_{-308}	63887^{+19734}_{-14037}
Alt.	-350 ± 49	$2.73^{+0.40}_{-0.42}$	313^{+17}_{-11}	4478^{+299}_{-258}	23398^{+8695}_{-6401}

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

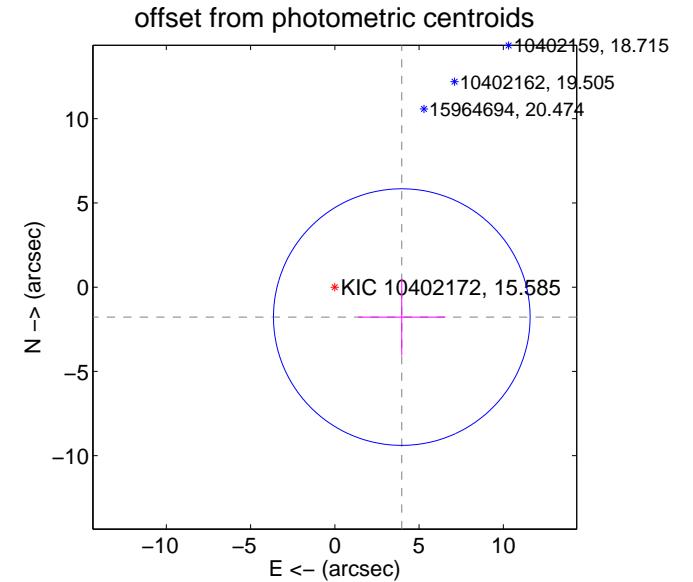
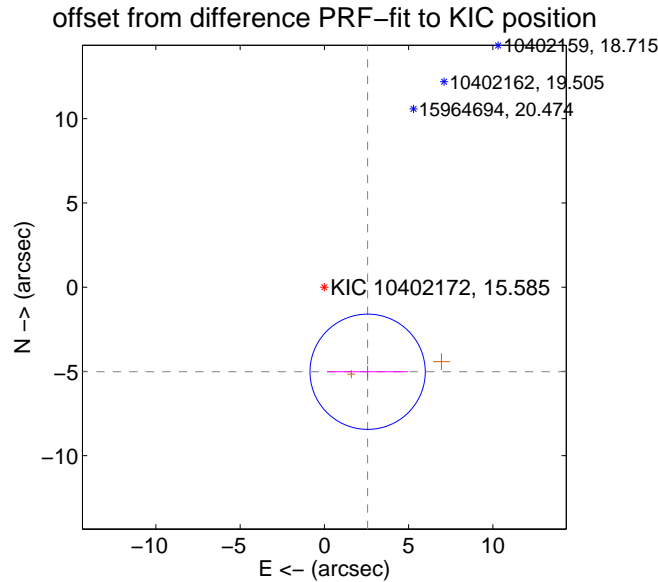
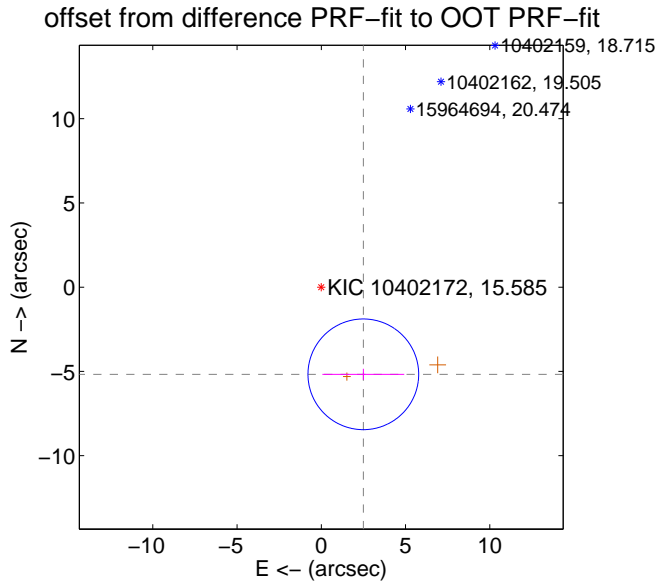
DV Centroid Data

Supplemental centroid analysis for 010402172-01. Kepler magnitude: 15.59. Transit SNR 7.19

There are 0 quarters with good PRF difference image offsets

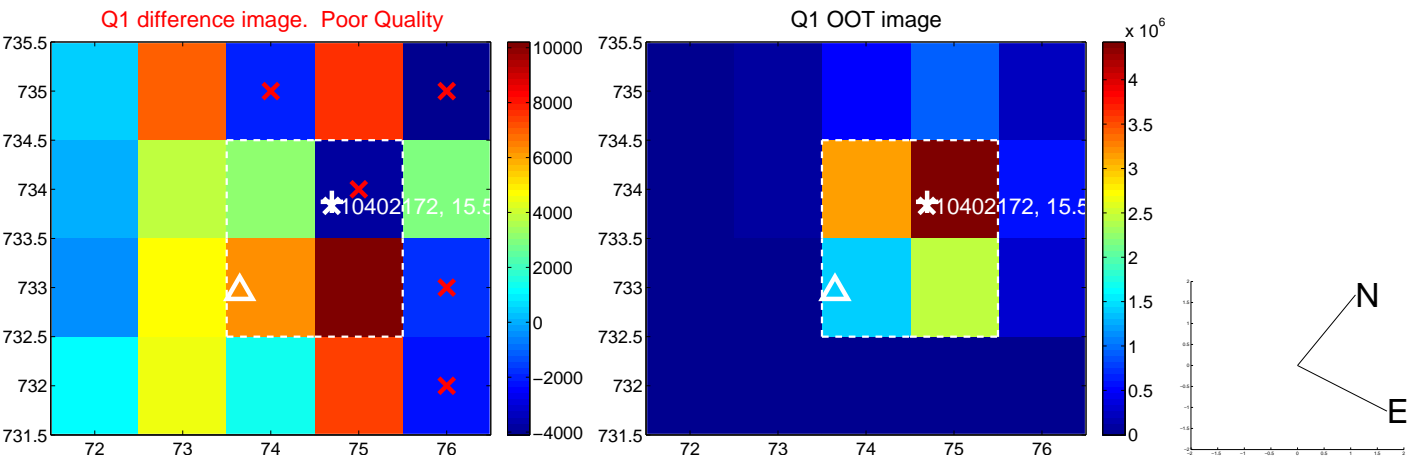
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	5.743 ± 1.095	5.24	-2.495 ± 2.427	-5.172 ± 0.327
PRF-fit source offset from KIC position	5.639 ± 1.140	4.95	-2.567 ± 2.409	-5.020 ± 0.349
photometric centroid source offset	4.35 ± 2.54	1.71	-3.97 ± 2.59	-1.78 ± 2.28

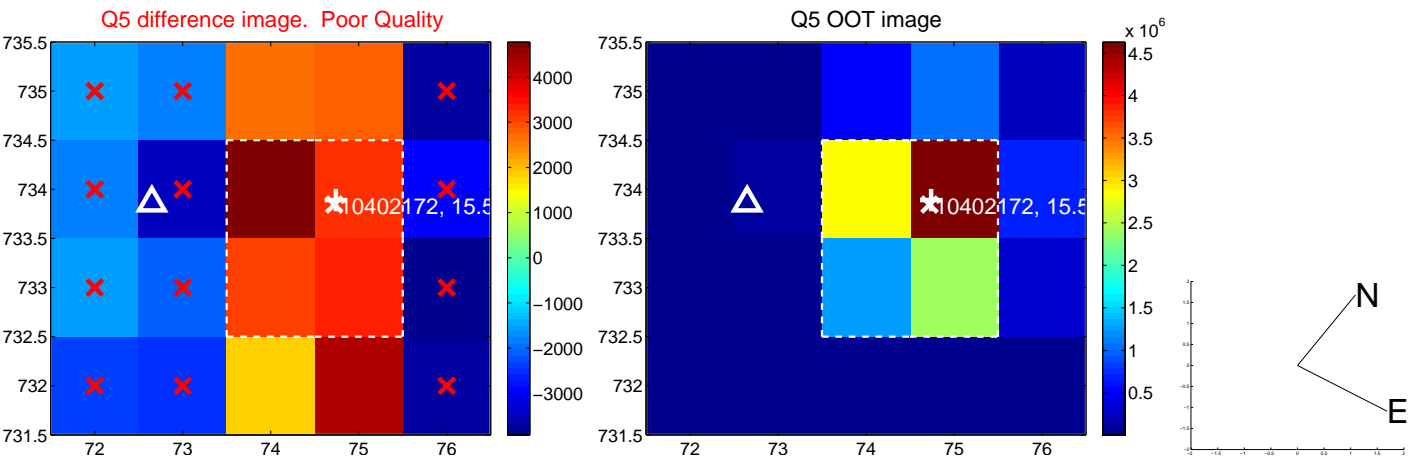


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

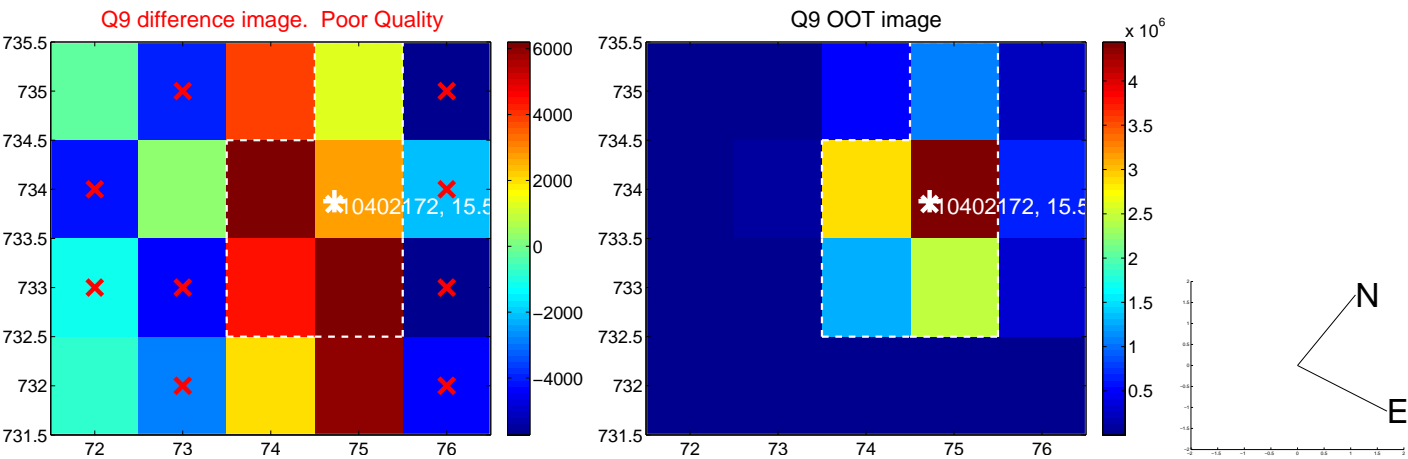
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



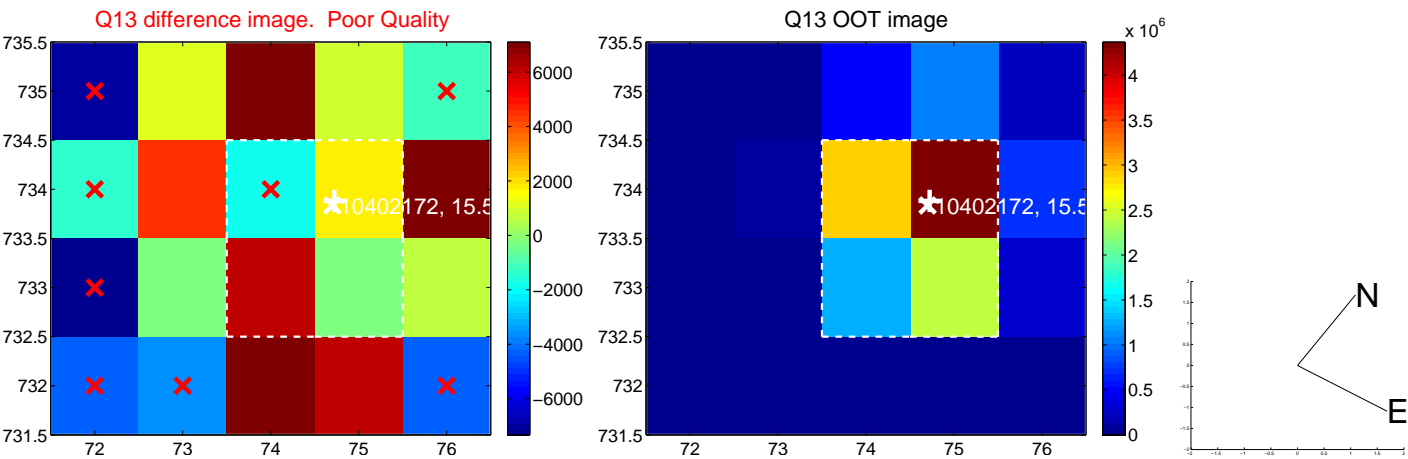
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



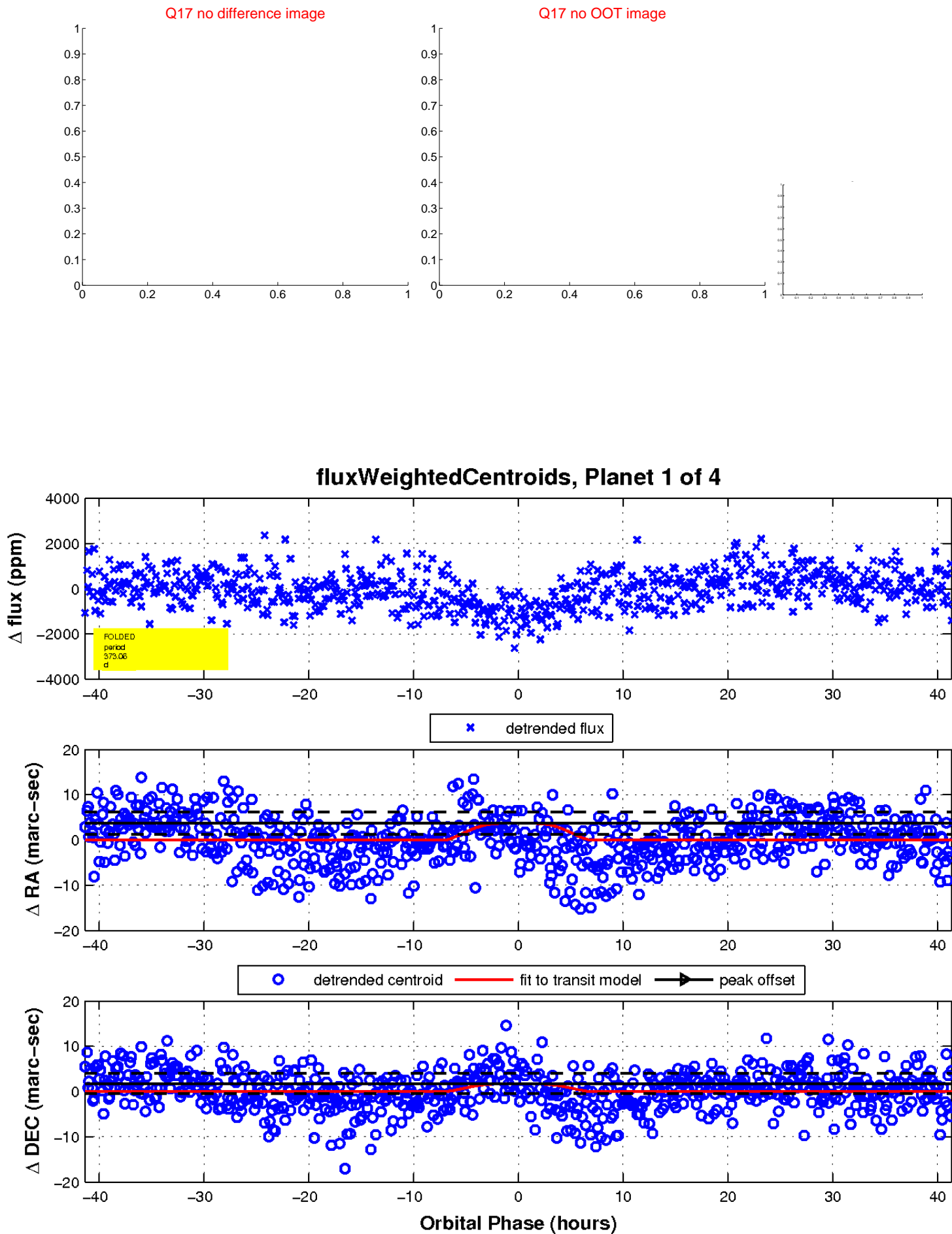
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

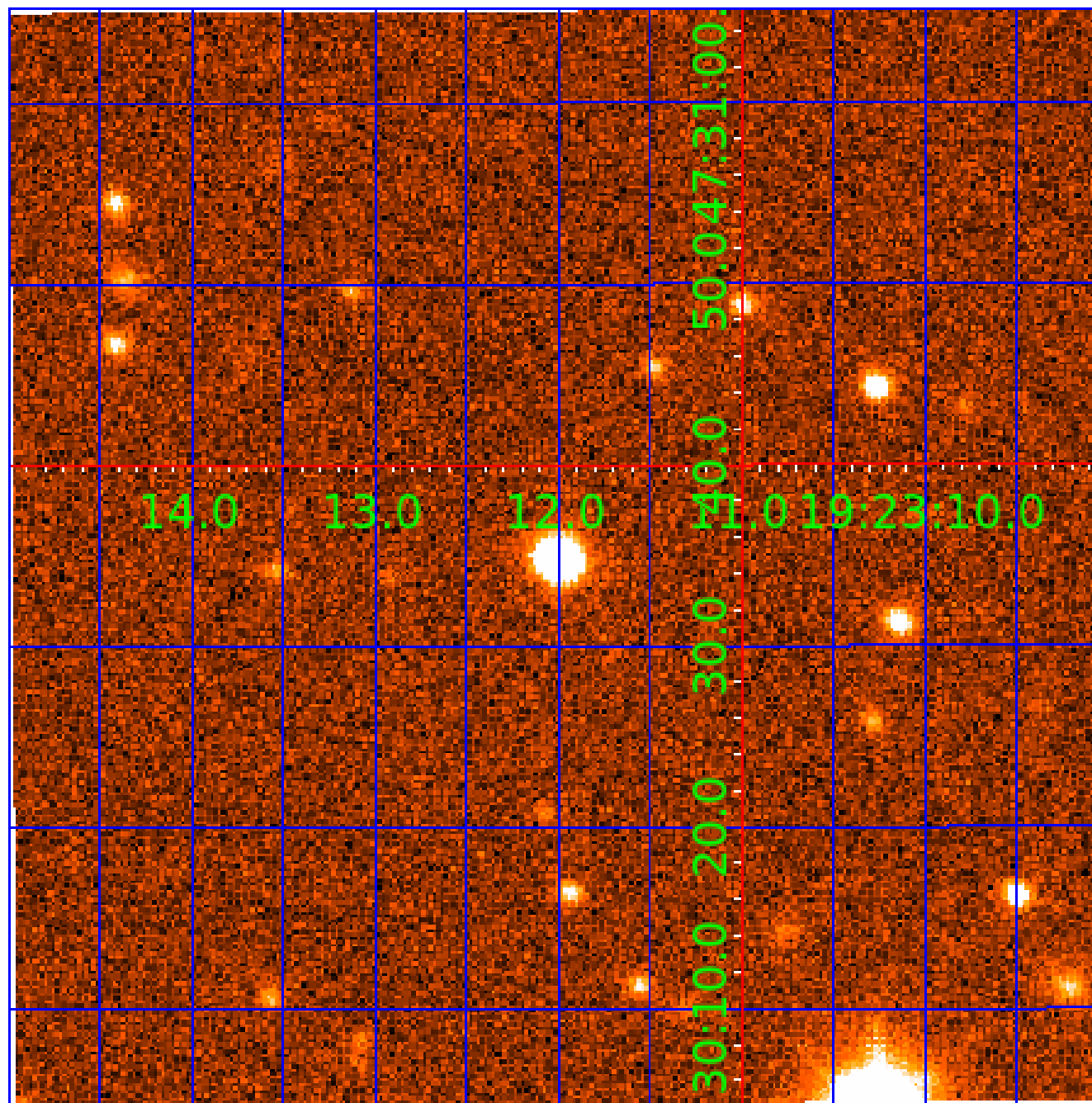


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010402172

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})
010402172-01	OBS	No	373.060101	137.320116	950.8	13.789	7.3	7.2	0.74	5635	2.90	0.55
010402172-02	OBS	No	412.159807	186.689774	1076.5	31.189	8.5	9.6	0.74	5635	3.16	0.48
010402172-03	OBS	No	375.593915	296.148030	1304.4	21.174	7.5	8.0	0.74	5635	3.39	0.54
010402172-04	OBS	No	226.022403	346.609243	877.5	3.046	7.2	6.7	0.74	5635	2.35	1.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010402172-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—CENT_FEW_DIFFS
010402172-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010402172-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—CENT_FEW_DIFFS
010402172-04	OBS	FP	0.08	1	0	0	0	MOD_NONUNIQ_ALT—CENT_FEW_DIFFS

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

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

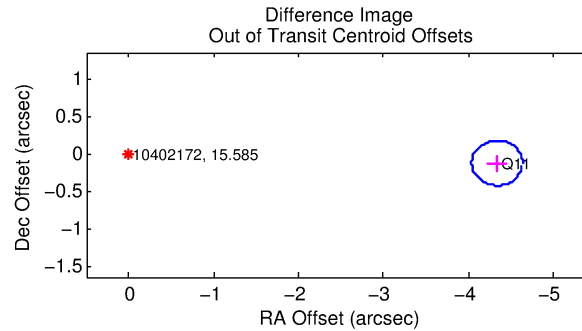
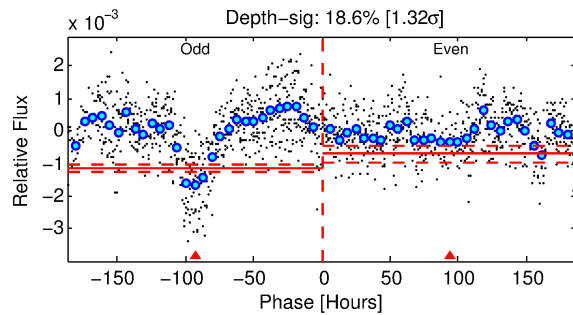
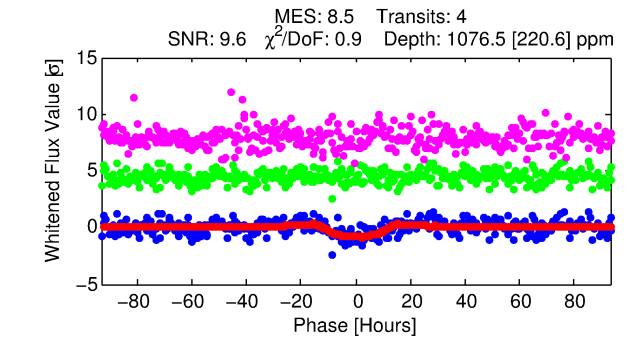
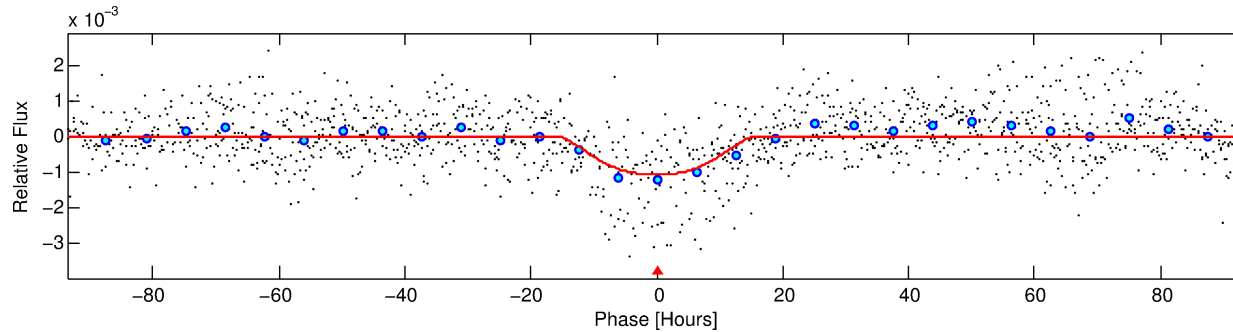
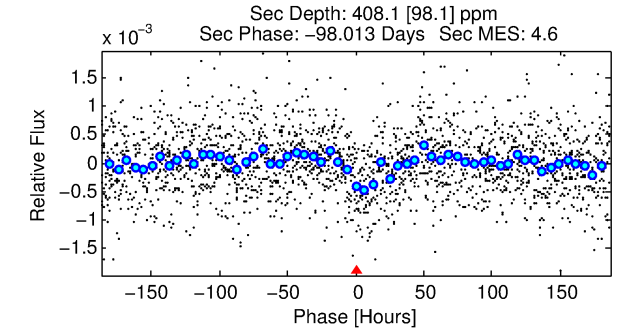
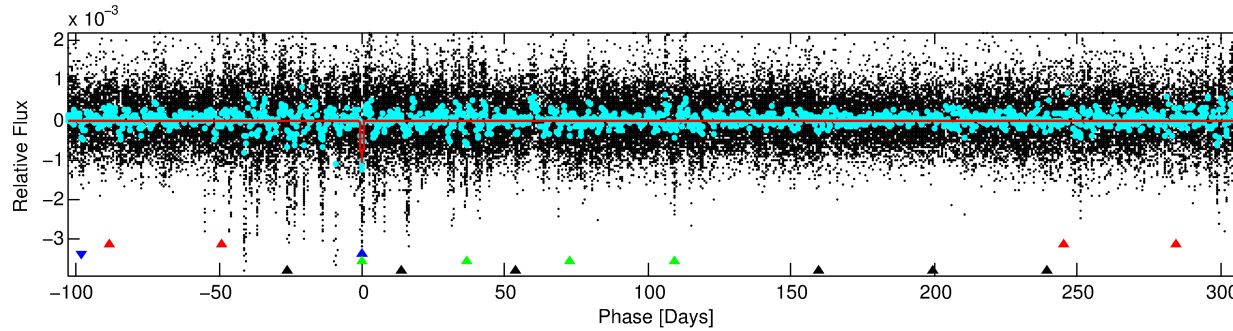
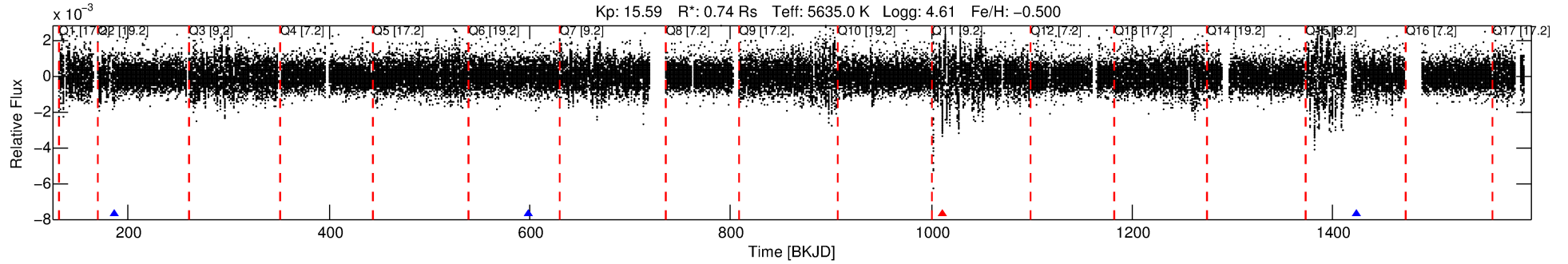
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010402172-02

No Significant Match Found

DV One-Page Summary

KIC: 10402172 Candidate: 2 of 4 Period: 412.160 d



DV Fit Results:

Period = 412.15981 [0.03051] d
Epoch = 186.6898 [0.0359] BKJD
Rp/R* = 0.0393 [0.0066]
a/R* = 39.81 [6.60]
b = 0.96 [0.02]
Seff = 0.48 [0.13]
Teq = 212 [14] K
Rp = 3.16 [0.79] Re
a = 1.0109 [0.1599] AU
Ag = 22960.93 [10919.48] [2.10σ]
Teff = 4040 [436] K [8.77σ]

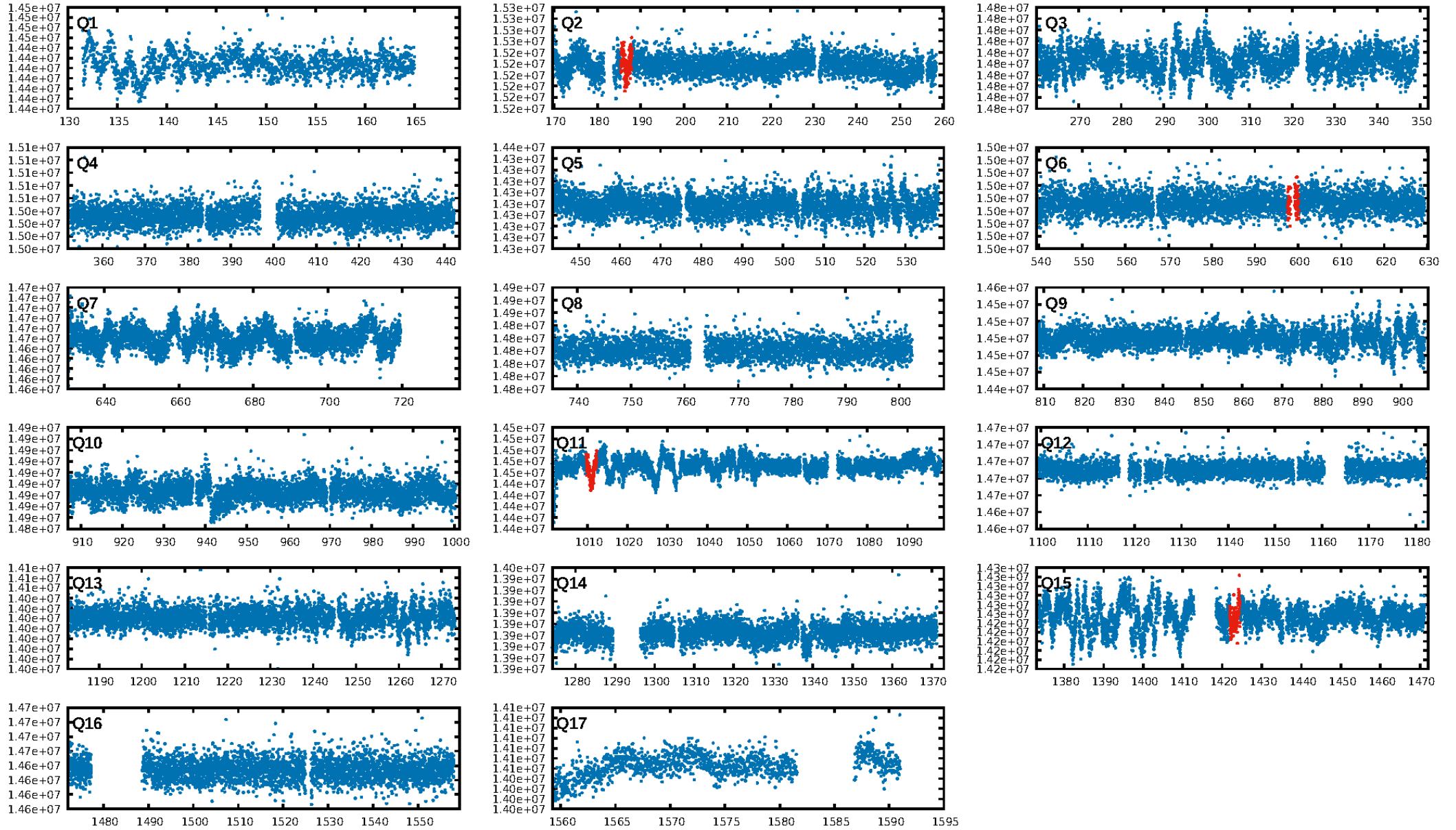
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [23.28σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 3.4%
ModelChiSquareGoF-sig: 100.0%
Bootstrap-pfa: 3.73e-09
RollingBand-fgt: 0.75 [3/4]
GhostDiagnostic-chr: 9.725
Centroid-sig: 0.0%
Centroid-so: 5.340 arcsec [2.34σ]
OotOffset-rm: 4.343 arcsec [43.37σ]
KicOffset-rm: 4.332 arcsec [43.26σ]
OotOffset-st: 0/1/0/0 [1]
KicOffset-st: 0/1/0/0 [1]
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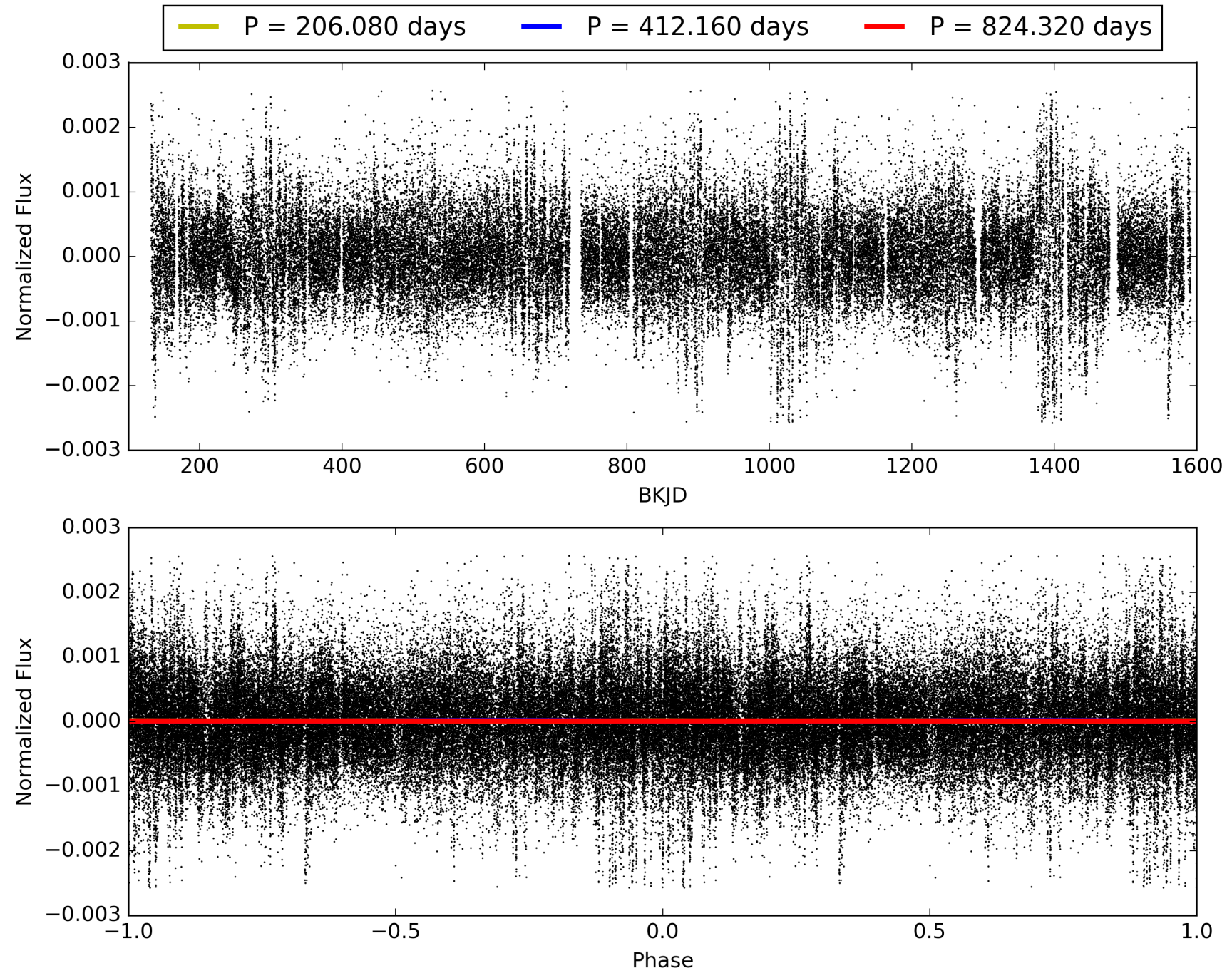
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 09:52:17 Z

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

TCE 010402172-02, PDC Light Curves

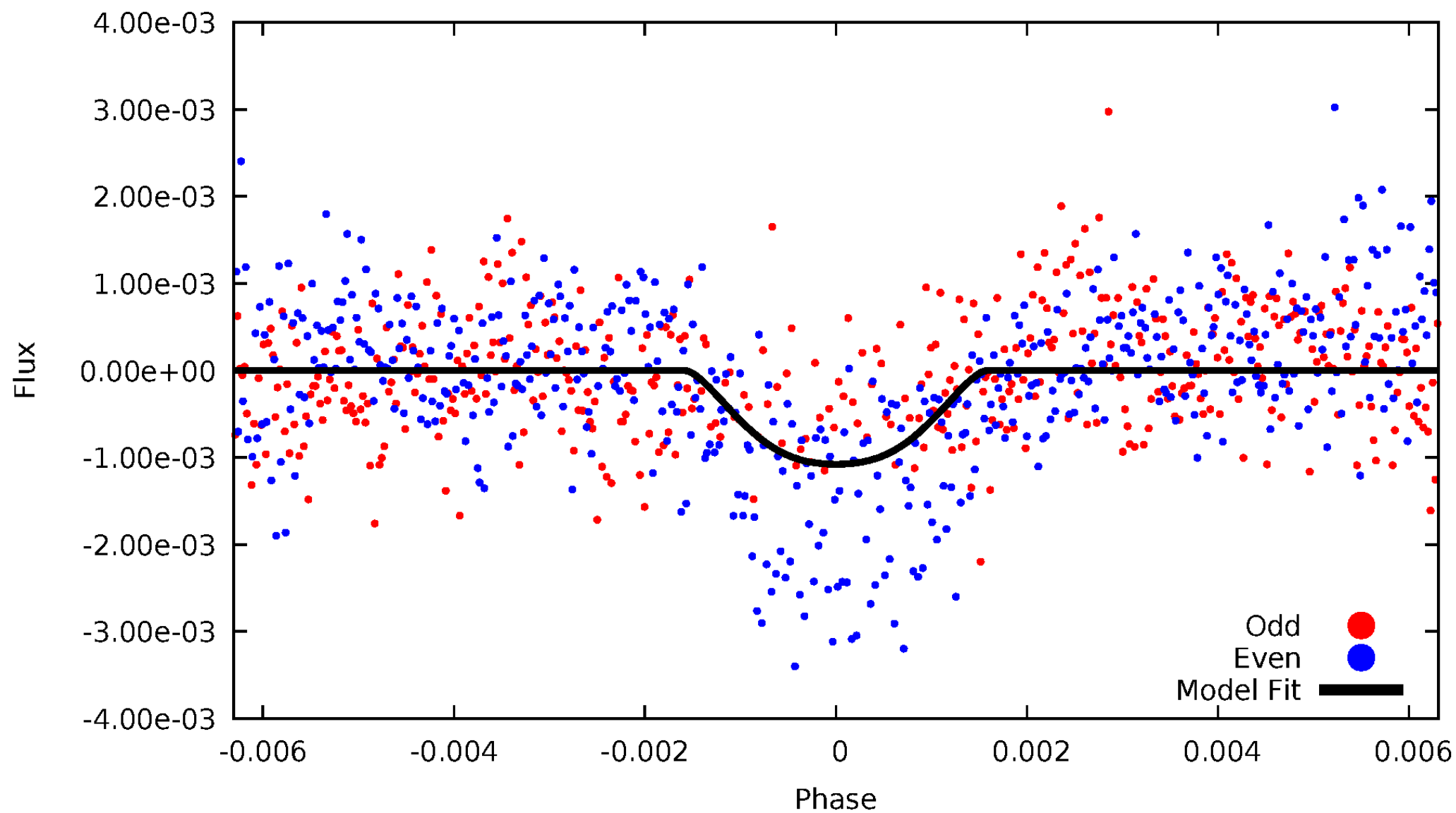


TCE 010402172-02



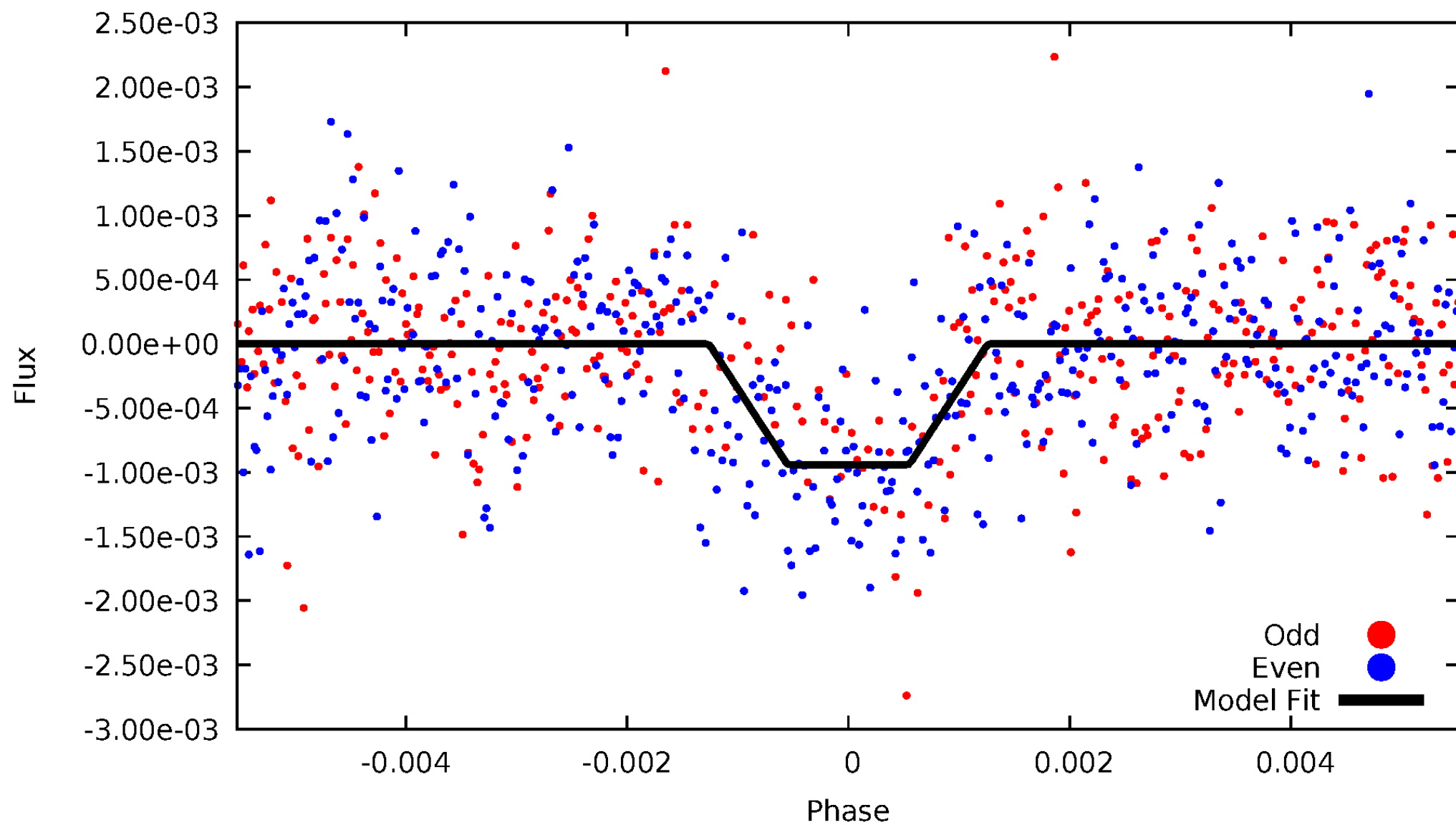
DV Odd/Even

TCE 010402172-02



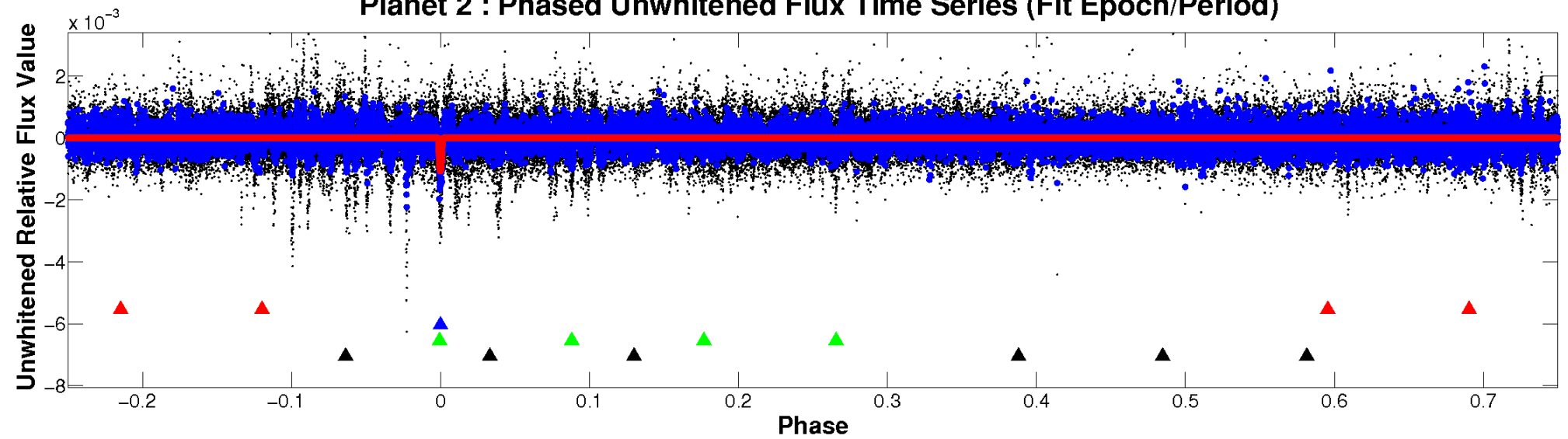
ALT Odd/Even

TCE 010402172-02

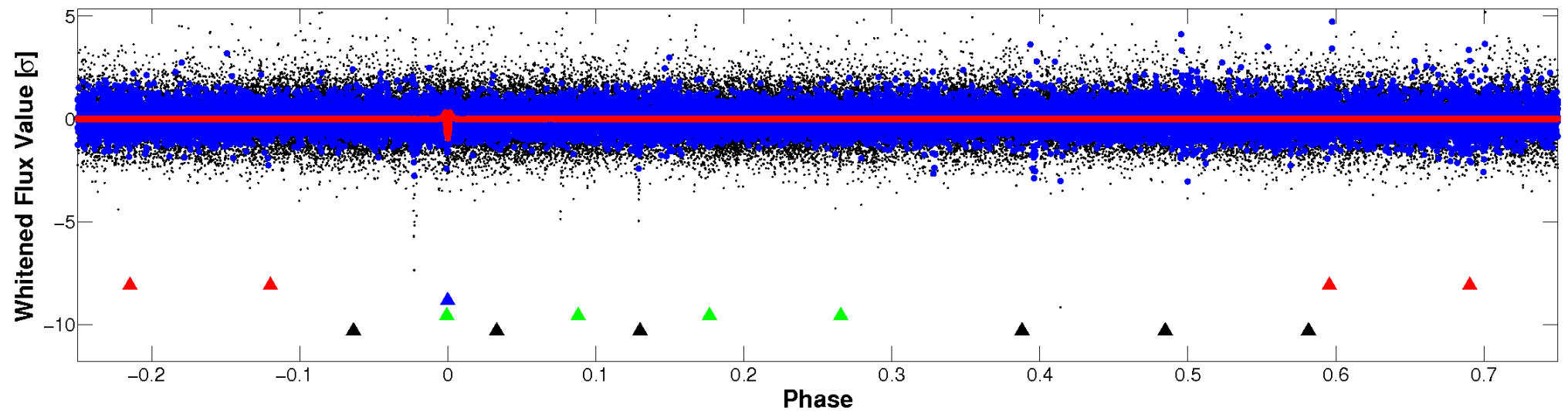


Non-Whitened Vs. Whitened Light Curve

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

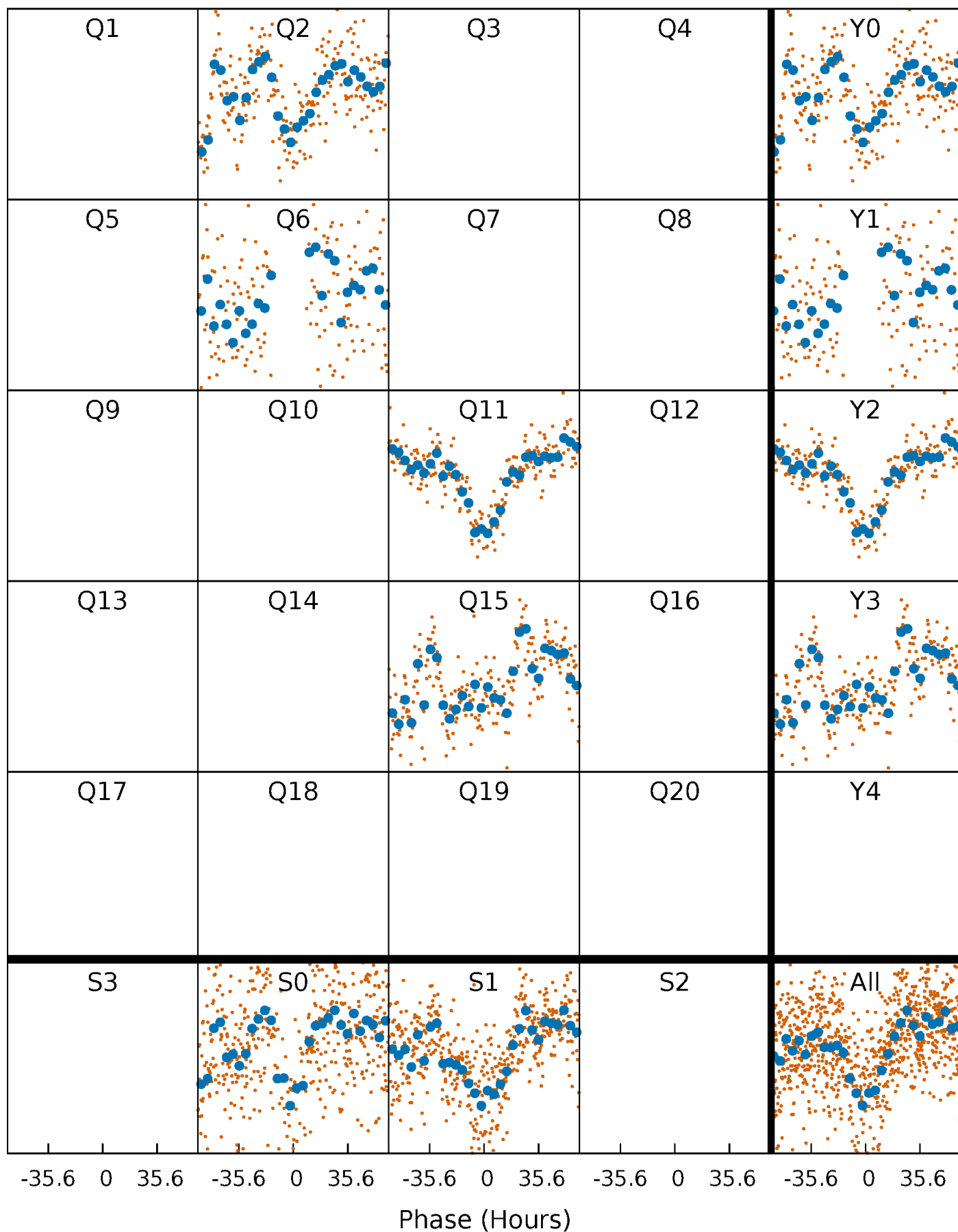


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



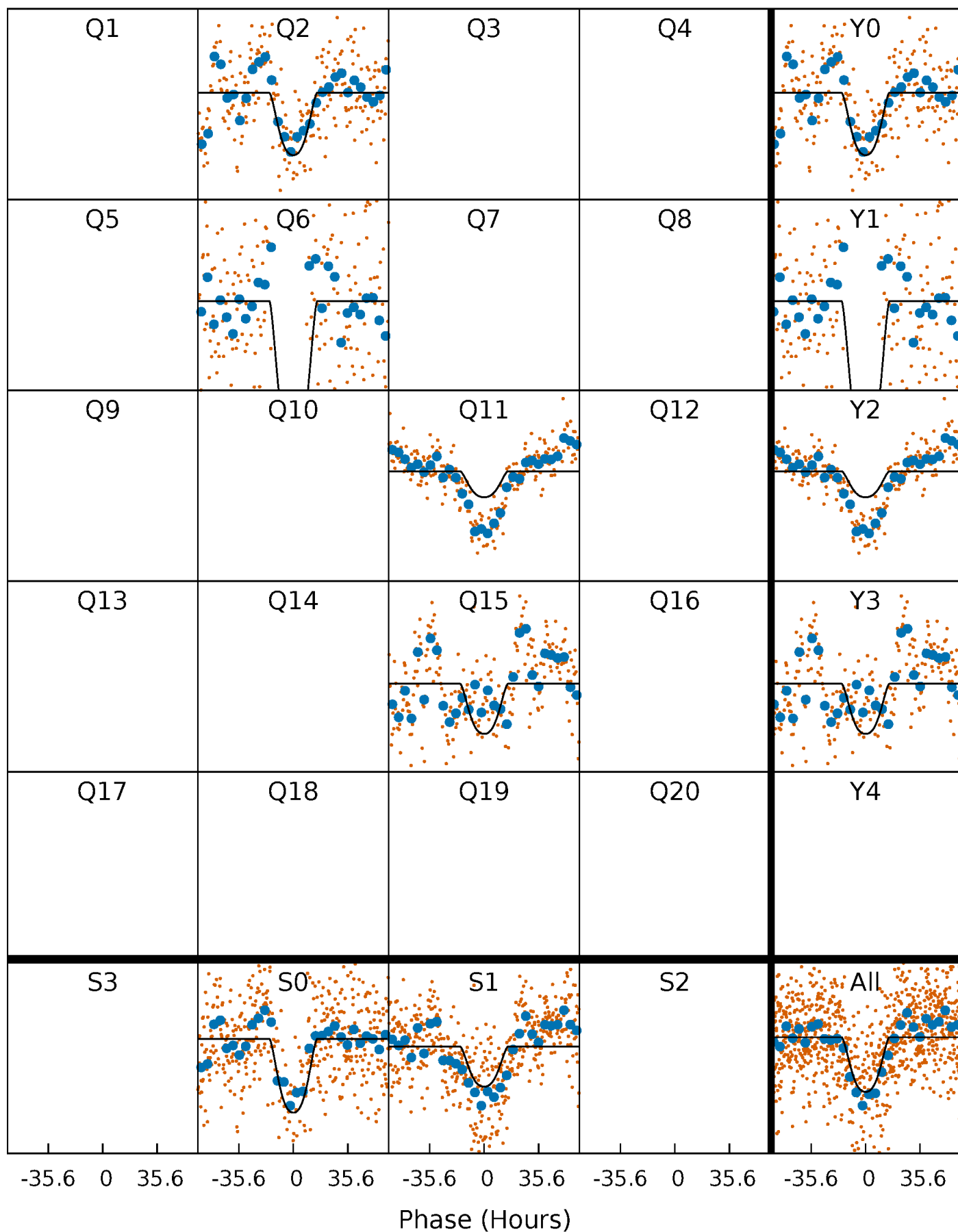
PDC Quarter-Phased Transit Curves

TCE 010402172-02 $P=412.159807$ Days $T_0=186.689774$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 010402172-02 P=412.159807 Days $T_0=186.689774$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

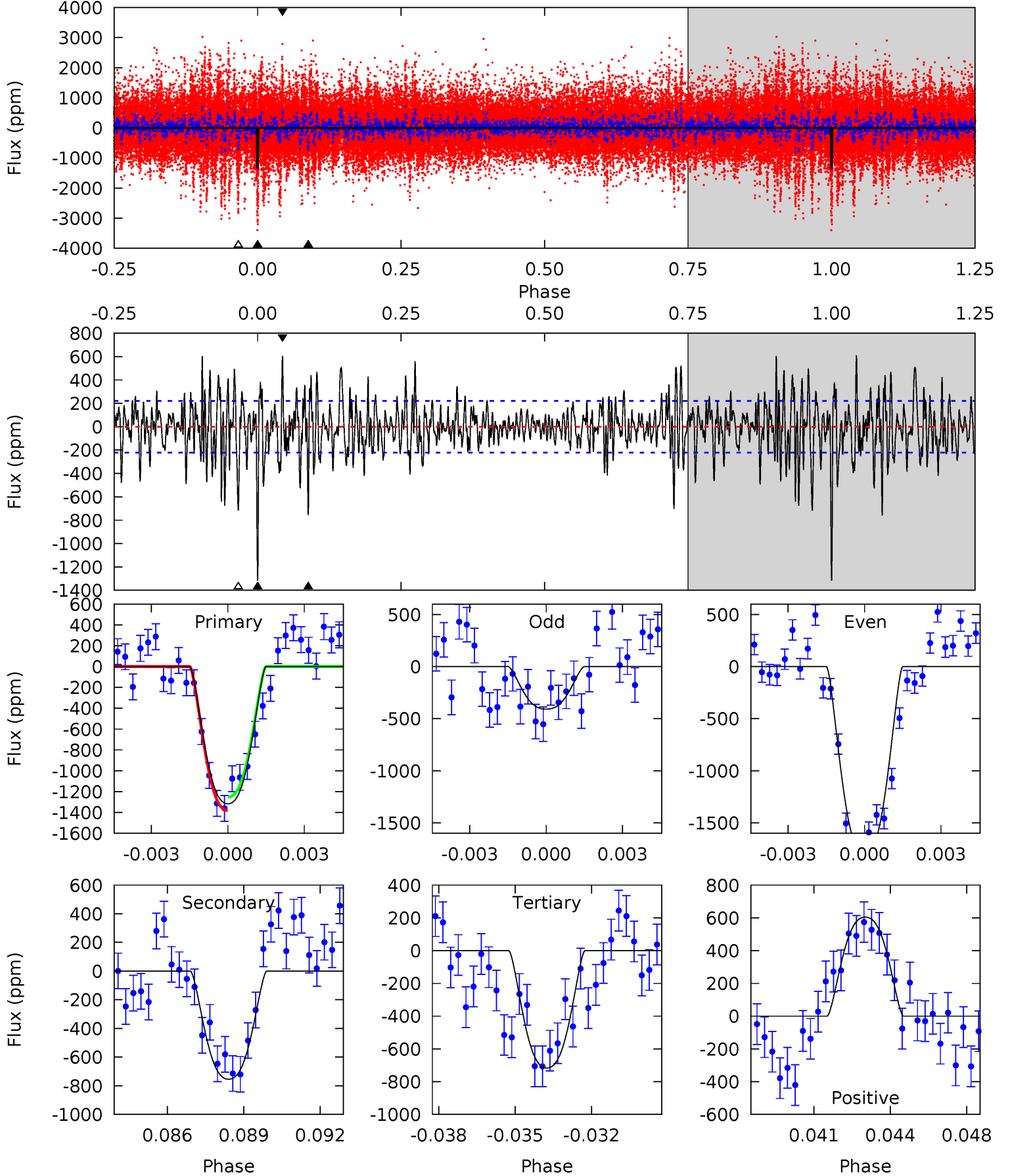
TCE 010402172-02 $P=412.356052$ Days $T_0=186.508893$ (BKJD)



DV Model-Shift Uniqueness Test

010402172-02, P = 412.159807 Days, E = 186.689774 Days

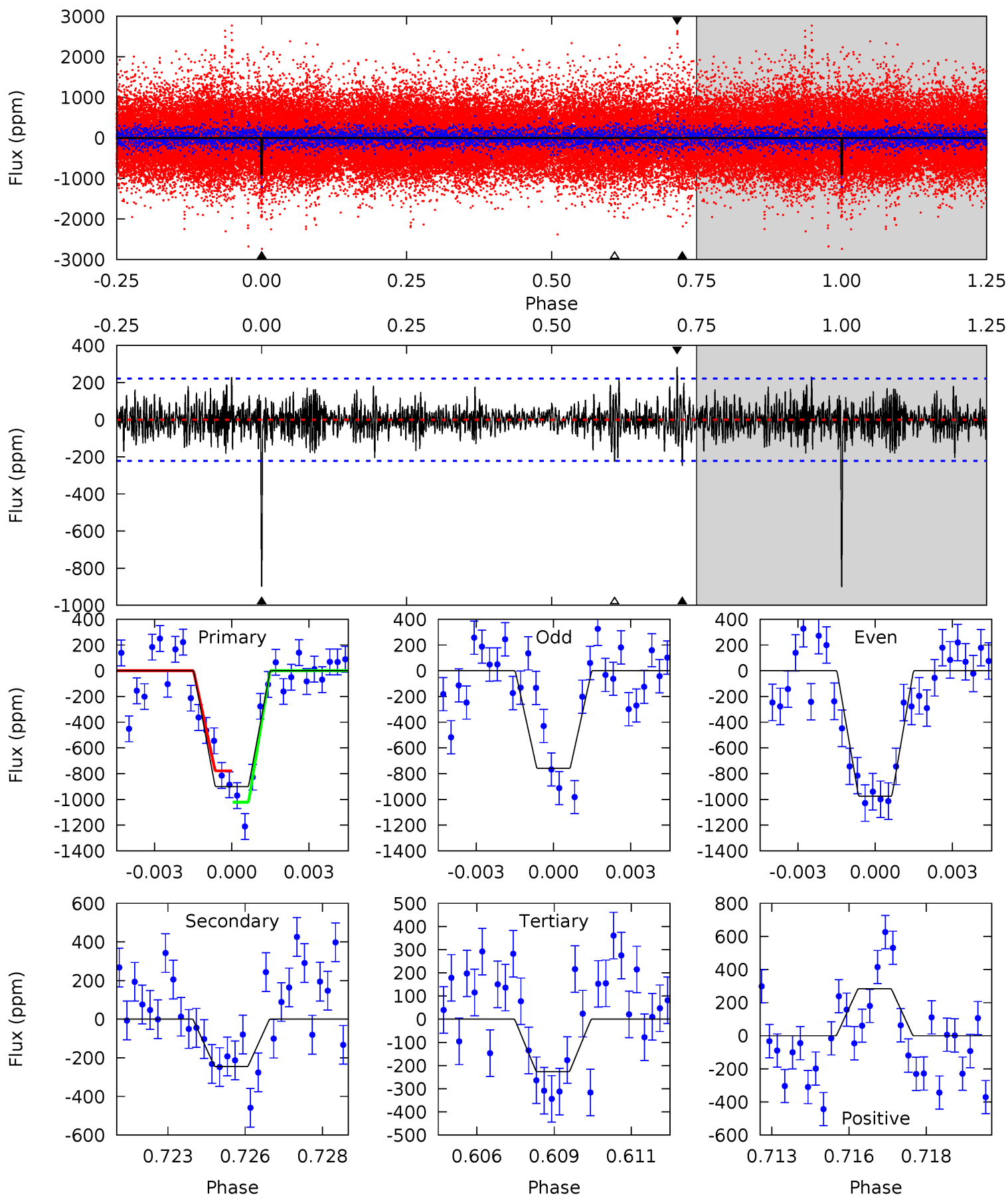
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
31.2	17.9	17.0	14.3	5.24	2.95	4.26	14.2	16.9	0.90	3.55	16.1	1.22	0.31	1.52



Alt Model-Shift Uniqueness Test

010402172-02, P = 412.356052 Days, E = 186.508893 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.5	5.85	5.40	6.78	5.28	3.02	1.45	16.1	14.7	0.45	-0.93	2.52	0.67	0.24	2.89



Stellar Parameters For KIC 010402172

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5635^{+169}_{-152}	$4.612^{+0.032}_{-0.128}$	$-0.500^{+0.300}_{-0.300}$	$0.737^{+0.137}_{-0.055}$	$0.839^{+0.078}_{-0.096}$	$2.954^{+0.470}_{-1.109}$
	+3%/-3%	+1%/-3%	+60%/-60%	+19%/-7%	+9%/-11%	+16%/-38%
Source	PHO1	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 010402172-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-755 ± 42	$3.32^{+0.67}_{-0.63}$	302^{+14}_{-12}	4811^{+434}_{-324}	38946^{+19877}_{-12325}
Alt.	-245 ± 42	$2.59^{+0.60}_{-0.57}$	302^{+15}_{-12}	4249^{+447}_{-346}	20539^{+13756}_{-7816}

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 $A_{obs} \gg 1.0$

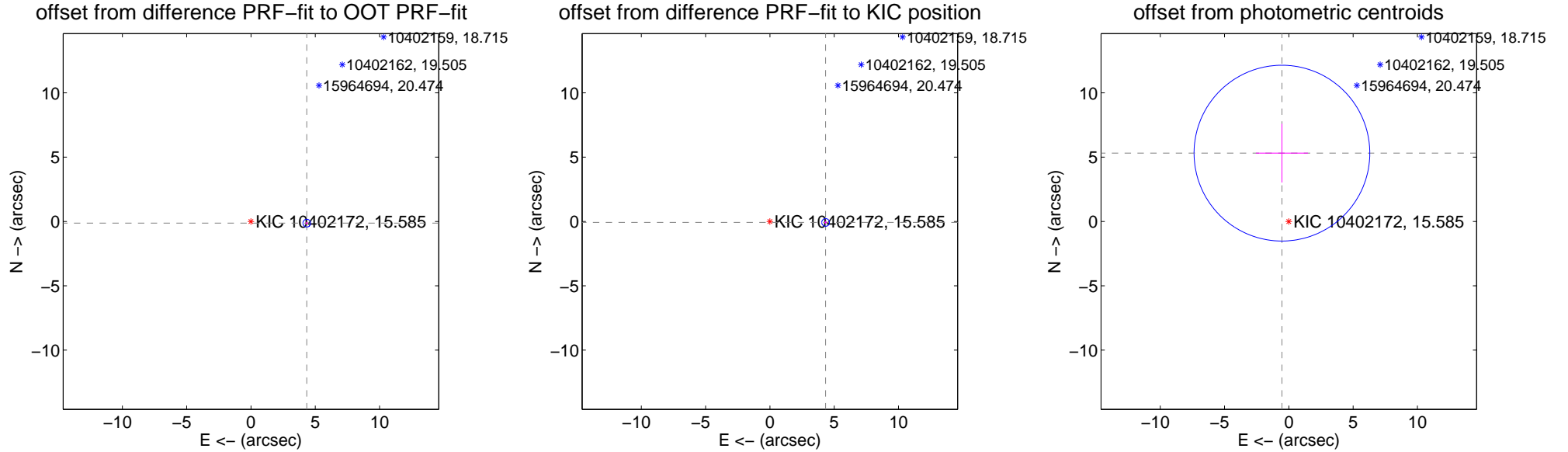
DV Centroid Data

Supplemental centroid analysis for 010402172-02. Kepler magnitude: 15.59. Transit SNR 9.55

There are 0 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	4.343 ± 0.100	43.37	-4.342 ± 0.100	-0.129 ± 0.104
PRF-fit source offset from KIC position	4.332 ± 0.100	43.26	-4.332 ± 0.100	-0.074 ± 0.104
photometric centroid source offset	5.34 ± 2.28	2.34	0.54 ± 2.03	5.31 ± 2.28



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.

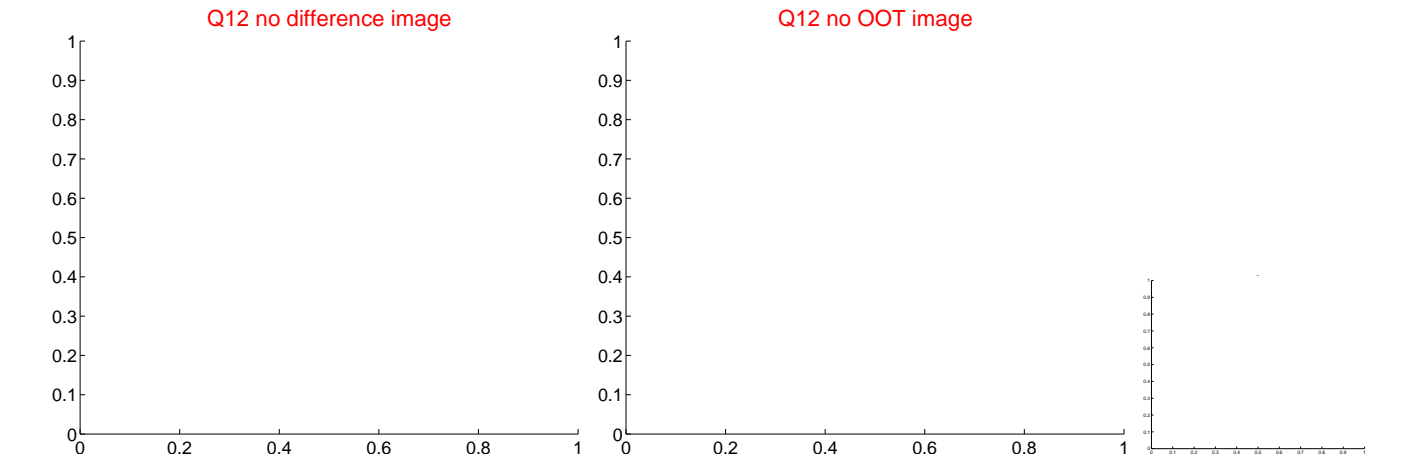
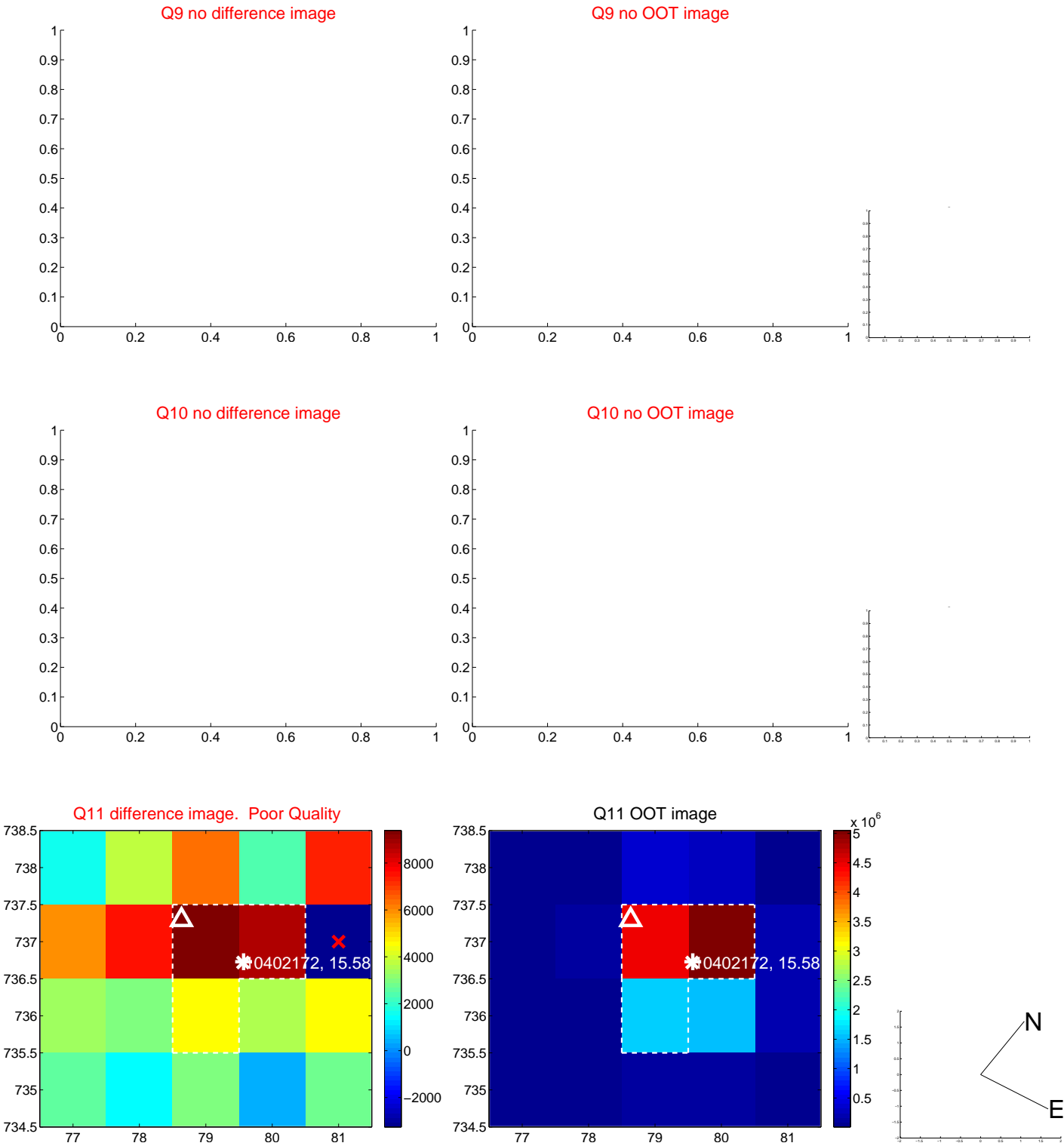
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



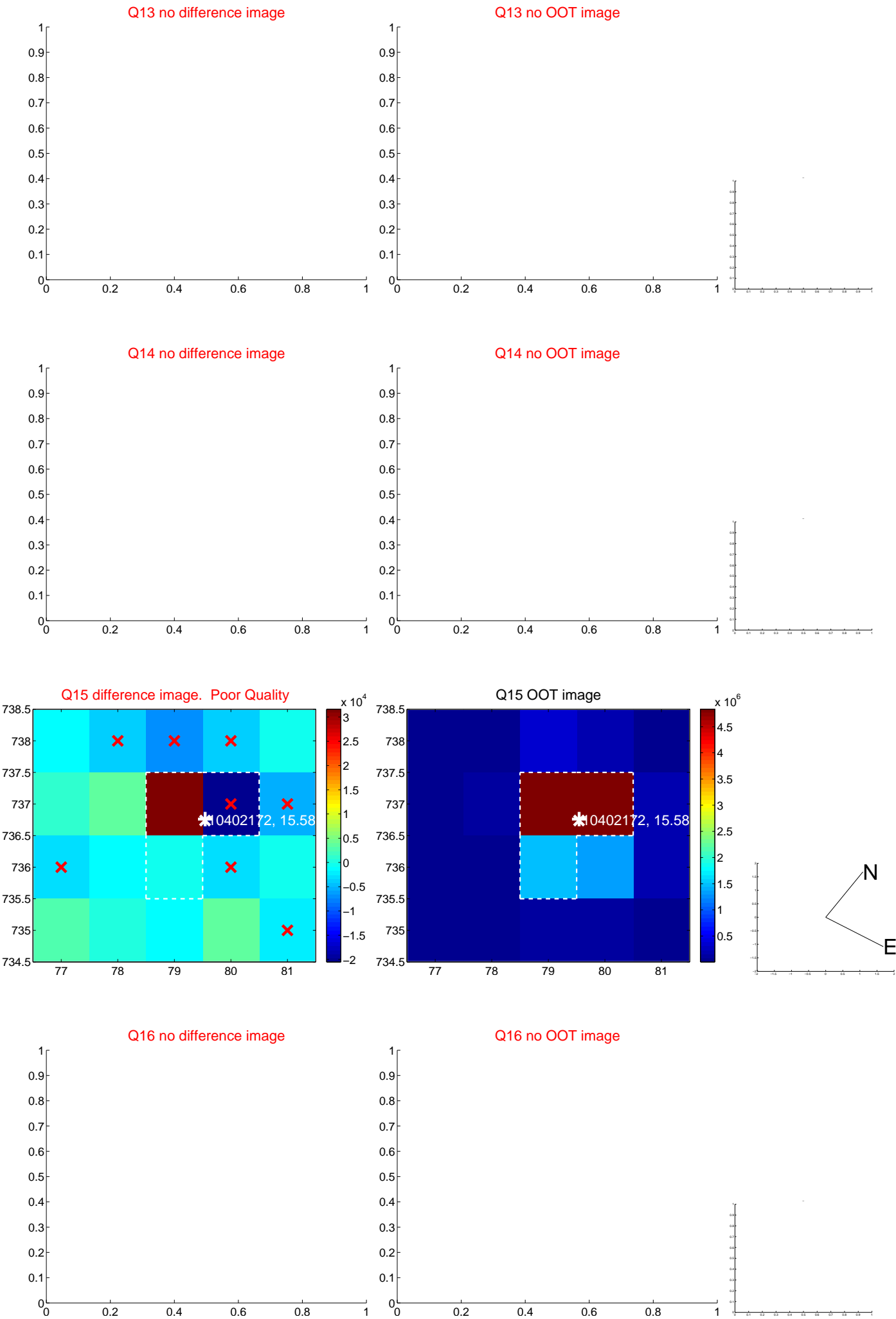
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



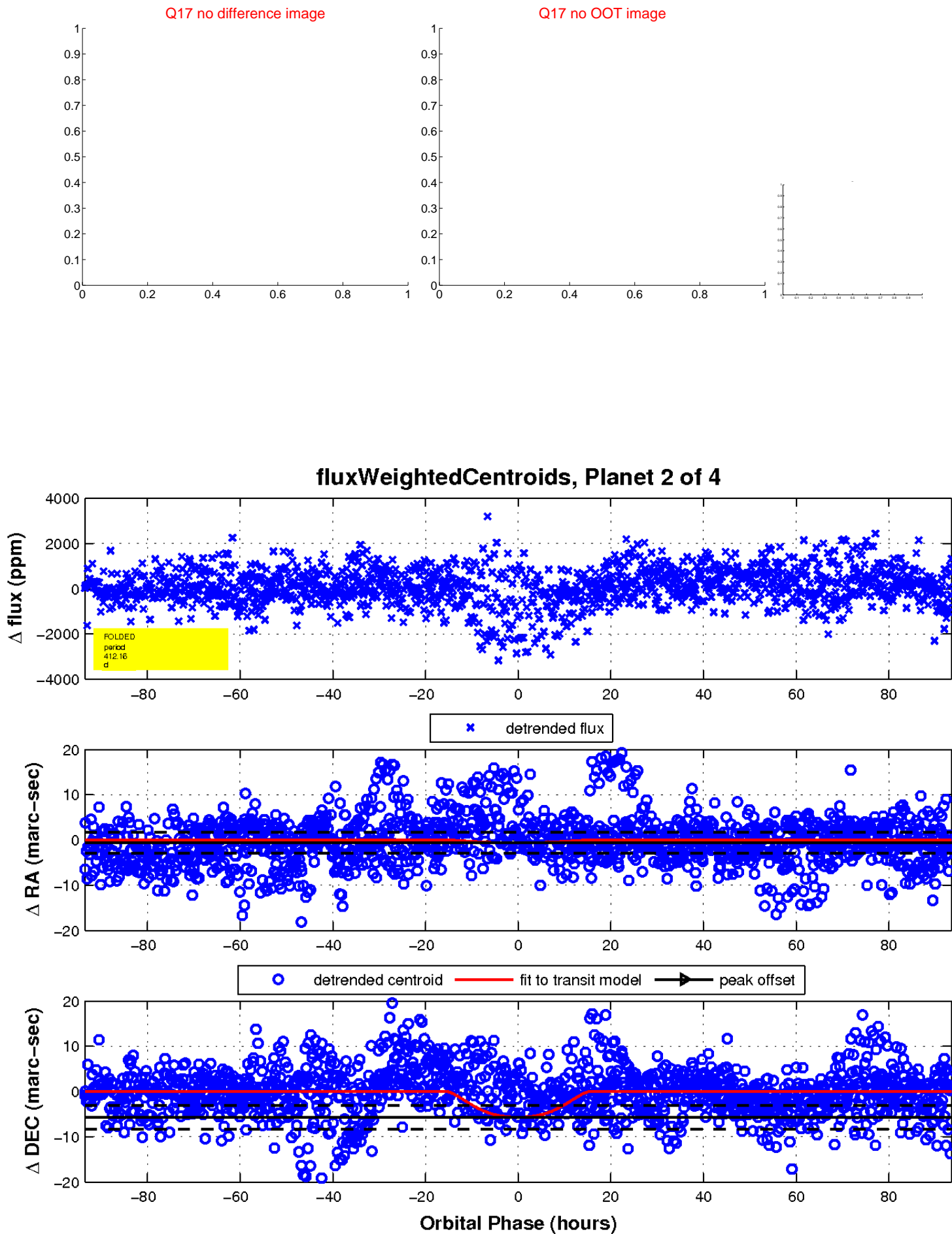
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

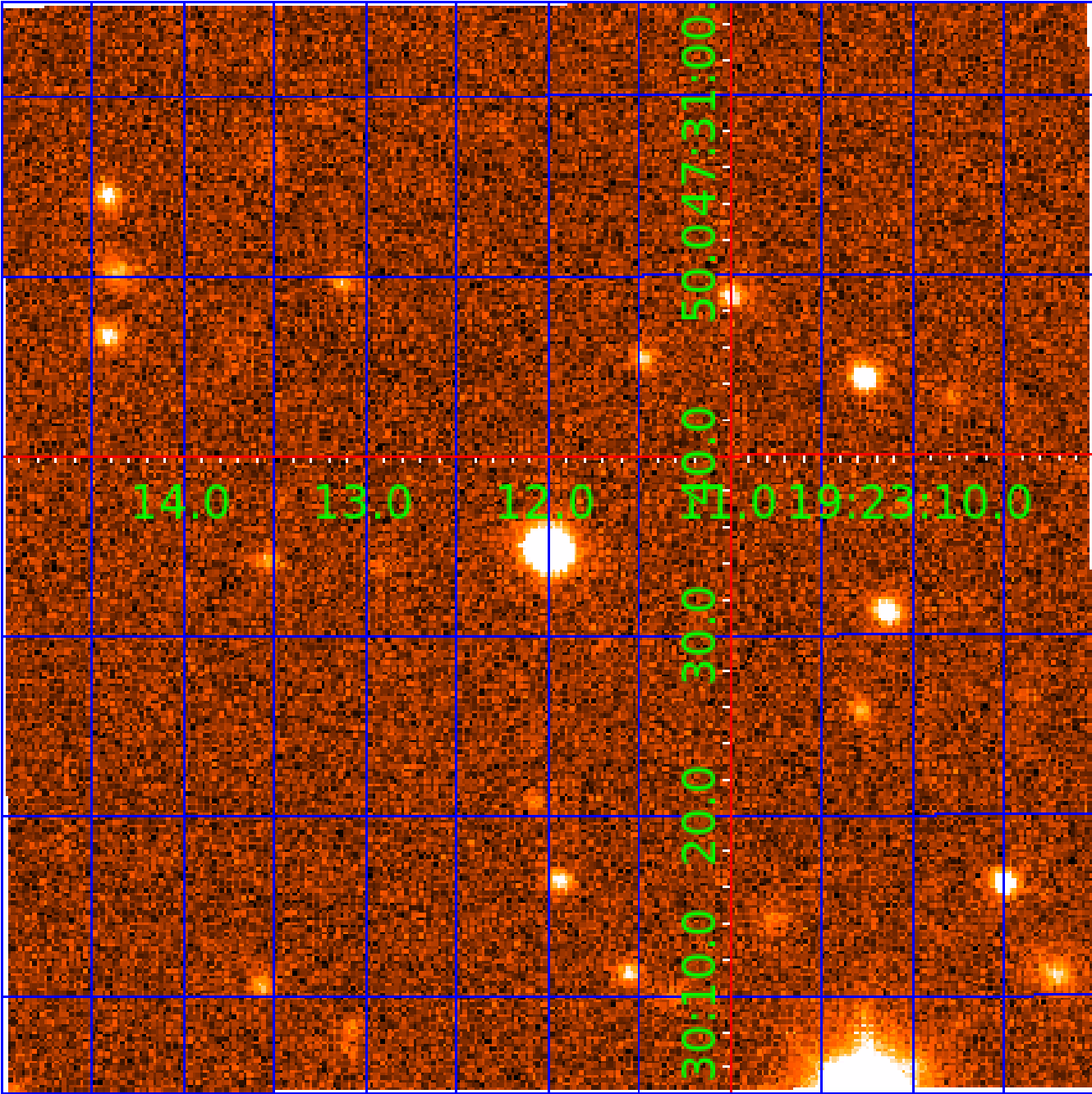


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010402172

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})
010402172-01	OBS	No	373.060101	137.320116	950.8	13.789	7.3	7.2	0.74	5635	2.90	0.55
010402172-02	OBS	No	412.159807	186.689774	1076.5	31.189	8.5	9.6	0.74	5635	3.16	0.48
010402172-03	OBS	No	375.593915	296.148030	1304.4	21.174	7.5	8.0	0.74	5635	3.39	0.54
010402172-04	OBS	No	226.022403	346.609243	877.5	3.046	7.2	6.7	0.74	5635	2.35	1.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010402172-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—CENT_FEW_DIFFS
010402172-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010402172-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—CENT_FEW_DIFFS
010402172-04	OBS	FP	0.08	1	0	0	0	MOD_NONUNIQ_ALT—CENT_FEW_DIFFS

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

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

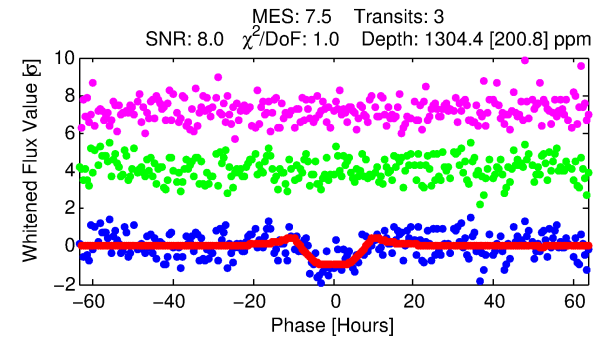
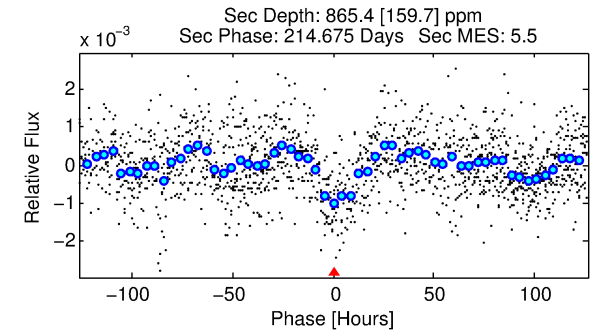
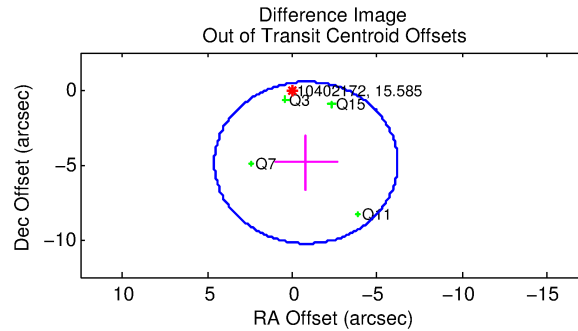
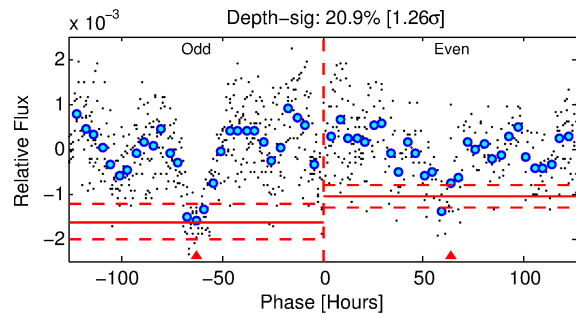
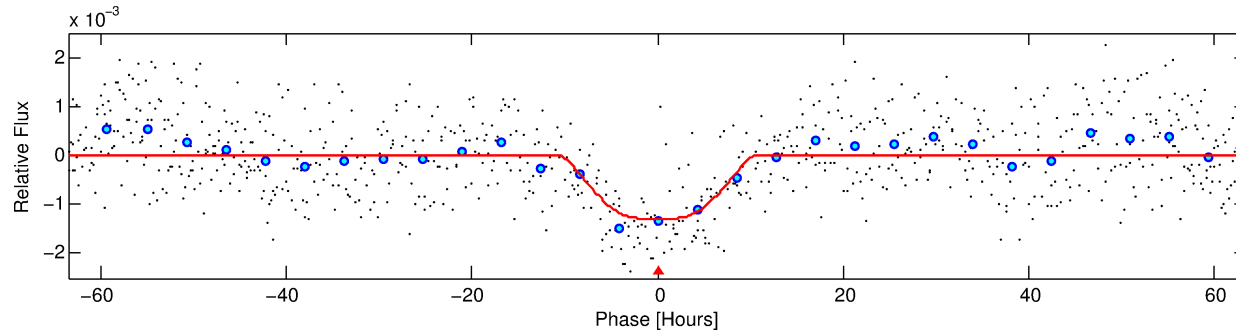
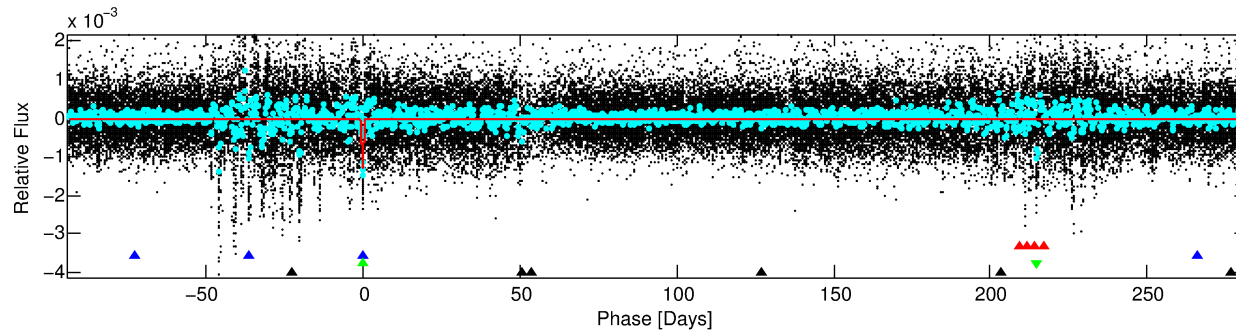
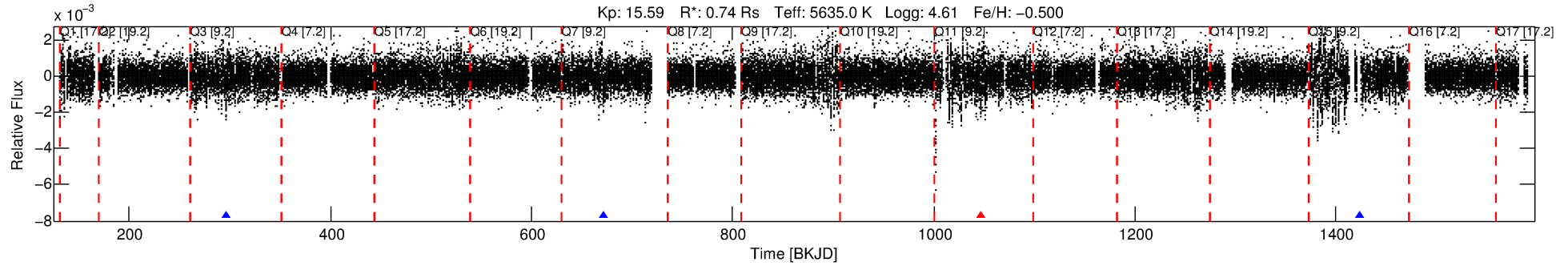
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010402172-03

No Significant Match Found

DV One-Page Summary

KIC: 10402172 Candidate: 3 of 4 Period: 375.594 d



DV Fit Results:

Period = 375.59391 [0.03144] d
Epoch = 296.1480 [0.0402] BKJD
Rp/R* = 0.0422 [0.0041]
a/R* = 57.62 [8.47]
b = 0.95 [0.02]
Seff = 0.54 [0.14]
Teff = 219 [14] K
Rp = 3.39 [0.71] Re
a = 0.9502 [0.1503] AU
Ag = 37315.24 [13261.61] [2.81 σ]
Teffp = 4705 [346] K [12.94 σ]

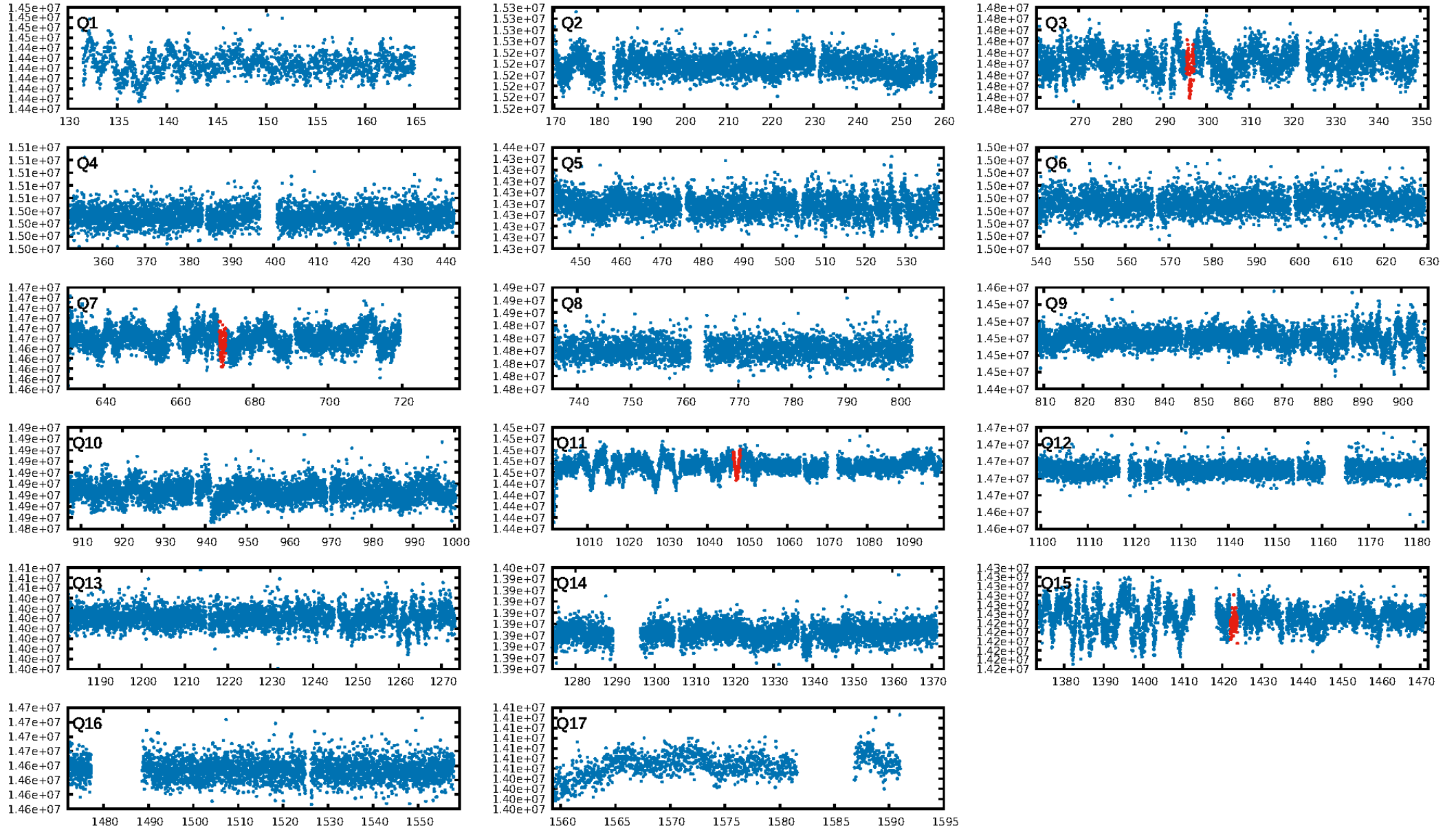
DV Diagnostic Results:

ShortPeriod-sig: 98.4% [2.41 σ]
LongPeriod-sig: 100.0% [23.28 σ]
ModelChiSquare2-sig: 39.8%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 8.16e-08
RollingBand-fgt: 0.67 [2/3]
GhostDiagnostic-chr: 1.164
Centroid-sig: 59.5%
Centroid-so: 1.375 arcsec [0.60 σ]
OotOffset-rm: 4.941 arcsec [2.75 σ]
OotOffset-st: 0/4/0/0 [4]
KicOffset-rm: 4.878 arcsec [2.71 σ]
KicOffset-st: 0/4/0/0 [4]
DiffImageQuality-fgm: 0.50 [2/4]
DiffImageOverlap-fno: 0.75 [3/4]

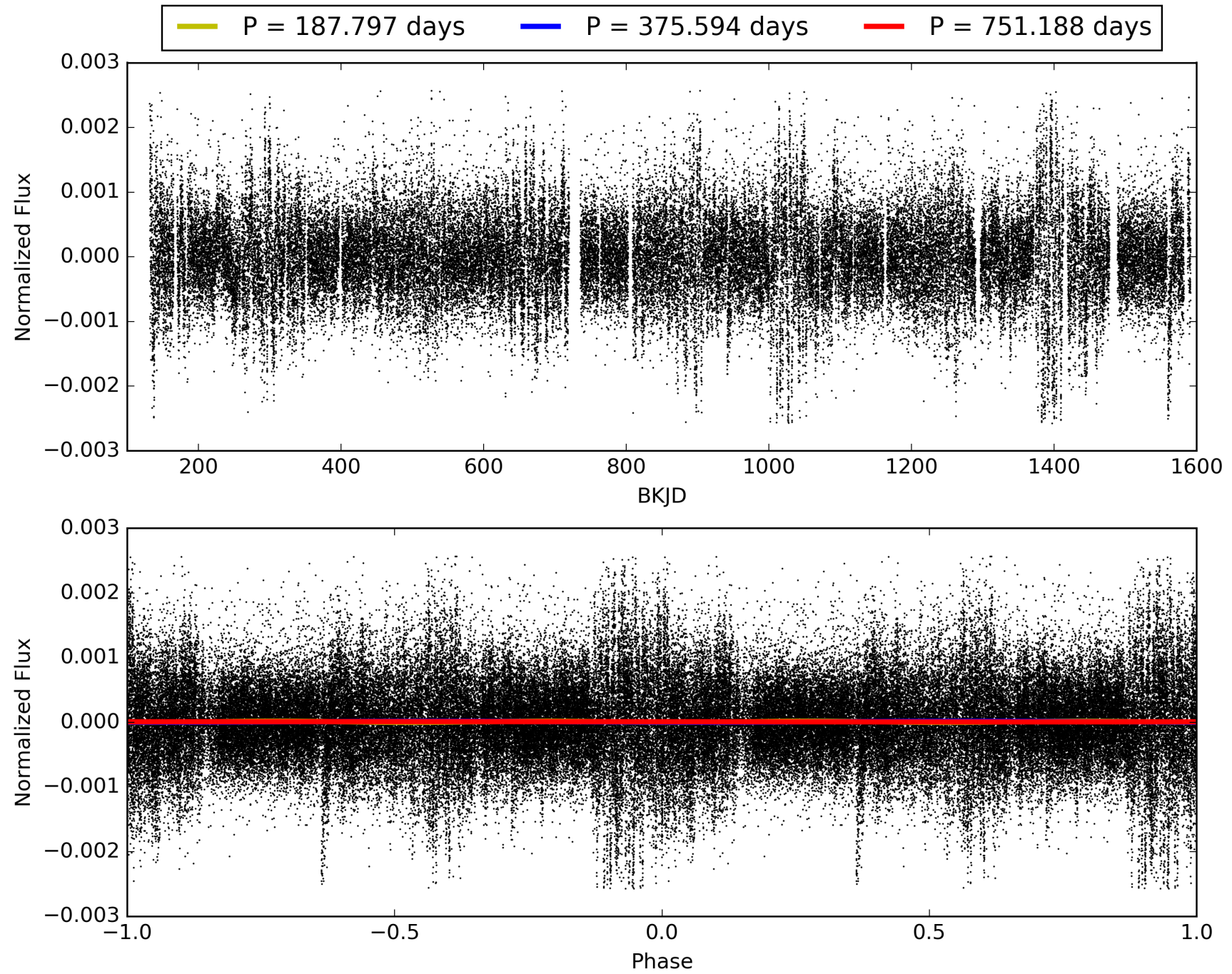
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 09:52:25 Z

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

TCE 010402172-03, PDC Light Curves

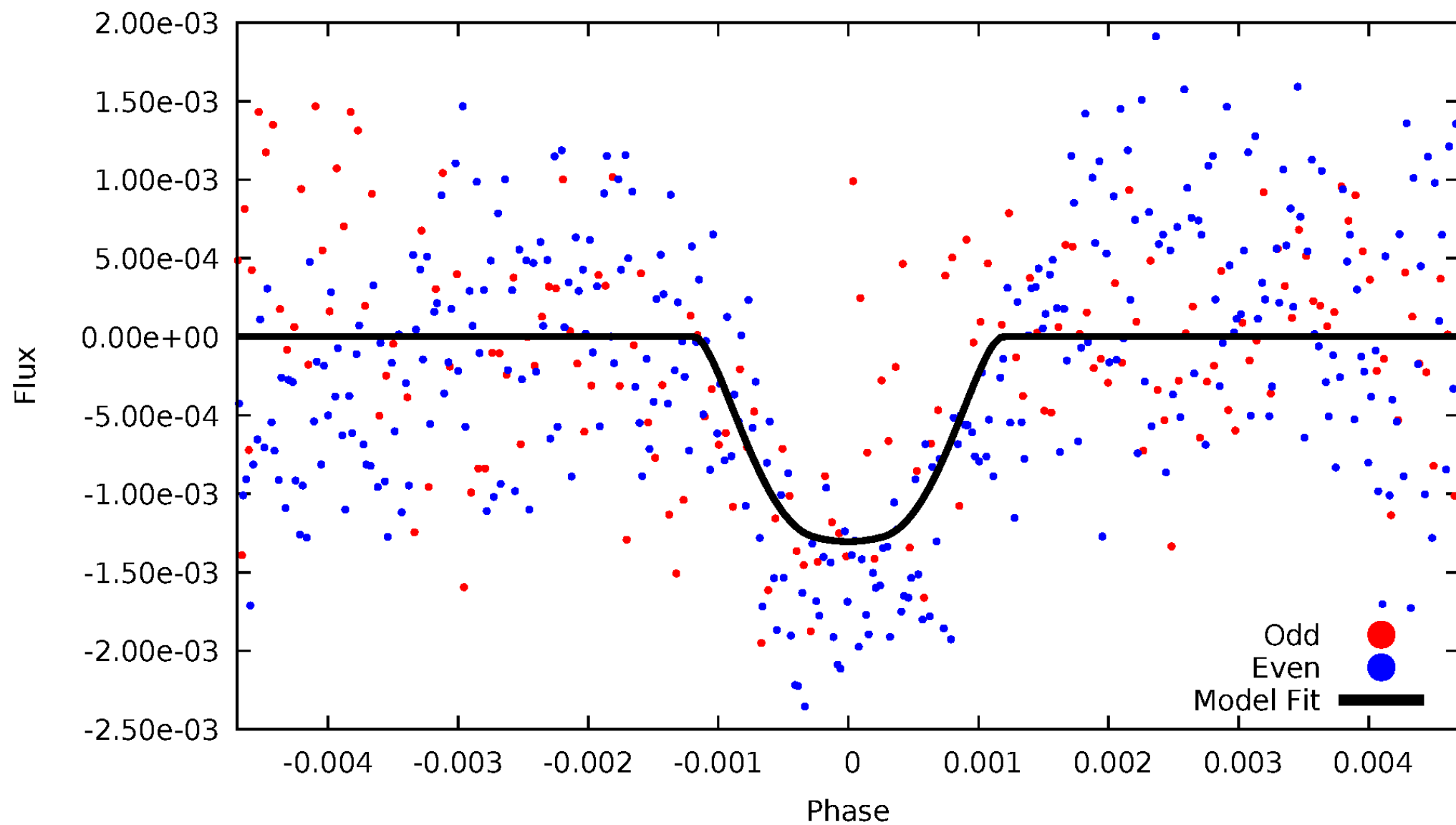


TCE 010402172-03



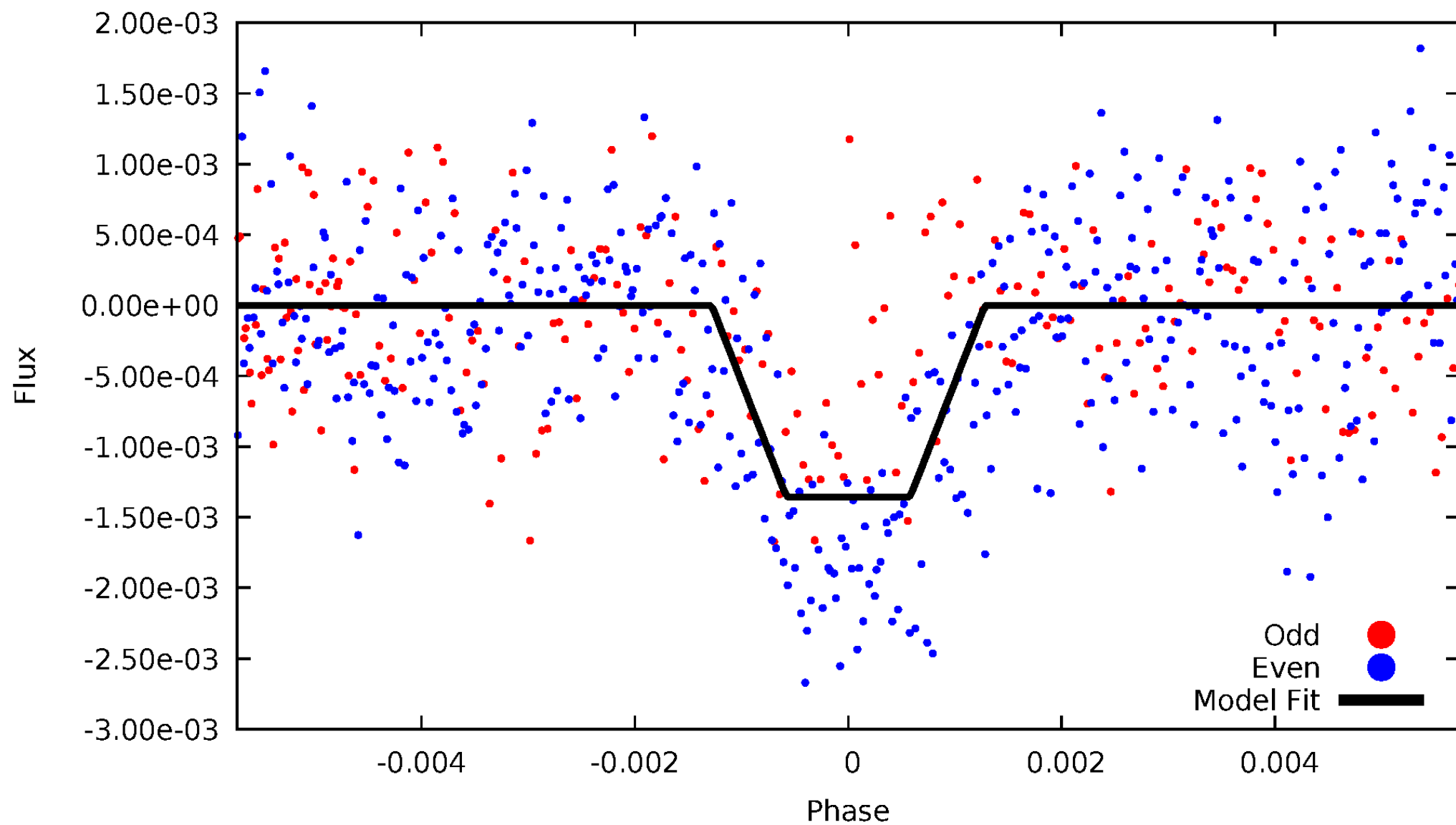
DV Odd/Even

TCE 010402172-03



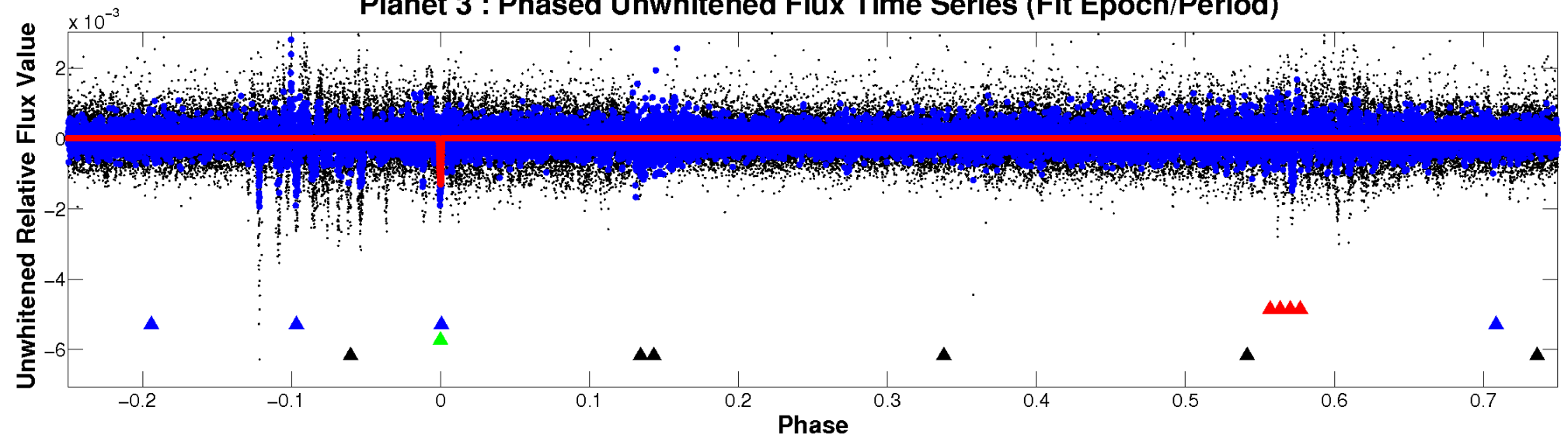
ALT Odd/Even

TCE 010402172-03

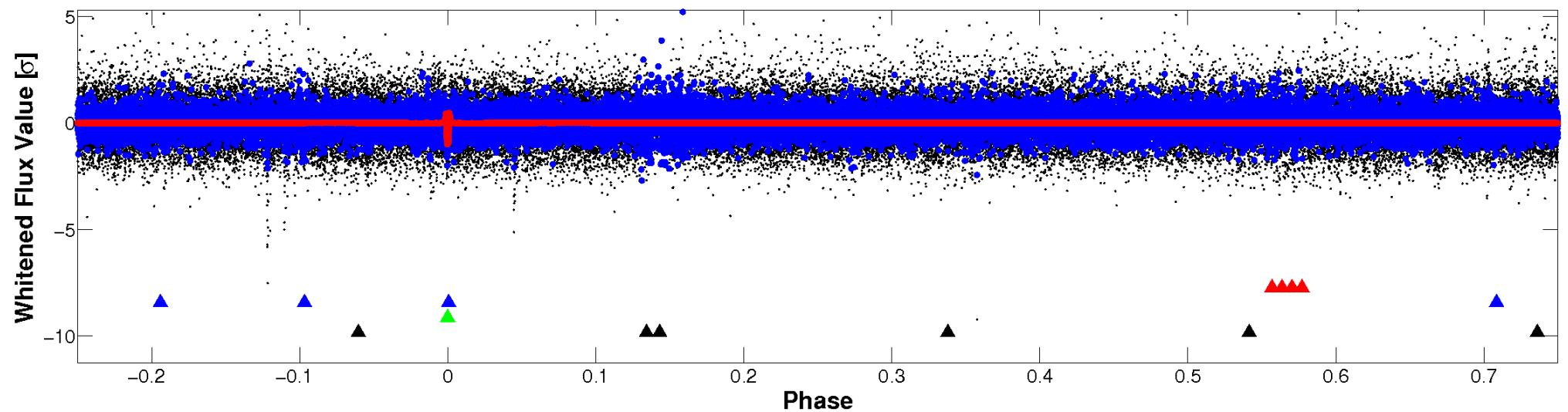


Non-Whitened Vs. Whitened Light Curve

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

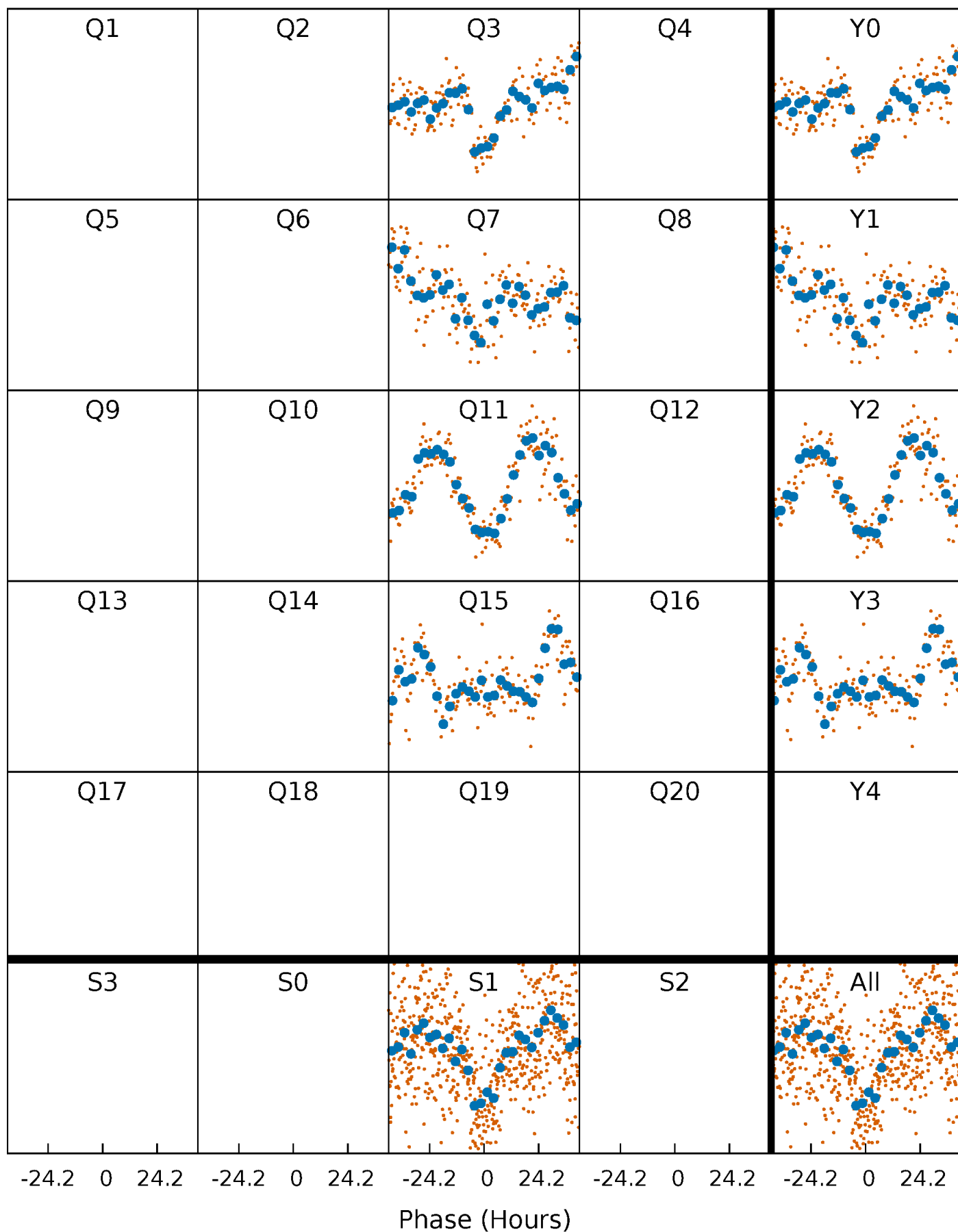


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



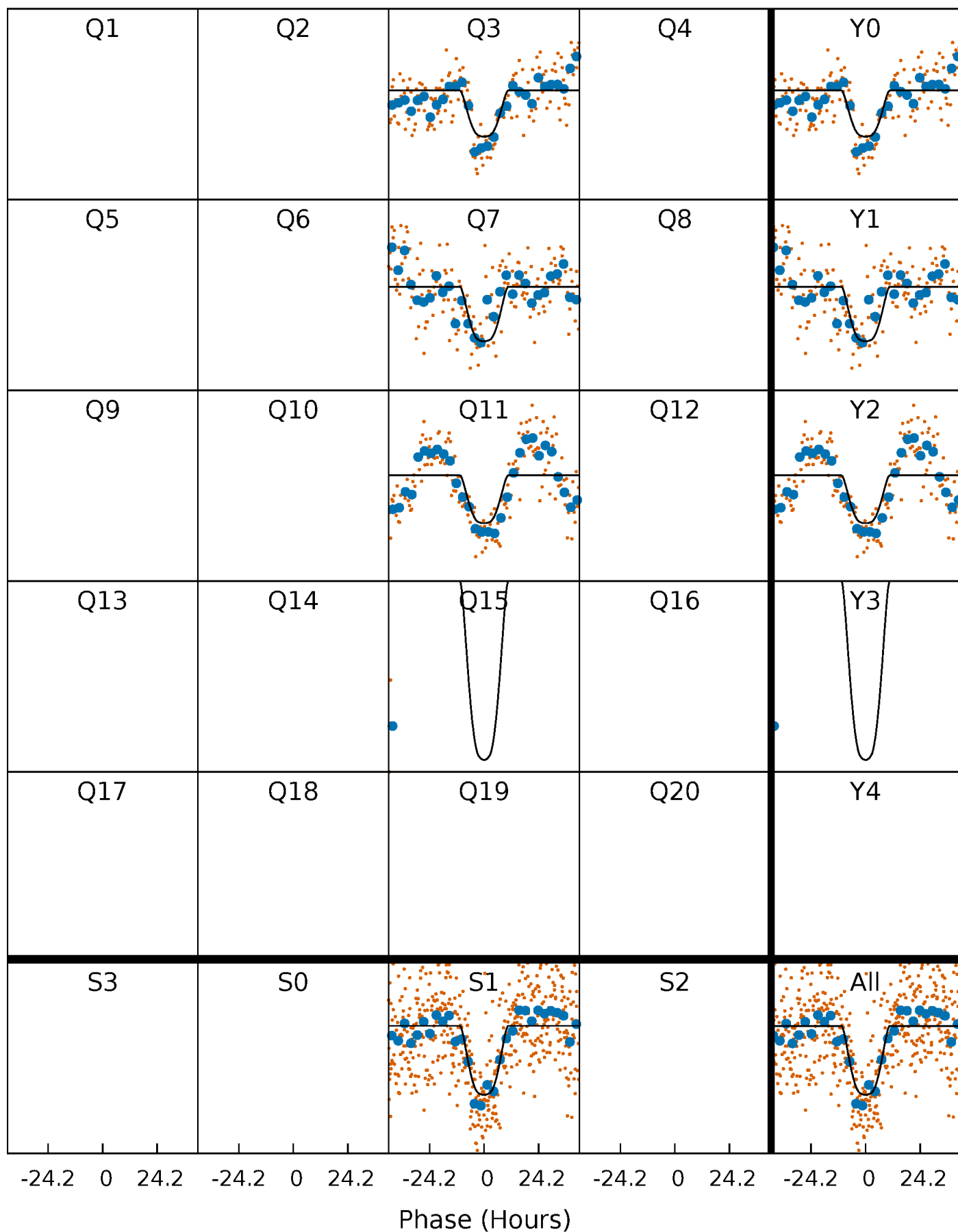
PDC Quarter-Phased Transit Curves

TCE 010402172-03 P=375.593915 Days $T_0=296.148030$ (BKJD)



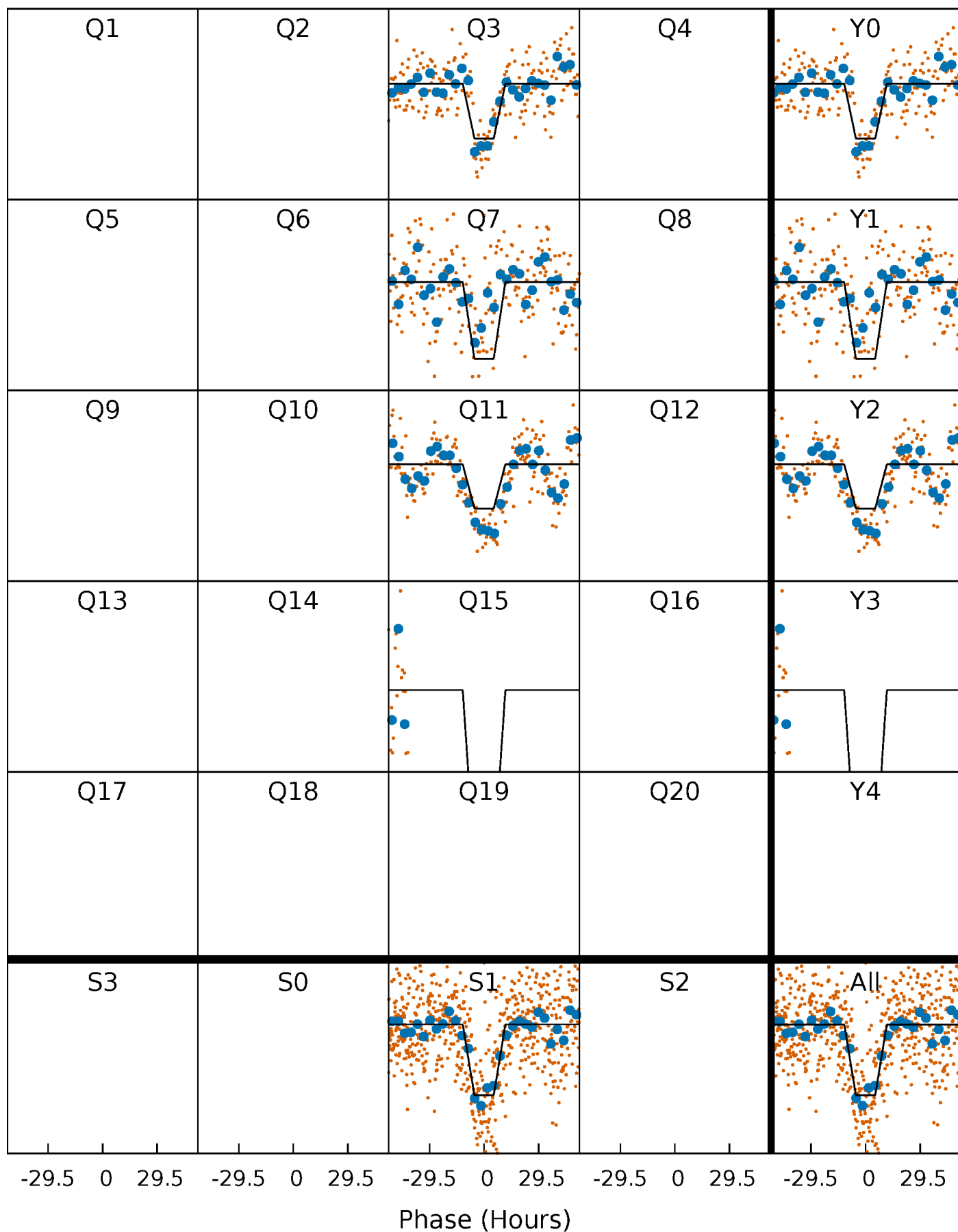
DV Quarter-Phased Transit Curves

TCE 010402172-03 $P=375.593915$ Days $T_0=296.148030$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

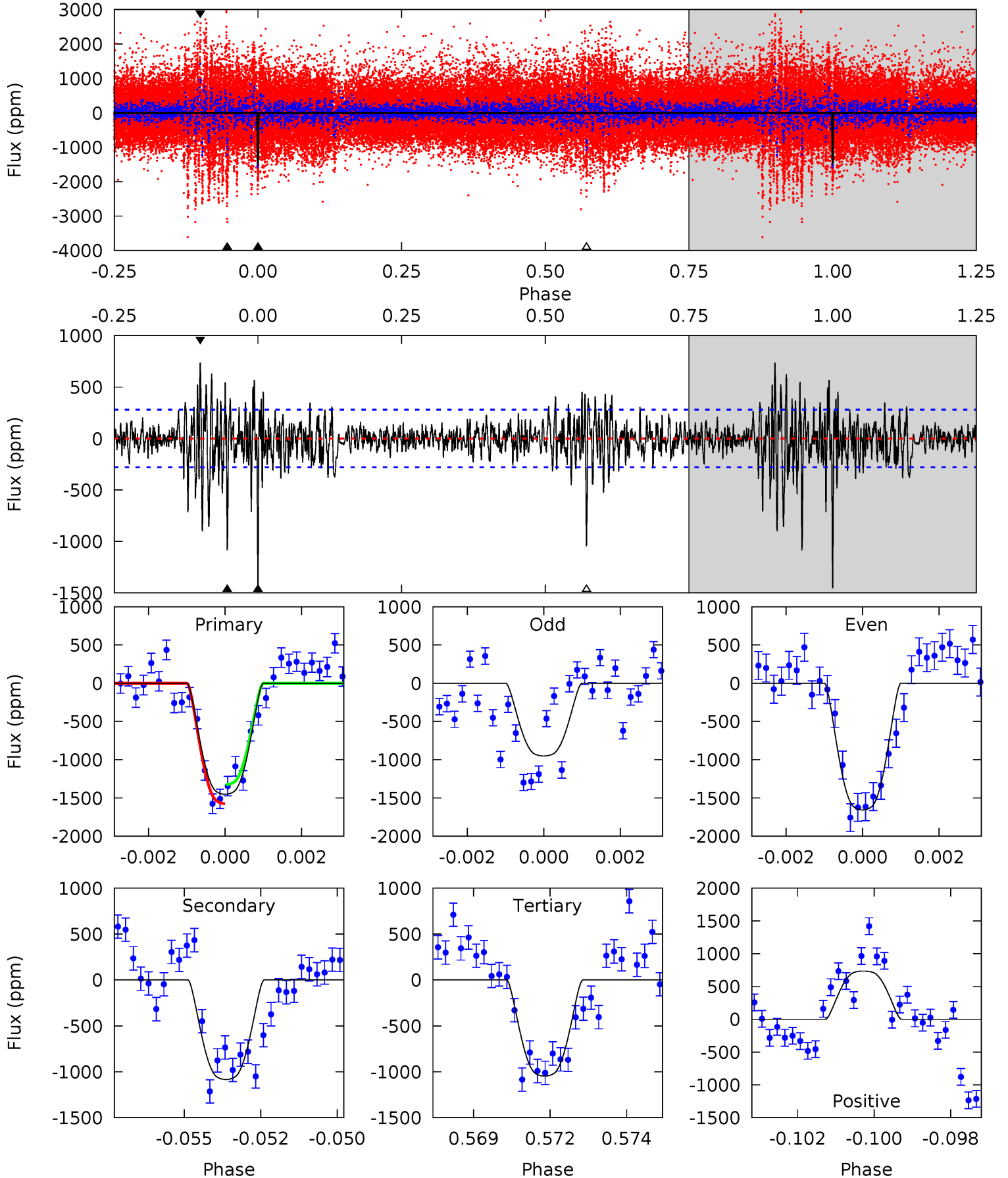
TCE 010402172-03 $P=375.582455$ Days $T_0=296.169302$ (BKJD)



DV Model-Shift Uniqueness Test

010402172-03, P = 375.593915 Days, E = 296.148030 Days

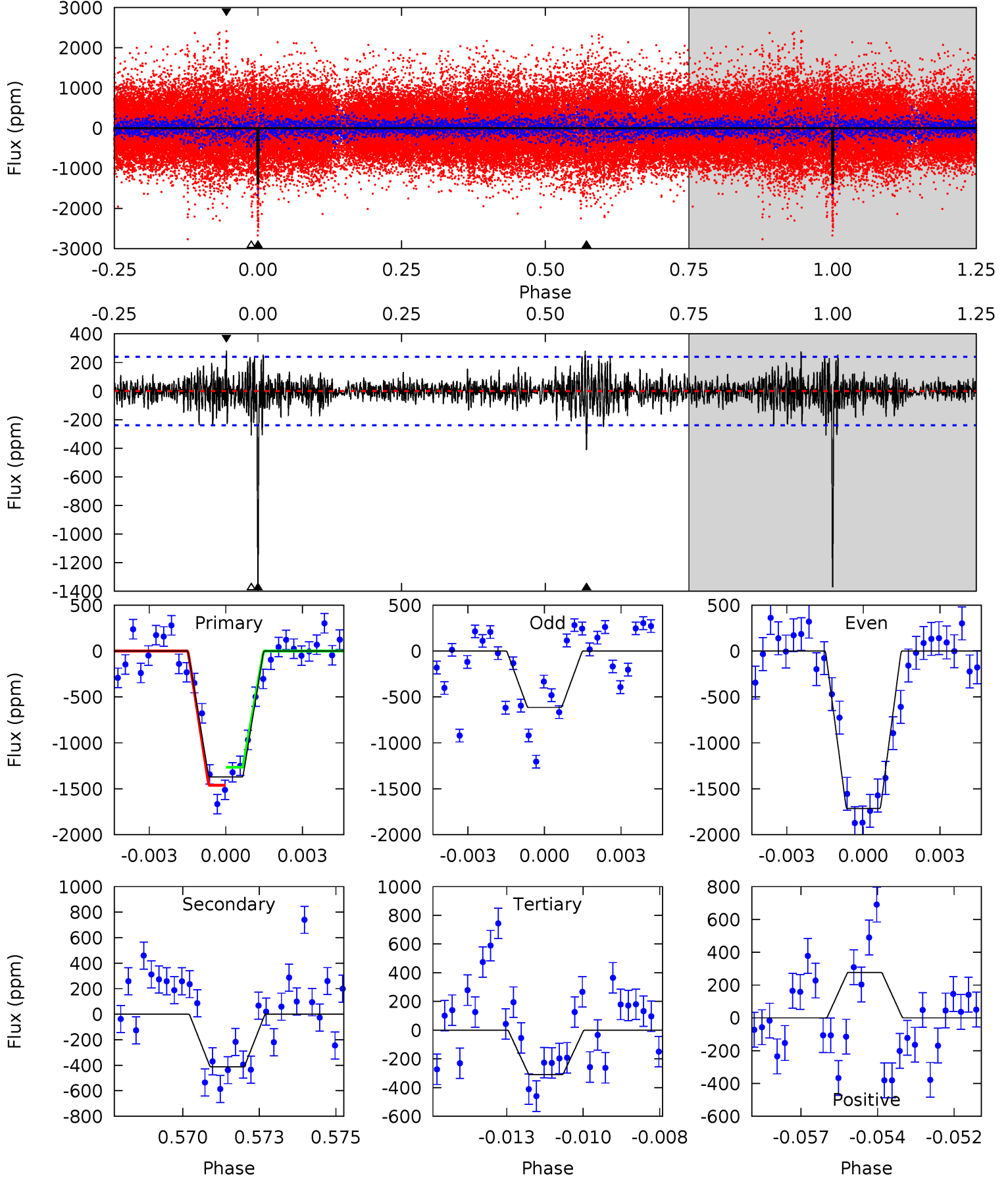
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.5	20.5	19.8	13.9	5.29	3.04	3.05	7.67	13.6	0.70	6.61	6.24	0.88	0.34	2.34



Alt Model-Shift Uniqueness Test

010402172-03, P = 375.582455 Days, E = 296.169302 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.2	9.09	6.81	6.12	5.28	3.01	1.44	23.4	24.1	2.28	2.97	11.5	0.99	0.17	2.18



Stellar Parameters For KIC 010402172

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5635^{+169}_{-152}	$4.612^{+0.032}_{-0.128}$	$-0.500^{+0.300}_{-0.300}$	$0.737^{+0.137}_{-0.055}$	$0.839^{+0.078}_{-0.096}$	$2.954^{+0.470}_{-1.109}$
	+3%/-3%	+1%/-3%	+60%/-60%	+19%/-7%	+9%/-11%	+16%/-38%
Source	PHO1	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 010402172-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-1085 ± 53	$3.51^{+0.50}_{-0.42}$	312^{+14}_{-13}	5072^{+284}_{-252}	43589^{+12119}_{-9144}
Alt.	-412 ± 45	$3.09^{+0.46}_{-0.40}$	312^{+15}_{-12}	4382^{+259}_{-206}	21453^{+6747}_{-5230}

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 $A_{obs} \gg 1.0$

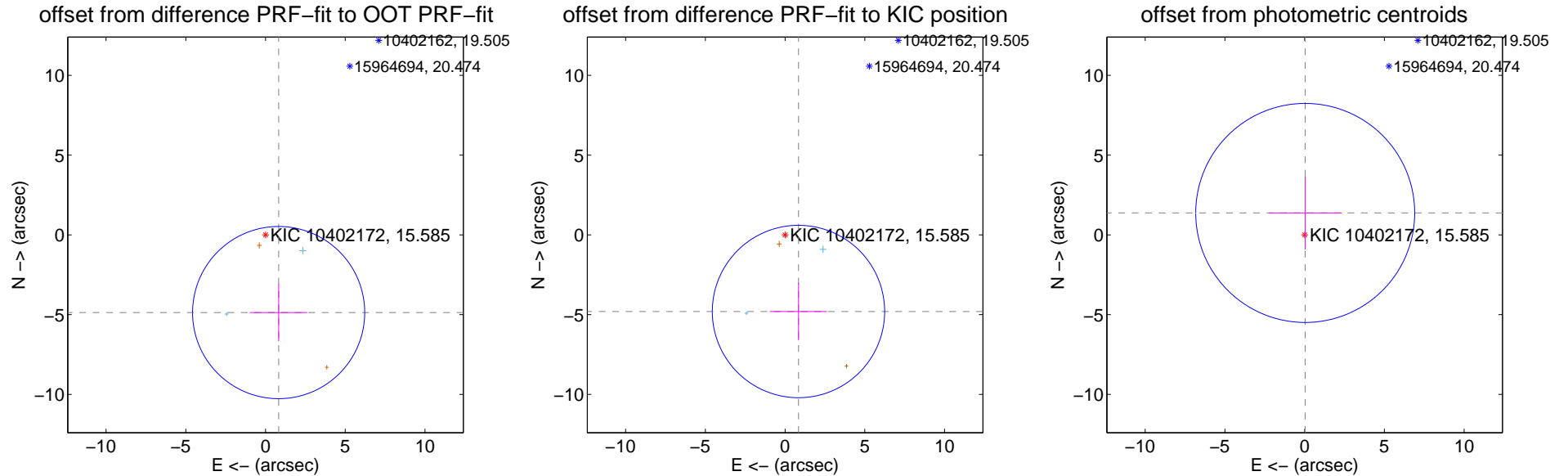
DV Centroid Data

Supplemental centroid analysis for 010402172-03. Kepler magnitude: 15.59. Transit SNR 8.00

There are 2 quarters with good PRF difference image offsets

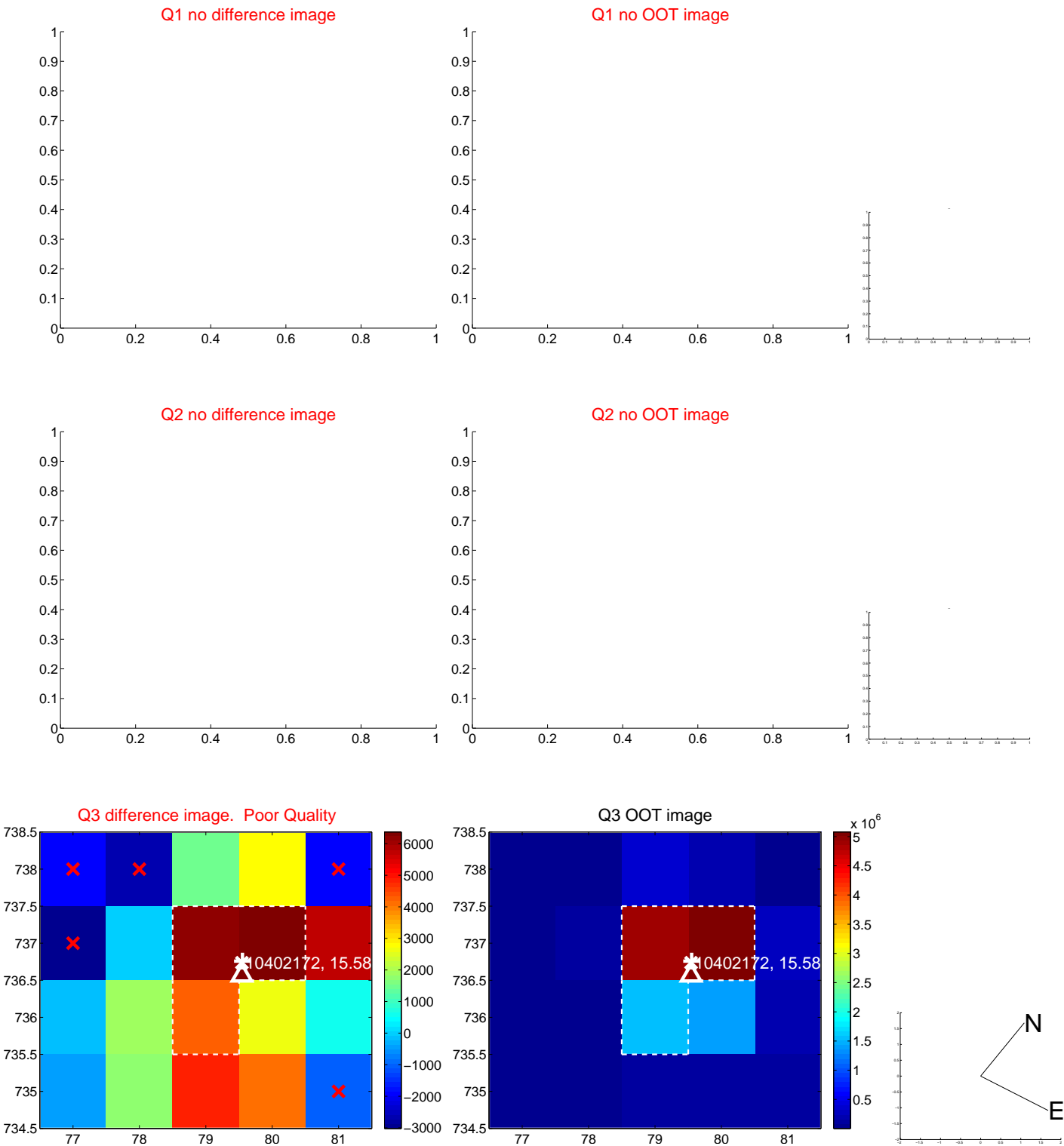
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	4.941 ± 1.799	2.75	-0.822 ± 1.791	-4.872 ± 1.799
PRF-fit source offset from KIC position	4.878 ± 1.801	2.71	-0.840 ± 1.789	-4.805 ± 1.802
photometric centroid source offset	1.38 ± 2.29	0.60	-0.03 ± 2.29	1.37 ± 2.29

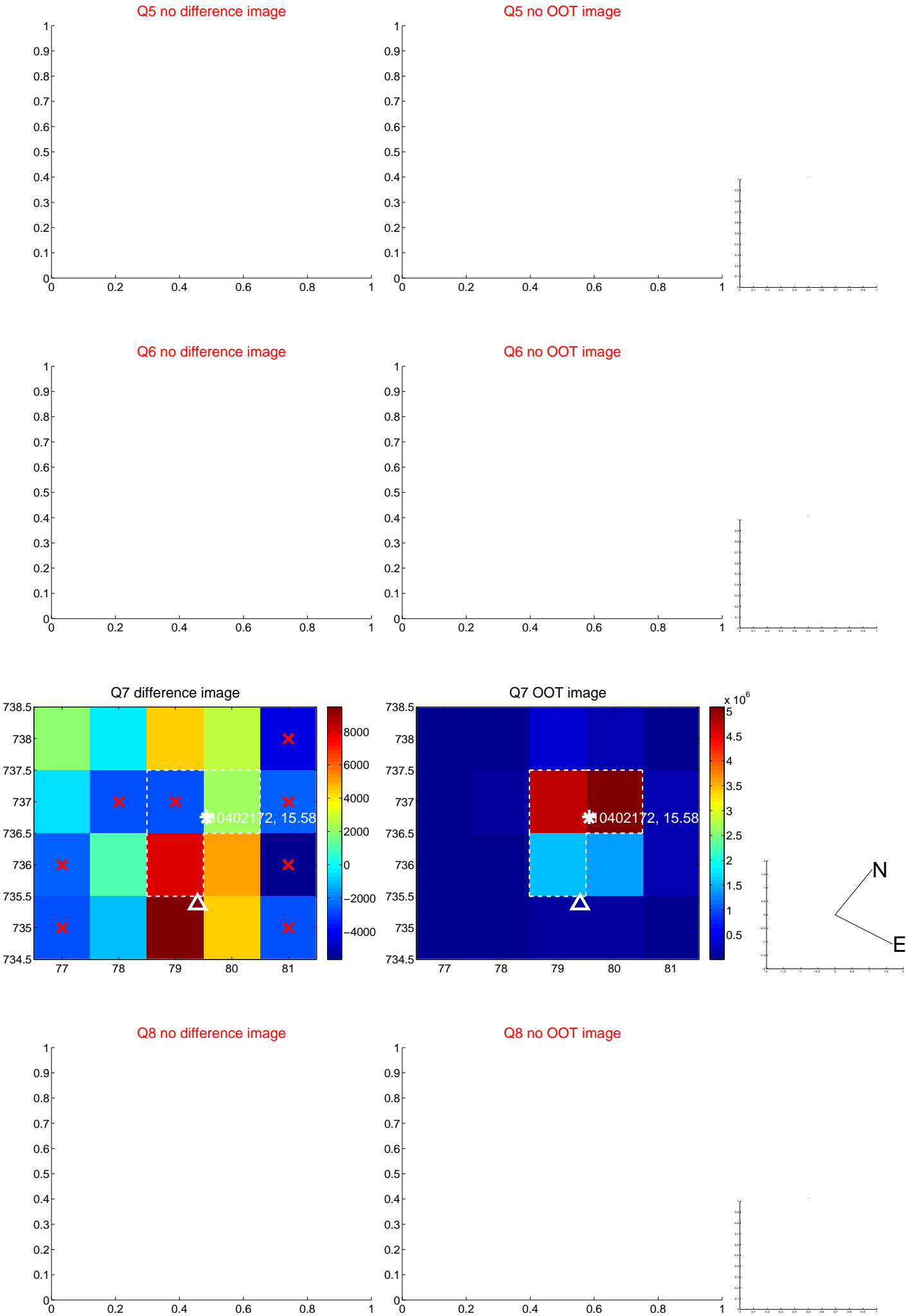


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

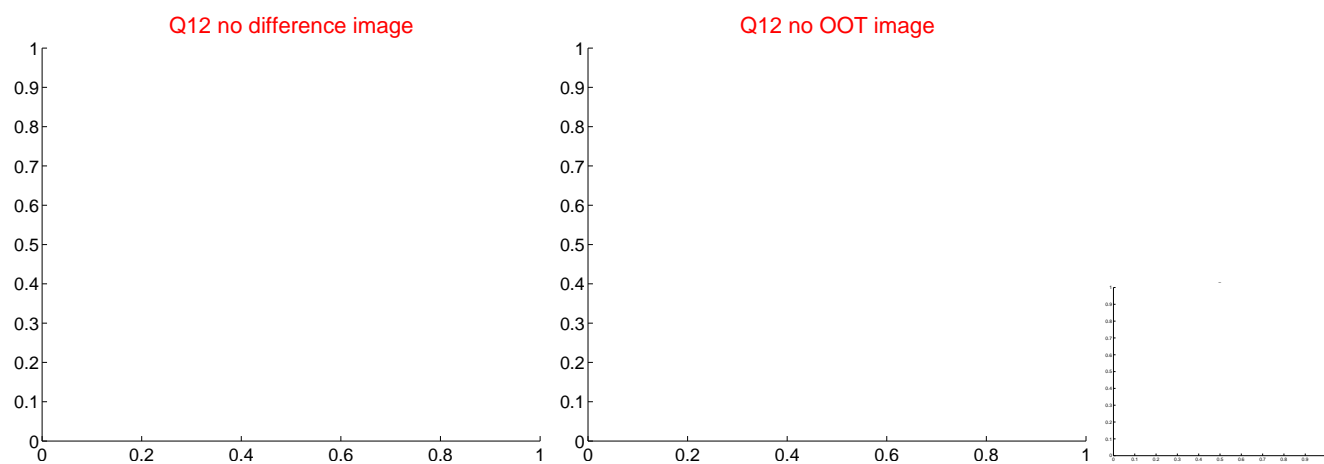
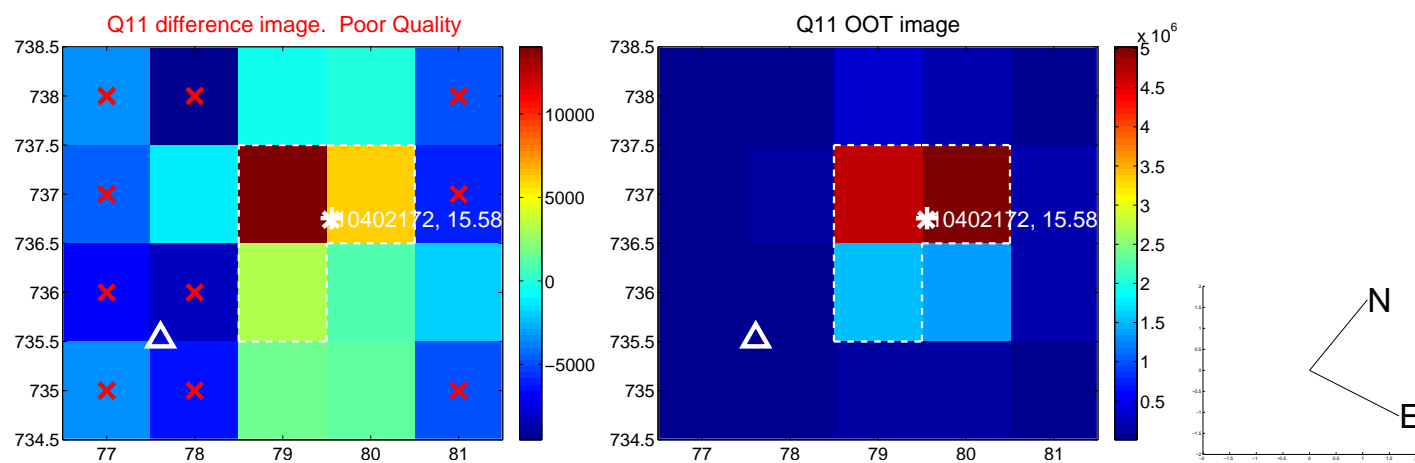
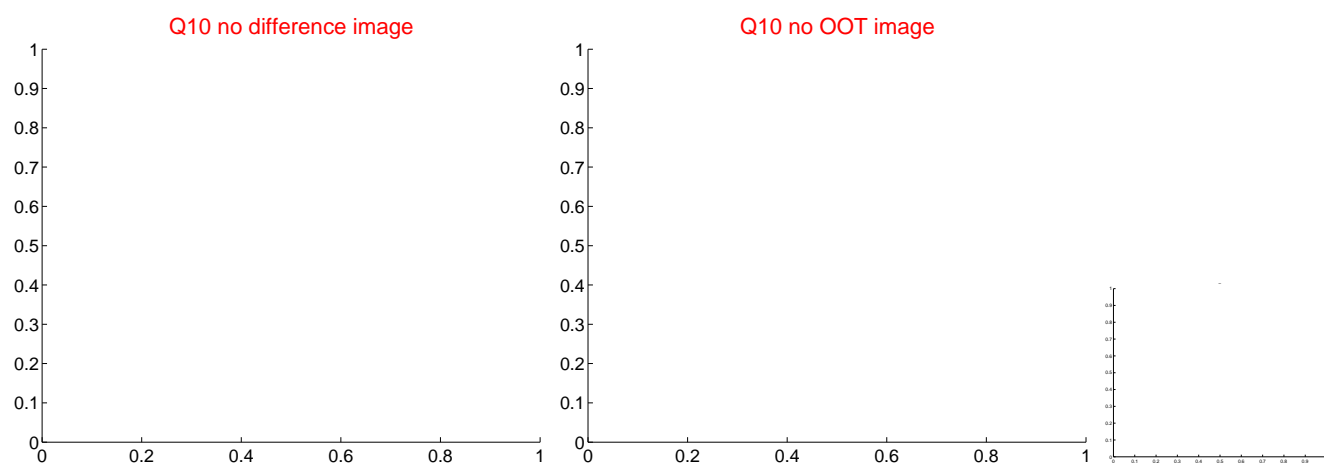
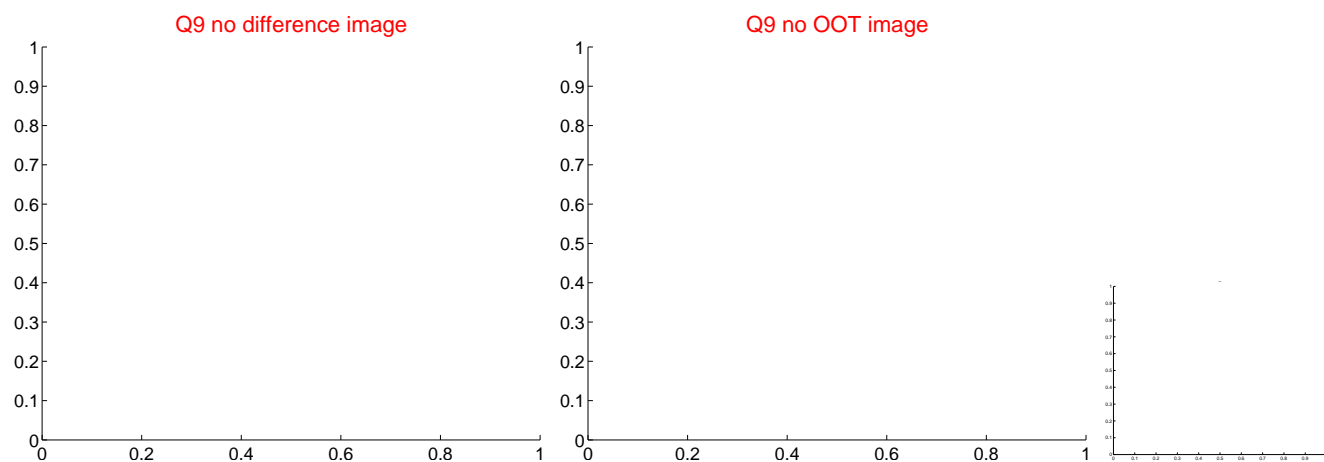
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



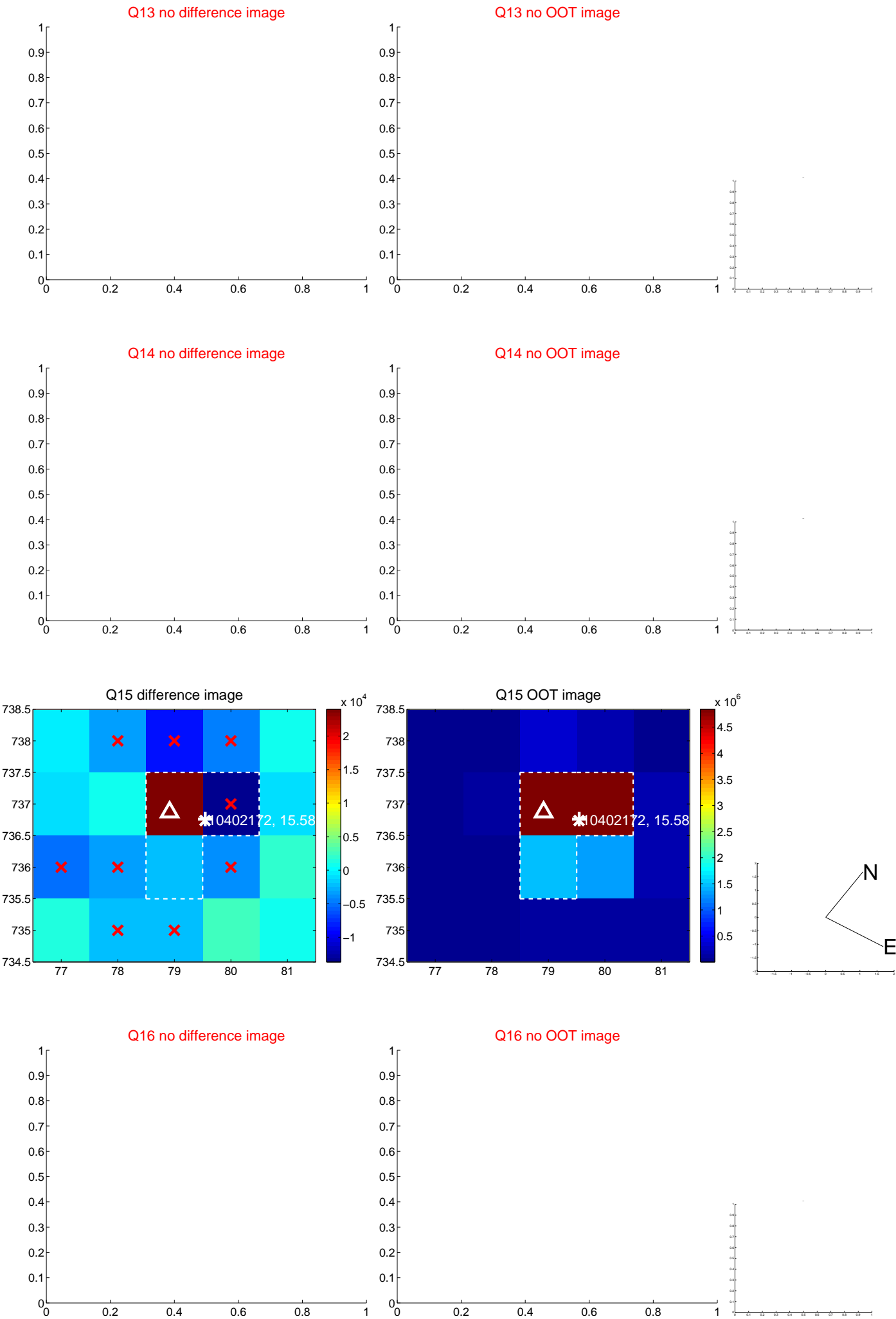
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



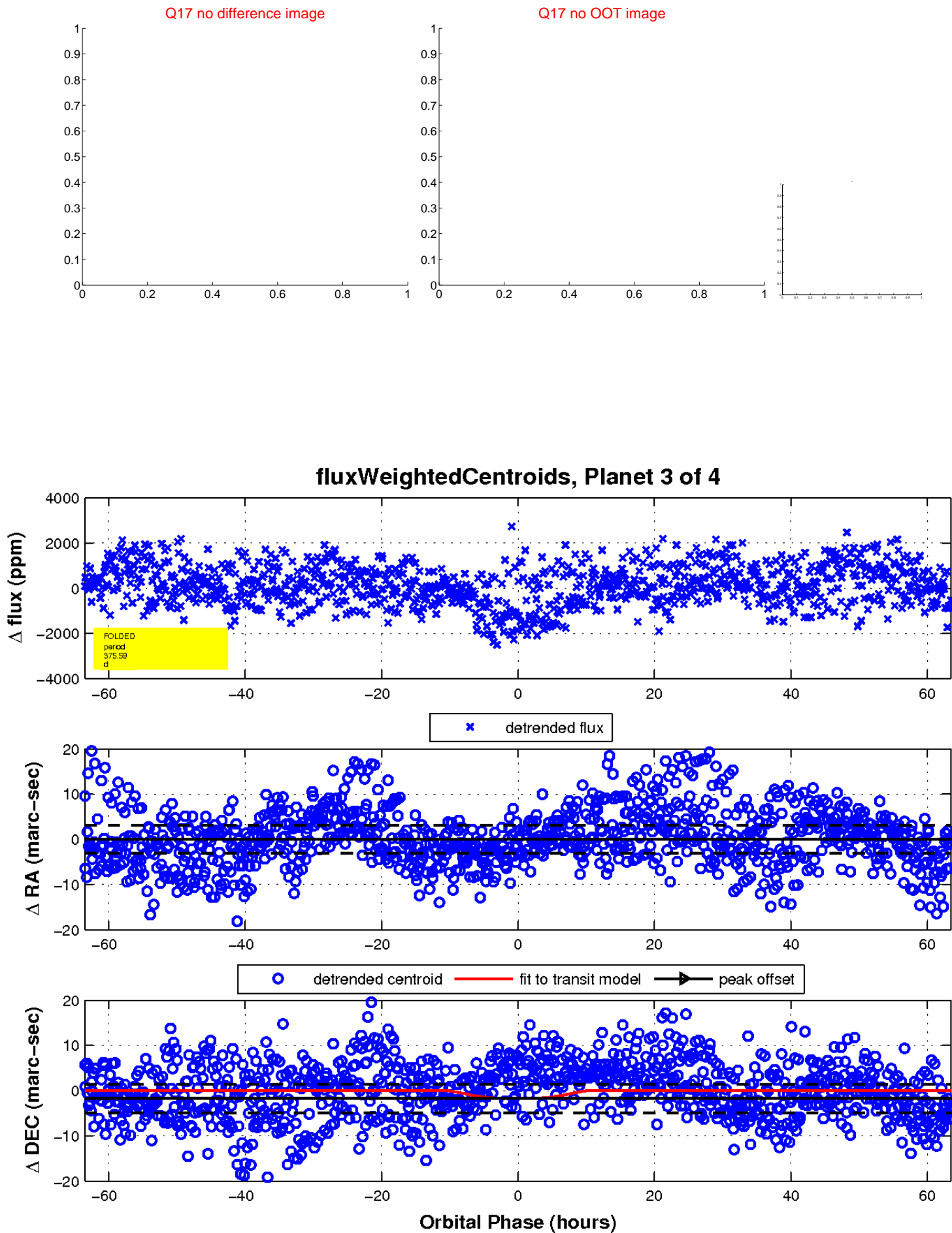
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



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

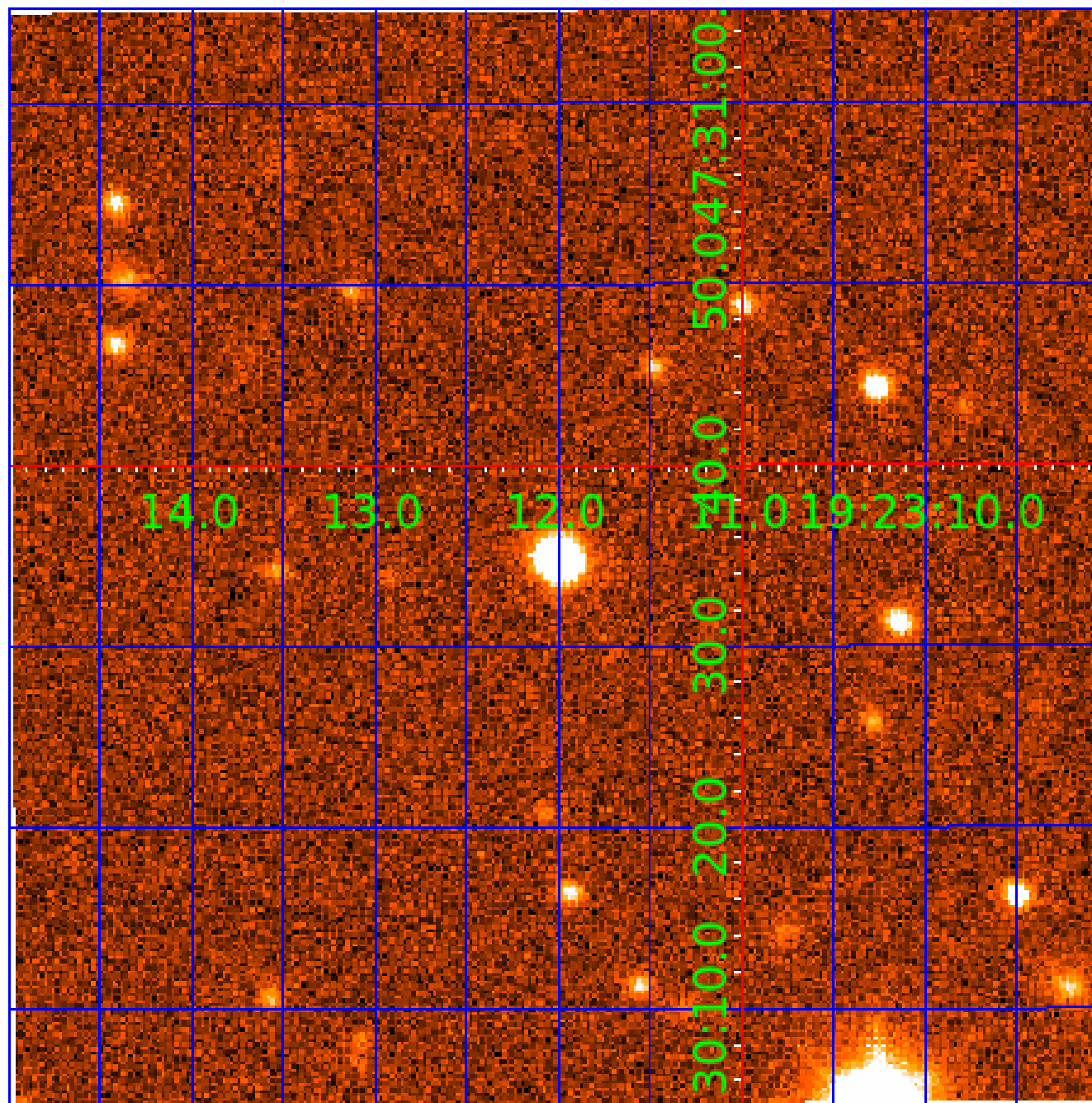


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010402172

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})
010402172-01	OBS	No	373.060101	137.320116	950.8	13.789	7.3	7.2	0.74	5635	2.90	0.55
010402172-02	OBS	No	412.159807	186.689774	1076.5	31.189	8.5	9.6	0.74	5635	3.16	0.48
010402172-03	OBS	No	375.593915	296.148030	1304.4	21.174	7.5	8.0	0.74	5635	3.39	0.54
010402172-04	OBS	No	226.022403	346.609243	877.5	3.046	7.2	6.7	0.74	5635	2.35	1.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010402172-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—CENT_FEW_DIFFS
010402172-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010402172-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—CENT_FEW_DIFFS
010402172-04	OBS	FP	0.08	1	0	0	0	MOD_NONUNIQ_ALT—CENT_FEW_DIFFS

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

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

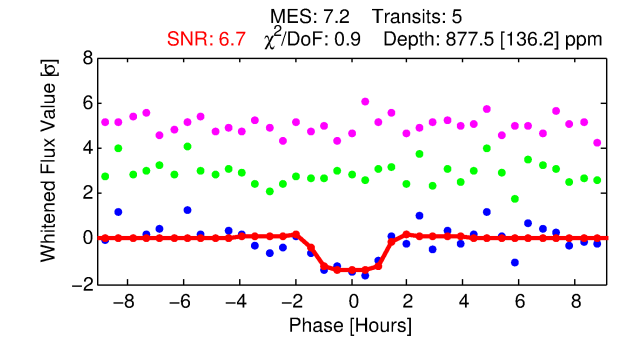
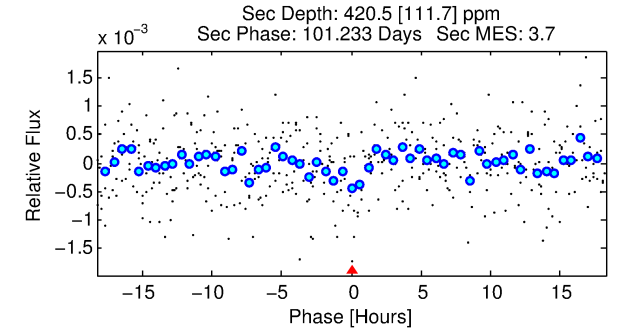
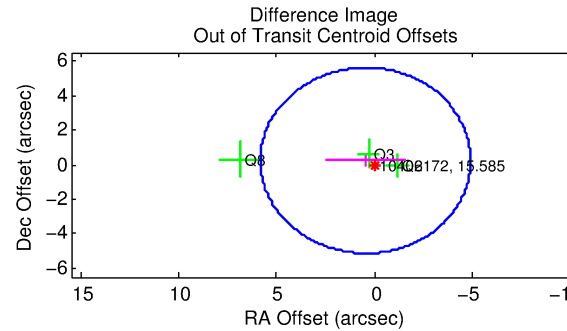
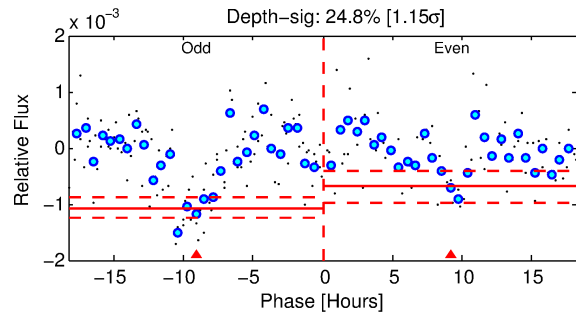
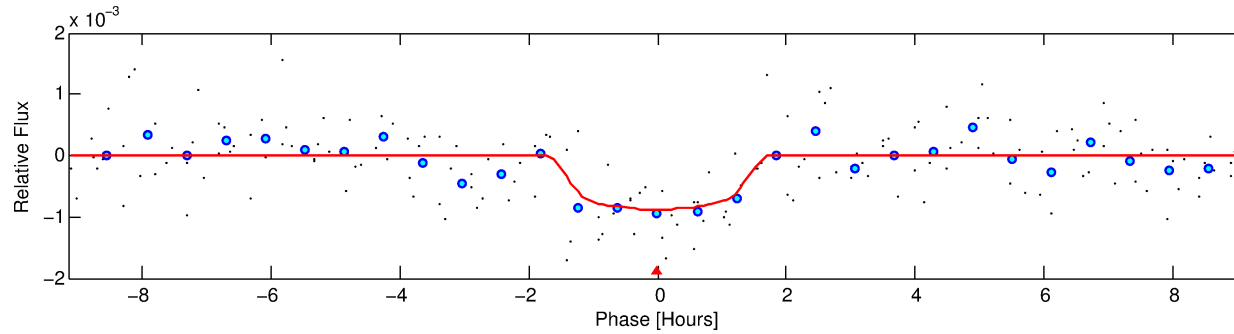
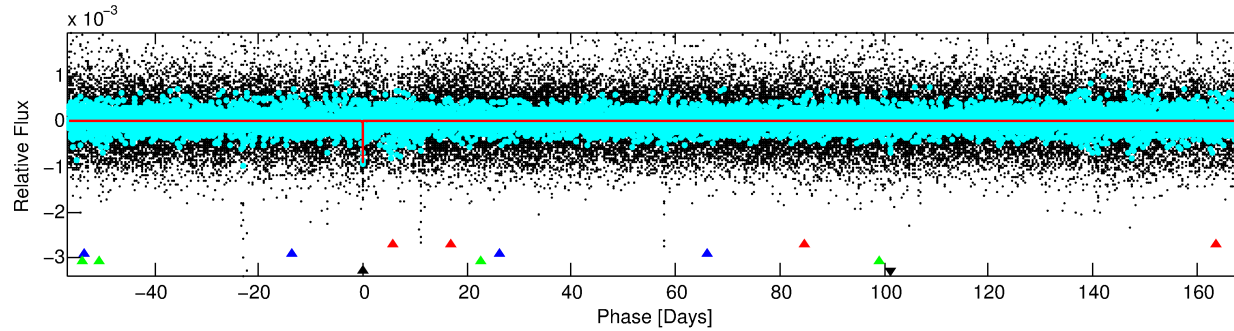
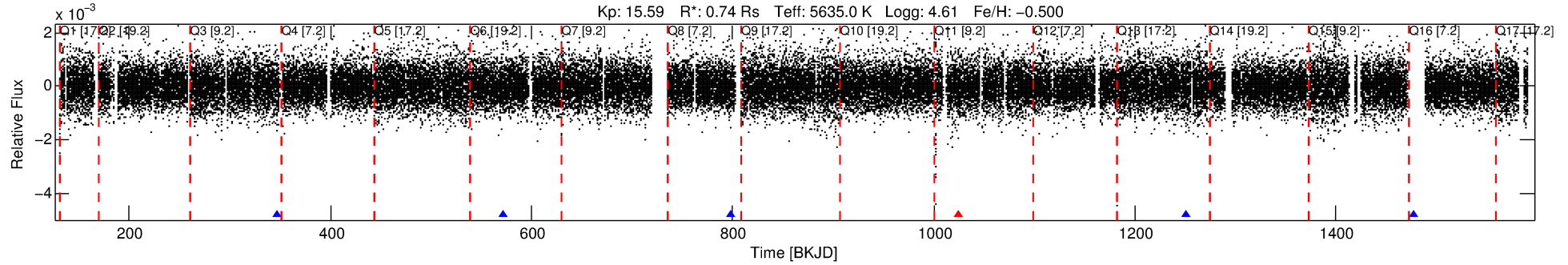
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010402172-04

No Significant Match Found

DV One-Page Summary

KIC: 10402172 Candidate: 4 of 4 Period: 226.022 d



DV Fit Results:

Period = 226.02240 [0.00354] d
Epoch = 346.6092 [0.0084] BKJD
Rp/R* = 0.0292 [0.0412]
a/R* = 415.35 [2675.63]
b = 0.72 [4.32]
Seff = 1.07 [0.28]
Teq = 259 [17] K
Rp = 2.35 [3.34] Re
a = 0.6773 [0.1071] AU
Ag = 19213.62 [54616.94] [0.35 σ]
Teffp = 4720 [3346] K [1.33 σ]

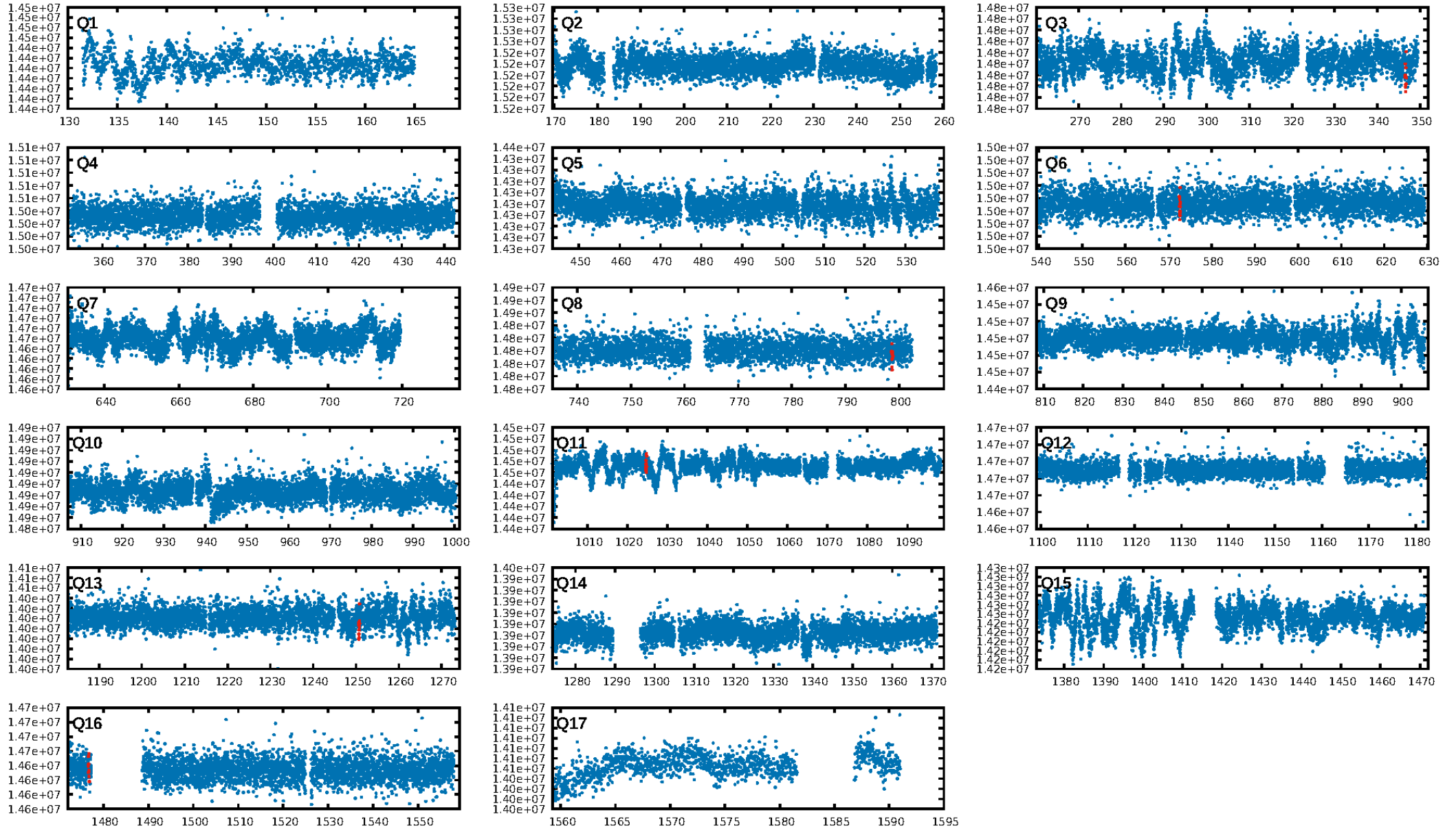
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [249.90 σ]
ModelChiSquare2-sig: 46.7%
ModelChiSquareGof-sig: 99.6%
Bootstrap-pfa: 1.75e-11
RollingBand-fgt: 0.80 [4/5]
GhostDiagnostic-chr: -3.525
Centroid-sig: 16.8%
Centroid-so: 3.005 arcsec [1.11 σ]
OotOffset-rm: 0.515 arcsec [0.29 σ]
OotOffset-st: 1/1/1/0 [3]
KicOffset-rm: 0.480 arcsec [0.24 σ]
KicOffset-st: 1/1/1/0 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [5/5]

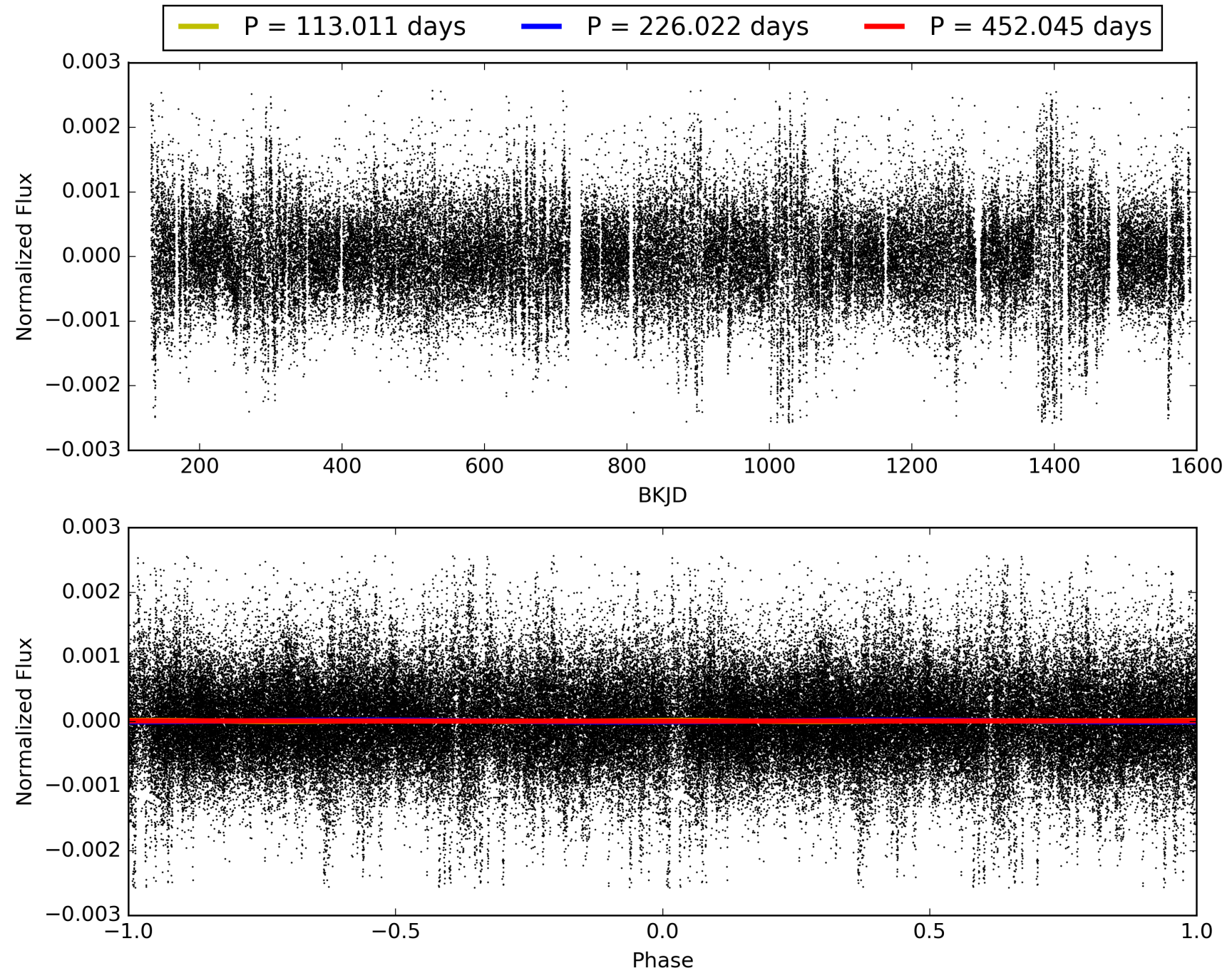
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 09:52:38 Z

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

TCE 010402172-04, PDC Light Curves

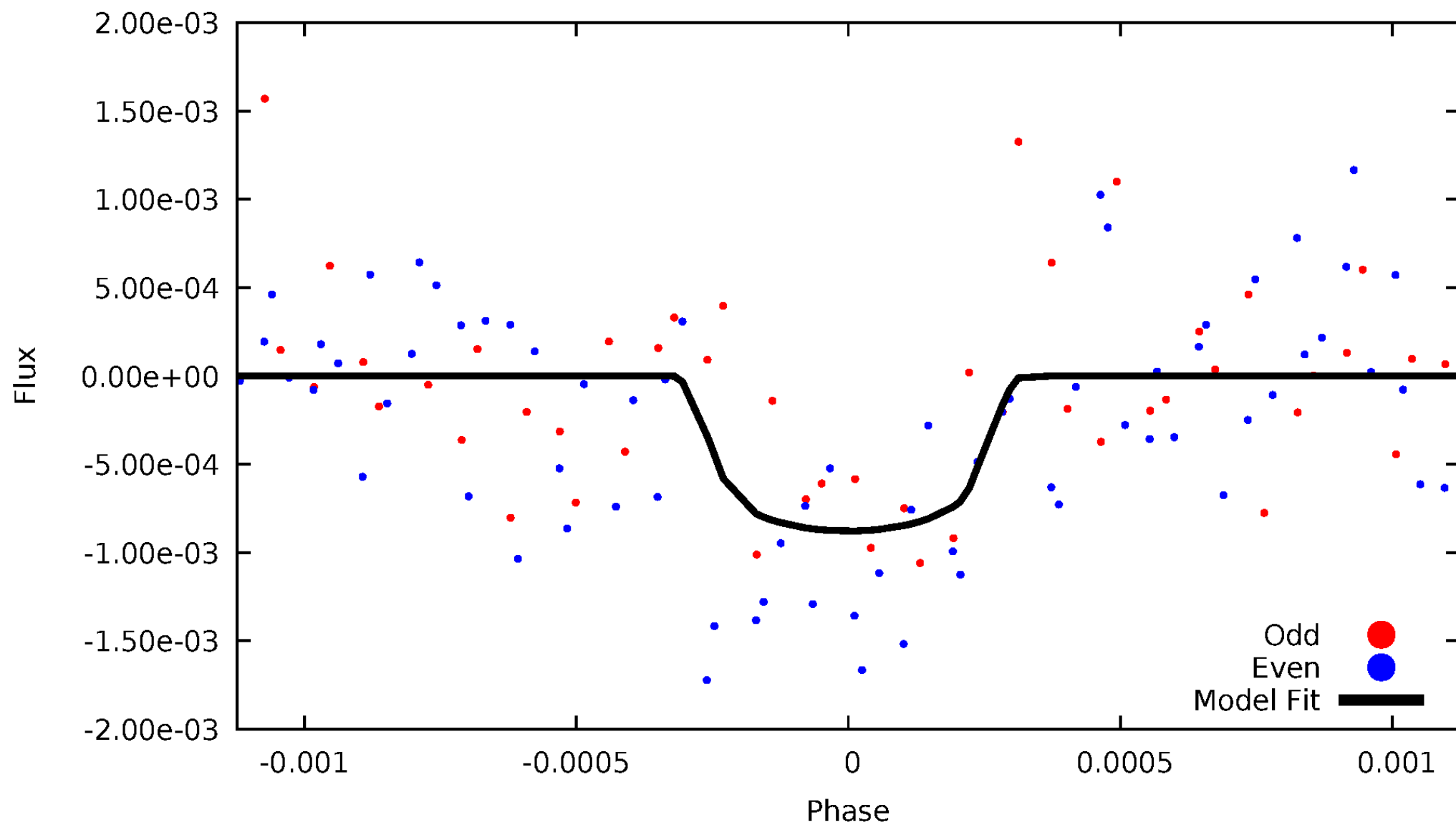


TCE 010402172-04



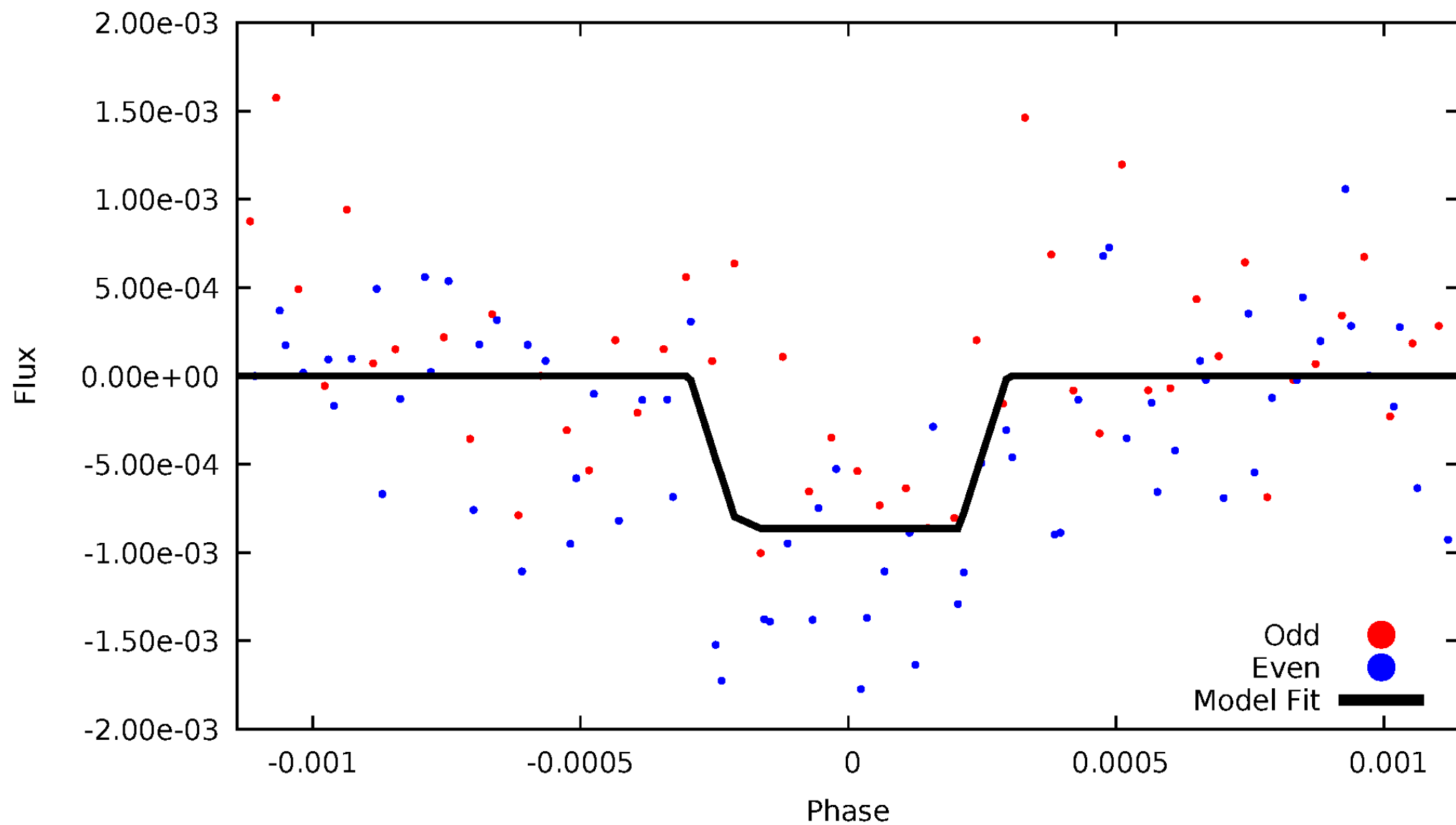
DV Odd/Even

TCE 010402172-04



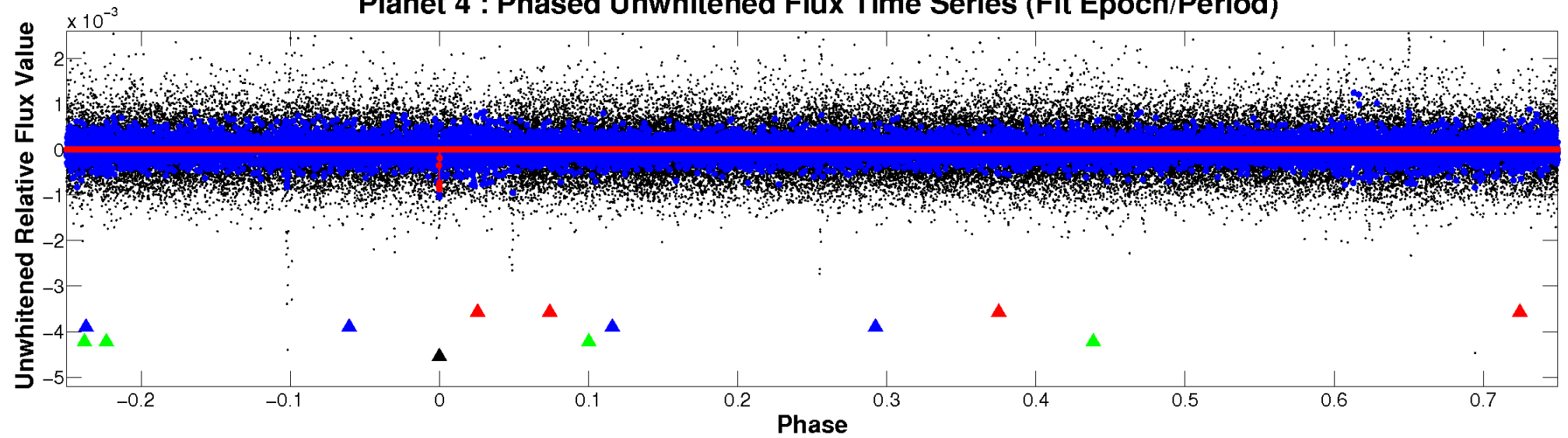
ALT Odd/Even

TCE 010402172-04

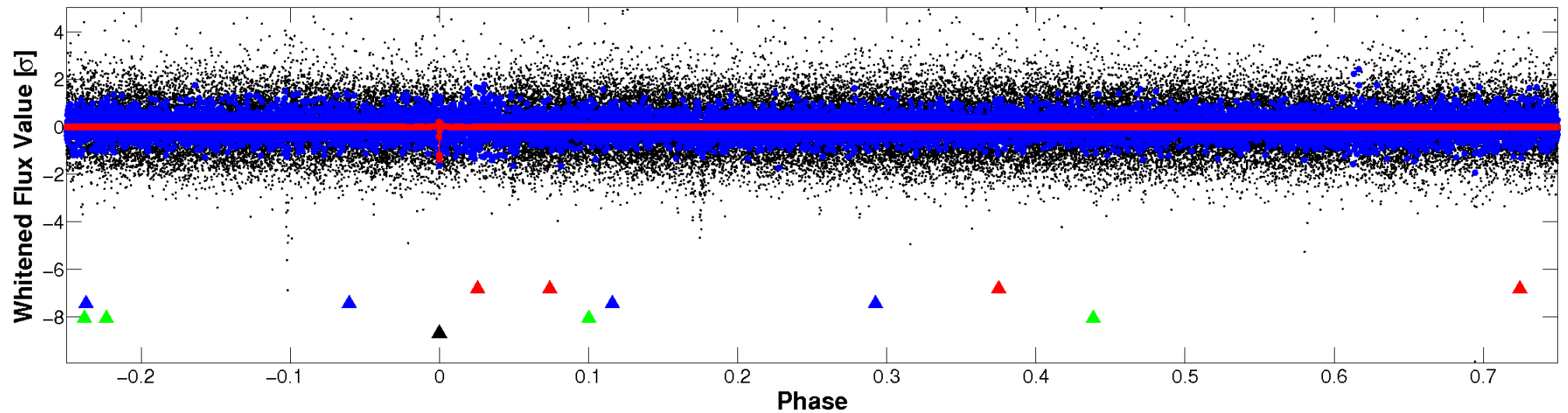


Non-Whitened Vs. Whitened Light Curve

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

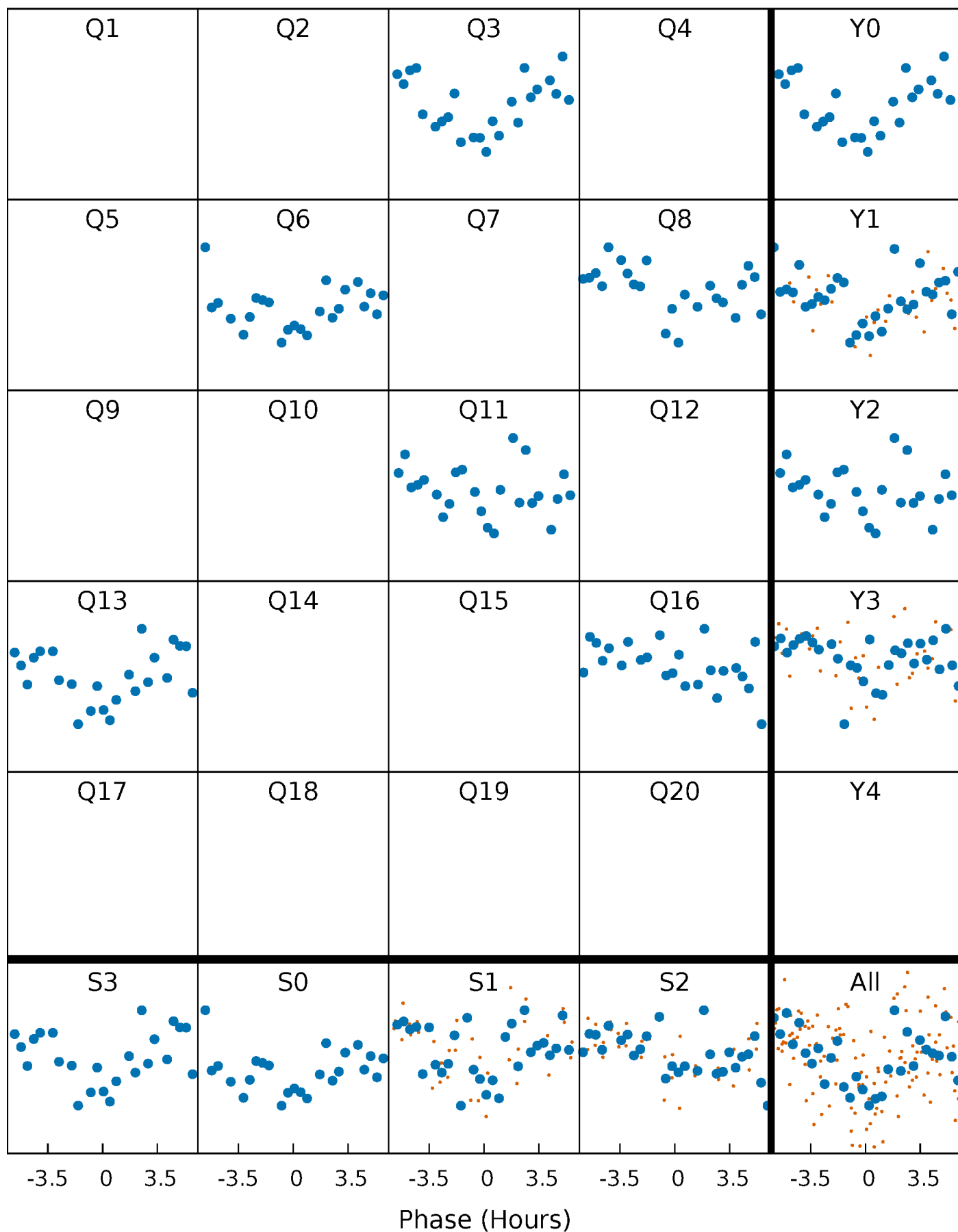


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



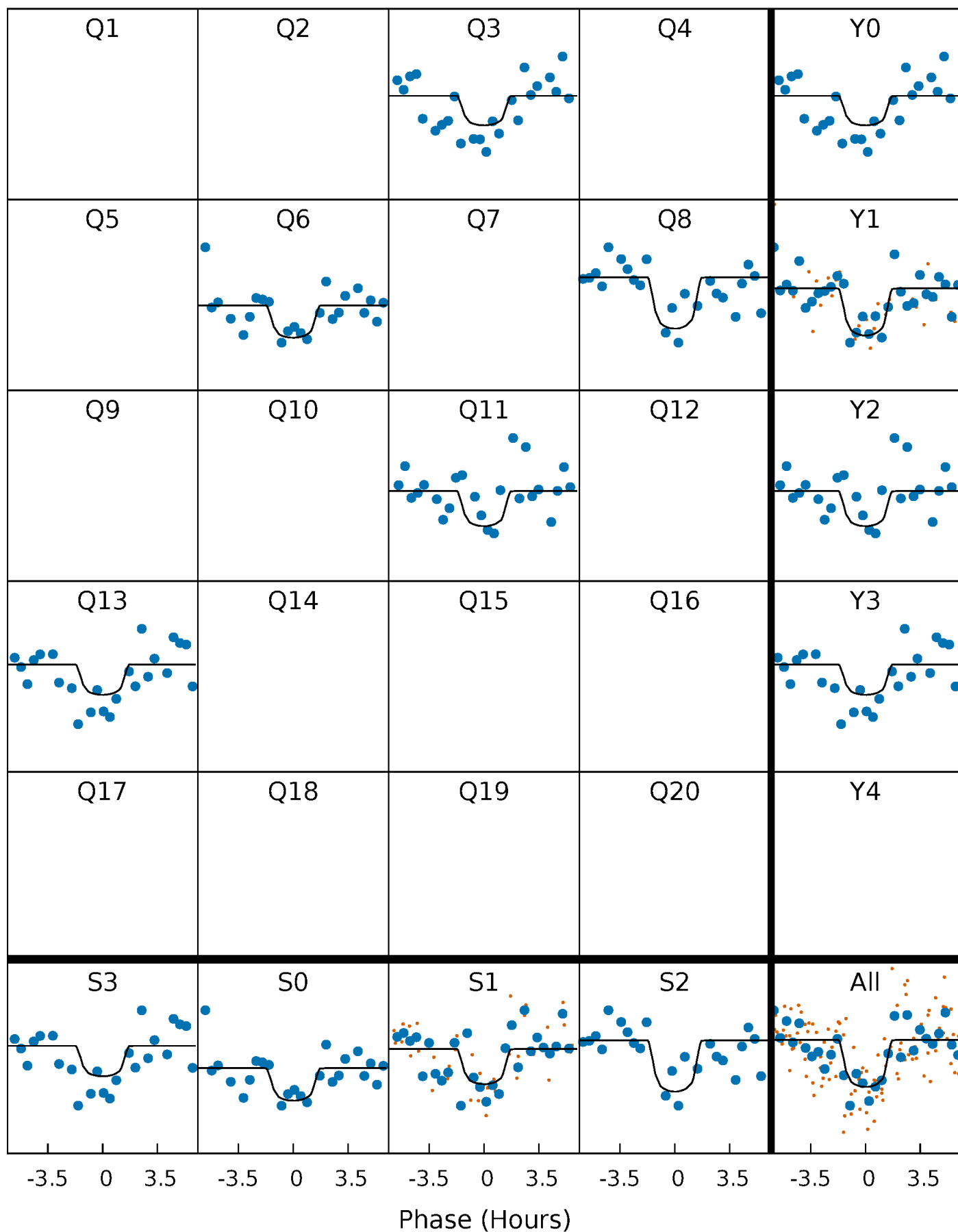
PDC Quarter-Phased Transit Curves

TCE 010402172-04 P=226.022403 Days $T_0=346.609243$ (BKJD)



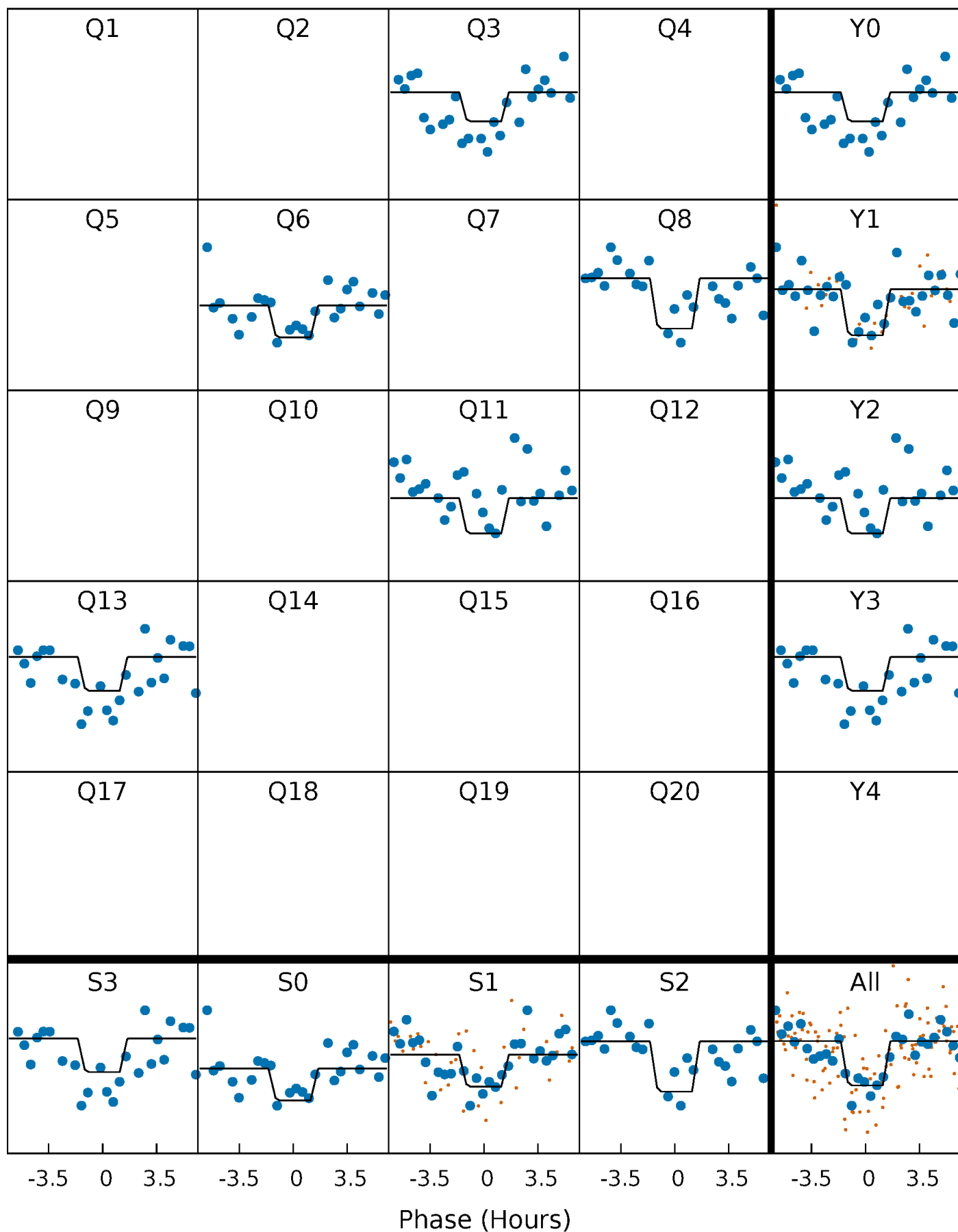
DV Quarter-Phased Transit Curves

TCE 010402172-04 $P=226.022403$ Days $T_0=346.609243$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

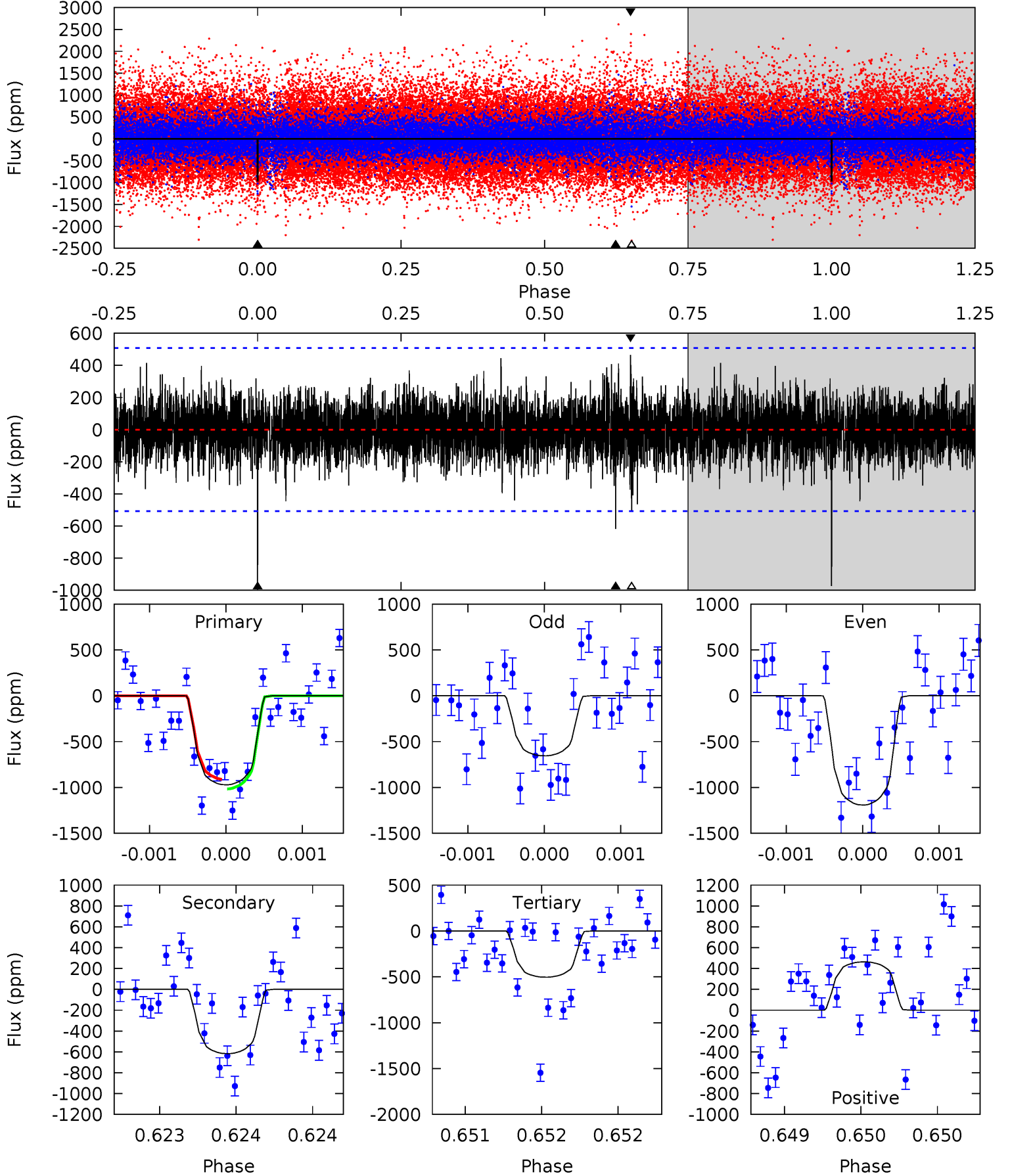
TCE 010402172-04 P=226.021011 Days $T_0=346.609559$ (BKJD)



DV Model-Shift Uniqueness Test

010402172-04, P = 226.022403 Days, E = 120.586840 Days

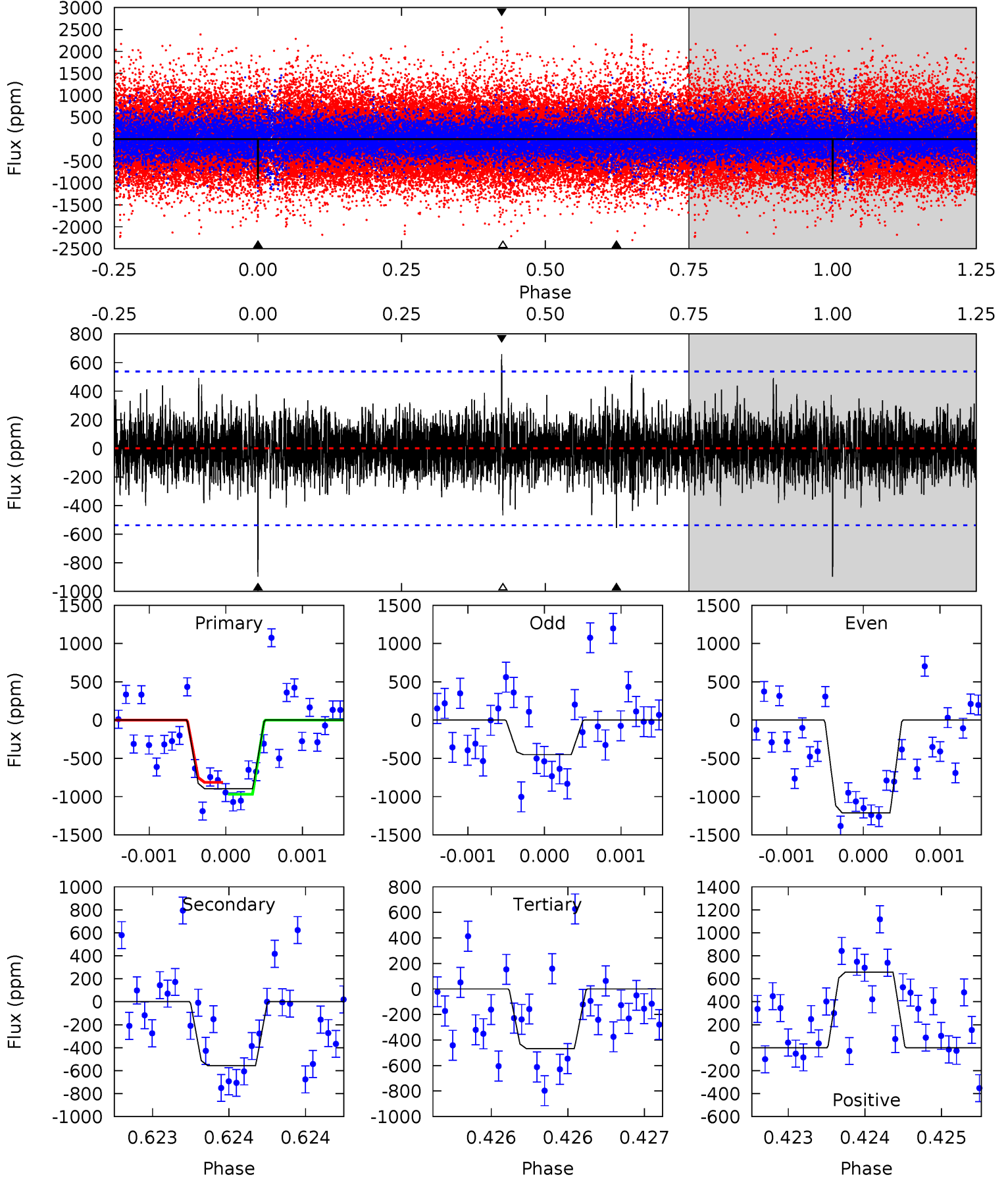
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.6	6.73	5.50	5.06	5.54	3.42	1.25	5.10	5.54	1.23	1.67	2.87	1.21	0.32	0.56



Alt Model-Shift Uniqueness Test

010402172-04, P = 226.021011 Days, E = 120.588548 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.25	5.73	4.83	6.78	5.54	3.44	1.23	4.42	2.46	0.91	-1.05	3.88	1.22	0.42	0.80



Stellar Parameters For KIC 010402172

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5635^{+169}_{-152}	$4.612^{+0.032}_{-0.128}$	$-0.500^{+0.300}_{-0.300}$	$0.737^{+0.137}_{-0.055}$	$0.839^{+0.078}_{-0.096}$	$2.954^{+0.470}_{-1.109}$
	+3%/-3%	+1%/-3%	+60%/-60%	+19%/-7%	+9%/-11%	+16%/-38%
Source	PHO1	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 010402172-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-617 ± 92	$3.43^{+3.30}_{-2.12}$	369^{+17}_{-14}	4560^{+2892}_{-947}	13210^{+88666}_{-9640}
Alt.	-555 ± 97	$3.61^{+2.92}_{-2.36}$	371^{+17}_{-14}	4393^{+2706}_{-846}	10658^{+80203}_{-7415}

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 $A_{obs} \gg 1.0$

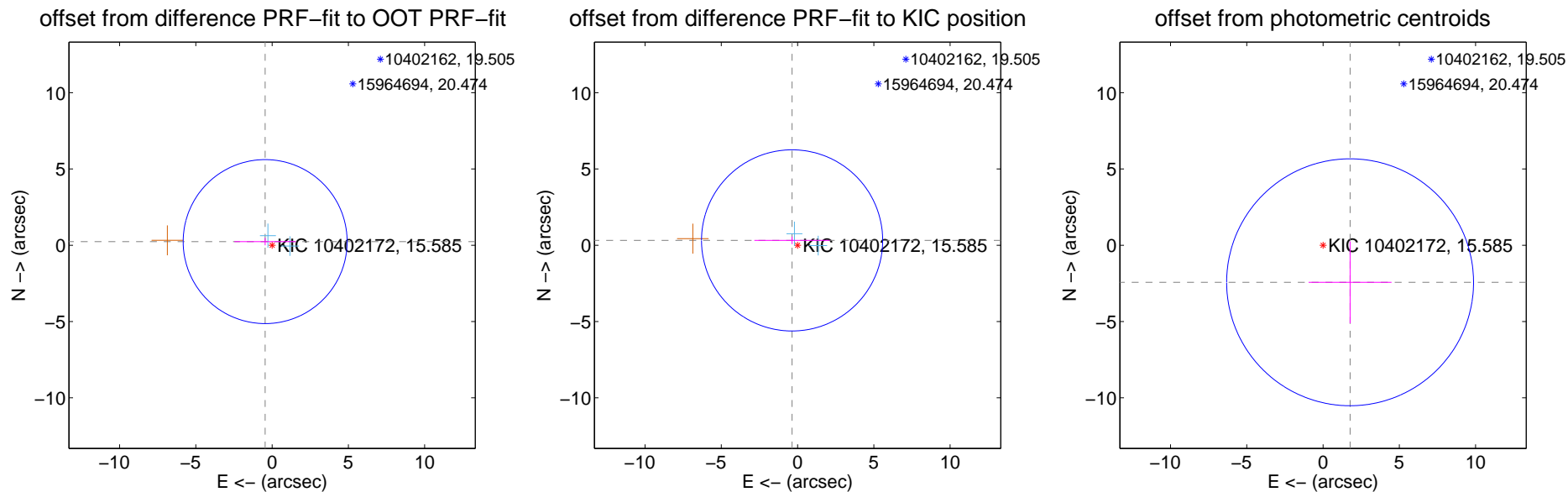
DV Centroid Data

Supplemental centroid analysis for 010402172-04. Kepler magnitude: 15.59. Transit SNR 6.66

There are 2 quarters with good PRF difference image offsets

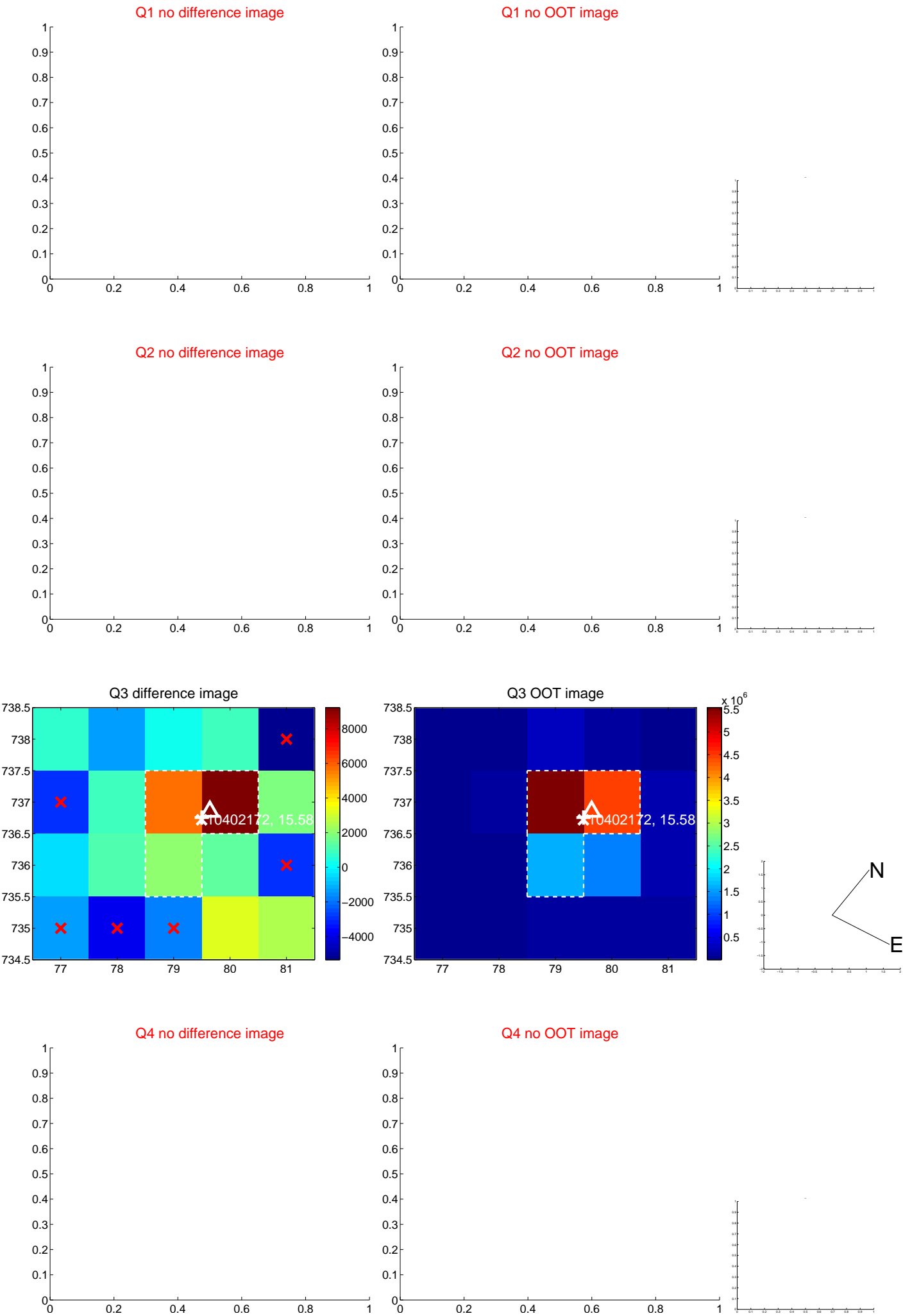
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.515 ± 1.791	0.29	0.456 ± 2.018	0.239 ± 0.240
PRF-fit source offset from KIC position	0.480 ± 1.979	0.24	0.360 ± 2.470	0.318 ± 0.247
photometric centroid source offset	3.01 ± 2.70	1.11	-1.77 ± 2.72	-2.43 ± 2.68

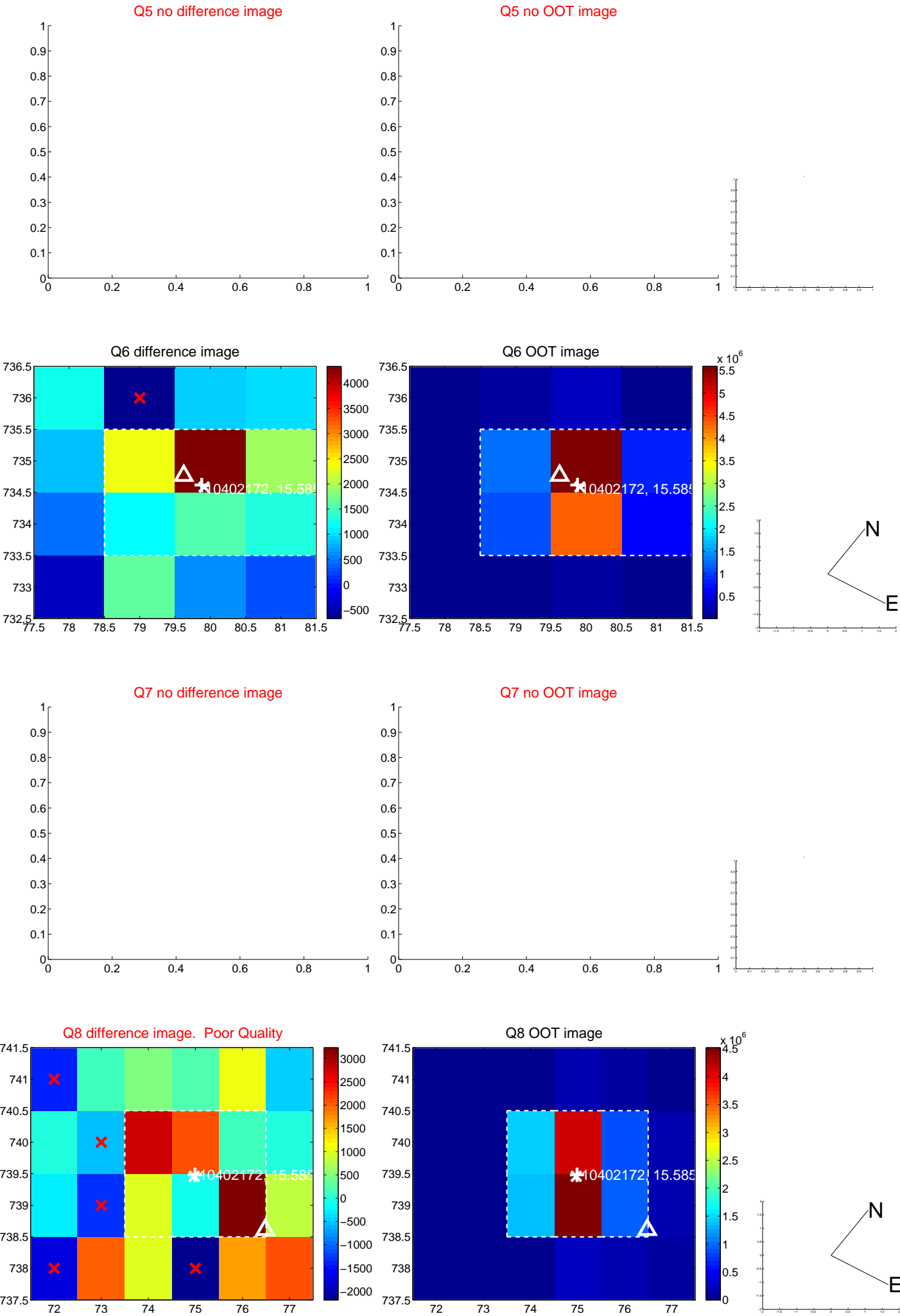


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

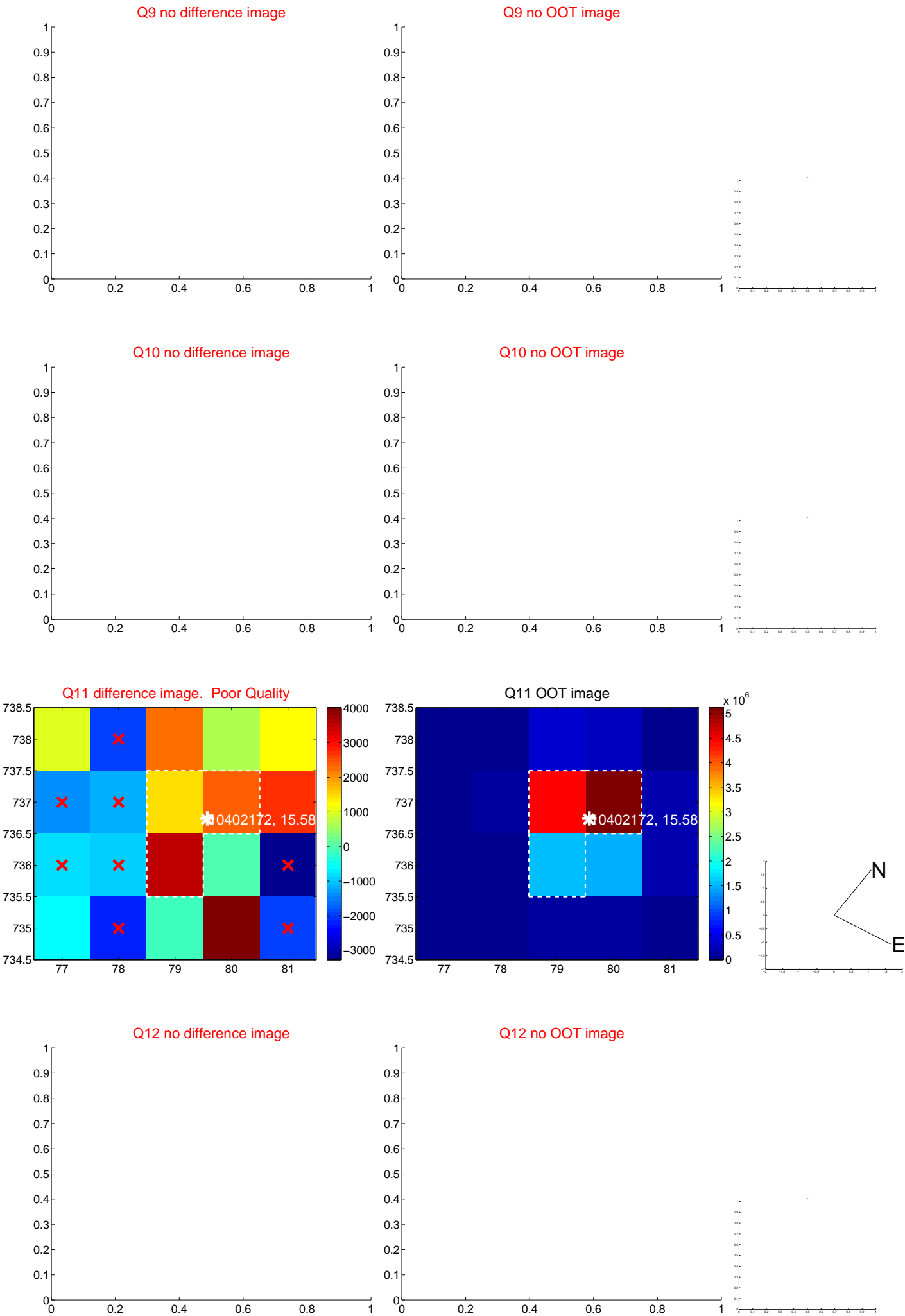
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



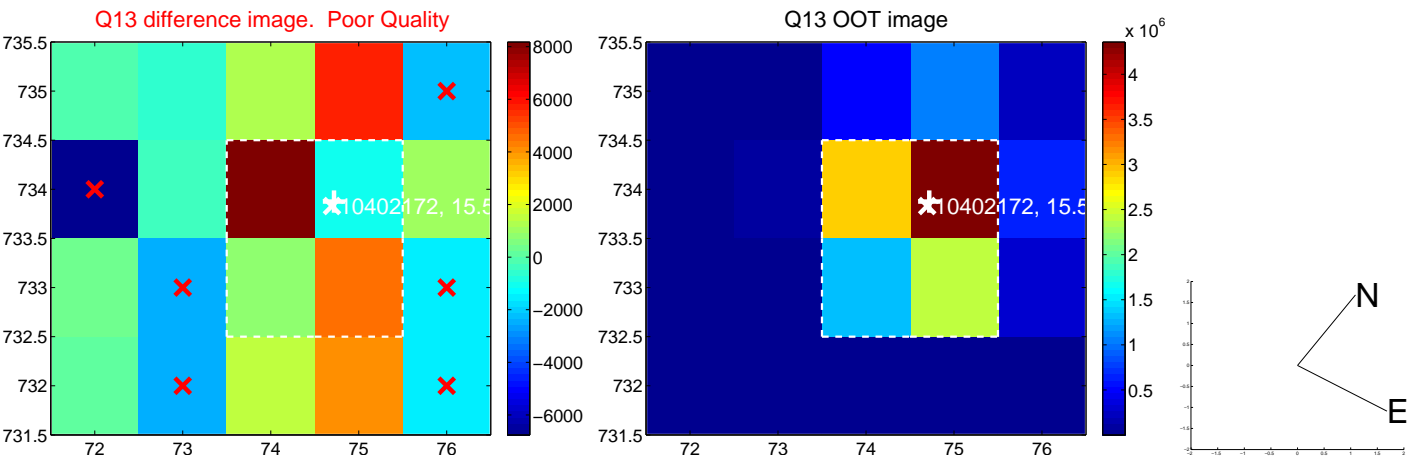
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



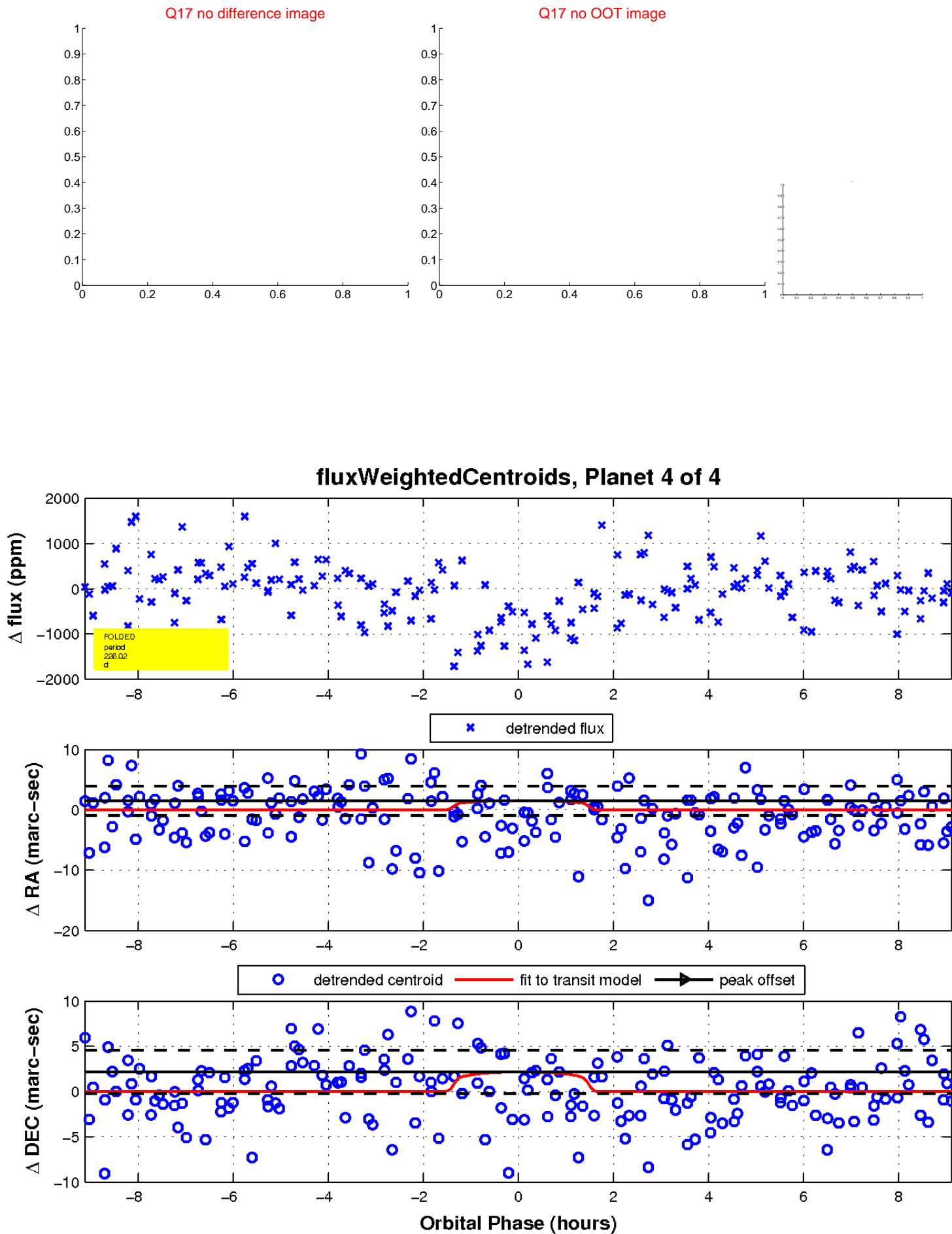
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



UKIRT Image

Declination

