

KIC 009945771

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})
009945771-01	OBS	No	480.527812	153.726712	2593.3	4.841	14.6	7.4	0.51	3799	2.98	0.05
009945771-02	OBS	No	385.304326	381.259917	900.5	3.817	13.5	3.4	0.51	3799	1.62	0.07
009945771-03	OBS	No	230.778489	235.835719	1504.7	3.887	13.7	7.0	0.51	3799	2.07	0.14
009945771-04	OBS	No	391.633634	181.644183	2063.7	4.992	13.5	5.8	0.51	3799	2.35	0.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009945771-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009945771-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009945771-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009945771-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—HALO_GHOST

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

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

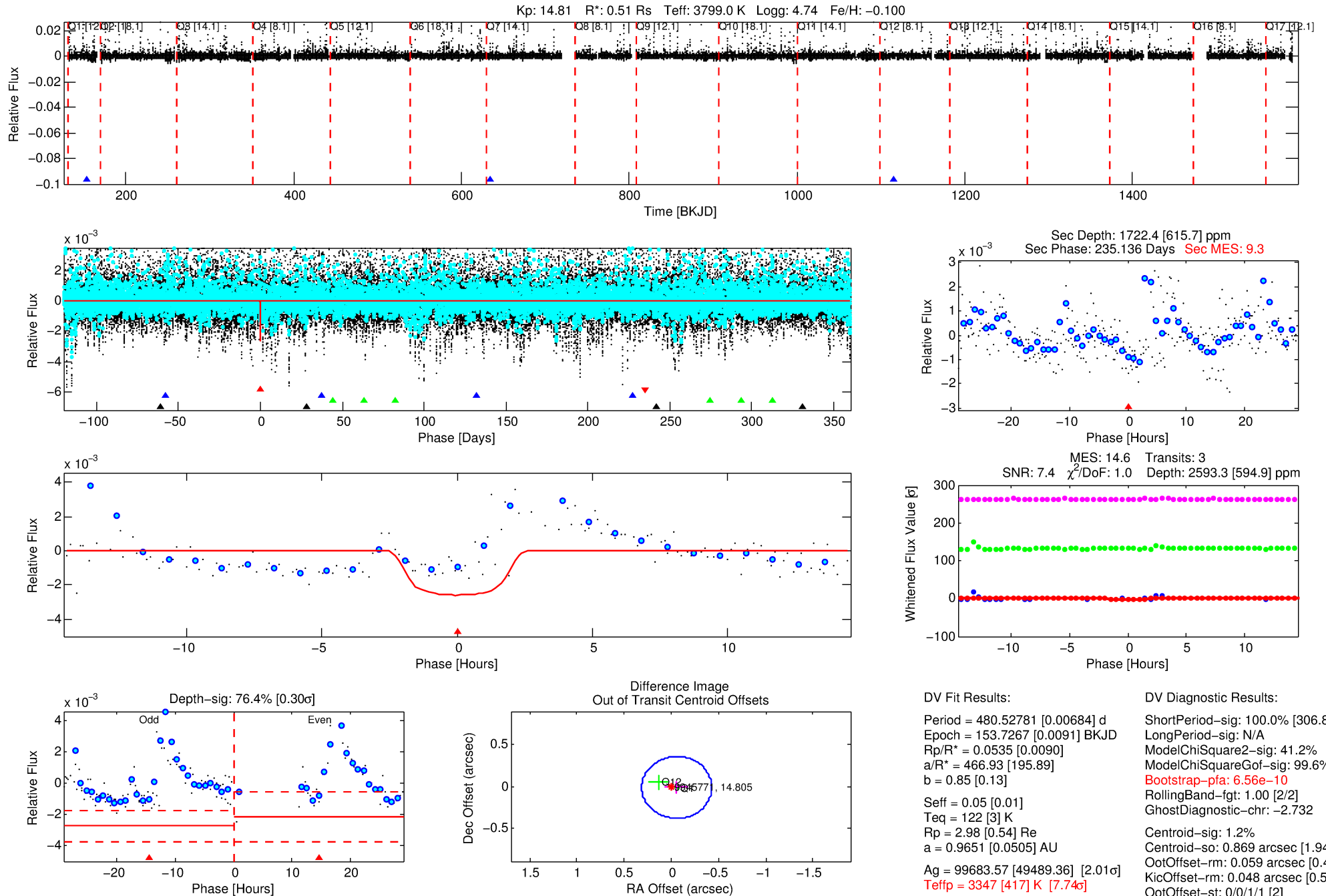
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009945771-01

No Significant Match Found

DV One-Page Summary

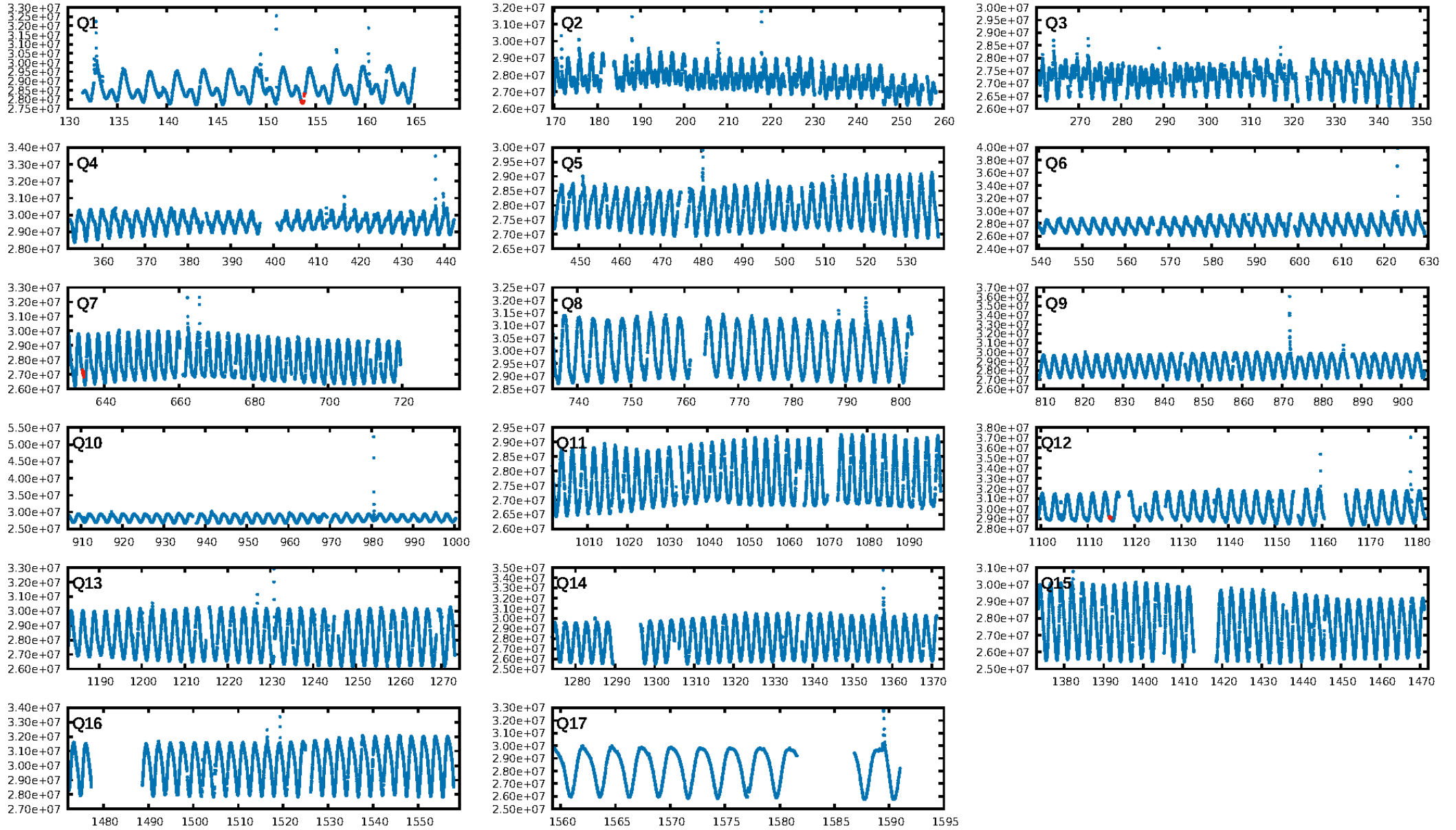
KIC: 9945771 Candidate: 1 of 4 Period: 480.528 d



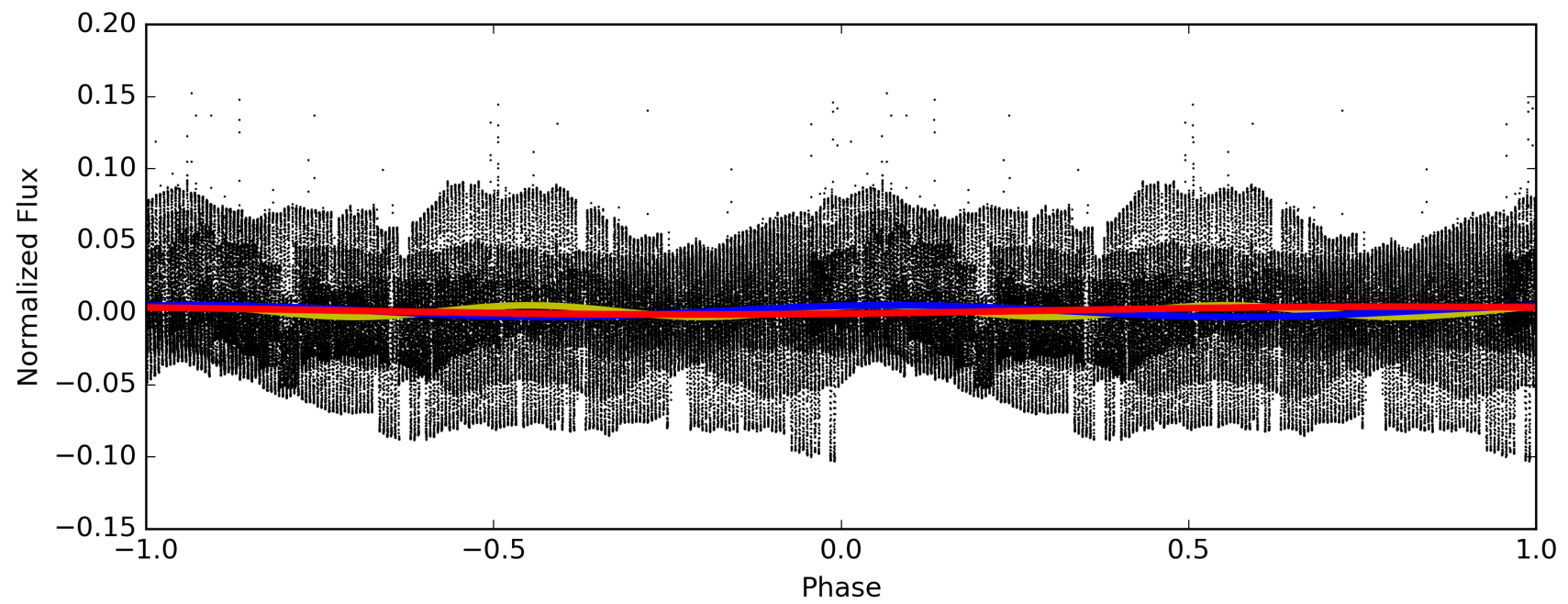
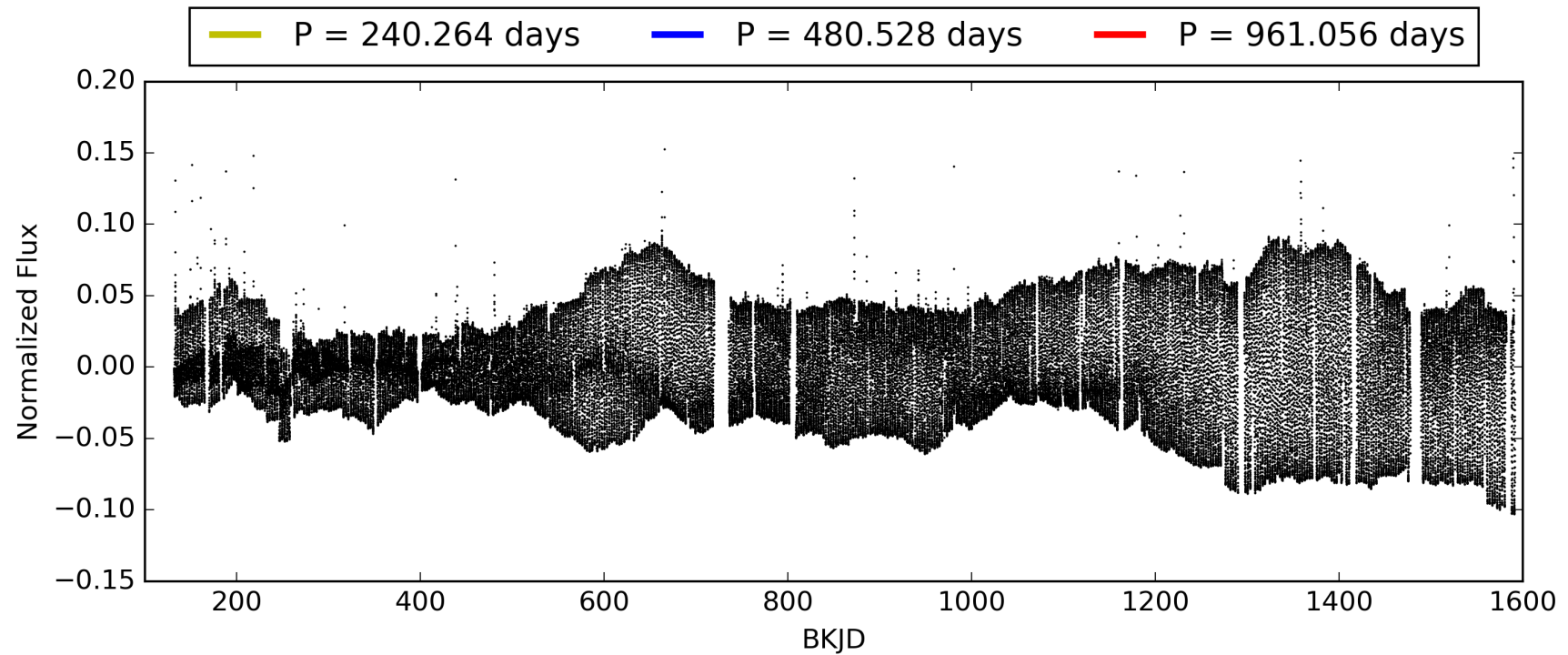
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:00:30 Z

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

TCE 009945771-01, PDC Light Curves

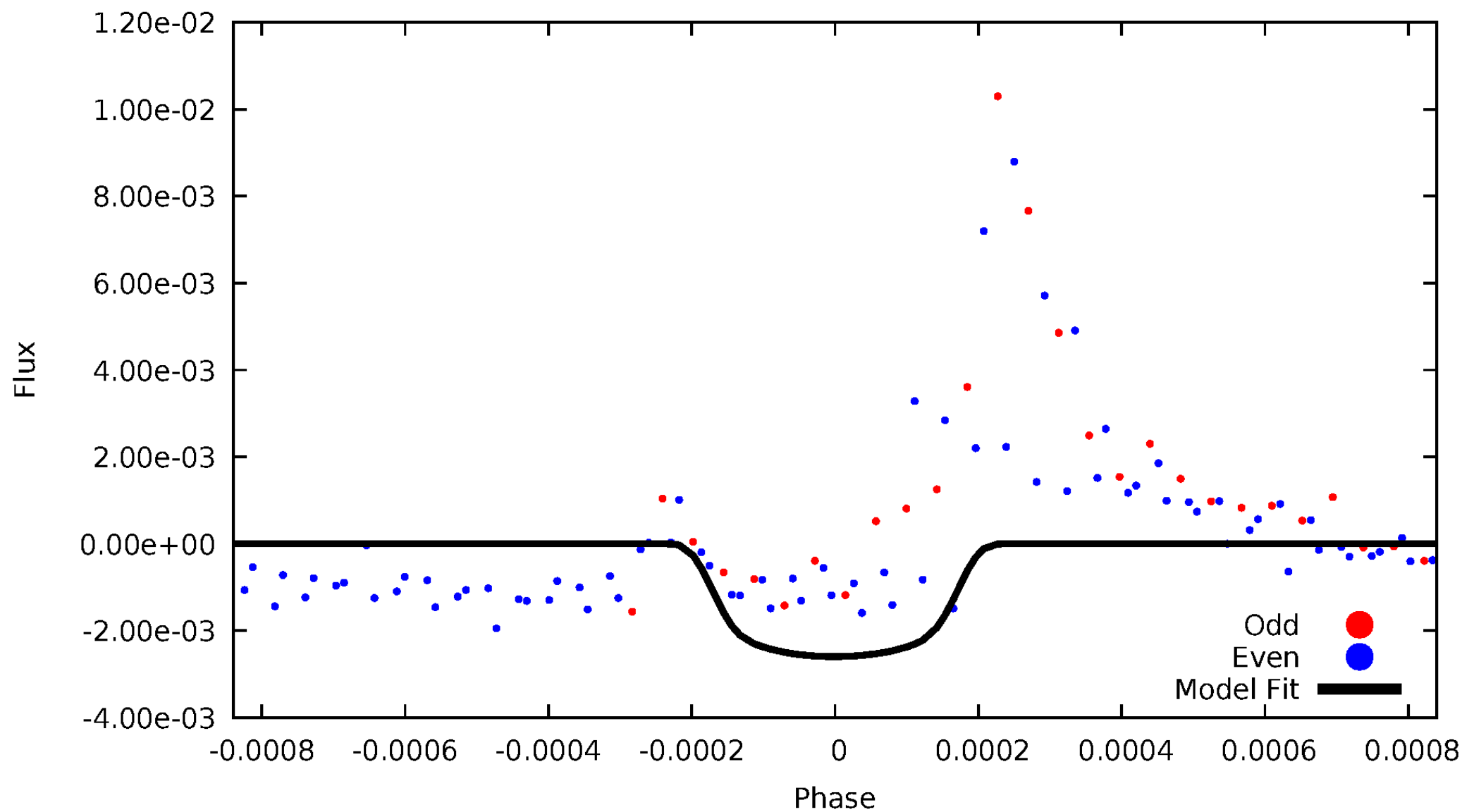


TCE 009945771-01



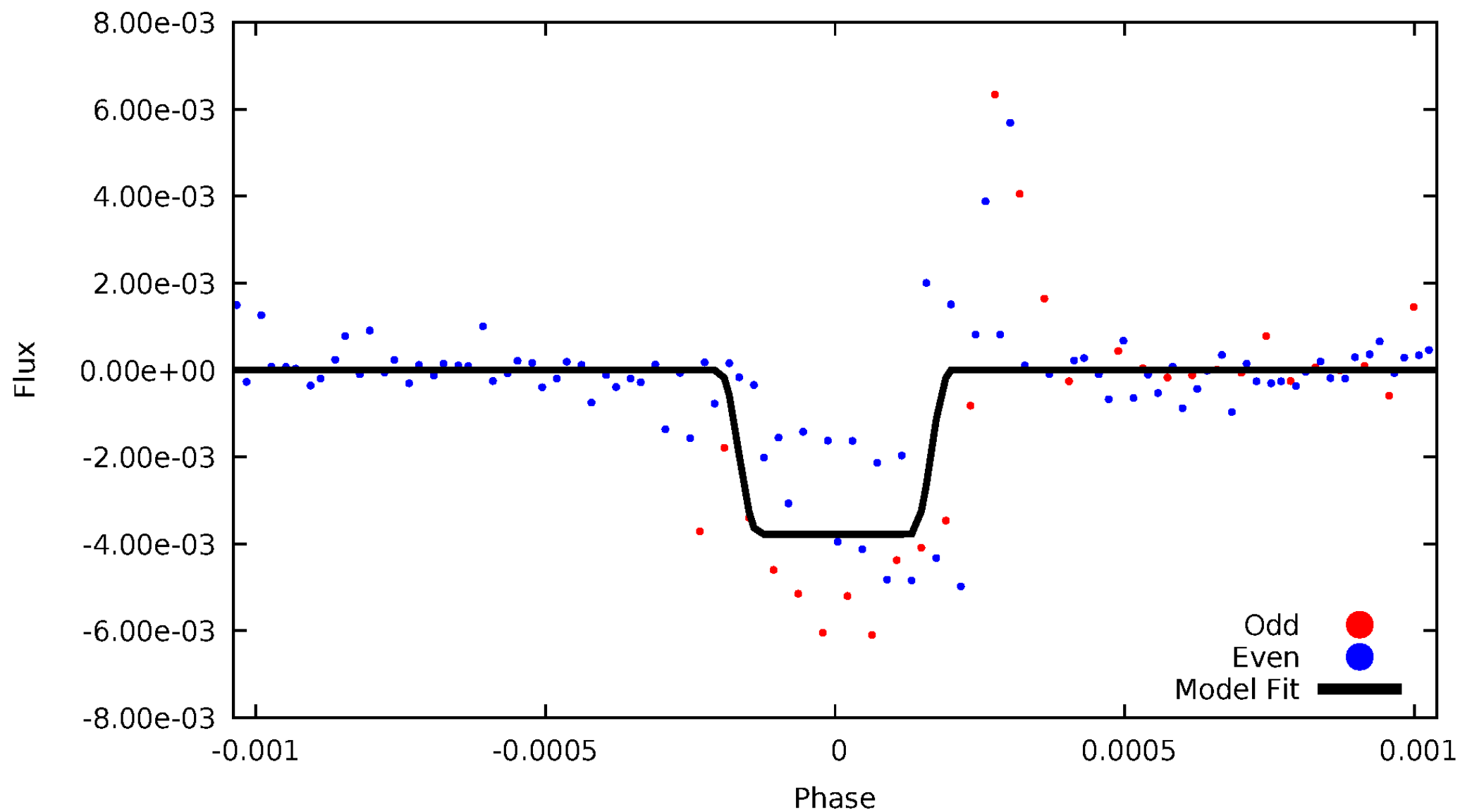
DV Odd/Even

TCE 009945771-01



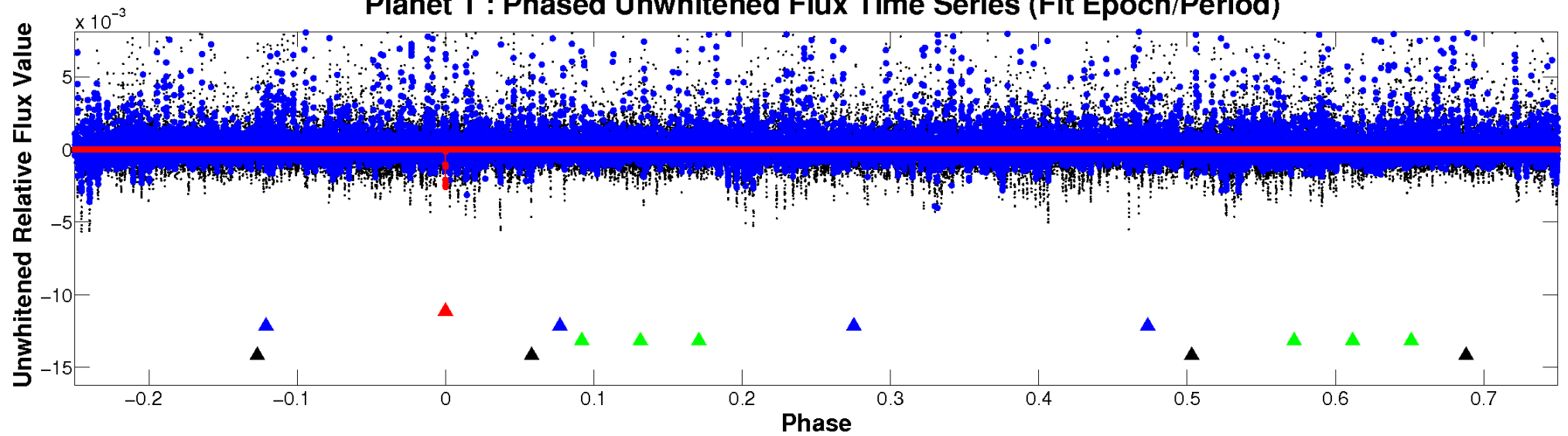
ALT Odd/Even

TCE 009945771-01

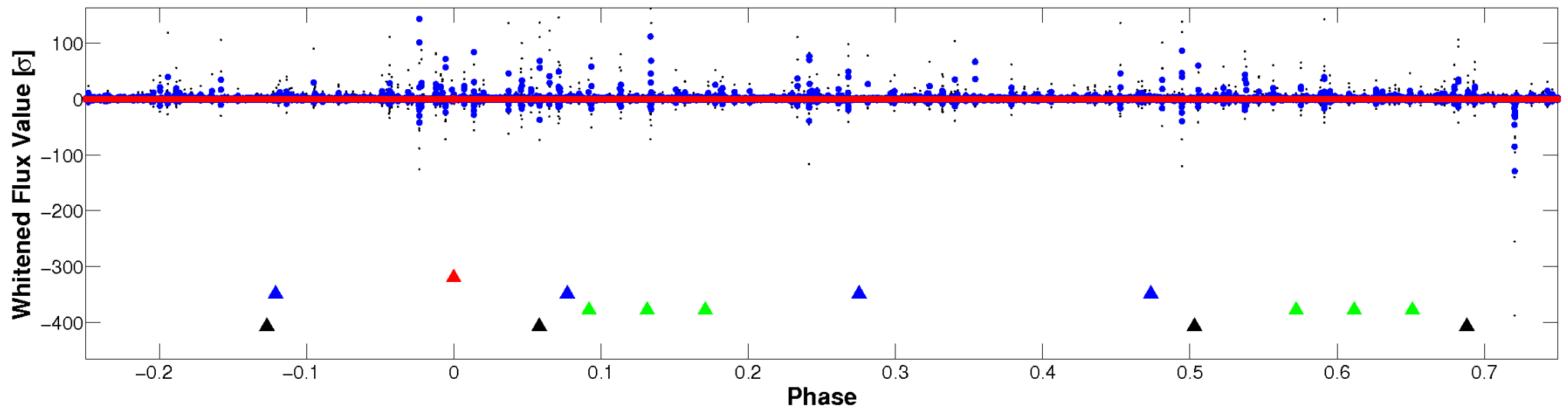


Non-Whitened Vs. Whitened Light Curve

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

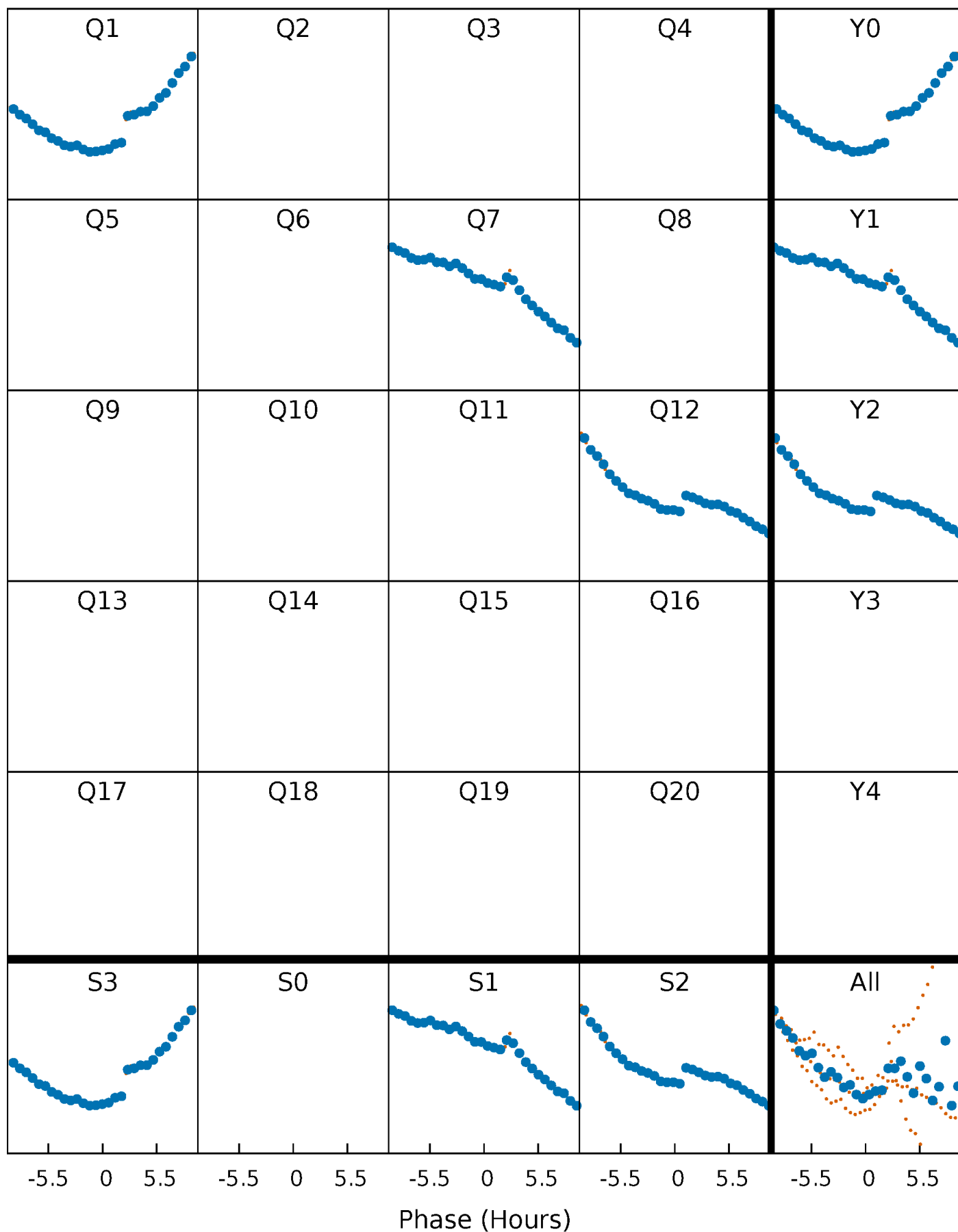


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



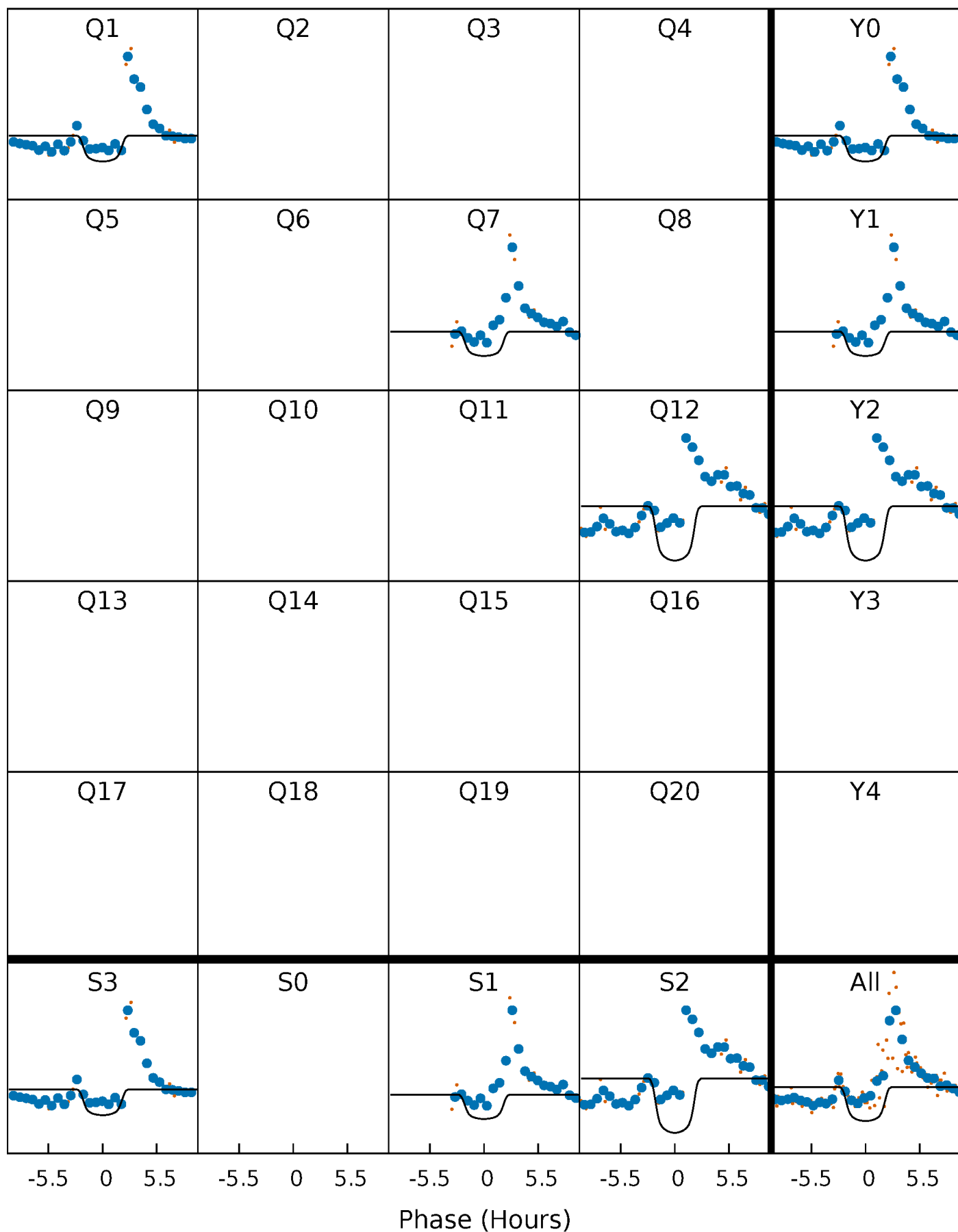
PDC Quarter-Phased Transit Curves

TCE 009945771-01 P=480.527812 Days $T_0=153.726712$ (BKJD)



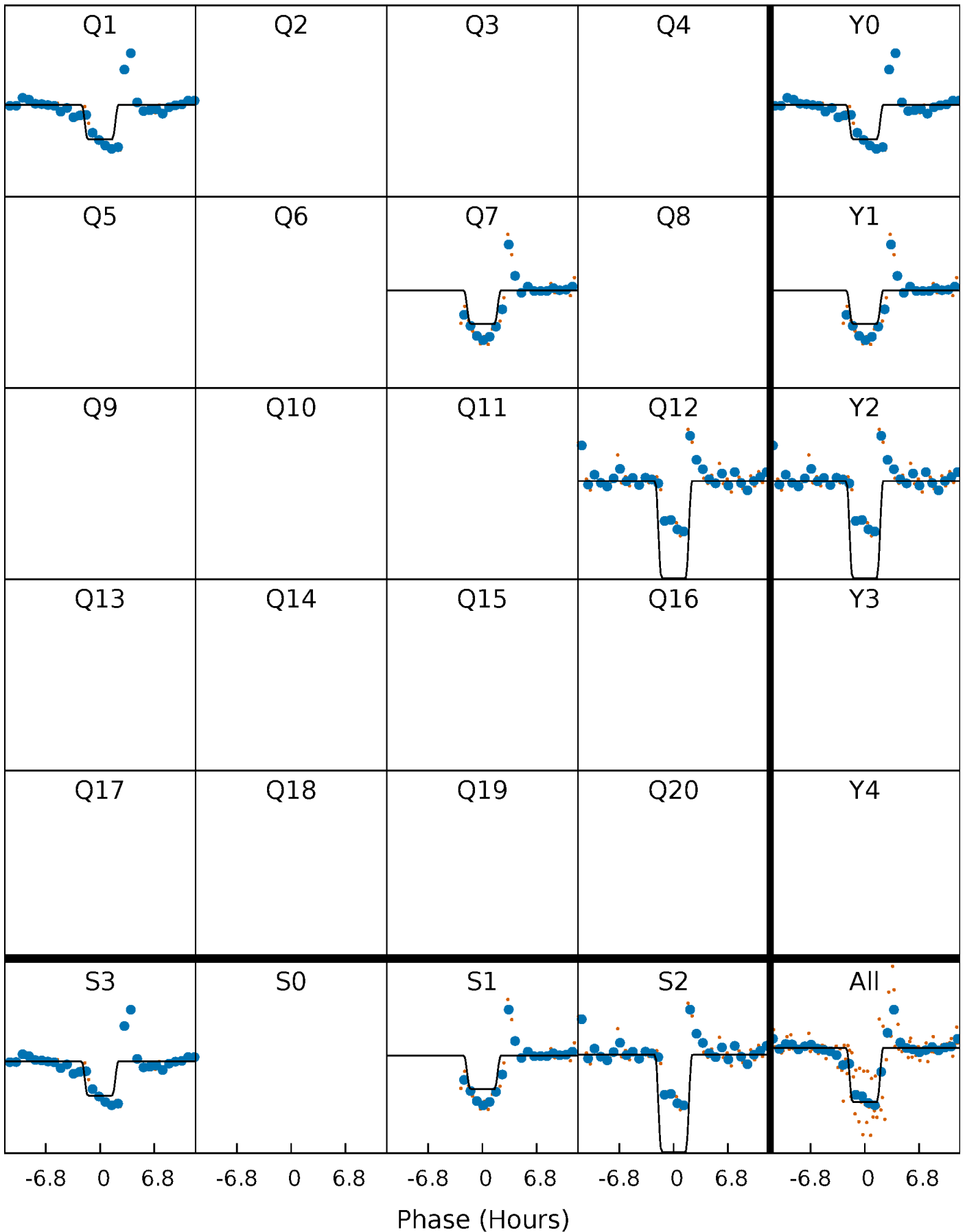
DV Quarter-Phased Transit Curves

TCE 009945771-01 P=480.527812 Days $T_0=153.726712$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

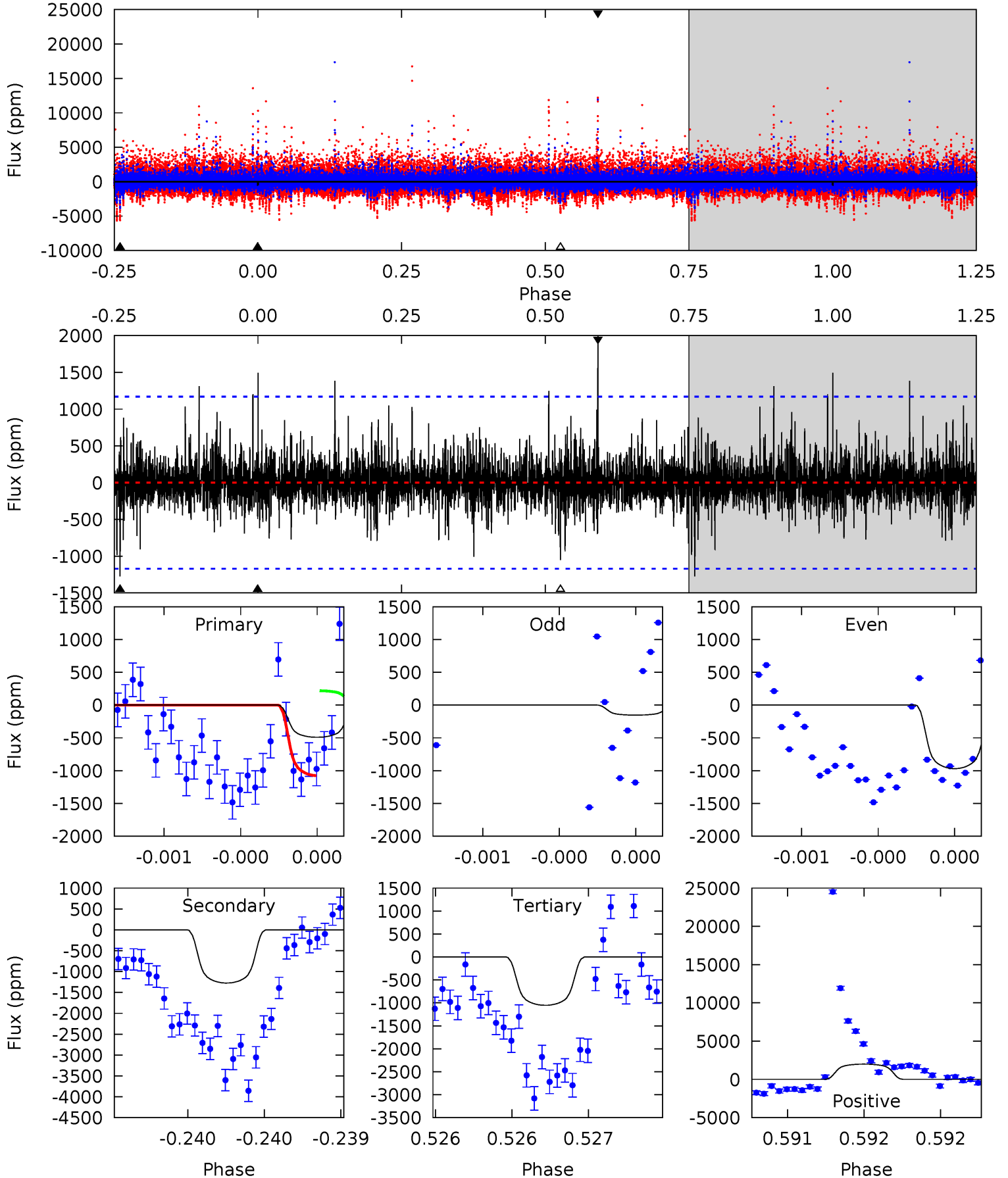
TCE 009945771-01 P=480.529219 Days $T_0=153.701647$ (BKJD)



DV Model-Shift Uniqueness Test

009945771-01, P = 480.527812 Days, E = 153.726712 Days

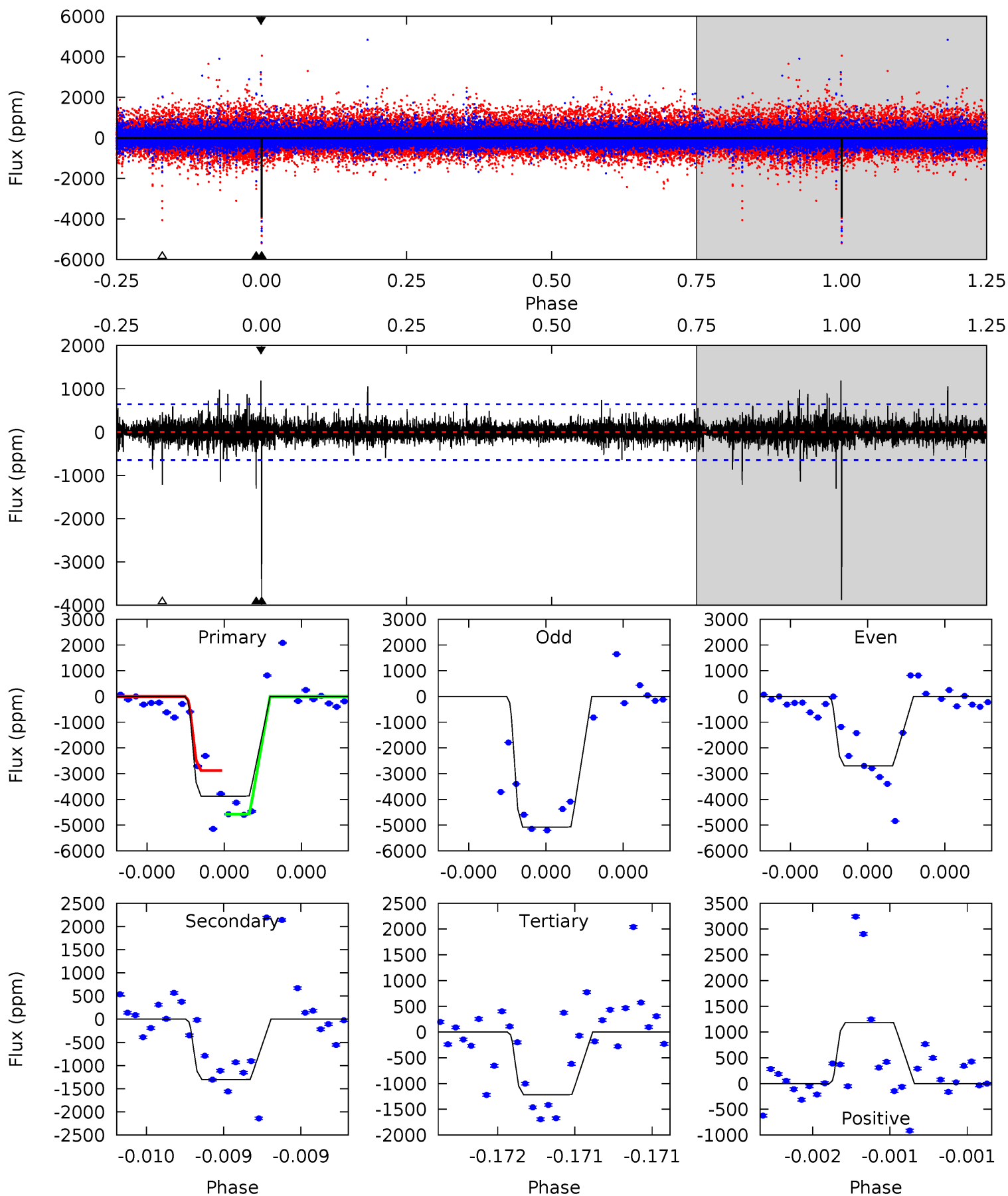
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.35	6.09	5.03	9.53	5.59	3.51	1.13	-2.68	-7.19	1.06	-3.44	0.57	3.20	0.61	2.04



Alt Model-Shift Uniqueness Test

009945771-01, P = 480.529219 Days, E = 153.701647 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.7	11.4	10.6	10.3	5.61	3.53	1.15	23.1	23.4	0.76	1.02	11.3	0.89	0.23	7.67



Stellar Parameters For KIC 009945771

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	3799^{+76}_{-76}	$4.738^{+0.036}_{-0.021}$	$-0.100^{+0.100}_{-0.100}$	$0.510^{+0.028}_{-0.034}$	$0.518^{+0.029}_{-0.029}$	$5.508^{+0.900}_{-0.528}$
	+2%/-2%	+1%/-0%	+100%/-100%	+5%/-7%	+6%/-6%	+16%/-10%
Source	PHO2	PHO2	PHO2	DSEP		

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

Secondary Eclipse Parameters for KIC 009945771-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-1275 ± 209	$2.95^{+0.53}_{-0.53}$	170^{+4}_{-4}	3337^{+237}_{-203}	75856^{+41875}_{-25024}
Alt.	-1303 ± 115	$3.39^{+0.55}_{-0.52}$	170^{+4}_{-4}	3198^{+194}_{-131}	57301^{+23607}_{-14428}

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

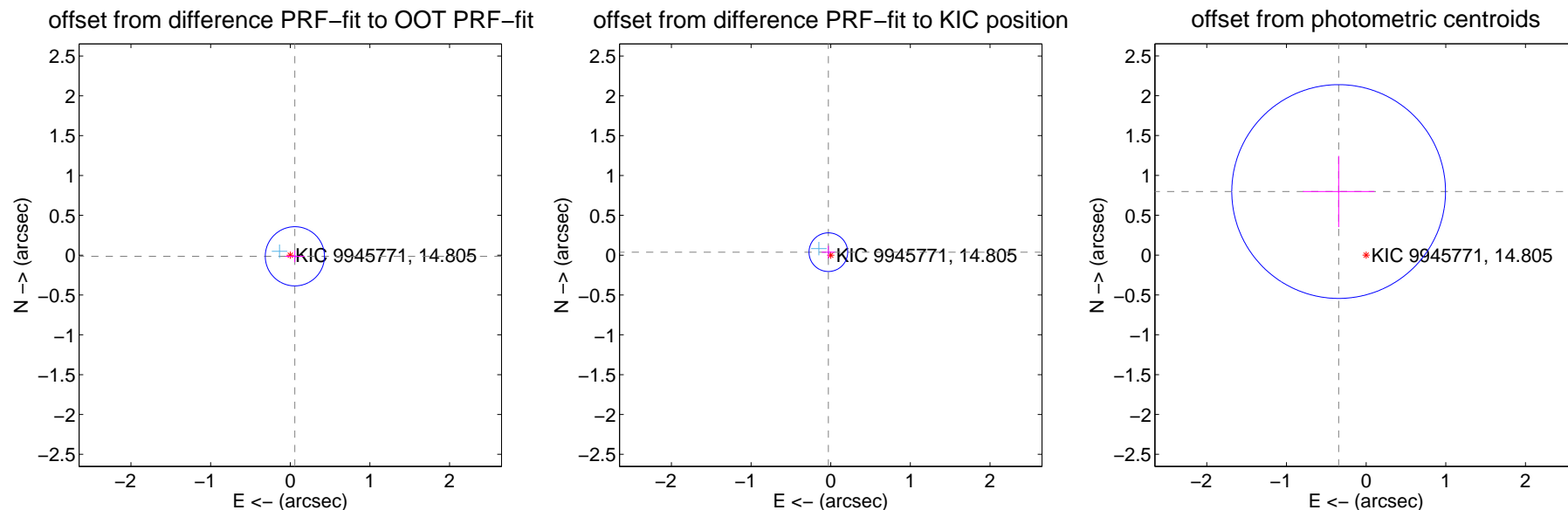
DV Centroid Data

Supplemental centroid analysis for 009945771-01. Kepler magnitude: 14.80. Transit SNR 7.40

There are 2 quarters with good PRF difference image offsets

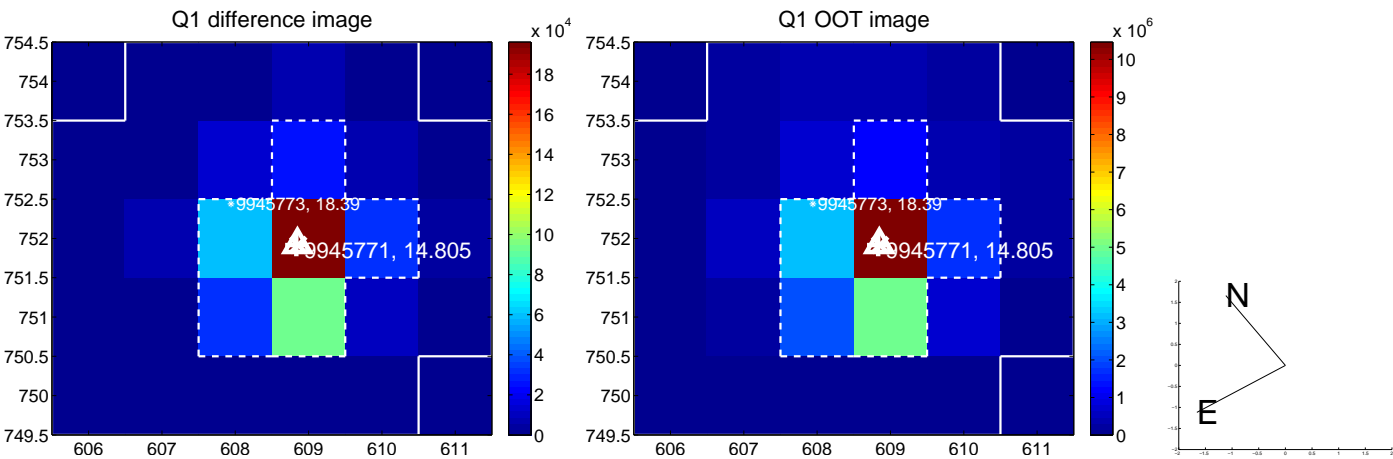
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.059 ± 0.124	0.48	-0.058 ± 0.120	-0.014 ± 0.074
PRF-fit source offset from KIC position	0.048 ± 0.081	0.59	0.030 ± 0.083	0.037 ± 0.079
photometric centroid source offset	0.87 ± 0.45	1.94	0.34 ± 0.45	0.80 ± 0.45



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.

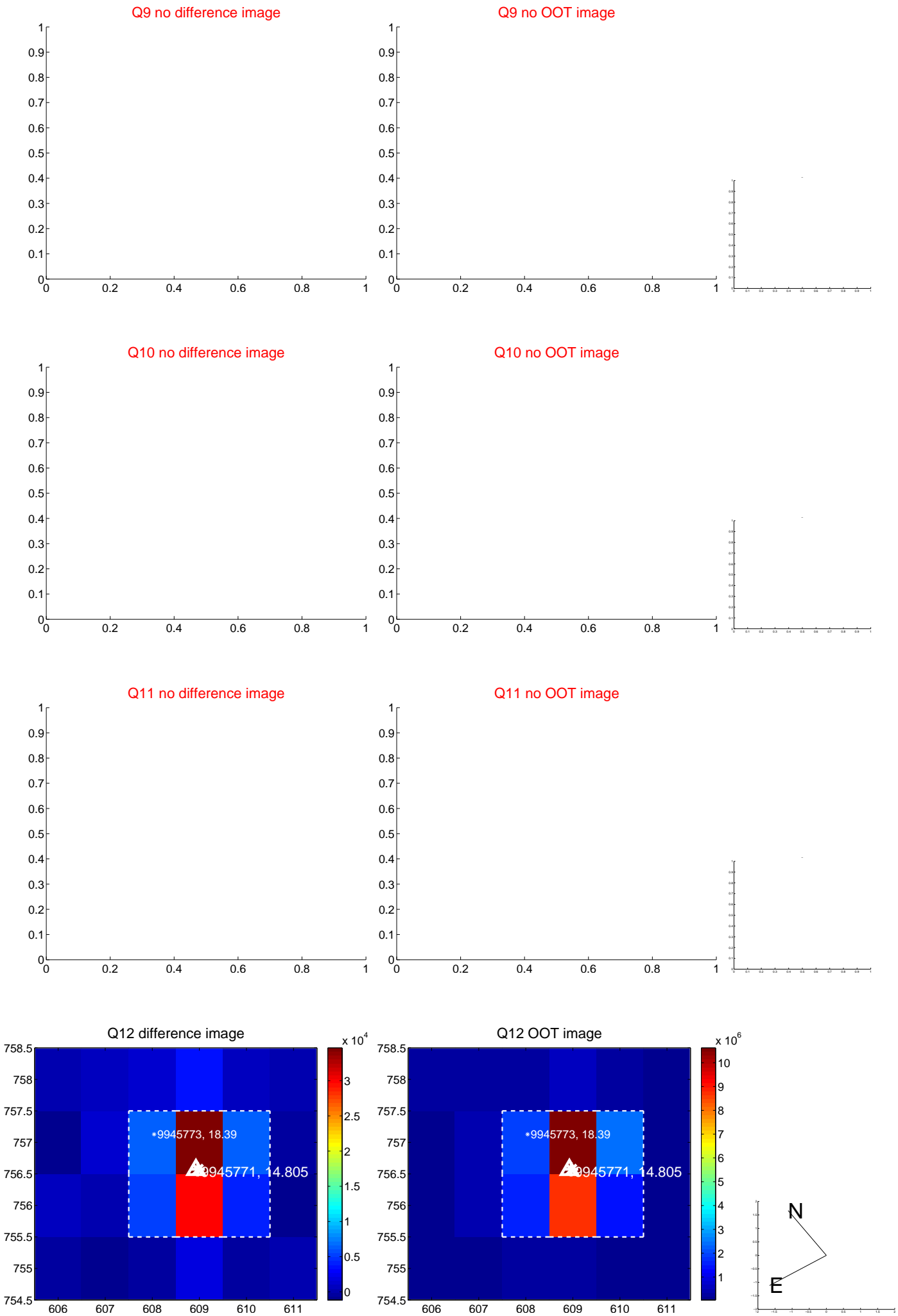
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



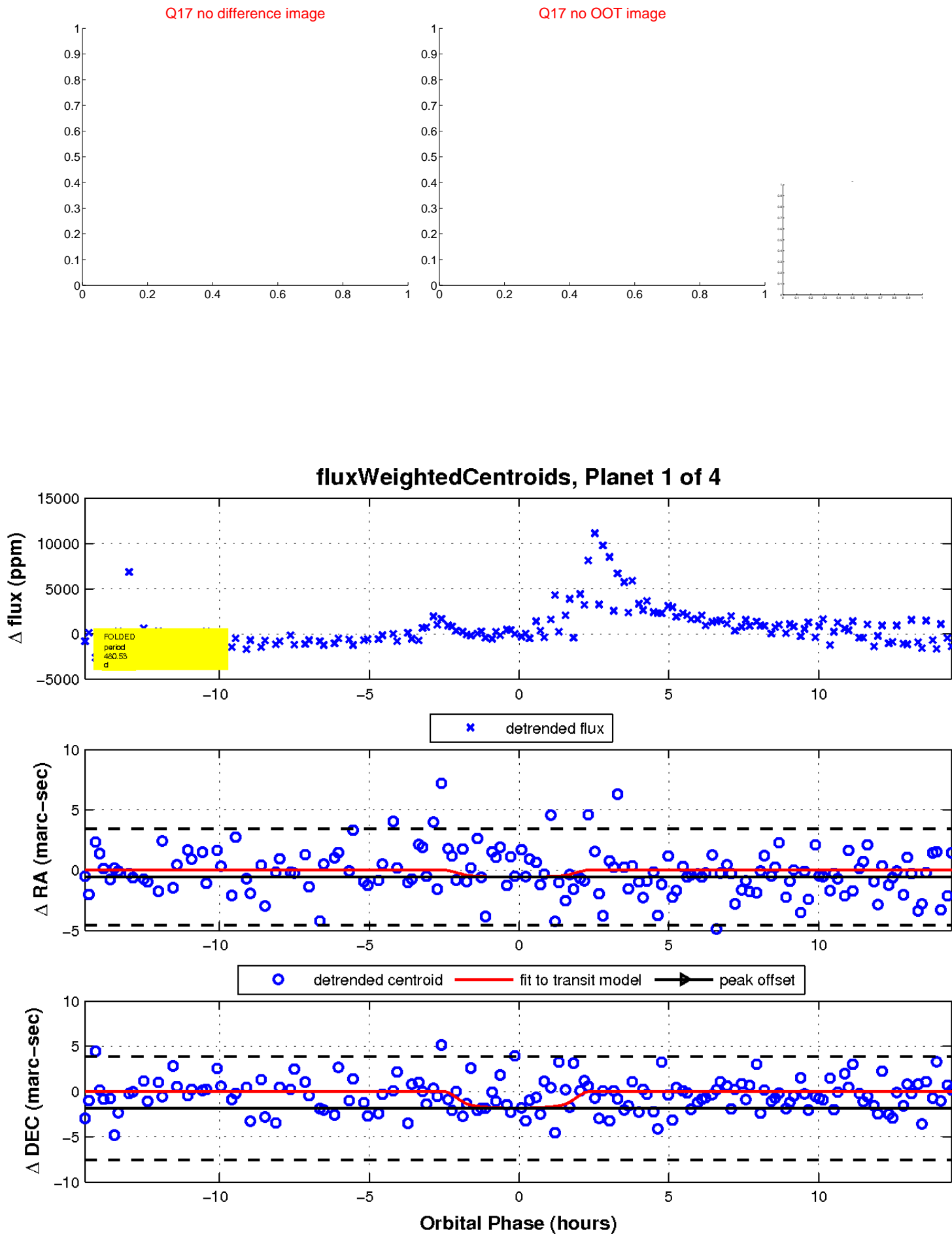
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



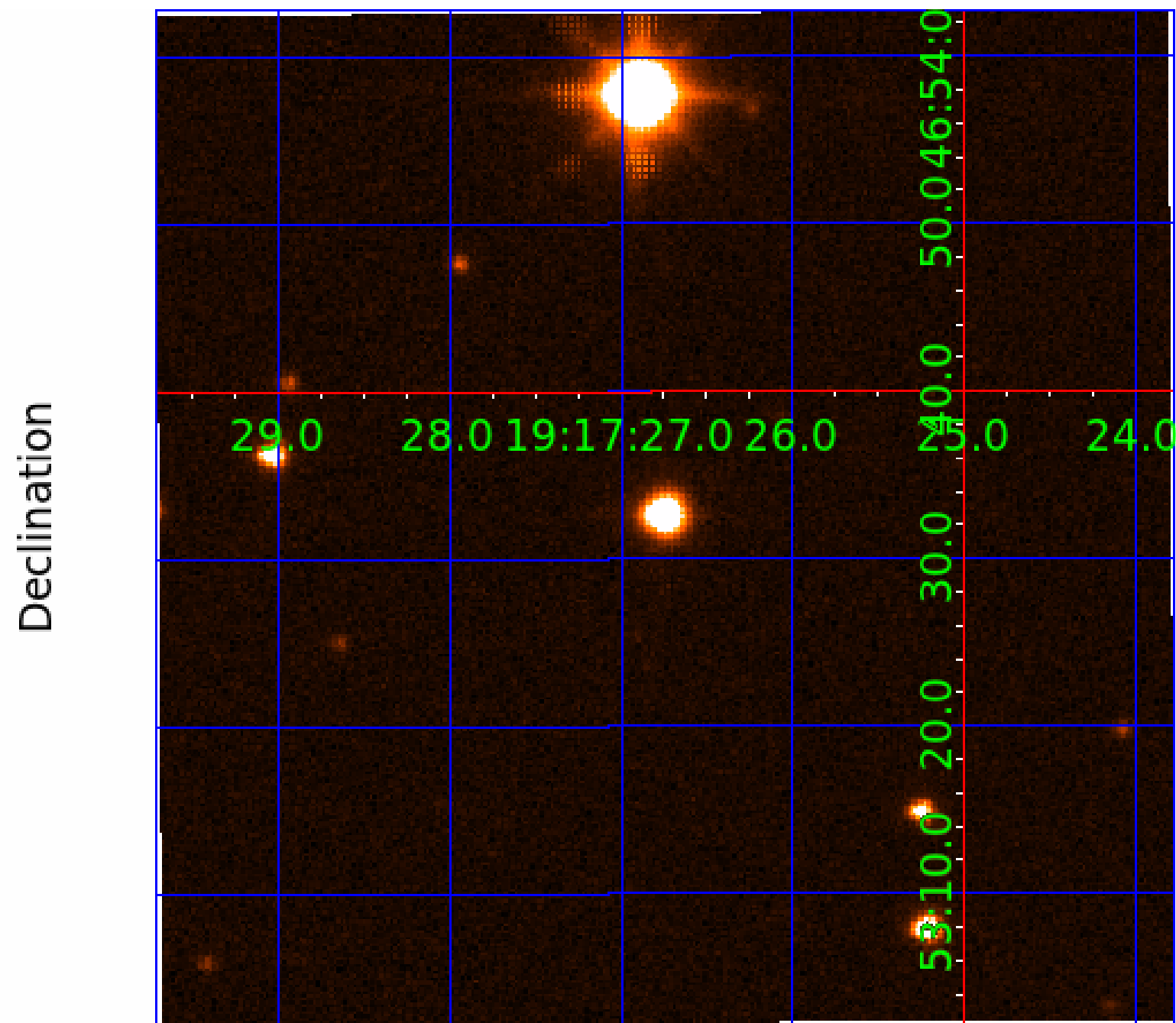
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 009945771

Q1-17 DR25 TCE Parameters

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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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009945771-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009945771-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009945771-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—HALO_GHOST

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

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

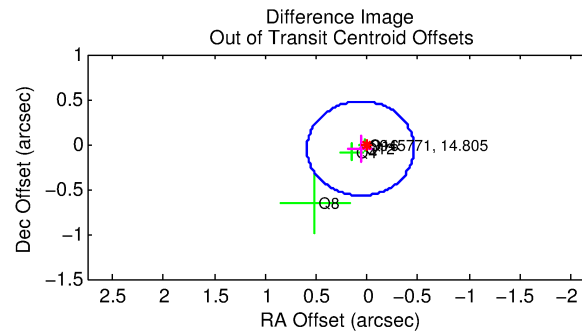
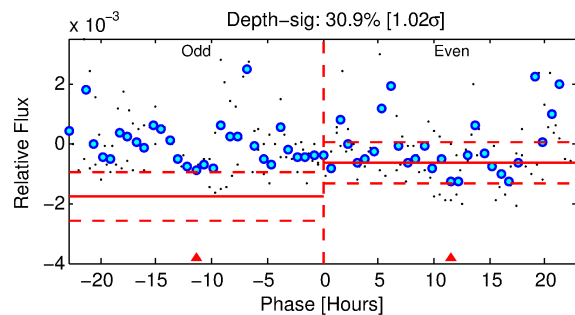
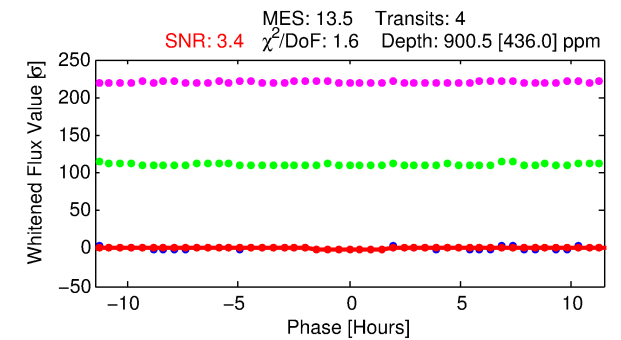
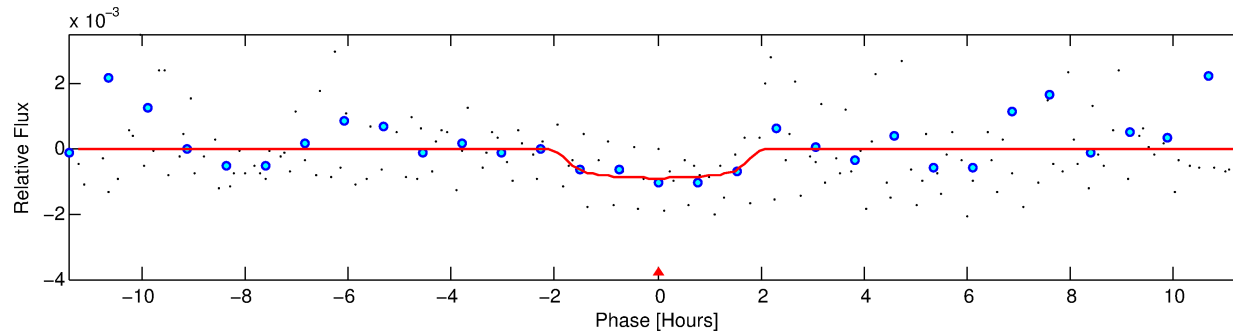
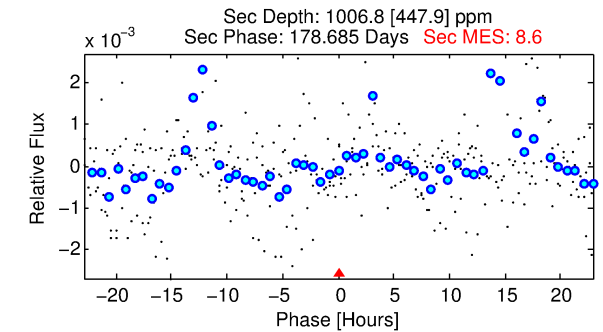
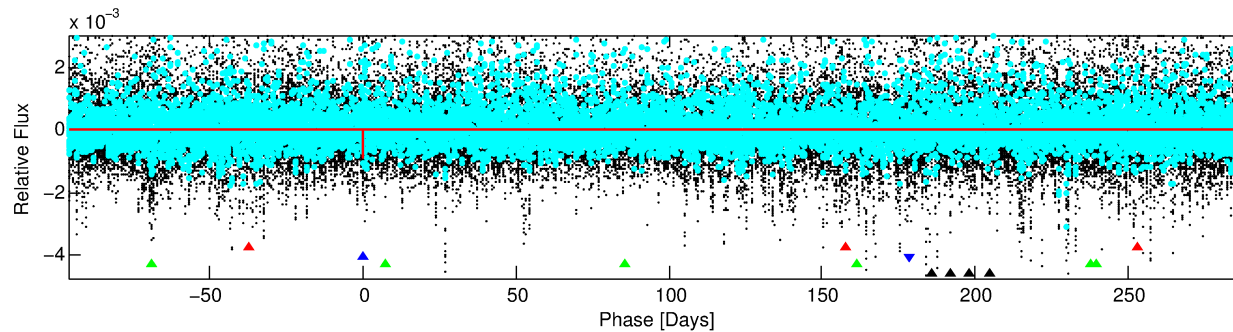
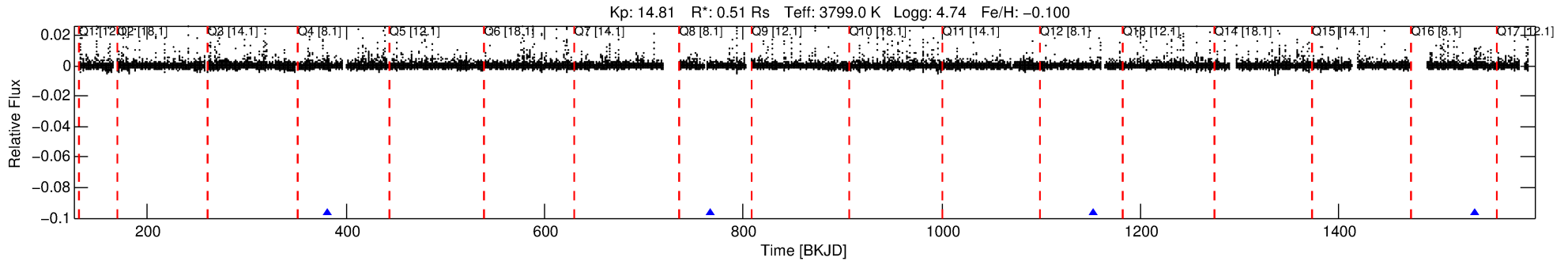
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009945771-02

No Significant Match Found

DV One-Page Summary

KIC: 9945771 Candidate: 2 of 4 Period: 385.304 d



DV Fit Results:

Period = 385.30433 [0.00939] d
Epoch = 381.2599 [0.0185] BKJD
Rp/R* = 0.0292 [0.0637]
a/R* = 592.71 [5616.14]
b = 0.68 [7.40]
Seff = 0.07 [0.01]
Teq = 131 [4] K
Rp = 1.62 [3.55] Re
a = 0.8329 [0.0436] AU
Ag = 145540.80 [638838.83] [0.23σ]
Teffp = 3960 [4346] K [0.88σ]

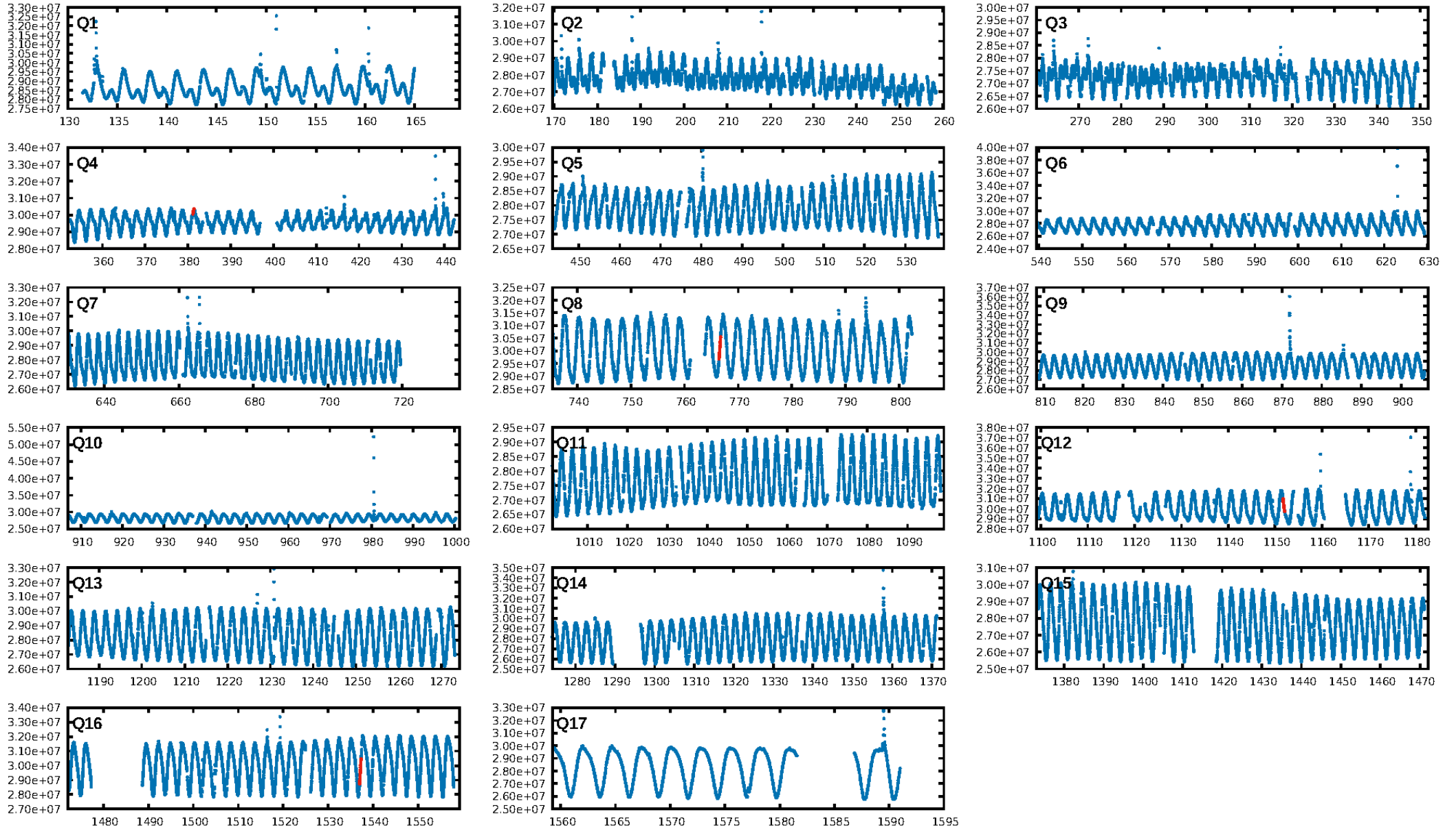
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [680.71σ]
LongPeriod-sig: 100.0% [24.17σ]
ModelChiSquare2-sig: 10.6%
ModelChiSquareGof-sig: 99.6%
Bootstrap-pfa: 2.08e-09
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 0.4403
Centroid-sig: 15.6%
Centroid-so: 1.366 arcsec [1.20σ]
OotOffset-rm: 0.079 arcsec [0.45σ]
KicOffset-rm: 0.092 arcsec [0.66σ]
OotOffset-st: 0/0/4/0 [4]
KicOffset-st: 0/0/4/0 [4]
DiffImageQuality-fgm: 0.75 [3/4]
DiffImageOverlap-fno: 1.00 [4/4]

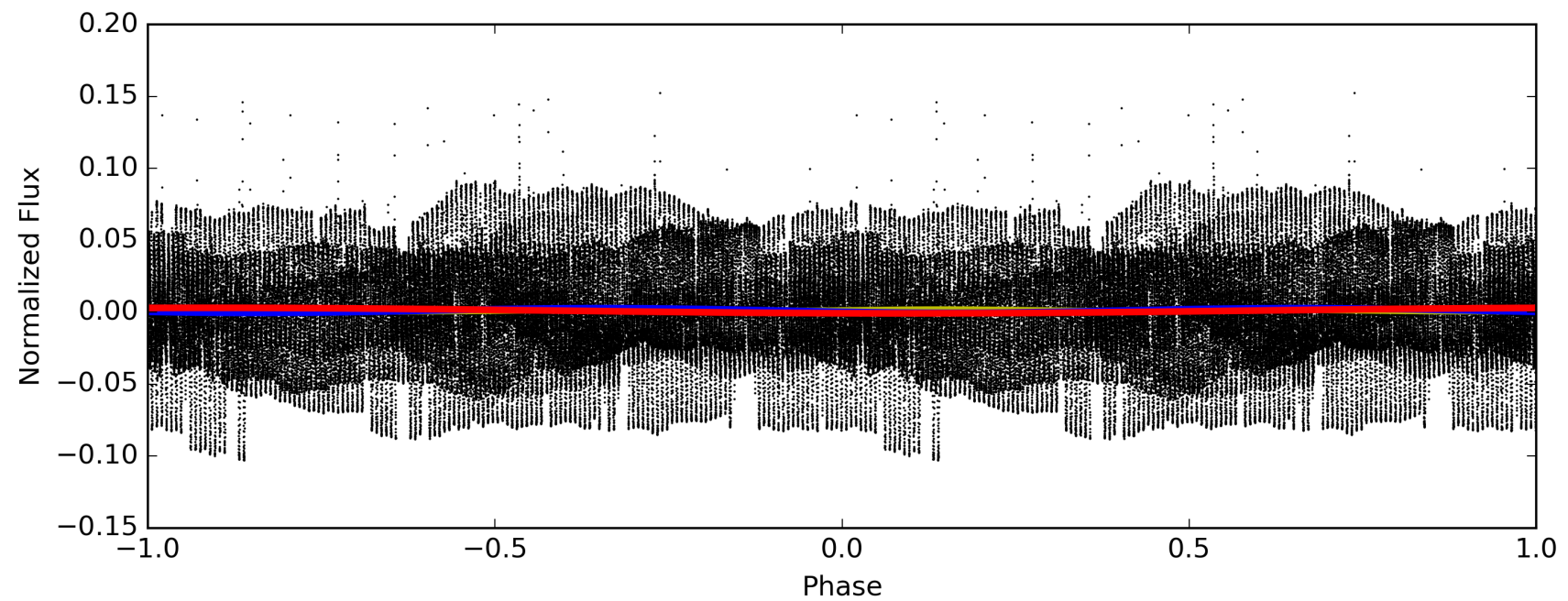
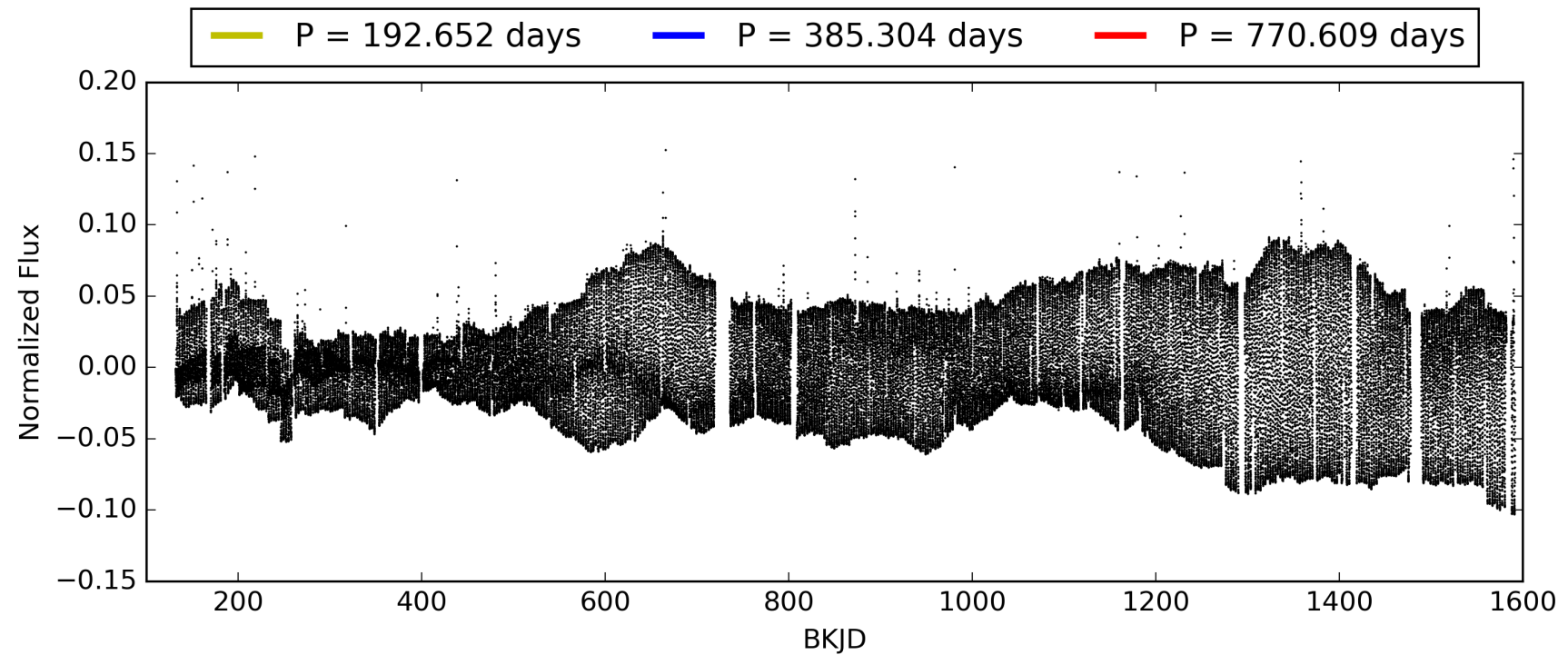
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009945771-02, PDC Light Curves

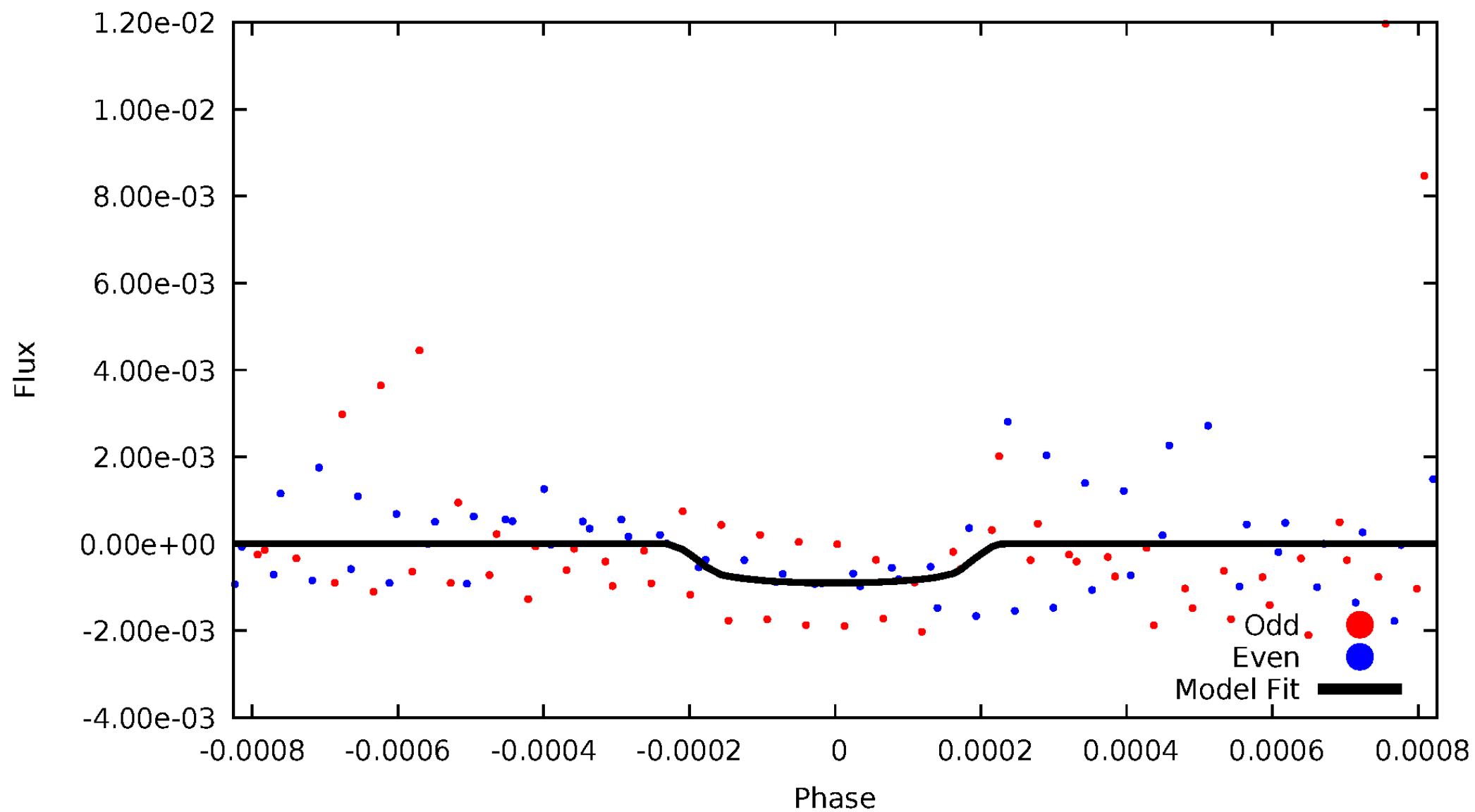


TCE 009945771-02



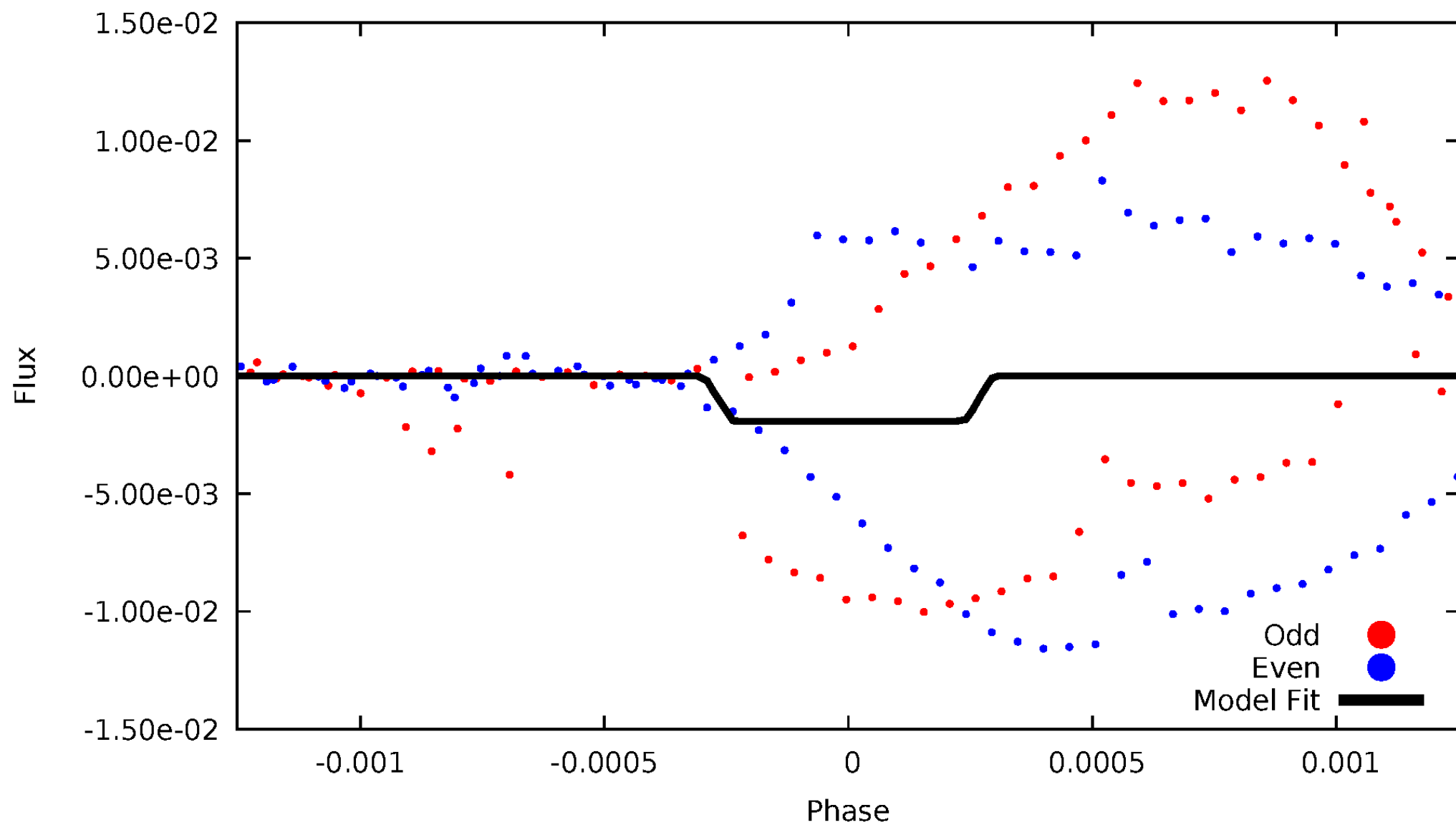
DV Odd/Even

TCE 009945771-02



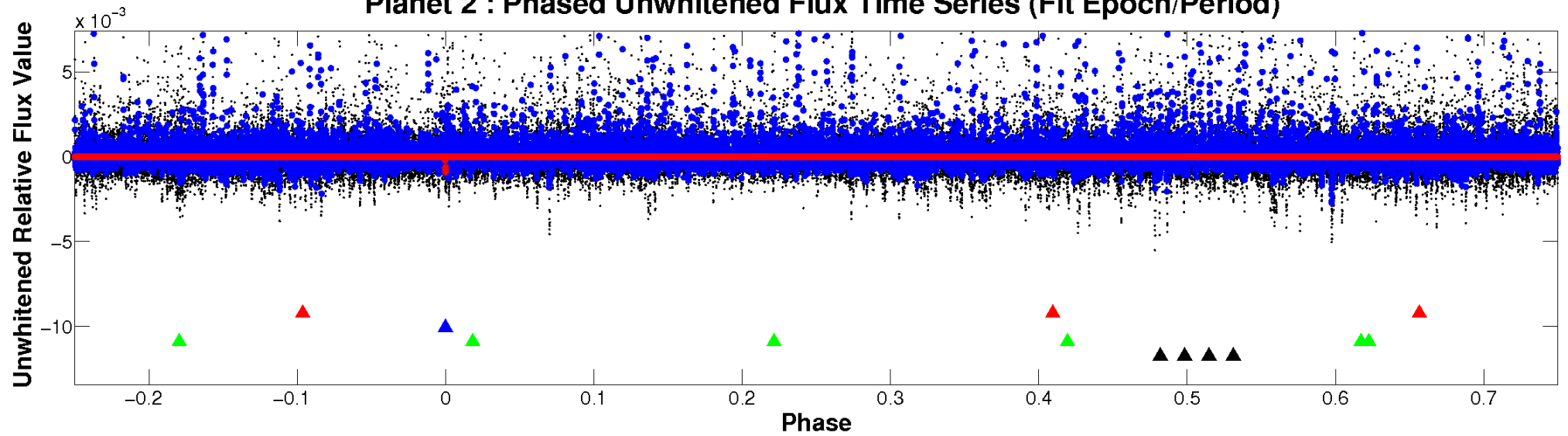
ALT Odd/Even

TCE 009945771-02

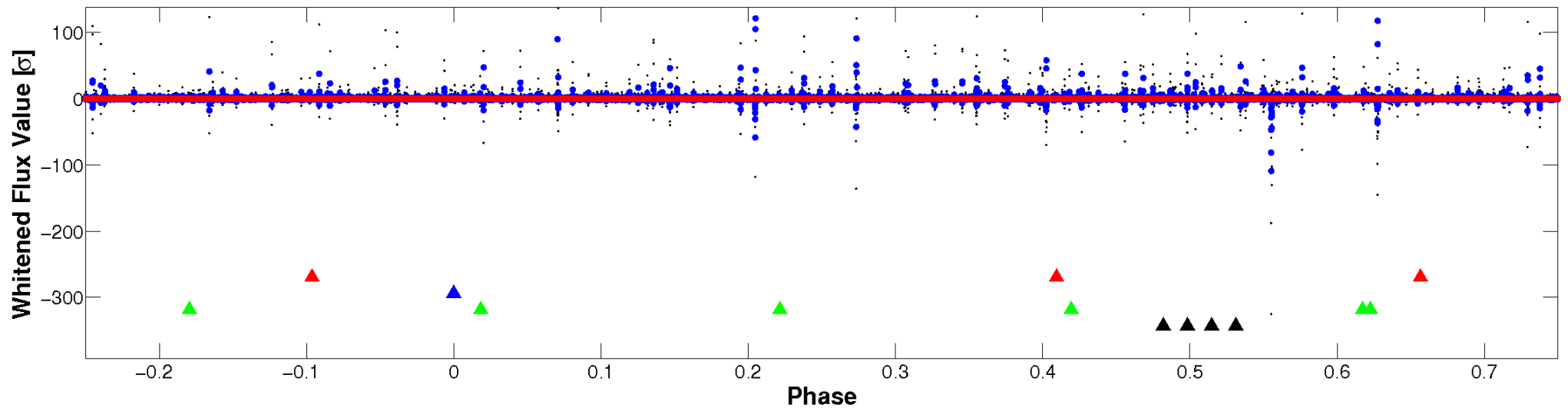


Non-Whitened Vs. Whitened Light Curve

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

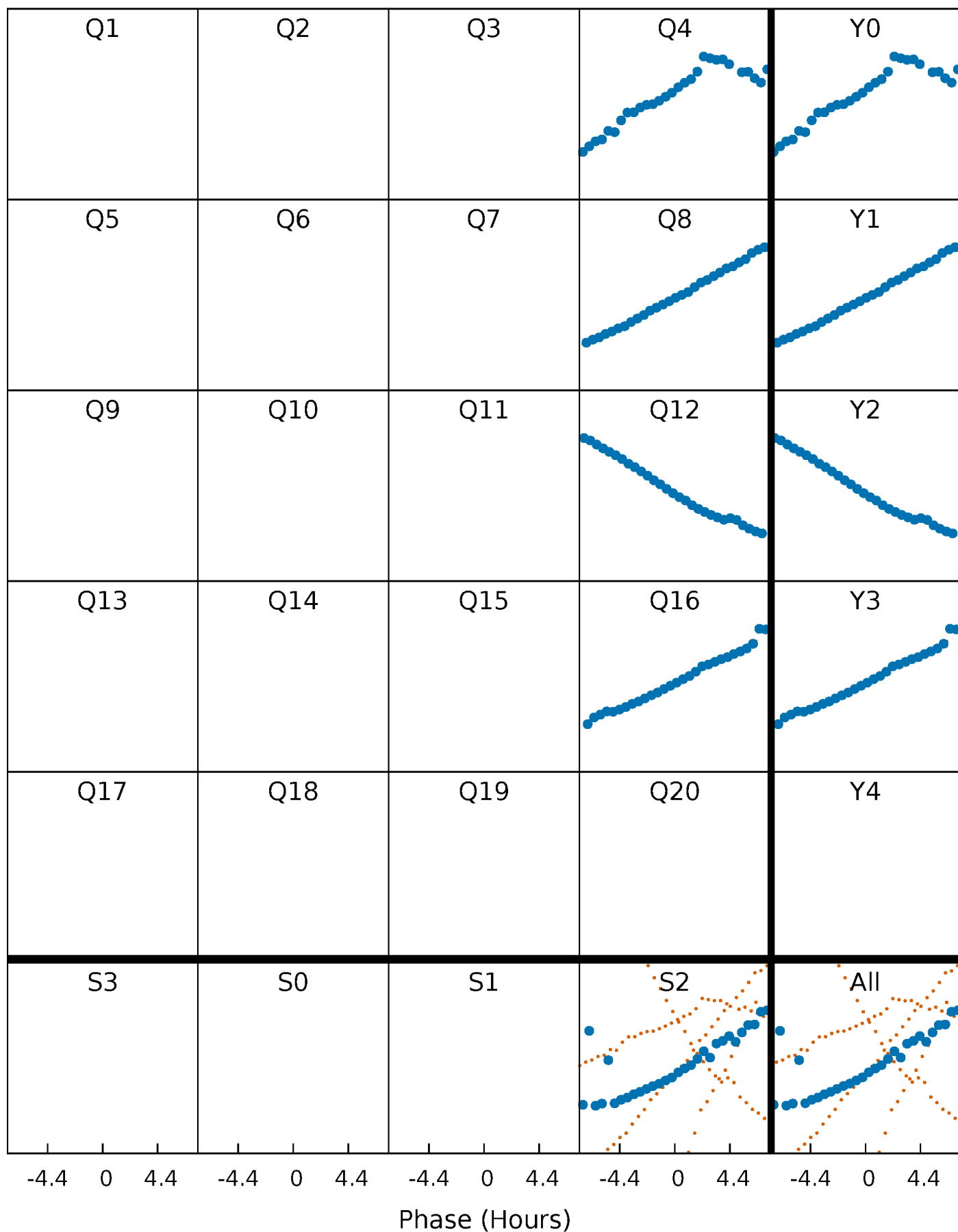


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



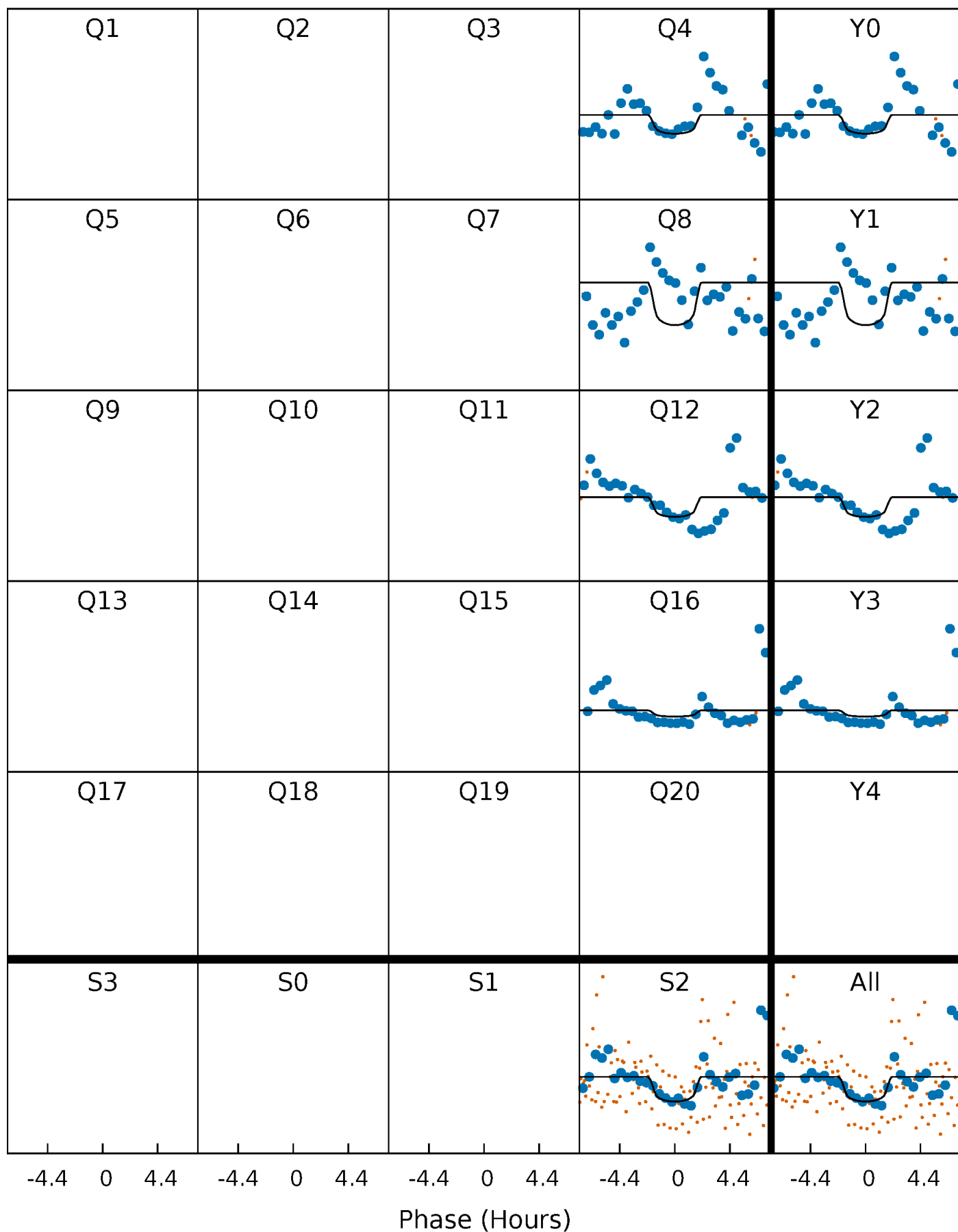
PDC Quarter-Phased Transit Curves

TCE 009945771-02 P=385.304326 Days $T_0=381.259917$ (BKJD)



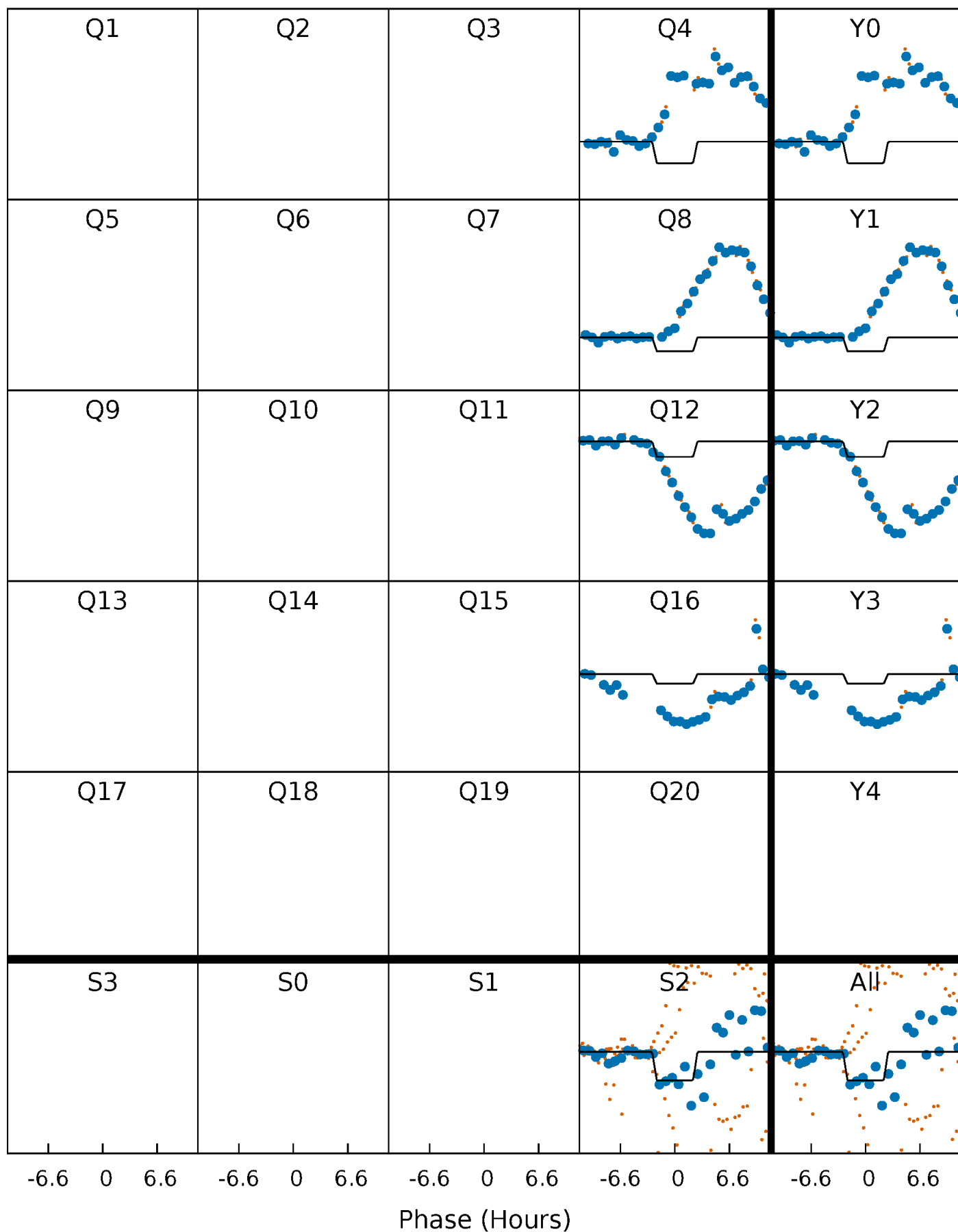
DV Quarter-Phased Transit Curves

TCE 009945771-02 $P=385.304326$ Days $T_0=381.259917$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

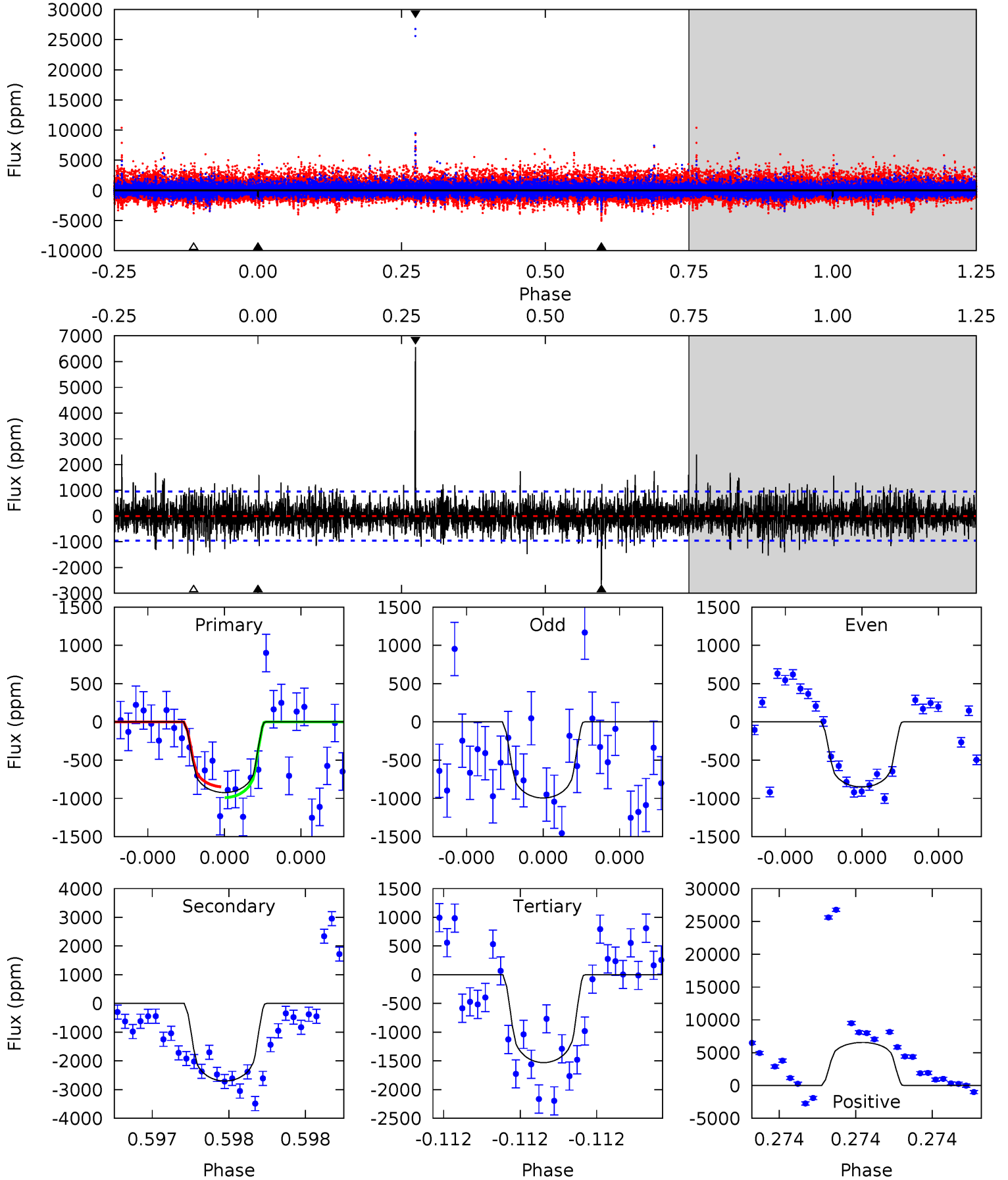
TCE 009945771-02 P=385.227096 Days $T_0=381.375723$ (BKJD)



DV Model-Shift Uniqueness Test

009945771-02, P = 385.304326 Days, E = 381.259917 Days

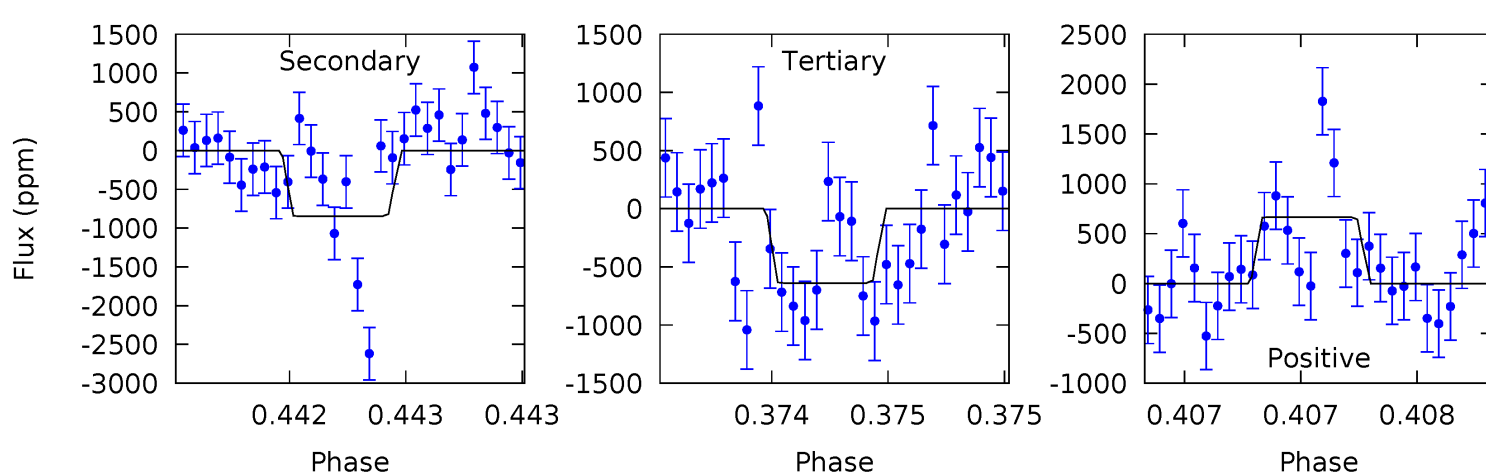
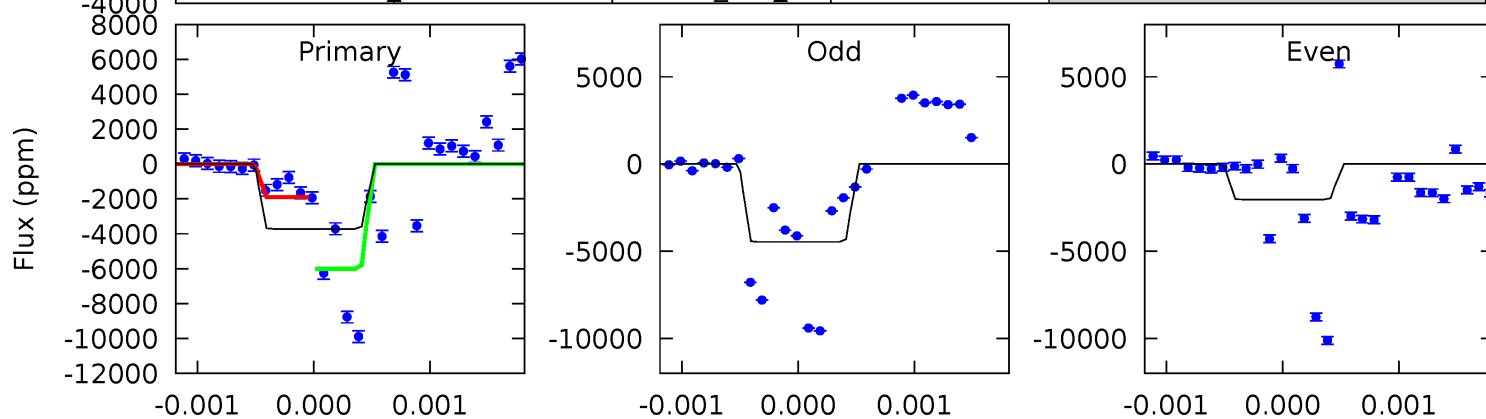
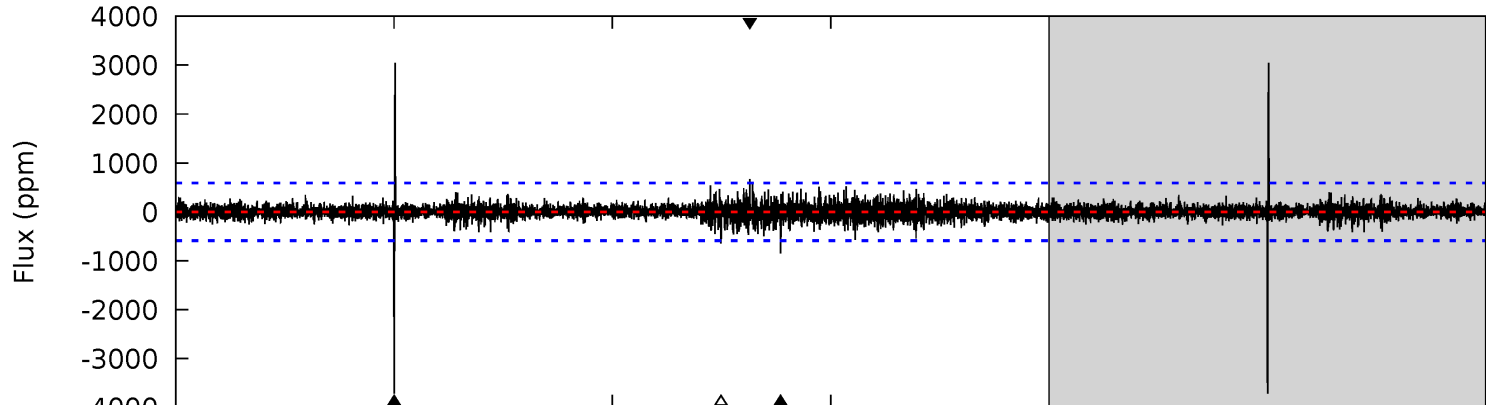
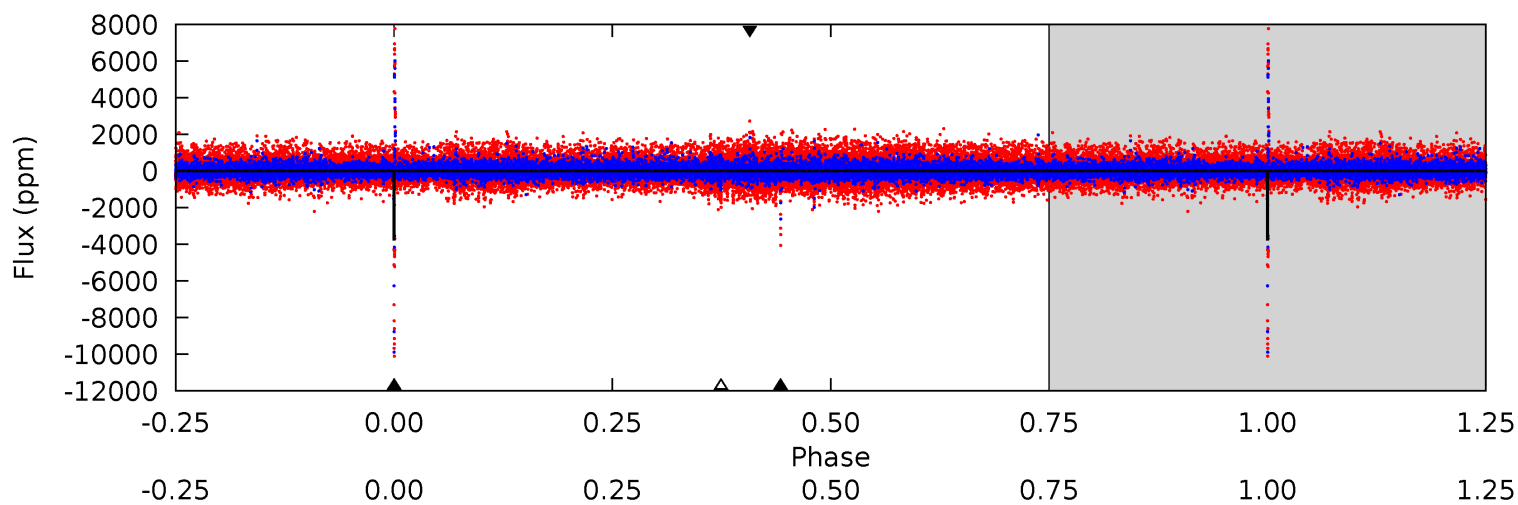
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.42	15.9	8.98	38.5	5.60	3.52	2.42	-3.56	-33.1	6.88	-22.6	0.24	1.09	0.71	0.42



Alt Model-Shift Uniqueness Test

009945771-02, P = 385.227096 Days, E = 381.375723 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
34.9	7.96	6.00	6.26	5.55	3.44	1.08	28.9	28.6	1.96	1.70	13.4	1.21	0.45	0



Stellar Parameters For KIC 009945771

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	3799^{+76}_{-76}	$4.738^{+0.036}_{-0.021}$	$-0.100^{+0.100}_{-0.100}$	$0.510^{+0.028}_{-0.034}$	$0.518^{+0.029}_{-0.029}$	$5.508^{+0.900}_{-0.528}$
	+2%/-2%	+1%/-0%	+100%/-100%	+5%/-7%	+6%/-6%	+16%/-10%
Source	PHO2	PHO2	PHO2	DSEP		

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

Secondary Eclipse Parameters for KIC 009945771-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-2702 ± 170	$3.04^{+3.07}_{-2.01}$	183^{+5}_{-4}	3751^{+2026}_{-734}	$113765^{+888062}_{-85489}$
Alt.	-848 ± 106	$3.55^{+2.97}_{-2.36}$	183^{+4}_{-4}	2975^{+1258}_{-433}	$25581^{+192367}_{-18004}$

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

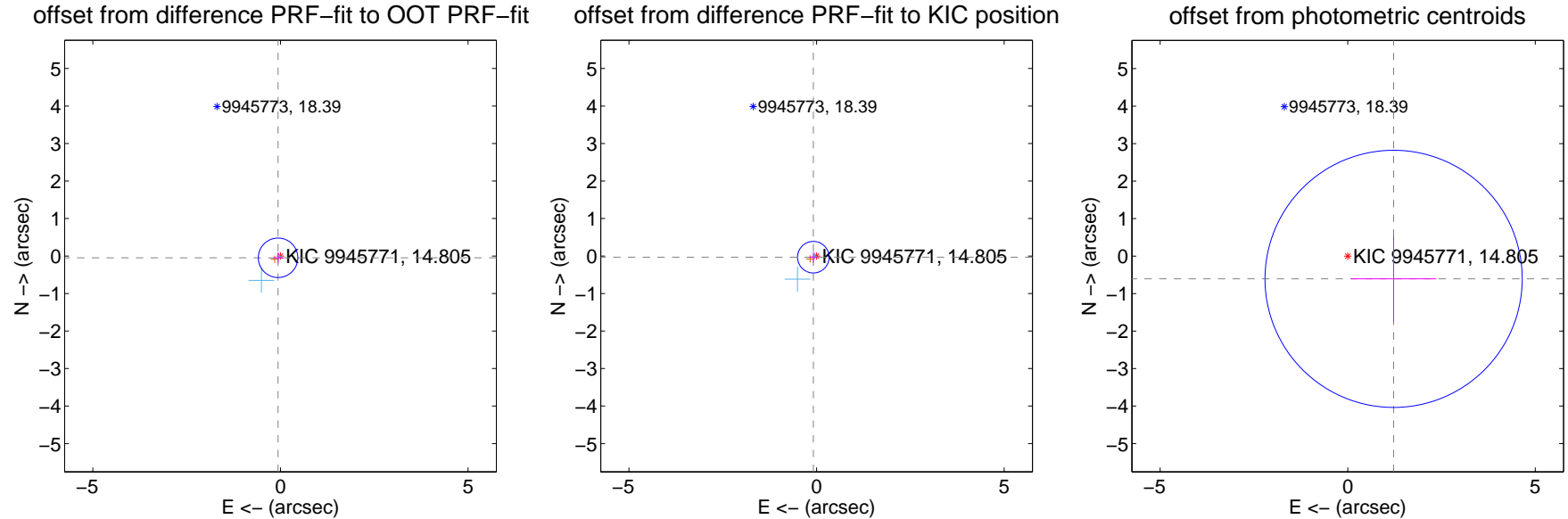
DV Centroid Data

Supplemental centroid analysis for 009945771-02. Kepler magnitude: 14.80. Transit SNR 3.42

There are 3 quarters with good PRF difference image offsets

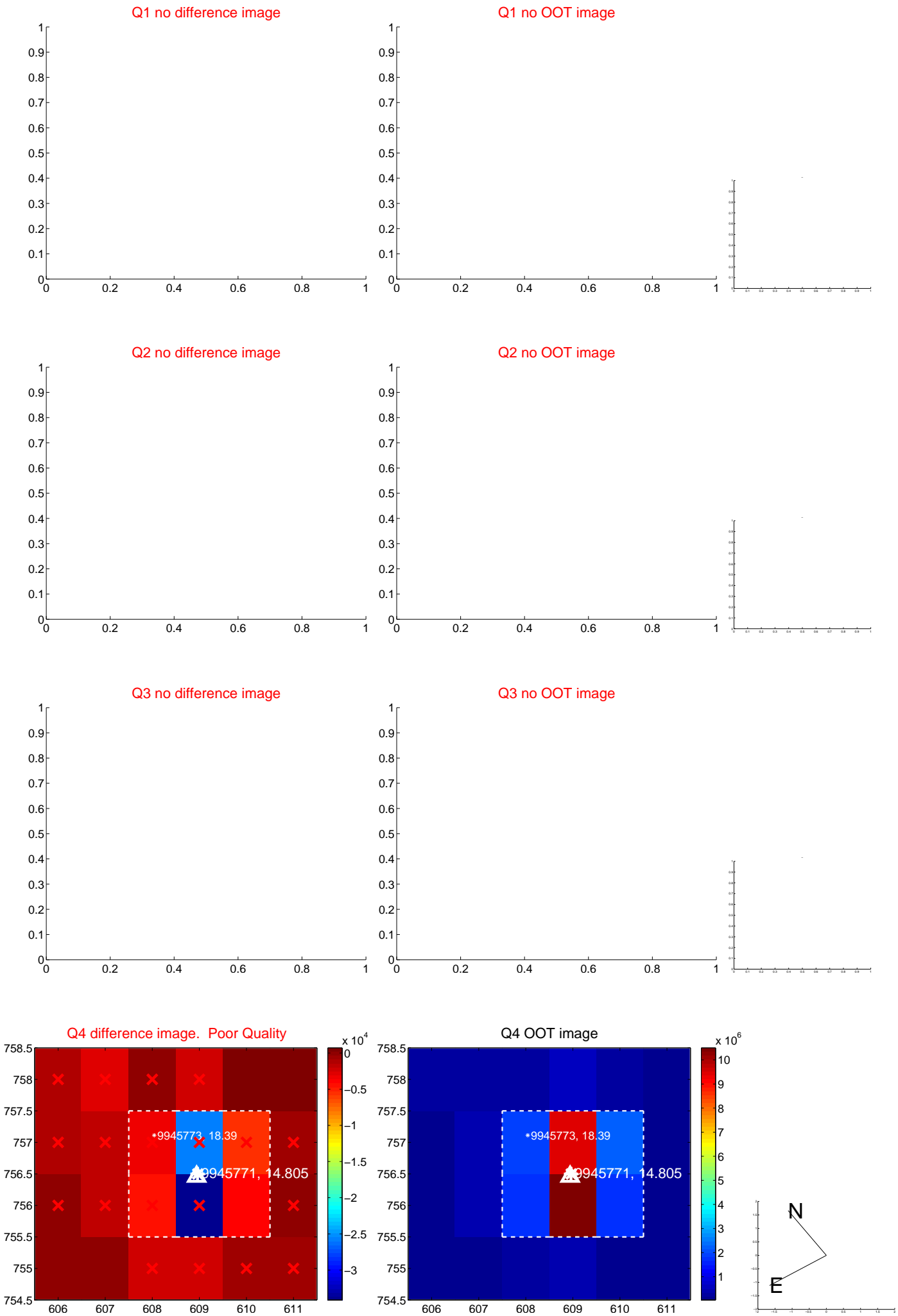
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.079 ± 0.175	0.45	0.064 ± 0.123	-0.047 ± 0.150
PRF-fit source offset from KIC position	0.092 ± 0.140	0.66	0.087 ± 0.109	-0.031 ± 0.144
photometric centroid source offset	1.37 ± 1.14	1.20	-1.22 ± 1.14	-0.61 ± 1.16

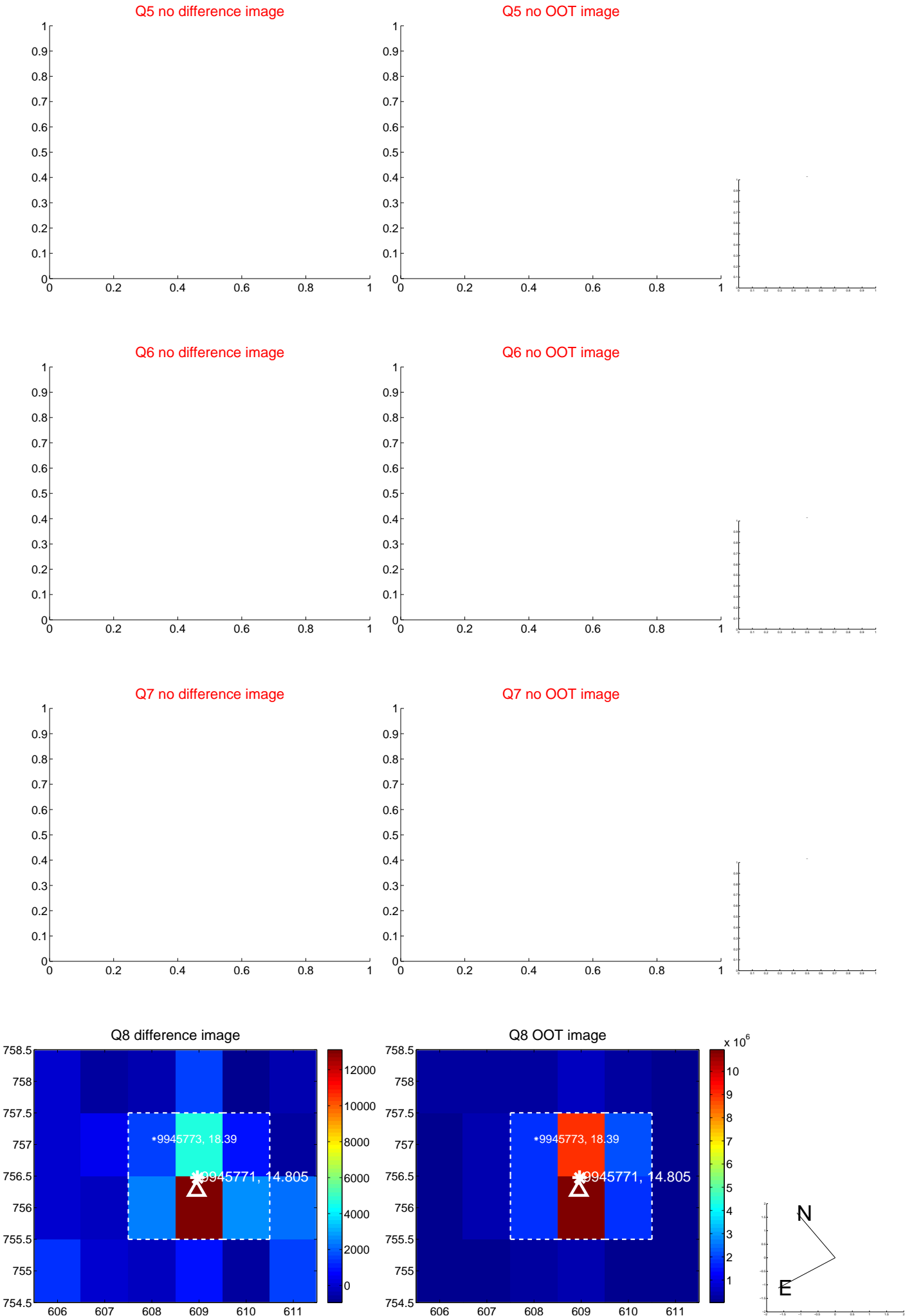


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

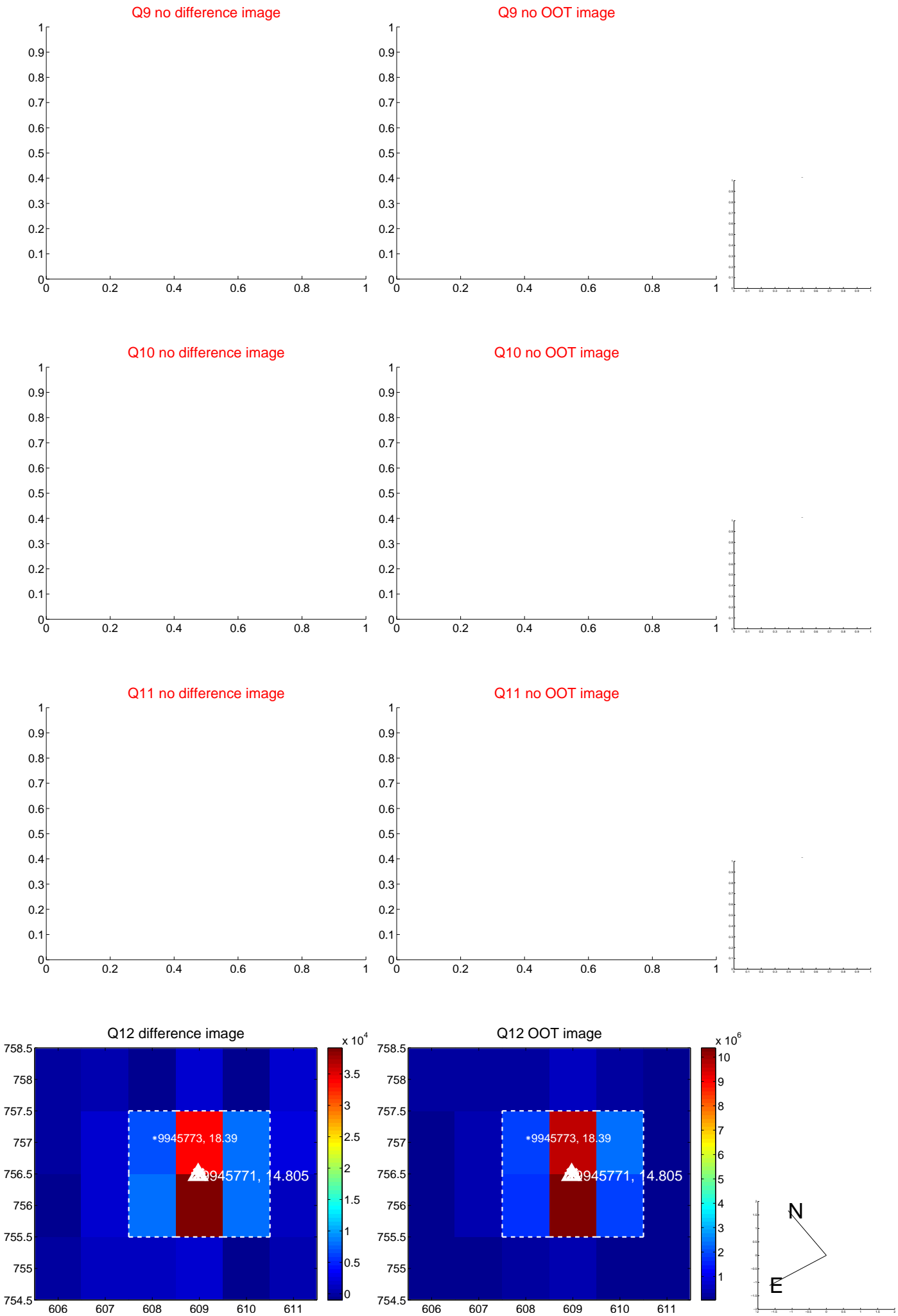
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



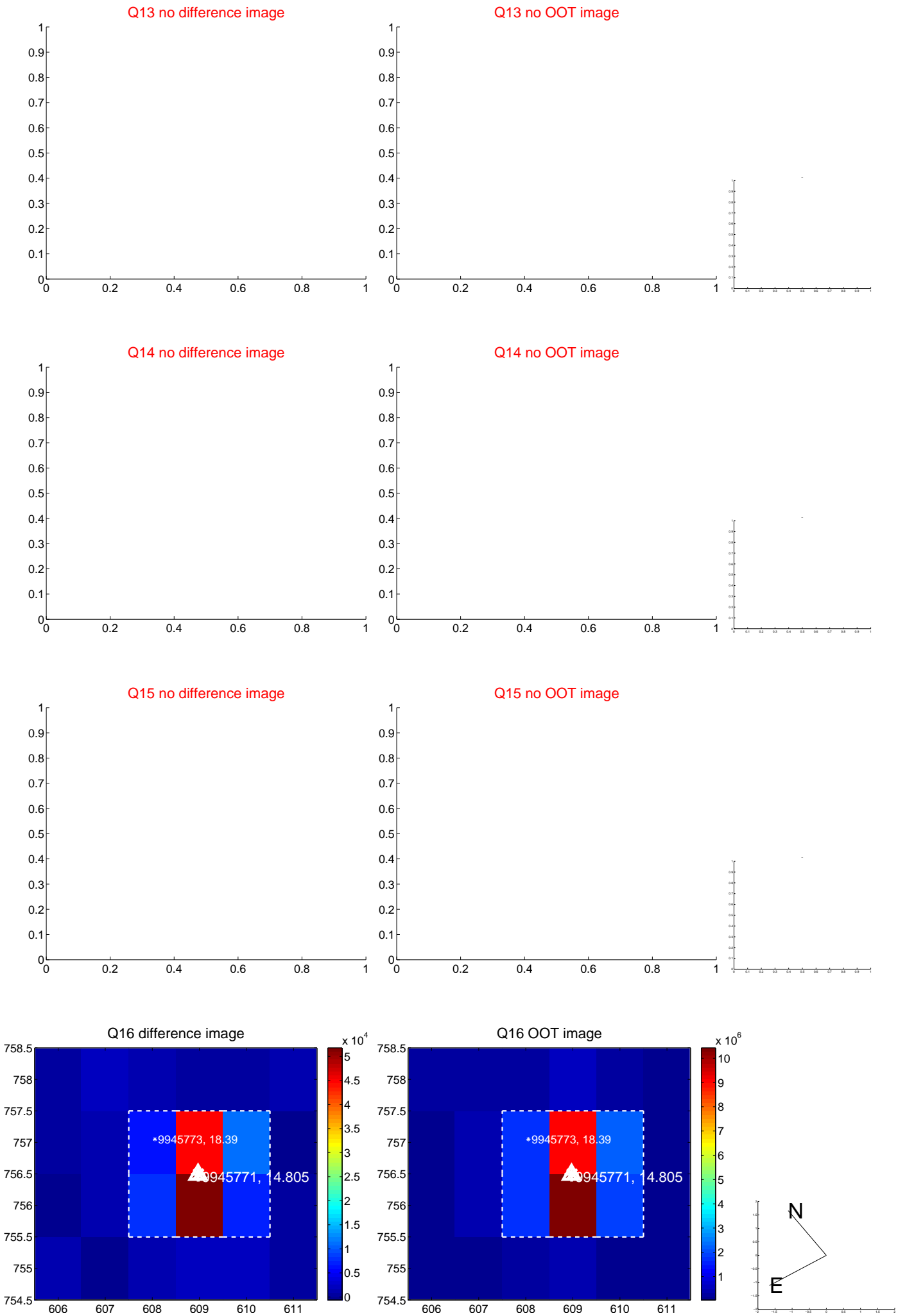
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



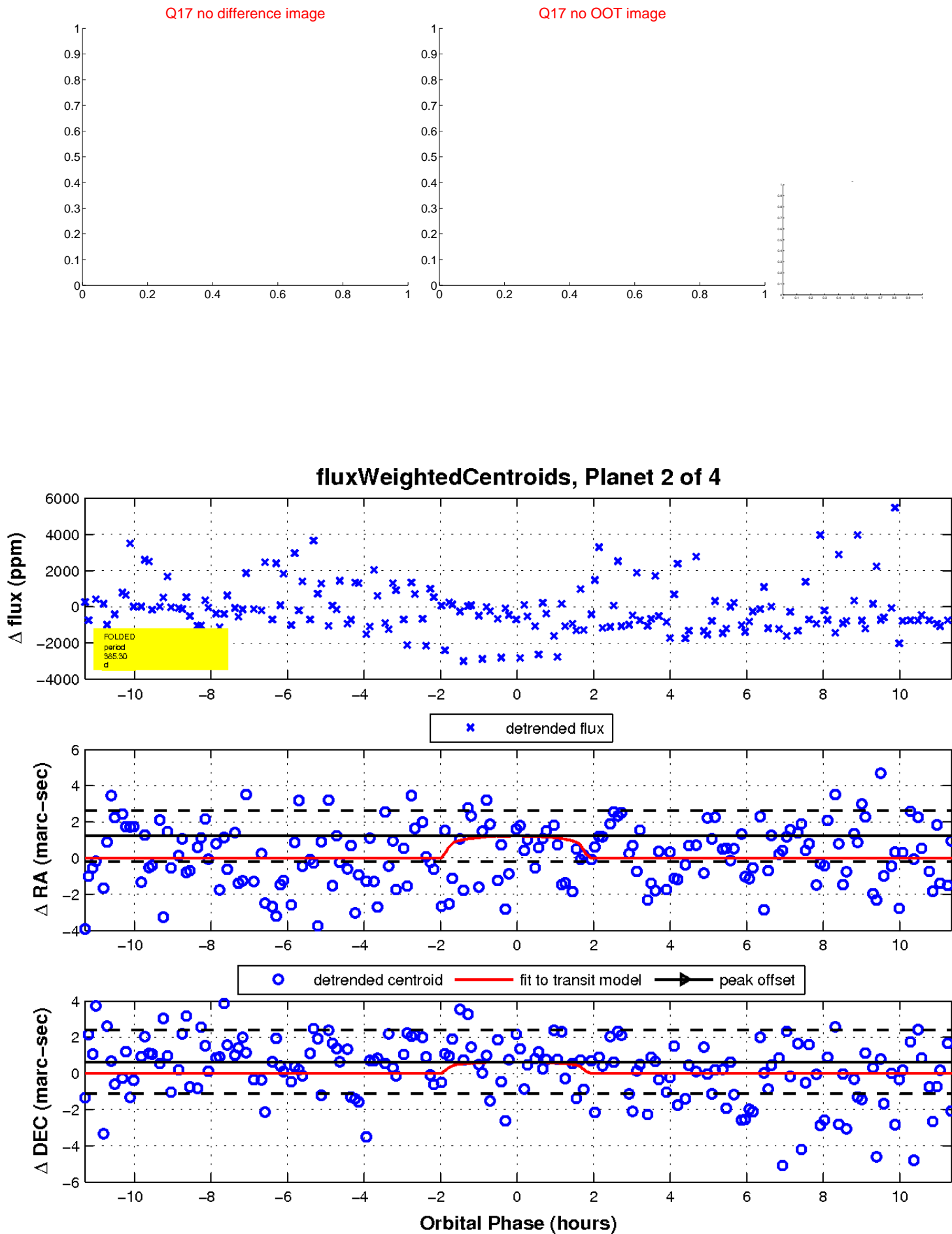
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



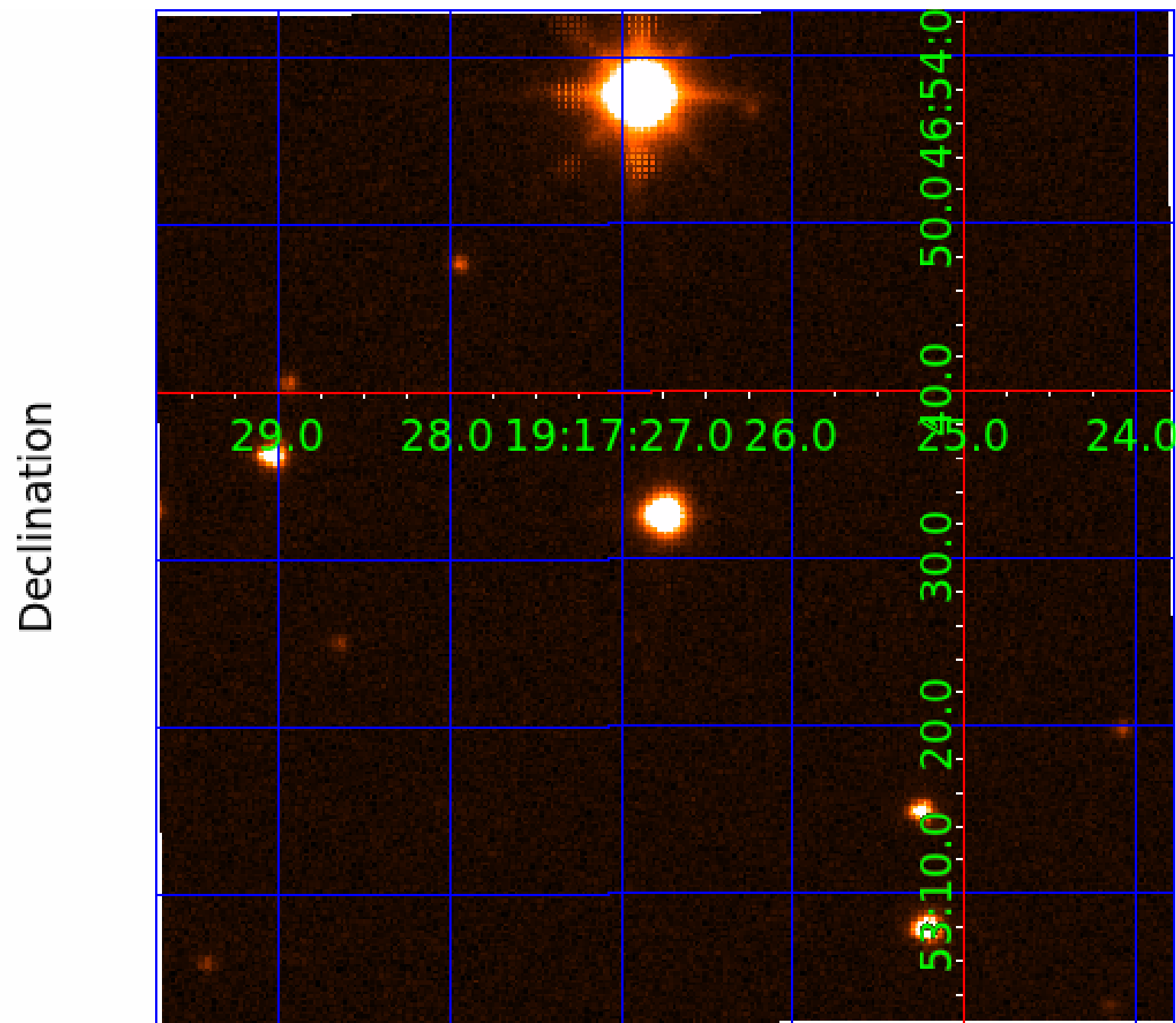
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 009945771

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})
009945771-01	OBS	No	480.527812	153.726712	2593.3	4.841	14.6	7.4	0.51	3799	2.98	0.05
009945771-02	OBS	No	385.304326	381.259917	900.5	3.817	13.5	3.4	0.51	3799	1.62	0.07
009945771-03	OBS	No	230.778489	235.835719	1504.7	3.887	13.7	7.0	0.51	3799	2.07	0.14
009945771-04	OBS	No	391.633634	181.644183	2063.7	4.992	13.5	5.8	0.51	3799	2.35	0.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009945771-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009945771-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009945771-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009945771-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—HALO_GHOST

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

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

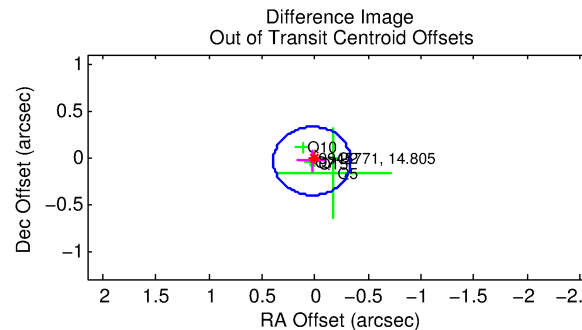
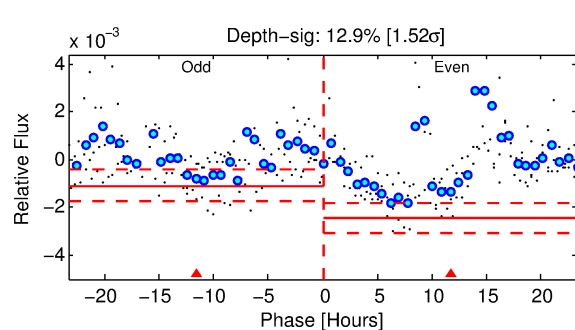
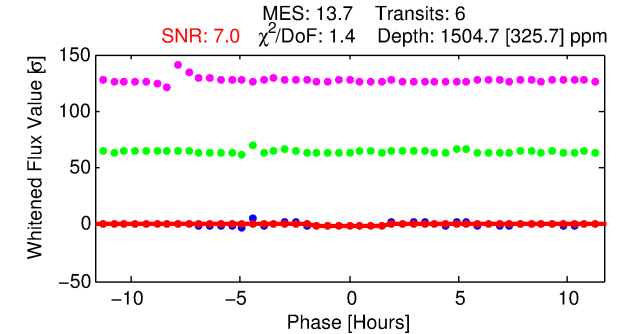
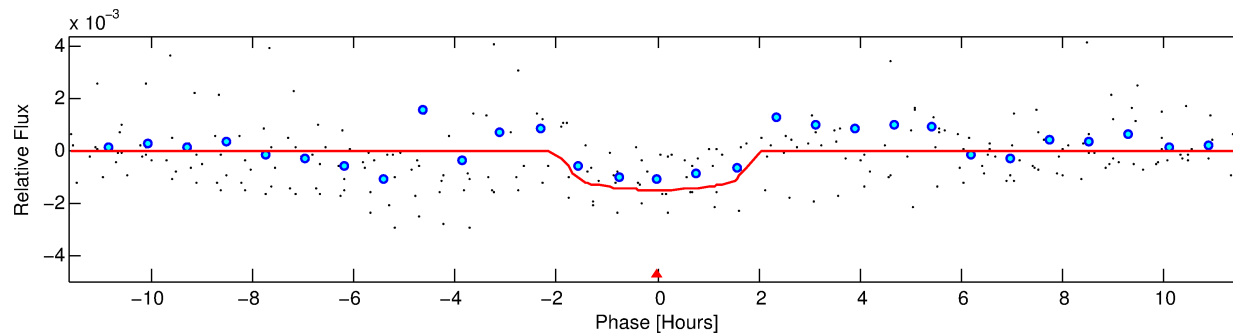
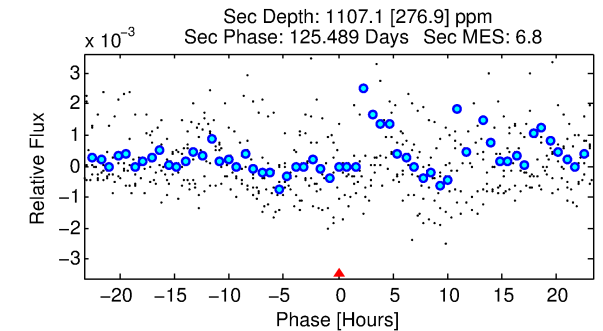
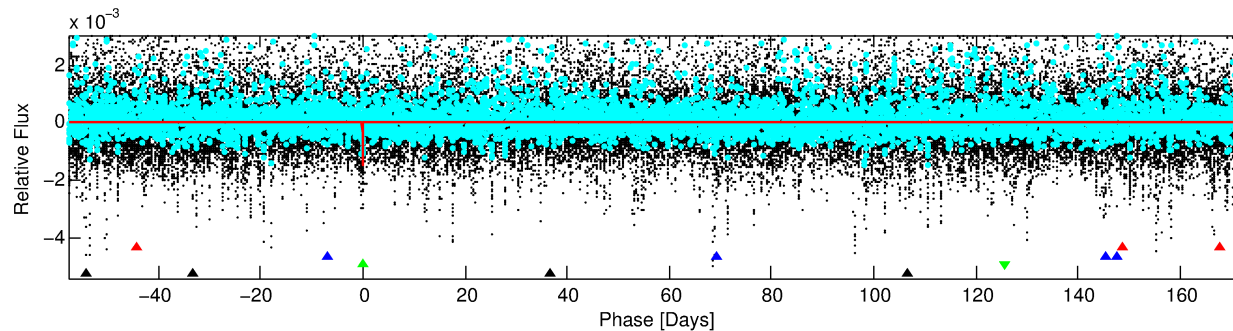
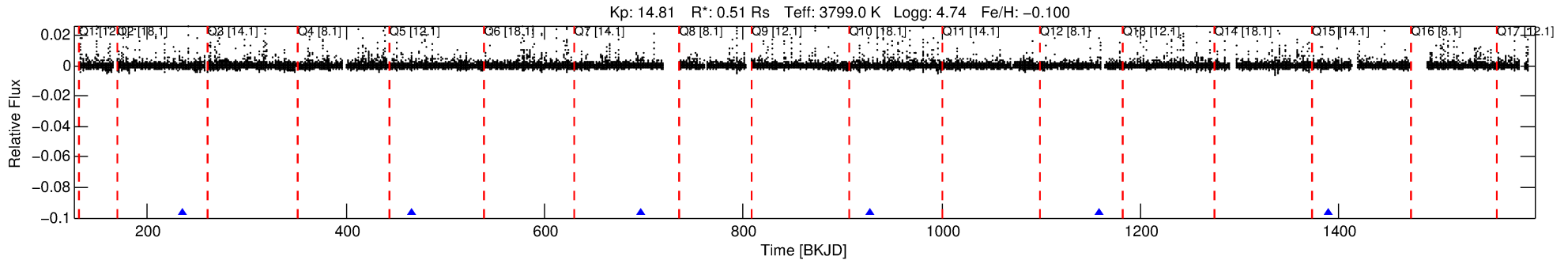
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009945771-03

No Significant Match Found

DV One-Page Summary

KIC: 9945771 Candidate: 3 of 4 Period: 230.778 d



DV Fit Results:

Period = 230.77849 [0.00261] d
Epoch = 235.8357 [0.0083] BKJD
Rp/R* = 0.0372 [0.0303]
a/R* = 373.05 [1301.16]
b = 0.63 [3.32]
Seff = 0.14 [0.01]
Teq = 156 [4] K
Rp = 2.07 [1.69] Re
a = 0.5918 [0.0310] AU
Ag = 49678.73 [81983.97] [0.61σ]
Teffp = 3591 [1482] K [2.32σ]

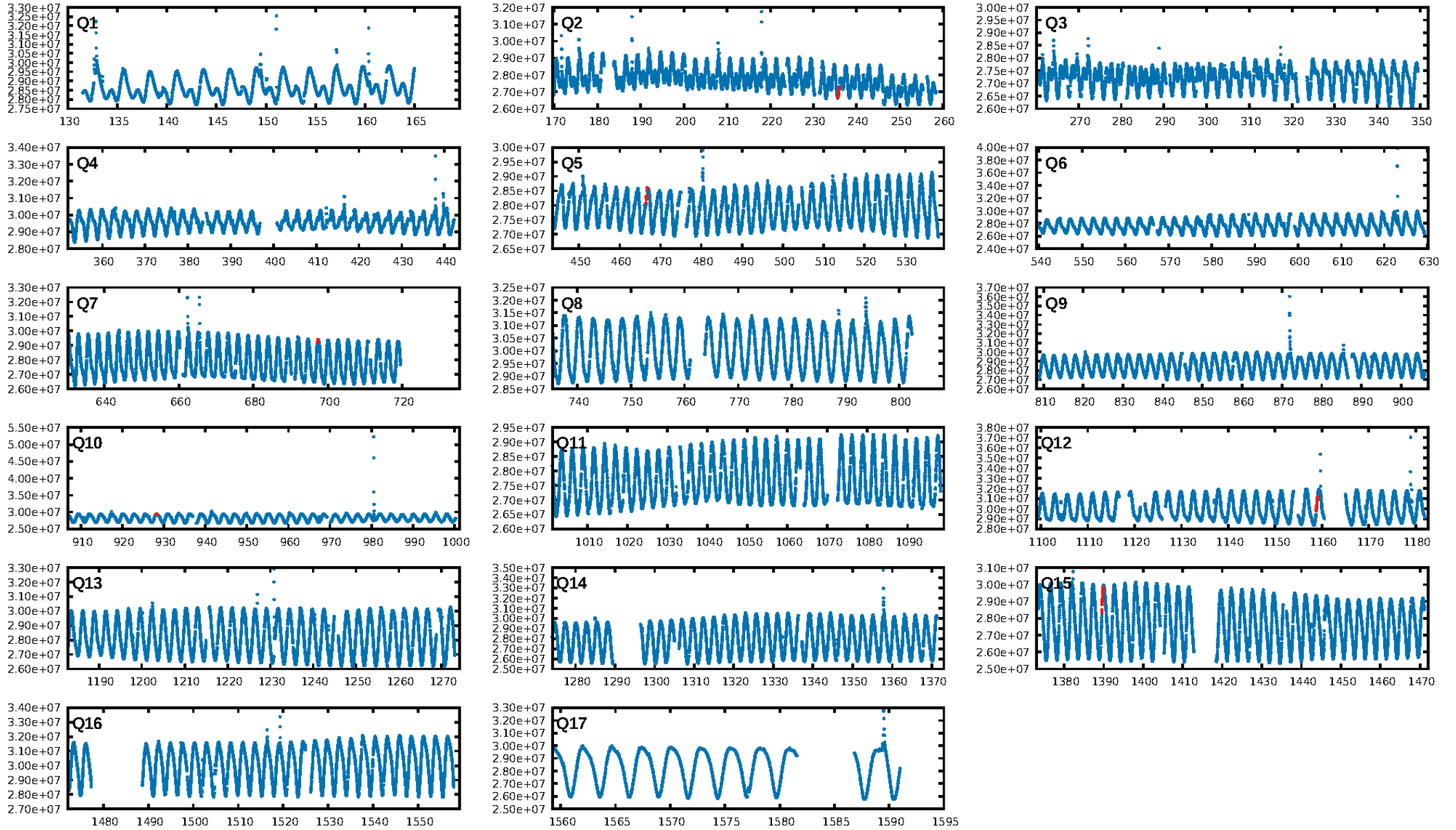
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [680.71σ]
ModelChiSquare2-sig: 5.4%
ModelChiSquareGof-sig: 95.3%
Bootstrap-pfa: 1.05e-10
RollingBand-fgt: 1.00 [6/6]
GhostDiagnostic-chr: 26.06
Centroid-sig: 9.9%
Centroid-so: 0.732 arcsec [1.40σ]
OotOffset-rm: 0.049 arcsec [0.40σ]
KicOffset-rm: 0.176 arcsec [1.45σ]
OotOffset-st: 2/2/0/1 [5]
KicOffset-st: 2/2/0/1 [5]
DiffImageQuality-fgm: 0.20 [1/5]
DiffImageOverlap-fno: 1.00 [6/6]

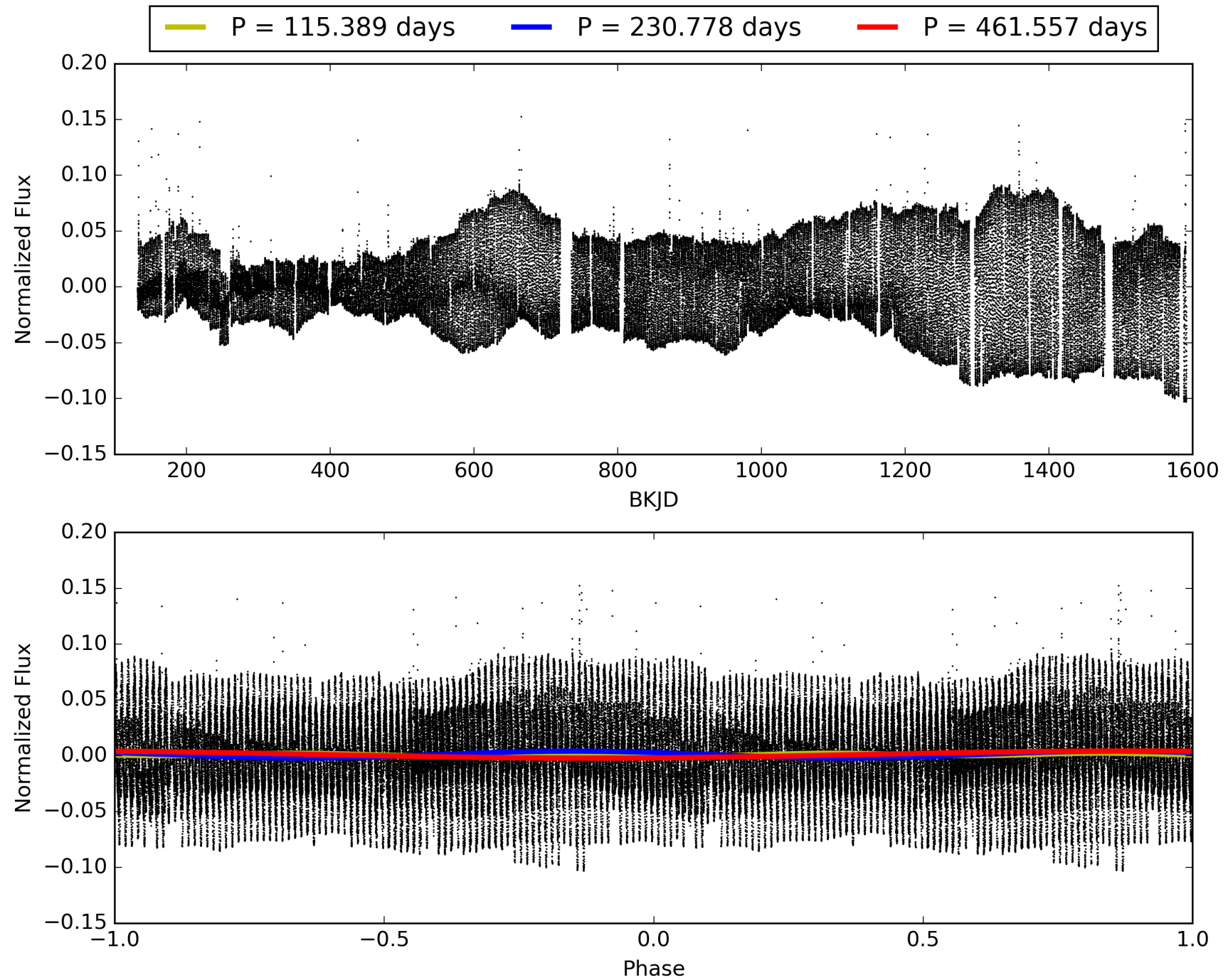
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:00:56 Z

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

TCE 009945771-03, PDC Light Curves

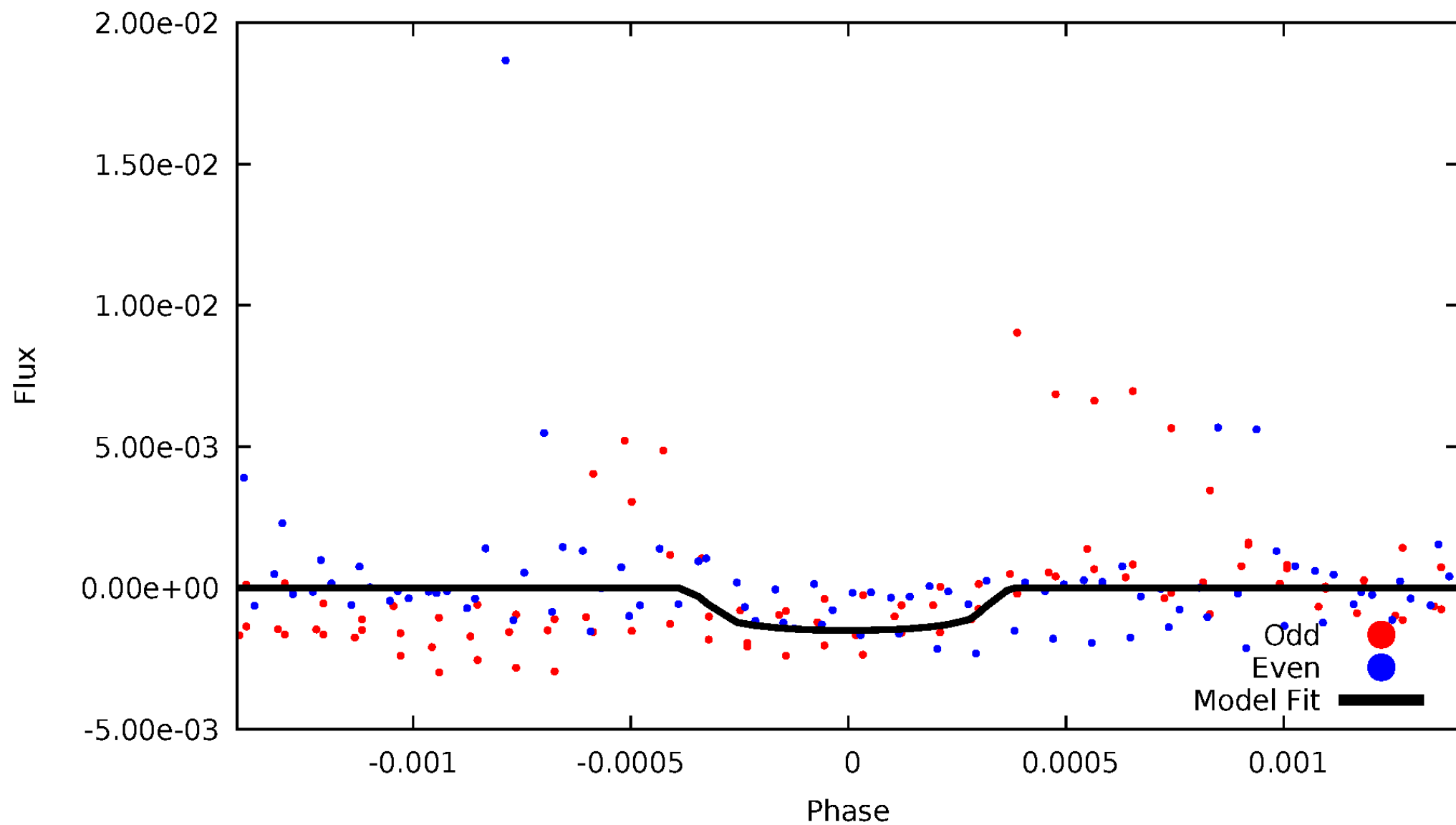


TCE 009945771-03



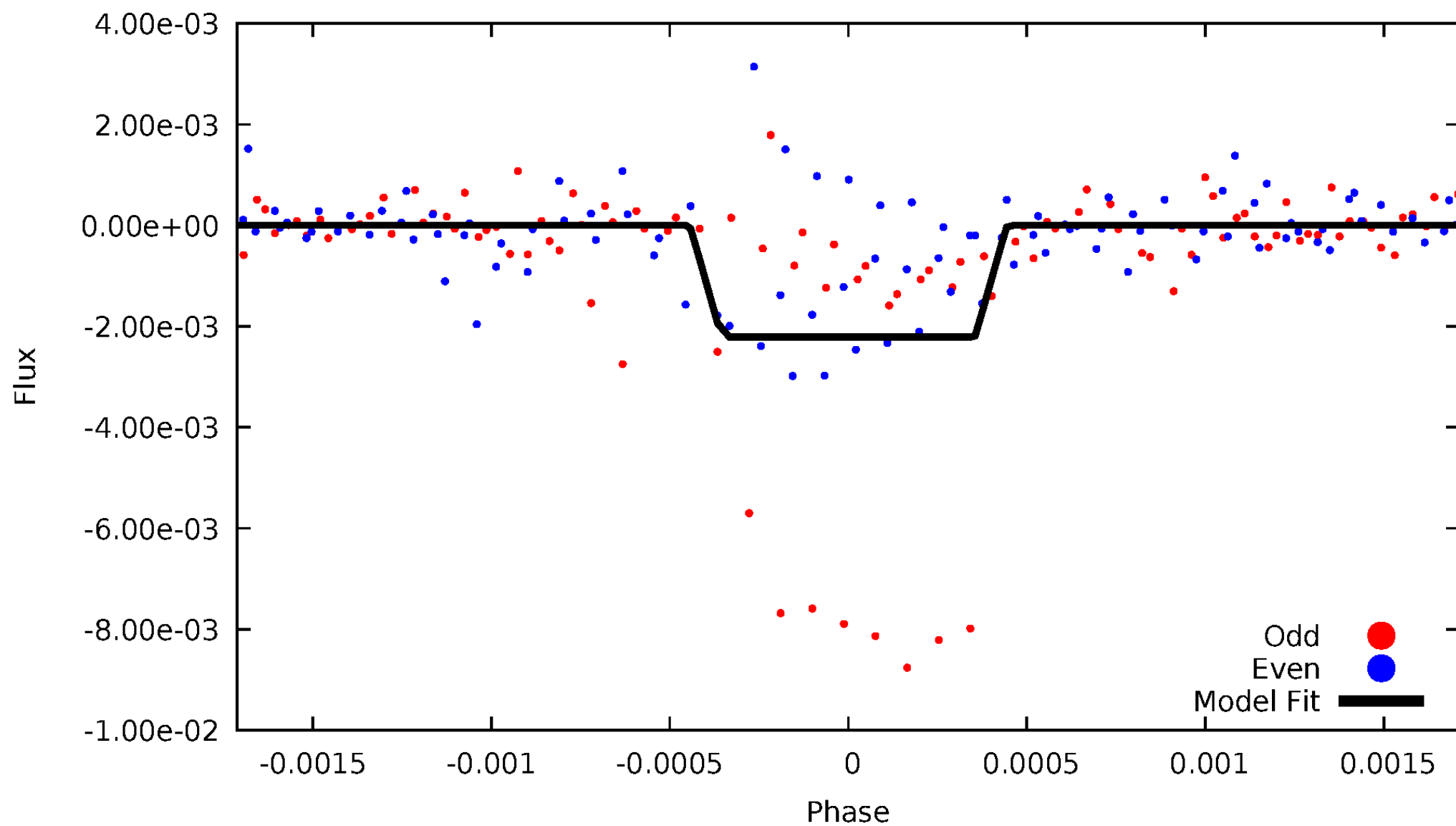
DV Odd/Even

TCE 009945771-03



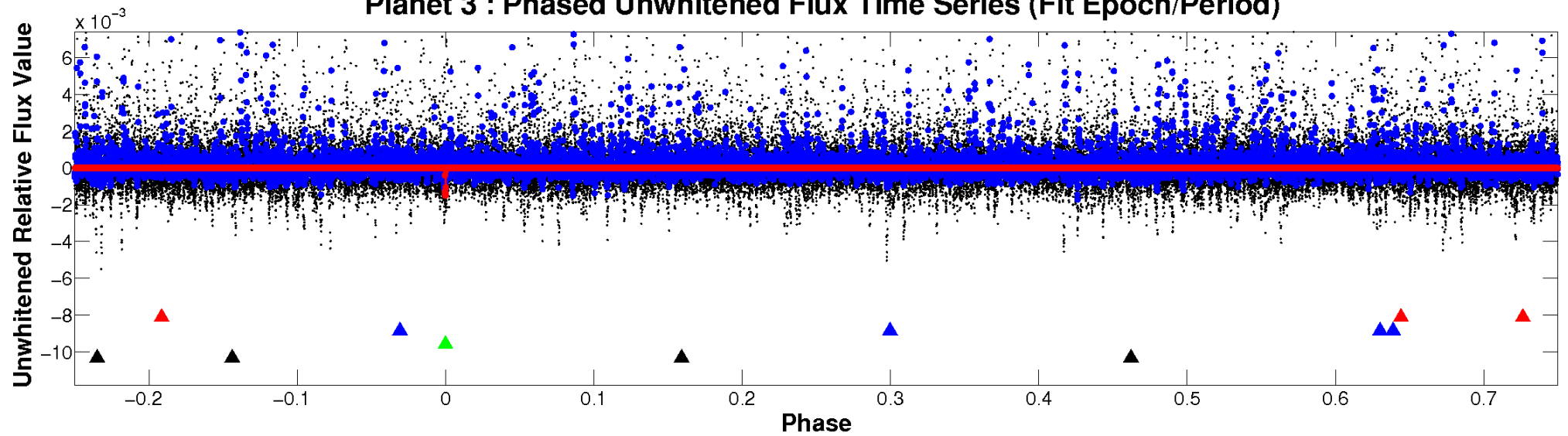
ALT Odd/Even

TCE 009945771-03

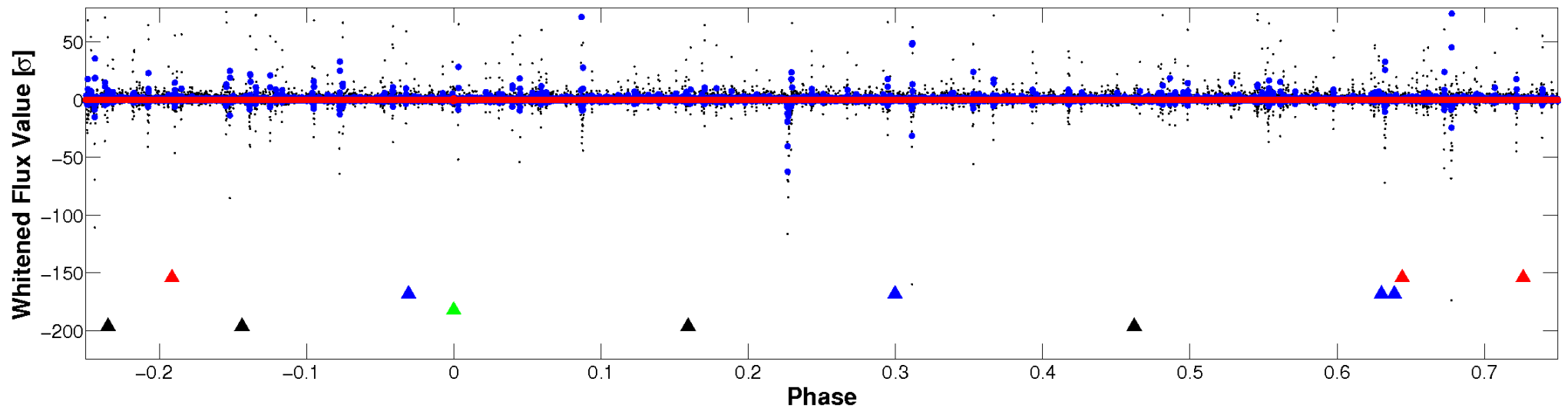


Non-Whitened Vs. Whitened Light Curve

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

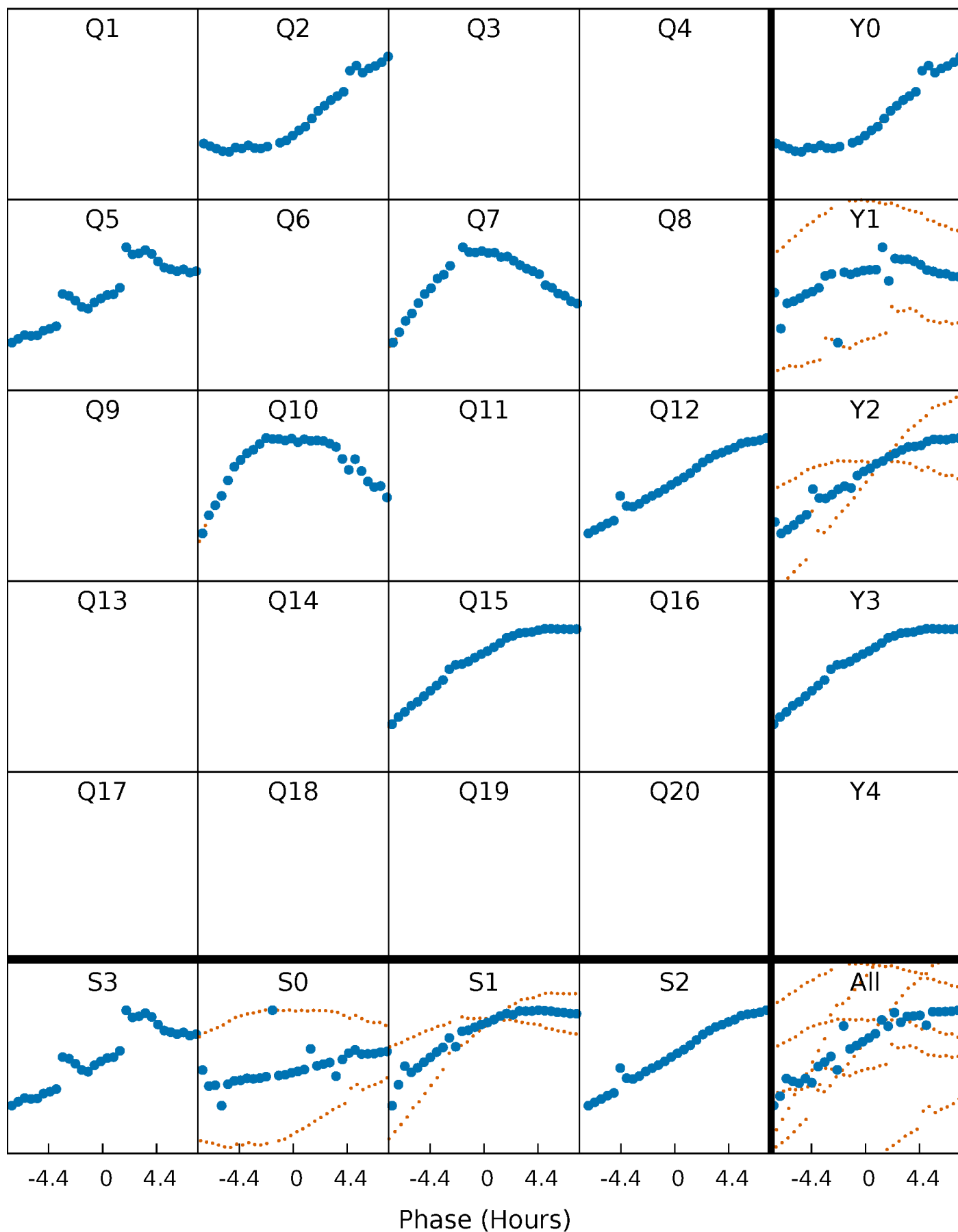


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



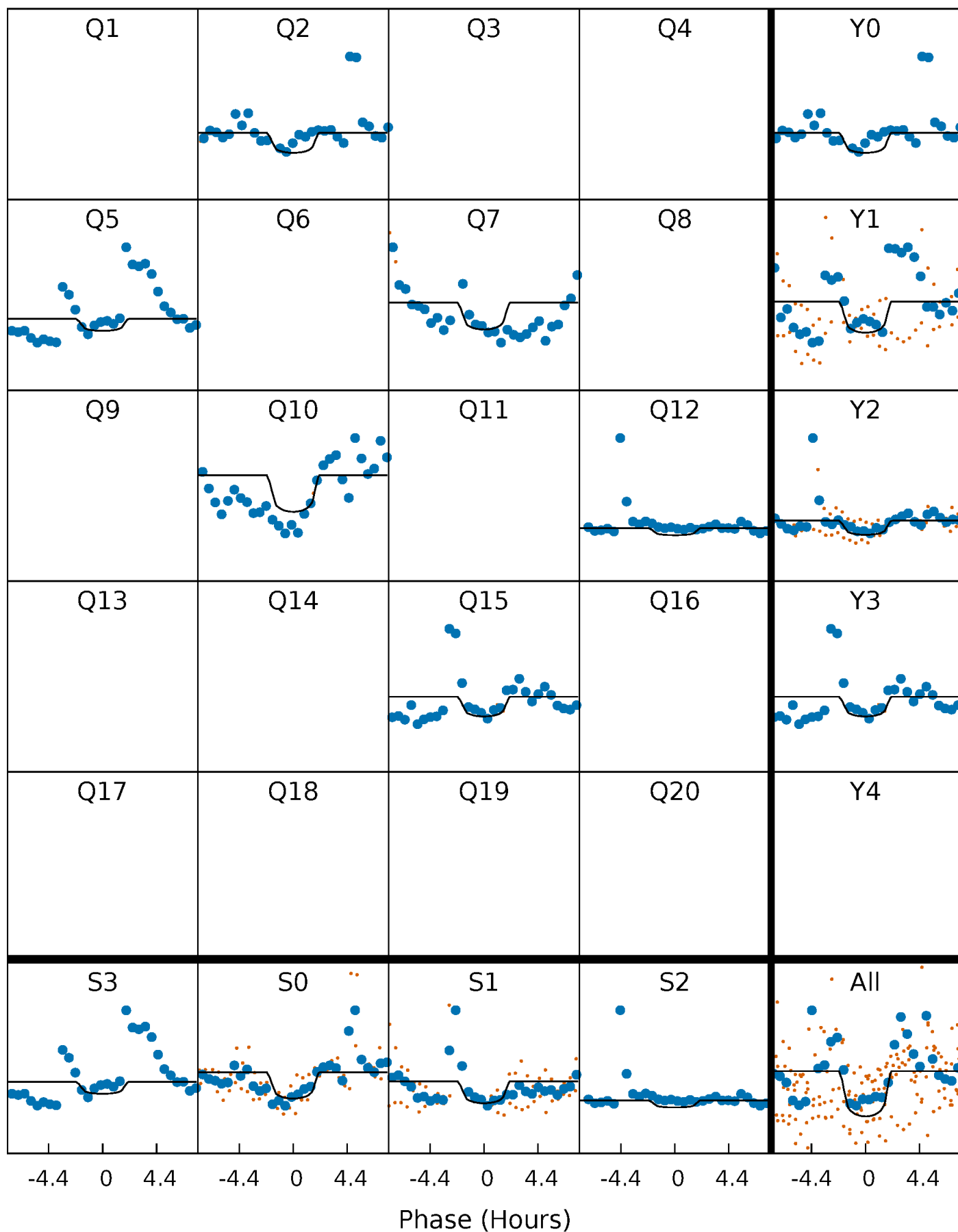
PDC Quarter-Phased Transit Curves

TCE 009945771-03 P=230.778489 Days $T_0=235.835719$ (BKJD)



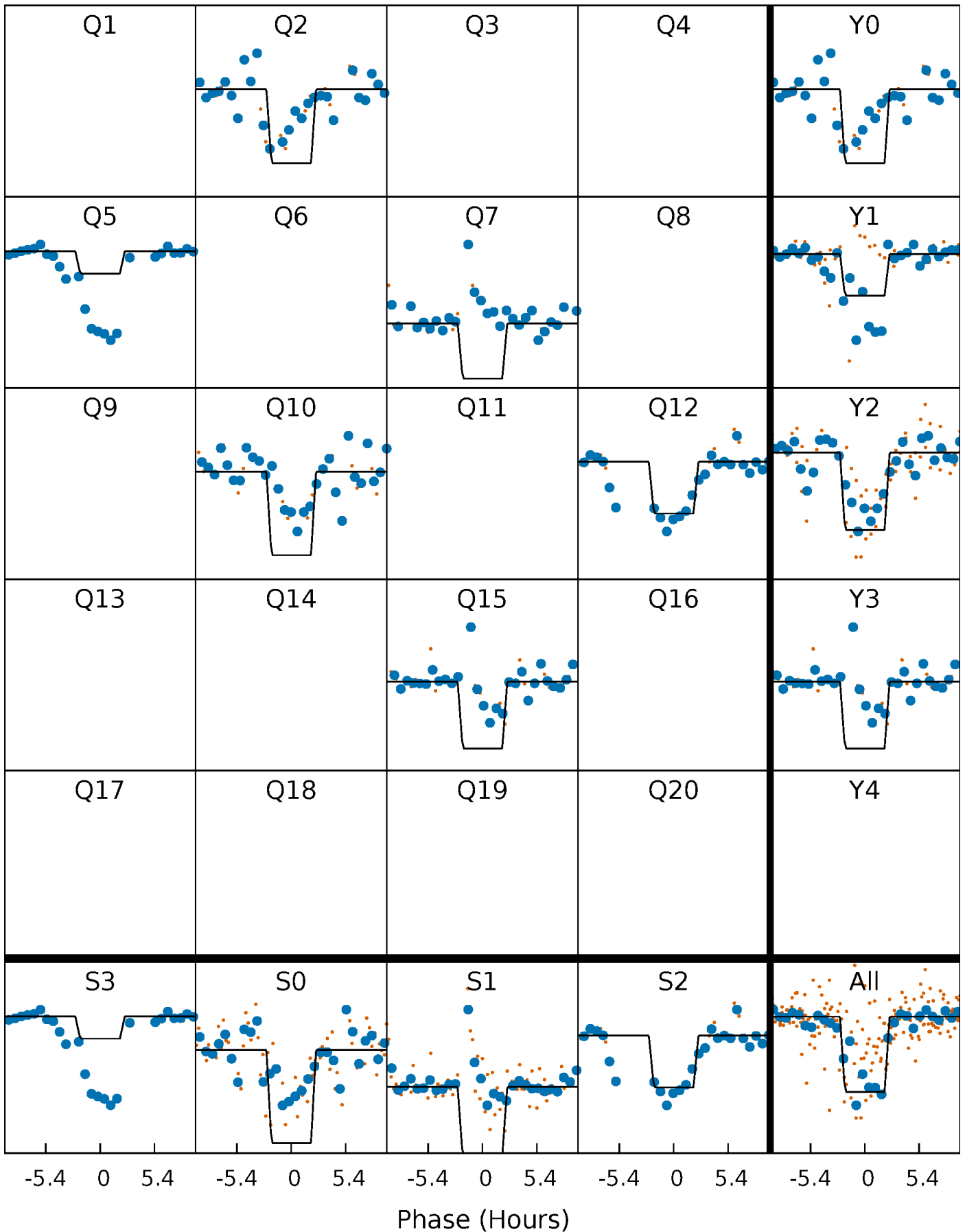
DV Quarter-Phased Transit Curves

TCE 009945771-03 P=230.778489 Days $T_0=235.835719$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

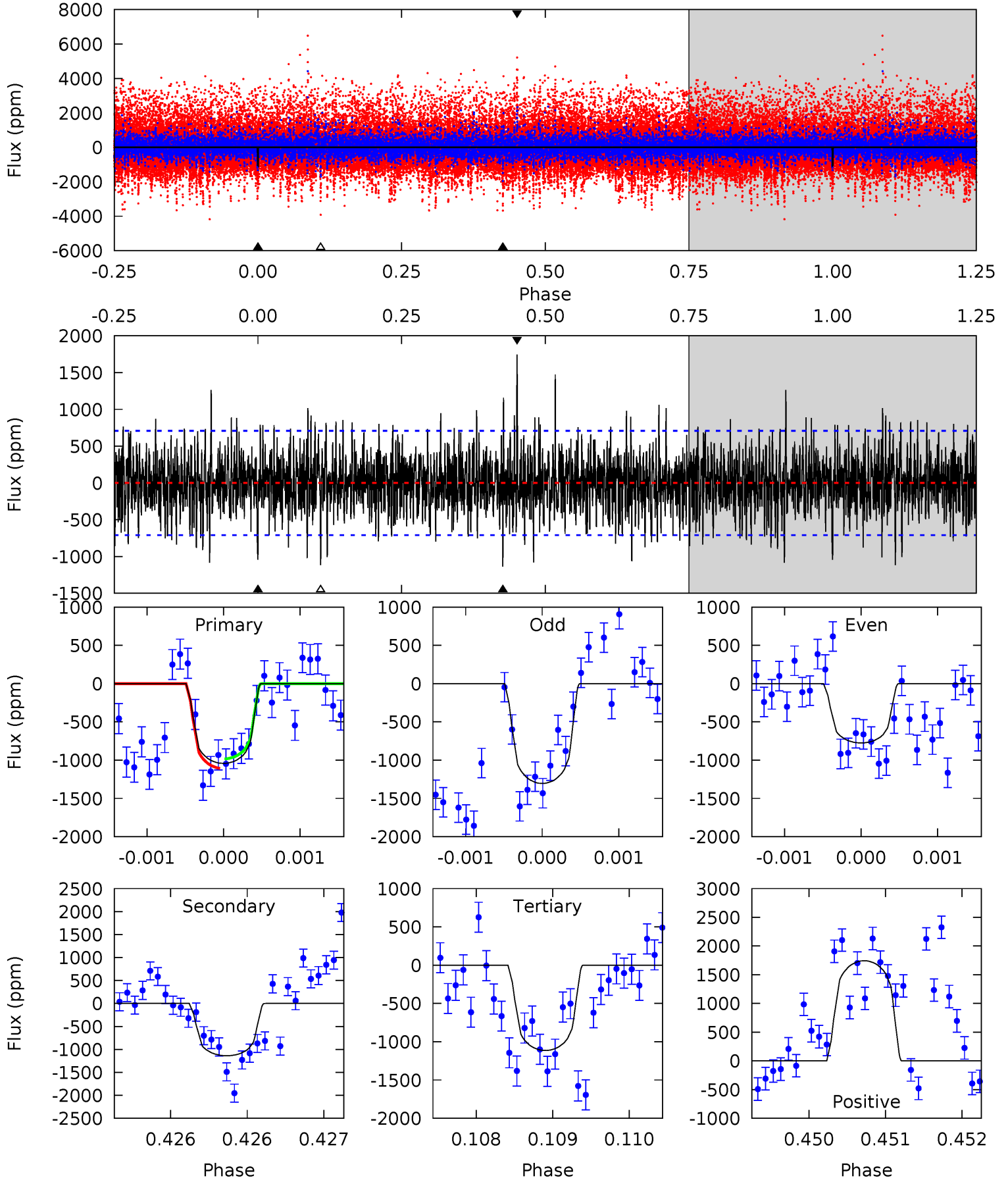
TCE 009945771-03 P=230.774048 Days $T_0=235.830373$ (BKJD)



DV Model-Shift Uniqueness Test

009945771-03, P = 230.778489 Days, E = 5.057230 Days

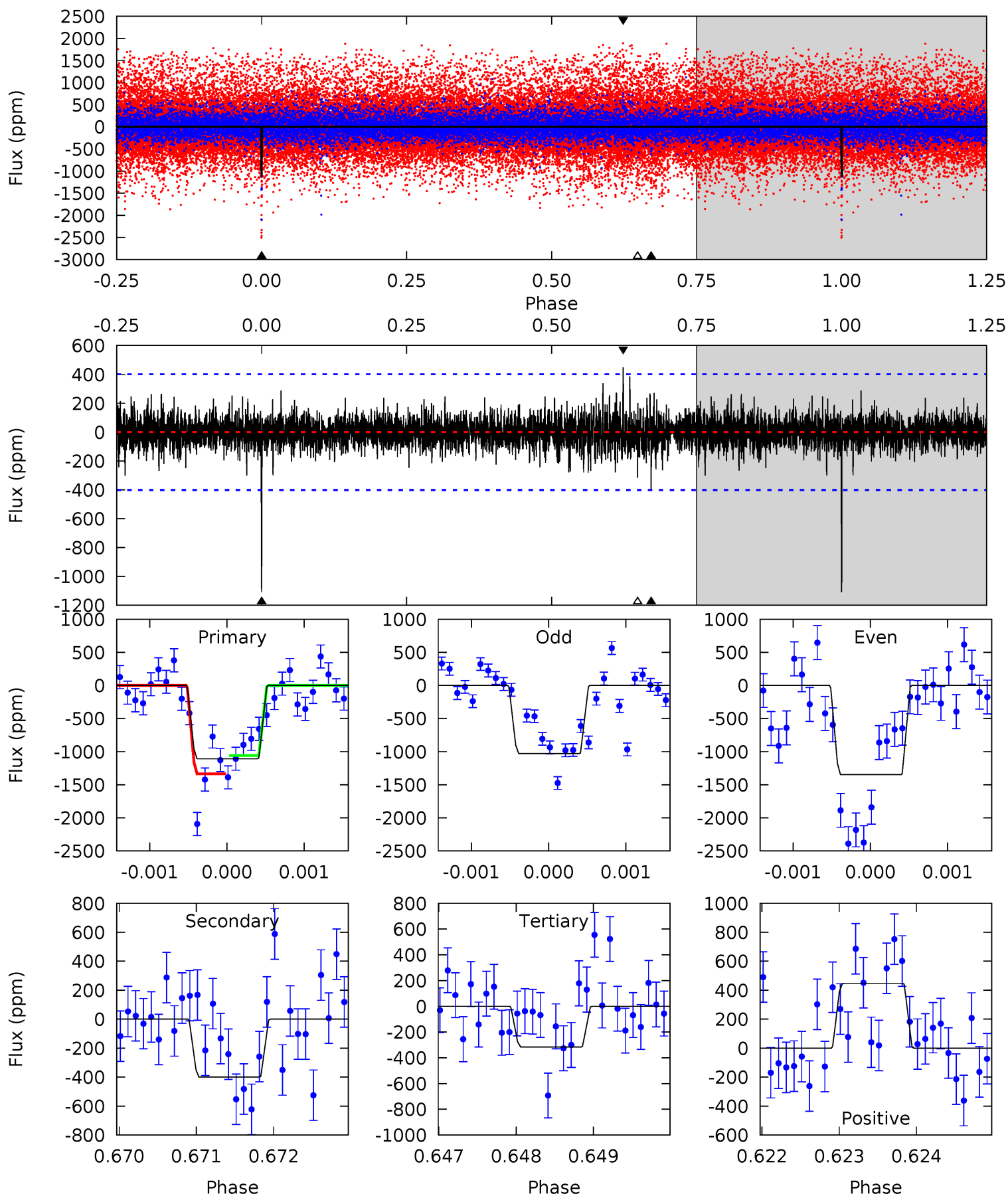
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.07	8.81	8.62	13.5	5.49	3.35	2.41	-0.56	-5.43	0.19	-4.69	1.93	1.17	0.61	0.48



Alt Model-Shift Uniqueness Test

009945771-03, P = 230.774048 Days, E = 5.056325 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.1	5.46	4.32	6.10	5.48	3.33	1.05	10.8	9.04	1.14	-0.65	2.19	1.88	0.29	0



Stellar Parameters For KIC 009945771

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	3799^{+76}_{-76}	$4.738^{+0.036}_{-0.021}$	$-0.100^{+0.100}_{-0.100}$	$0.510^{+0.028}_{-0.034}$	$0.518^{+0.029}_{-0.029}$	$5.508^{+0.900}_{-0.528}$
	+2%/-2%	+1%/-0%	+100%/-100%	+5%/-7%	+6%/-6%	+16%/-10%
Source	PHO2	PHO2	PHO2	DSEP		

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

Secondary Eclipse Parameters for KIC 009945771-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1139±129	$2.23^{+1.56}_{-1.27}$	217^{+5}_{-5}	3594^{+1317}_{-562}	$44051^{+198392}_{-29047}$
Alt.	-399±73	$2.76^{+1.59}_{-1.54}$	217^{+5}_{-5}	2871^{+790}_{-323}	9982^{+42955}_{-5951}

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 $A_{obs} \gg 1.0$

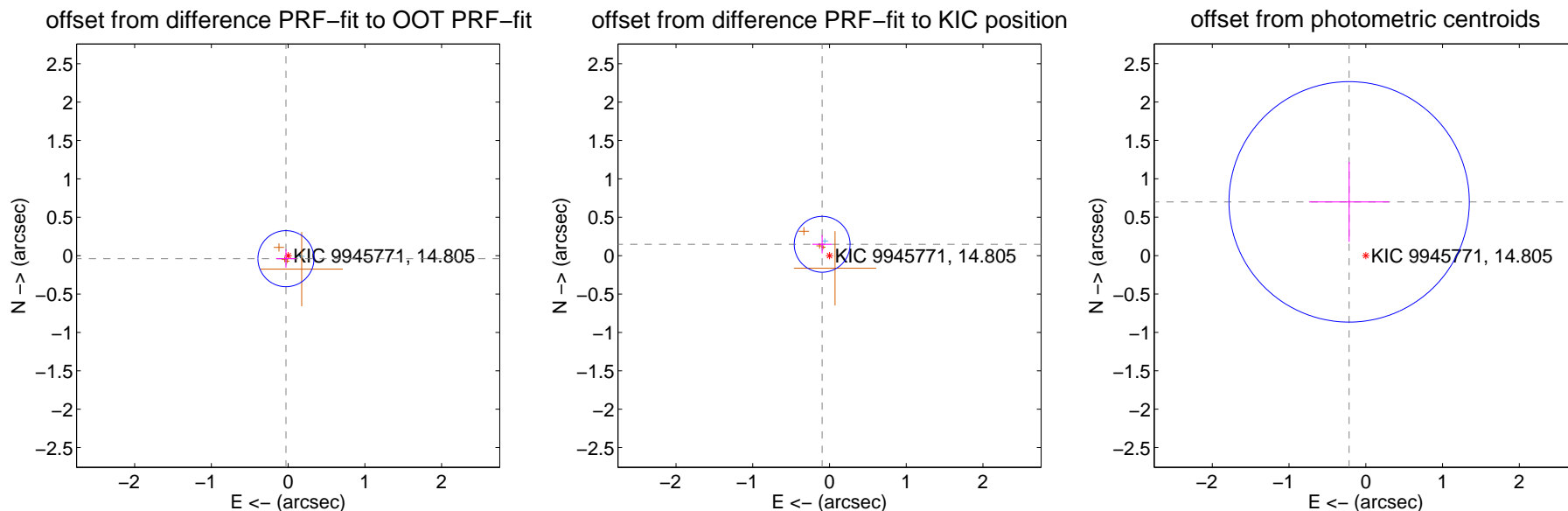
DV Centroid Data

Supplemental centroid analysis for 009945771-03. Kepler magnitude: 14.80. Transit SNR 6.99

There are 1 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.049 ± 0.122	0.40	0.028 ± 0.128	-0.039 ± 0.119
PRF-fit source offset from KIC position	0.176 ± 0.121	1.45	0.096 ± 0.128	0.148 ± 0.119
photometric centroid source offset	0.73 ± 0.52	1.40	0.22 ± 0.52	0.70 ± 0.52



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

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

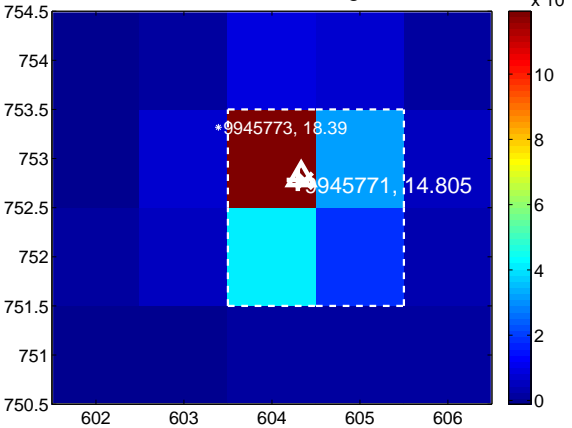
Q1 no difference image



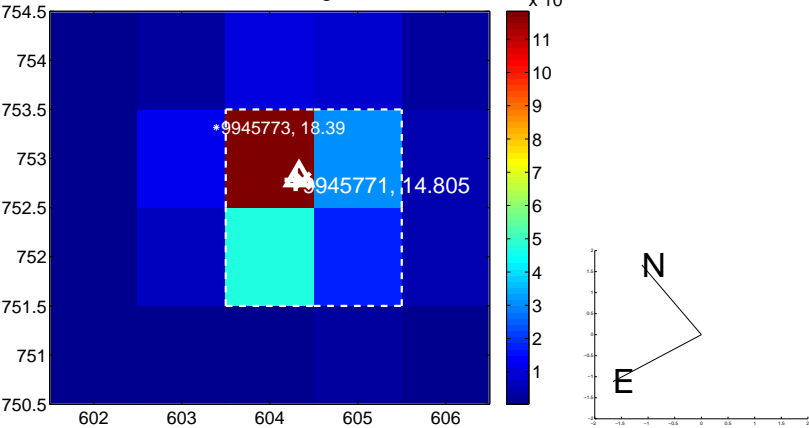
Q1 no OOT image



Q2 difference image



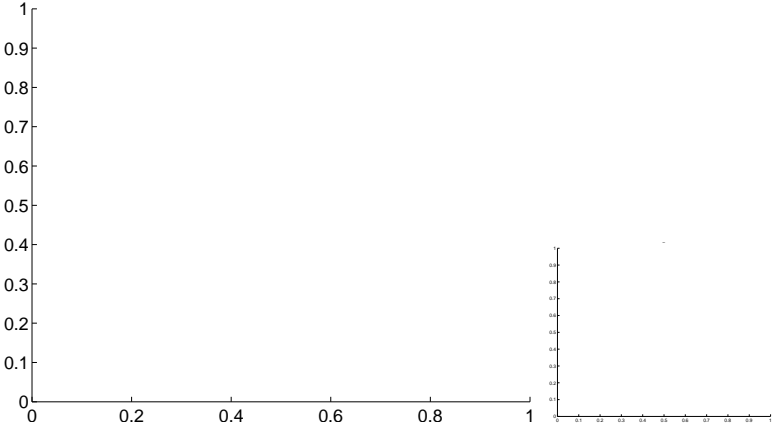
Q2 OOT image



Q3 no difference image



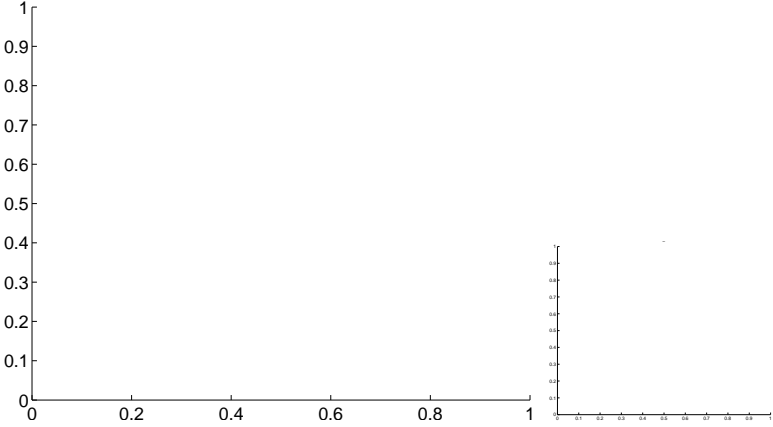
Q3 no OOT image



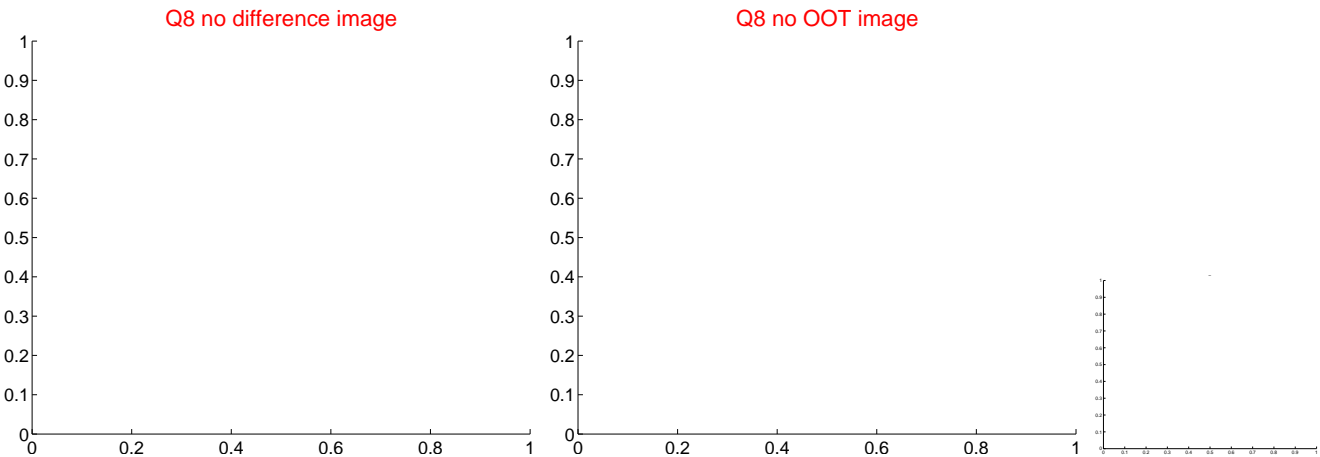
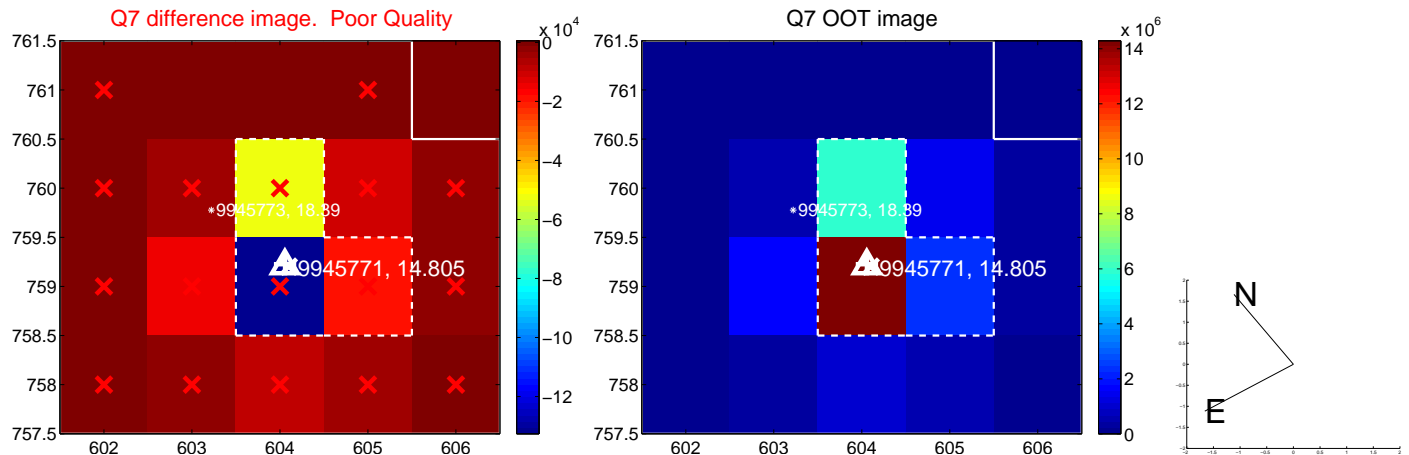
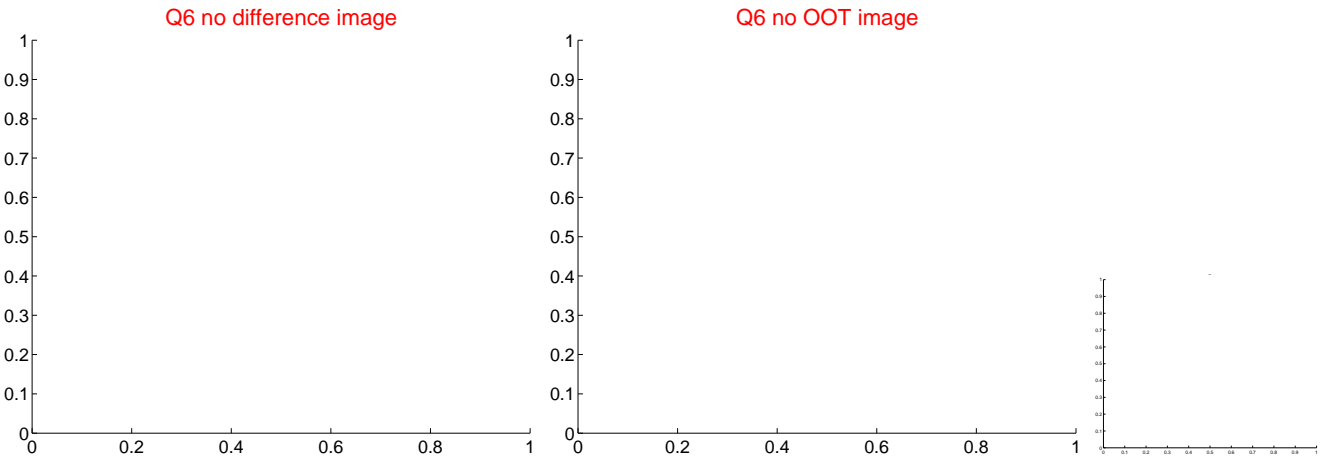
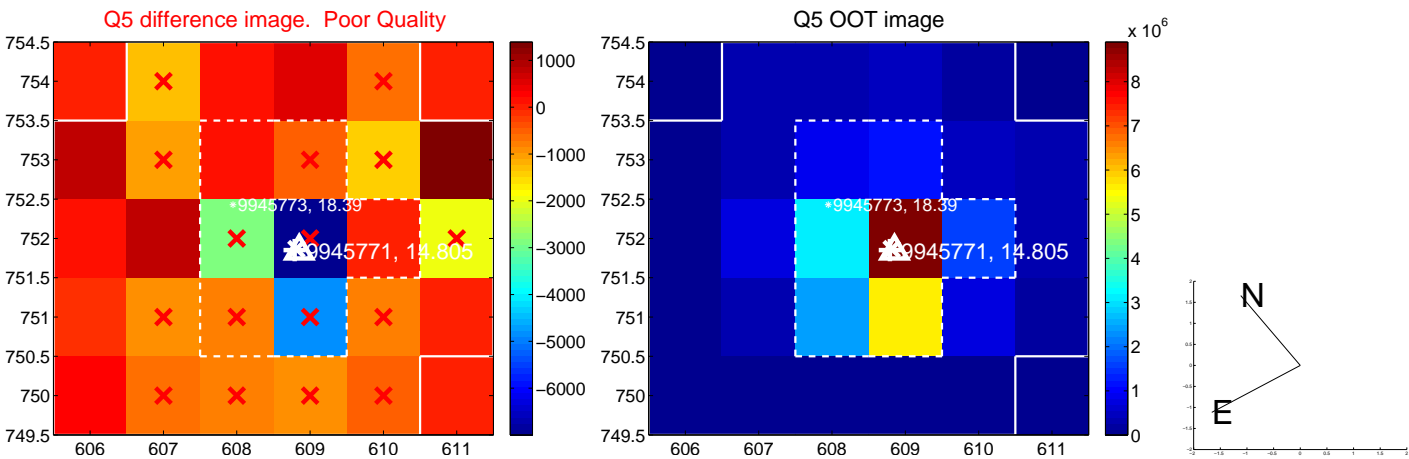
Q4 no difference image



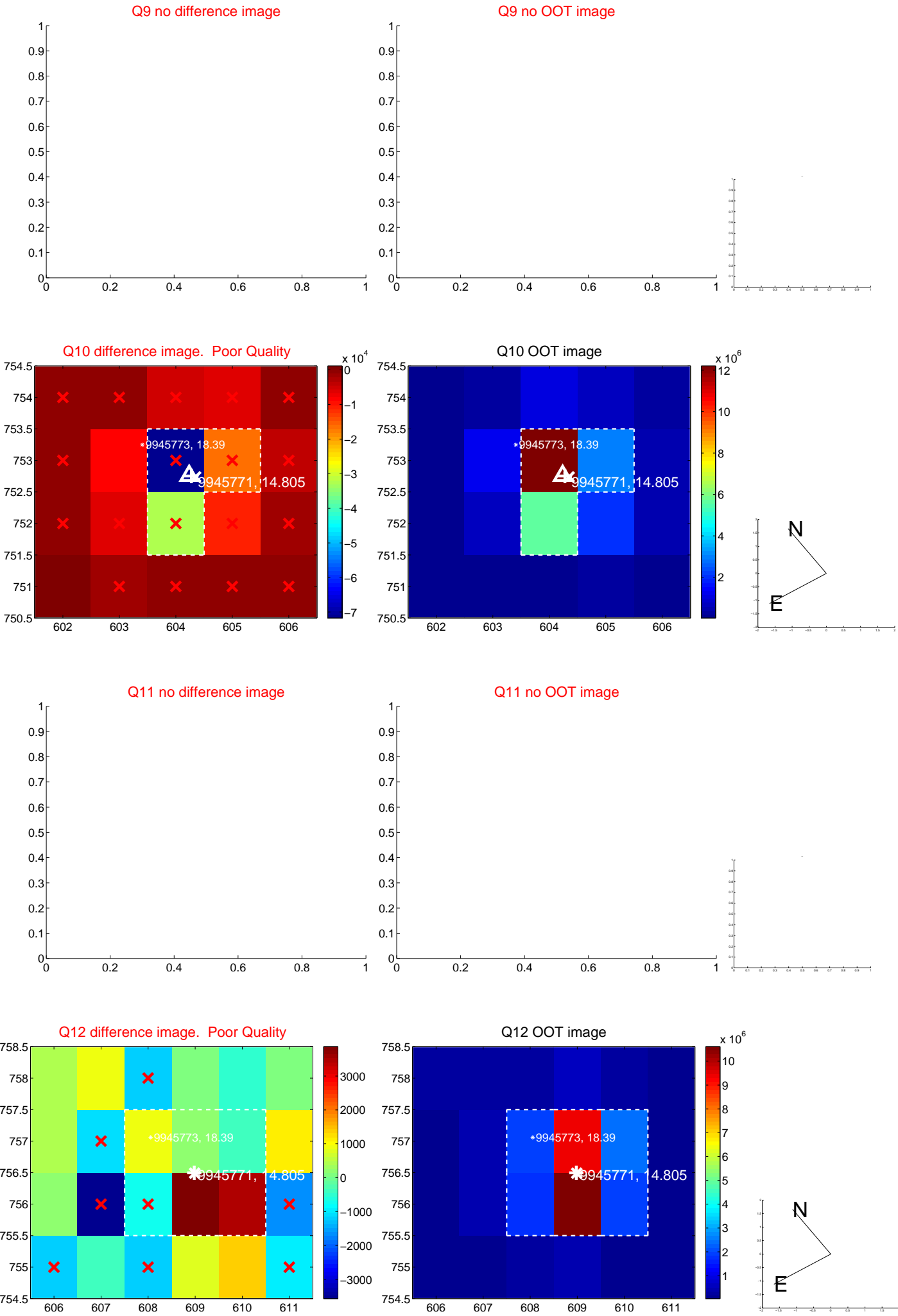
Q4 no OOT image



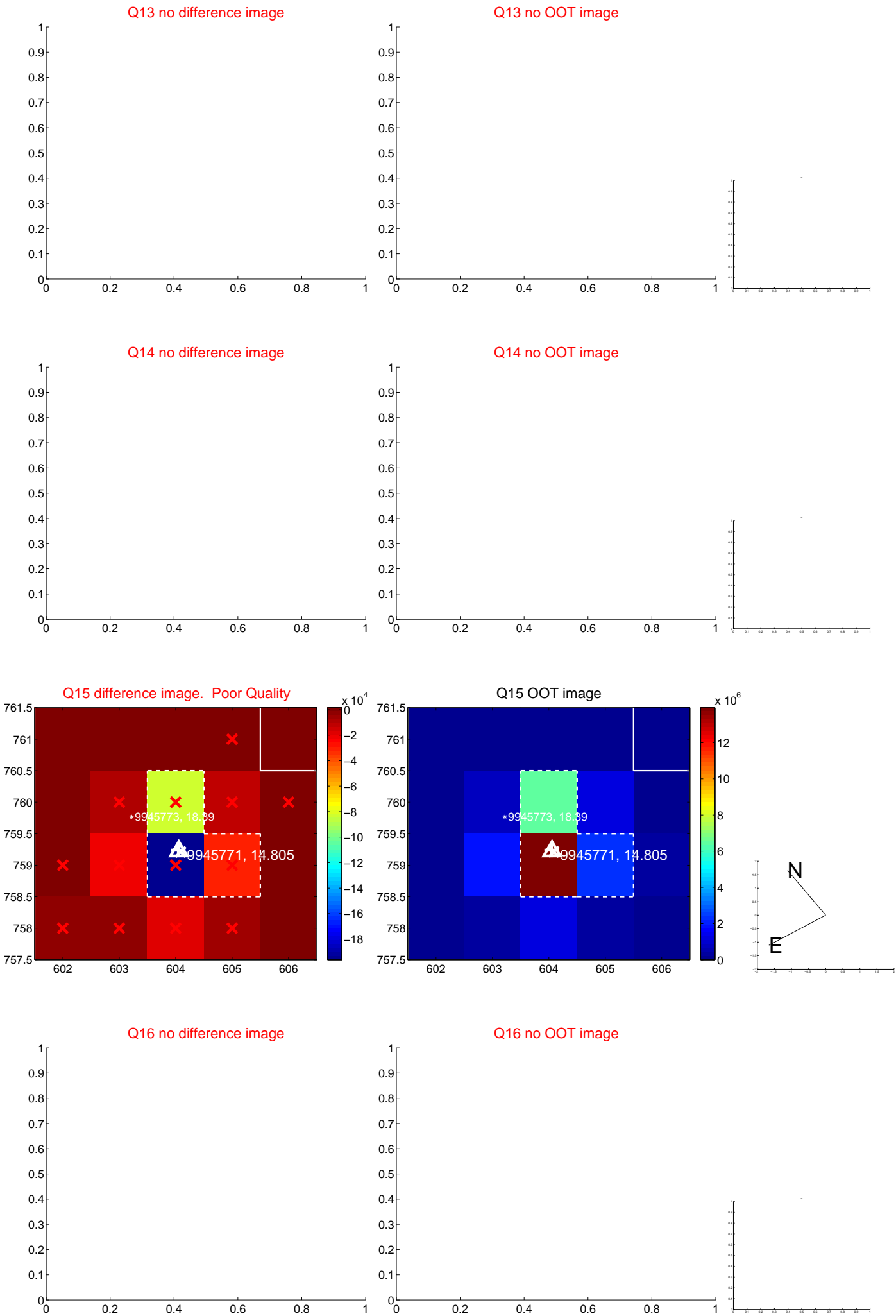
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



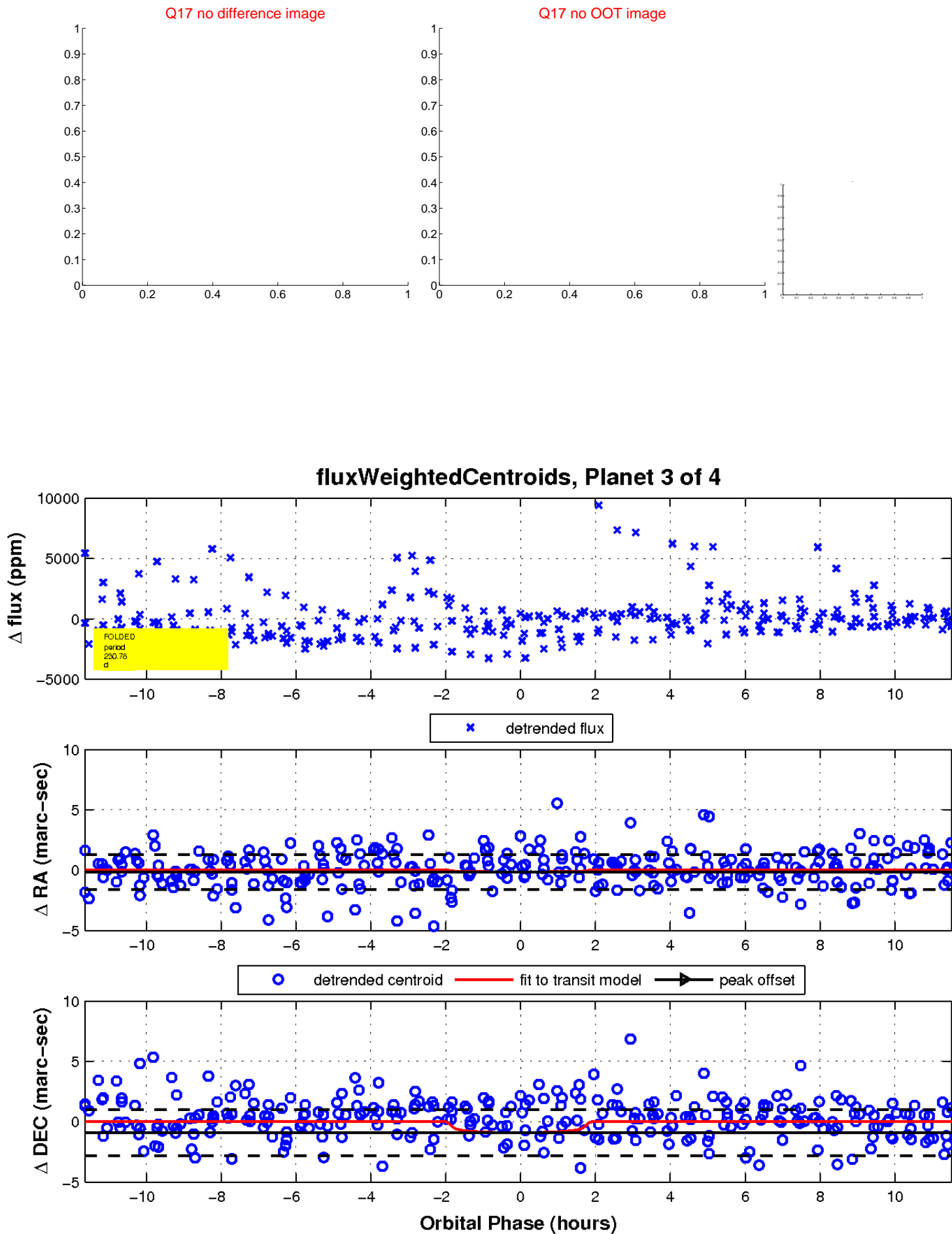
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



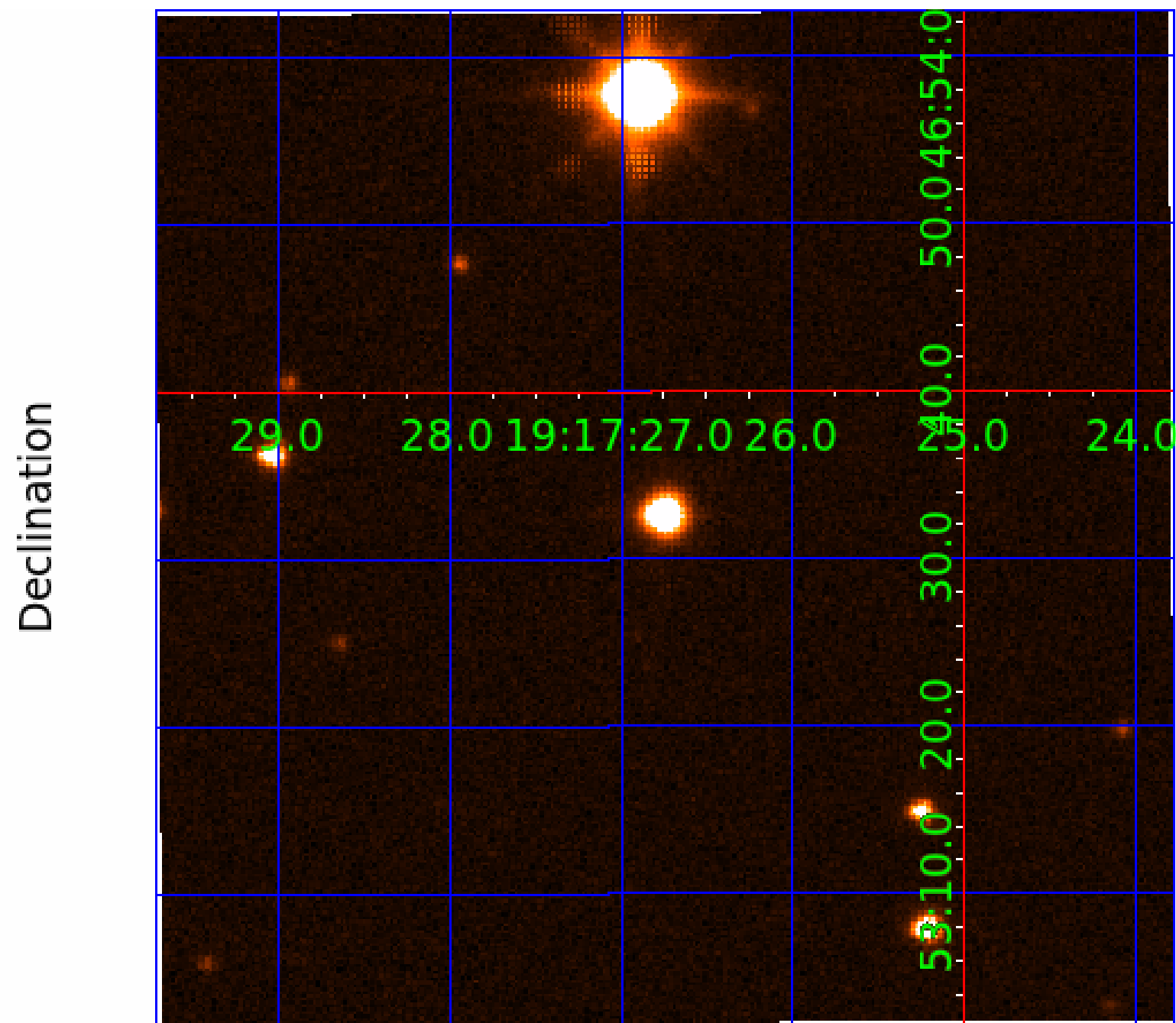
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 009945771

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})
009945771-01	OBS	No	480.527812	153.726712	2593.3	4.841	14.6	7.4	0.51	3799	2.98	0.05
009945771-02	OBS	No	385.304326	381.259917	900.5	3.817	13.5	3.4	0.51	3799	1.62	0.07
009945771-03	OBS	No	230.778489	235.835719	1504.7	3.887	13.7	7.0	0.51	3799	2.07	0.14
009945771-04	OBS	No	391.633634	181.644183	2063.7	4.992	13.5	5.8	0.51	3799	2.35	0.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009945771-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009945771-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009945771-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009945771-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—HALO_GHOST

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

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

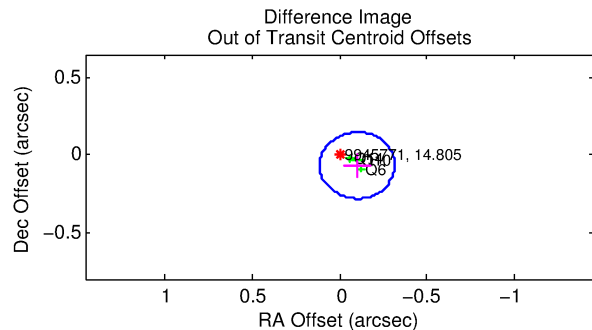
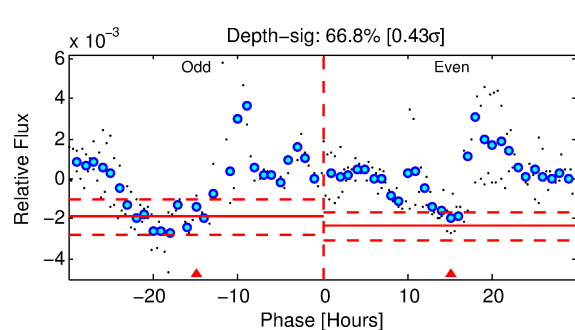
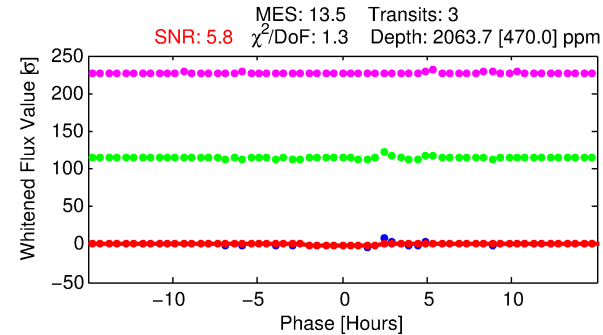
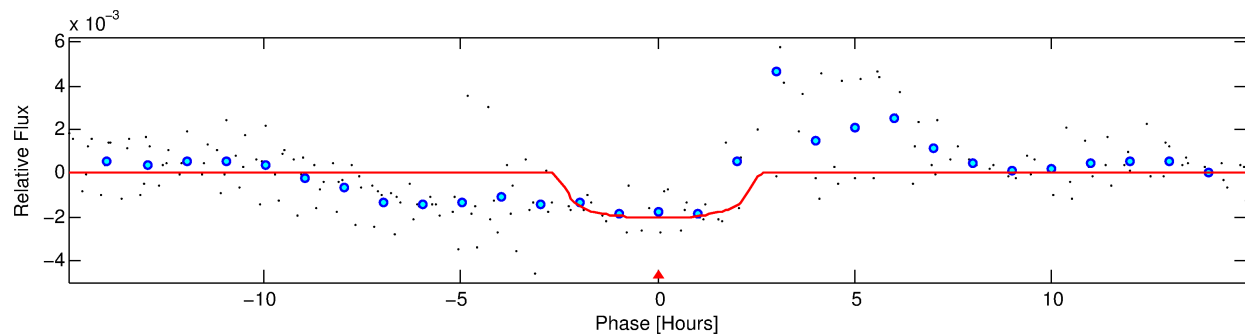
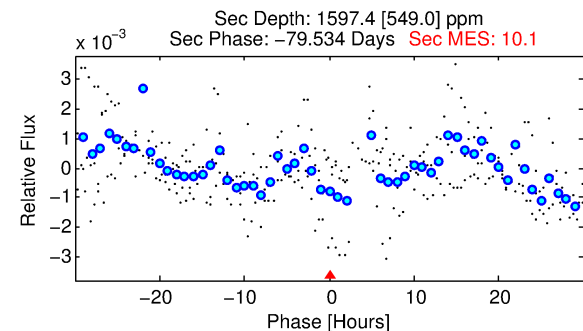
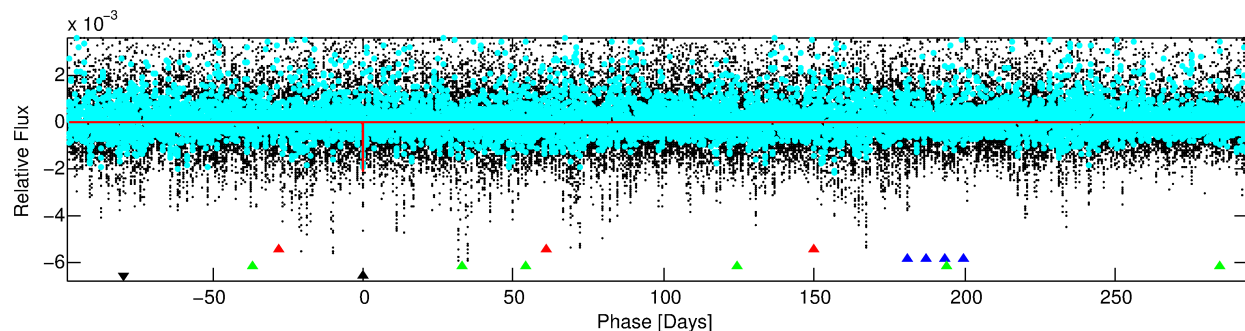
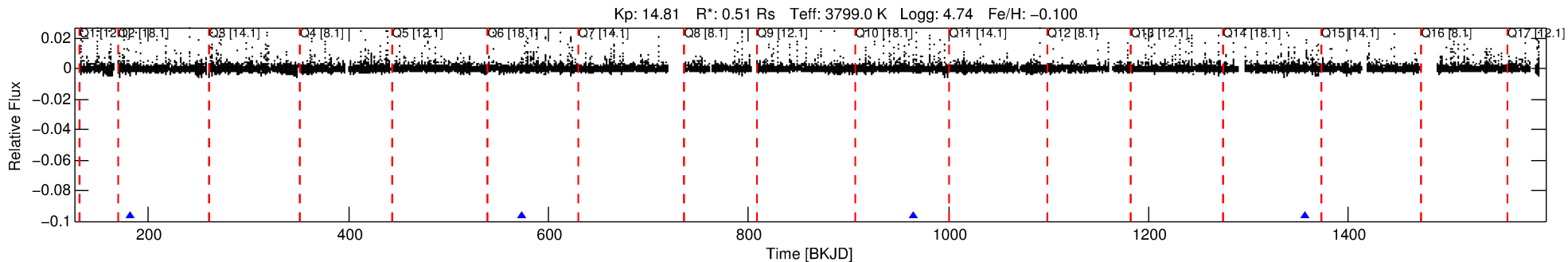
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009945771-04

No Significant Match Found

DV One-Page Summary

KIC: 9945771 Candidate: 4 of 4 Period: 391.634 d



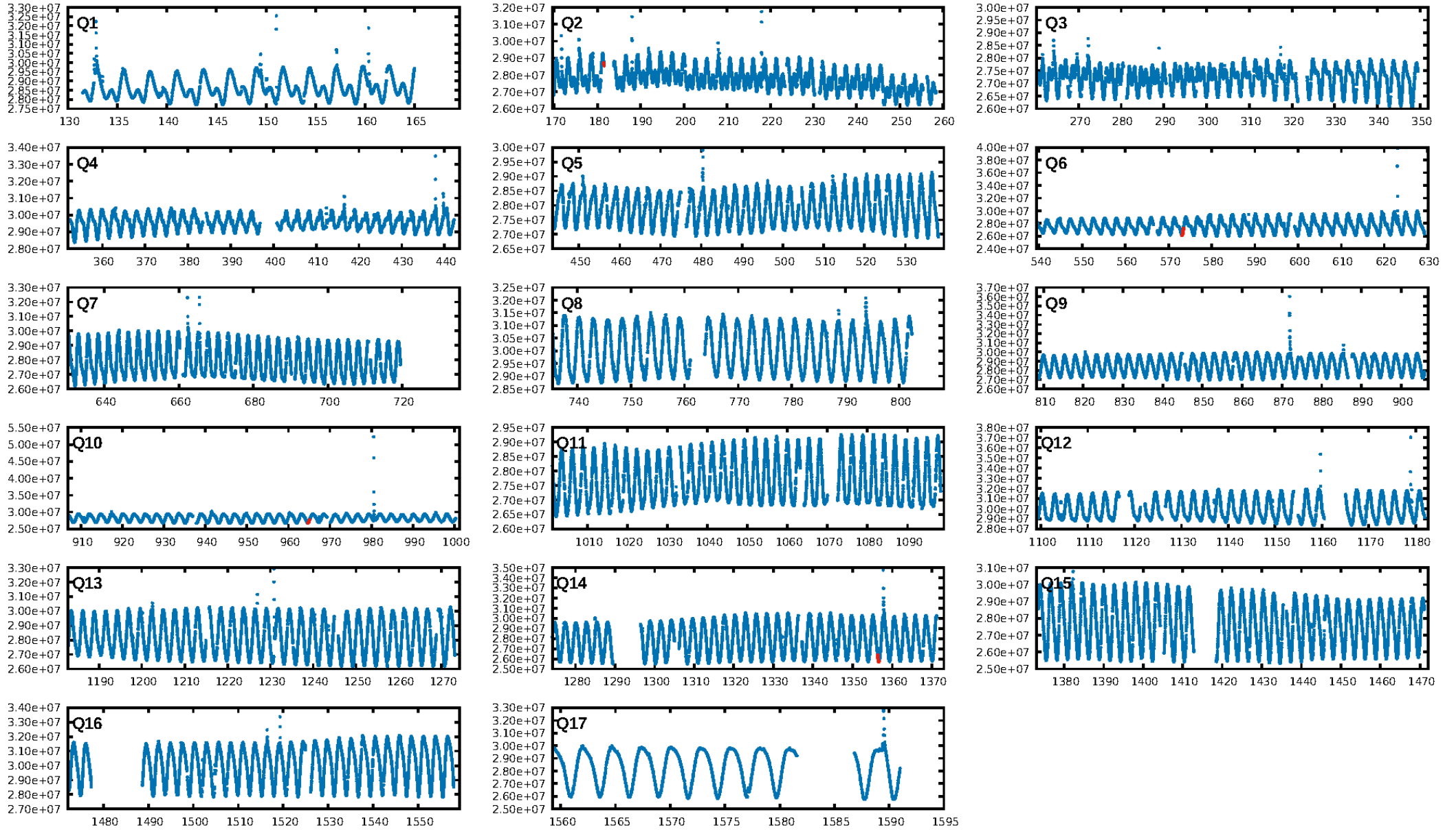
DV Fit Results:

Period = 391.63363 [0.00584] d
Epoch = 181.6442 [0.0131] BKJD
Rp/R* = 0.0422 [0.0322]
a/R* = 564.43 [1819.75]
b = 0.45 [5.79]
Seff = 0.07 [0.01]
Teq = 130 [3] K
Rp = 2.35 [1.80] Re
a = 0.8420 [0.0441] AU
Ag = 112858.54 [176528.56] [0.64σ]
Teffp = 3696 [1446] K [2.47σ]

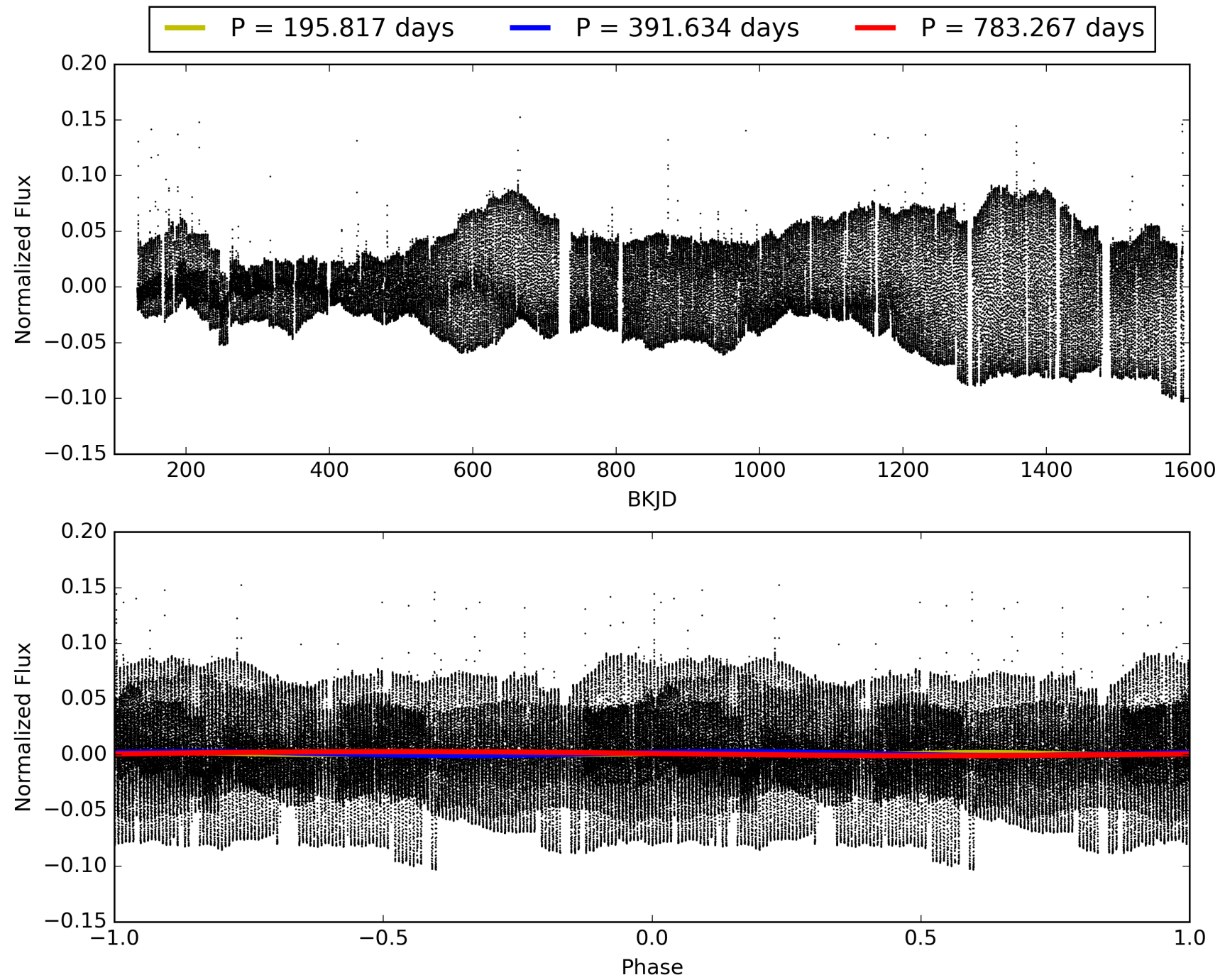
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [24.17σ]
LongPeriod-sig: 100.0% [306.82σ]
ModelChiSquare2-sig: 68.6%
ModelChiSquareGof-sig: 86.0%
Bootstrap-pfa: 1.31e-09
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.1442
Centroid-sig: 19.1%
Centroid-so: 0.554 arcsec [1.23σ]
OotOffset-rm: 0.120 arcsec [1.68σ]
KicOffset-rm: 0.173 arcsec [2.40σ]
OotOffset-st: 3/0/0/0 [3]
KicOffset-st: 3/0/0/0 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

TCE 009945771-04, PDC Light Curves

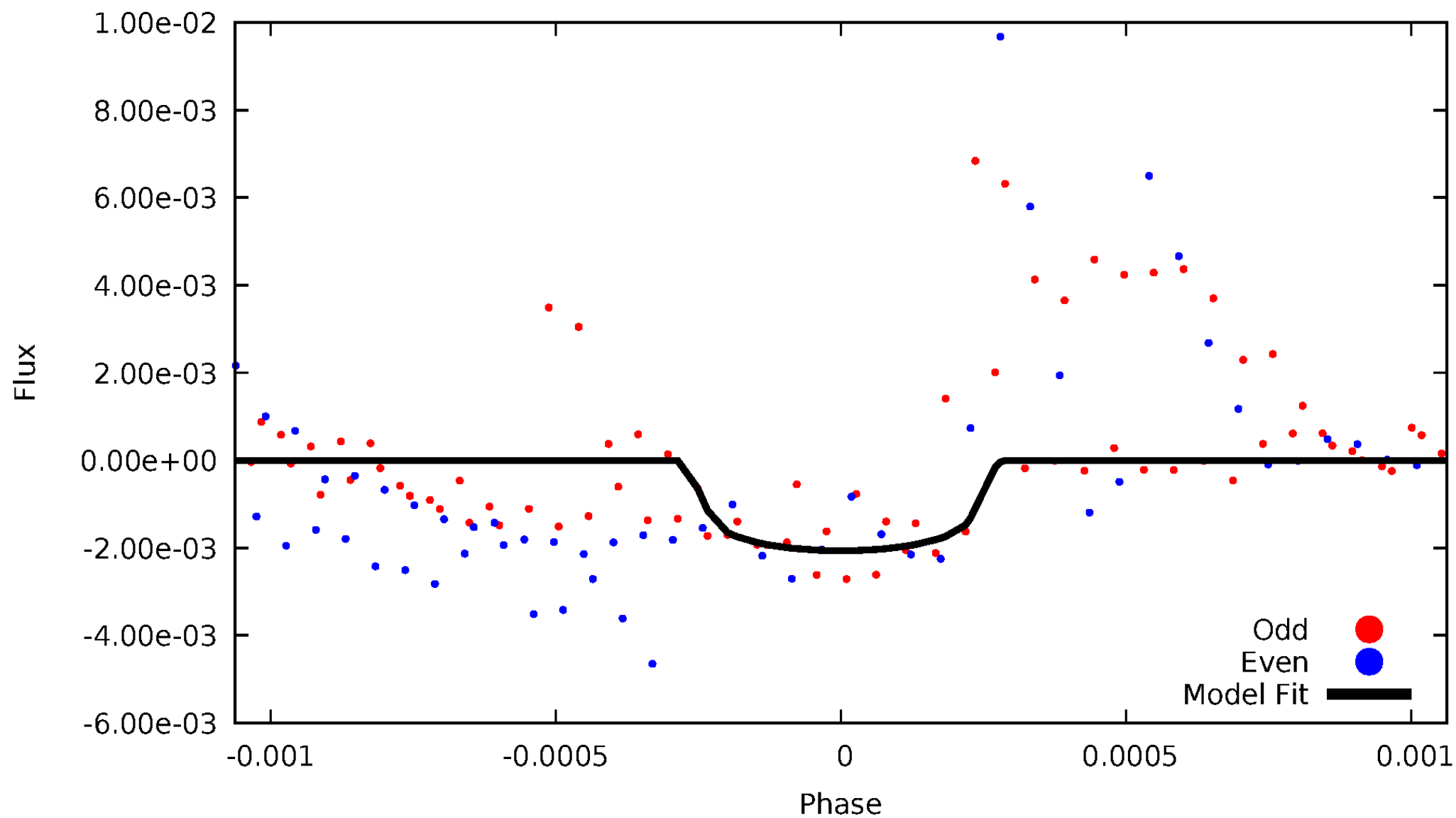


TCE 009945771-04



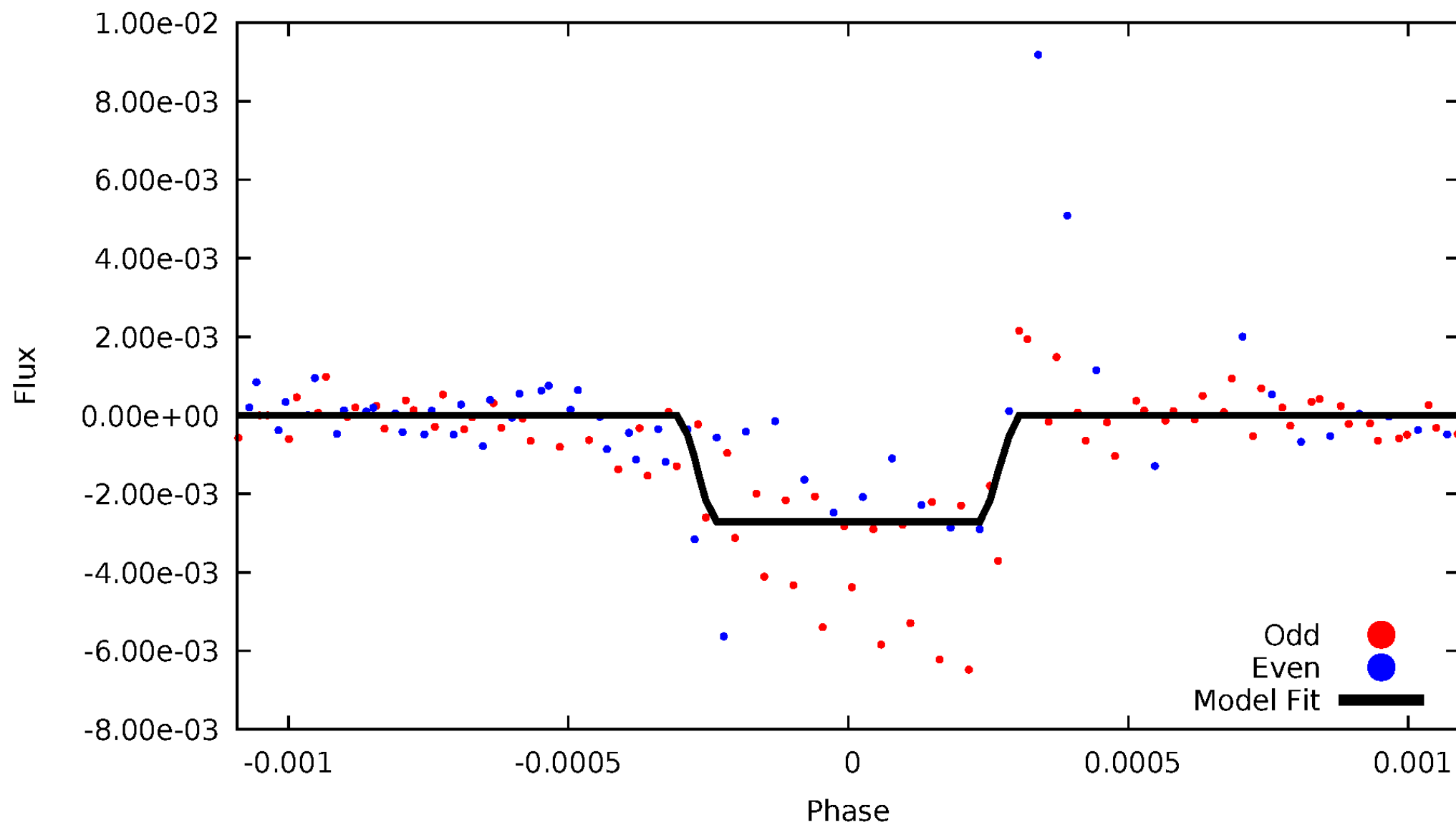
DV Odd/Even

TCE 009945771-04



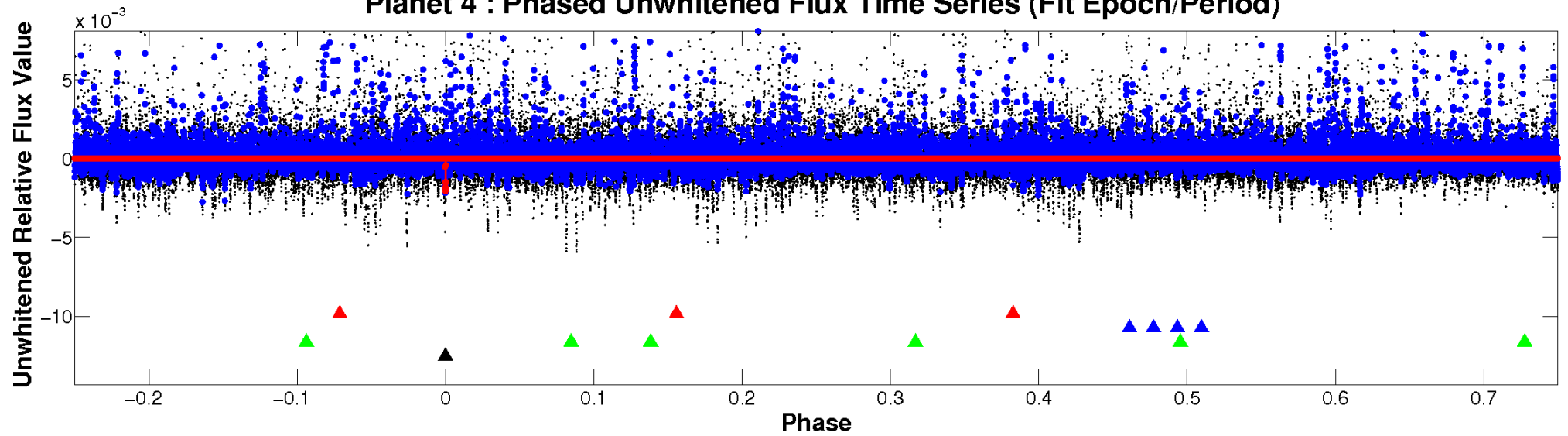
ALT Odd/Even

TCE 009945771-04

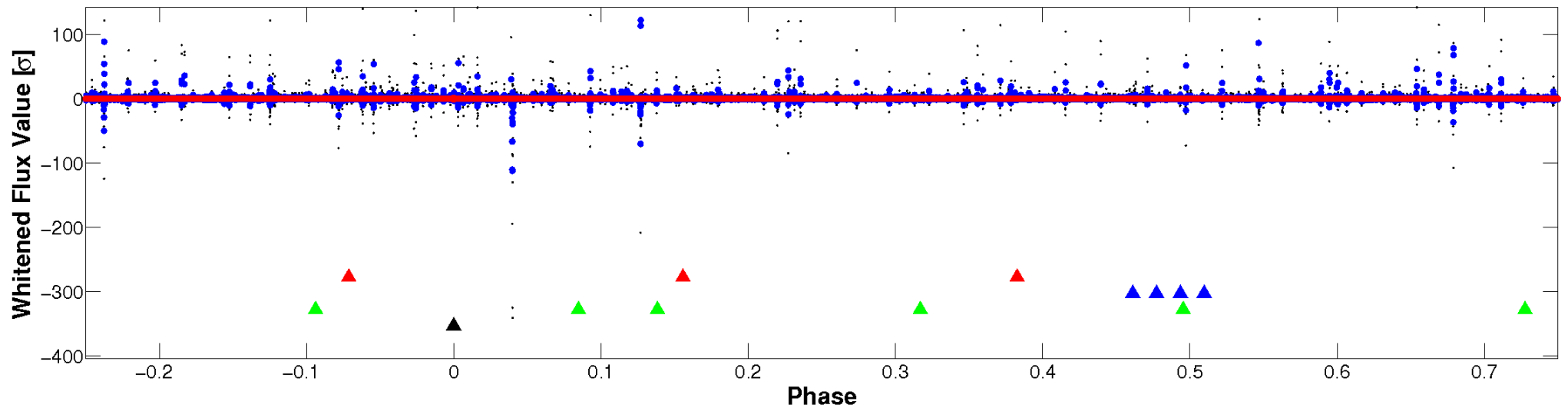


Non-Whitened Vs. Whitened Light Curve

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

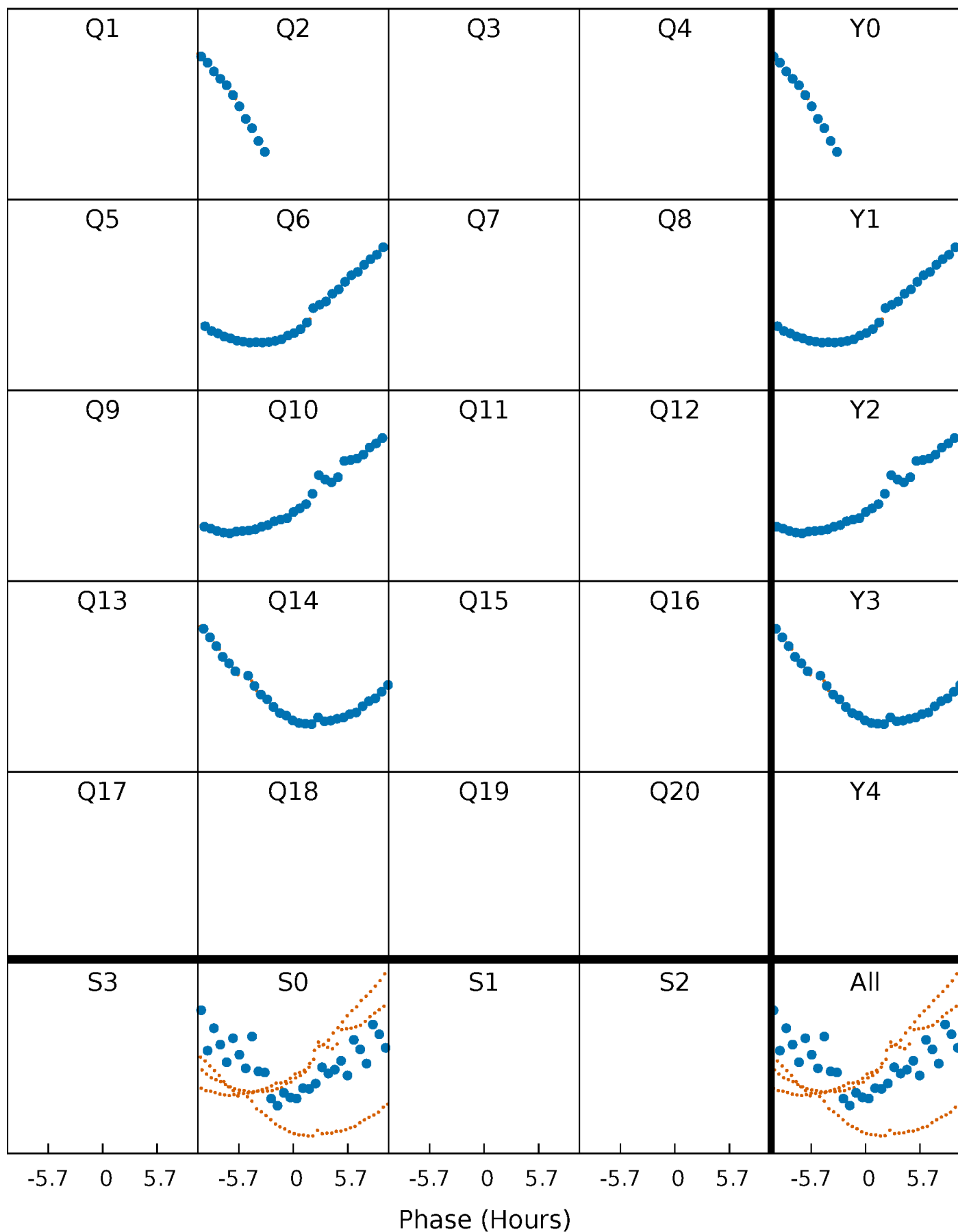


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



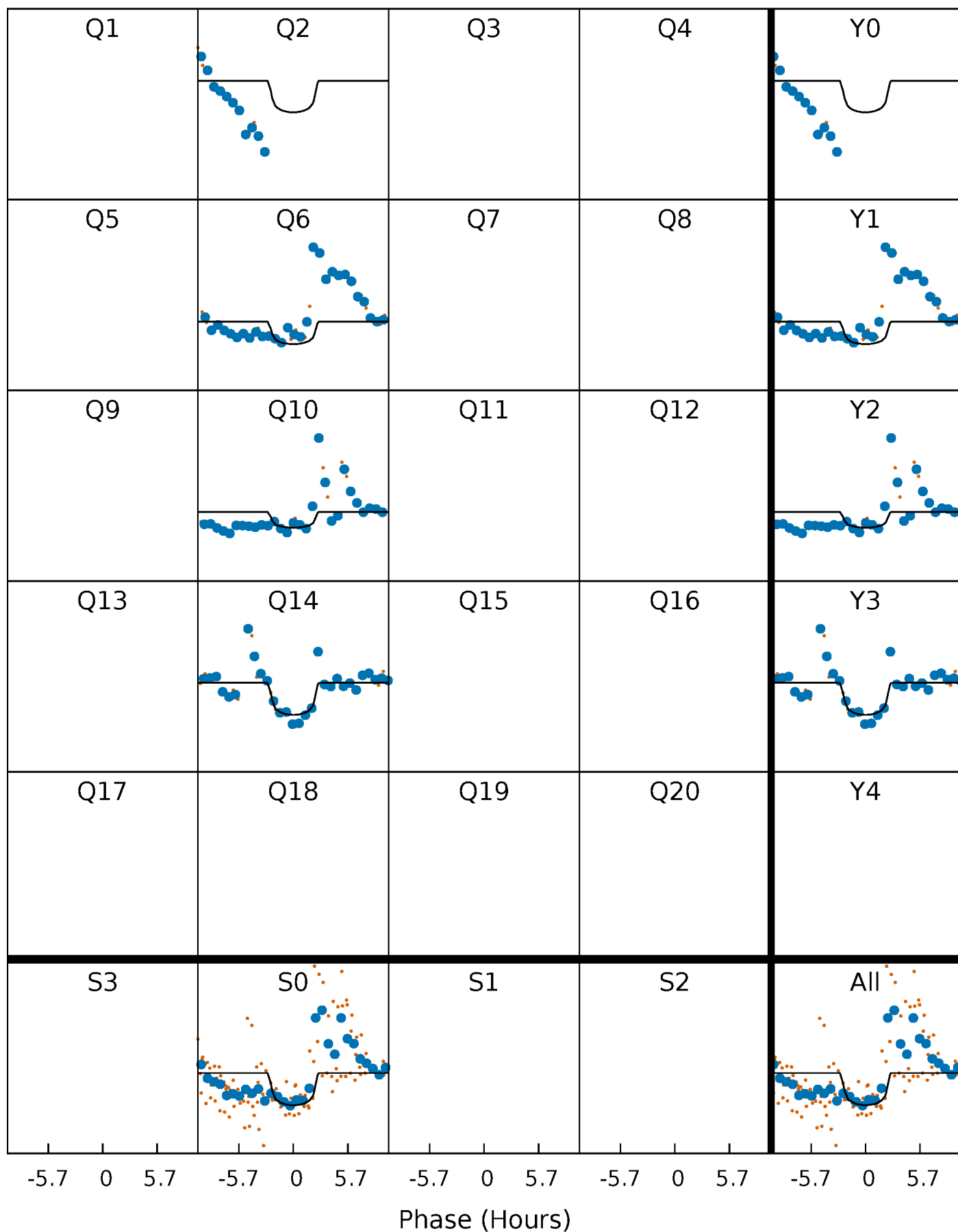
PDC Quarter-Phased Transit Curves

TCE 009945771-04 P=391.633634 Days $T_0=181.644183$ (BKJD)



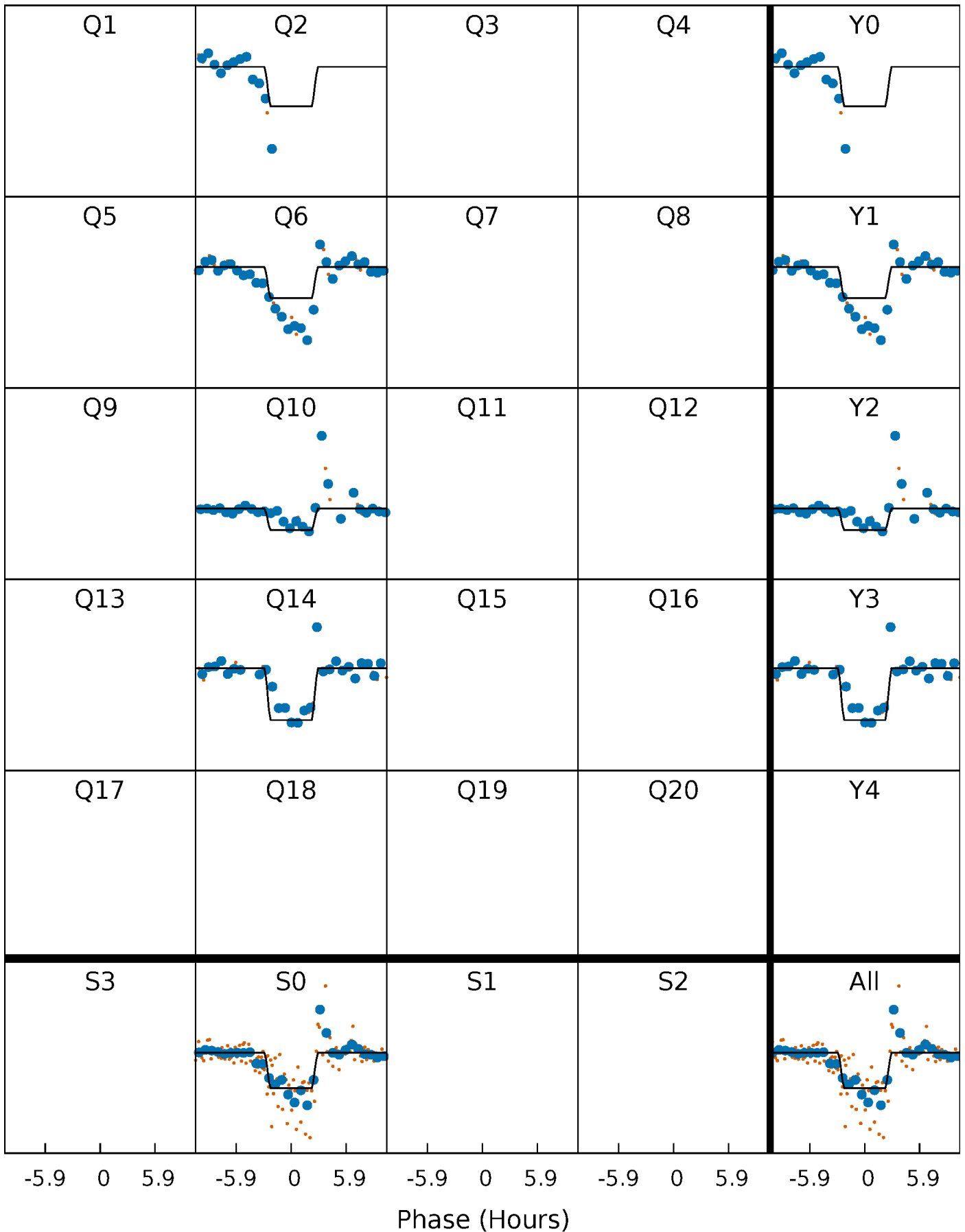
DV Quarter-Phased Transit Curves

TCE 009945771-04 P=391.633634 Days $T_0=181.644183$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

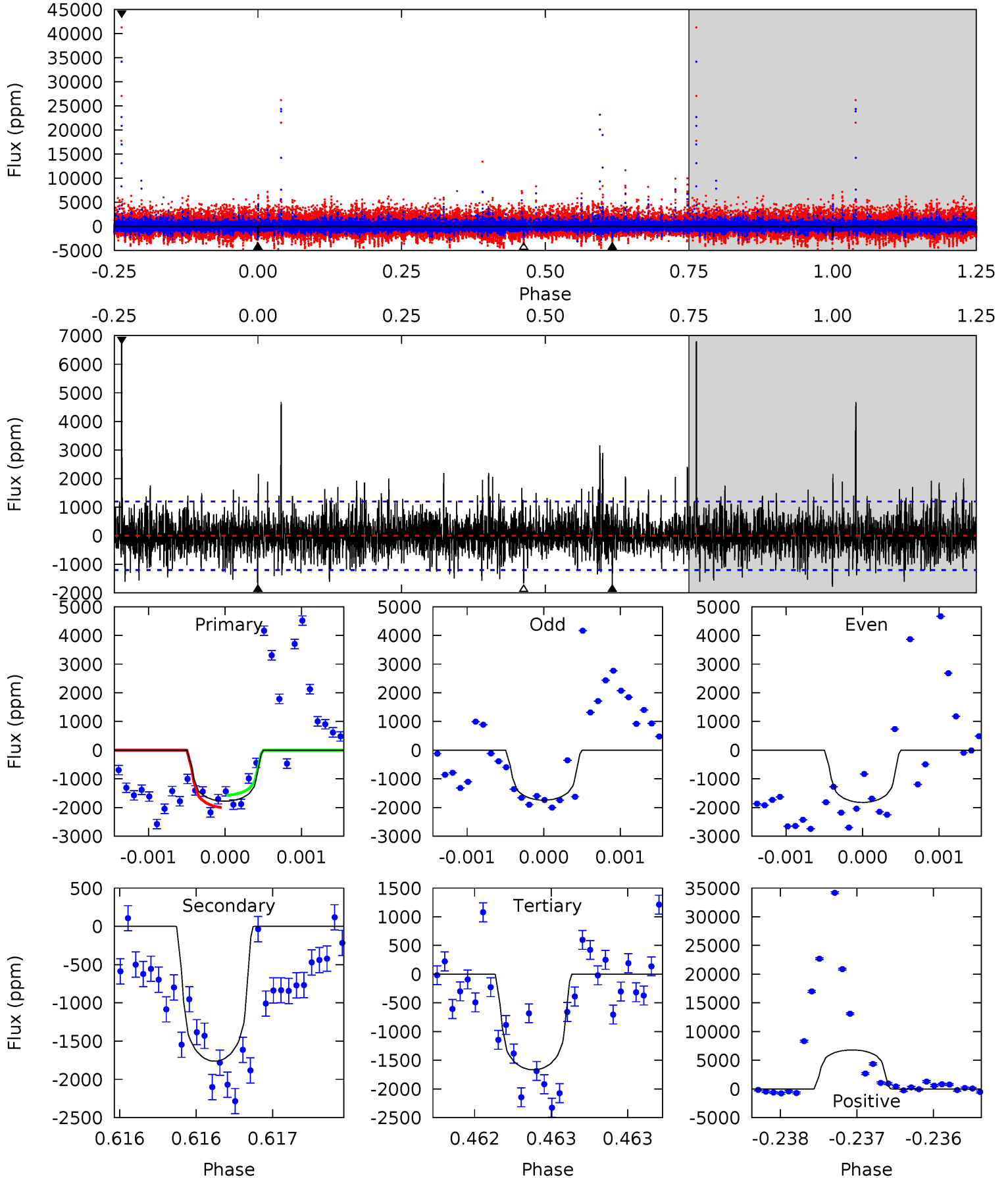
TCE 009945771-04 P=391.643233 Days $T_0=181.601735$ (BKJD)



DV Model-Shift Uniqueness Test

009945771-04, P = 391.633634 Days, E = 181.644183 Days

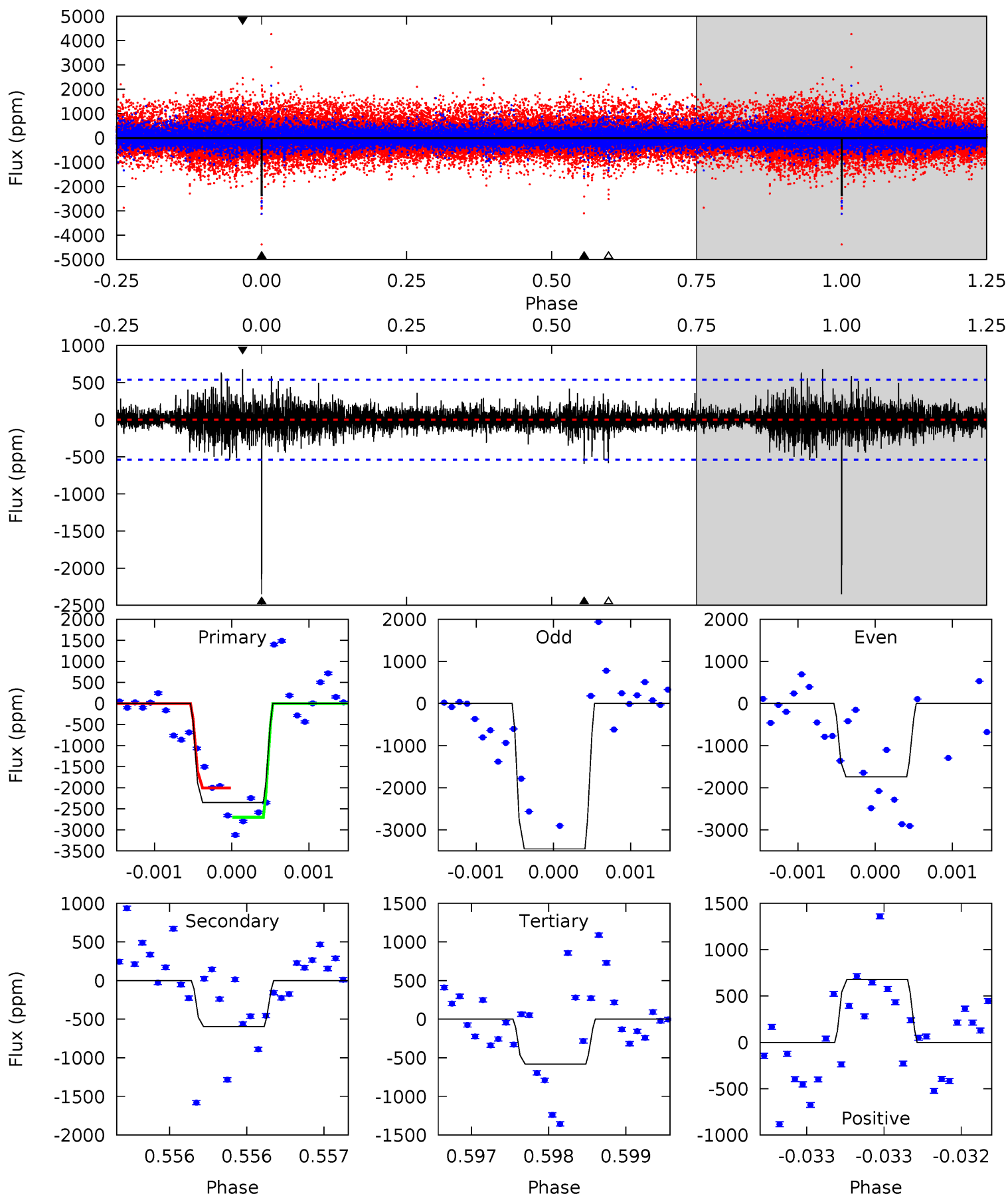
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.24	8.16	7.72	31.5	5.55	3.44	2.36	0.52	-23.2	0.44	-23.3	0.11	0.87	0.79	1.00



Alt Model-Shift Uniqueness Test

009945771-04, P = 391.643233 Days, E = 181.601735 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.2	6.14	6.00	6.99	5.55	3.44	1.06	18.2	17.2	0.14	-0.86	7.36	1.03	0.22	3.60



Stellar Parameters For KIC 009945771

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	3799^{+76}_{-76}	$4.738^{+0.036}_{-0.021}$	$-0.100^{+0.100}_{-0.100}$	$0.510^{+0.028}_{-0.034}$	$0.518^{+0.029}_{-0.029}$	$5.508^{+0.900}_{-0.528}$
	+2%/-2%	+1%/-0%	+100%/-100%	+5%/-7%	+6%/-6%	+16%/-10%
Source	PHO2	PHO2	PHO2	DSEP		

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

Secondary Eclipse Parameters for KIC 009945771-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-1762 ± 216	$2.66^{+1.70}_{-1.53}$	182^{+4}_{-4}	3636^{+1356}_{-532}	$100366^{+426077}_{-64793}$
Alt.	-595 ± 97	$3.03^{+1.83}_{-1.68}$	182^{+4}_{-4}	2962^{+847}_{-361}	$25421^{+100407}_{-15906}$

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

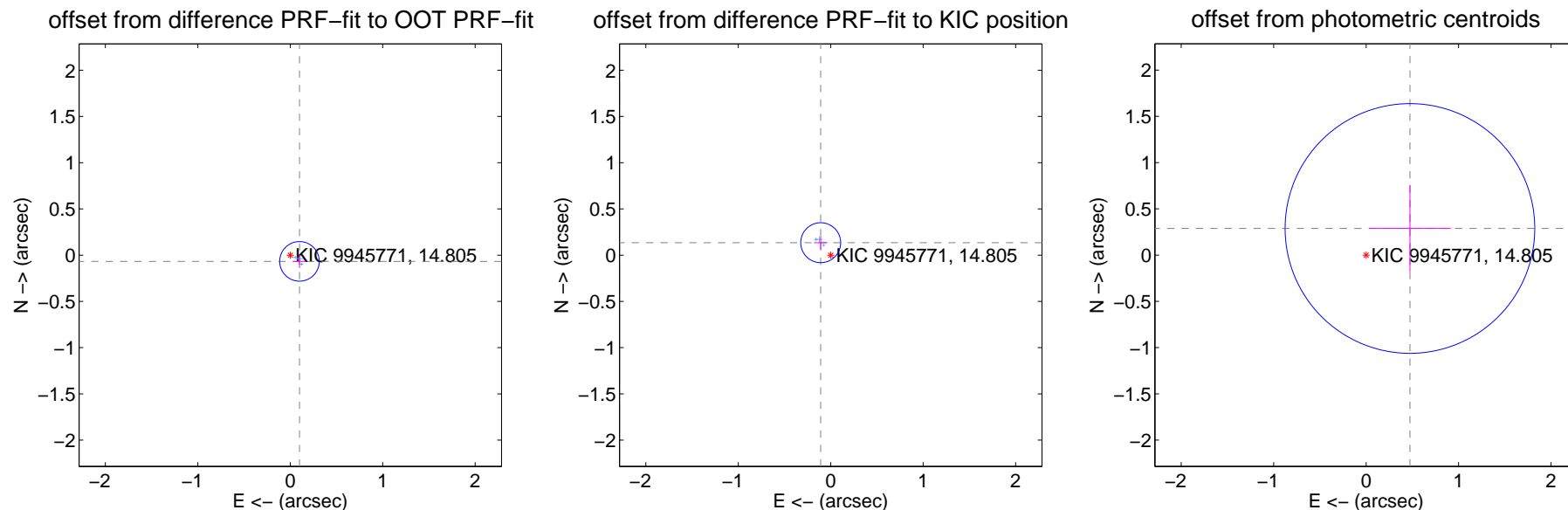
DV Centroid Data

Supplemental centroid analysis for 009945771-04. Kepler magnitude: 14.80. Transit SNR 5.82

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.120 ± 0.071	1.68	-0.100 ± 0.071	-0.067 ± 0.072
PRF-fit source offset from KIC position	0.173 ± 0.072	2.40	0.108 ± 0.073	0.135 ± 0.071
photometric centroid source offset	0.55 ± 0.45	1.23	-0.47 ± 0.44	0.29 ± 0.47



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.

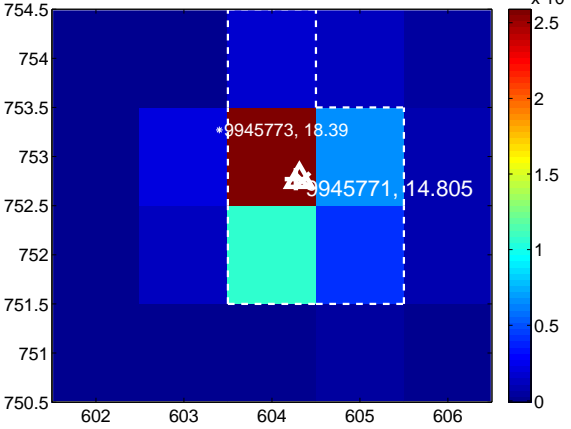
Q5 no difference image



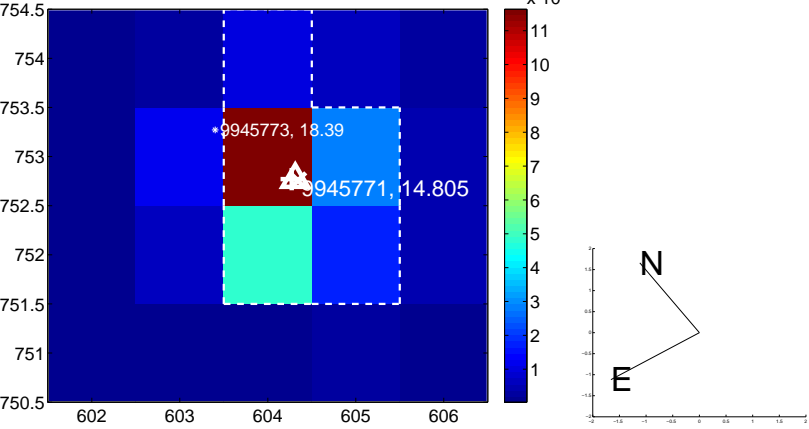
Q5 no OOT image



Q6 difference image



Q6 OOT image



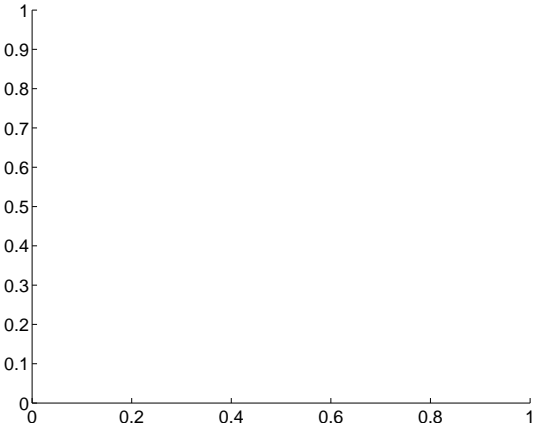
Q7 no difference image



Q7 no OOT image



Q8 no difference image



Q8 no OOT image



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

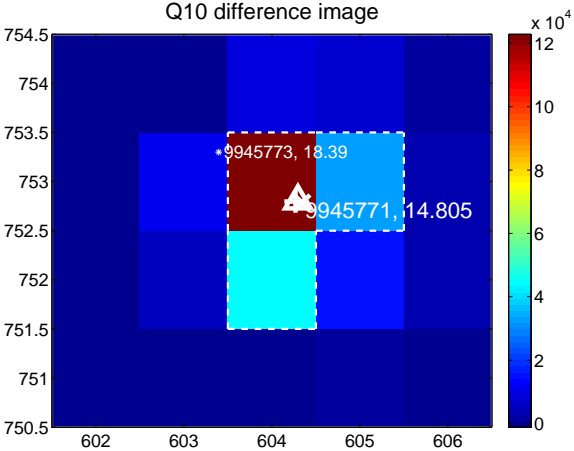
Q9 no difference image



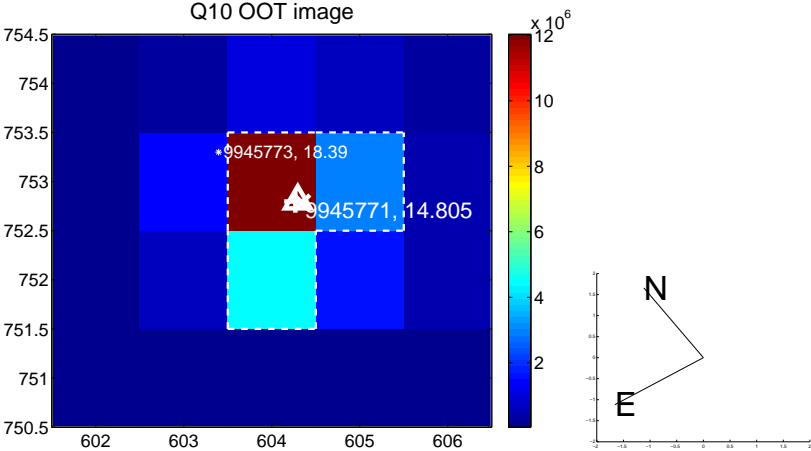
Q9 no OOT image



Q10 difference image



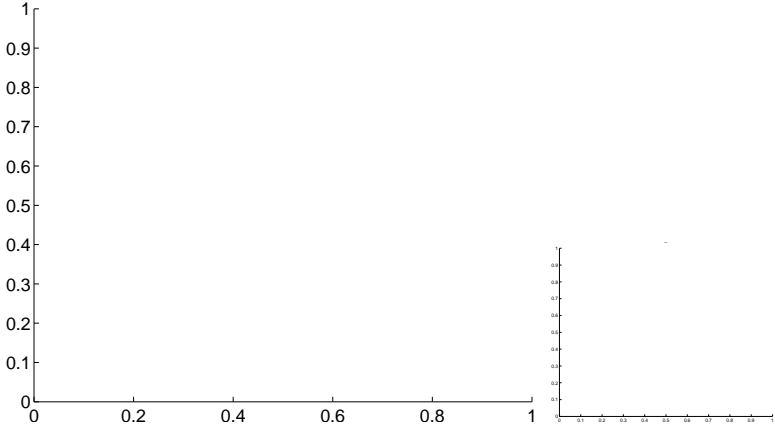
Q10 OOT image



Q11 no difference image



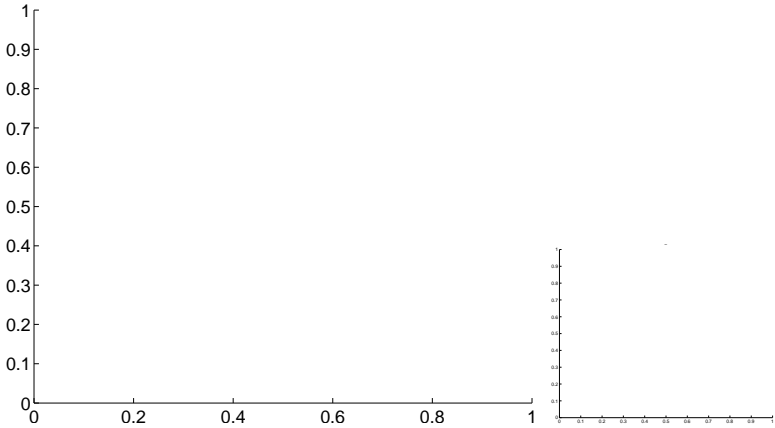
Q11 no OOT image



Q12 no difference image



Q12 no OOT image



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

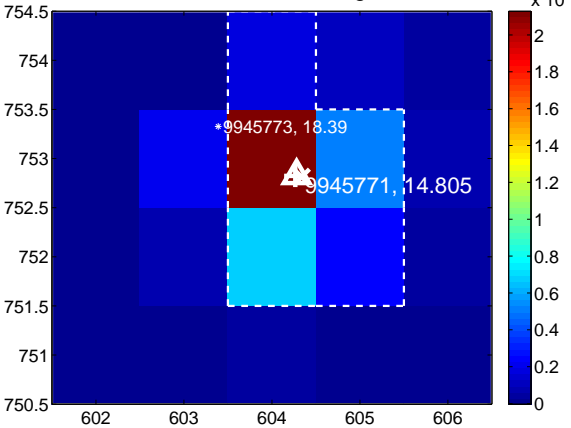
Q13 no difference image



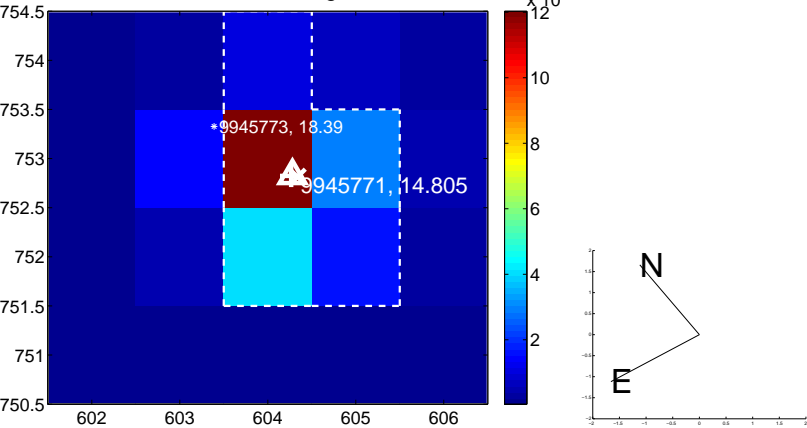
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



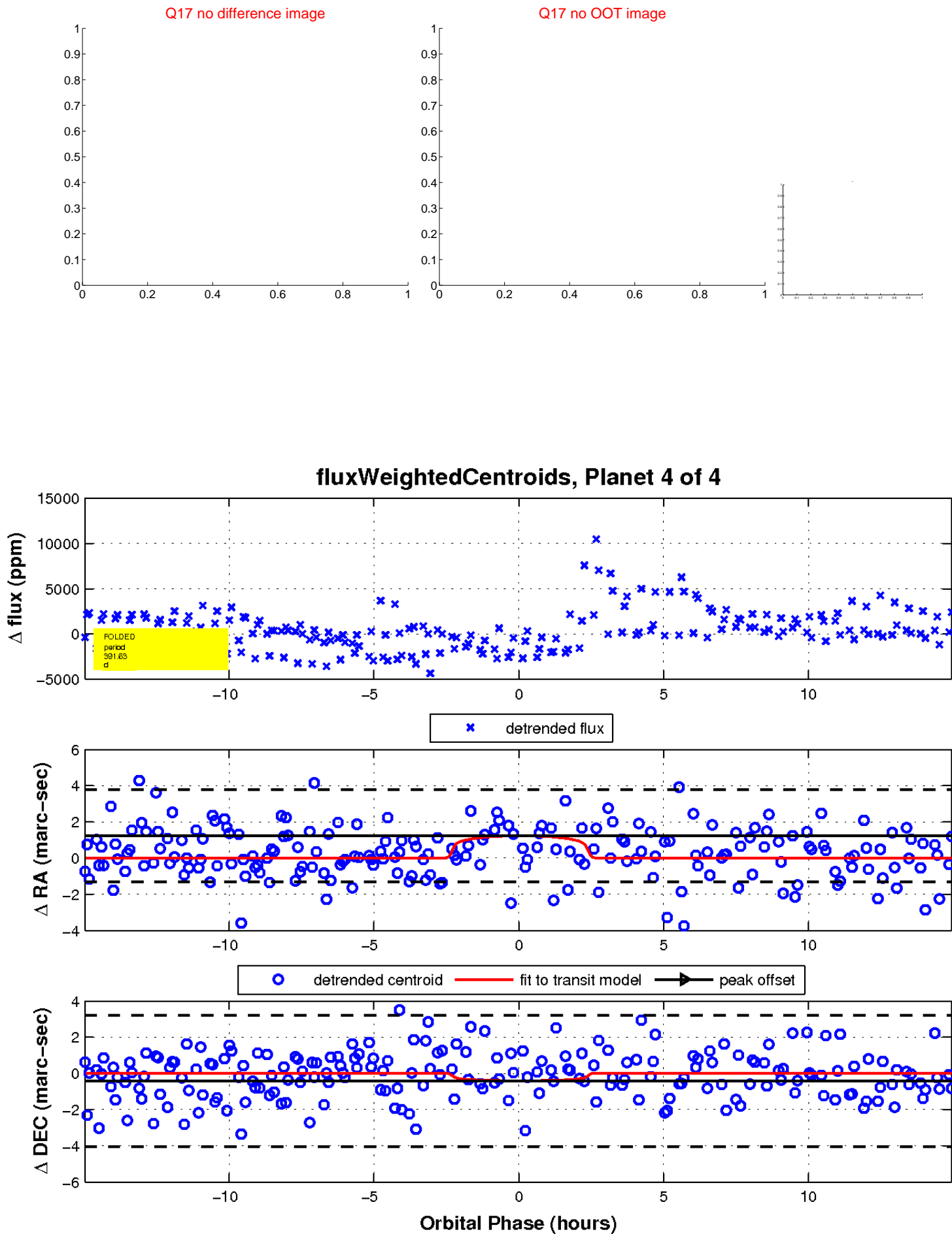
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

