

KIC 010973465

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})
010973465-01	OBS	No	299.745309	143.386954	1772.2	7.468	13.6	6.0	0.67	5174	2.89	0.50
010973465-02	OBS	No	2.200152	132.938860	158.7	10.508	11.6	7.2	0.67	5174	0.84	349.50
010973465-03	OBS	No	321.090074	226.155490	2214.5	1.057	15.0	5.4	0.67	5174	3.31	0.46
010973465-04	OBS	No	241.159409	145.286042	1387.2	4.452	14.9	5.5	0.67	5174	2.58	0.67

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010973465-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
010973465-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
010973465-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010973465-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS

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

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

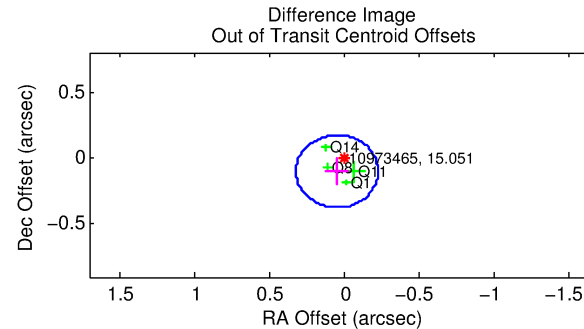
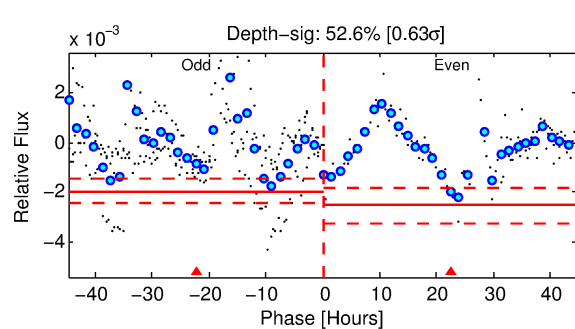
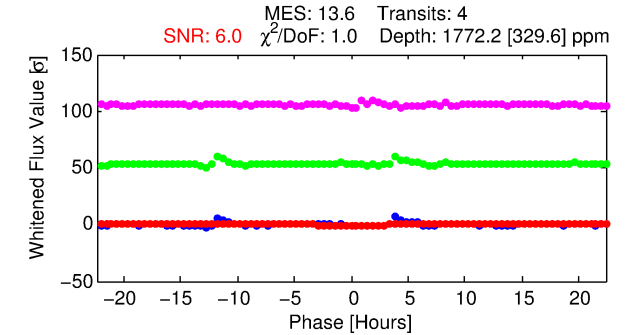
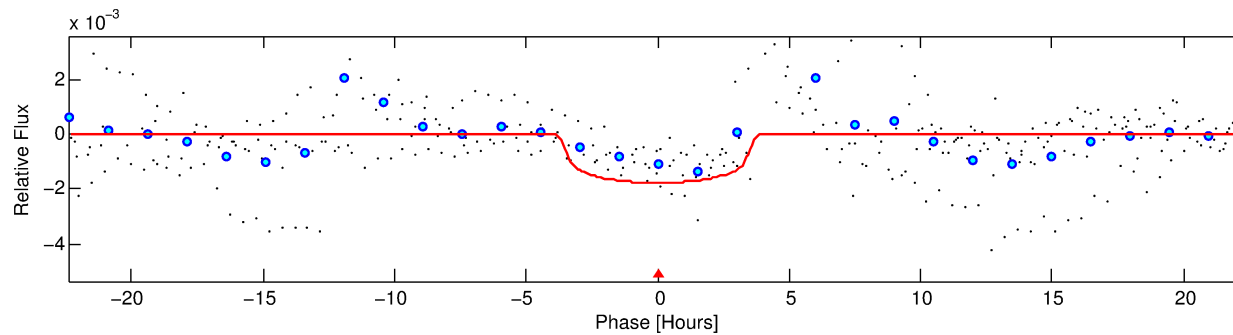
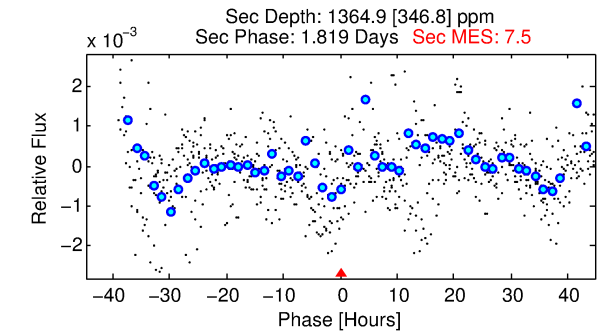
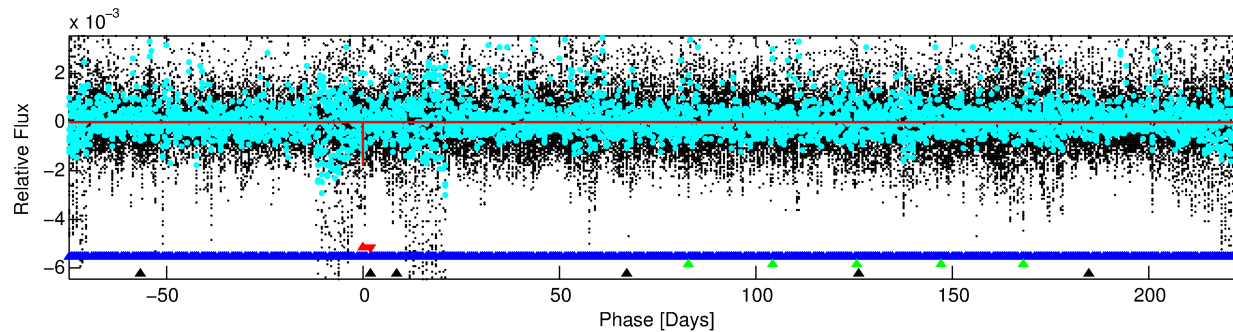
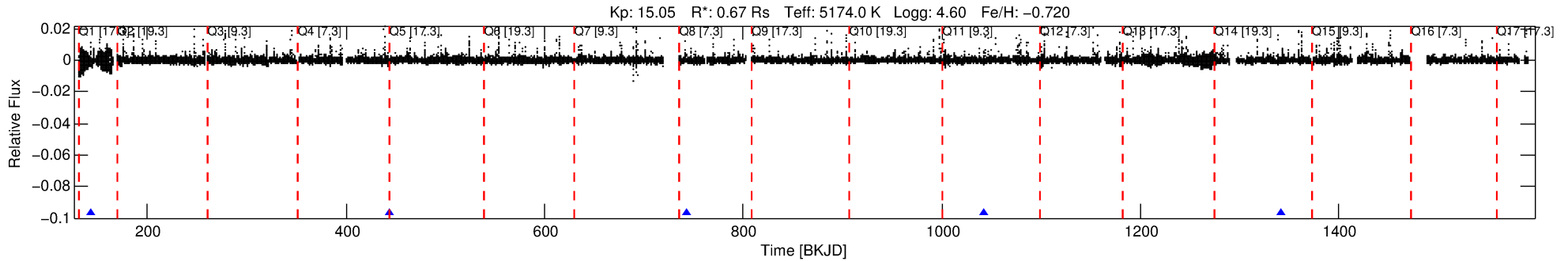
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010973465-01

No Significant Match Found

DV One-Page Summary

KIC: 10973465 Candidate: 1 of 4 Period: 299.745 d



DV Fit Results:

Period = 299.74531 [0.00262] d
Epoch = 143.3870 [0.0072] BKJD
Rp/R* = 0.0397 [0.0158]
a/R* = 268.09 [399.94]
b = 0.56 [1.82]
Seff = 0.50 [0.09]
Teq = 214 [10] K
Rp = 2.89 [1.19] Re
a = 0.7581 [0.0675] AU
Ag = 51523.24 [43647.50] [1.18σ]
Teffp = 4991 [1055] K [4.53σ]

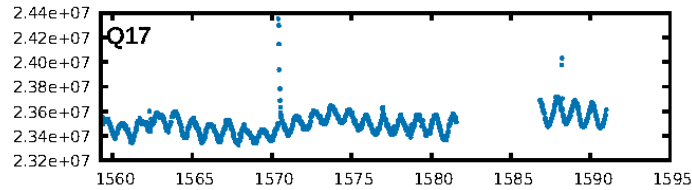
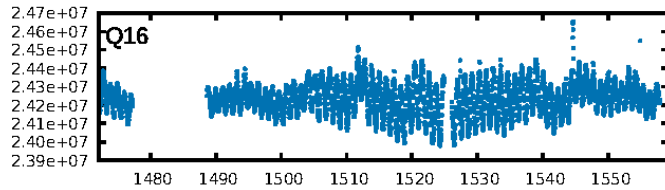
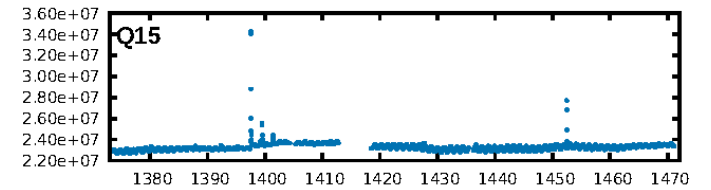
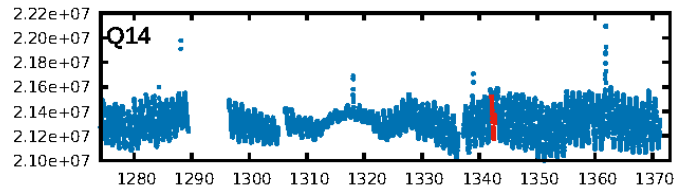
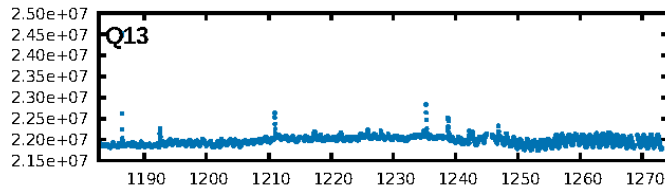
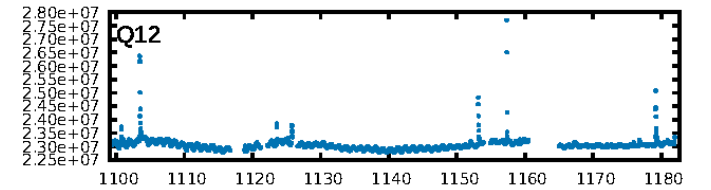
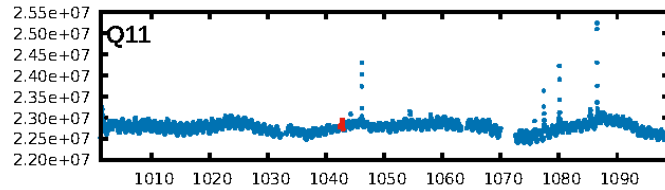
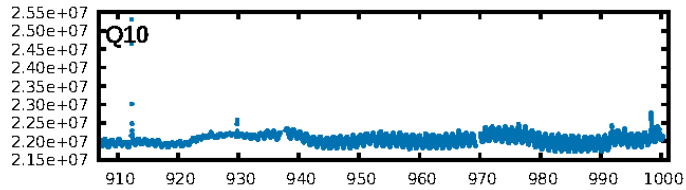
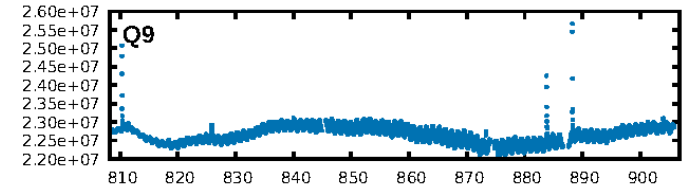
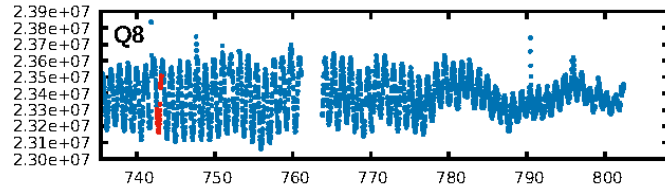
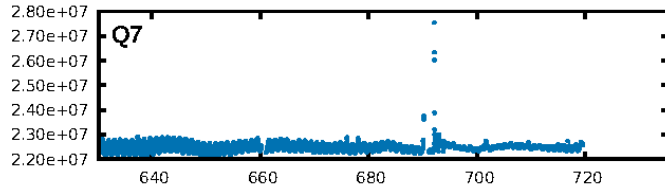
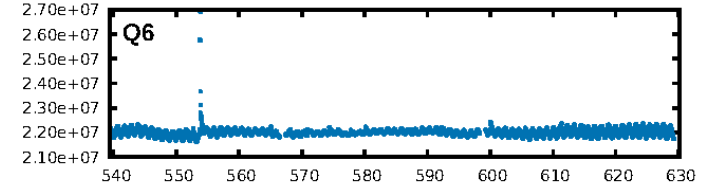
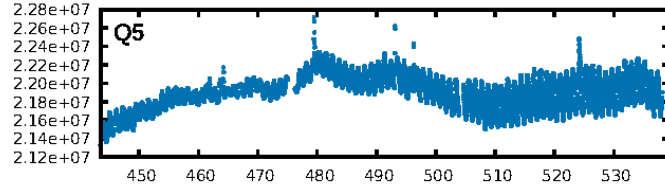
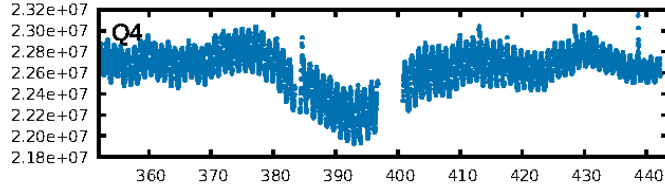
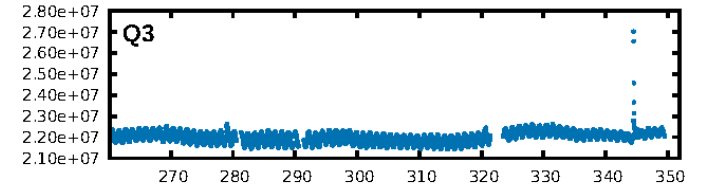
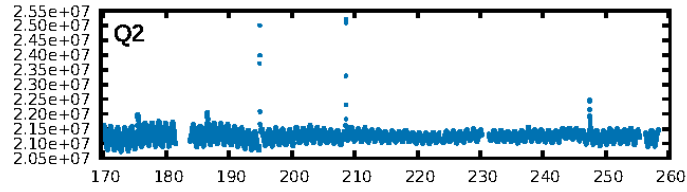
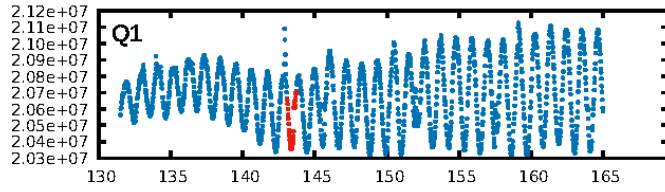
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [161.73σ]
LongPeriod-sig: 100.0% [67.92σ]
ModelChiSquare2-sig: 92.0%
ModelChiSquareGof-sig: 99.8%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 3.114
Centroid-sig: 58.4%
Centroid-so: 0.373 arcsec [0.79σ]
OotOffset-rm: 0.109 arcsec [1.20σ]
KicOffset-rm: 0.007 arcsec [0.07σ]
OotOffset-st: 1/1/1/1 [4]
KicOffset-st: 1/1/1/1 [4]
DiffImageQuality-fgm: 0.75 [3/4]
DiffImageOverlap-fno: 0.25 [1/4]

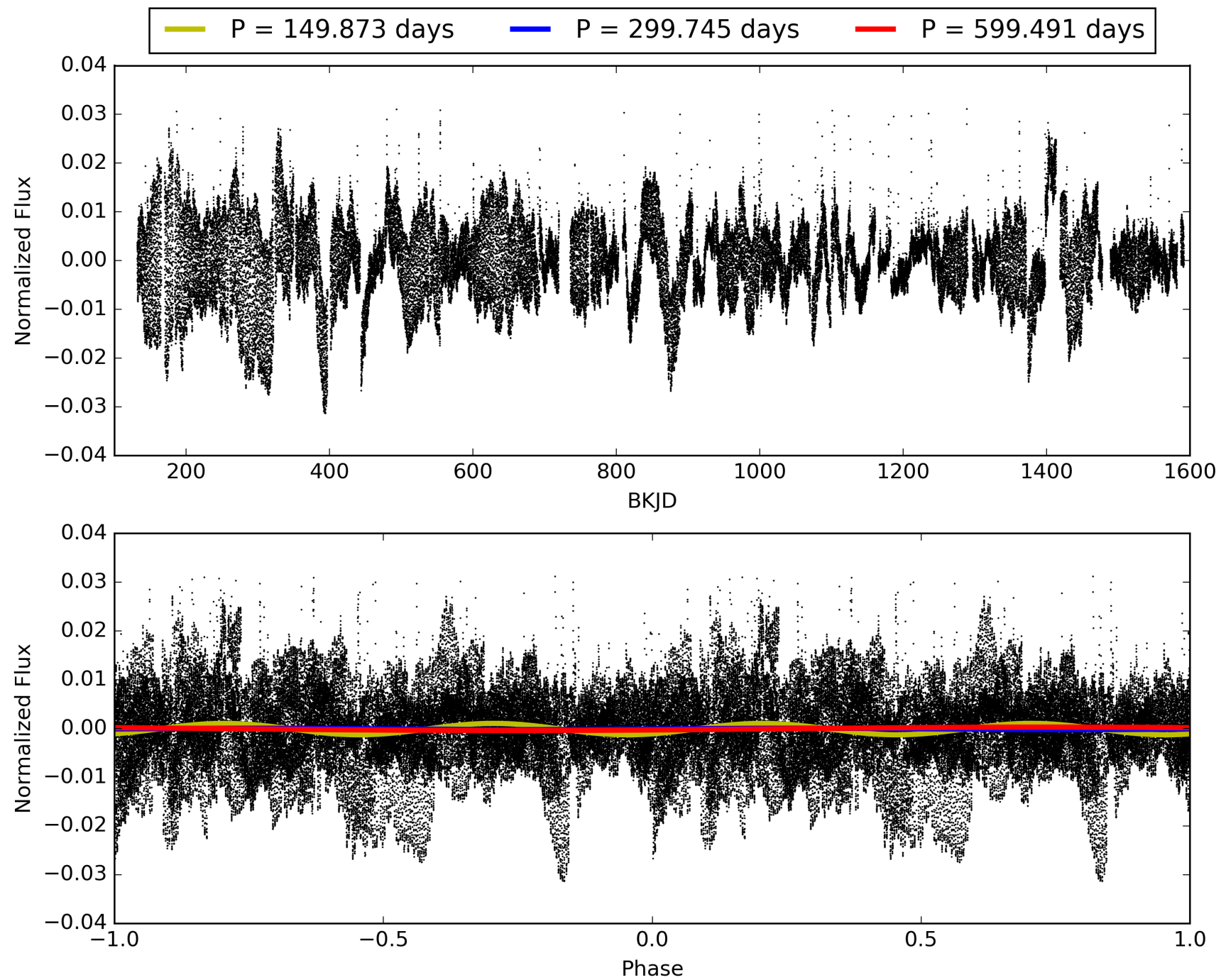
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:18:29 Z

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

TCE 010973465-01, PDC Light Curves

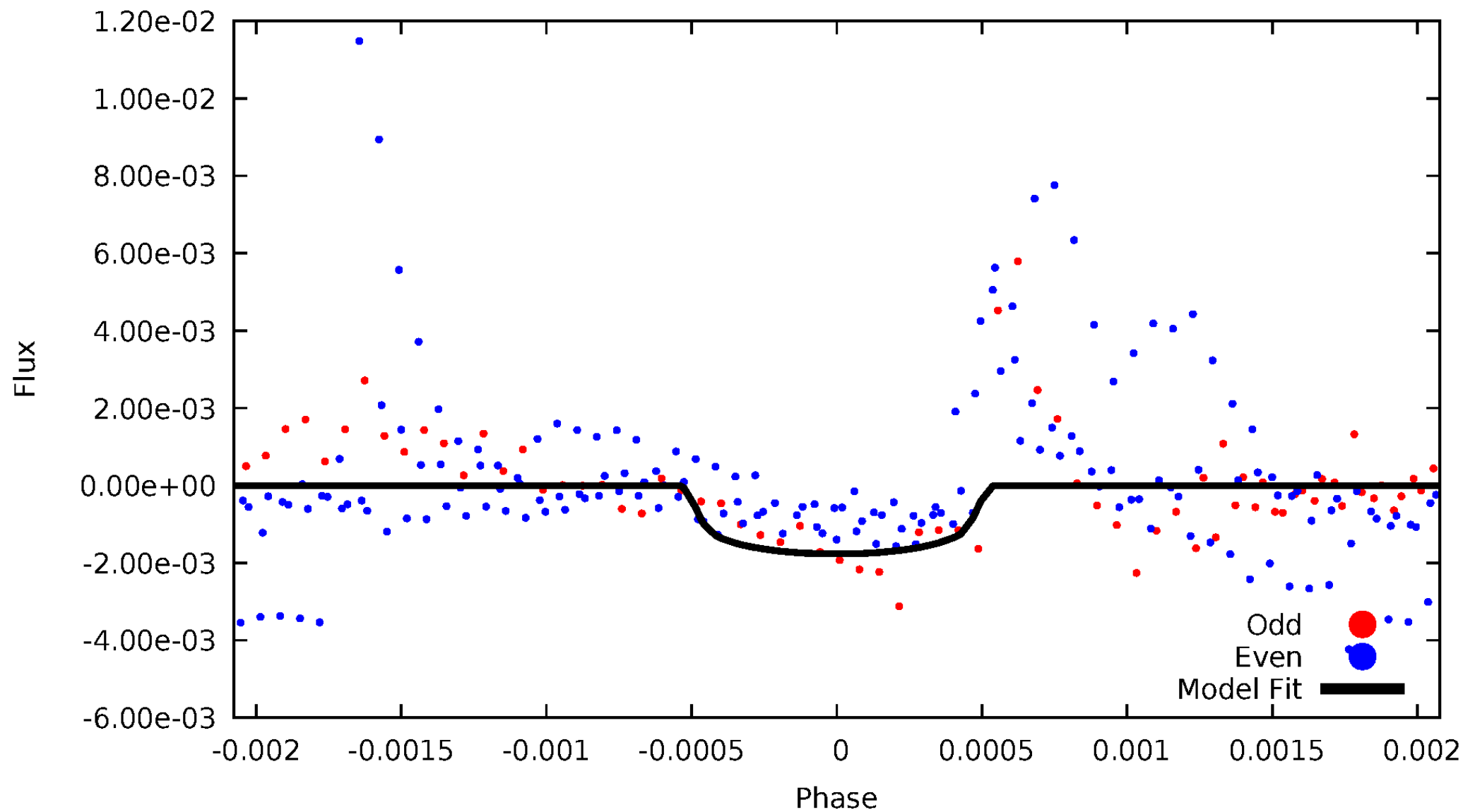


TCE 010973465-01



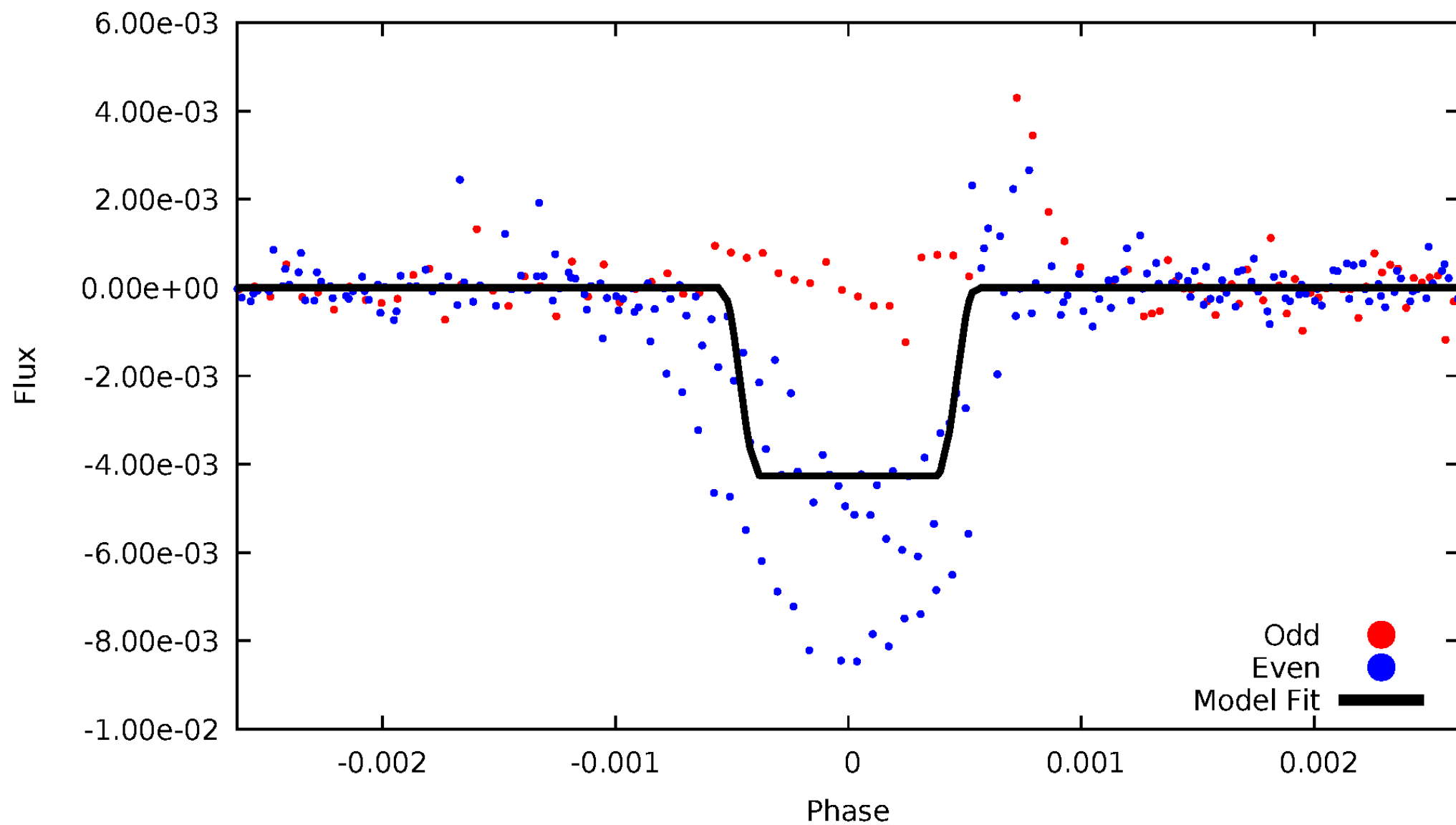
DV Odd/Even

TCE 010973465-01



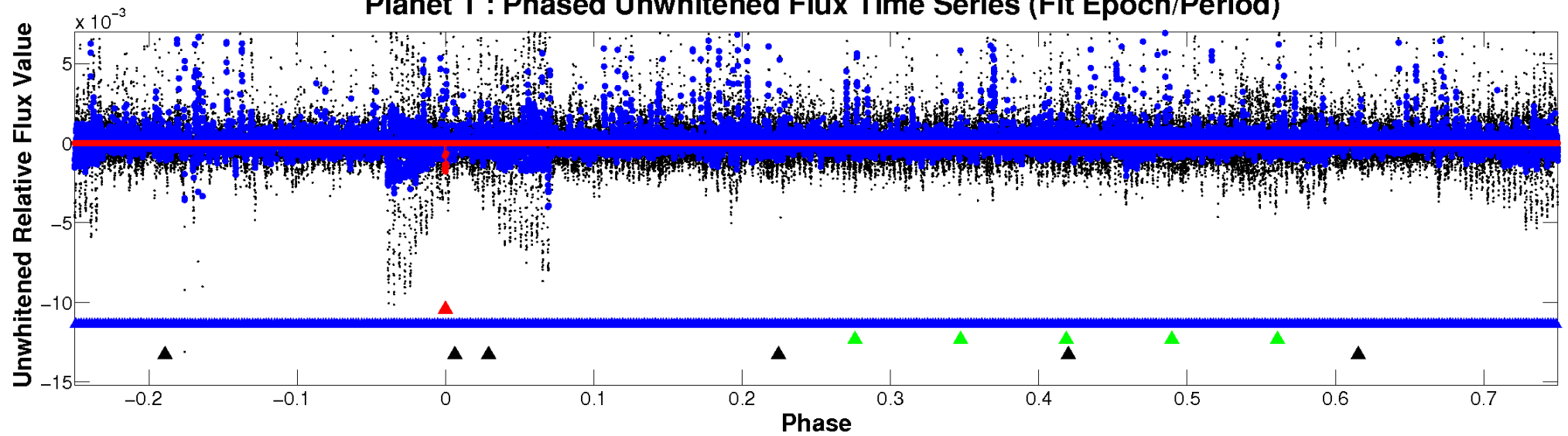
ALT Odd/Even

TCE 010973465-01

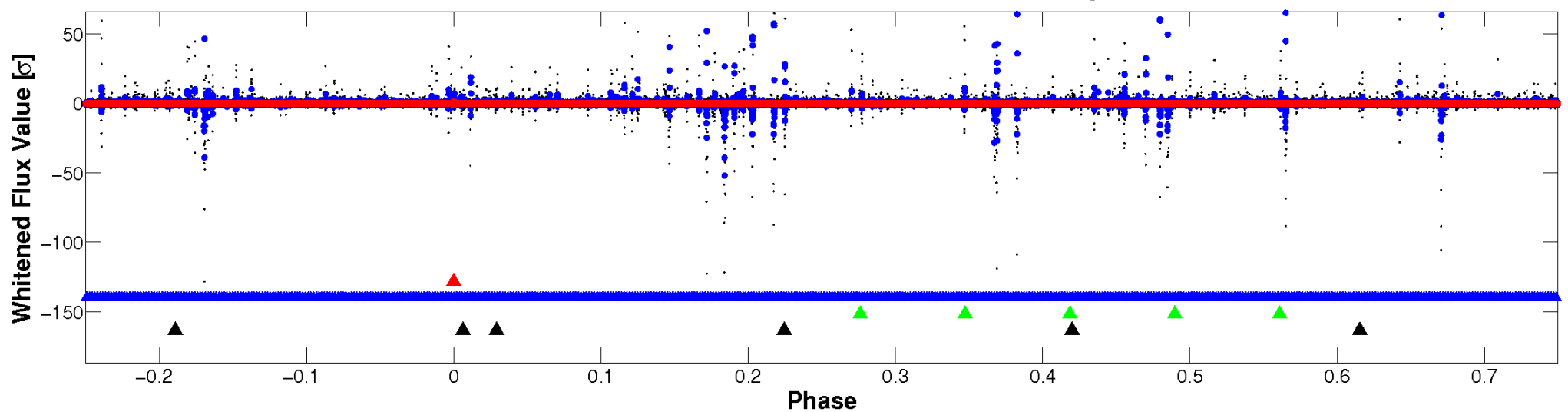


Non-Whitened Vs. Whitened Light Curve

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

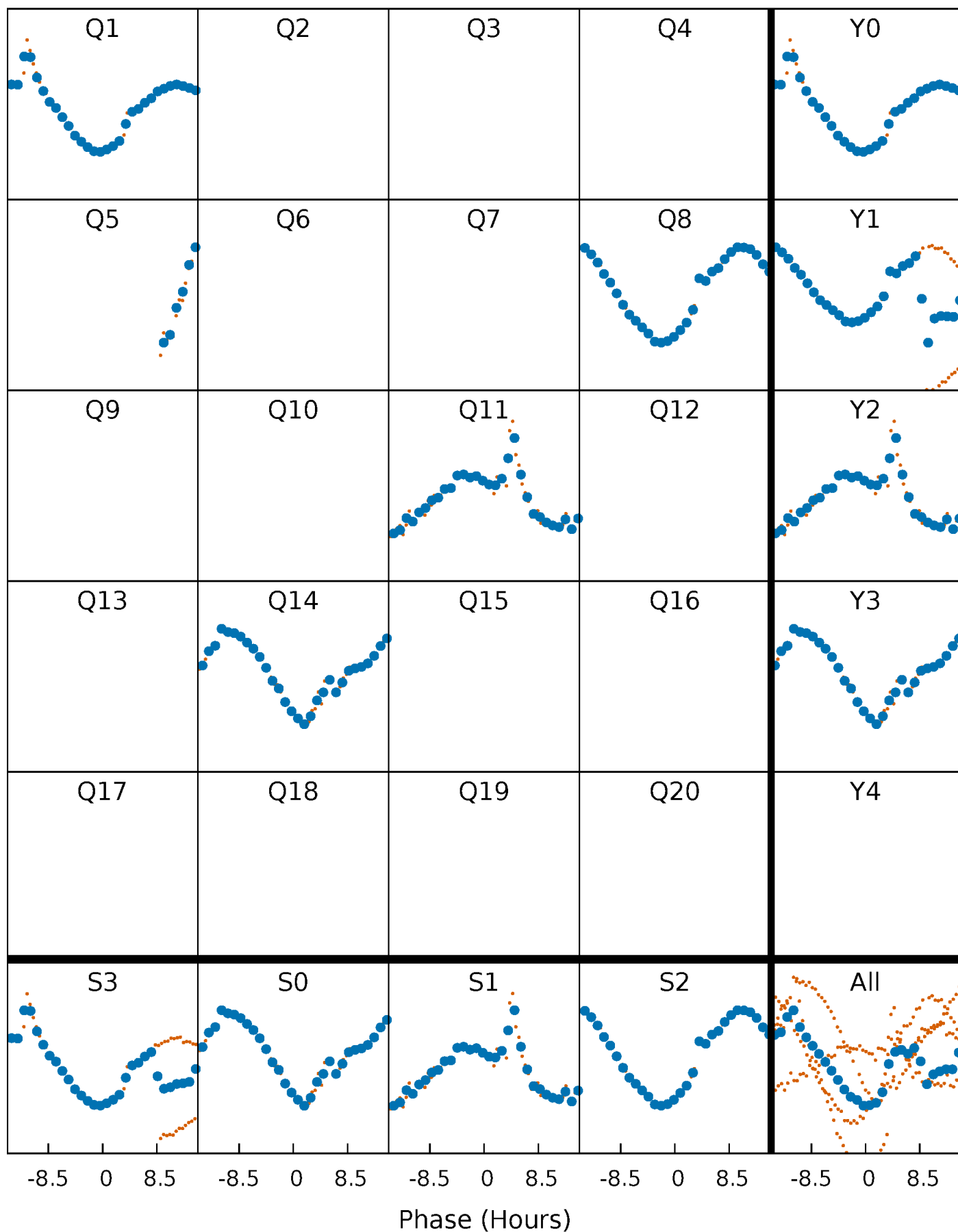


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



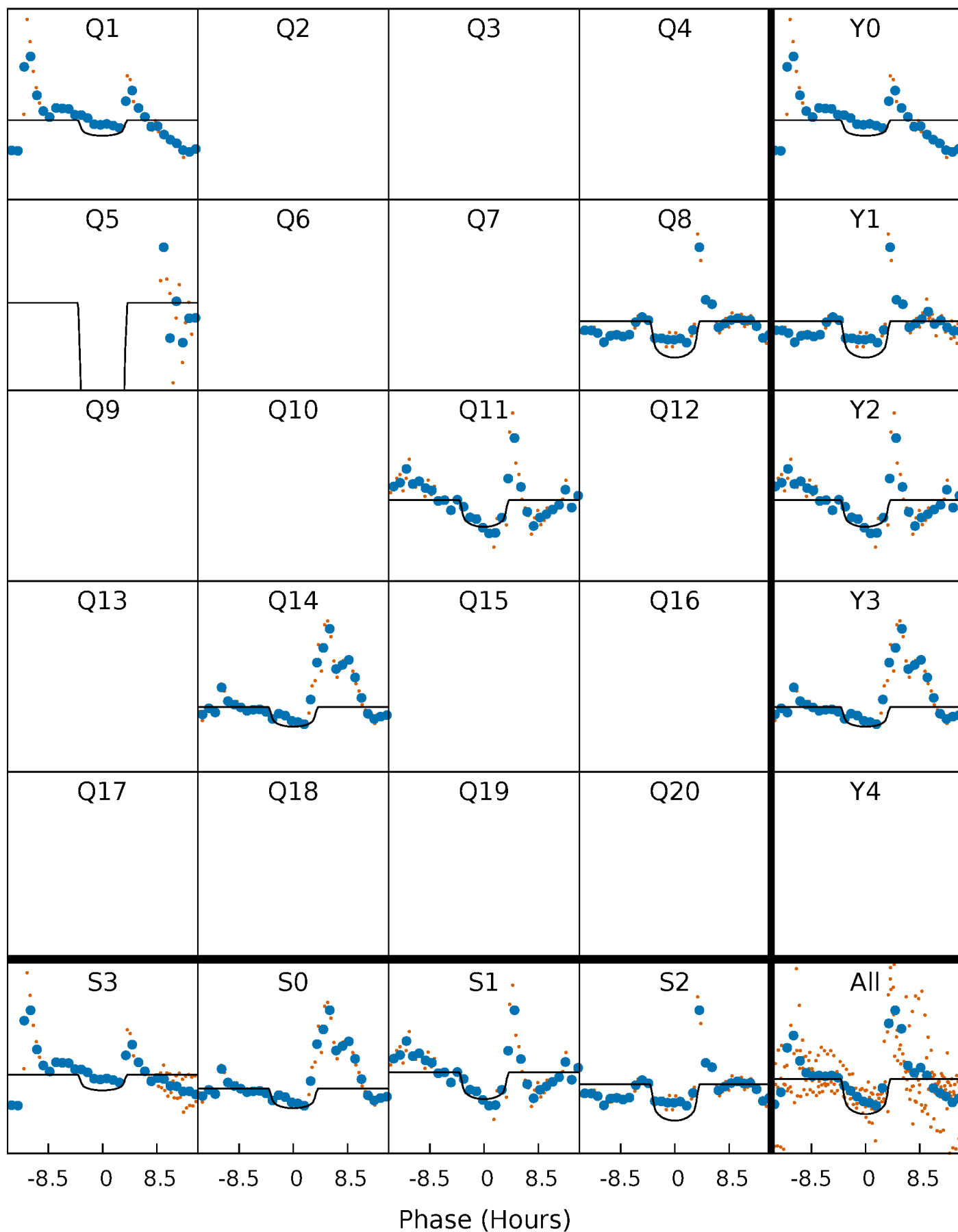
PDC Quarter-Phased Transit Curves

TCE 010973465-01 P=299.745309 Days $T_0=143.386954$ (BKJD)



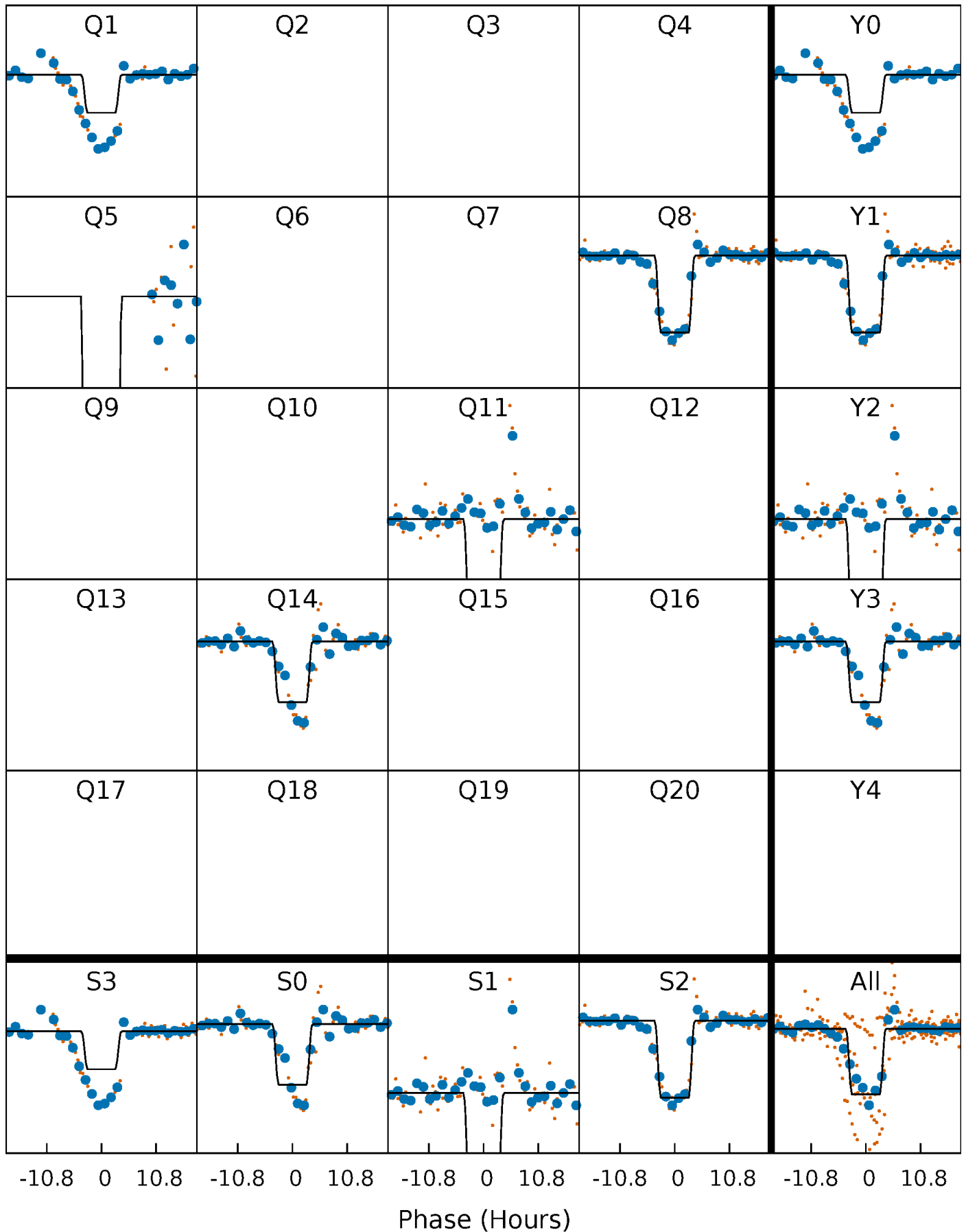
DV Quarter-Phased Transit Curves

TCE 010973465-01 P=299.745309 Days $T_0=143.386954$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

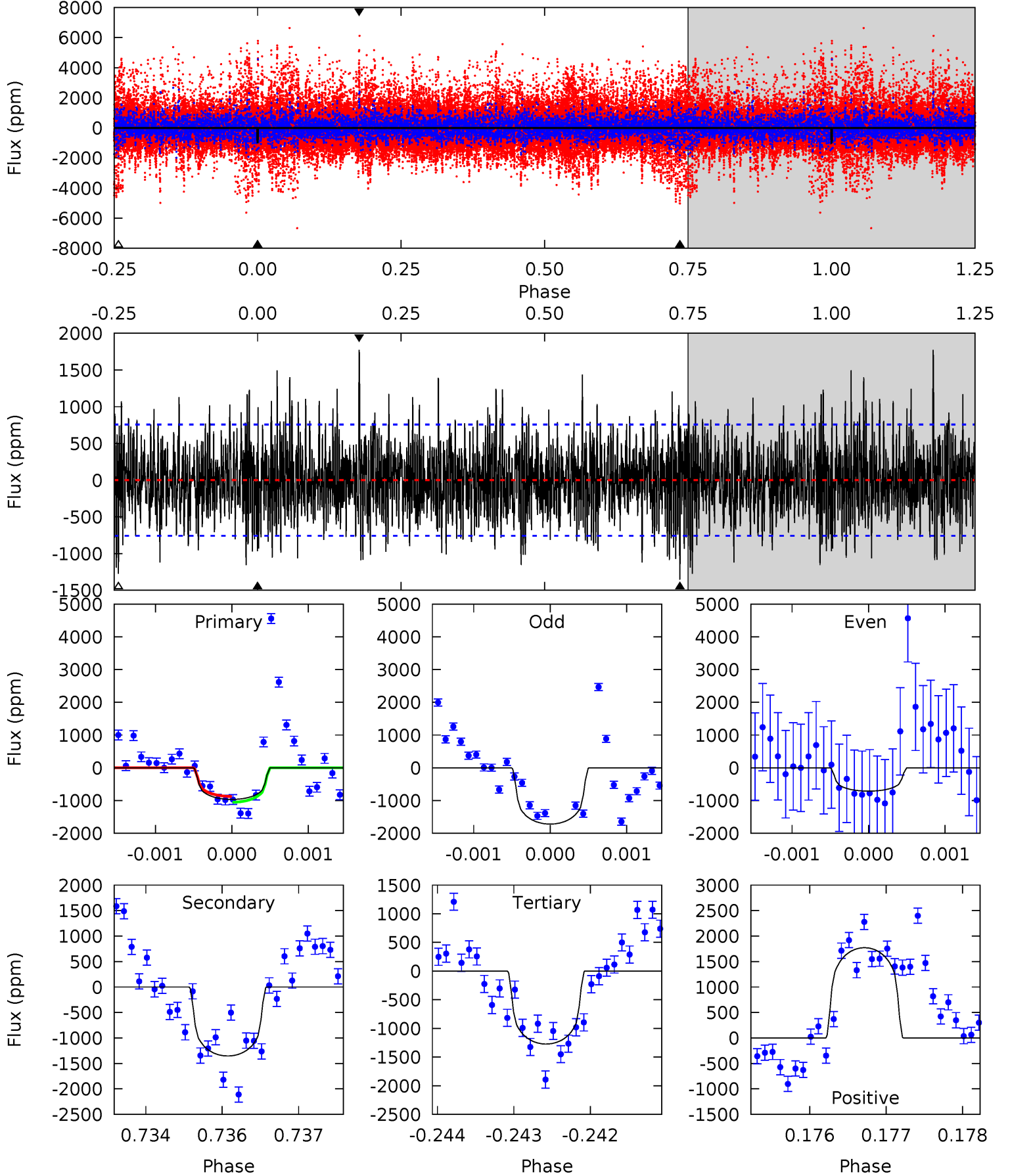
TCE 010973465-01 P=299.746703 Days $T_0=143.373388$ (BKJD)



DV Model-Shift Uniqueness Test

010973465-01, P = 299.745309 Days, E = 143.386954 Days

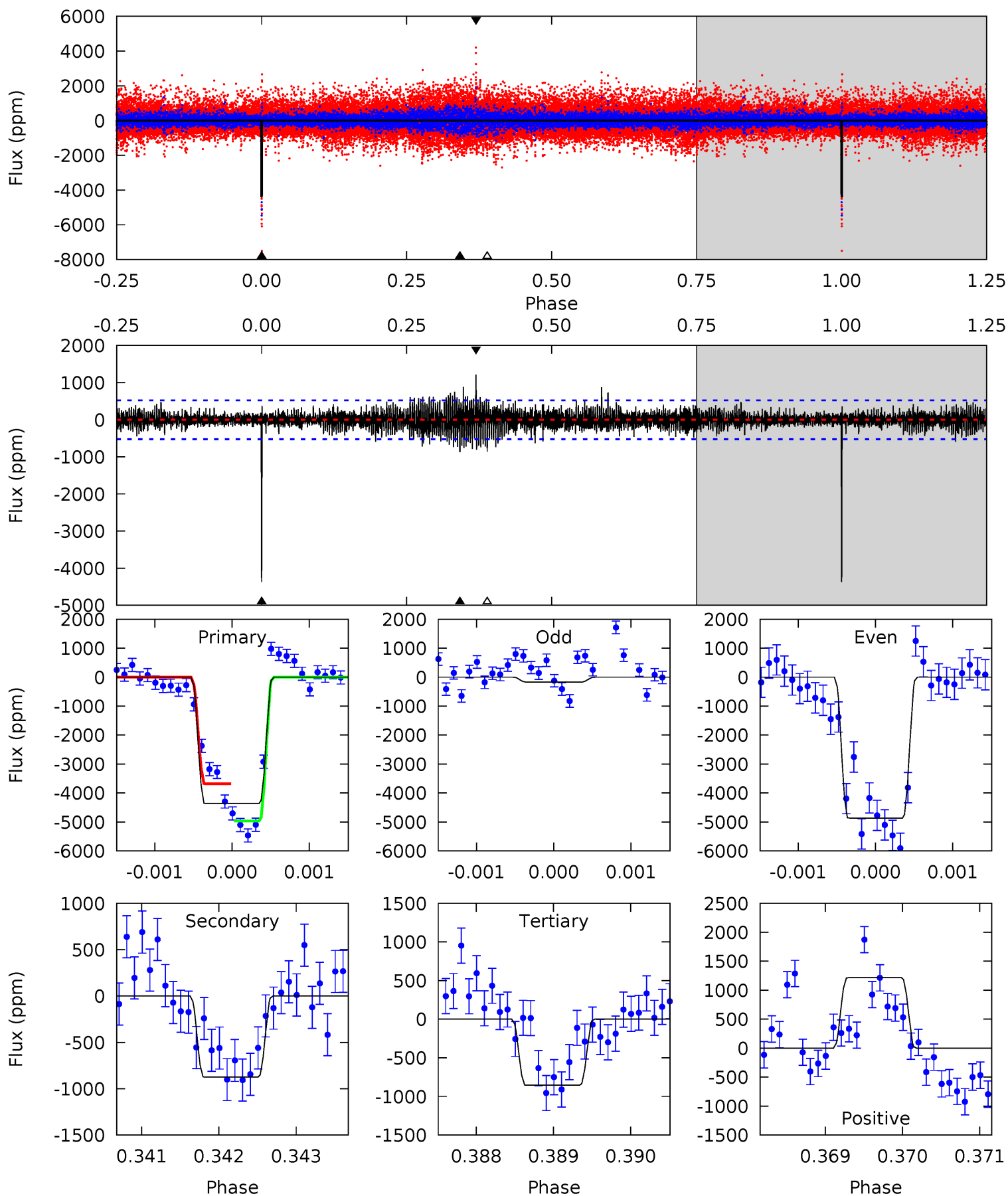
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.93	9.70	9.13	12.7	5.44	3.27	2.94	-2.20	-5.78	0.58	-3.00	1.93	1.12	0.57	0.64



Alt Model-Shift Uniqueness Test

010973465-01, P = 299.746703 Days, E = 143.373388 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
45.3	9.08	8.87	12.6	5.44	3.28	1.96	36.4	32.7	0.21	-3.53	26.5	0.94	0.22	6.72



Stellar Parameters For KIC 010973465

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5174^{+156}_{-156}	$4.599^{+0.072}_{-0.048}$	$-0.720^{+0.300}_{-0.300}$	$0.668^{+0.070}_{-0.064}$	$0.648^{+0.075}_{-0.032}$	$3.056^{+0.881}_{-0.572}$
	+3%/-3%	+2%/-1%	+42%/-42%	+10%/-10%	+12%/-5%	+29%/-19%
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 010973465-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-1353 ± 139	$2.88^{+1.15}_{-1.12}$	298^{+11}_{-11}	5028^{+1304}_{-650}	53147^{+88955}_{-26283}
Alt.	-875 ± 96	$4.74^{+1.15}_{-1.20}$	299^{+11}_{-12}	3813^{+446}_{-273}	12547^{+9772}_{-4517}

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

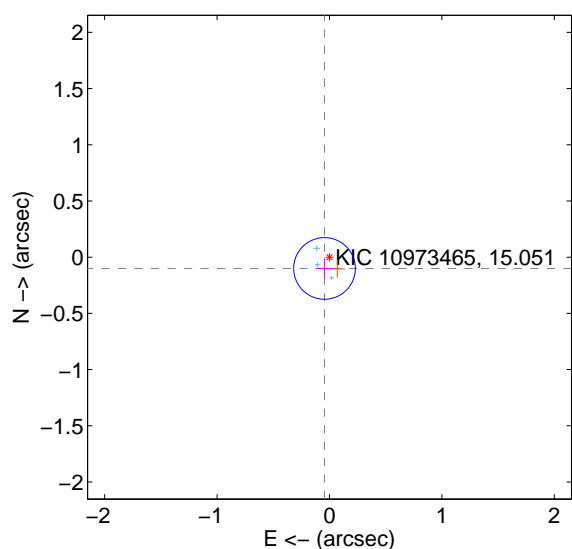
Supplemental centroid analysis for 010973465-01. Kepler magnitude: 15.05. Transit SNR 6.02

There are 3 quarters with good PRF difference image offsets

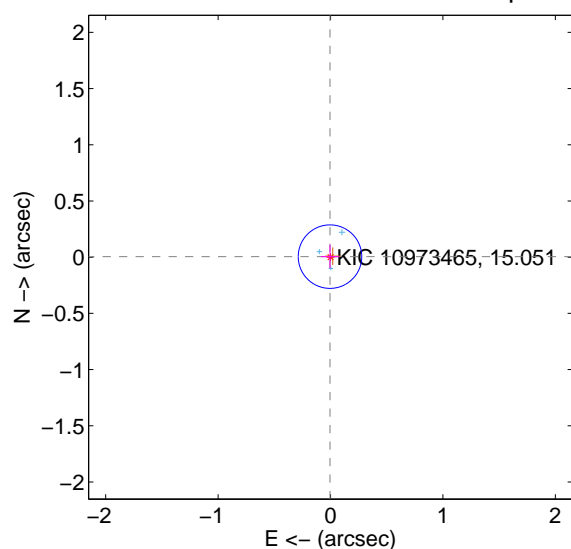
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.109 ± 0.091	1.20	0.044 ± 0.080	-0.100 ± 0.093
PRF-fit source offset from KIC position	0.007 ± 0.094	0.07	0.005 ± 0.082	0.005 ± 0.105
photometric centroid source offset	0.37 ± 0.47	0.79	0.37 ± 0.47	0.03 ± 0.45

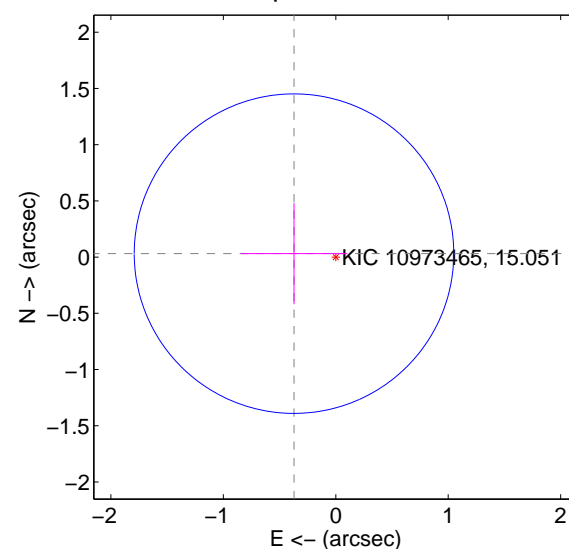
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

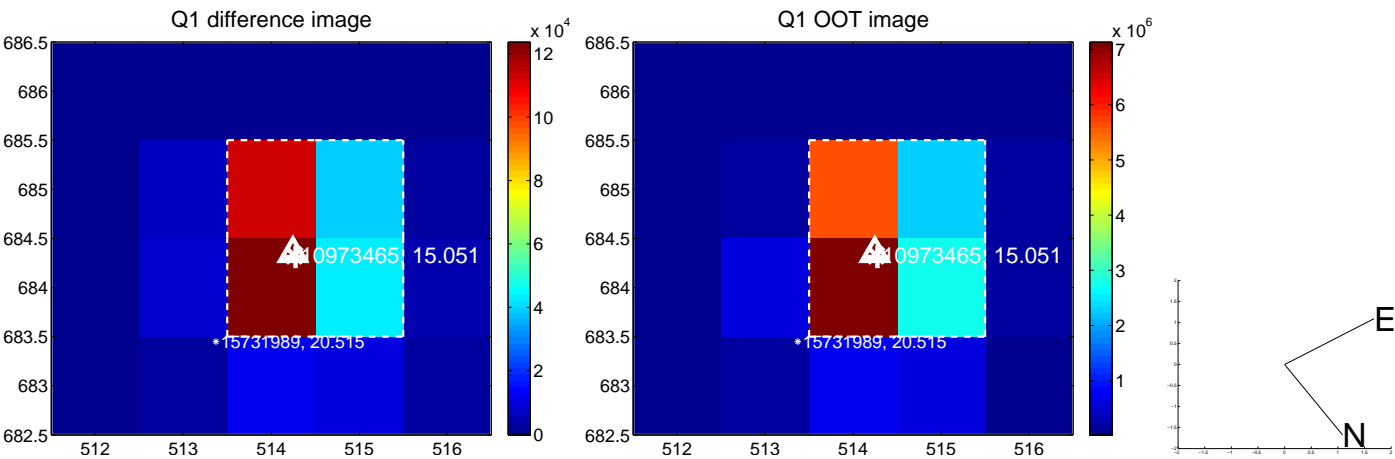


offset from photometric centroids

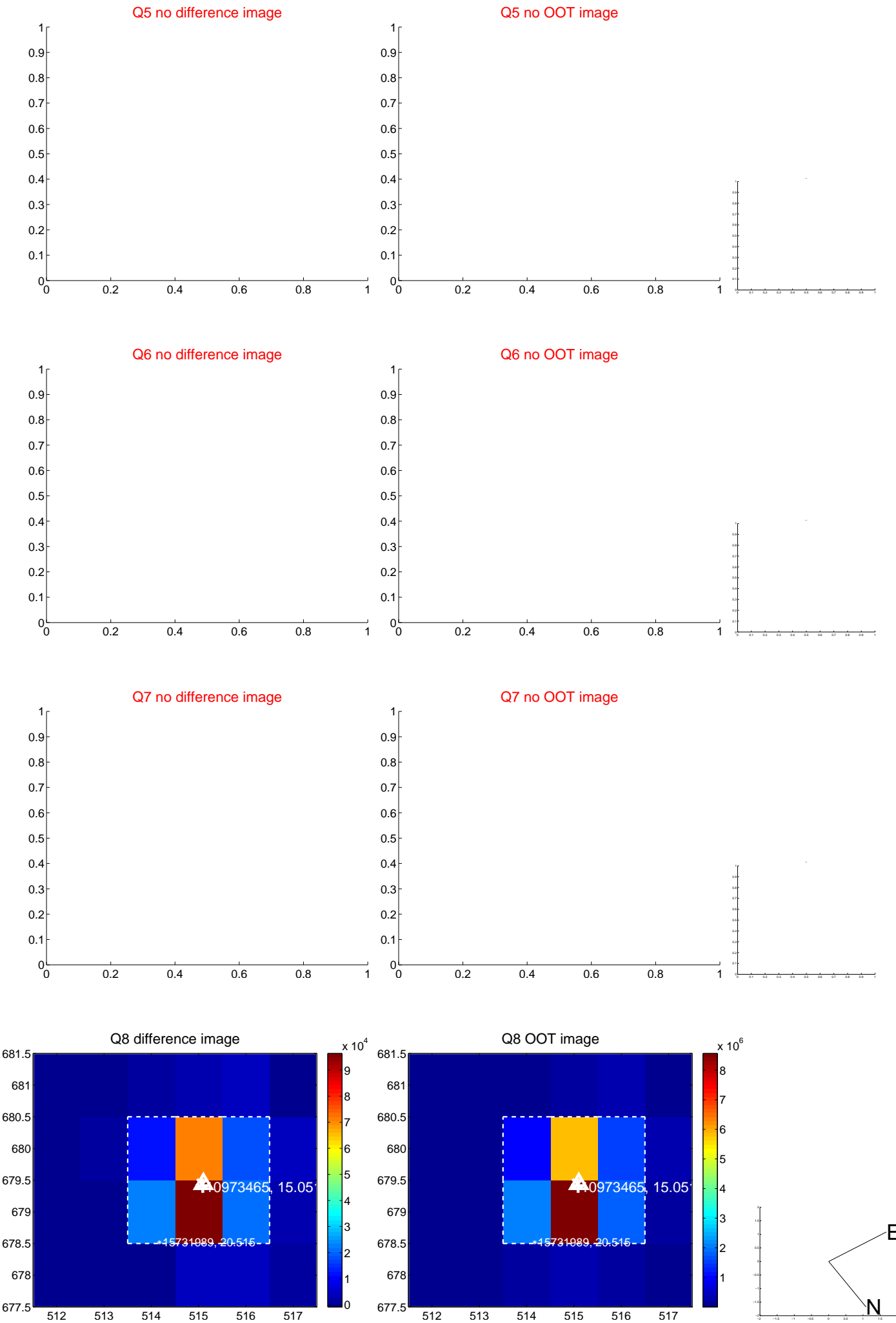


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

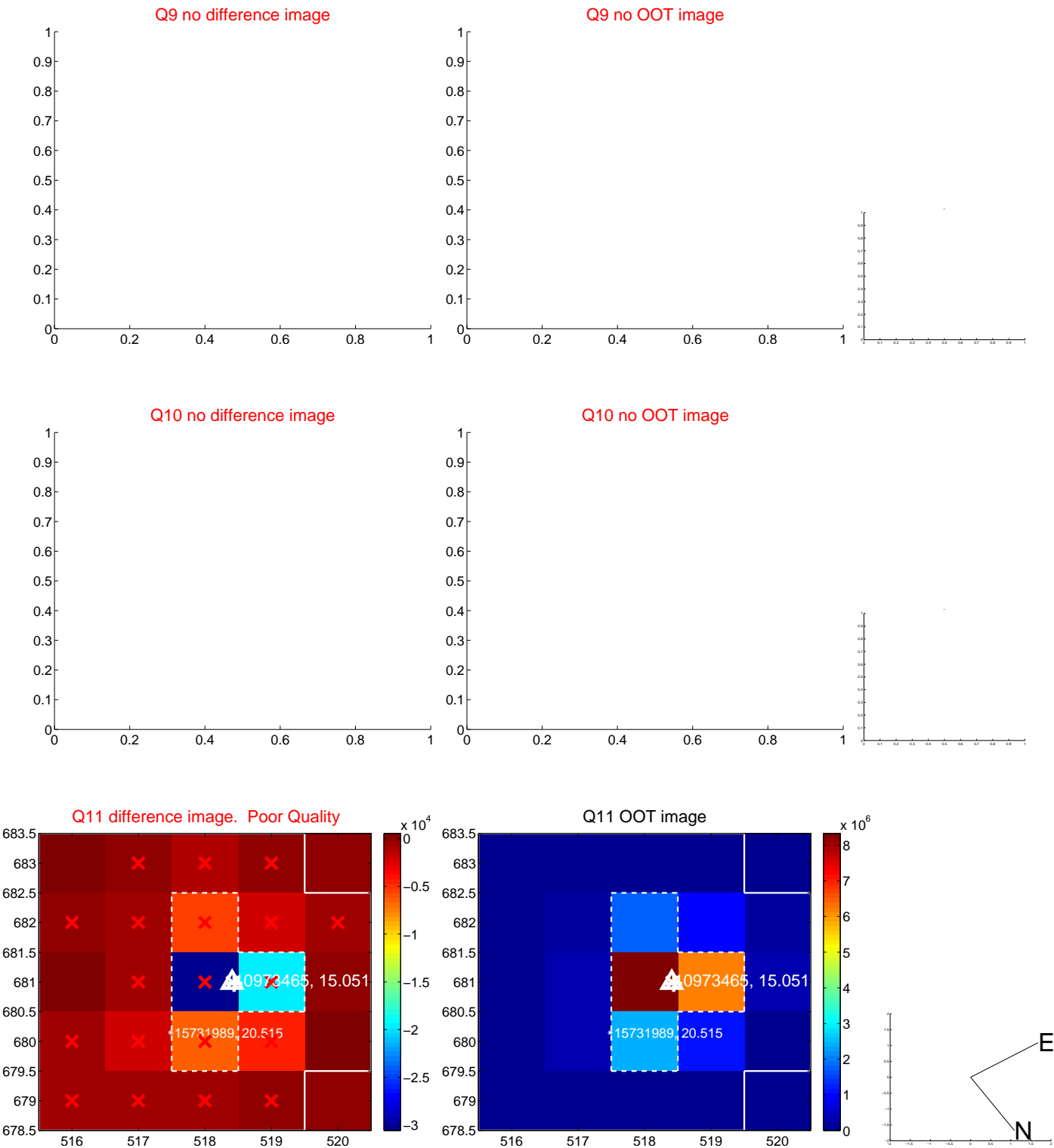
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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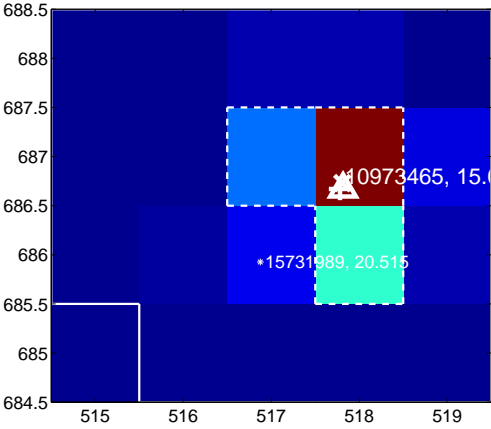
Q13 no difference image



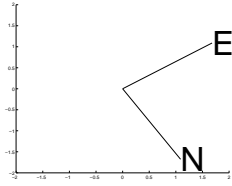
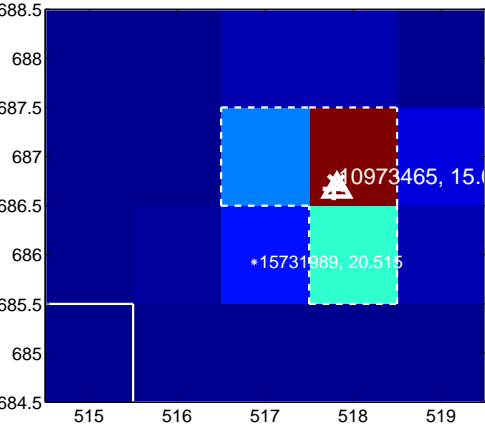
Q13 no OOT image



Q14 difference image



Q14 OOT image



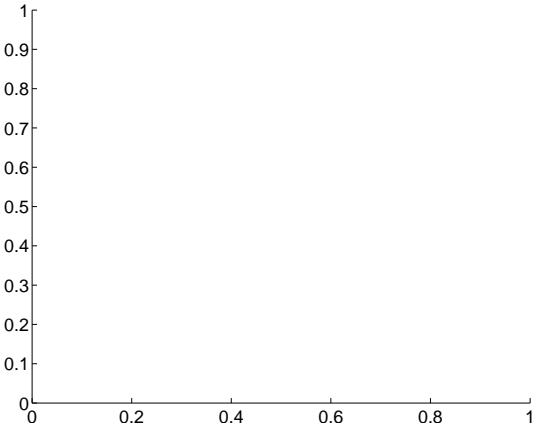
Q15 no difference image



Q15 no OOT image



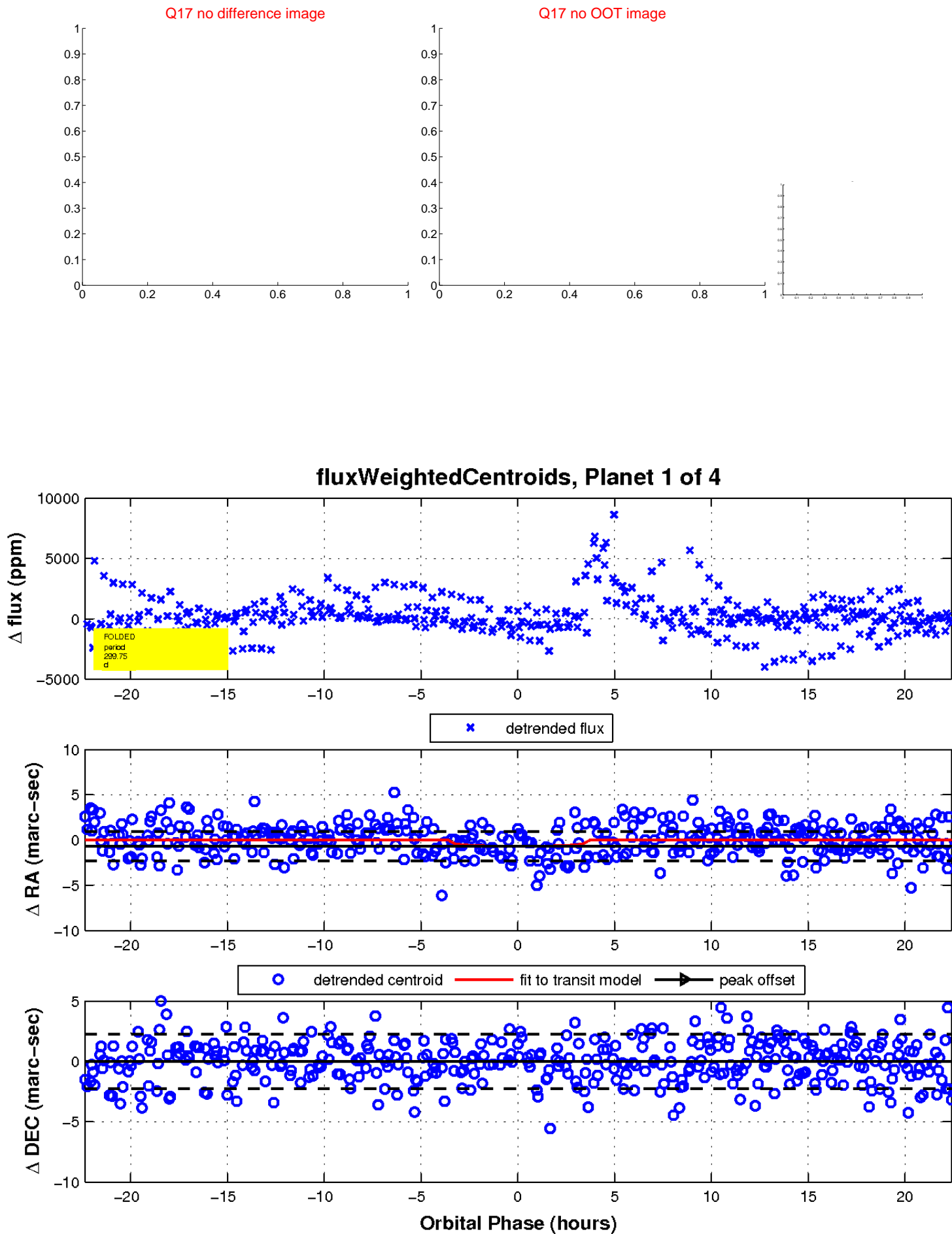
Q16 no difference image



Q16 no OOT image

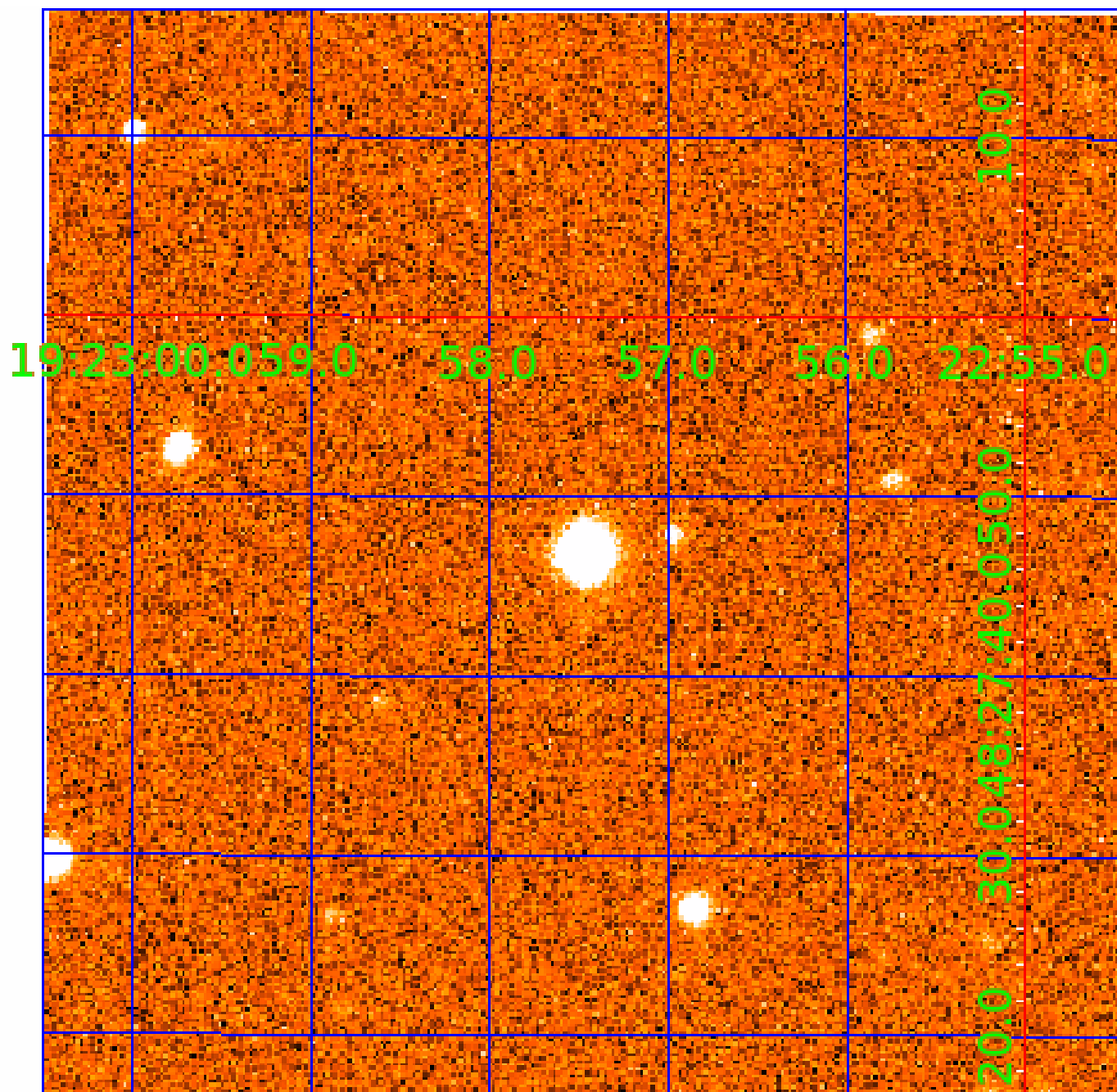


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010973465

Q1-17 DR25 TCE Parameters

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010973465-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010973465-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS

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

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

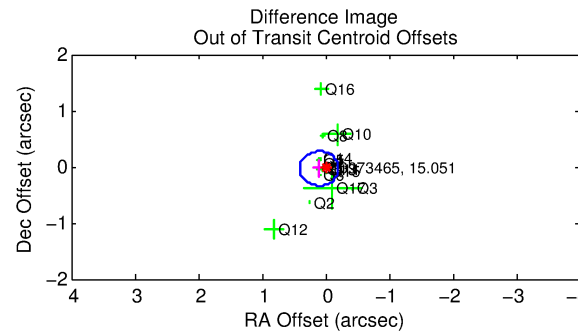
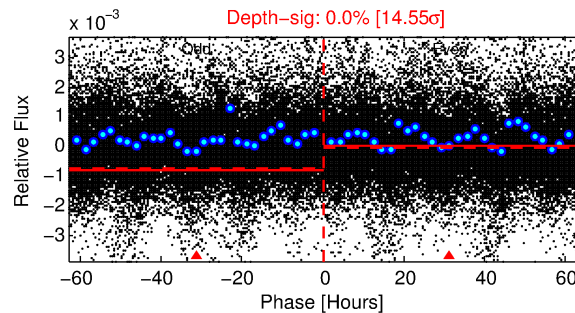
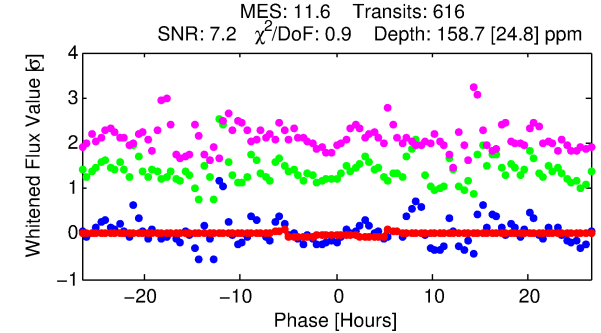
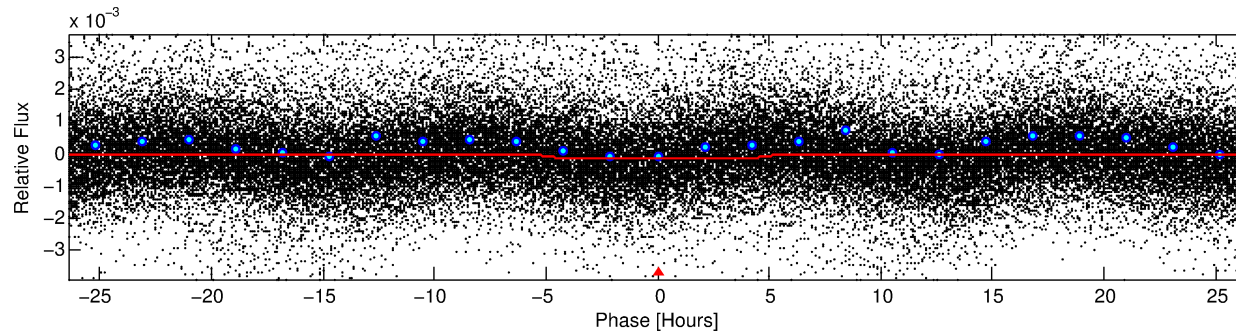
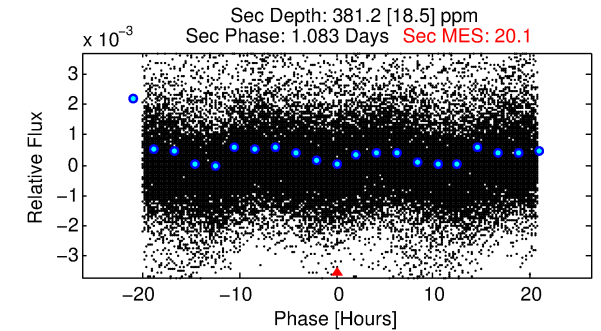
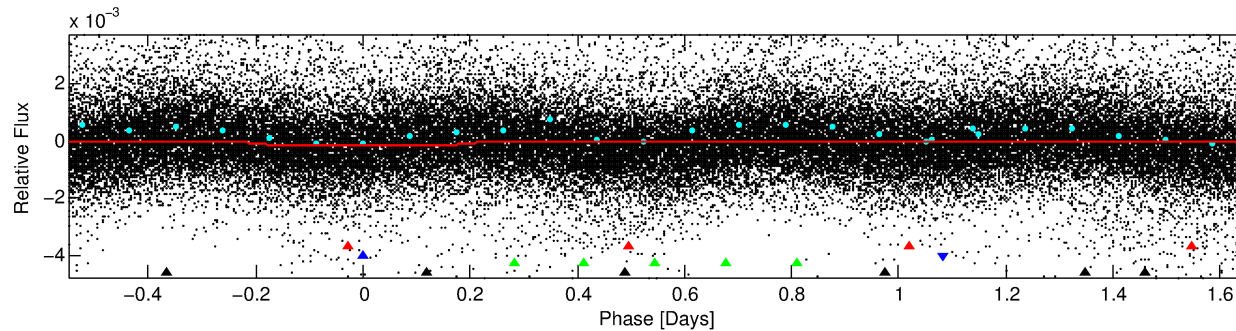
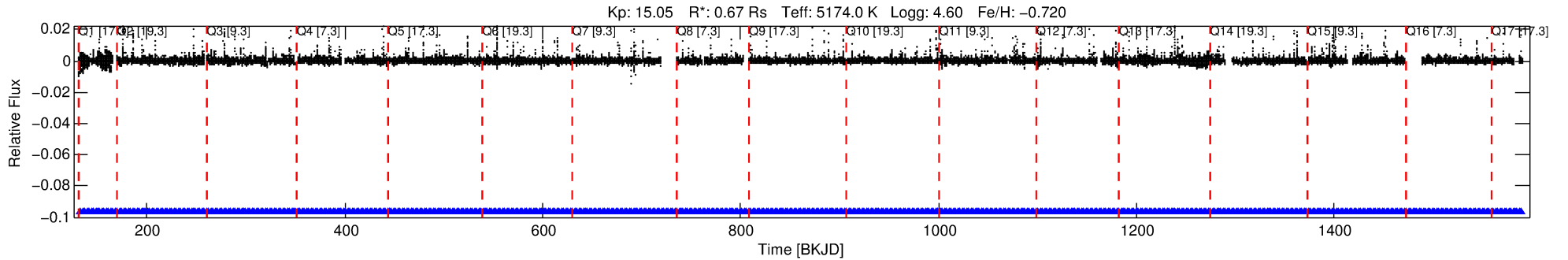
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010973465-02

No Significant Match Found

DV One-Page Summary

KIC: 10973465 Candidate: 2 of 4 Period: 2.200 d



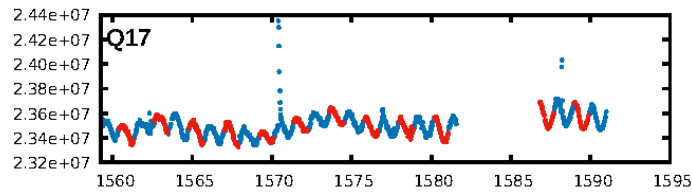
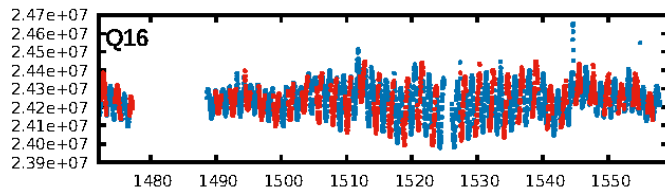
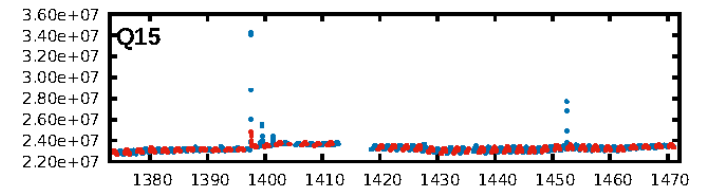
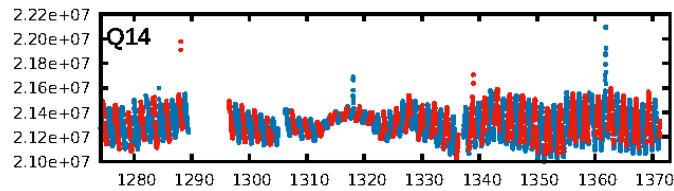
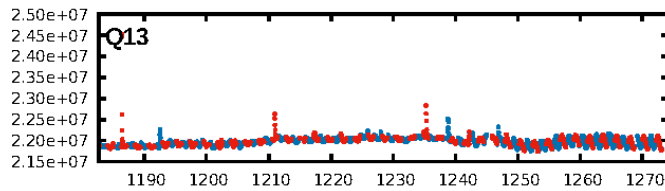
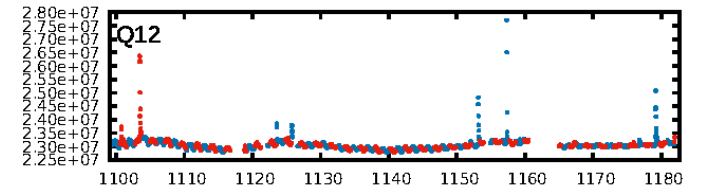
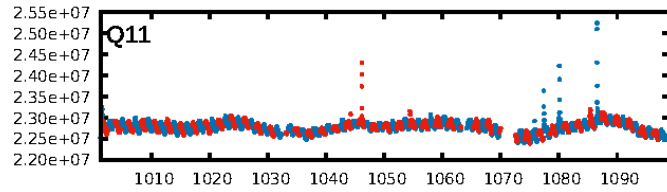
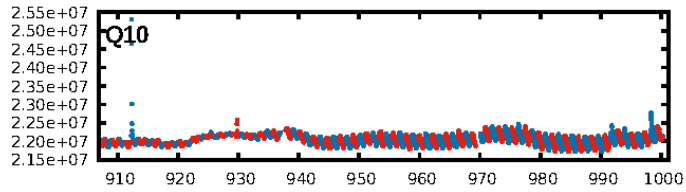
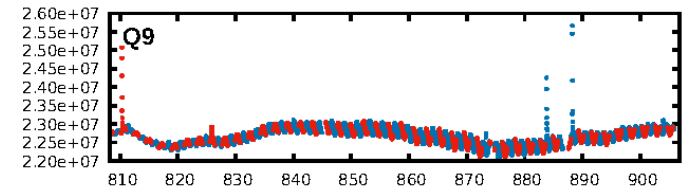
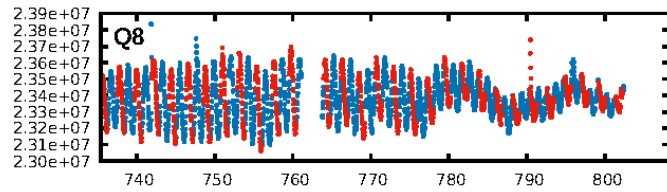
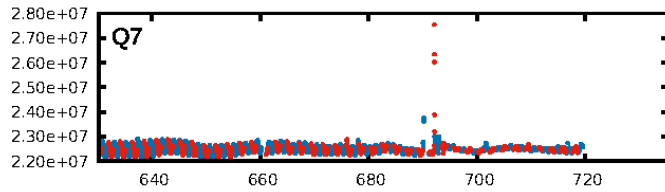
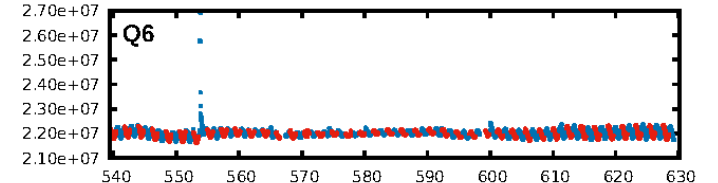
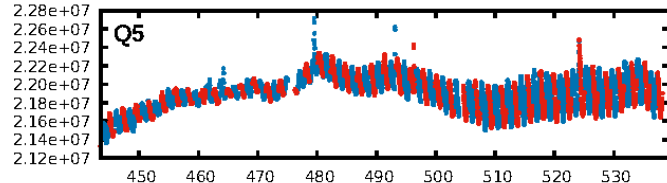
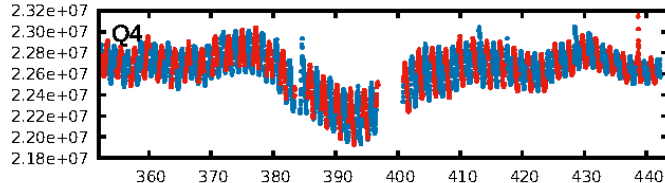
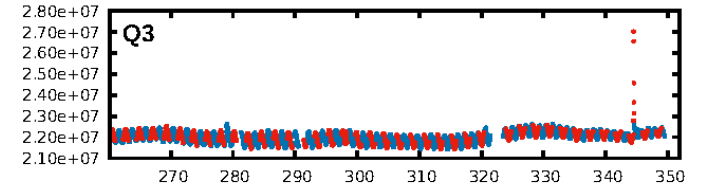
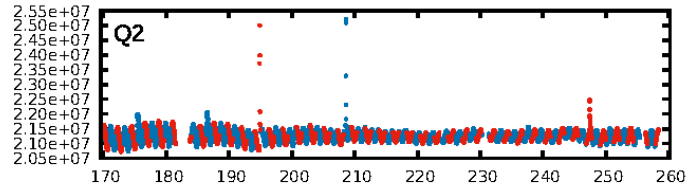
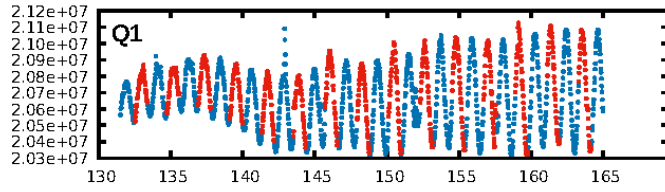
DV Fit Results:

Period = 2.20015 [0.00002] d
Epoch = 132.9389 [0.0039] BKJD
Rp/R* = 0.0116 [0.0077]
a/R* = 1.64 [2.85]
b = 0.39 [6.11]
Seff = 349.50 [62.17]
Teff = 1103 [49] K
Rp = 0.84 [0.57] Re
a = 0.0286 [0.0026] AU
Ag = 241.89 [325.52] [0.74σ]
Teffp = 6723 [2260] K [2.49σ]

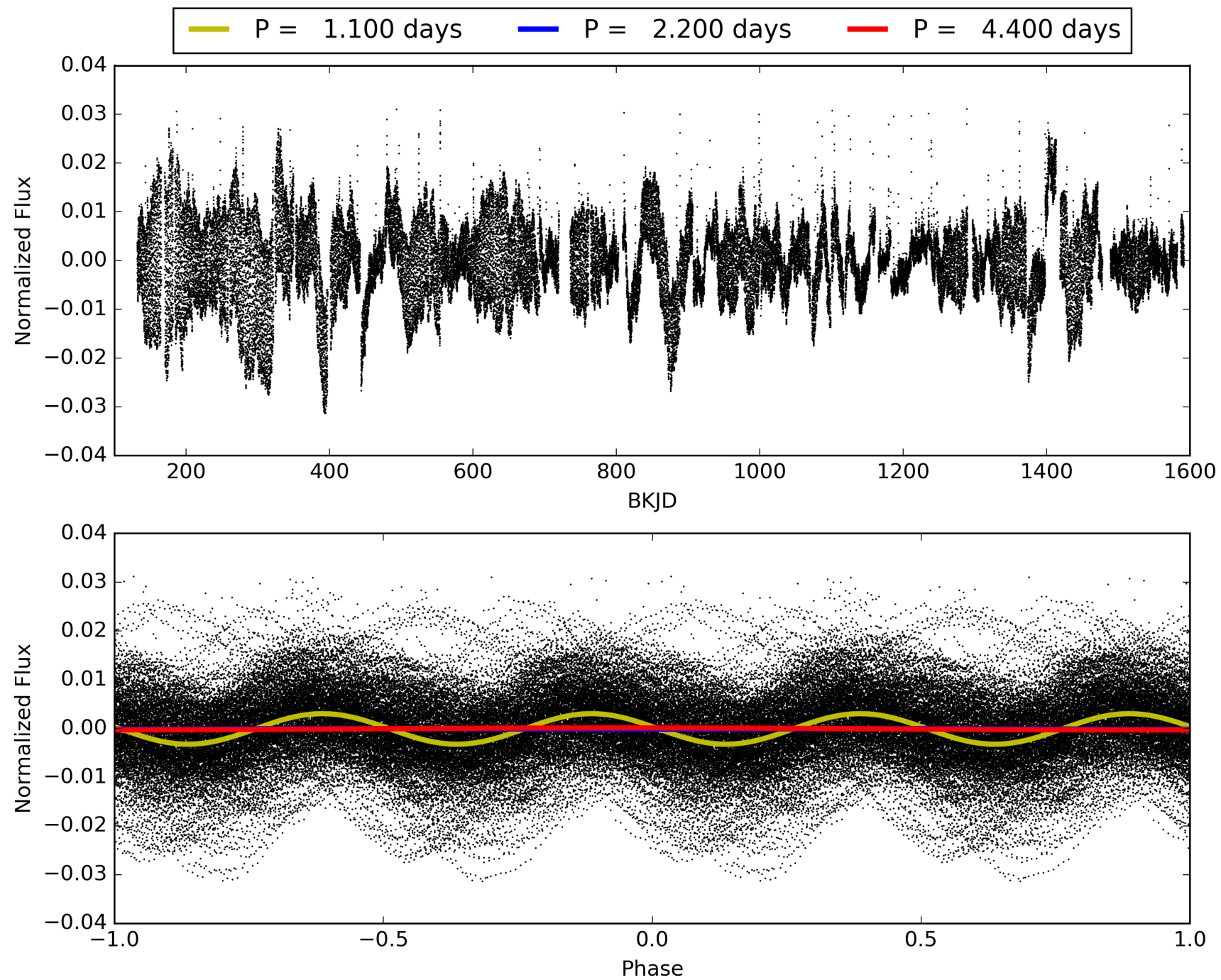
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [502.54σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [589/589]
GhostDiagnostic-chr: 0.852
Centroid-sig: 96.4%
Centroid-so: 0.043 arcsec [0.12σ]
OotOffset-rm: 0.108 arcsec [1.06σ]
KicOffset-rm: 0.083 arcsec [0.66σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.53 [9/17]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 010973465-02, PDC Light Curves

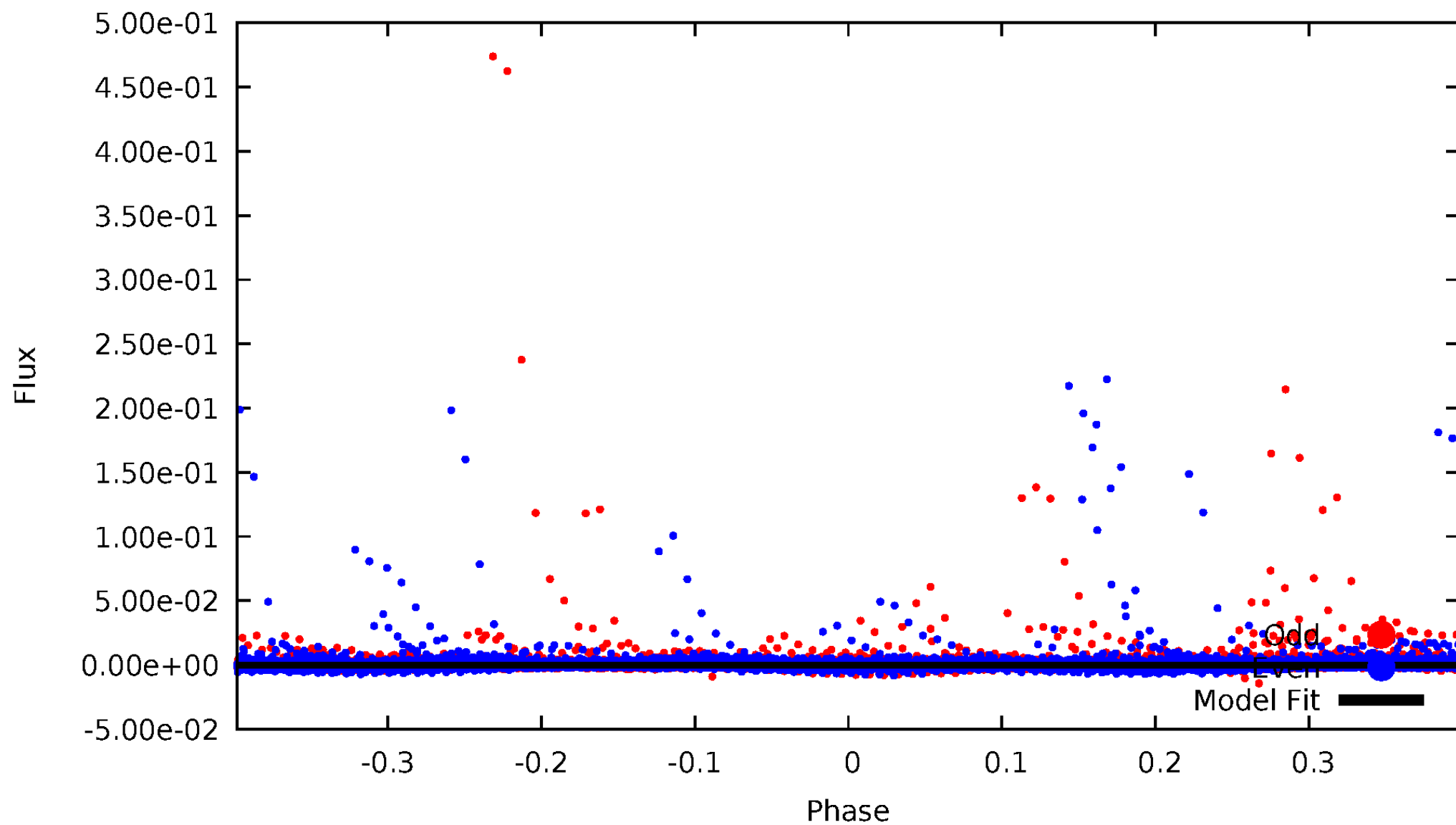


TCE 010973465-02



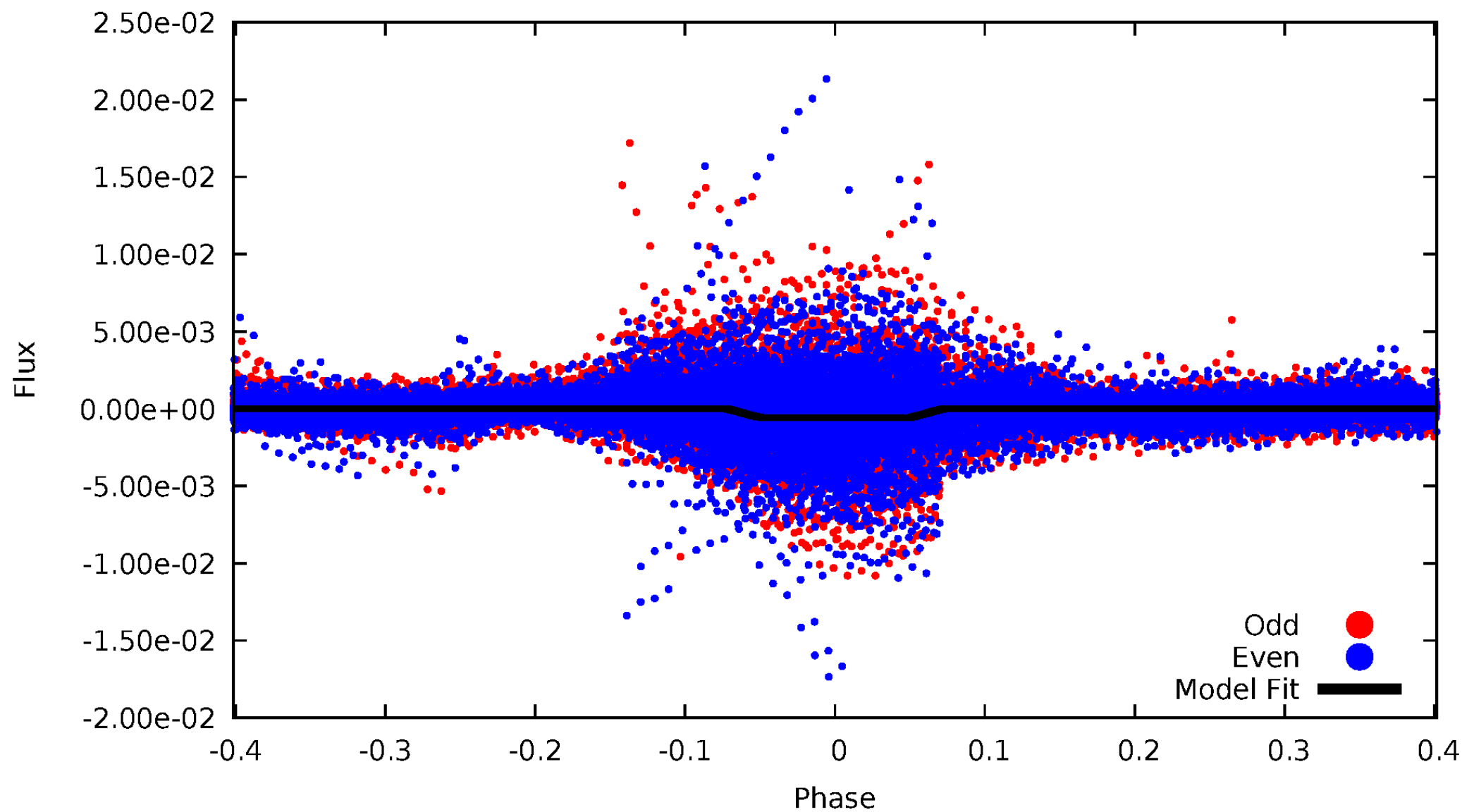
DV Odd/Even

TCE 010973465-02



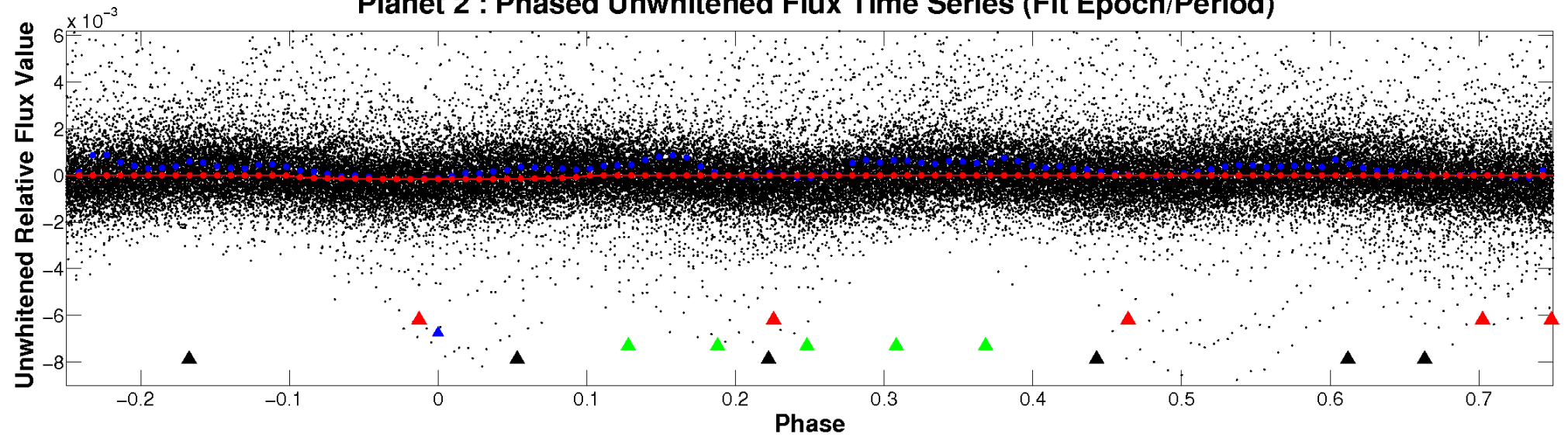
ALT Odd/Even

TCE 010973465-02

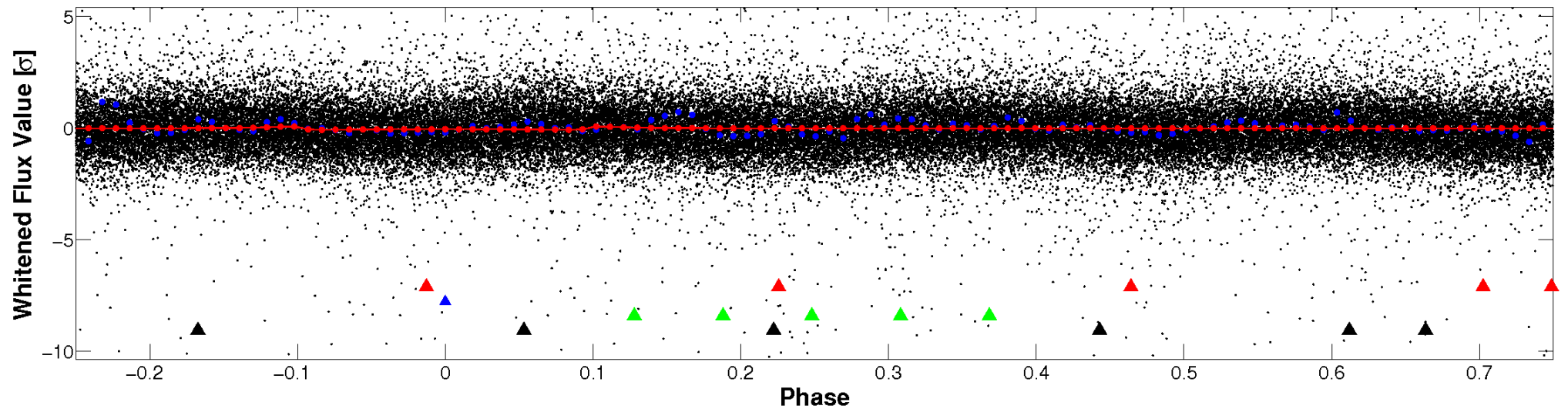


Non-Whitened Vs. Whitened Light Curve

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

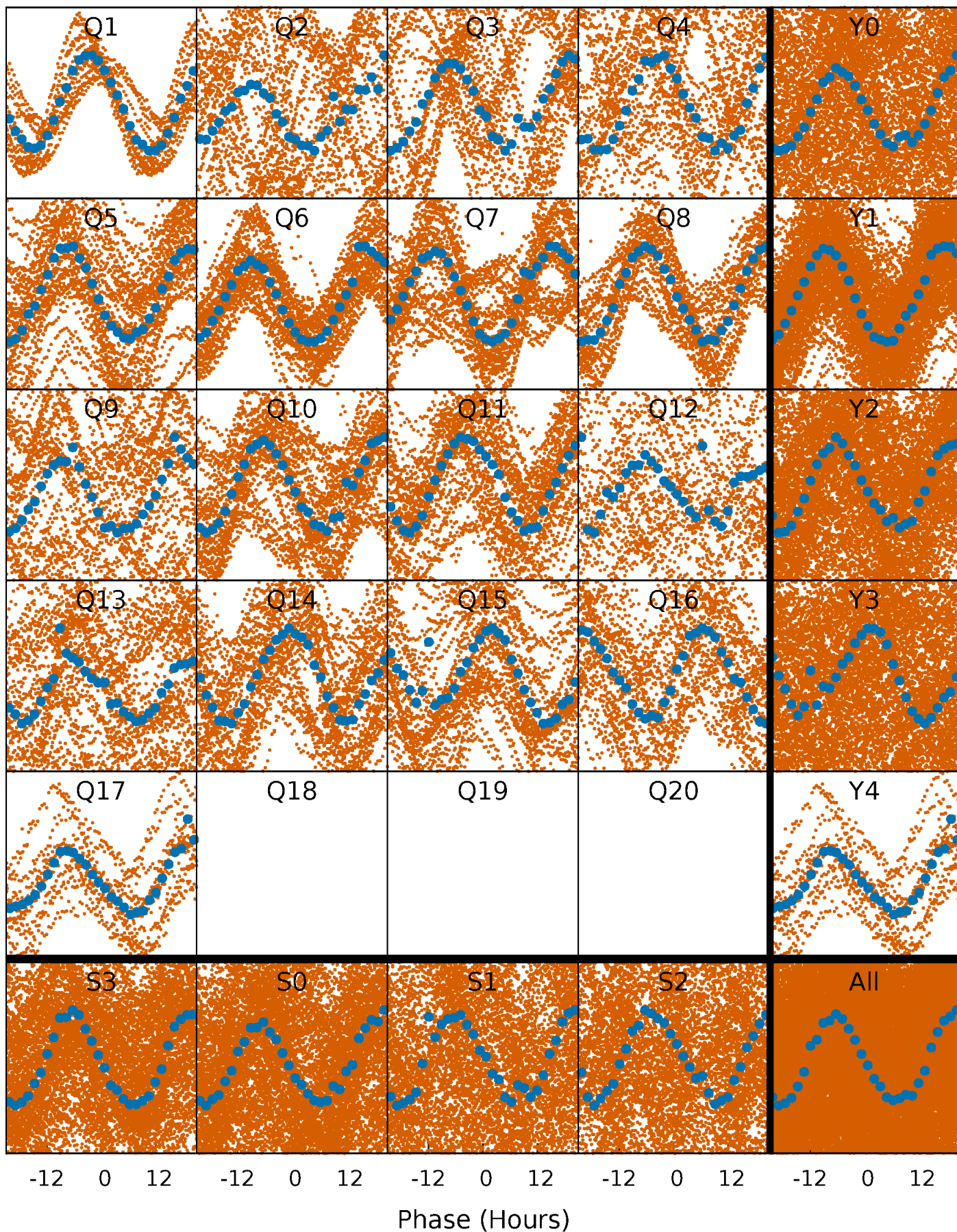


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



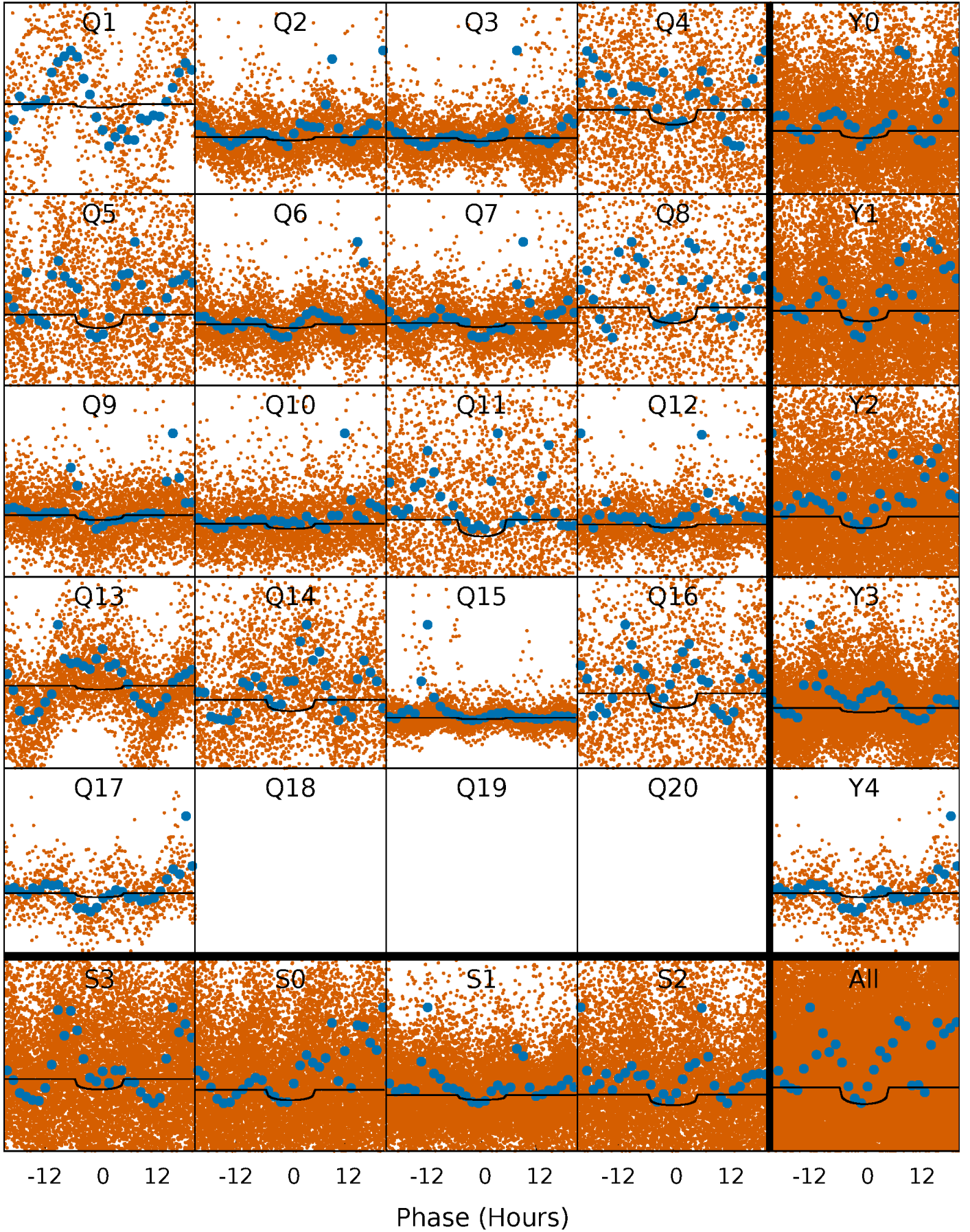
PDC Quarter-Phased Transit Curves

TCE 010973465-02 P= 2.200152 Days $T_0=132.938860$ (BKJD)



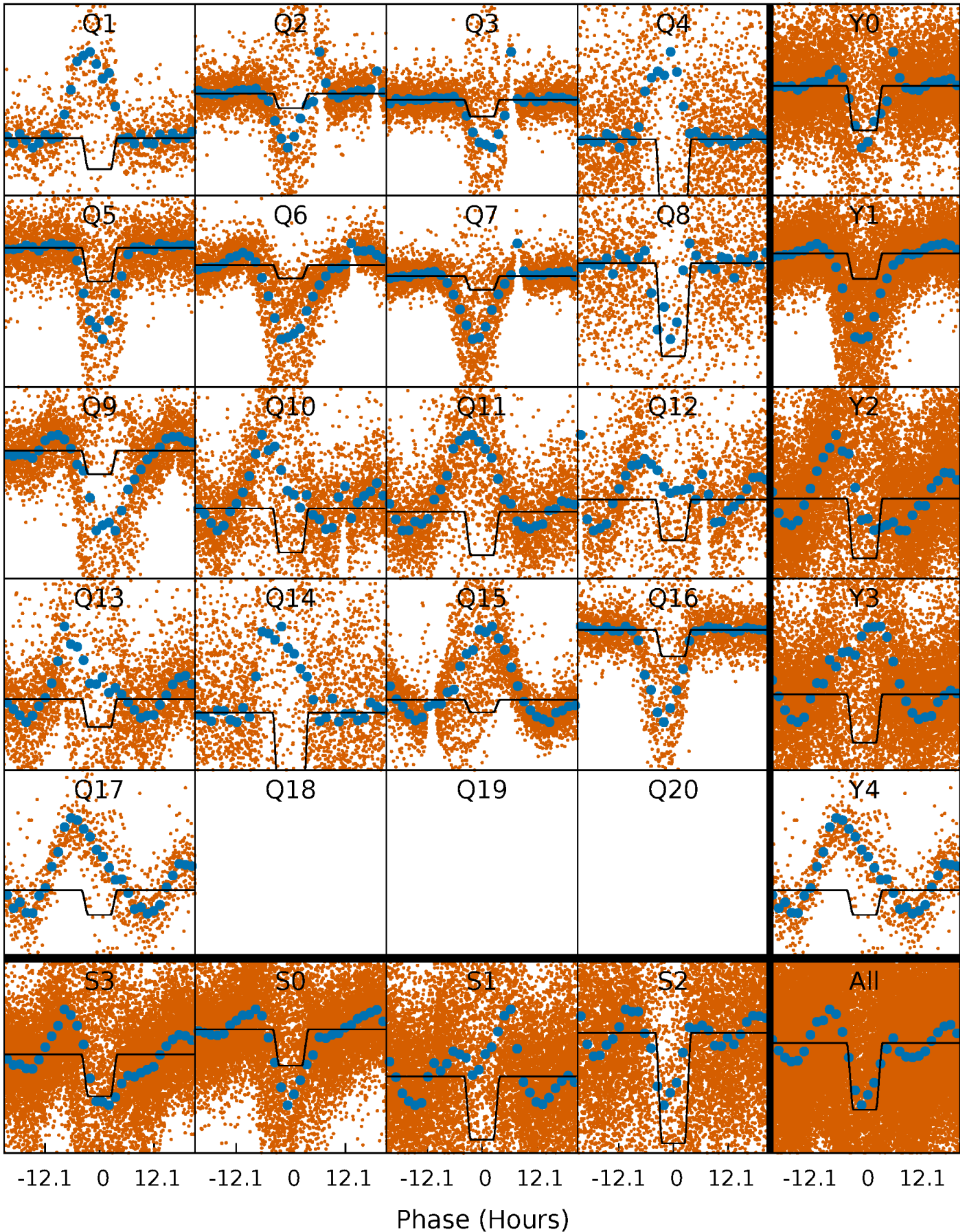
DV Quarter-Phased Transit Curves

TCE 010973465-02 P= 2.200152 Days $T_0=132.938860$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

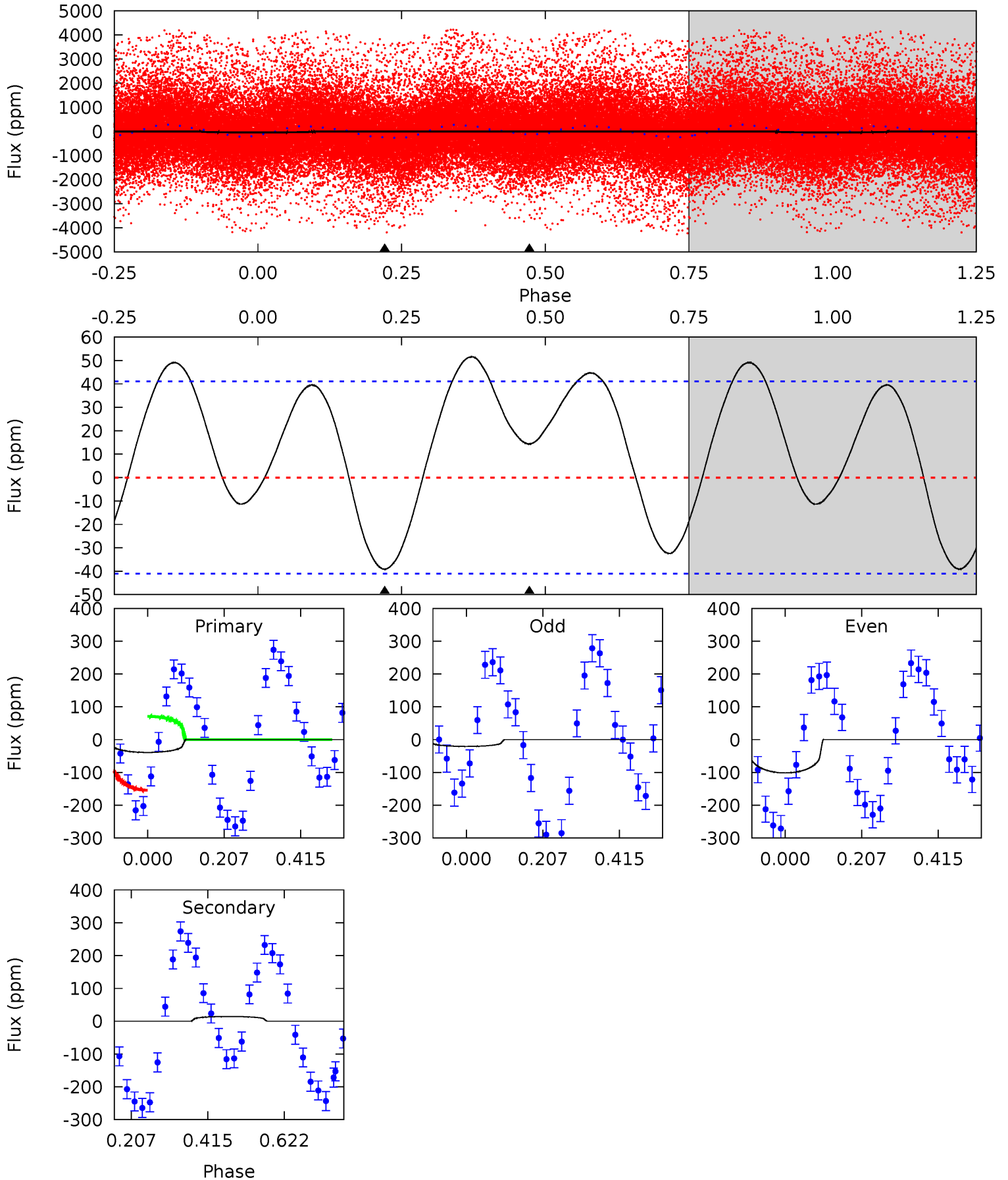
TCE 010973465-02 P= 2.199947 Days $T_0=133.023169$ (BKJD)



DV Model-Shift Uniqueness Test

010973465-02, P = 2.200152 Days, E = 130.738708 Days

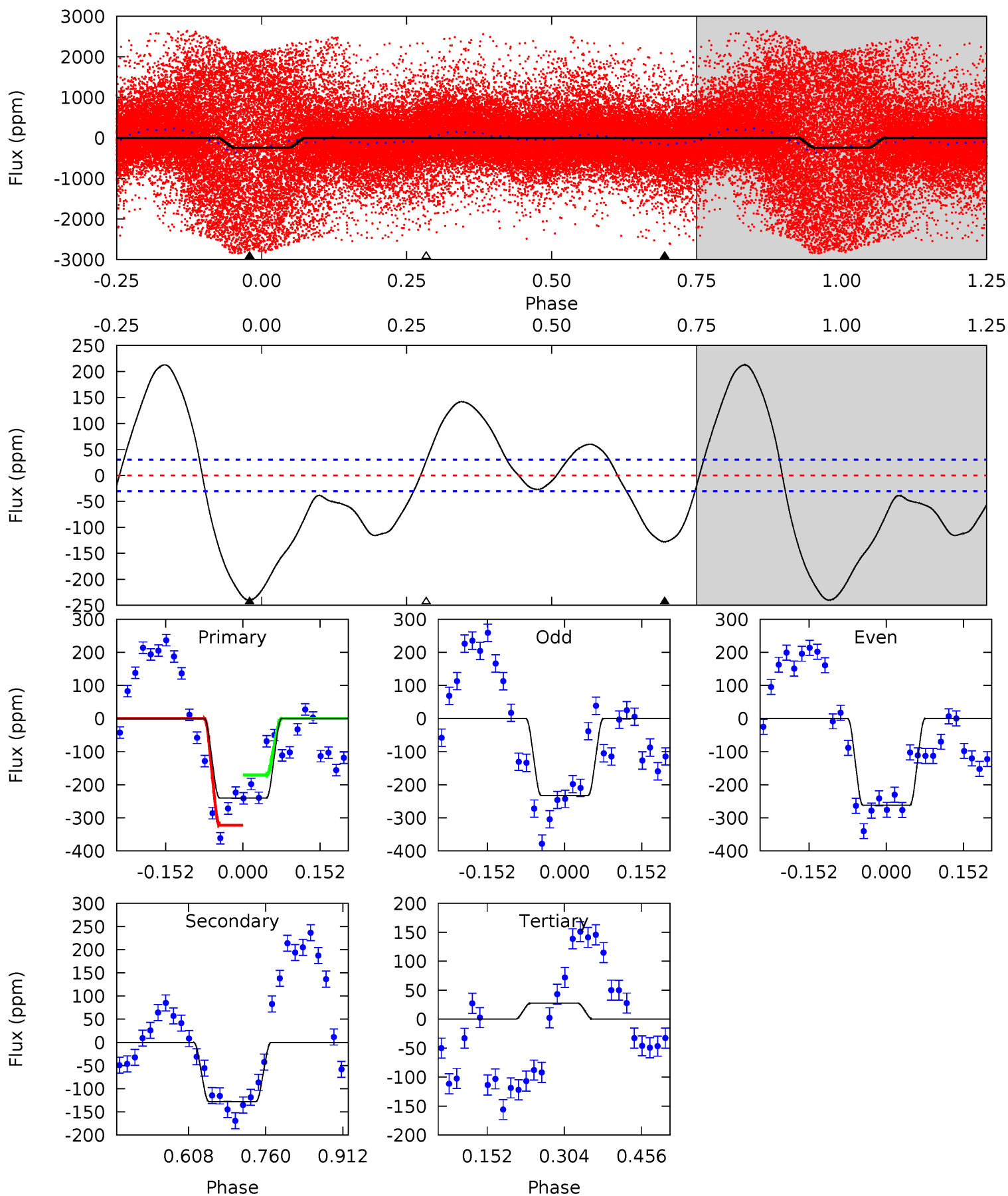
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.20	-1.53	0	0	4.41	1.26	2.86	4.20	4.20	-1.53	-1.53	4.27	-2.57	0.57	4.57



Alt Model-Shift Uniqueness Test

010973465-02, P = 2.199947 Days, E = 130.823222 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
35.5	18.9	-4.08	0	4.48	1.43	11.7	39.6	35.5	23.0	18.9	2.16	1.28	0.47	11.0



Stellar Parameters For KIC 010973465

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5174^{+156}_{-156}	$4.599^{+0.072}_{-0.048}$	$-0.720^{+0.300}_{-0.300}$	$0.668^{+0.070}_{-0.064}$	$0.648^{+0.075}_{-0.032}$	$3.056^{+0.881}_{-0.572}$
	+3%/-3%	+2%/-1%	+42%/-42%	+10%/-10%	+12%/-5%	+29%/-19%
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 010973465-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	14 ± 9	$0.89^{+0.56}_{-0.49}$	1533^{+59}_{-56}	-3310^{+630}_{-1087}	$-7.085^{+5.832}_{-31.566}$
Alt.	-128 ± 7	$1.73^{+0.66}_{-0.55}$	1532^{+56}_{-63}	3864^{+597}_{-403}	20^{+22}_{-9}

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

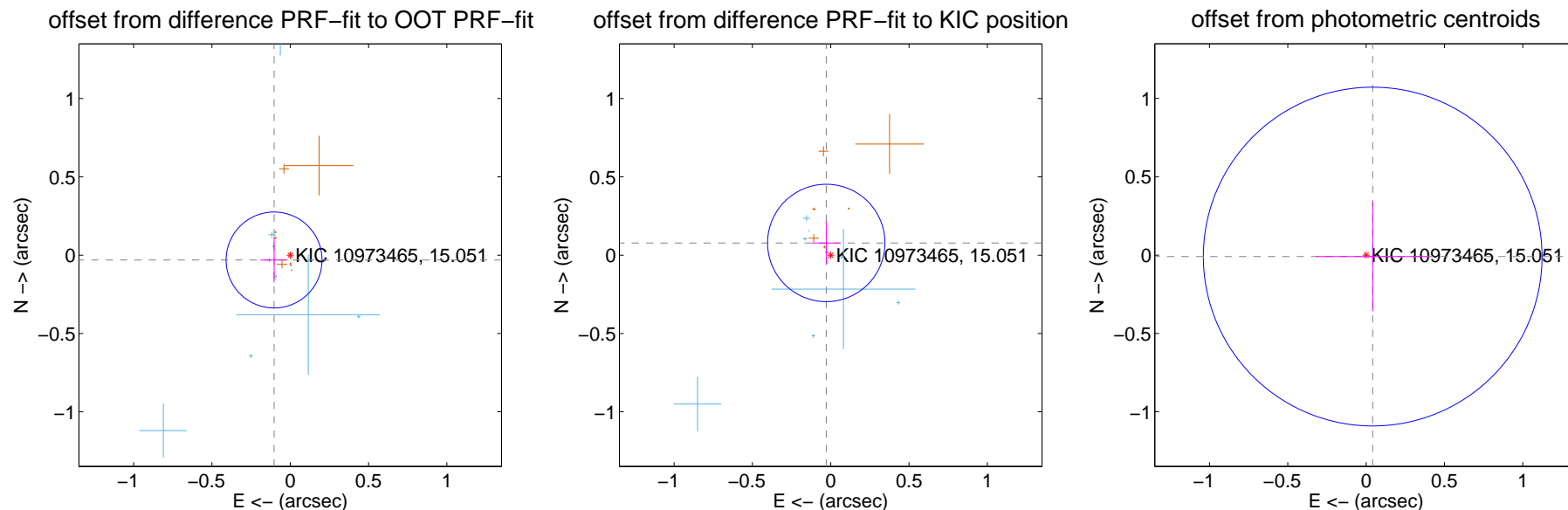
DV Centroid Data

Supplemental centroid analysis for 010973465-02. Kepler magnitude: 15.05. Transit SNR 7.18

There are 9 quarters with good PRF difference image offsets

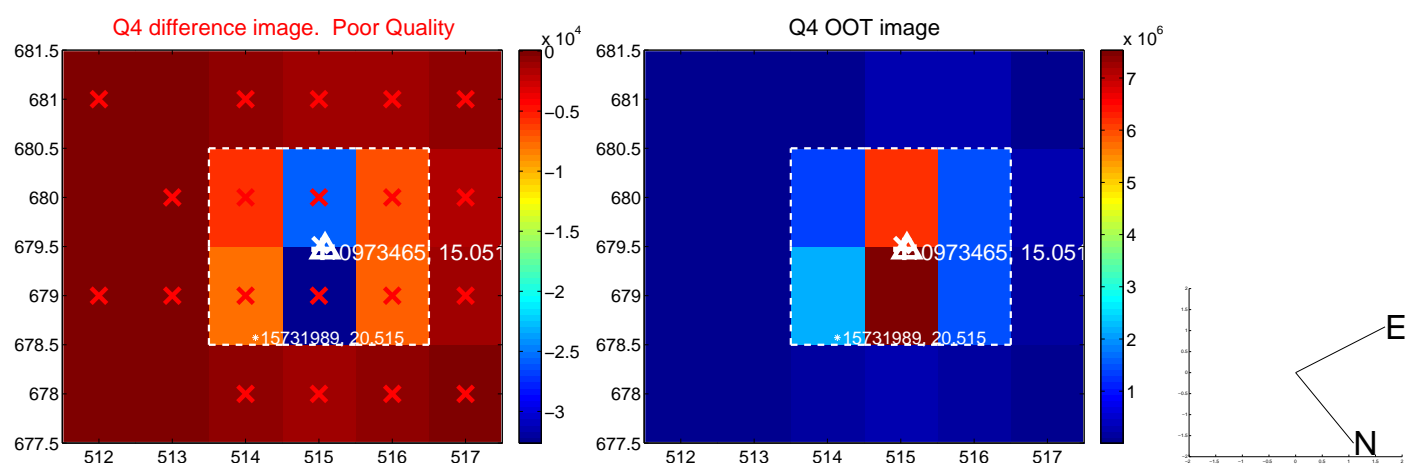
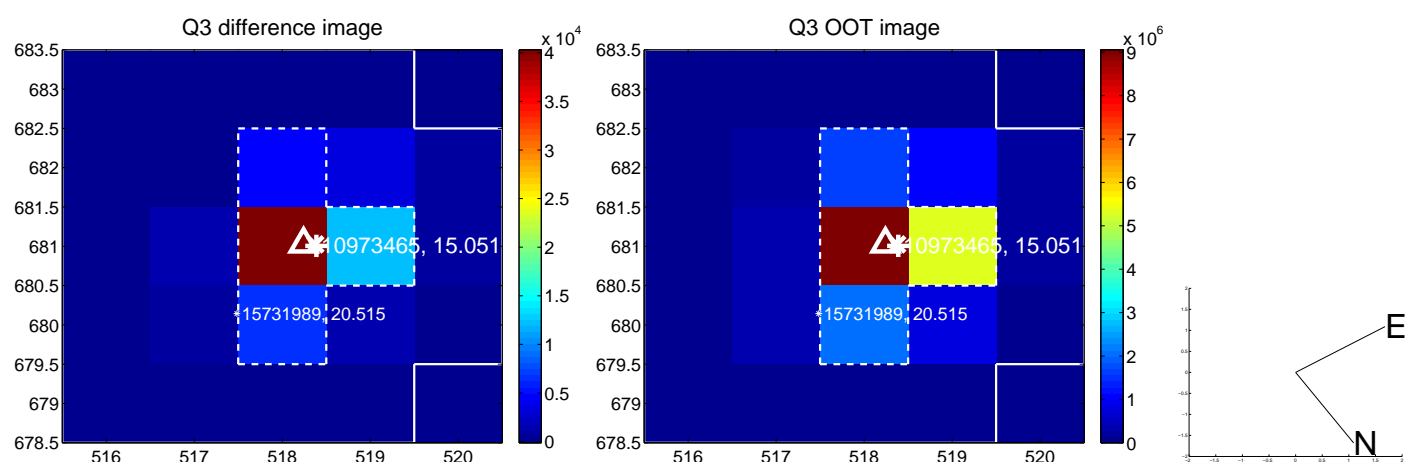
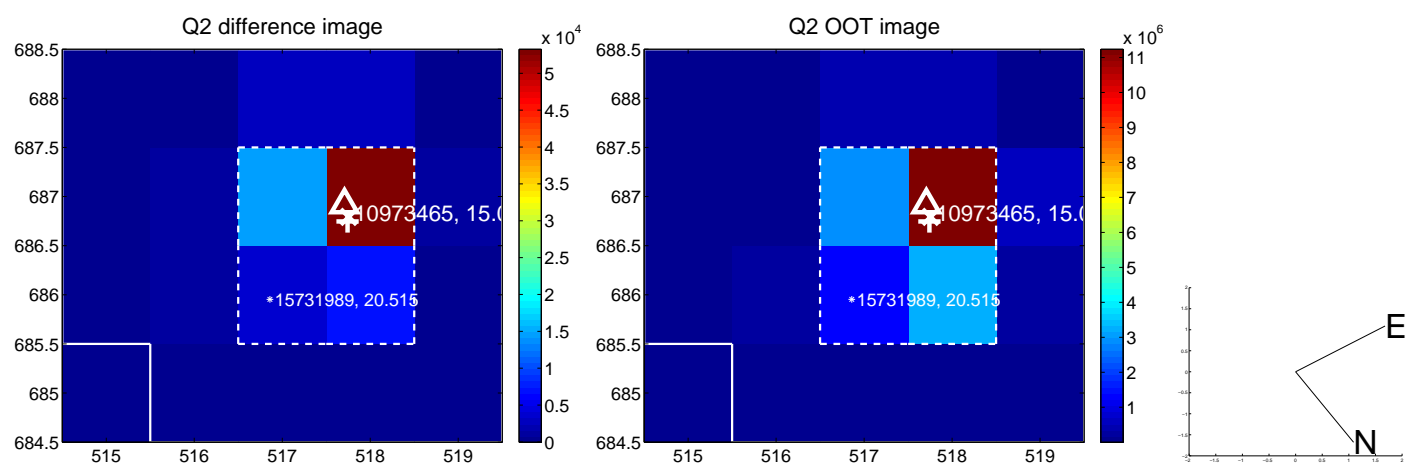
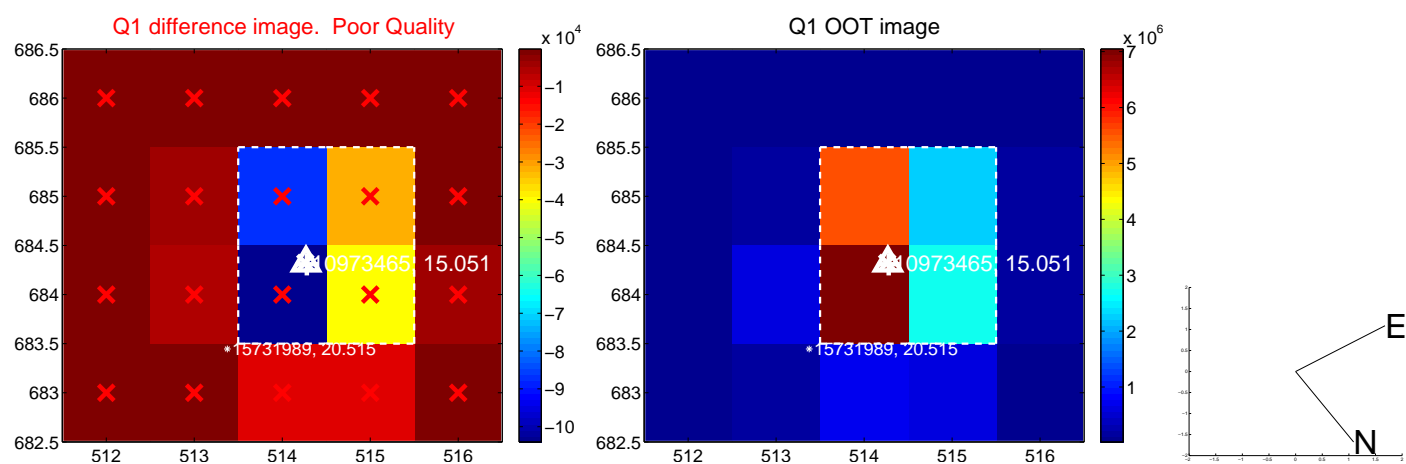
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.108 ± 0.102	1.06	0.103 ± 0.087	-0.031 ± 0.144
PRF-fit source offset from KIC position	0.083 ± 0.125	0.66	0.029 ± 0.092	0.078 ± 0.137
photometric centroid source offset	0.04 ± 0.36	0.12	-0.04 ± 0.36	-0.01 ± 0.35

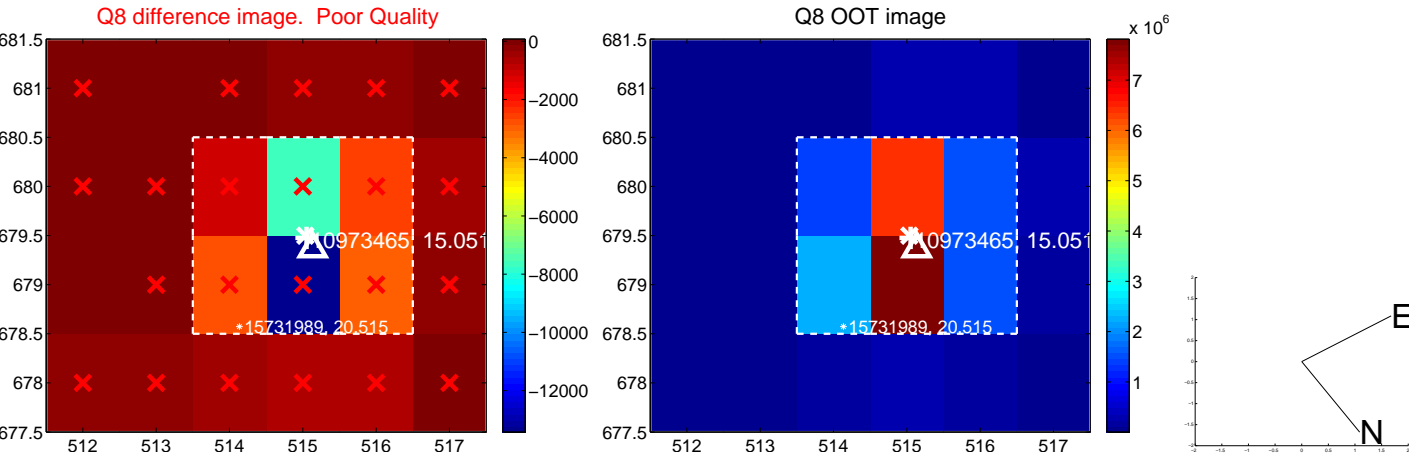
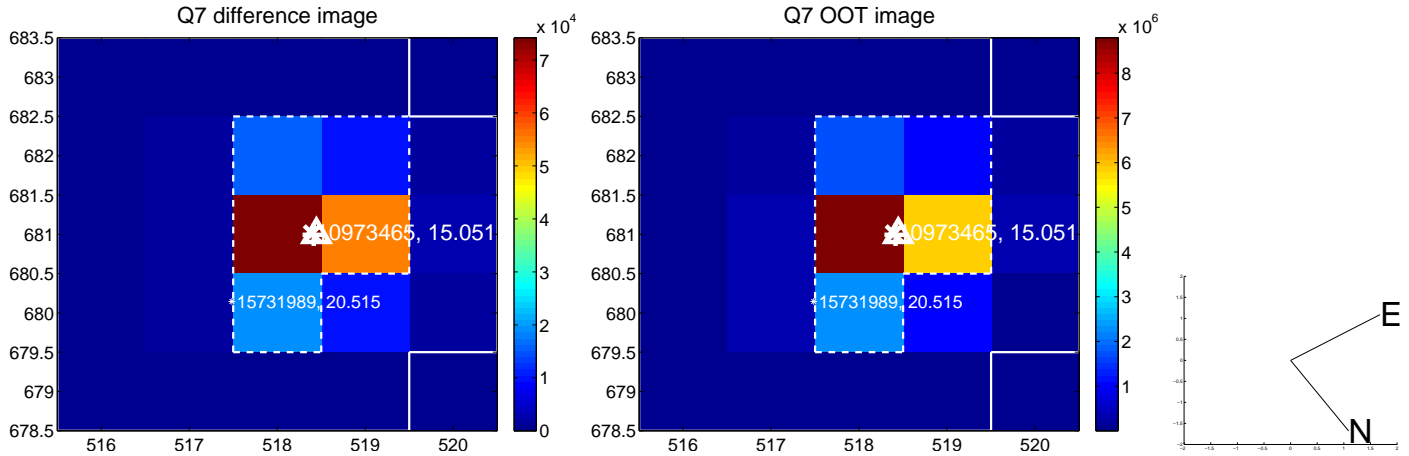
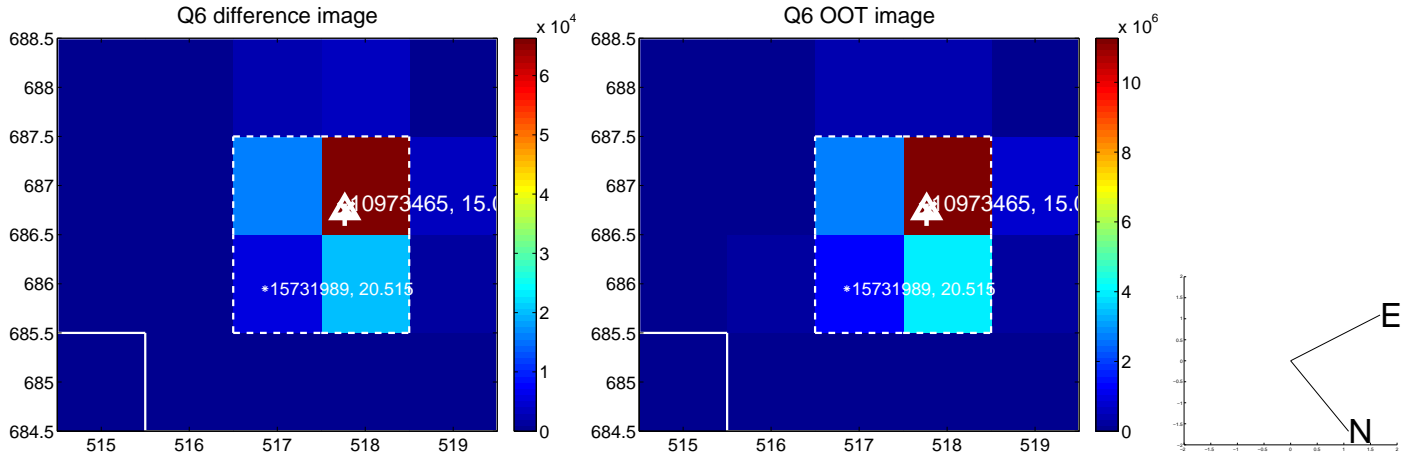
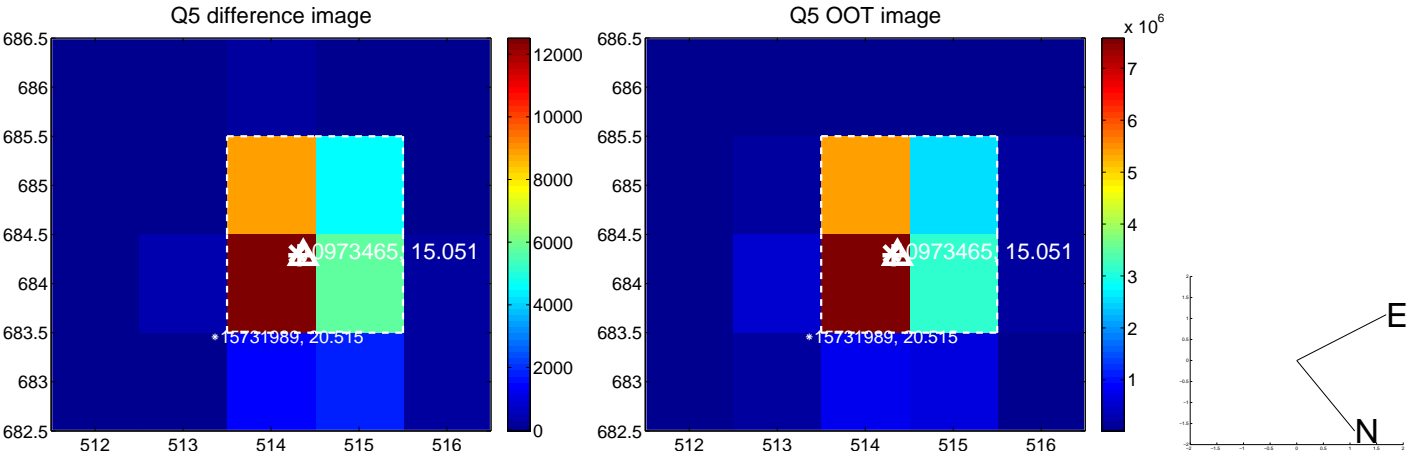


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

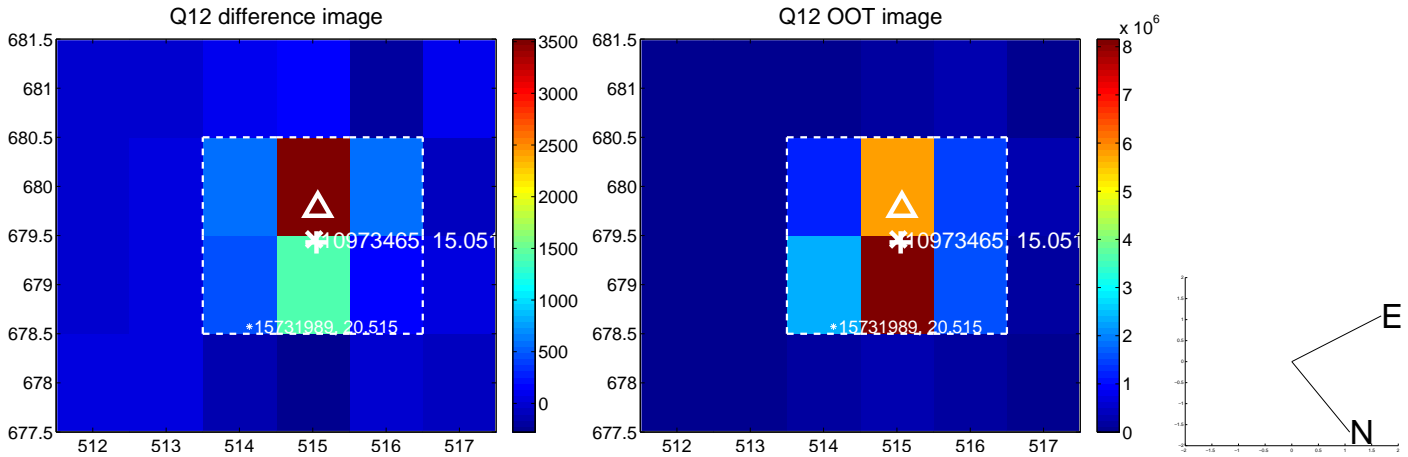
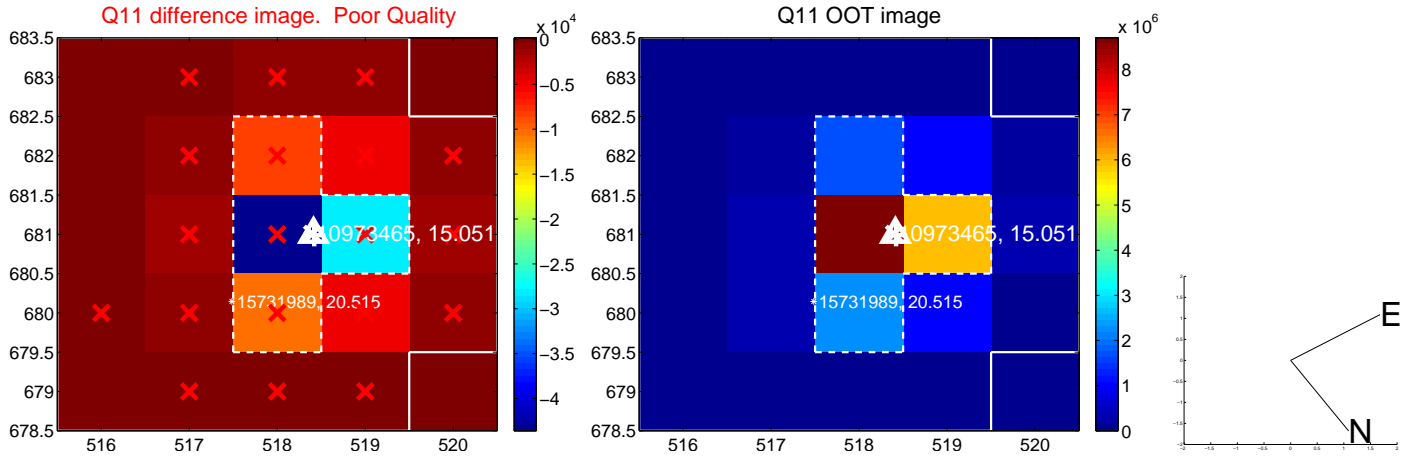
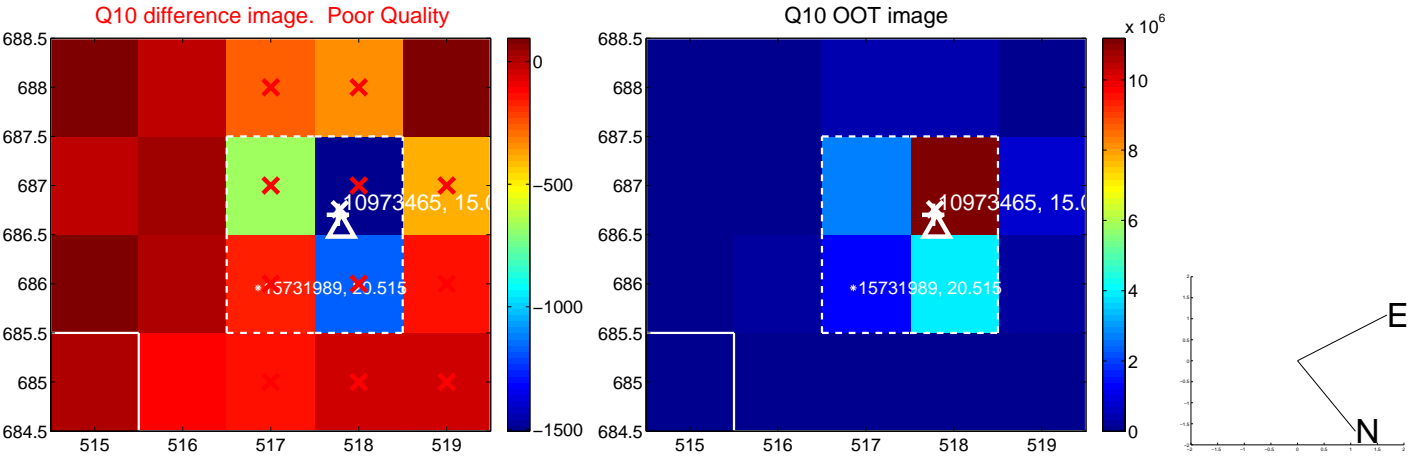
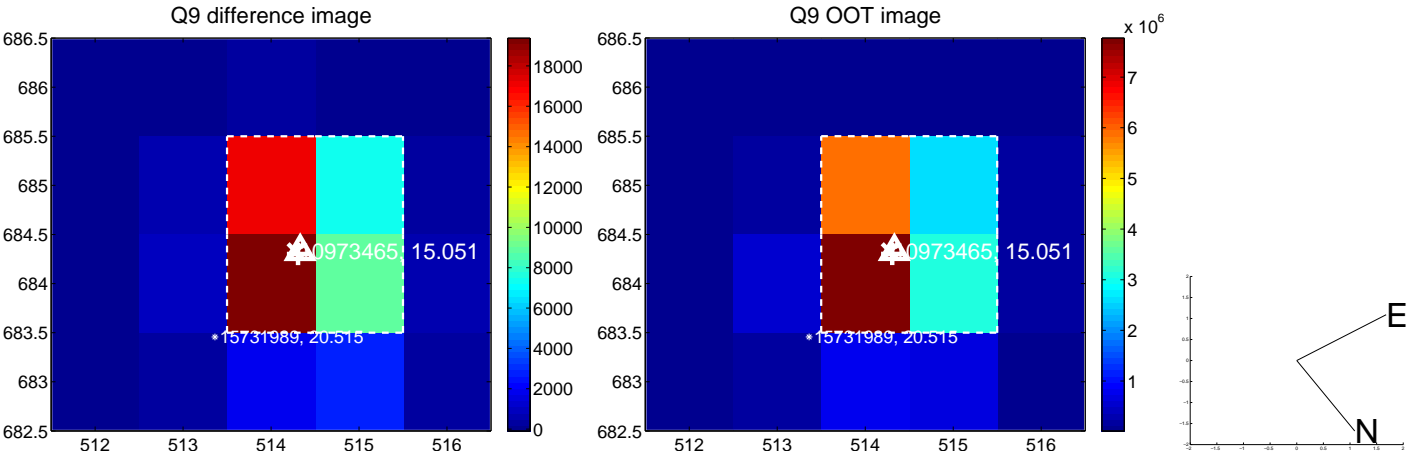
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



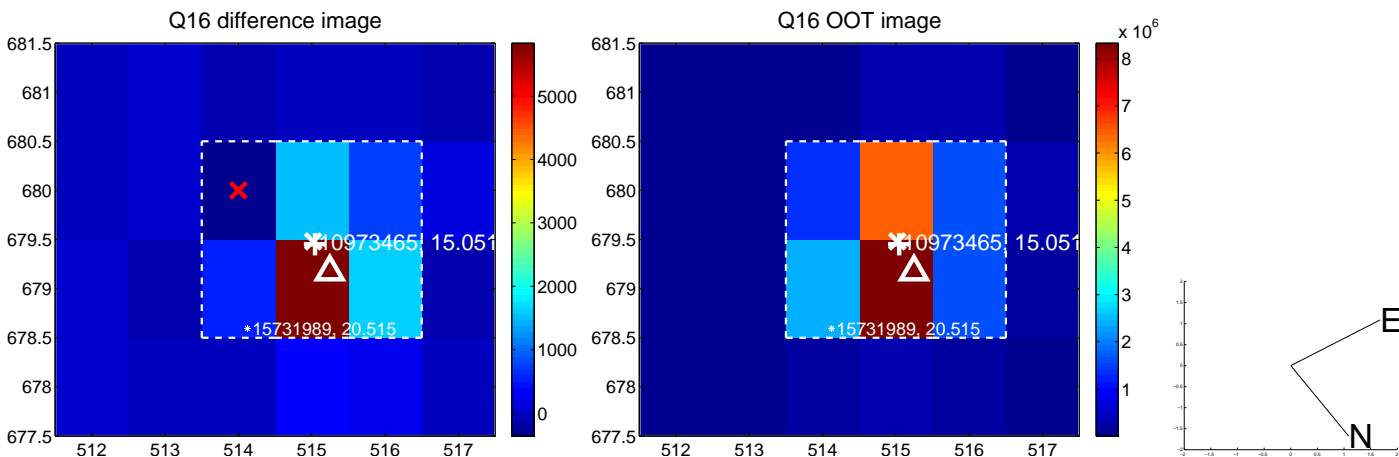
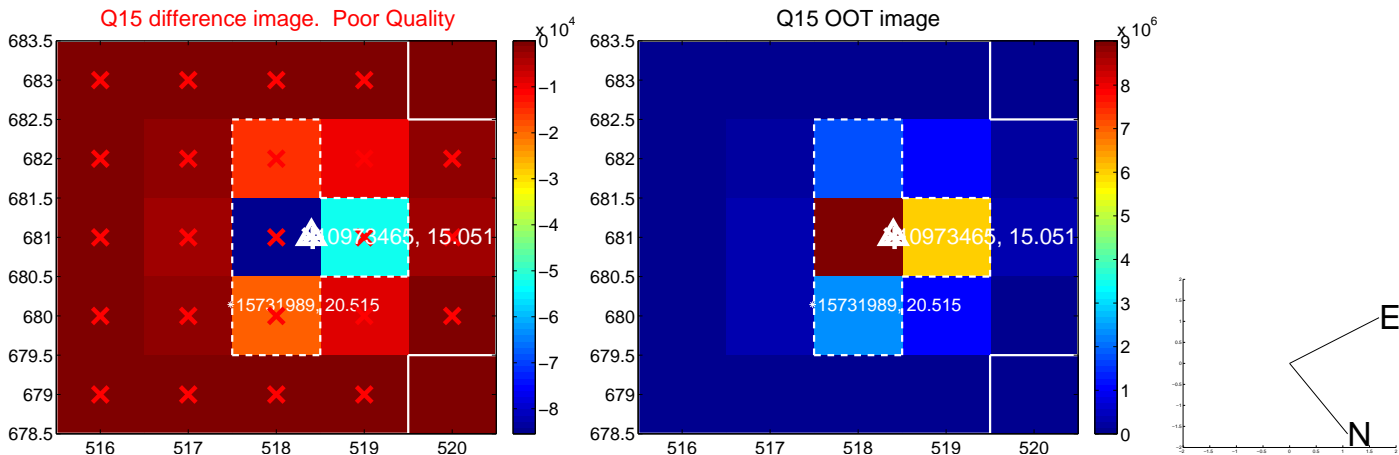
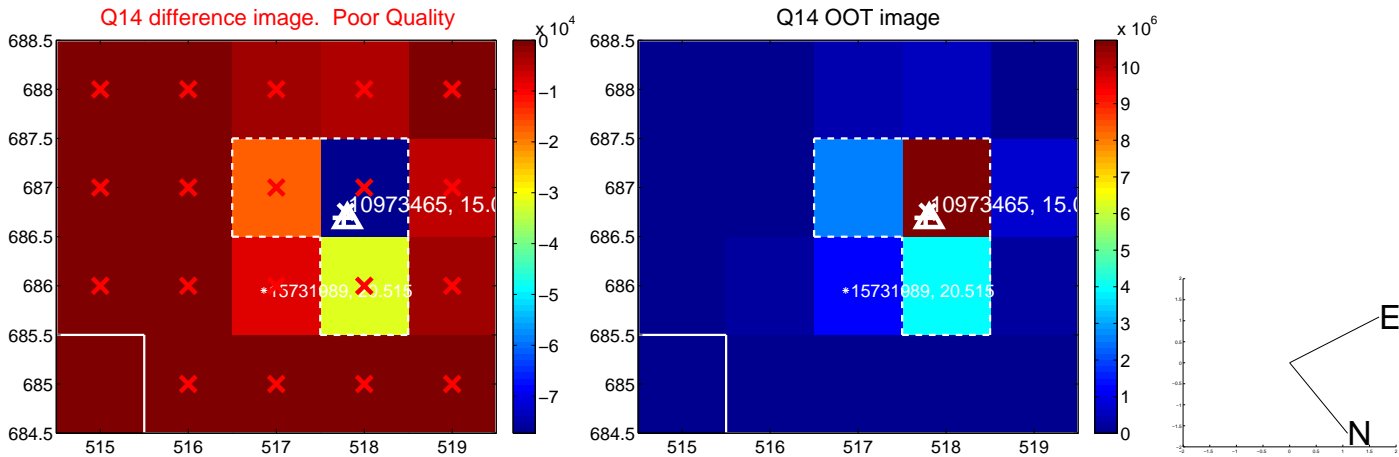
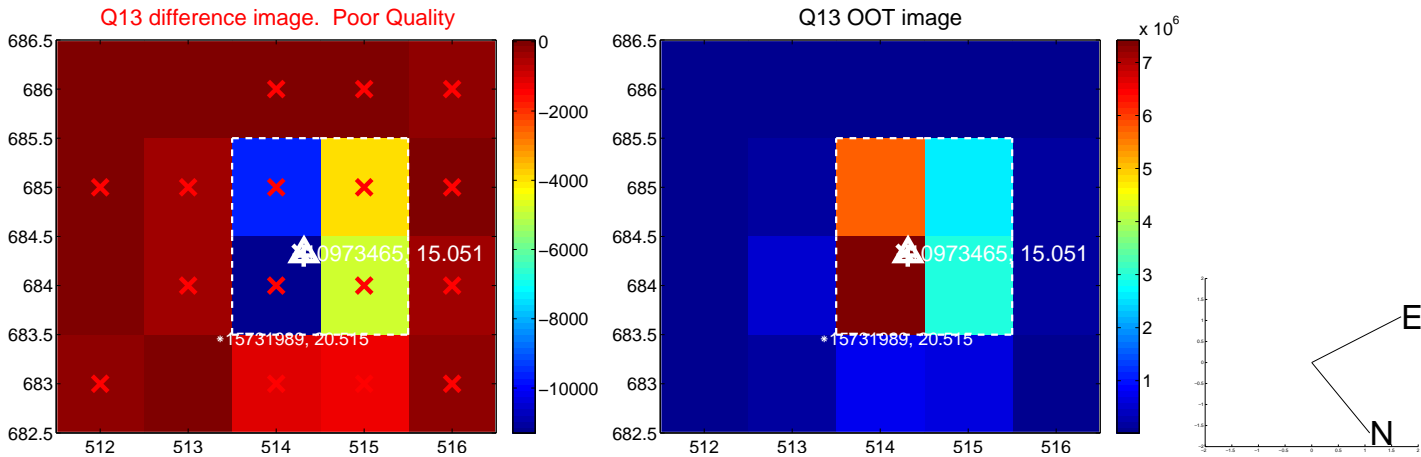
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



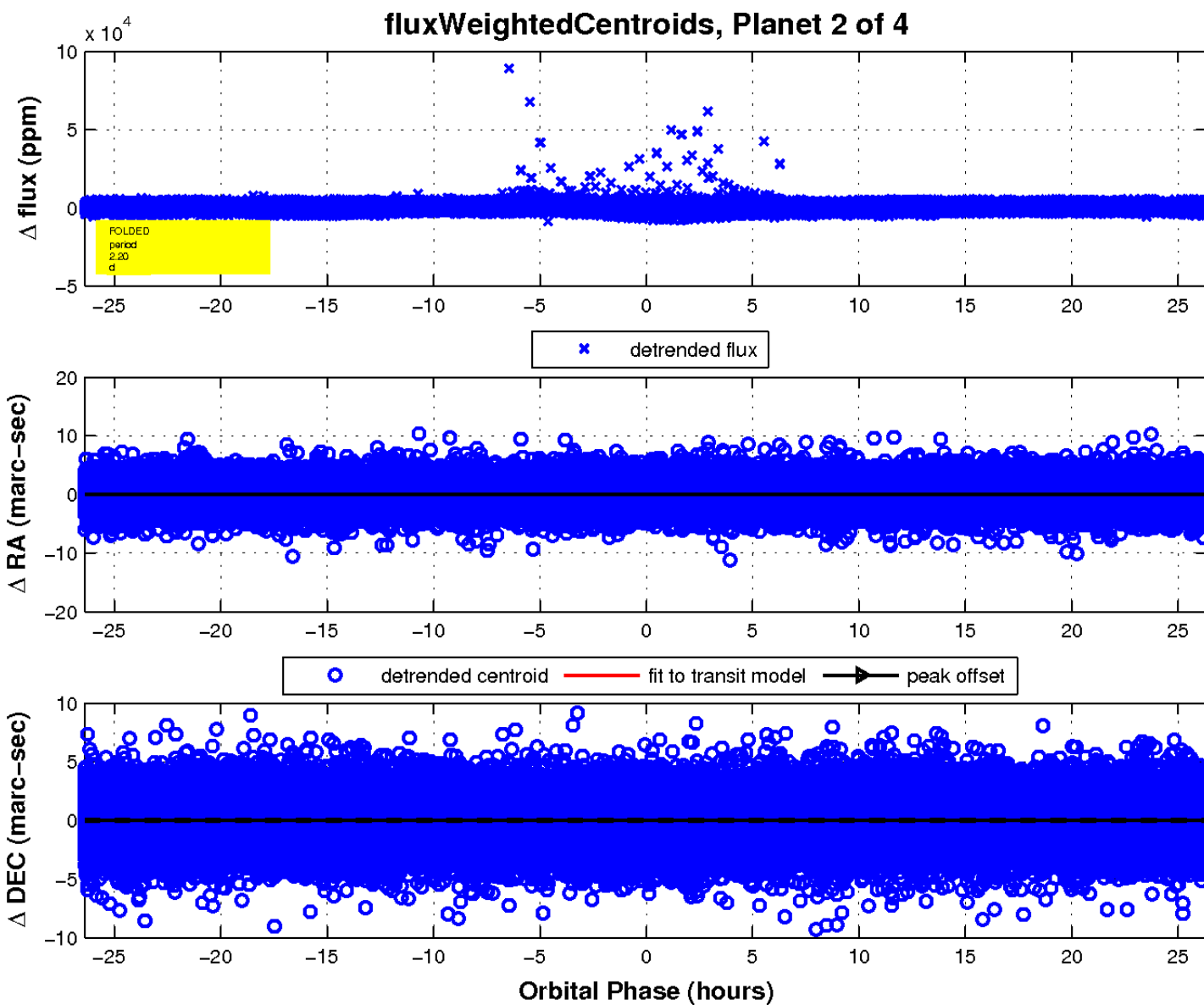
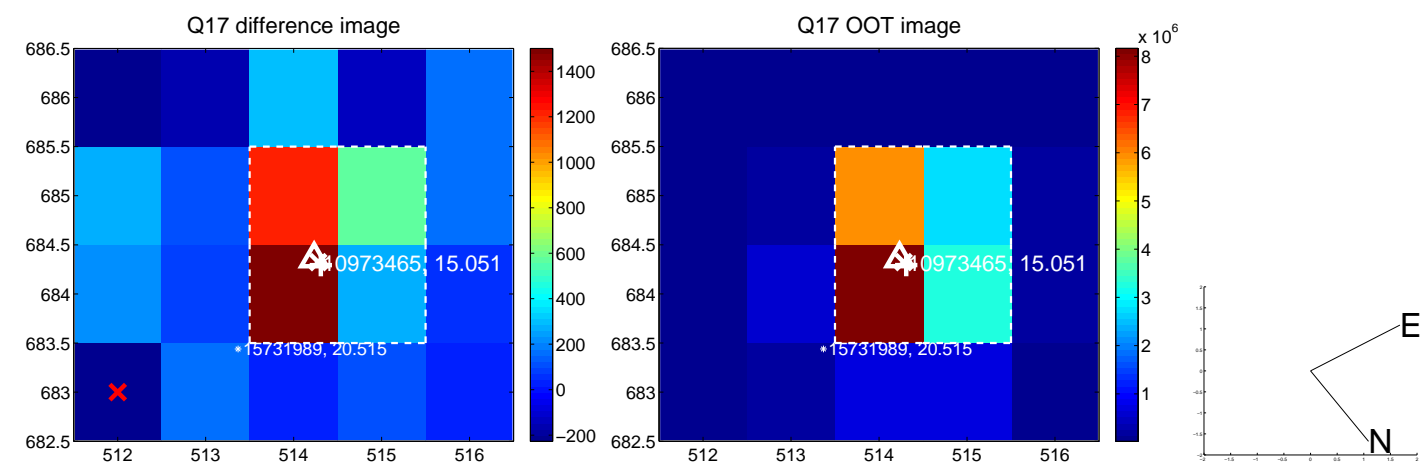
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

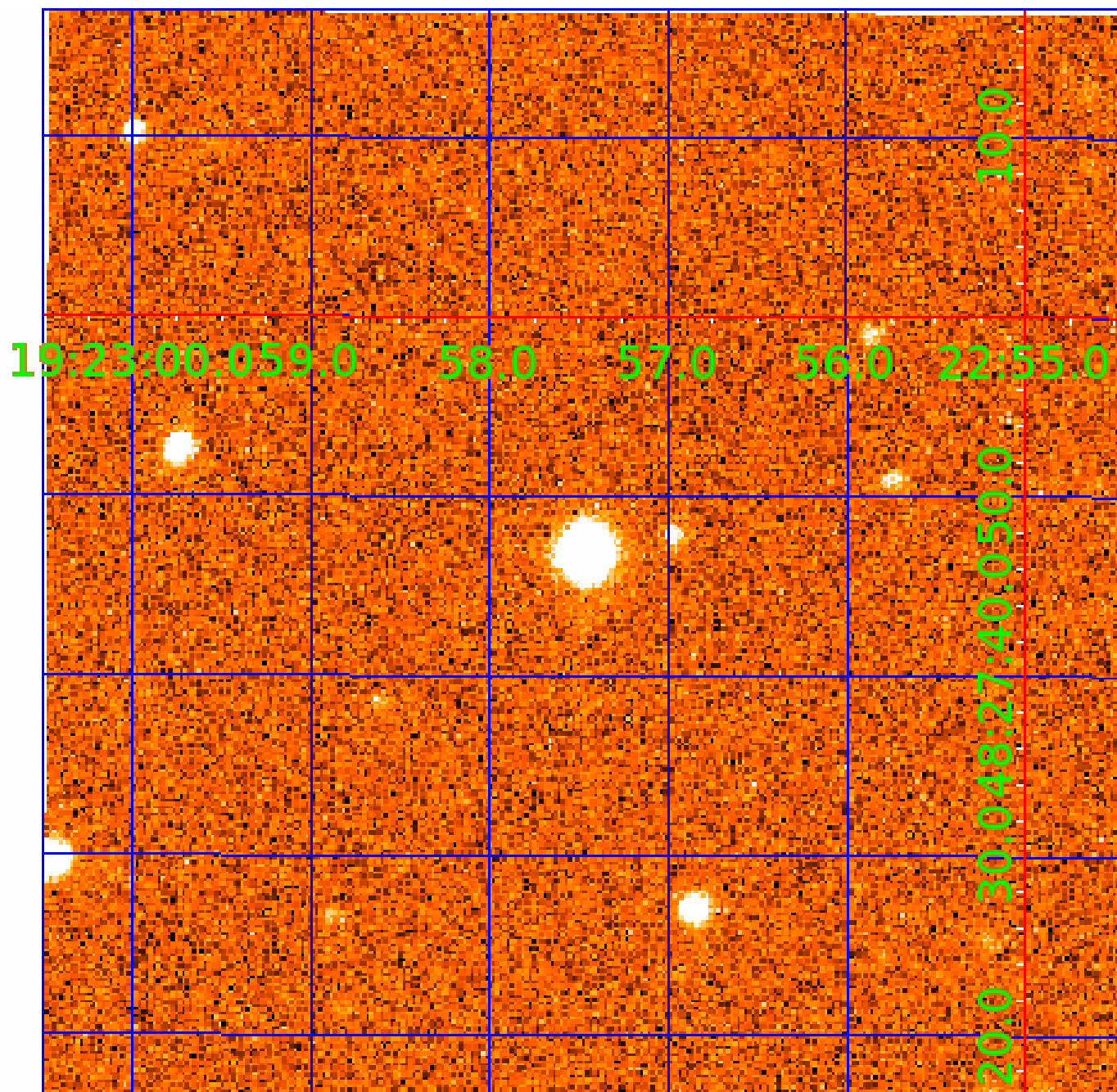


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010973465

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})
010973465-01	OBS	No	299.745309	143.386954	1772.2	7.468	13.6	6.0	0.67	5174	2.89	0.50
010973465-02	OBS	No	2.200152	132.938860	158.7	10.508	11.6	7.2	0.67	5174	0.84	349.50
010973465-03	OBS	No	321.090074	226.155490	2214.5	1.057	15.0	5.4	0.67	5174	3.31	0.46
010973465-04	OBS	No	241.159409	145.286042	1387.2	4.452	14.9	5.5	0.67	5174	2.58	0.67

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010973465-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
010973465-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
010973465-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010973465-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS

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.

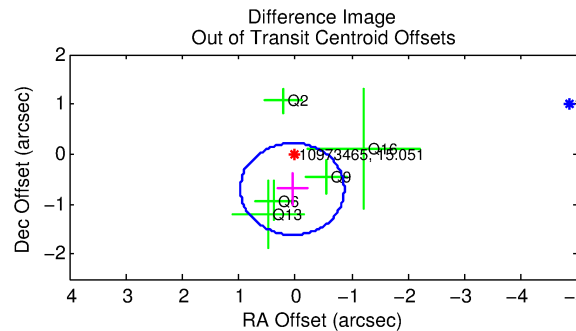
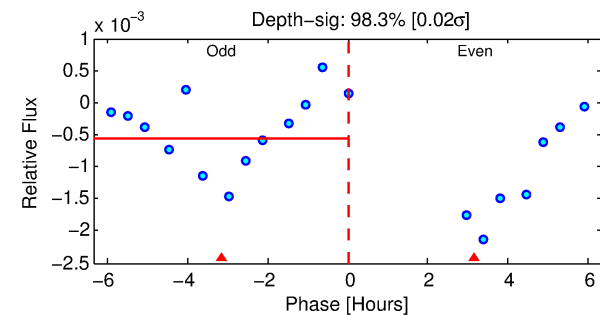
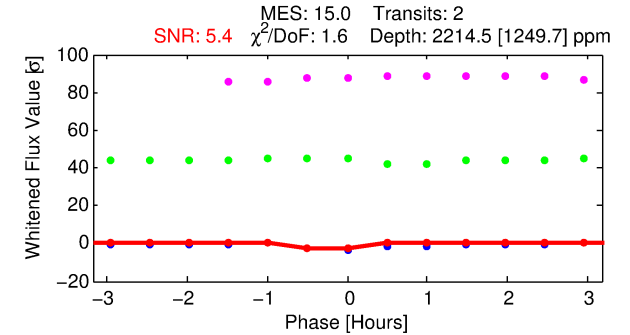
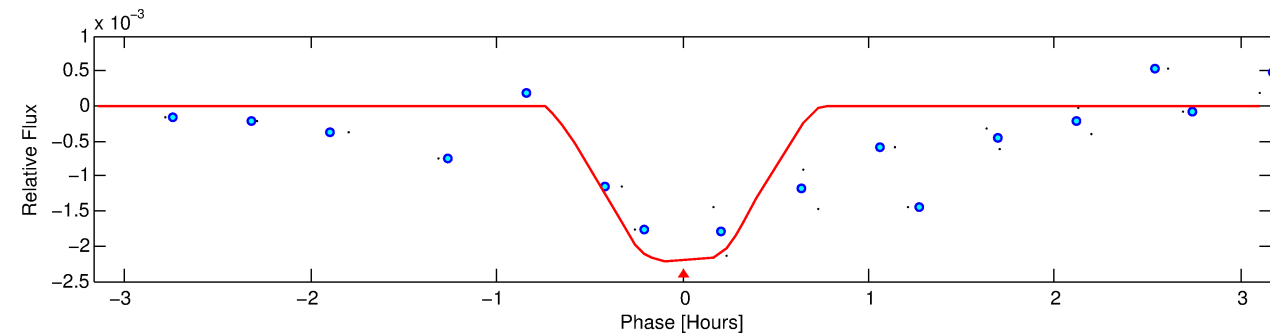
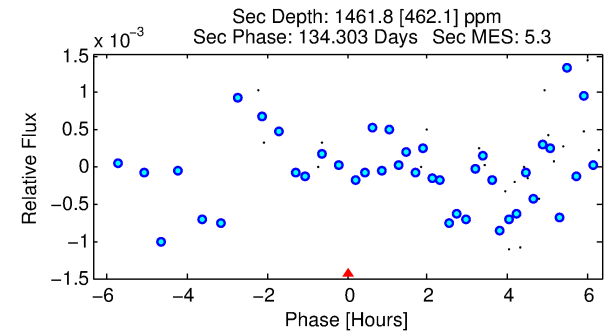
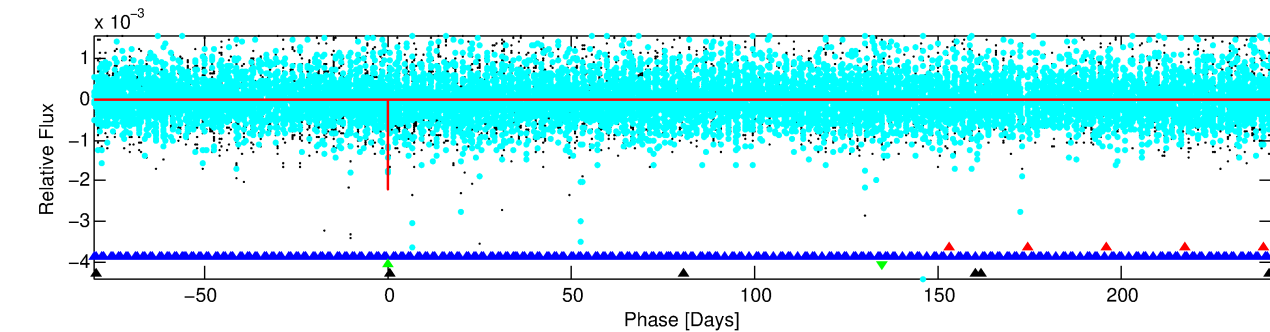
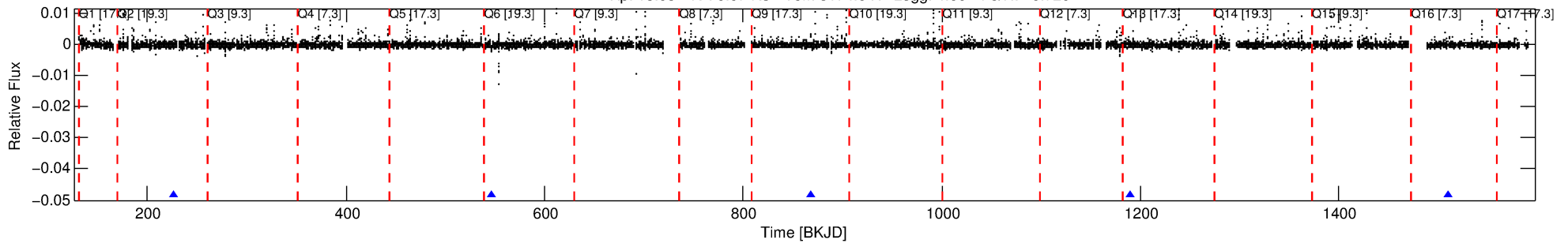
Ephemeris Match Information For 010973465-03

No Significant Match Found

DV One-Page Summary

KIC: 10973465 Candidate: 3 of 4 Period: 321.090 d

Kp: 15.05 R*: 0.67 Rs Teff: 5174.0 K Logg: 4.60 Fe/H: -0.720



DV Fit Results:

Period = 321.09007 [0.01003] d
Epoch = 226.1555 [0.0083] BKJD
Rp/R* = 0.0454 [0.1624]
a/R* = 1994.66 [26547.56]
b = 0.60 [14.83]
Seff = 0.45 [0.08]
Teq = 209 [9] K
Rp = 3.31 [11.84] Re
a = 0.7937 [0.0707] AU
Ag = 46216.84 [330827.11] [0.14σ]
Teffp = 4747 [8495] K [0.53σ]

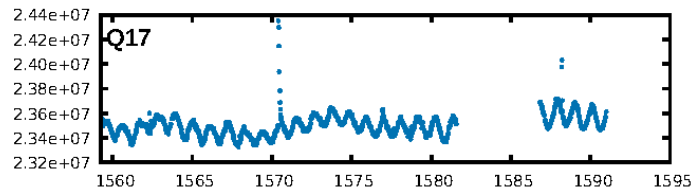
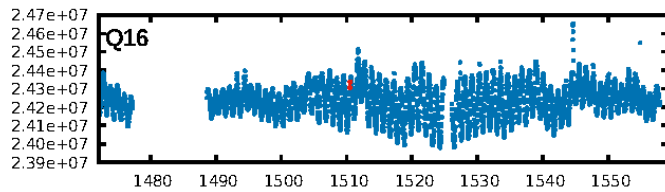
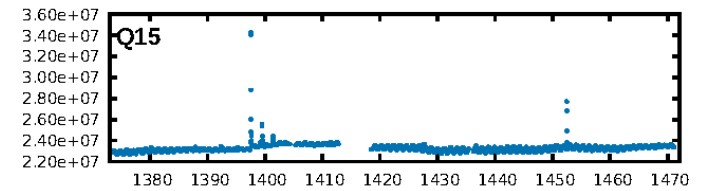
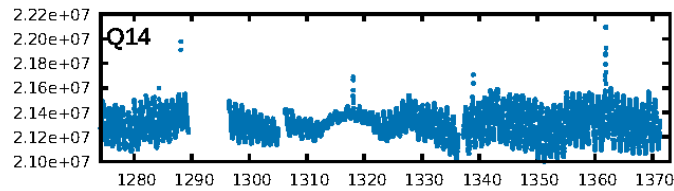
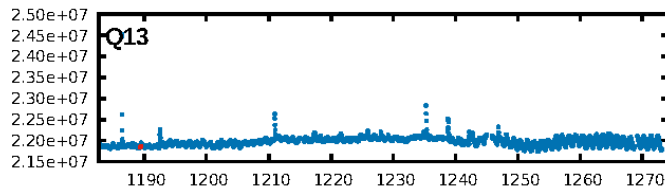
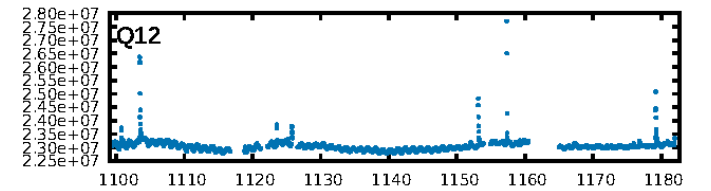
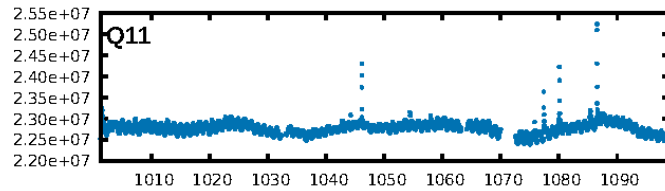
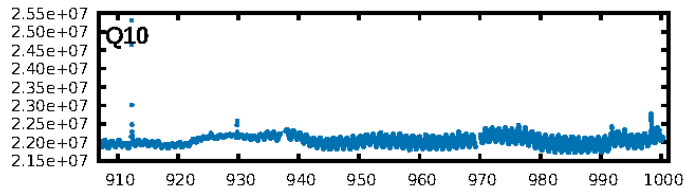
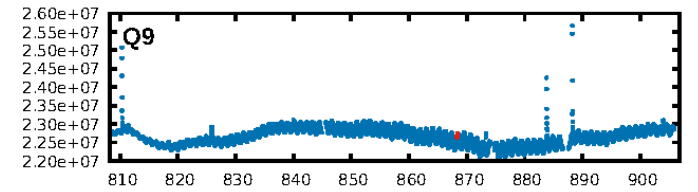
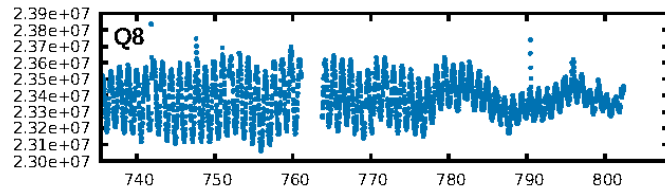
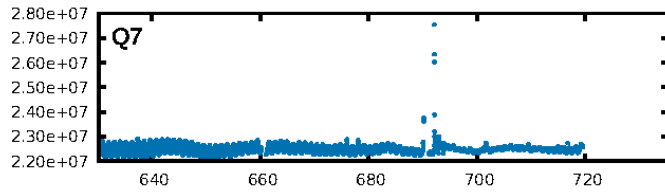
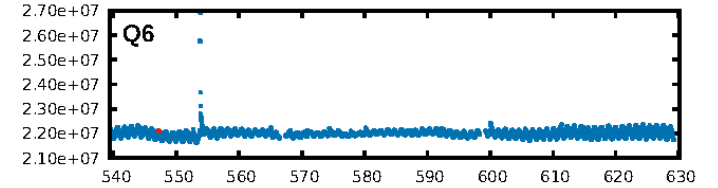
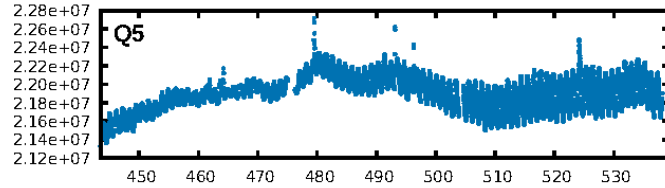
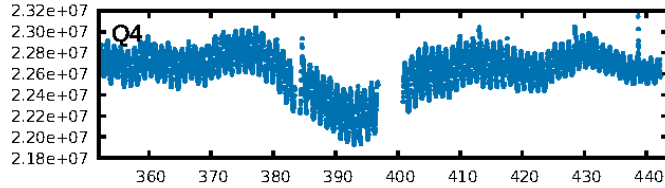
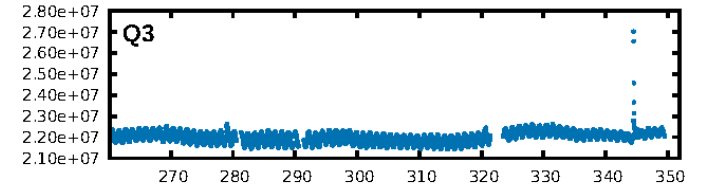
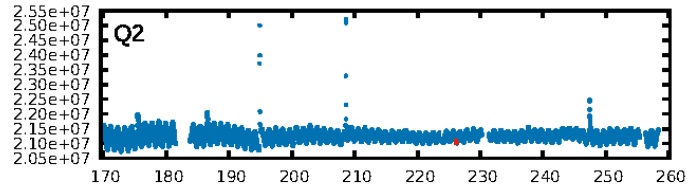
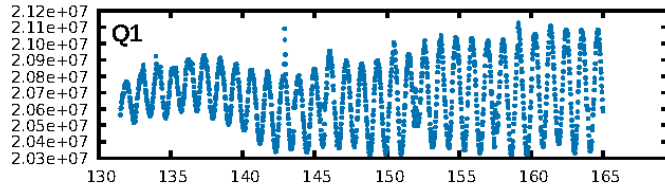
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [67.92σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 33.1%
ModelChiSquareGof-sig: 89.7%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: -61.66
Centroid-sig: 41.8%
Centroid-so: 0.543 arcsec [0.65σ]
OotOffset-rm: 0.701 arcsec [2.29σ]
KicOffset-rm: 0.565 arcsec [1.60σ]
OotOffset-st: 2/0/1/2 [5]
KicOffset-st: 2/0/1/2 [5]
DiffImageQuality-fgm: 0.40 [2/5]
DiffImageOverlap-fno: 0.60 [3/5]

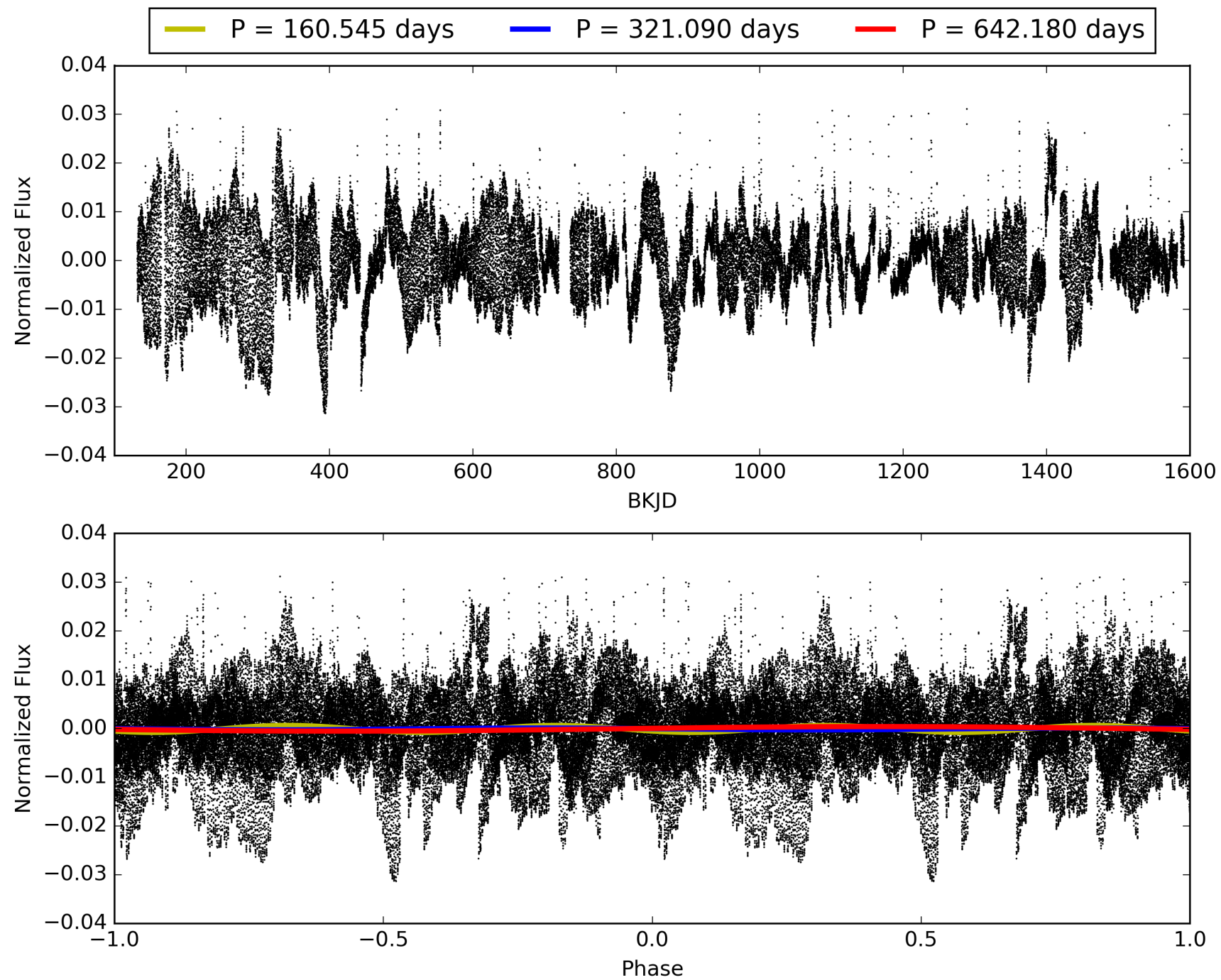
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:19:00 Z

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

TCE 010973465-03, PDC Light Curves

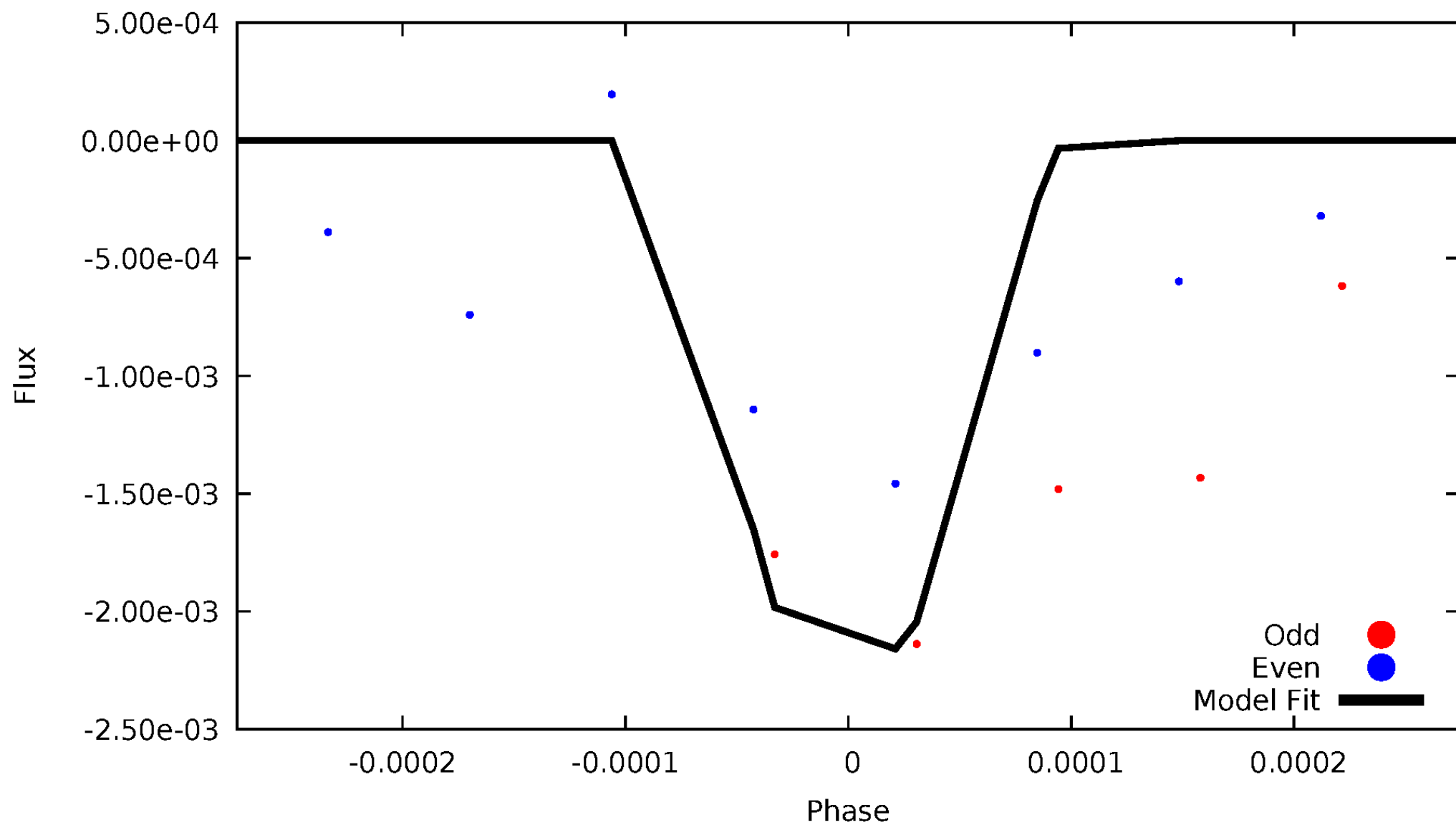


TCE 010973465-03



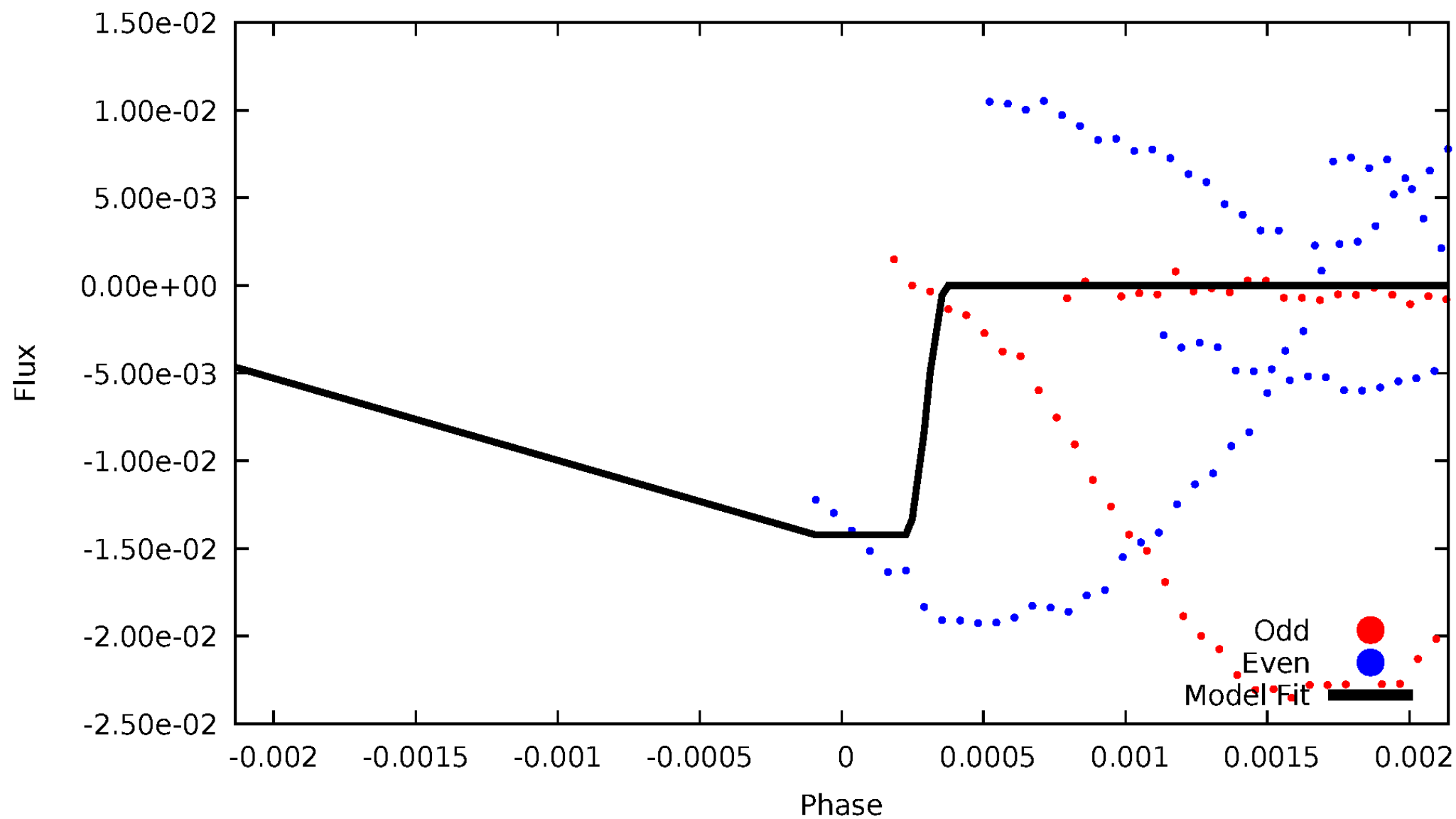
DV Odd/Even

TCE 010973465-03

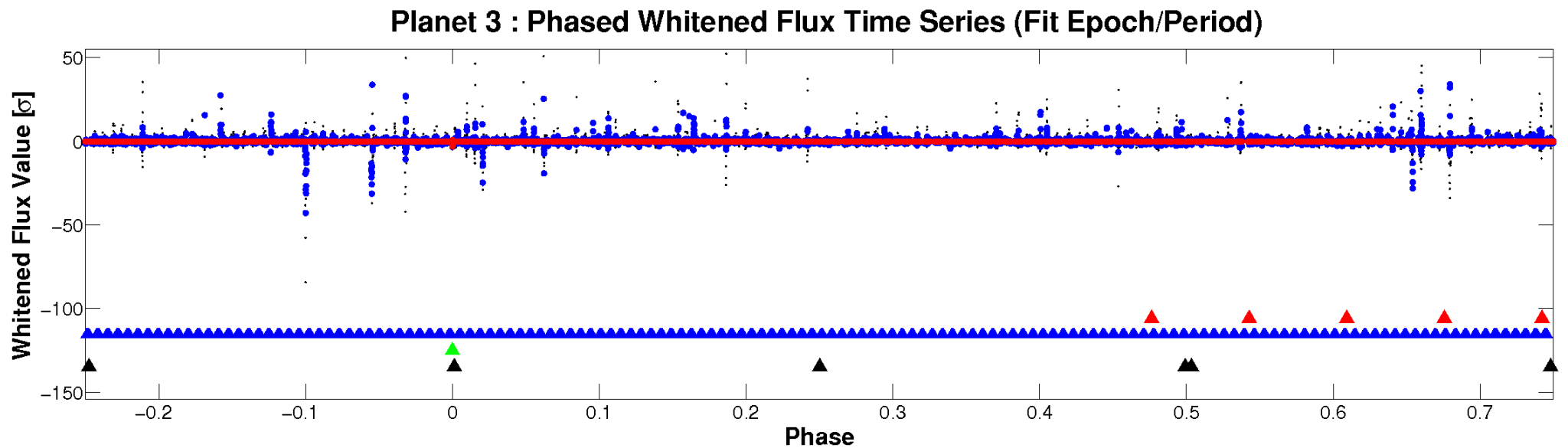
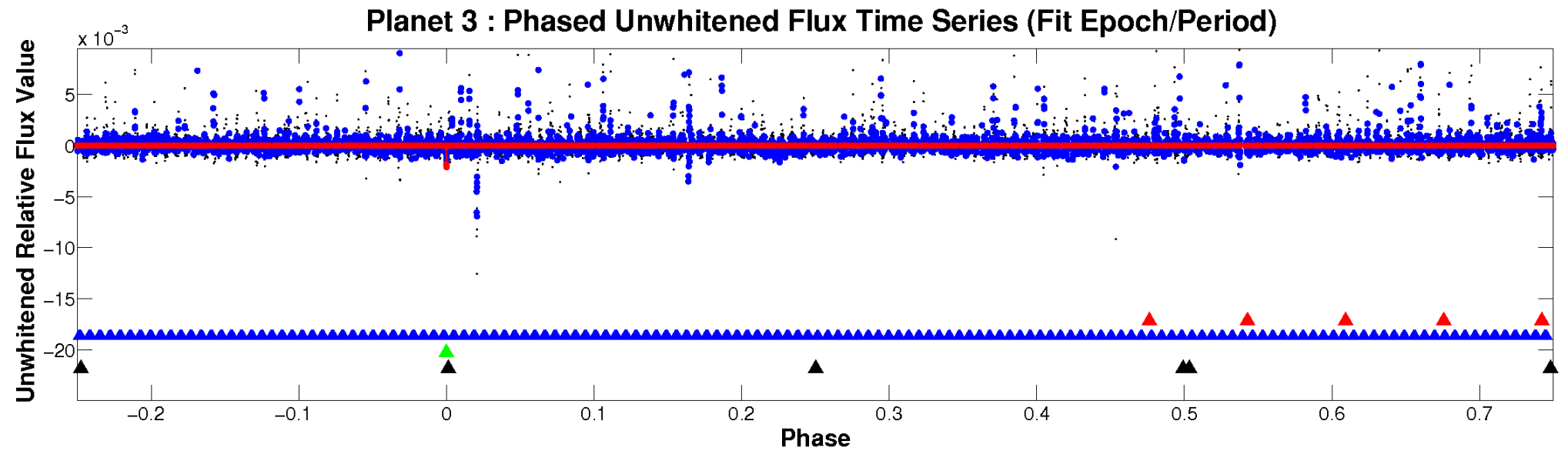


ALT Odd/Even

TCE 010973465-03

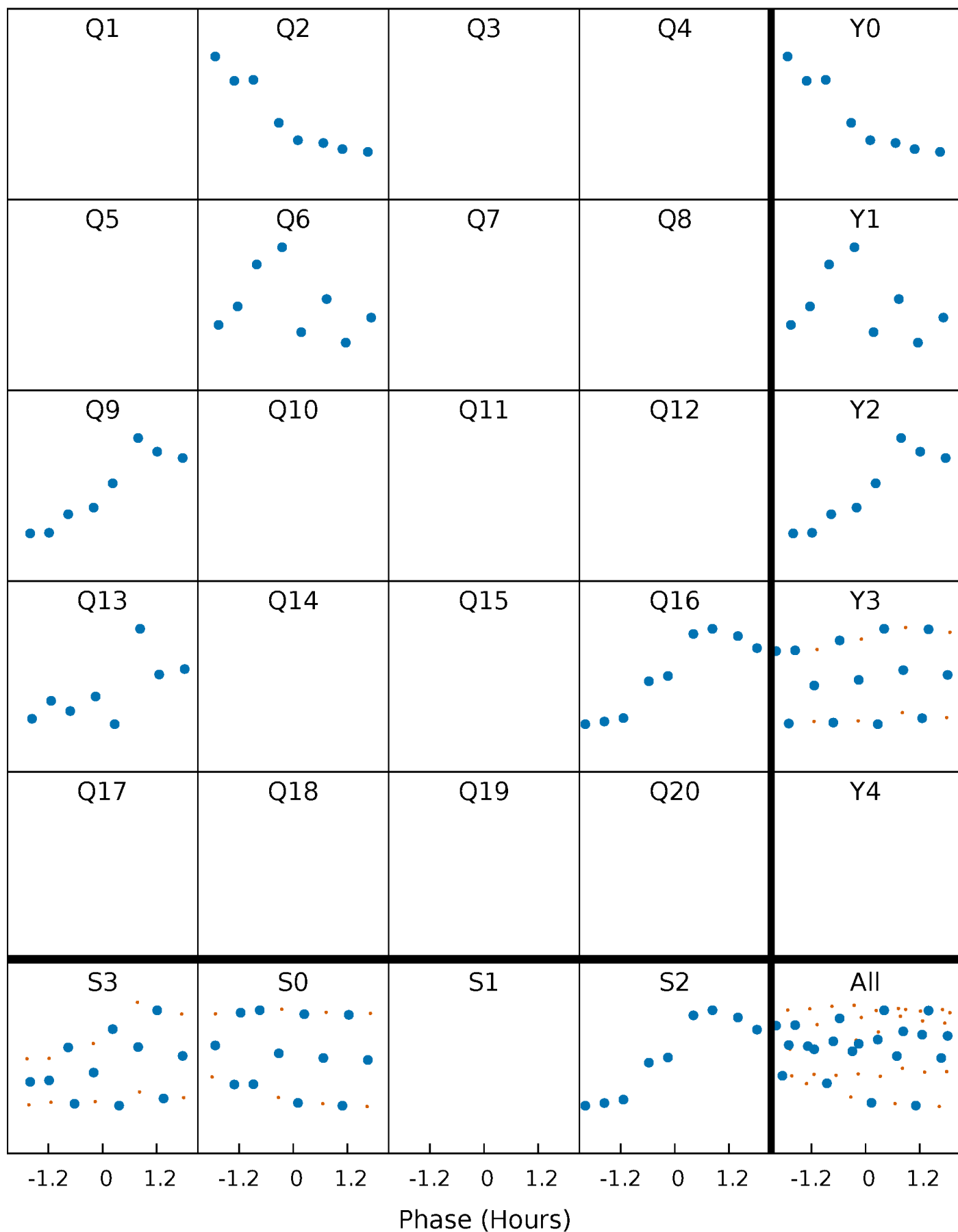


Non-Whitened Vs. Whitened Light Curve



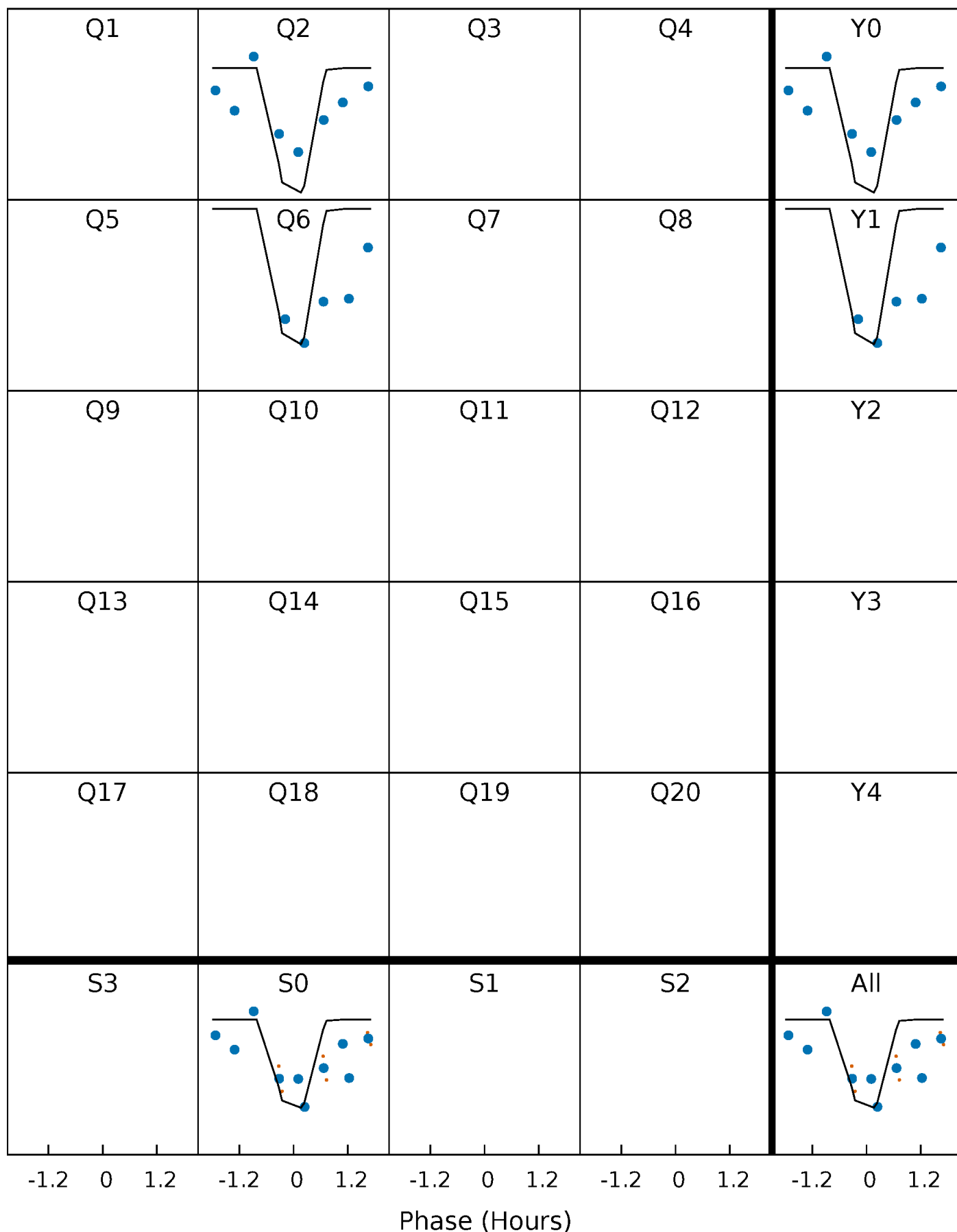
PDC Quarter-Phased Transit Curves

TCE 010973465-03 P=321.090074 Days $T_0=226.155491$ (BKJD)



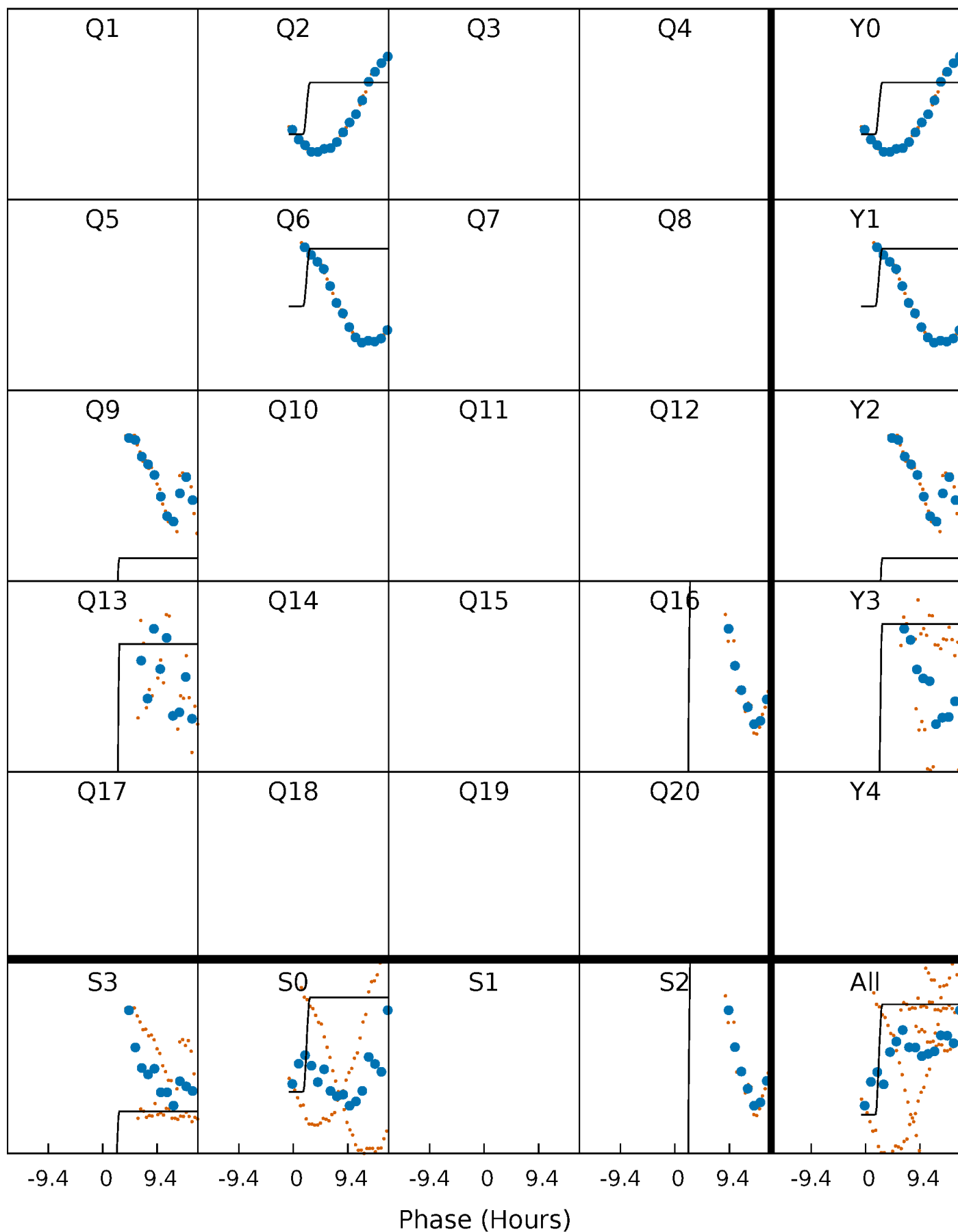
DV Quarter-Phased Transit Curves

TCE 010973465-03 P=321.090074 Days $T_0=226.155491$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

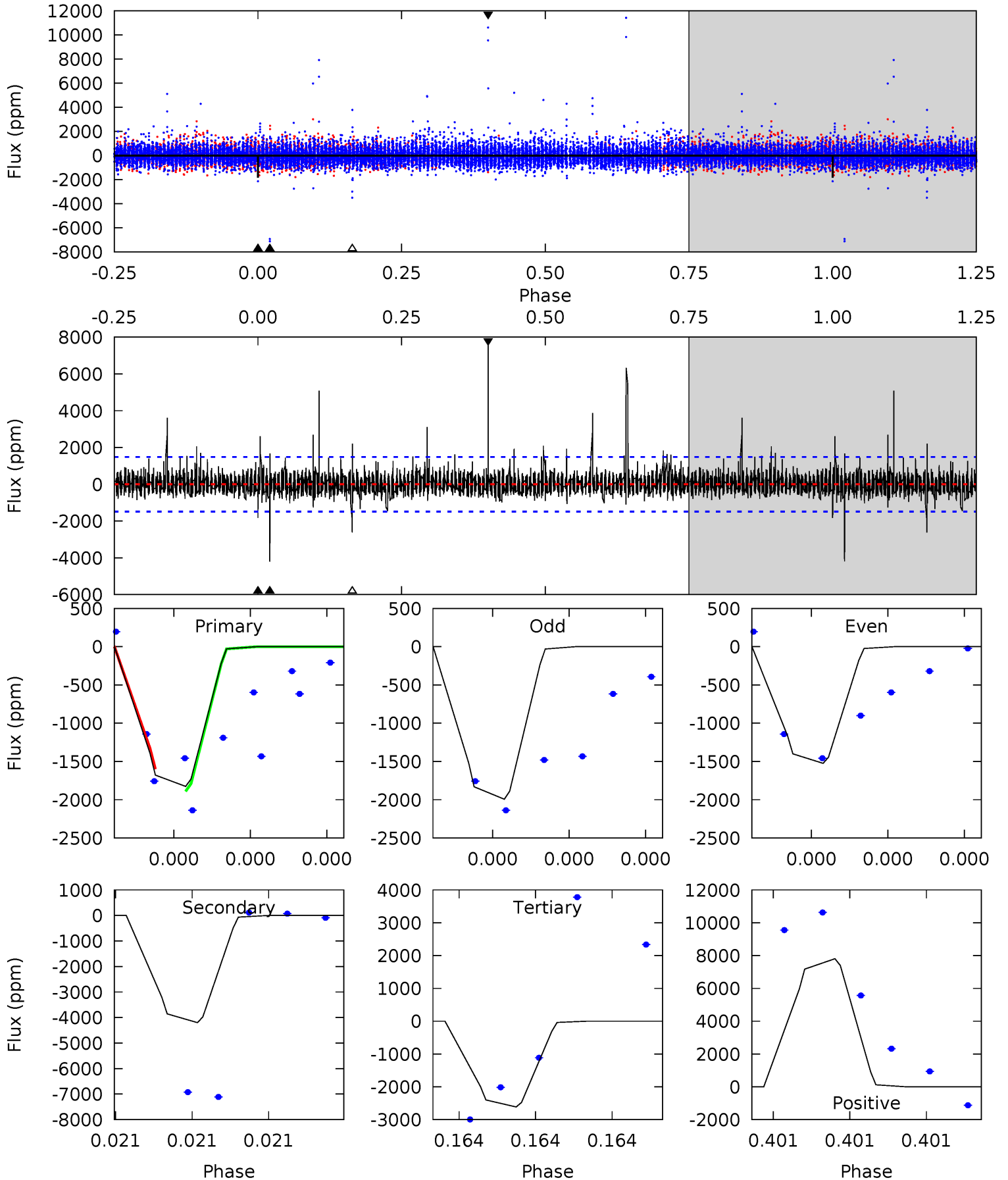
TCE 010973465-03 P=321.127018 Days $T_0=226.048729$ (BKJD)



DV Model-Shift Uniqueness Test

010973465-03, P = 321.090074 Days, E = 226.155491 Days

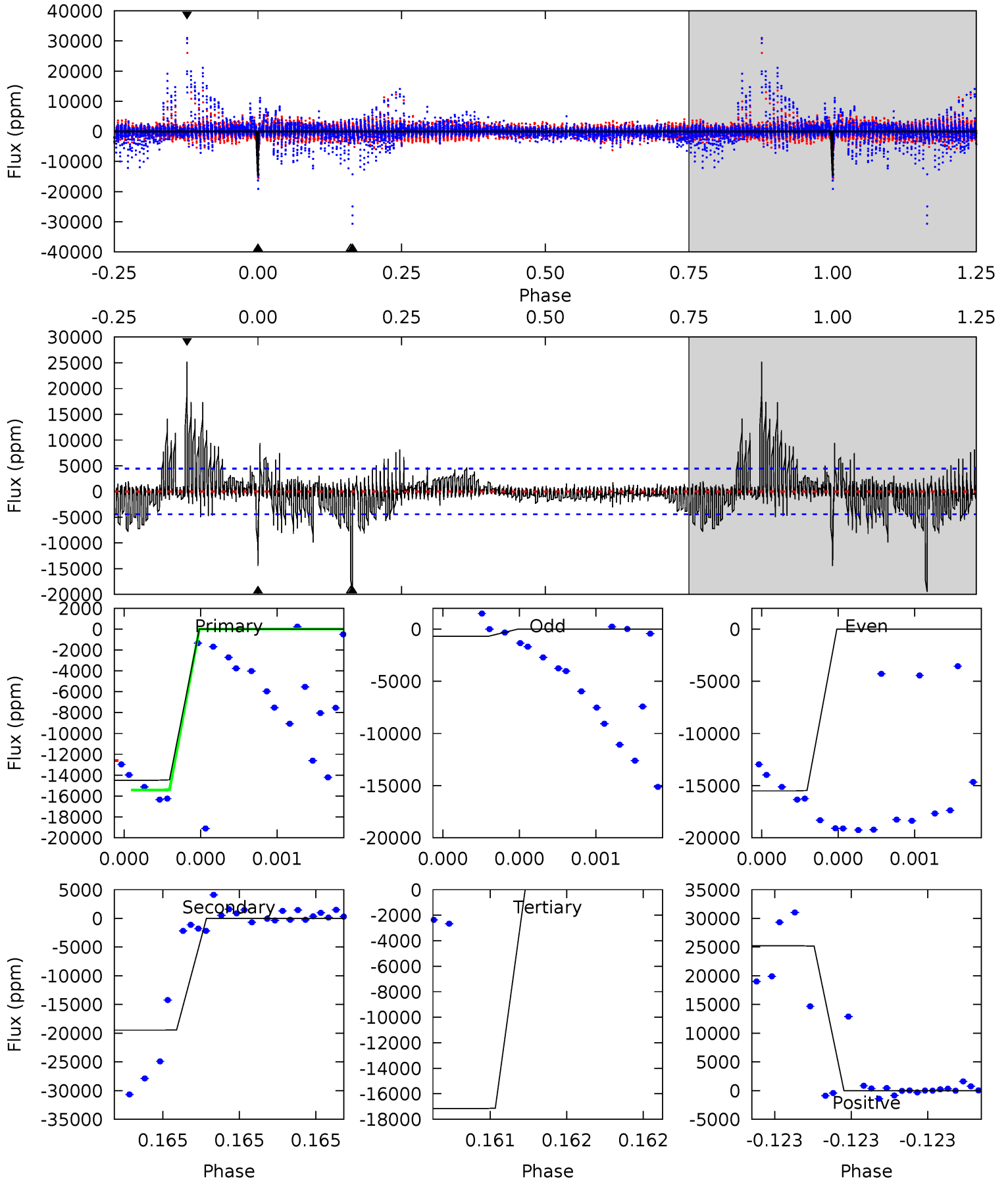
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.13	16.4	10.2	30.5	5.79	3.81	1.28	-3.07	-23.3	6.19	-14.1	0.32	1.00	0.65	0.51



Alt Model-Shift Uniqueness Test

010973465-03, P = 321.127018 Days, E = 226.048729 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.4	24.7	21.8	32.0	5.62	3.55	1.42	-3.40	-13.6	2.92	-7.30	11.5	1.00	0.56	0.00



Stellar Parameters For KIC 010973465

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5174^{+156}_{-156}	$4.599^{+0.072}_{-0.048}$	$-0.720^{+0.300}_{-0.300}$	$0.668^{+0.070}_{-0.064}$	$0.648^{+0.075}_{-0.032}$	$3.056^{+0.881}_{-0.572}$
	+3%/-3%	+2%/-1%	+42%/-42%	+10%/-10%	+12%/-5%	+29%/-19%
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 010973465-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-4199 ± 256	$9.27^{+9.24}_{-6.61}$	291^{+11}_{-11}	3979^{+2861}_{-789}	$17660^{+200465}_{-13264}$
Alt.	-19466 ± 788	$12.05^{+9.96}_{-8.04}$	291^{+11}_{-11}	4831^{+3786}_{-977}	$48036^{+376272}_{-33908}$

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

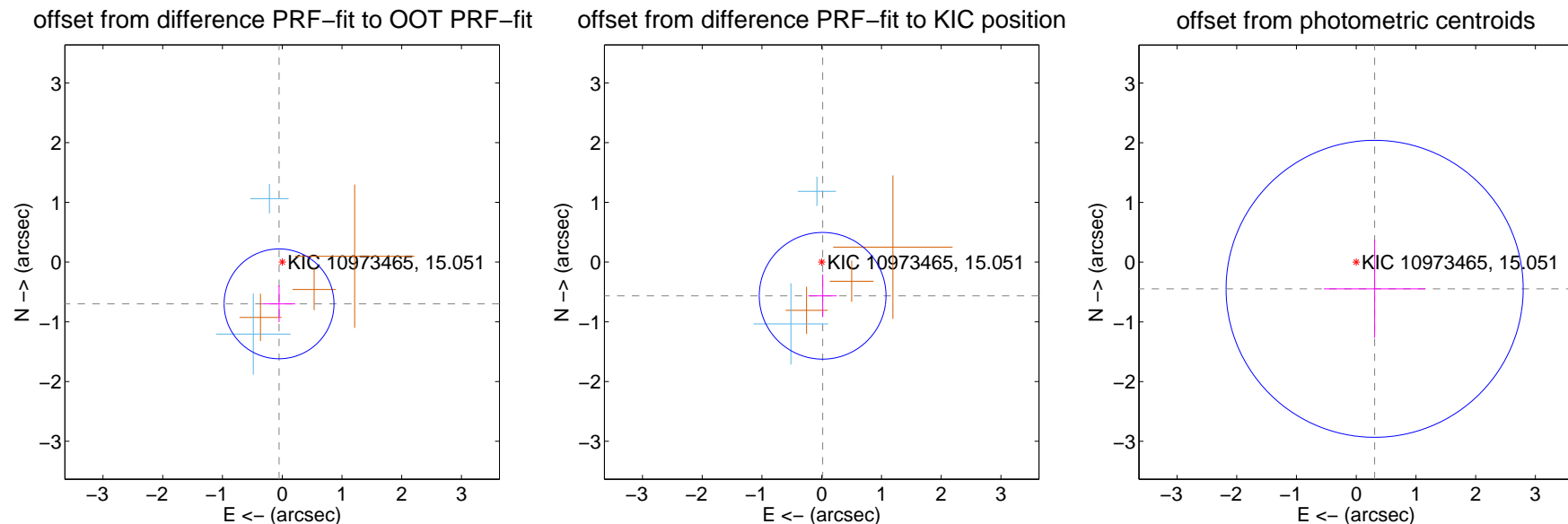
DV Centroid Data

Supplemental centroid analysis for 010973465-03. Kepler magnitude: 15.05. Transit SNR 5.39

There are 2 quarters with good PRF difference image offsets

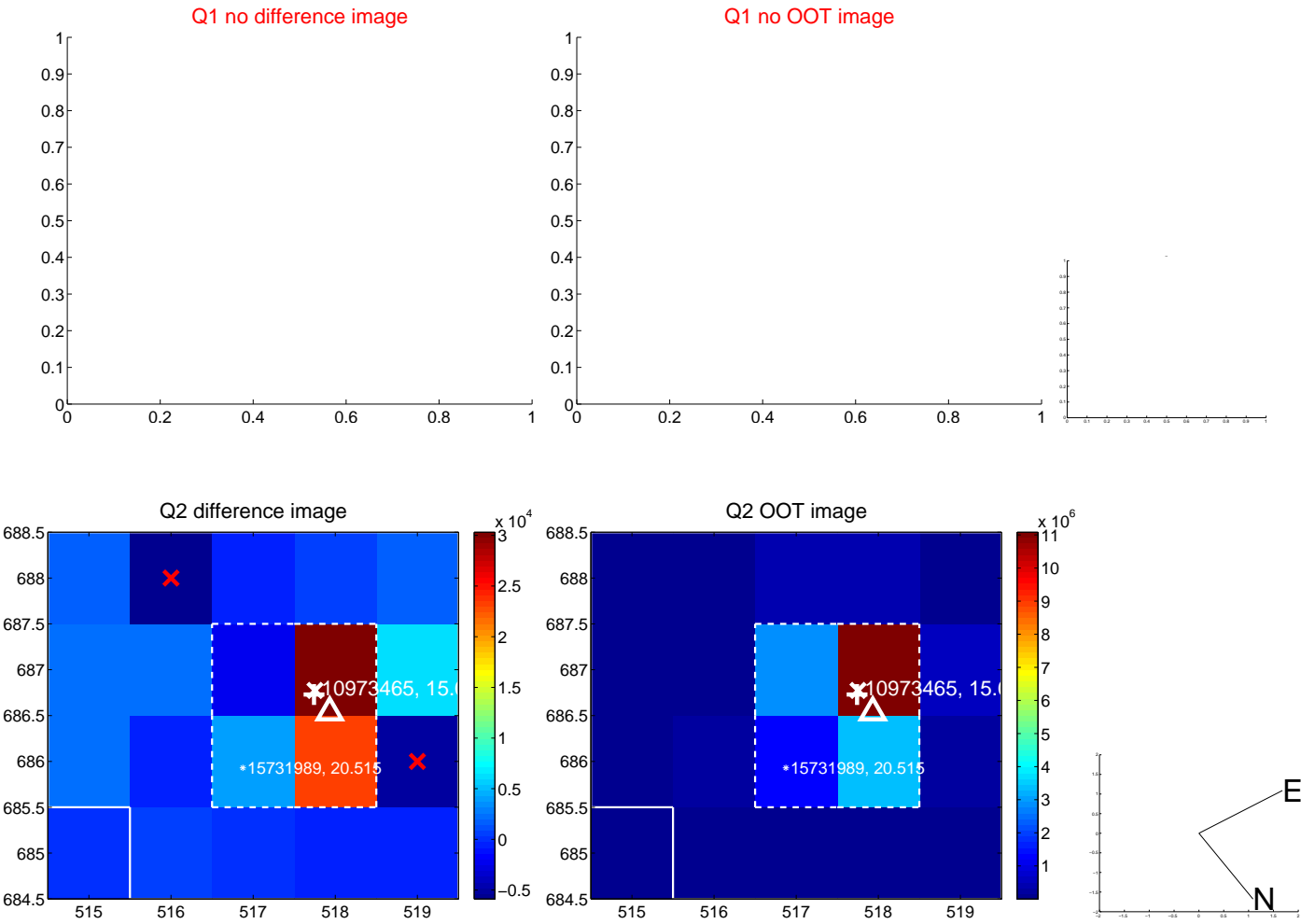
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.701 ± 0.307	2.29	0.053 ± 0.273	-0.699 ± 0.307
PRF-fit source offset from KIC position	0.565 ± 0.354	1.60	-0.015 ± 0.238	-0.565 ± 0.357
photometric centroid source offset	0.54 ± 0.83	0.65	-0.31 ± 0.85	-0.45 ± 0.82

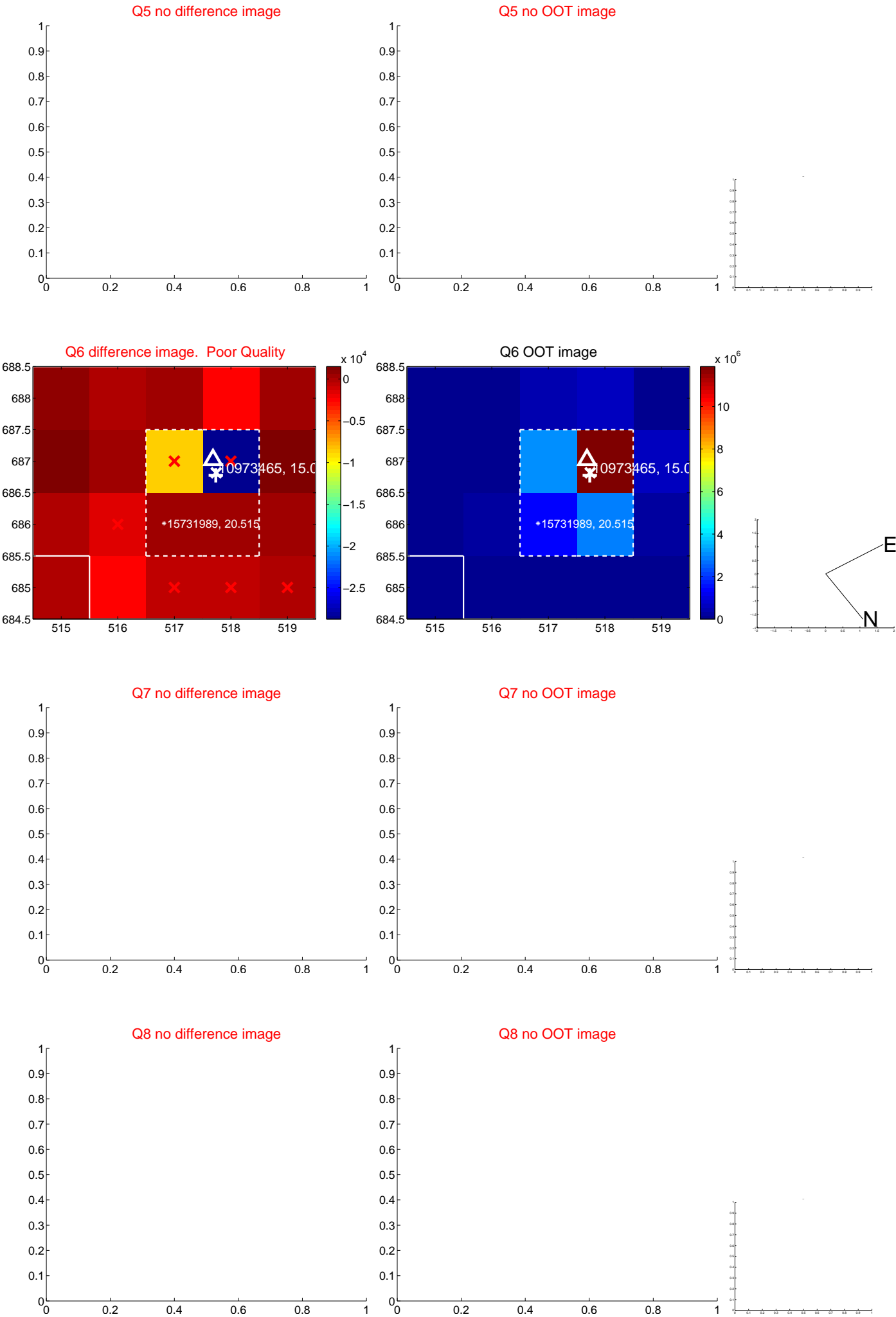


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

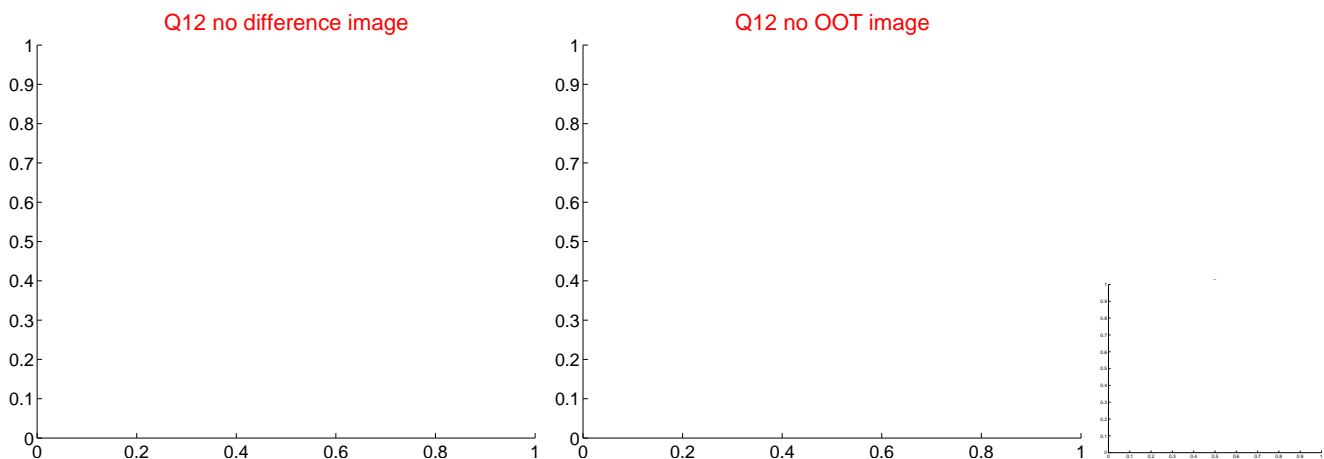
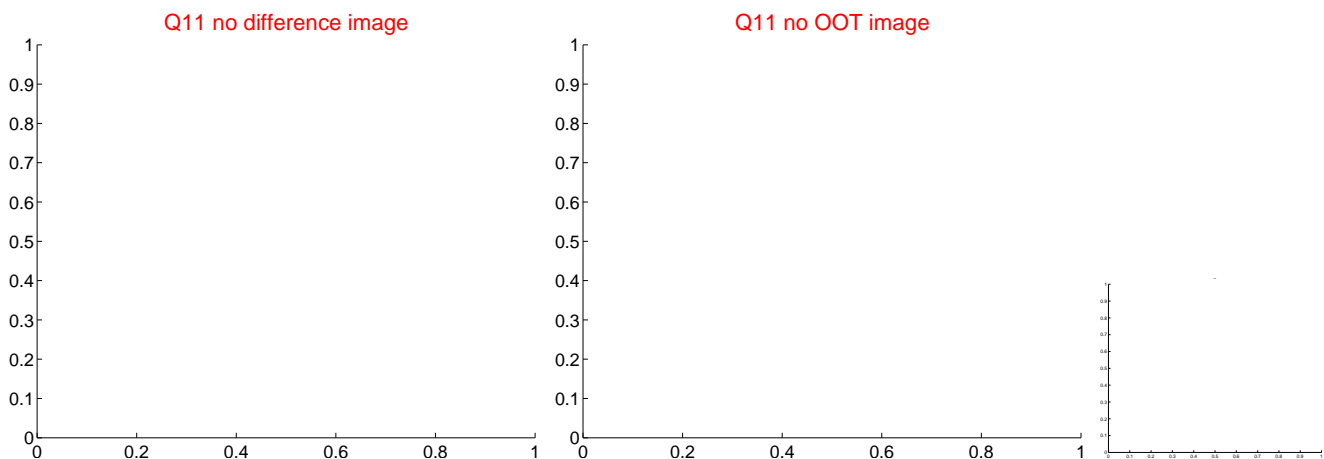
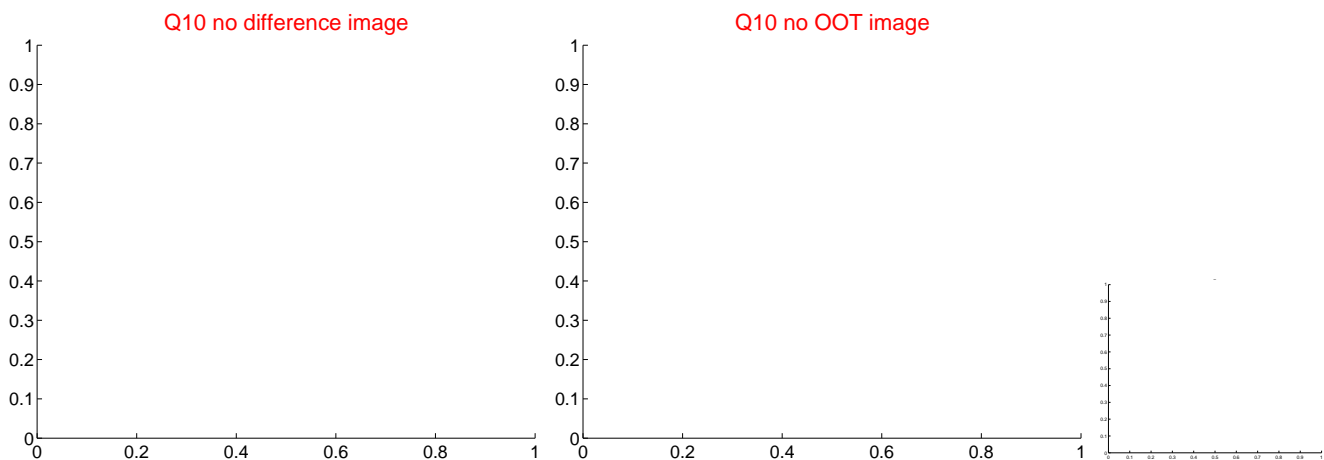
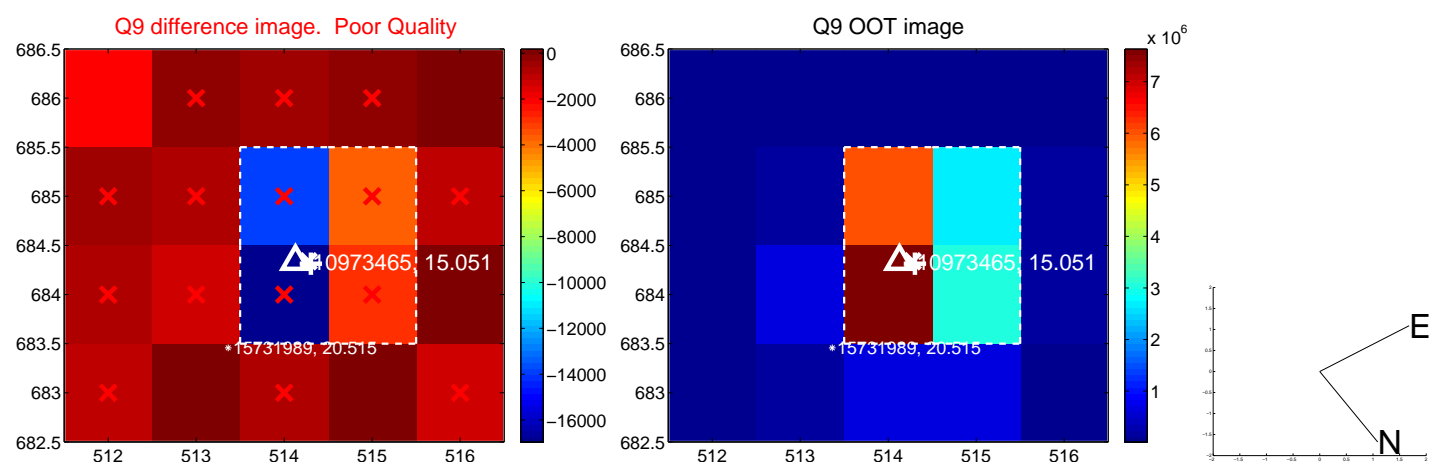
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



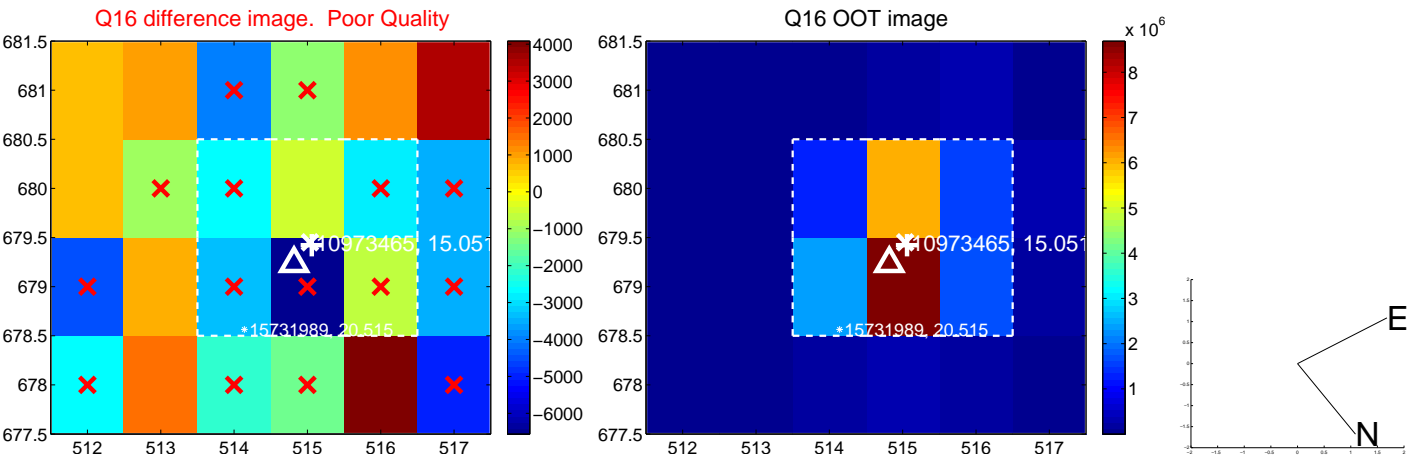
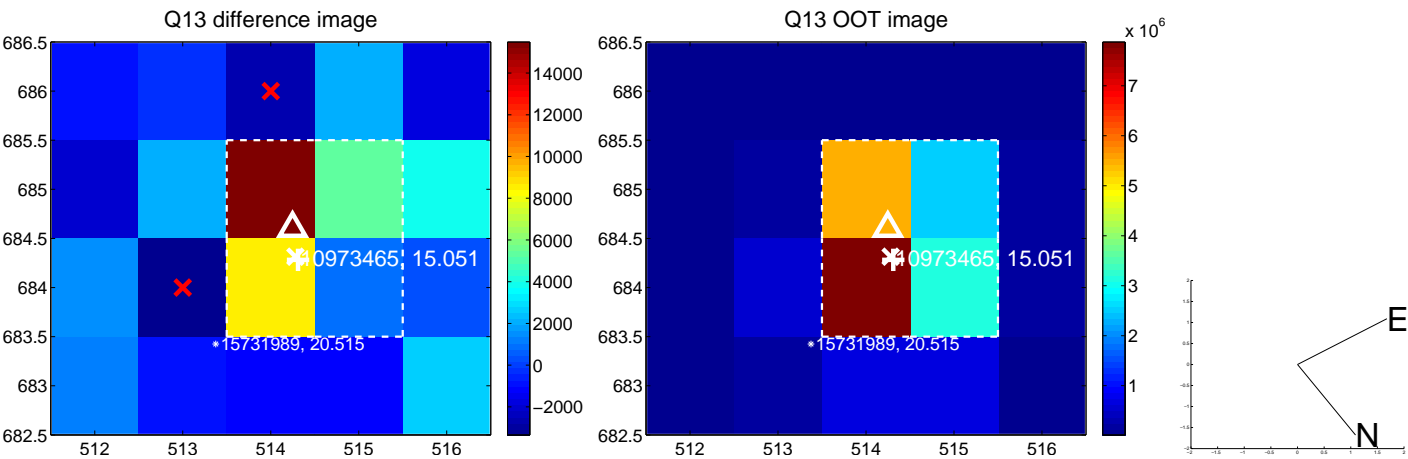
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



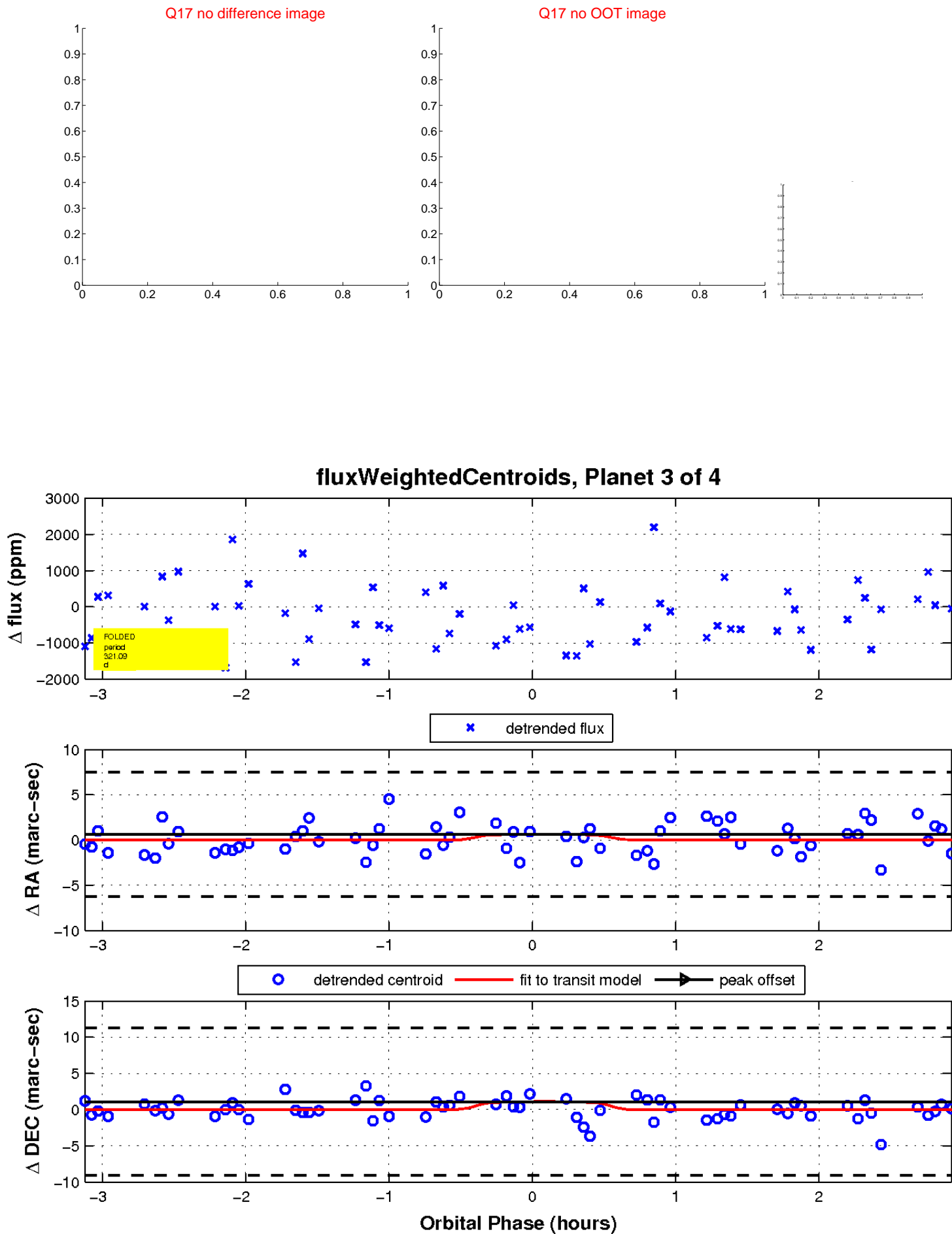
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

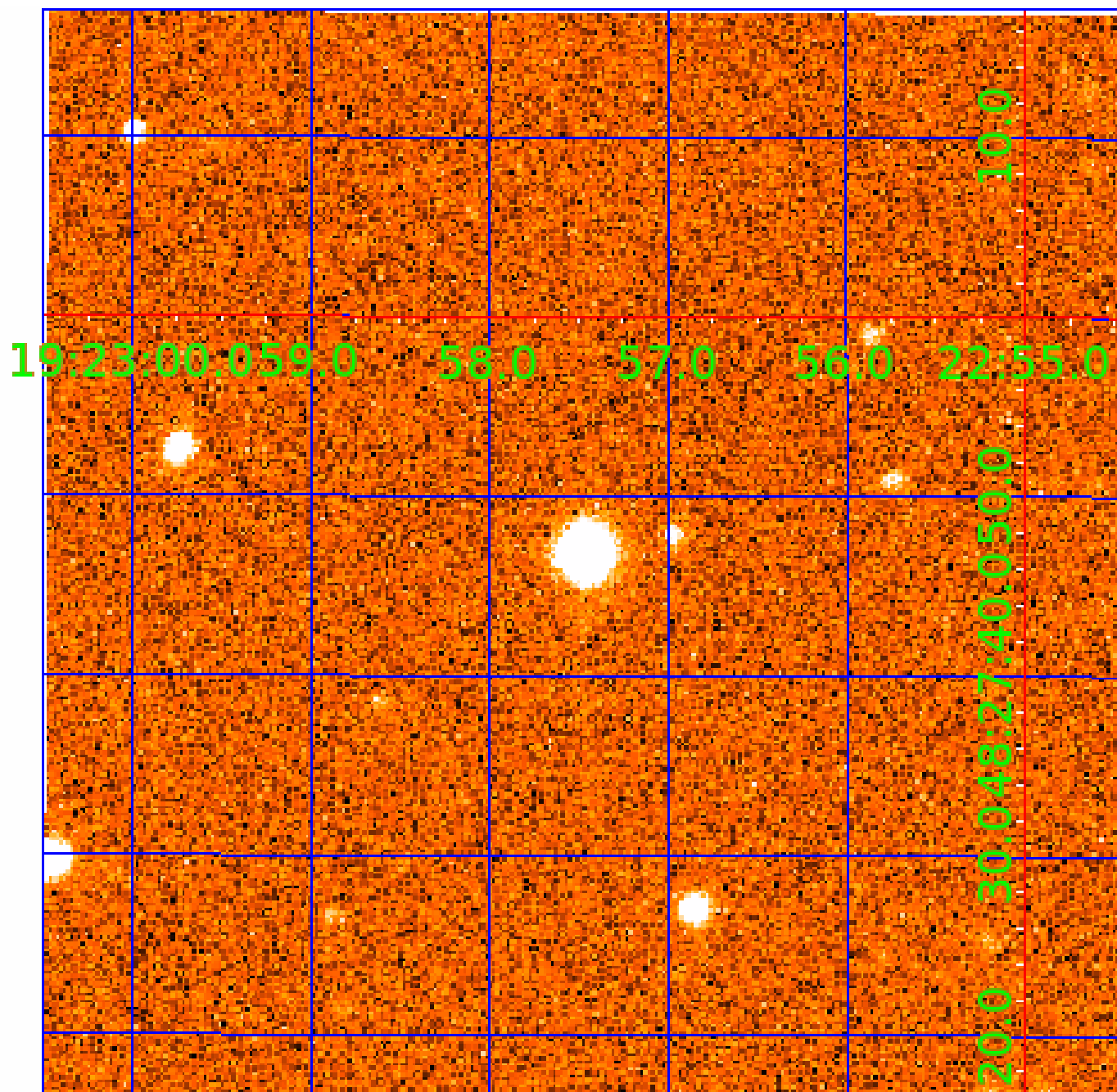


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010973465

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})
010973465-01	OBS	No	299.745309	143.386954	1772.2	7.468	13.6	6.0	0.67	5174	2.89	0.50
010973465-02	OBS	No	2.200152	132.938860	158.7	10.508	11.6	7.2	0.67	5174	0.84	349.50
010973465-03	OBS	No	321.090074	226.155490	2214.5	1.057	15.0	5.4	0.67	5174	3.31	0.46
010973465-04	OBS	No	241.159409	145.286042	1387.2	4.452	14.9	5.5	0.67	5174	2.58	0.67

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010973465-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
010973465-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
010973465-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010973465-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS

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

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

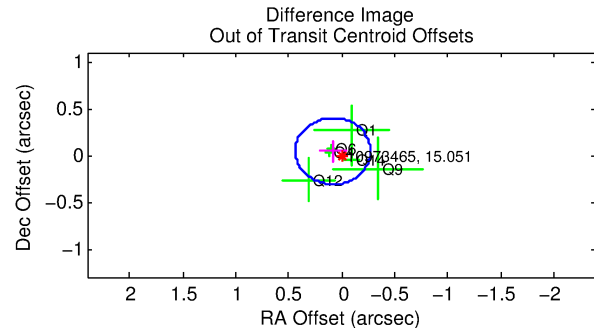
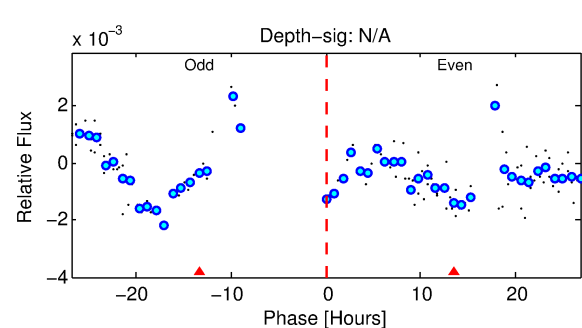
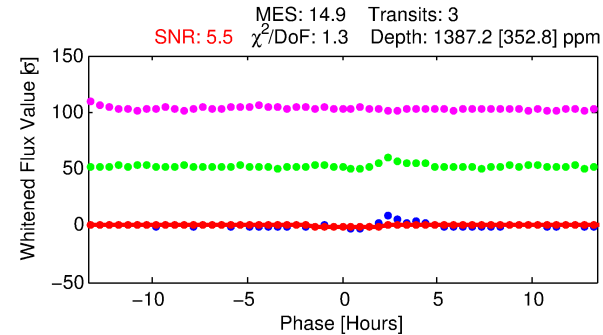
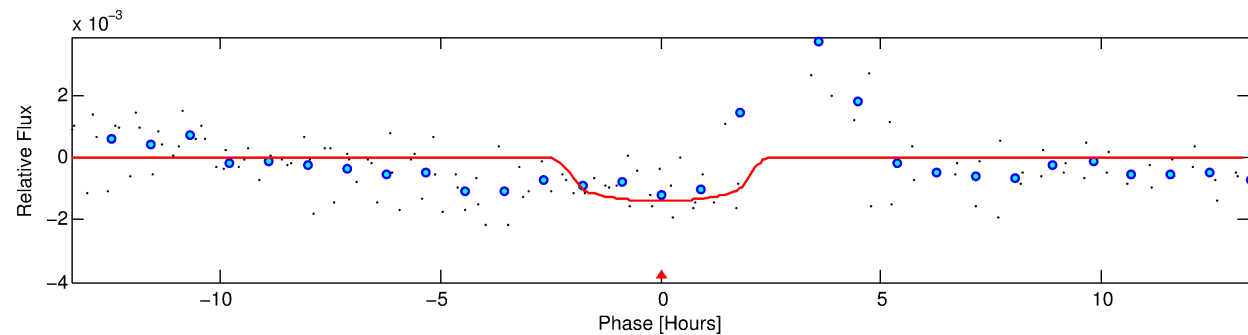
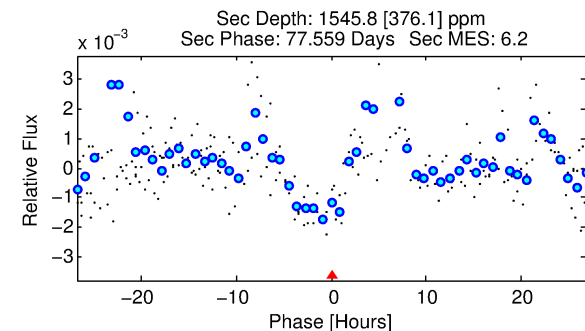
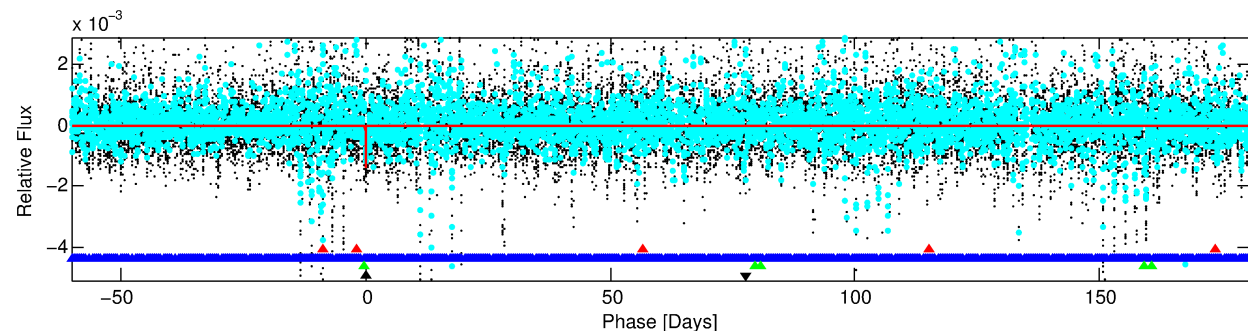
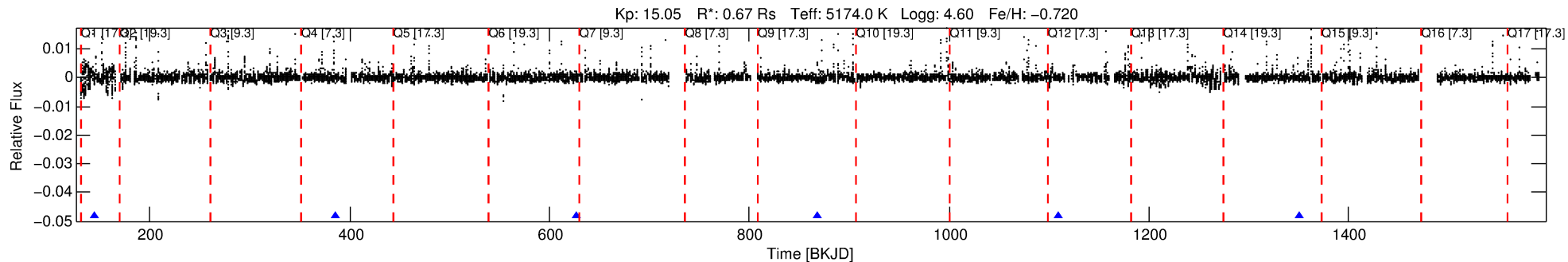
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010973465-04

No Significant Match Found

DV One-Page Summary

KIC: 10973465 Candidate: 4 of 4 Period: 241.159 d



DV Fit Results:

Period = 241.15941 [0.00436] d
Epoch = 145.2860 [0.0124] BKJD
Rp/R* = 0.0355 [0.0989]
a/R* = 347.75 [3865.54]
b = 0.61 [11.84]
Seff = 0.67 [0.12]
Teq = 230 [10] K
Rp = 2.58 [7.22] Re
a = 0.6558 [0.0584] AU
Ag = 54733.55 [305716.79] [0.18σ]
Teffp = 5448 [7607] K [0.69σ]

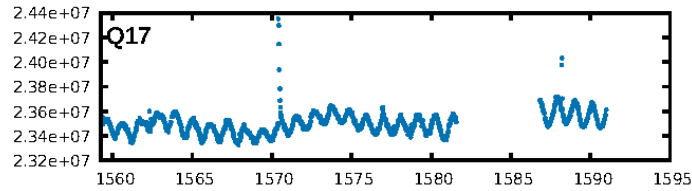
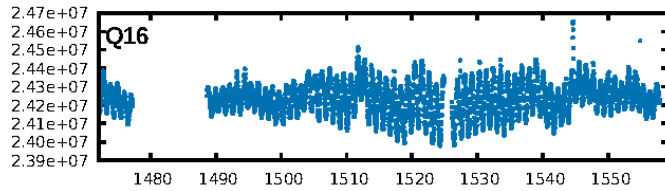
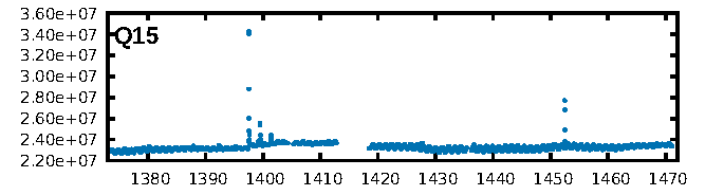
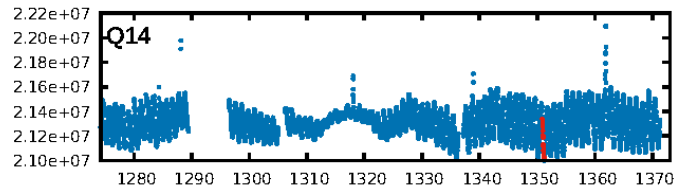
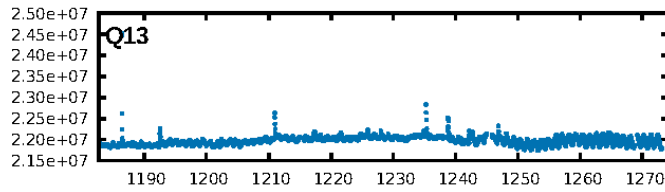
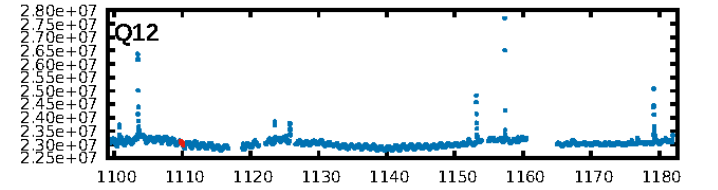
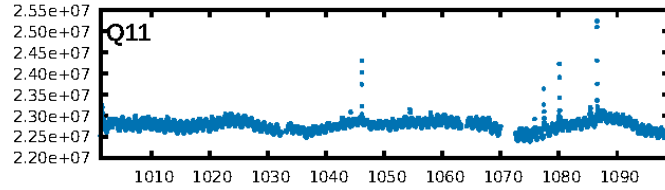
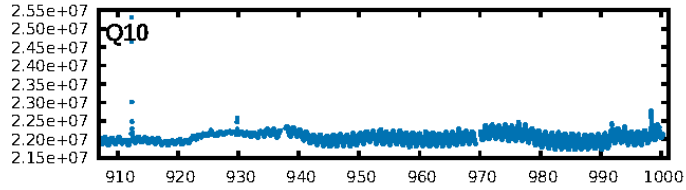
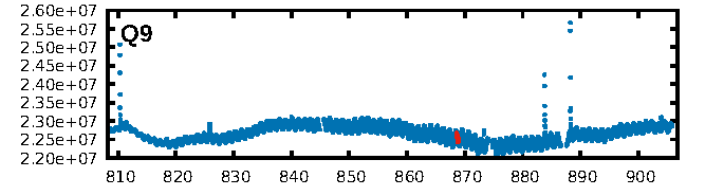
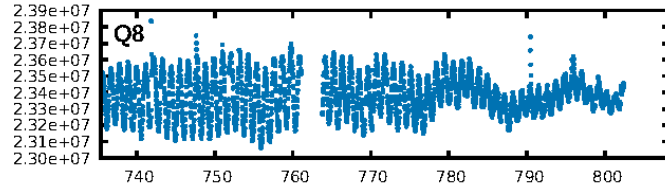
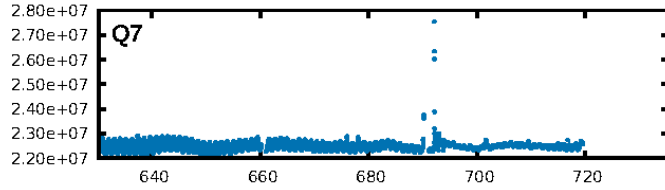
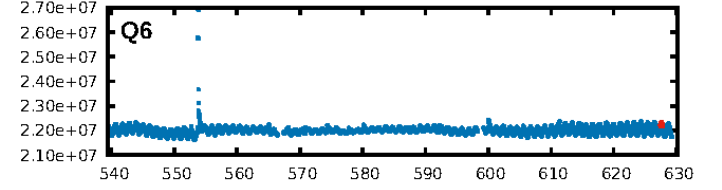
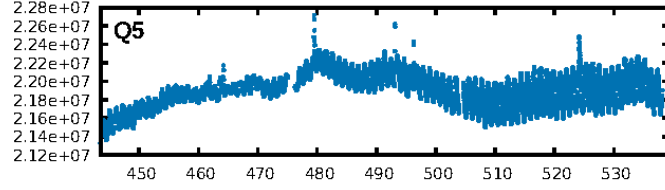
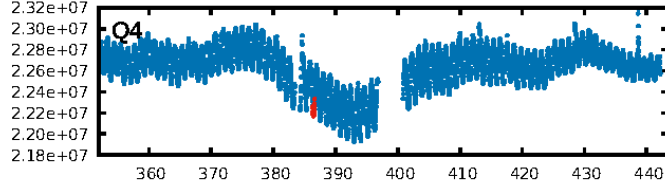
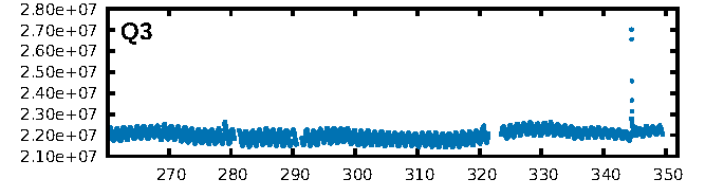
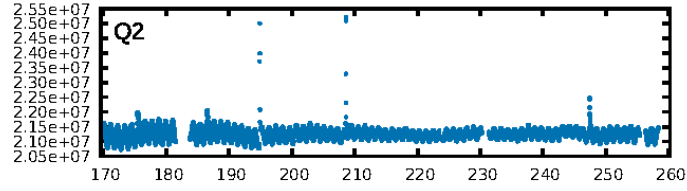
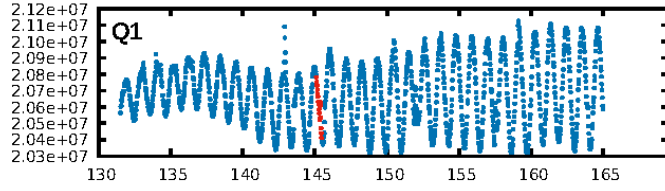
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [502.54σ]
LongPeriod-sig: 100.0% [161.73σ]
ModelChiSquare2-sig: 17.3%
ModelChiSquareGof-sig: 97.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 2.542
Centroid-sig: 10.6%
Centroid-so: 1.136 arcsec [1.82σ]
OotOffset-rm: 0.094 arcsec [0.80σ]
KicOffset-rm: 0.197 arcsec [1.82σ]
OotOffset-st: 2/0/2/2 [6]
KicOffset-st: 2/0/2/2 [6]
DiffImageQuality-fgm: 0.67 [4/6]
DiffImageOverlap-fno: 0.33 [2/6]

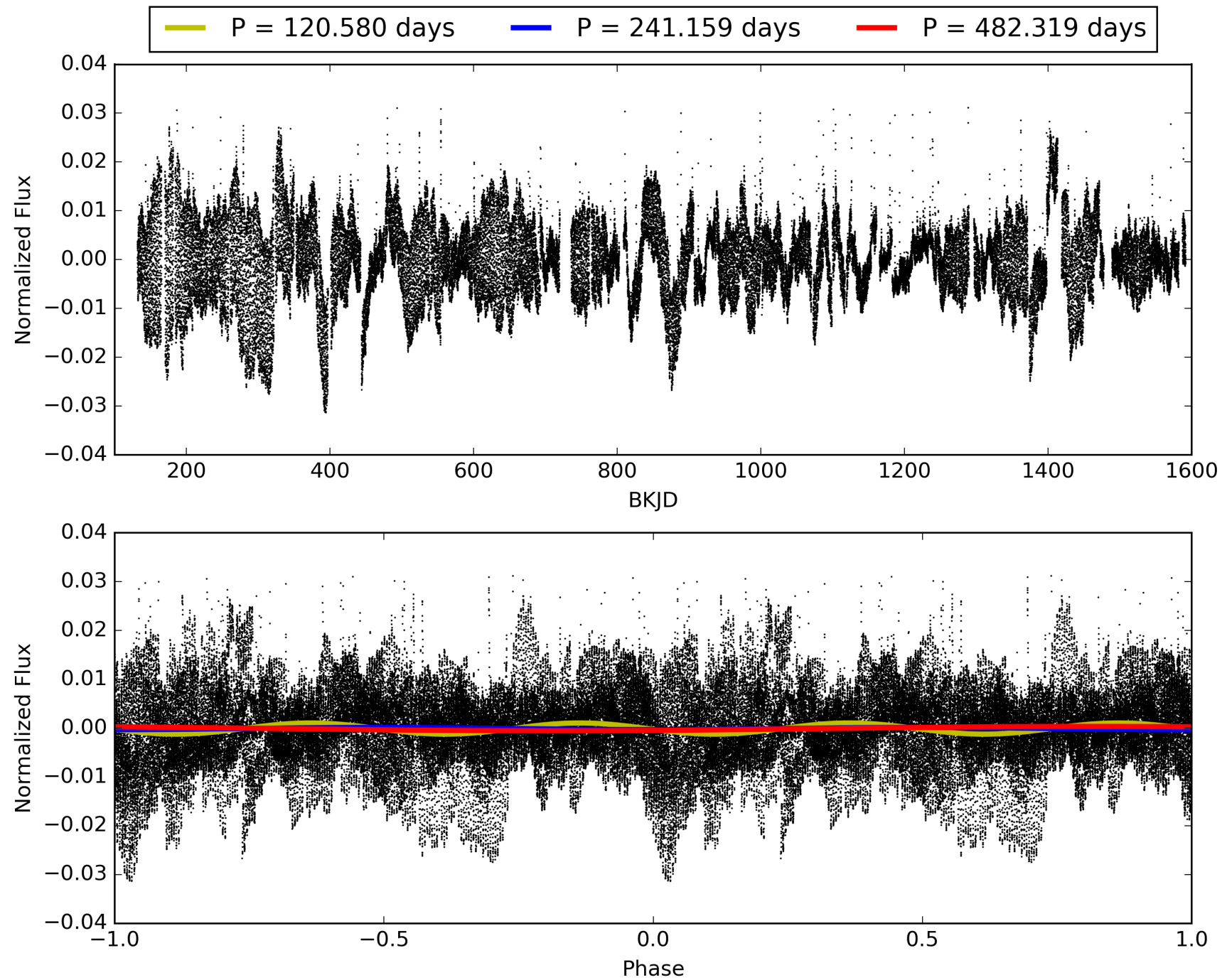
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:19:06 Z

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

TCE 010973465-04, PDC Light Curves

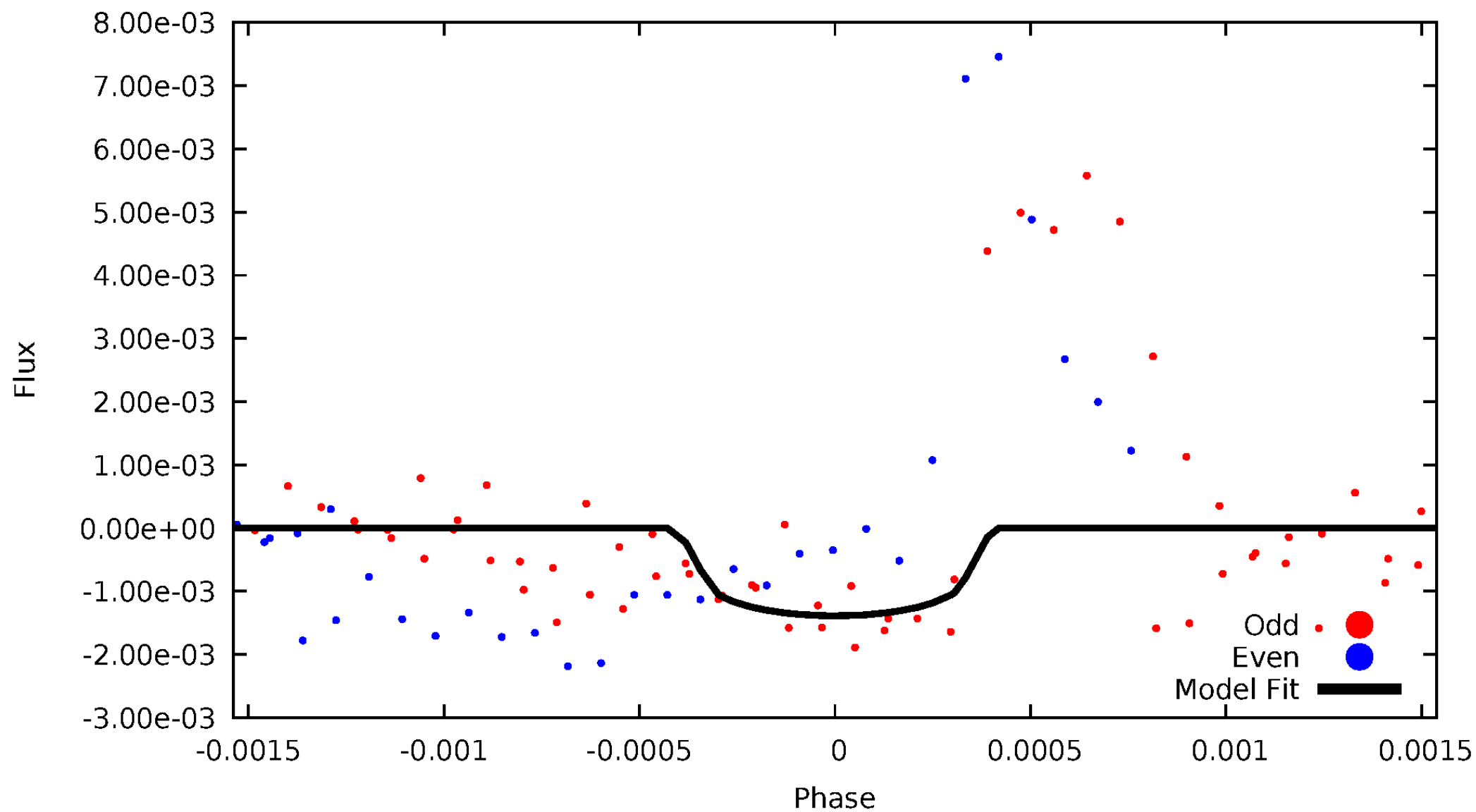


TCE 010973465-04



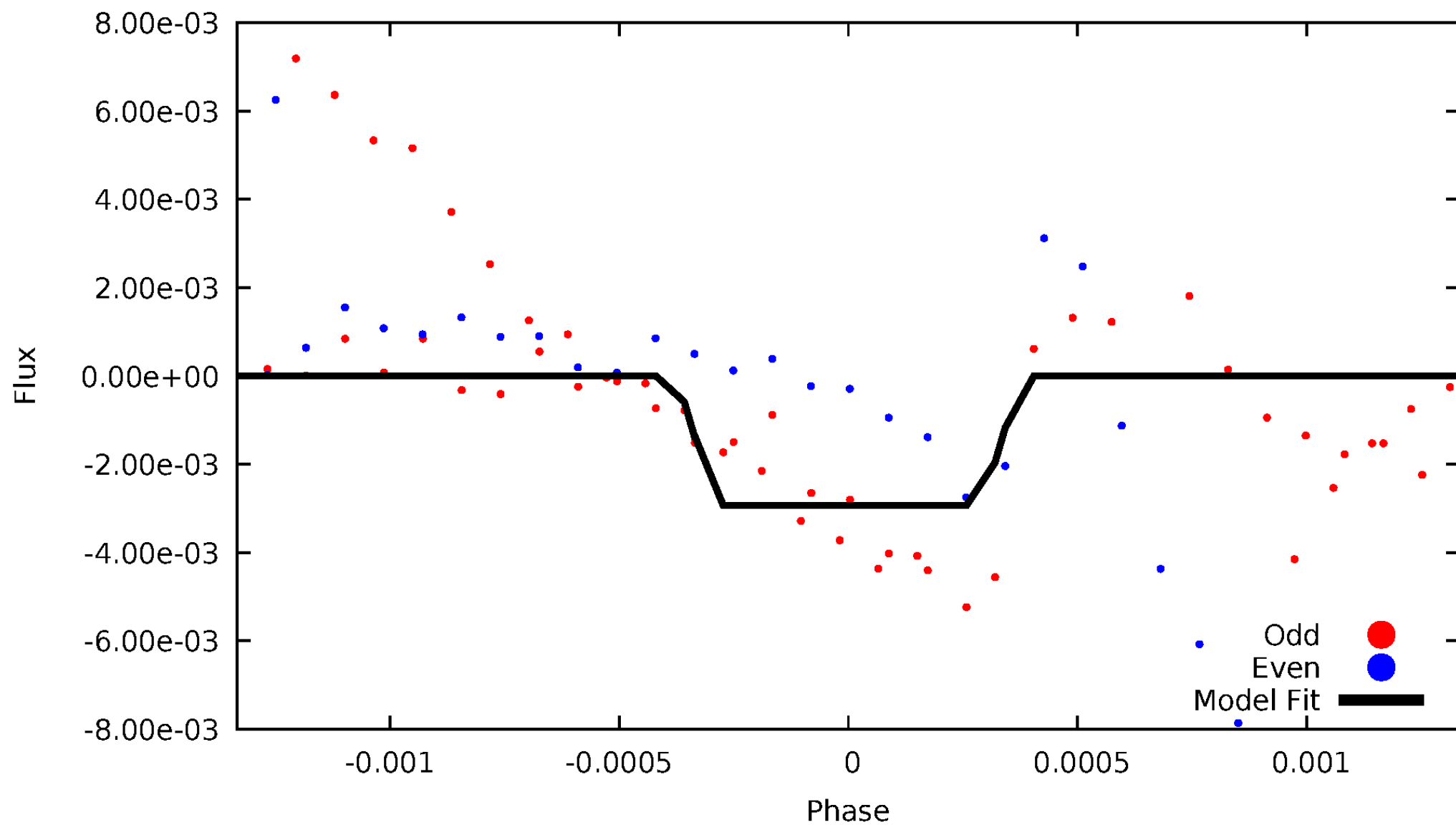
DV Odd/Even

TCE 010973465-04



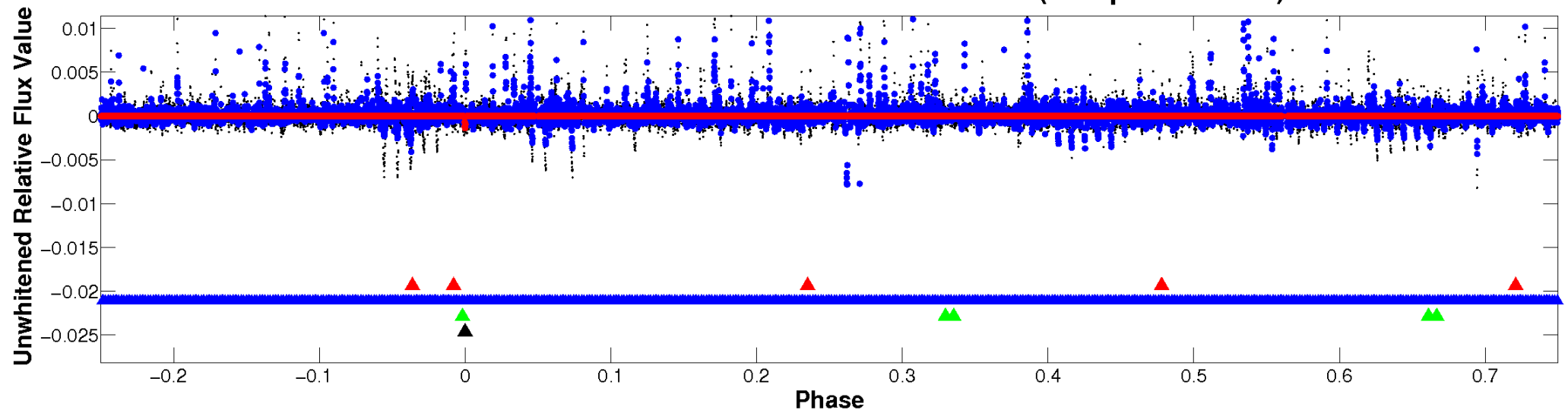
ALT Odd/Even

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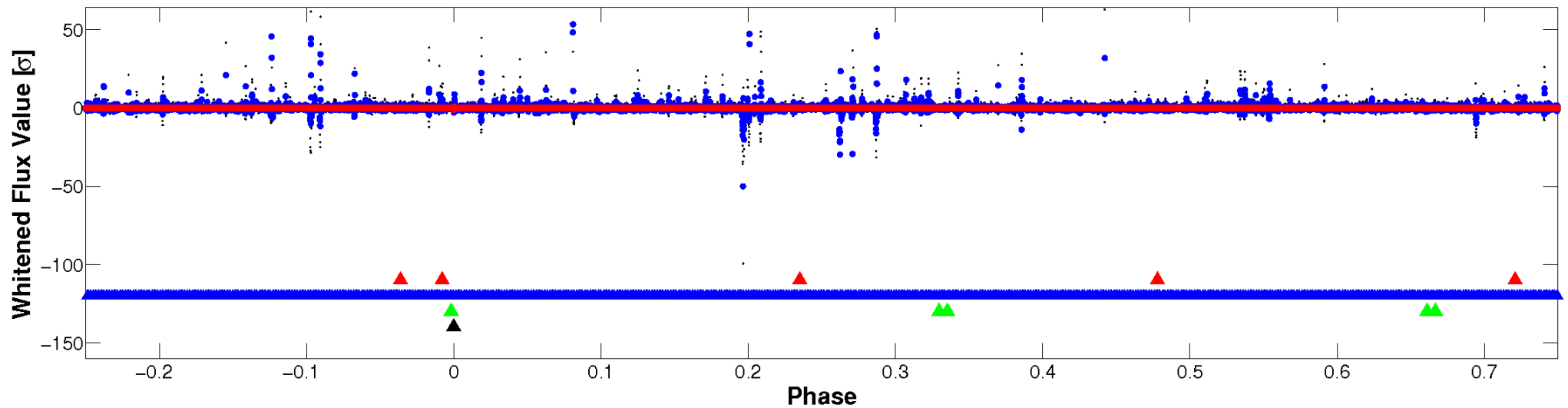


Non-Whitened Vs. Whitened Light Curve

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

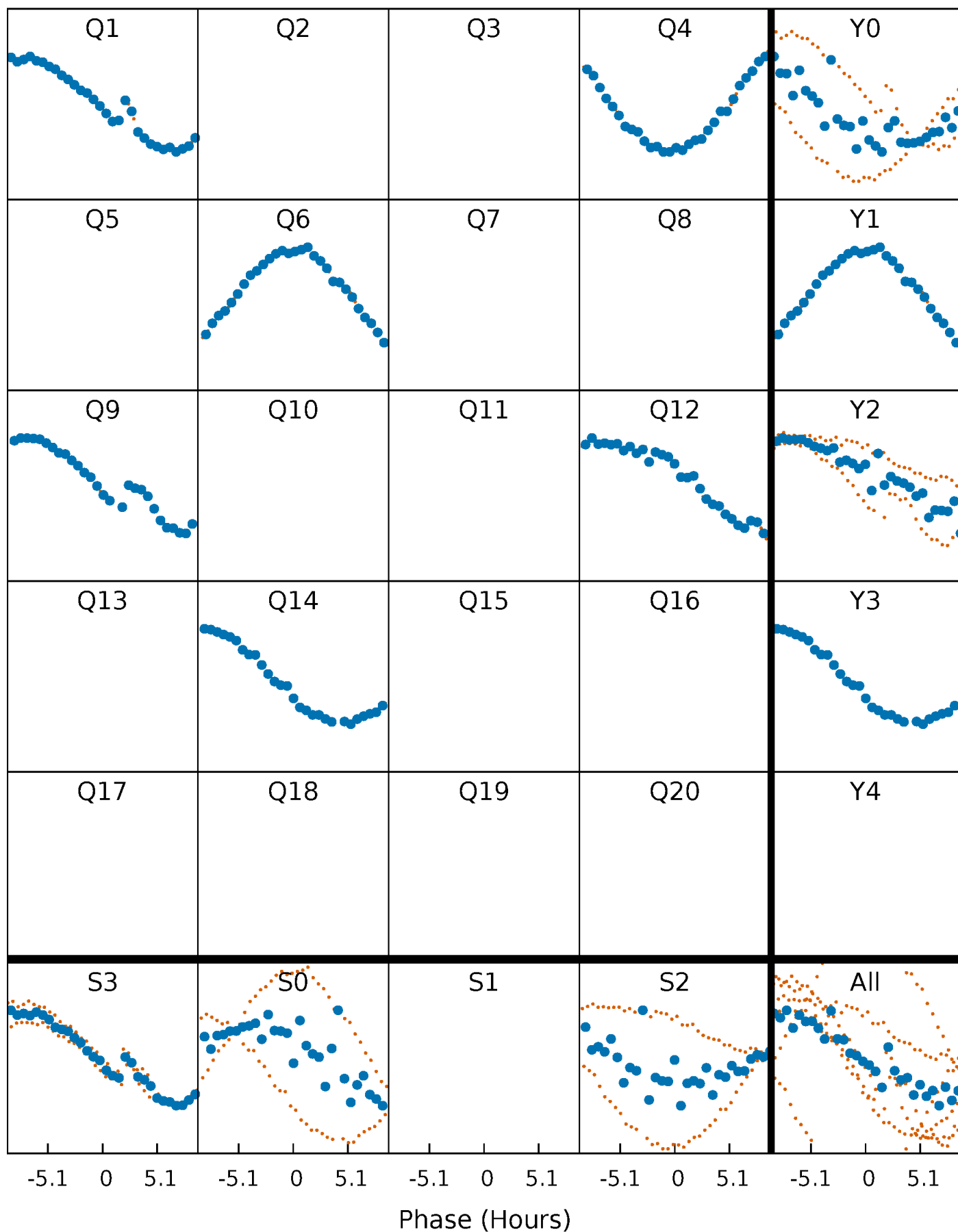


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



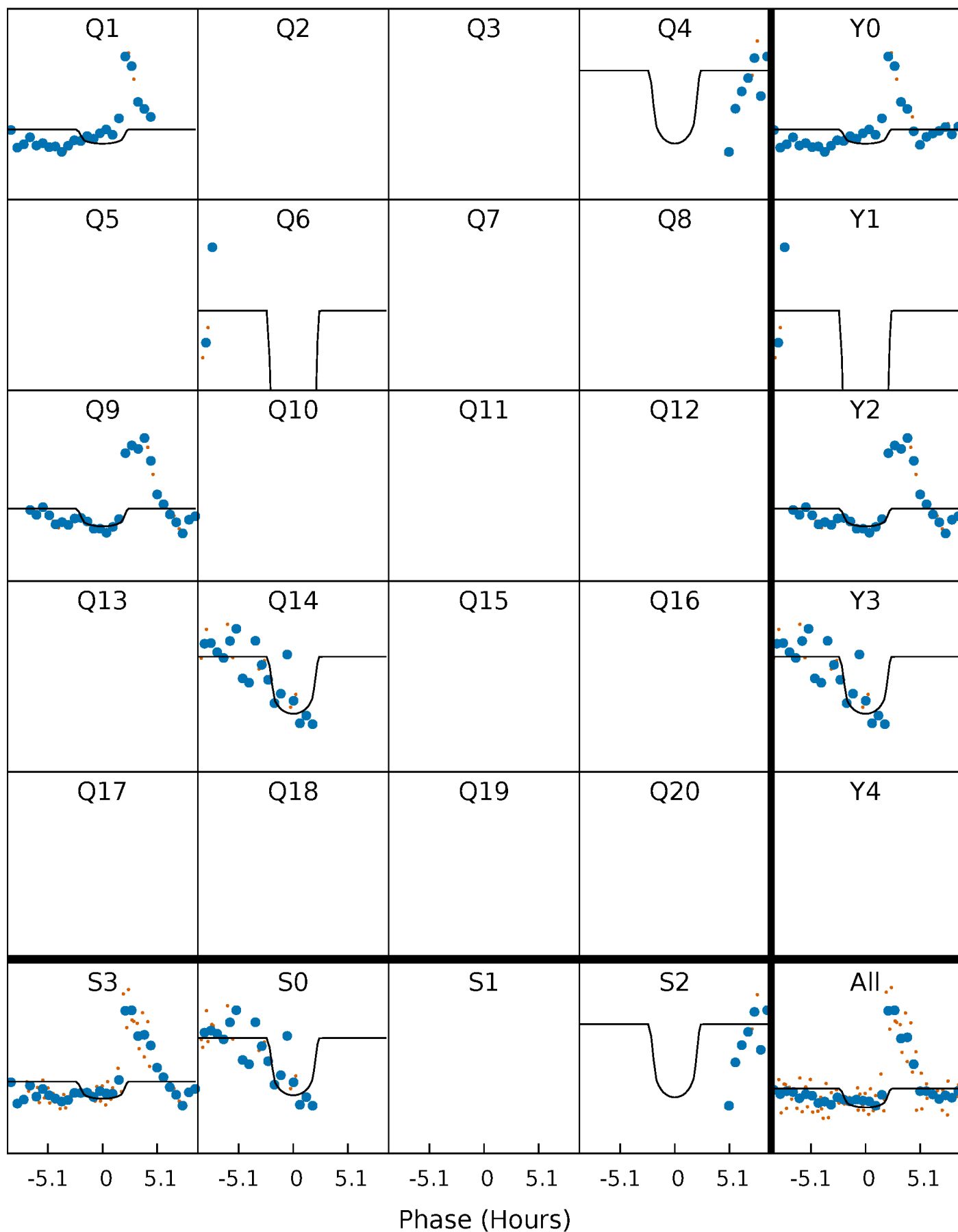
PDC Quarter-Phased Transit Curves

TCE 010973465-04 P=241.159409 Days $T_0=145.286042$ (BKJD)



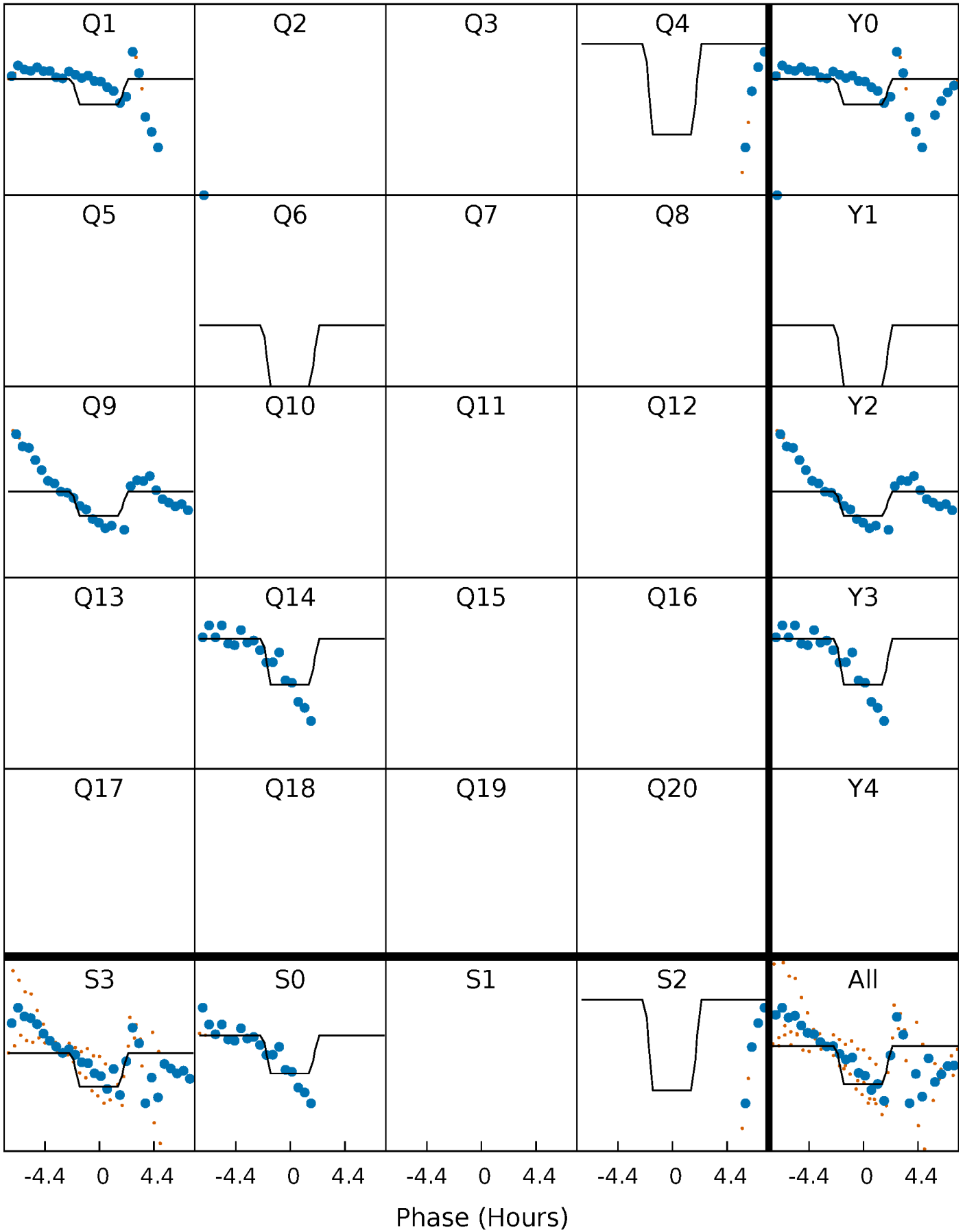
DV Quarter-Phased Transit Curves

TCE 010973465-04 P=241.159409 Days $T_0=145.286042$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

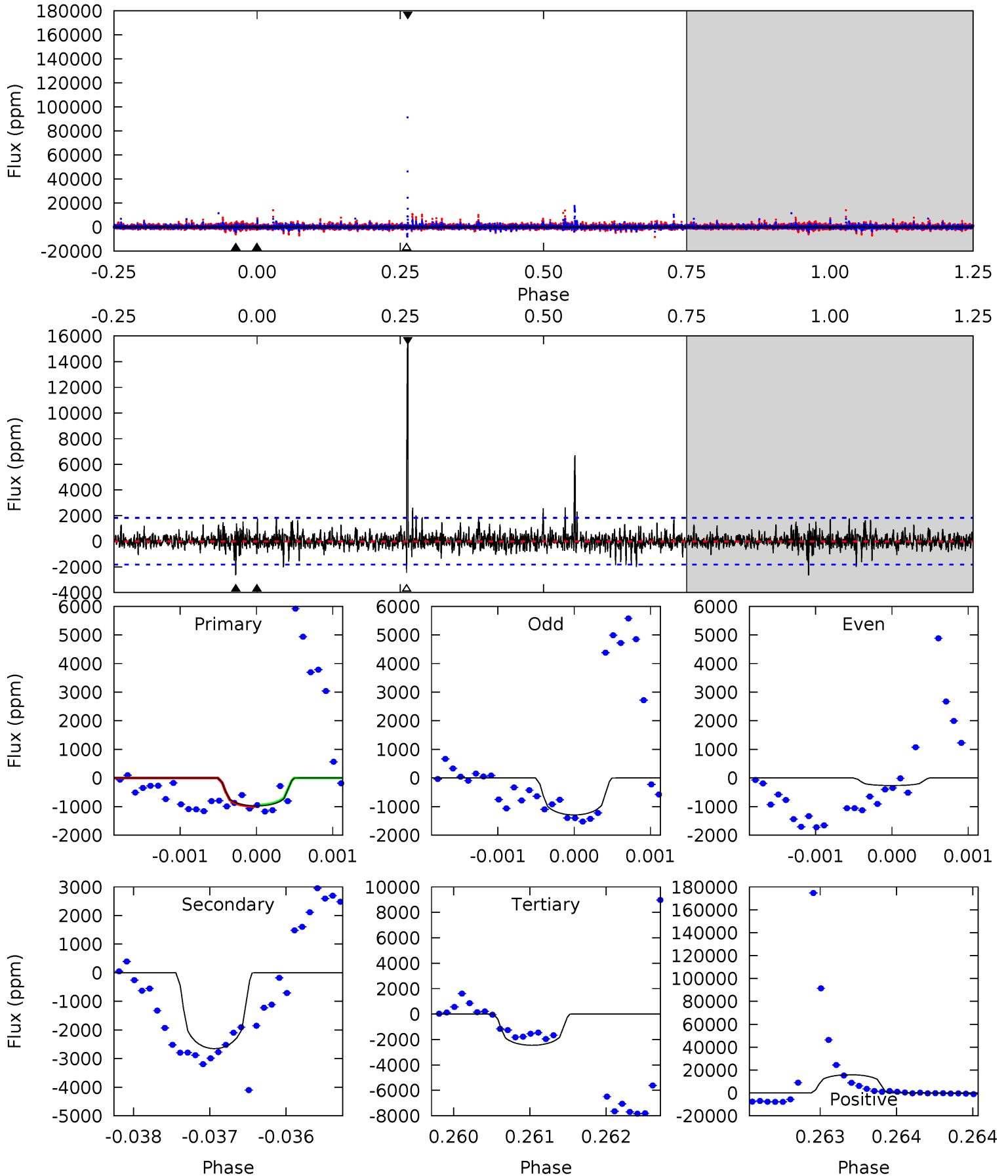
TCE 010973465-04 $P=241.165717$ Days $T_0=145.263605$ (BKJD)



DV Model-Shift Uniqueness Test

010973465-04, P = 241.159409 Days, E = 145.286042 Days

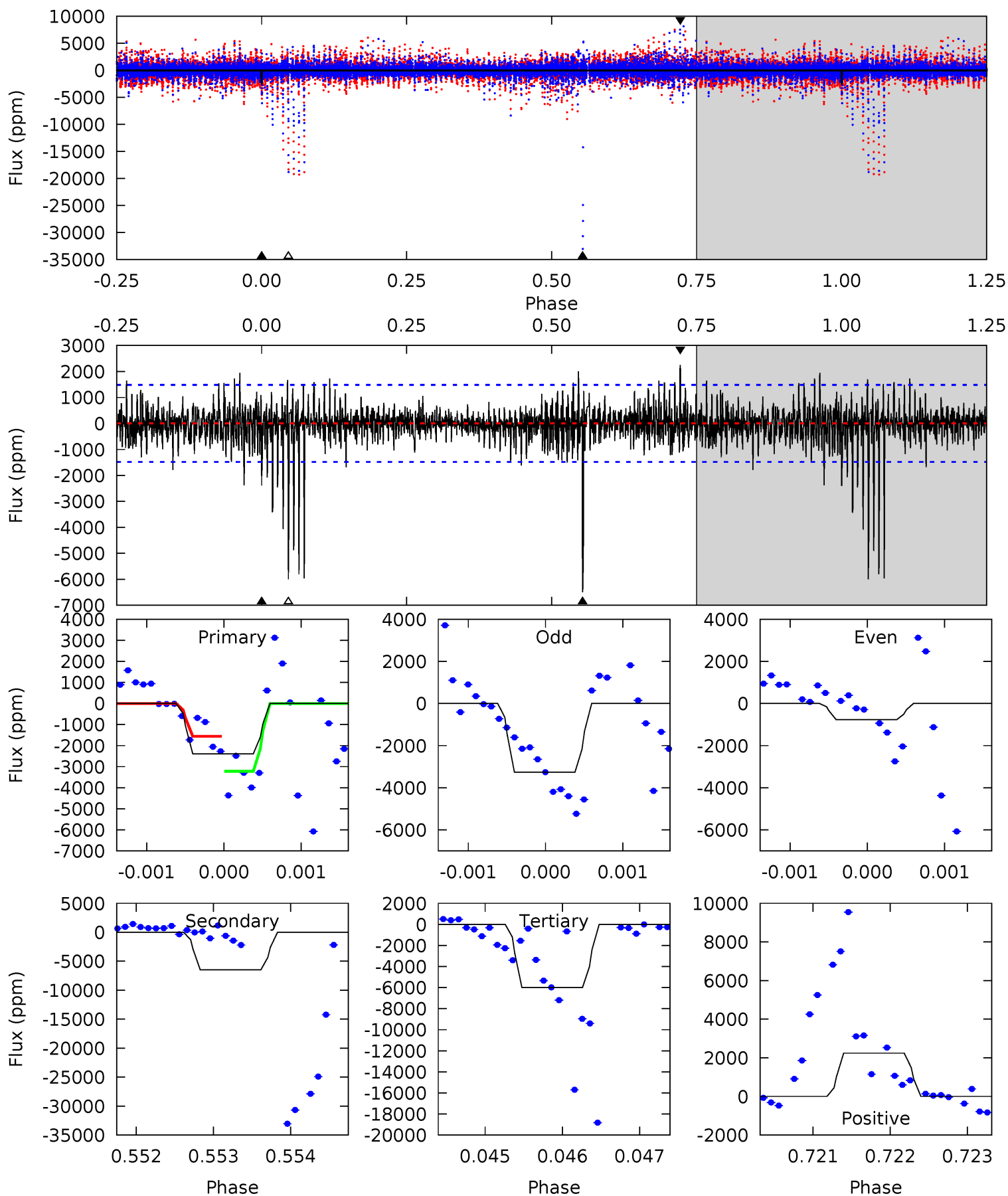
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.94	7.98	7.38	47.8	5.48	3.34	1.92	-4.44	-44.9	0.60	-39.8	1.83	0.66	0.86	0.08



Alt Model-Shift Uniqueness Test

010973465-04, P = 241.165717 Days, E = 145.263605 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.91	24.2	22.4	8.36	5.52	3.40	2.22	-13.4	0.55	1.85	15.8	4.05	0.79	0.26	3.22



Stellar Parameters For KIC 010973465

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5174^{+156}_{-156}	$4.599^{+0.072}_{-0.048}$	$-0.720^{+0.300}_{-0.300}$	$0.668^{+0.070}_{-0.064}$	$0.648^{+0.075}_{-0.032}$	$3.056^{+0.881}_{-0.572}$
	+3%/-3%	+2%/-1%	+42%/-42%	+10%/-10%	+12%/-5%	+29%/-19%
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 010973465-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-2654 ± 333	$6.07^{+5.24}_{-4.36}$	320^{+12}_{-13}	4280^{+3602}_{-860}	$17780^{+212376}_{-12833}$
Alt.	-6491 ± 268	$6.36^{+5.97}_{-4.32}$	321^{+12}_{-12}	5012^{+4466}_{-1126}	$39070^{+357473}_{-28892}$

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 $A_{obs} \gg 1.0$

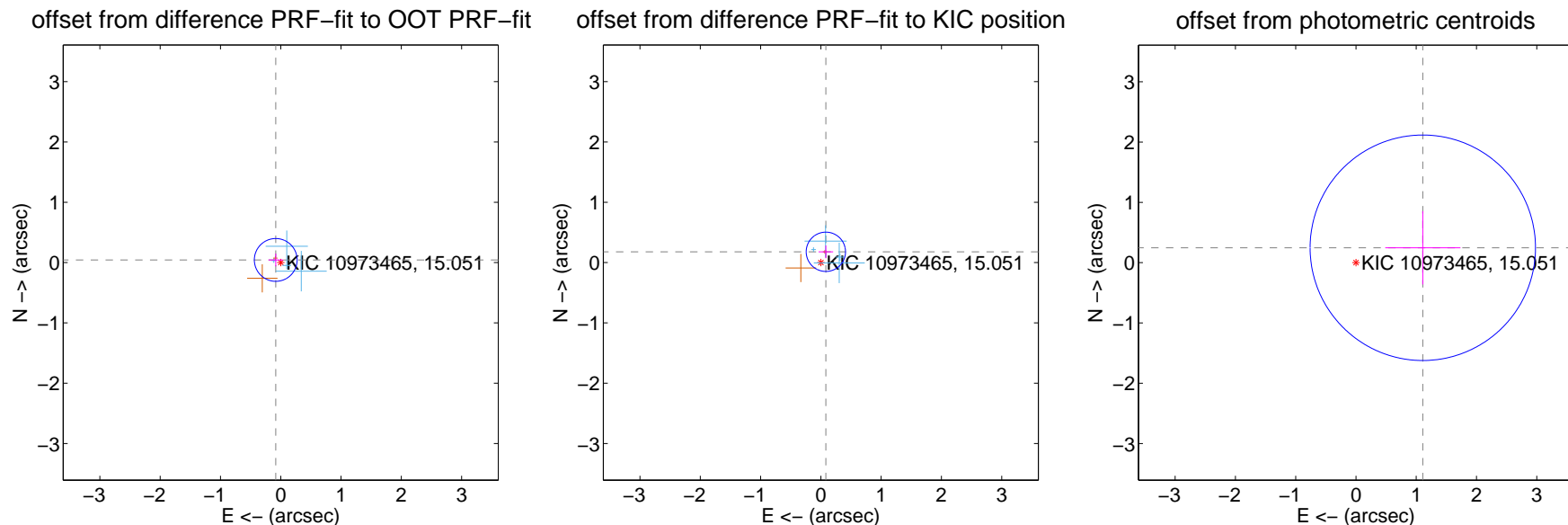
DV Centroid Data

Supplemental centroid analysis for 010973465-04. Kepler magnitude: 15.05. Transit SNR 5.53

There are 4 quarters with good PRF difference image offsets

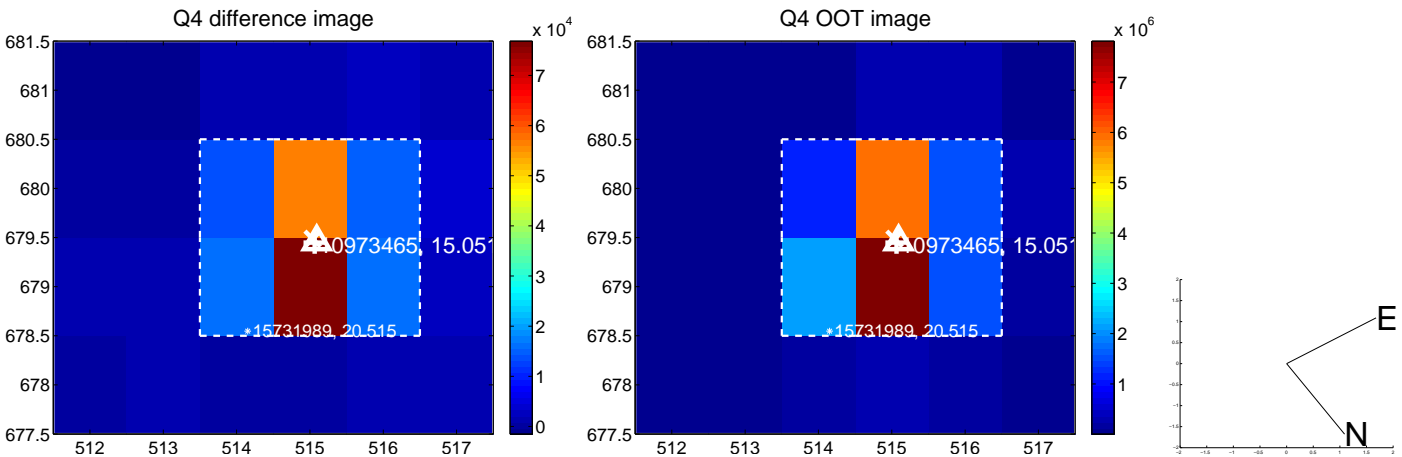
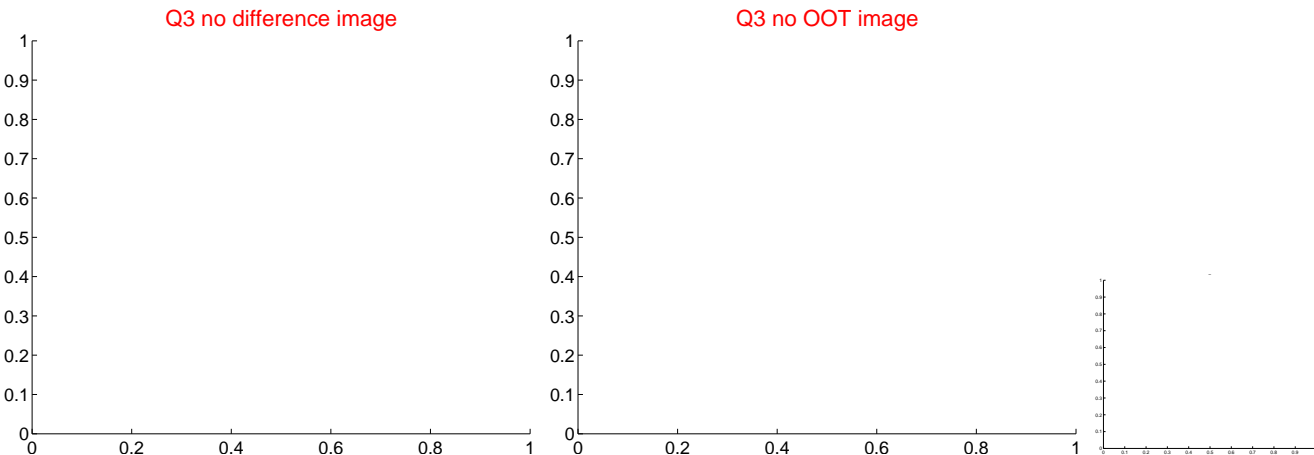
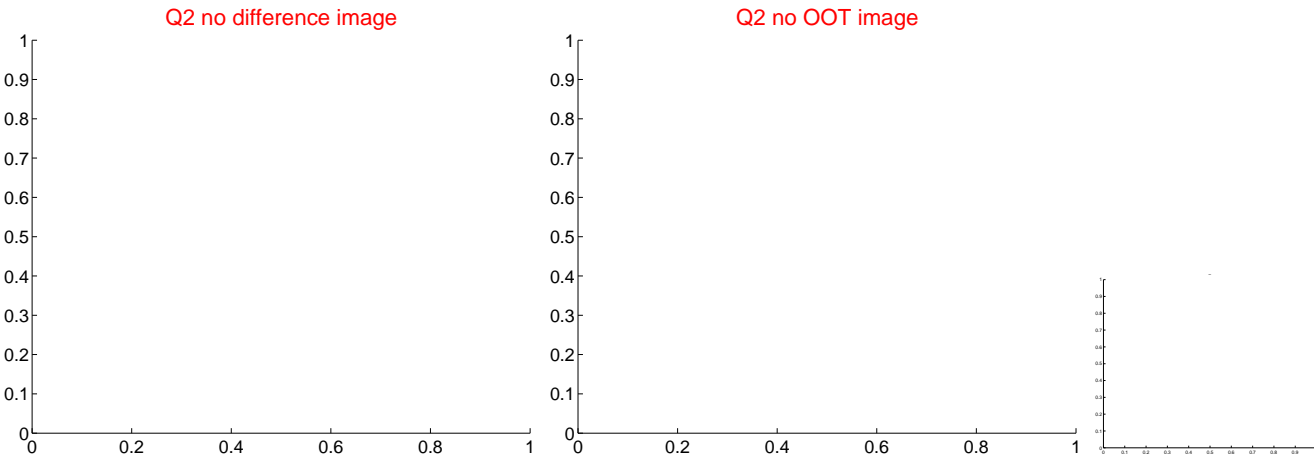
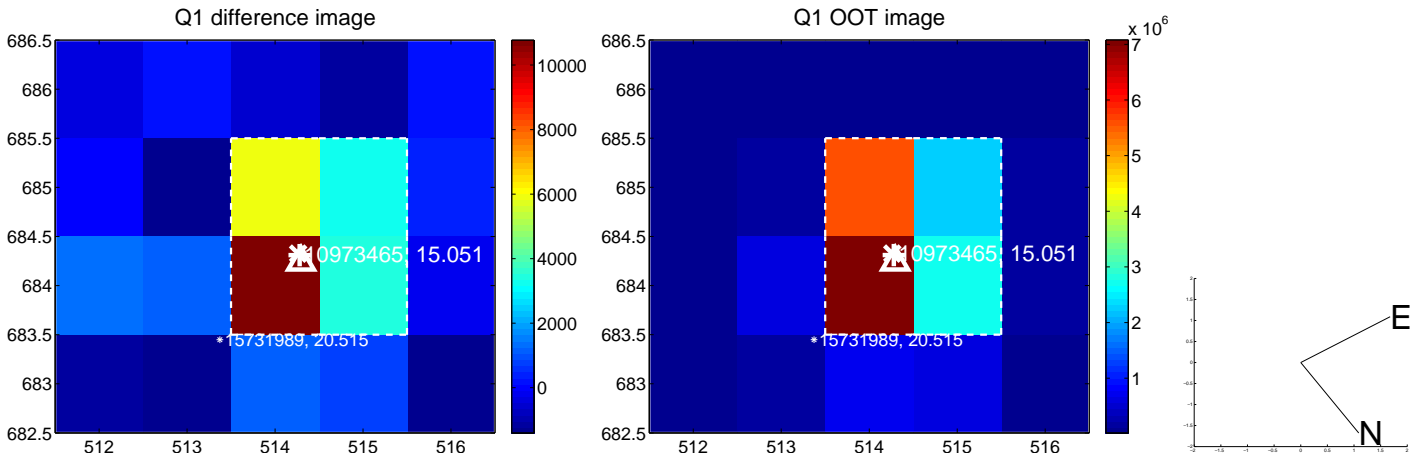
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.094 ± 0.118	0.80	0.083 ± 0.122	0.044 ± 0.106
PRF-fit source offset from KIC position	0.197 ± 0.109	1.82	-0.083 ± 0.122	0.179 ± 0.106
photometric centroid source offset	1.14 ± 0.62	1.82	-1.11 ± 0.62	0.25 ± 0.61

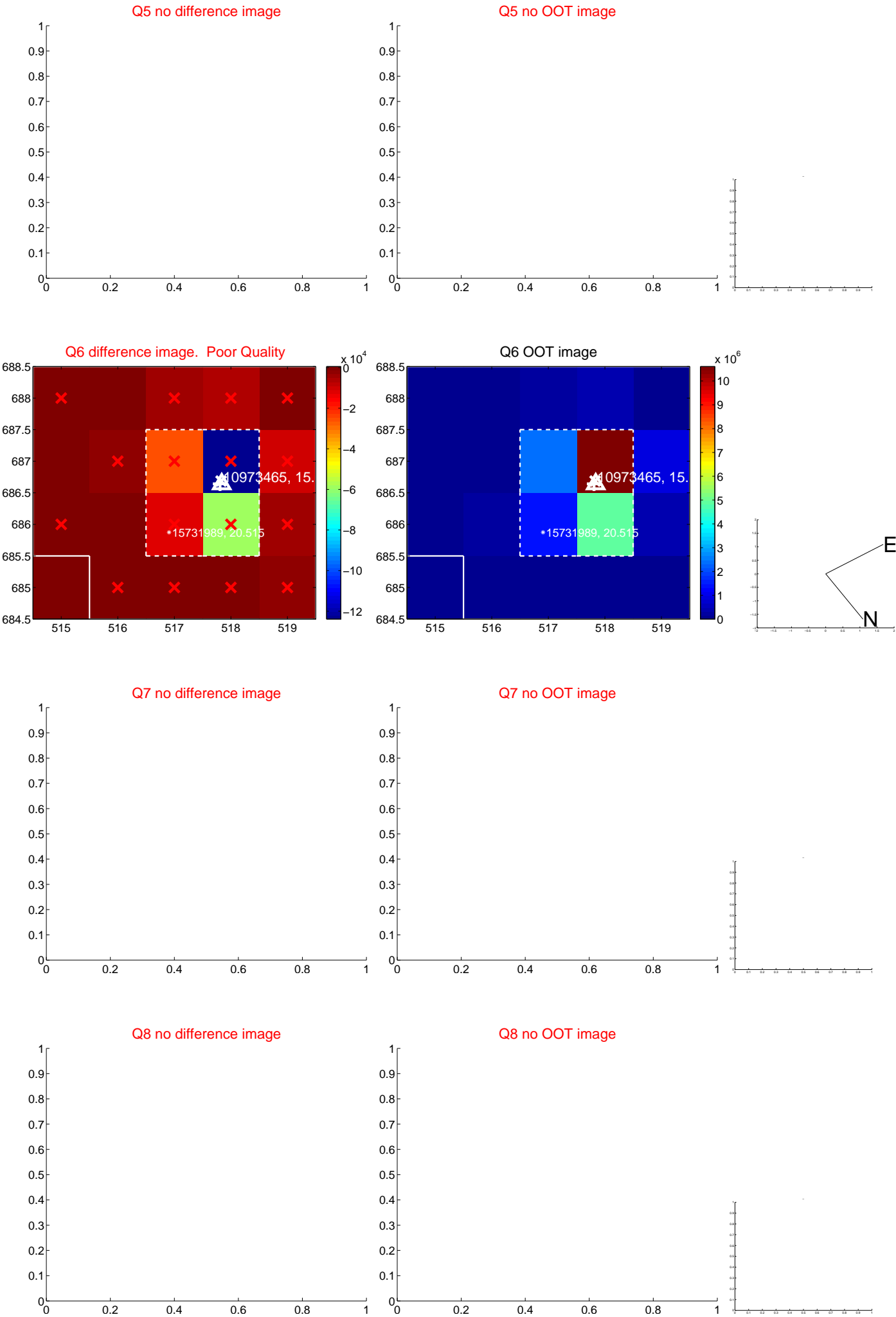


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

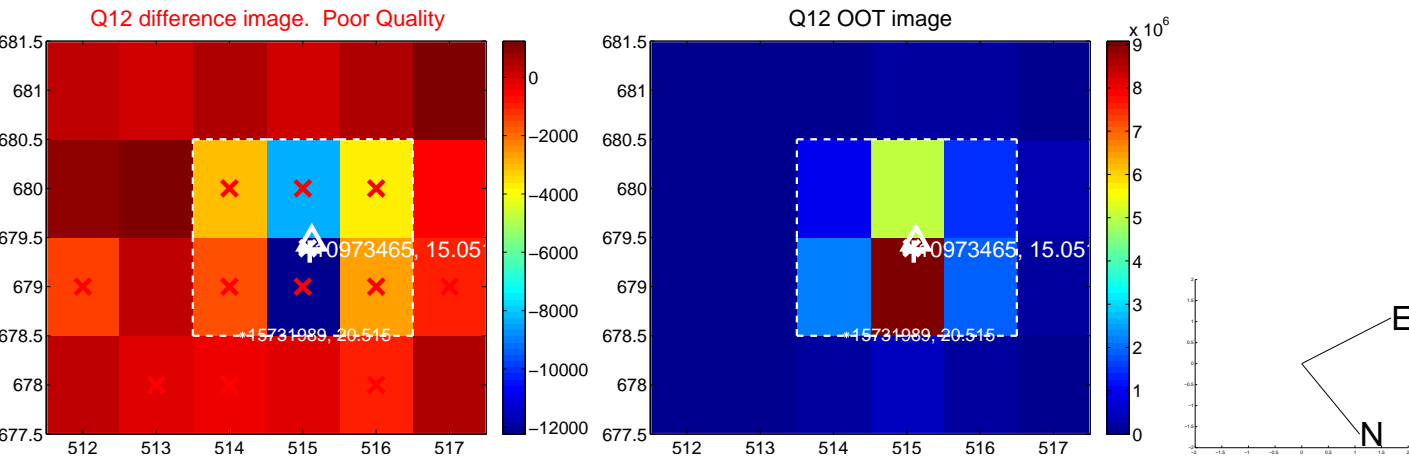
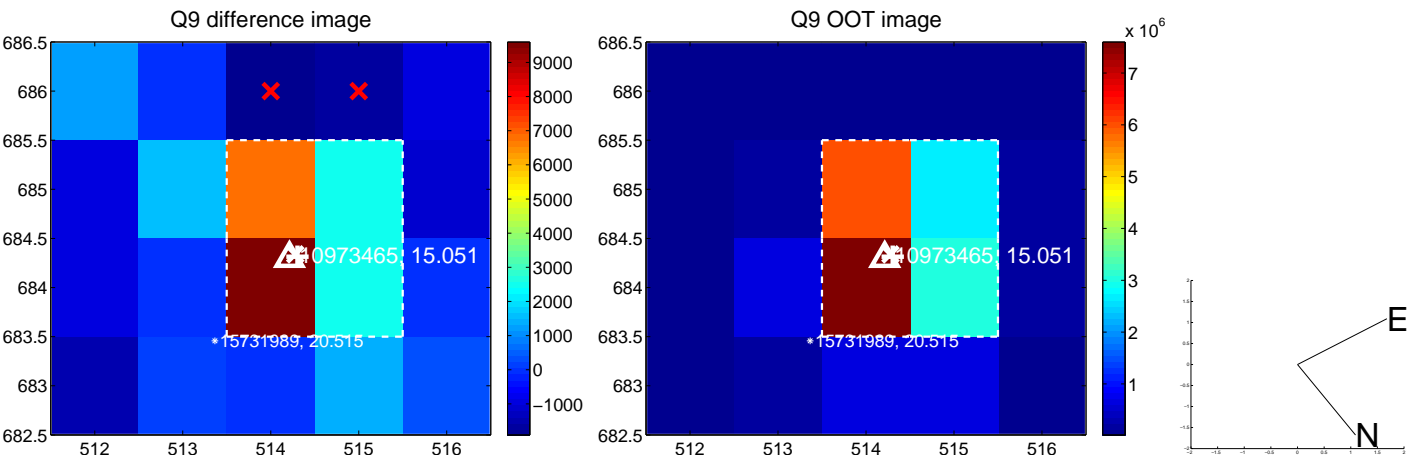
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



white ×: 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.



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

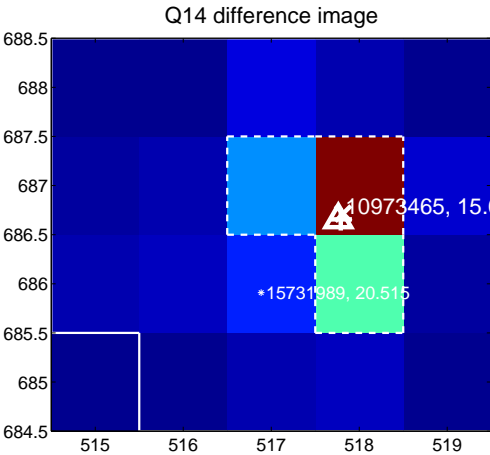
Q13 no difference image



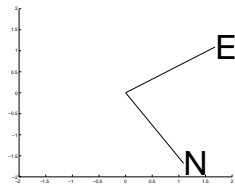
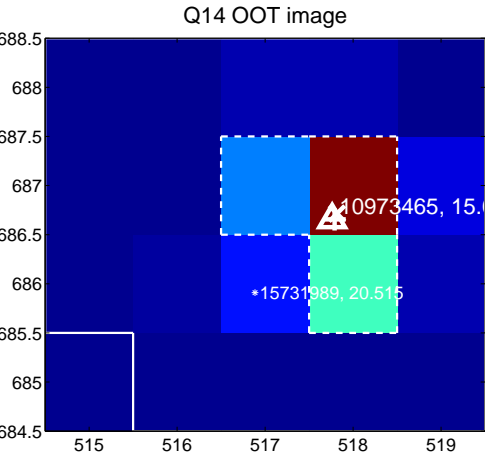
Q13 no OOT image



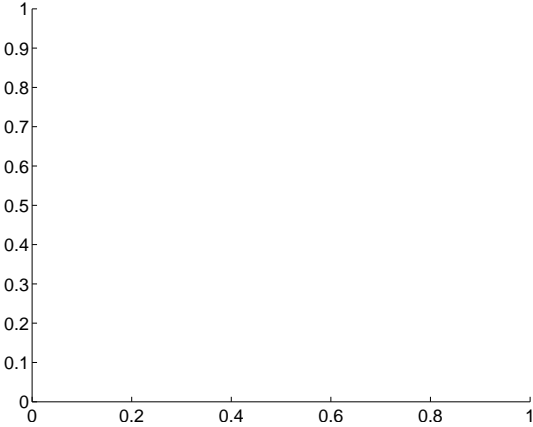
Q14 difference image



Q14 OOT image



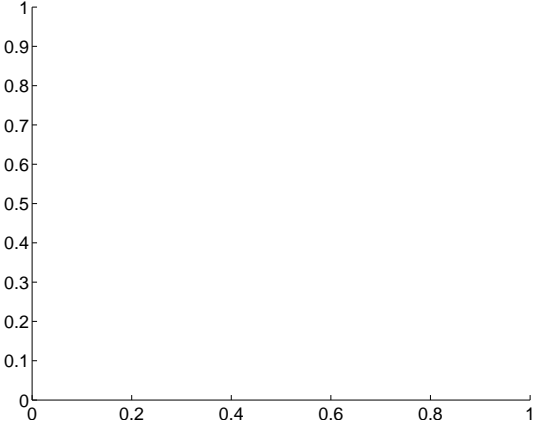
Q15 no difference image



Q15 no OOT image



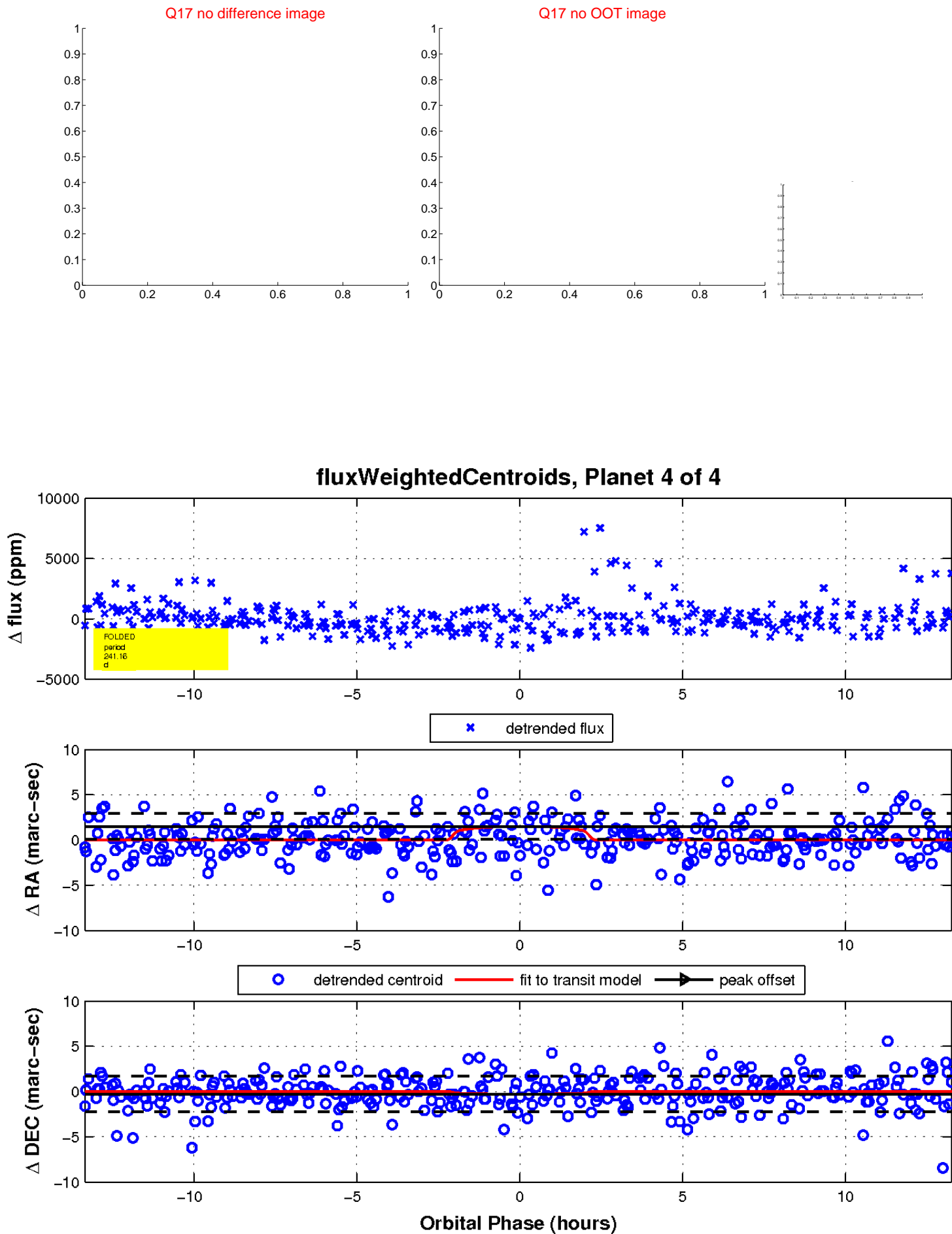
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

