

KIC 005437945

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})
005437945-01	OBS	3791.01	440.784976	139.352861	2590.5	21.793	79.5	99.4	1.39	6340	7.32	2.14
005437945-02	OBS	3791.02	220.129333	245.990846	1692.5	21.340	56.6	72.1	1.39	6340	5.77	5.41

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005437945-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT
005437945-02	OBS	PC	0.90	0	0	0	0	NO_COMMENT

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 005437945-01

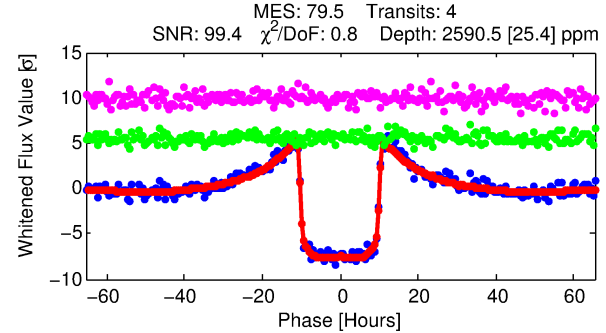
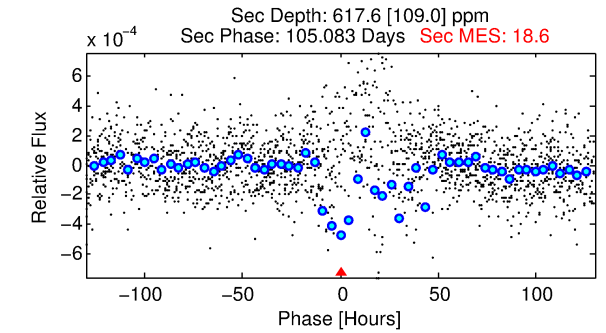
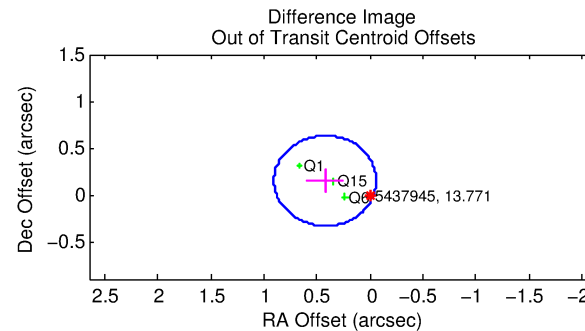
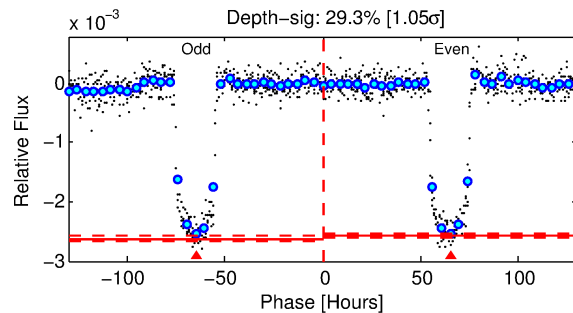
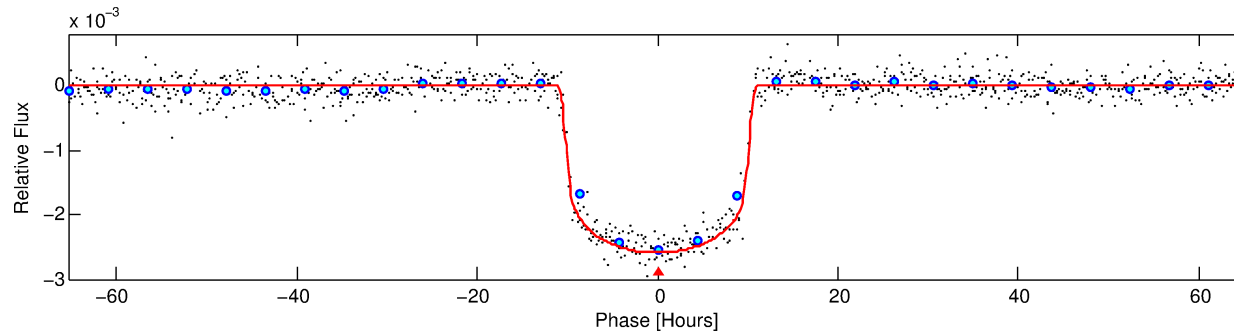
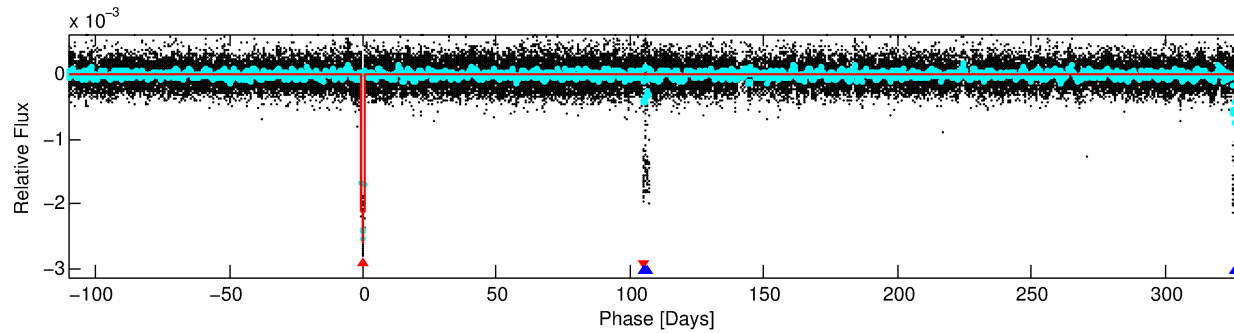
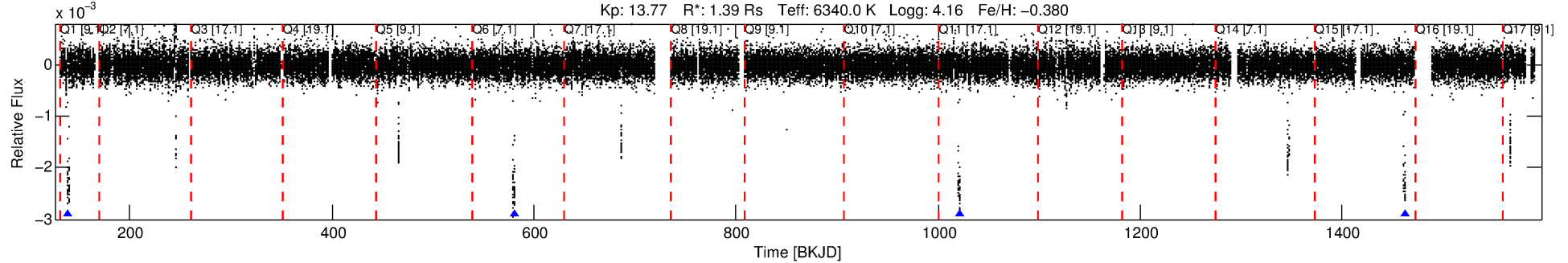
No Significant Match Found

DV One-Page Summary

KIC: 5437945 Candidate: 1 of 2 Period: 440.785 d

KOI: K03791.01 Corr: 0.988

Kp: 13.77 R*: 1.39 Rs Teff: 6340.0 K Logg: 4.16 Fe/H: -0.380



DV Fit Results:

Period = 440.78498 [0.00099] d
Epoch = 139.3529 [0.0020] BKJD
Rp/R* = 0.0482 [0.0006]
a/R* = 141.73 [7.26]
b = 0.51 [0.08]
Seff = 2.14 [0.94]
Teq = 309 [34] K
Rp = 7.32 [2.03] Re
a = 1.1450 [0.3021] AU
Ag = 8307.94 [3790.94] [2.19σ]
Teff = 4554 [252] K [16.69σ]

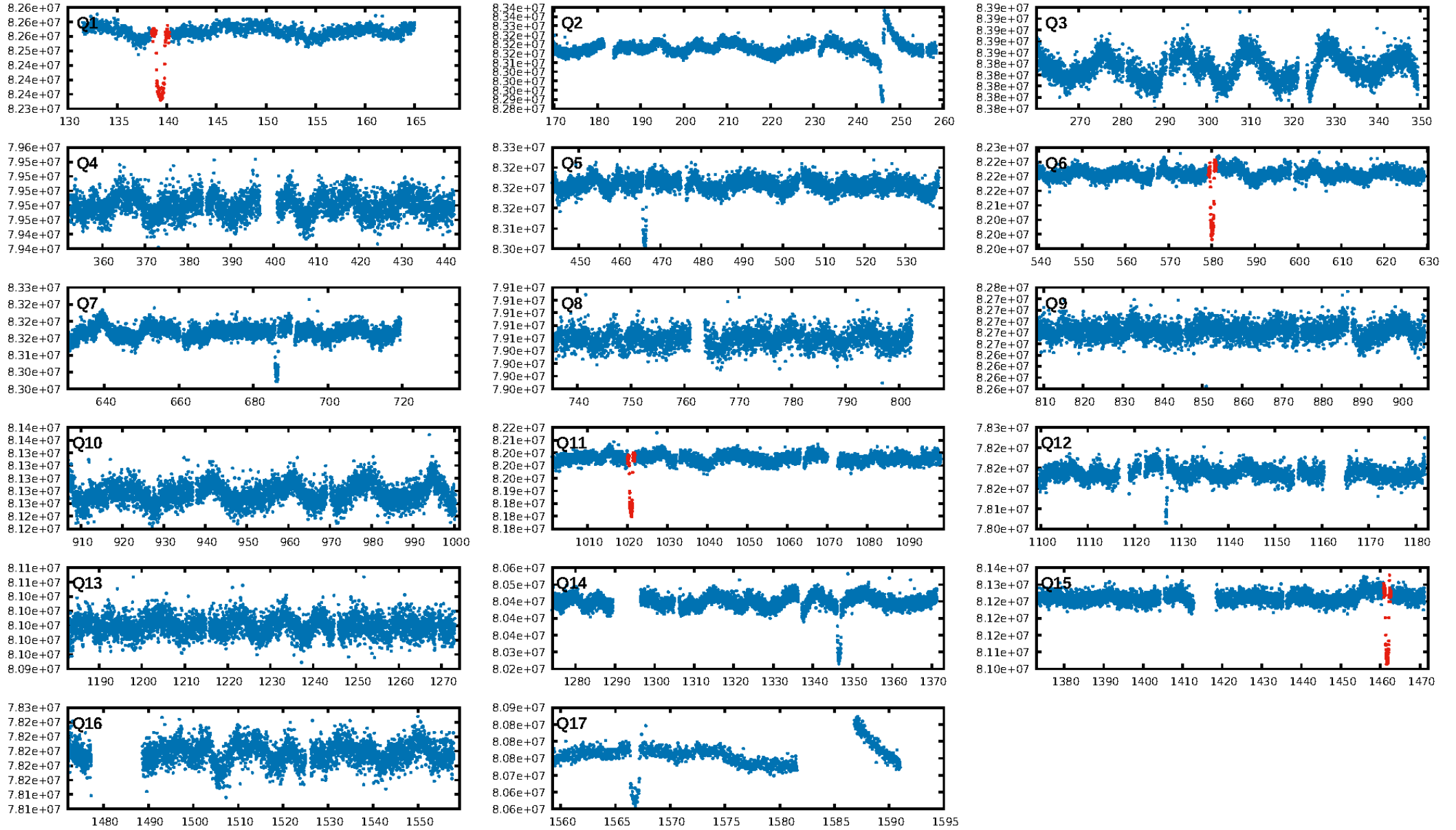
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [173.63σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 28.5%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 6.111
Centroid-sig: 0.0%
Centroid-so: 0.314 arcsec [4.88σ]
OotOffset-rm: 0.450 arcsec [2.80σ]
KicOffset-rm: 0.317 arcsec [1.60σ]
OotOffset-st: 1/1/0/1 [3]
KicOffset-st: 1/1/0/1 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

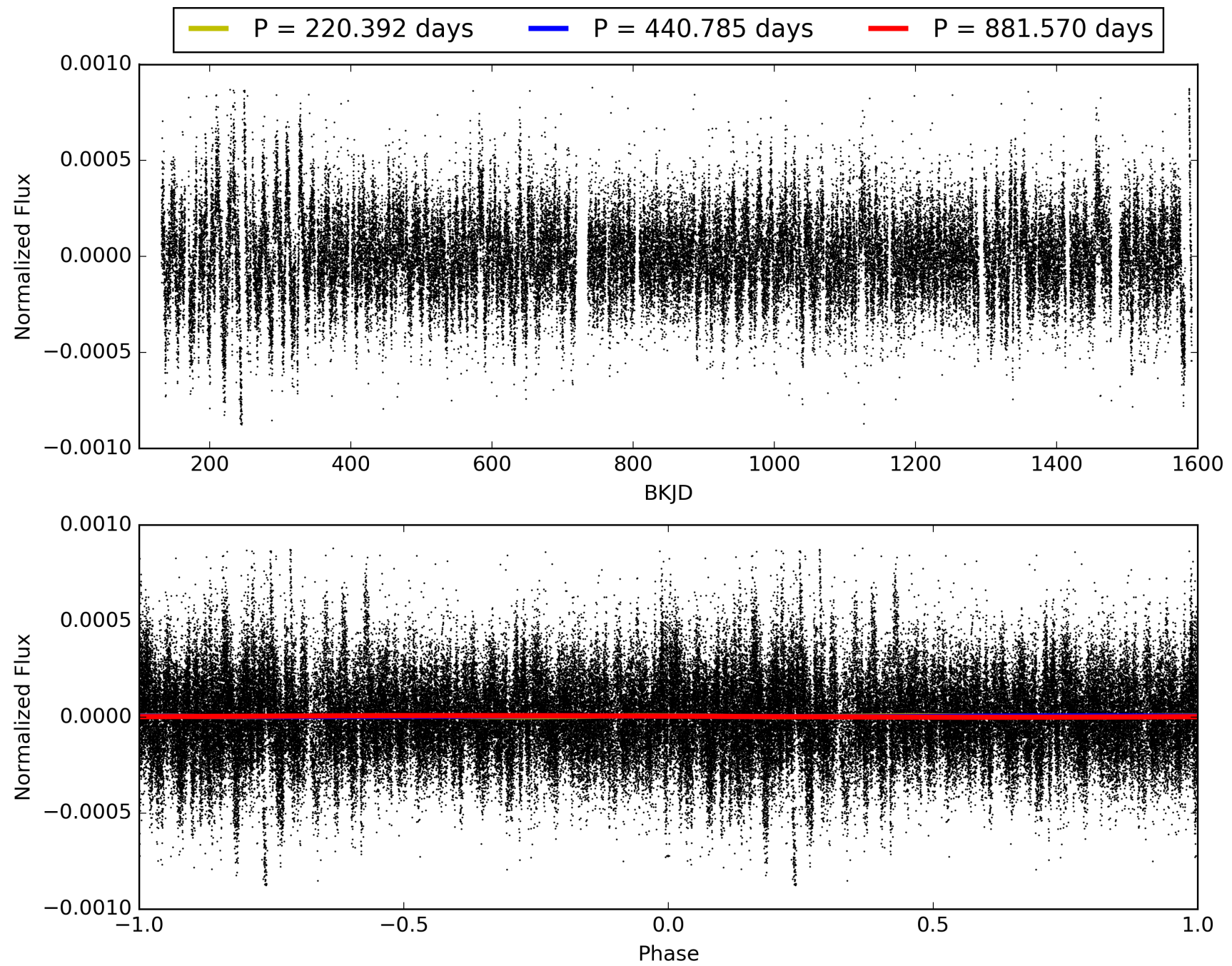
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:19:58 Z

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

TCE 005437945-01, PDC Light Curves

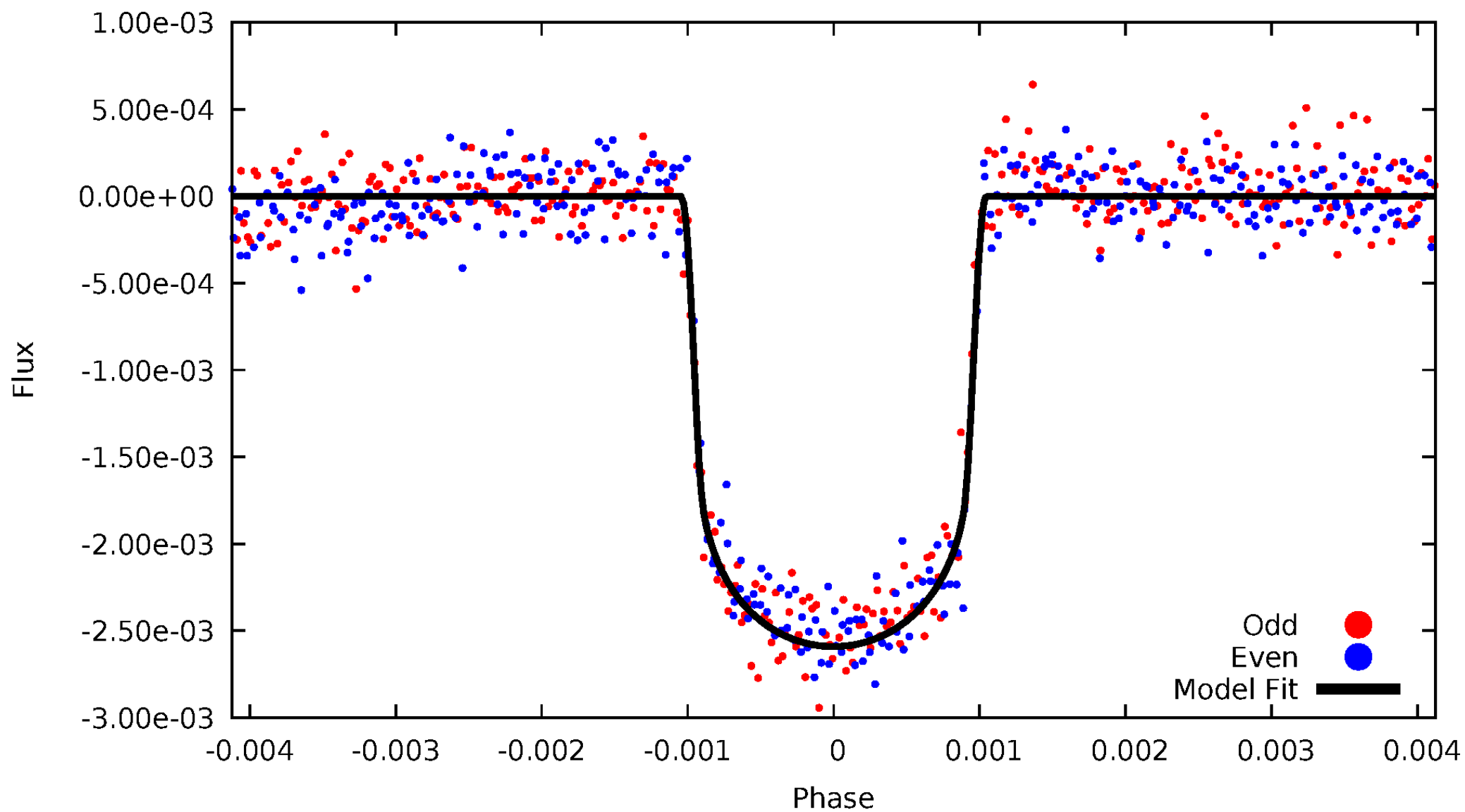


TCE 005437945-01



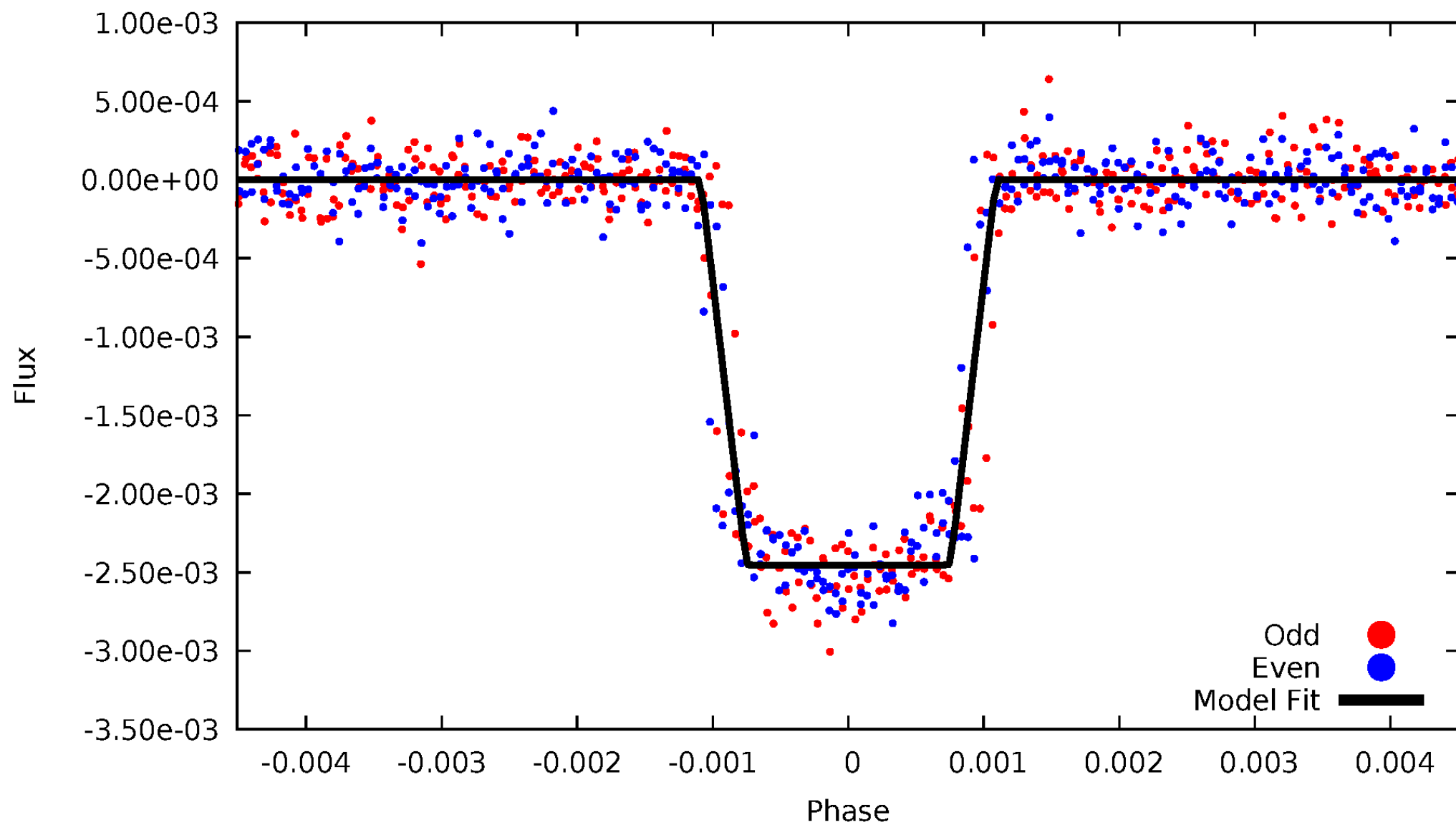
DV Odd/Even

TCE 005437945-01



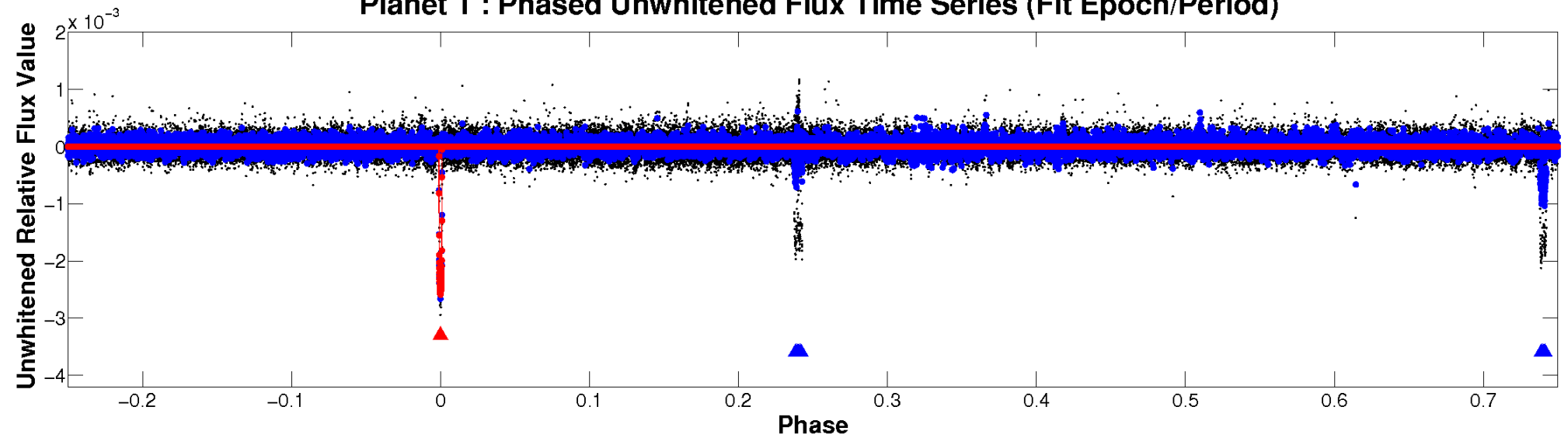
ALT Odd/Even

TCE 005437945-01

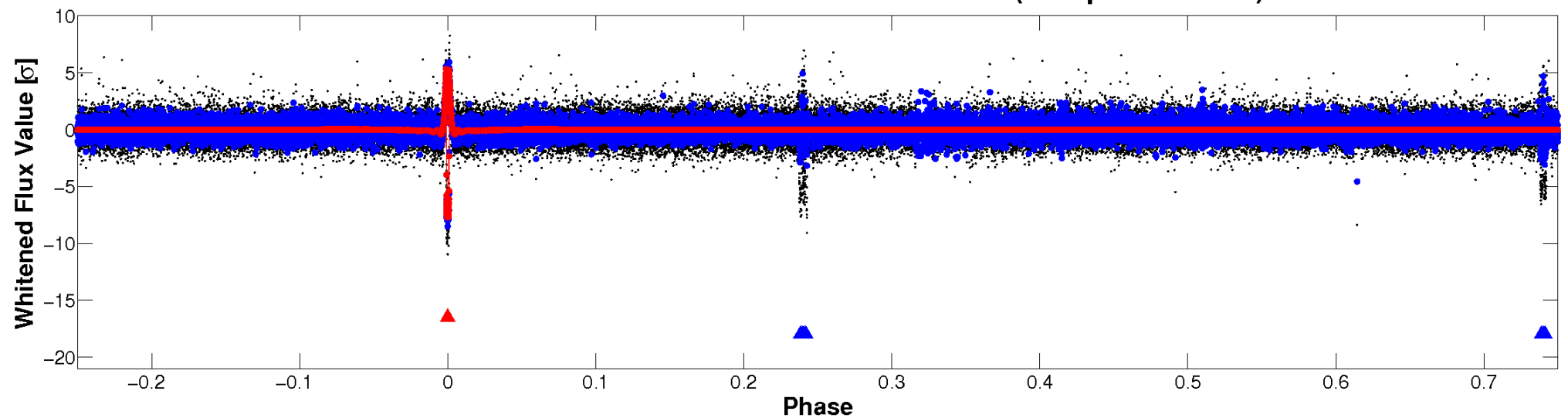


Non-Whitened Vs. Whitened Light Curve

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

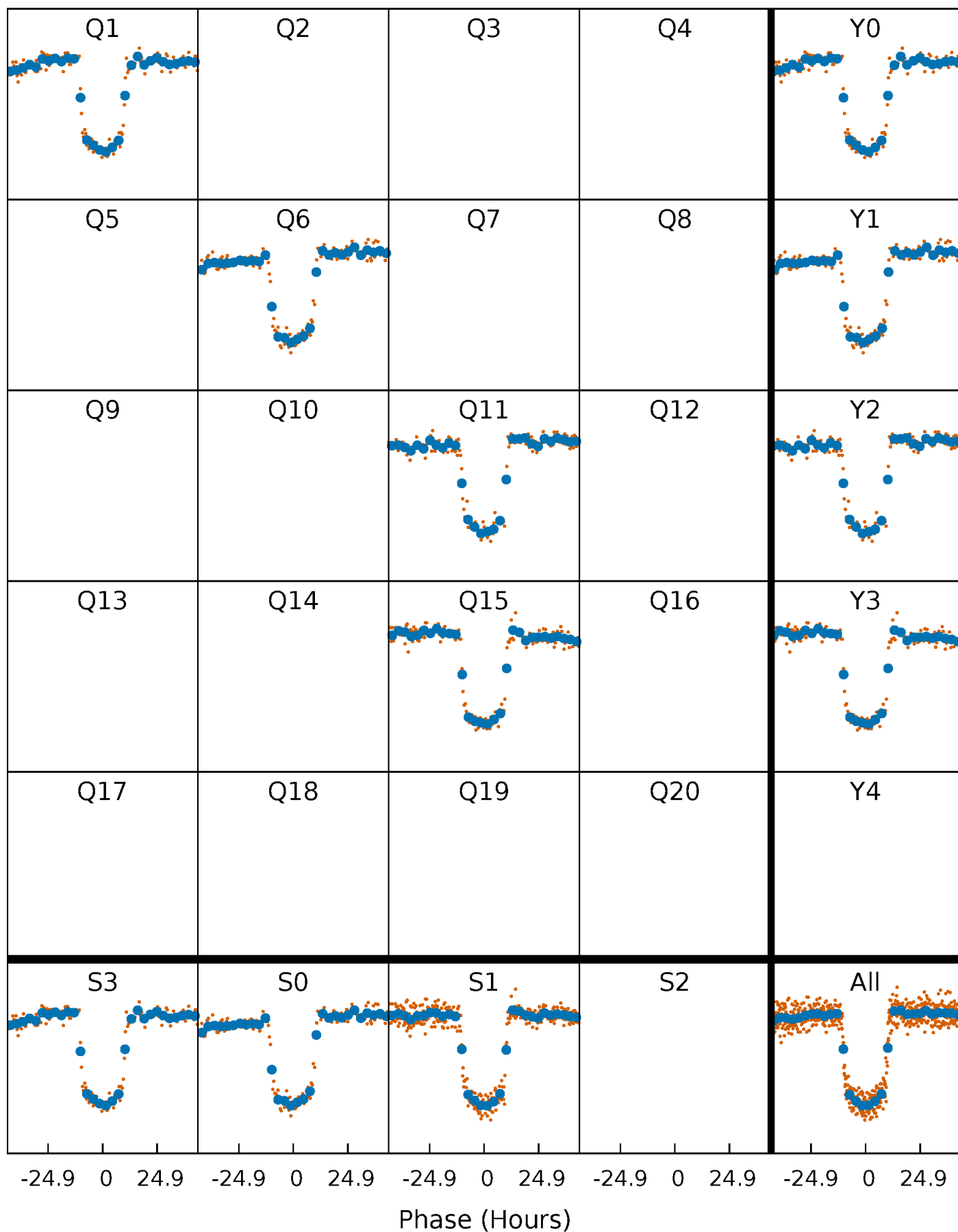


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



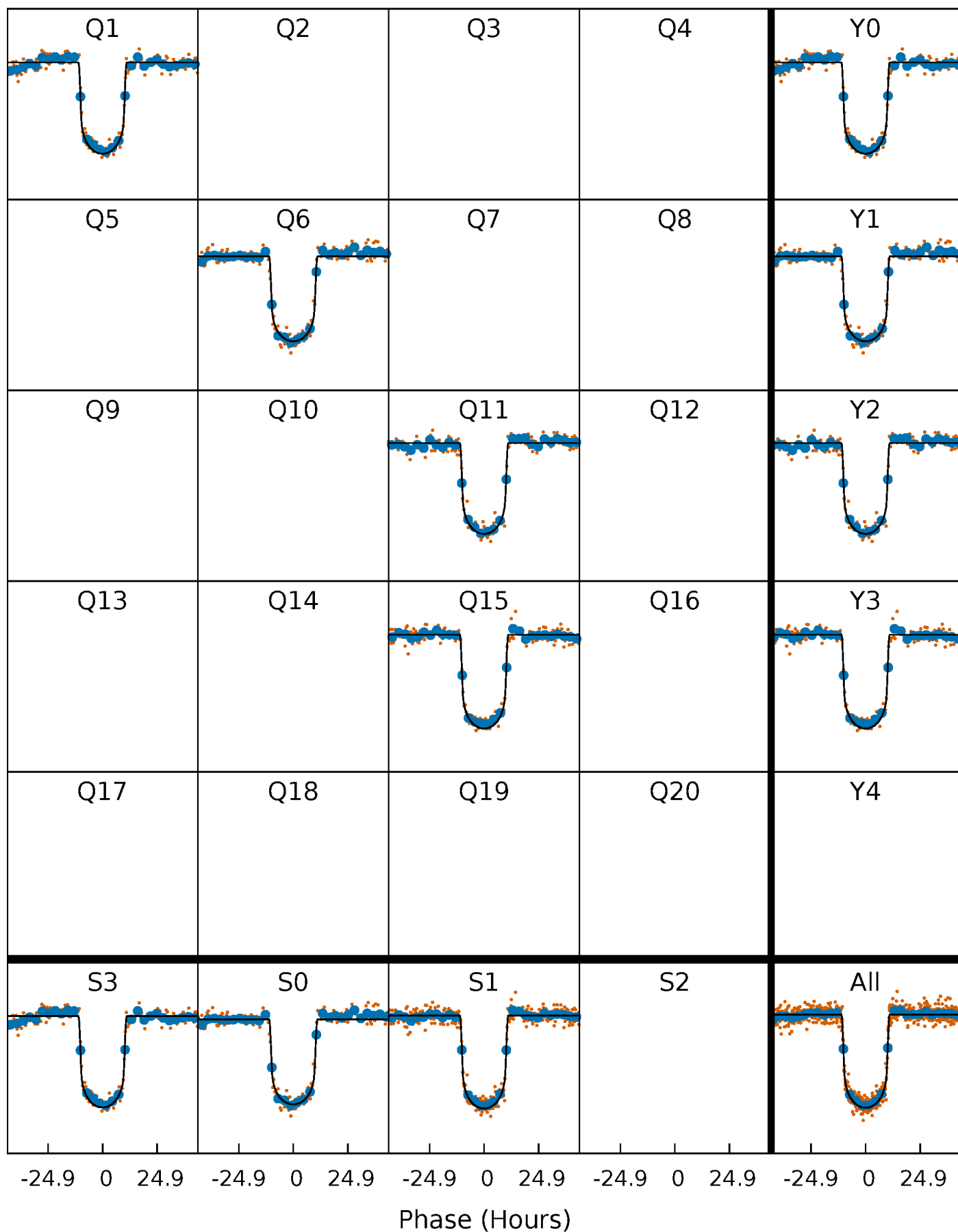
PDC Quarter-Phased Transit Curves

TCE 005437945-01 P=440.784976 Days $T_0=139.352861$ (BKJD)



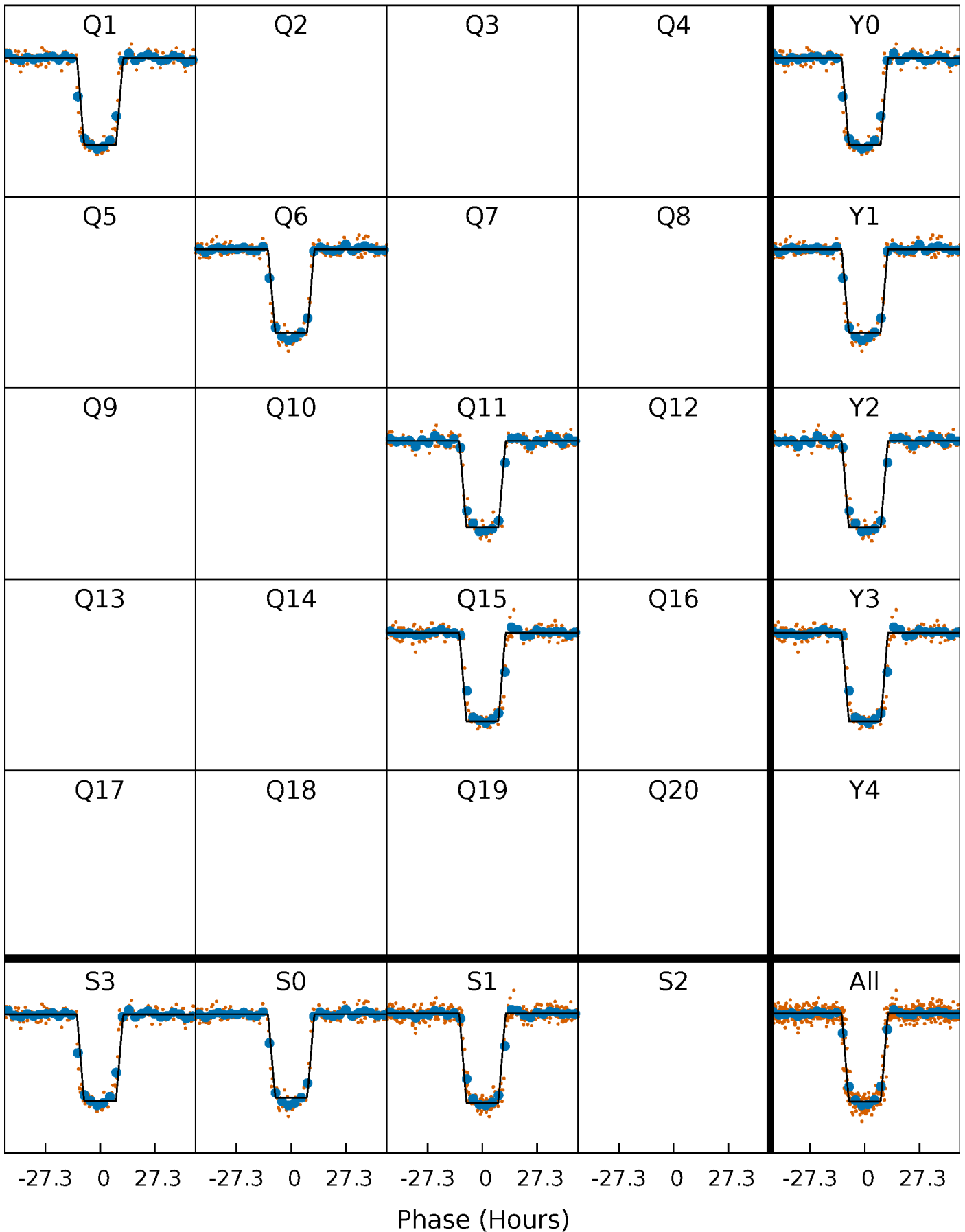
DV Quarter-Phased Transit Curves

TCE 005437945-01 P=440.784976 Days $T_0=139.352861$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

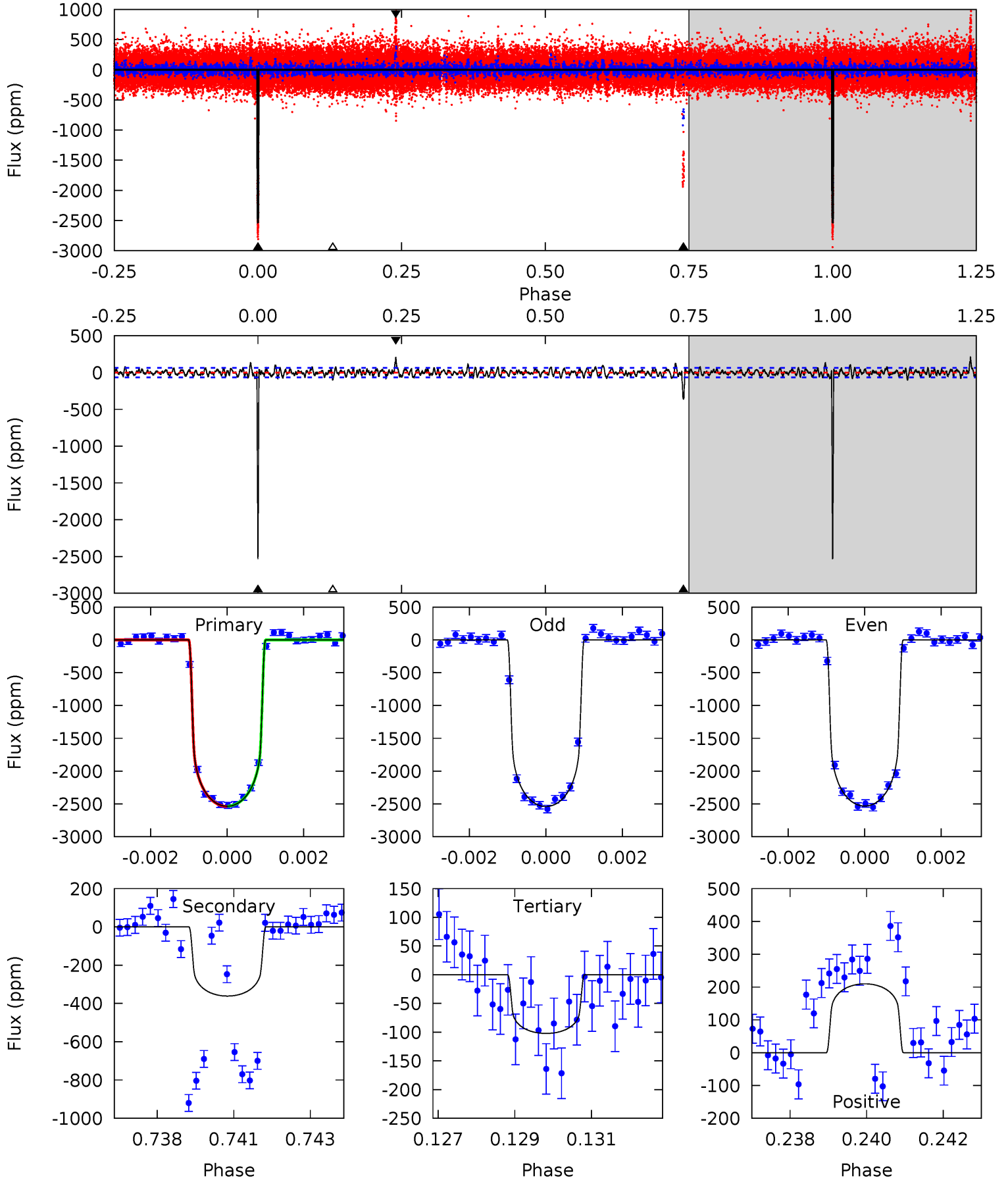
TCE 005437945-01 P=440.751889 Days $T_0=139.400783$ (BKJD)



DV Model-Shift Uniqueness Test

005437945-01, P = 440.784976 Days, E = 139.352861 Days

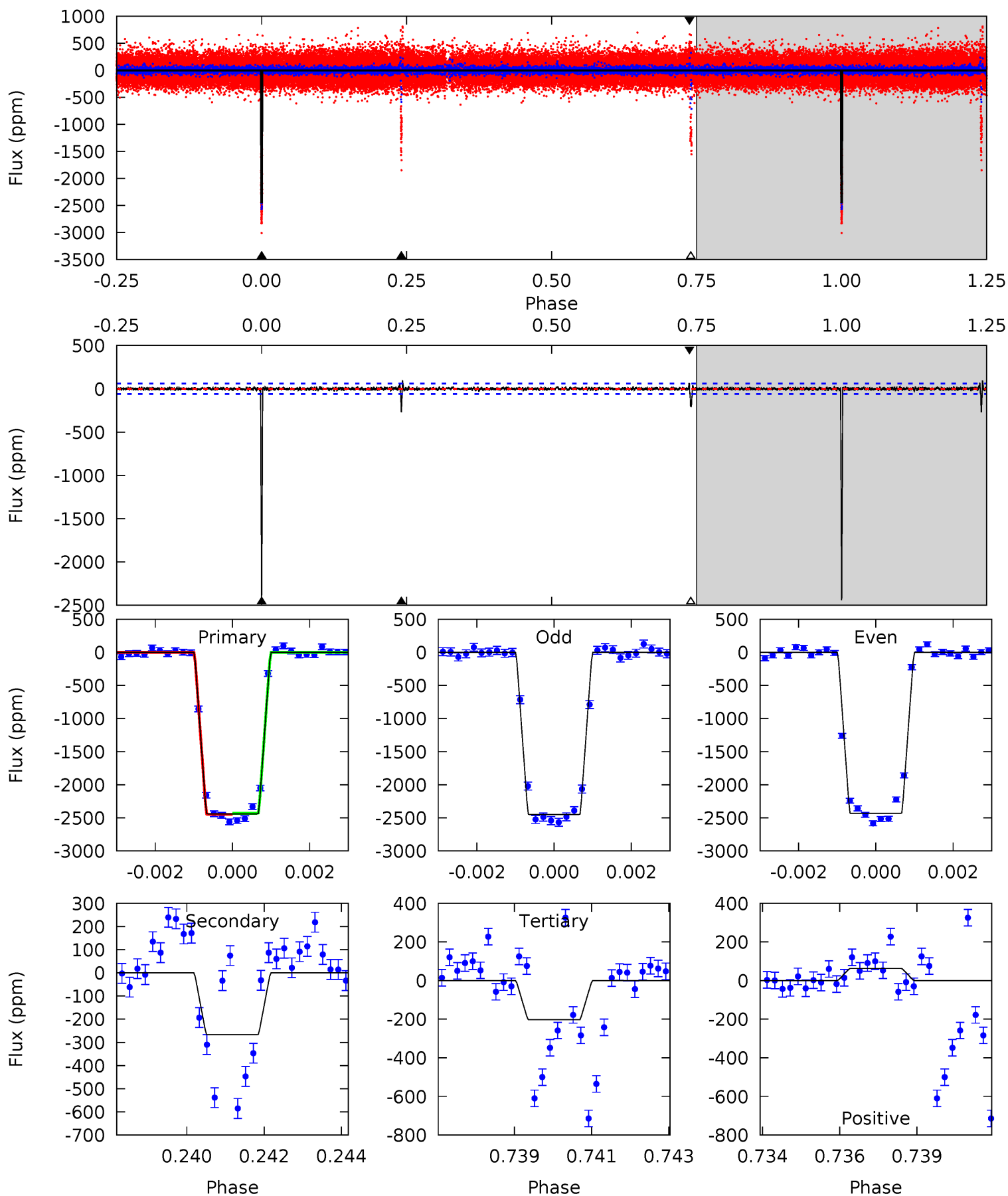
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
208.0	29.6	8.38	17.2	5.32	3.08	2.79	199.6	190.8	21.2	12.4	0.28	1.00	0.08	0.19



Alt Model-Shift Uniqueness Test

005437945-01, P = 440.751889 Days, E = 139.400783 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
211.8	23.1	17.6	5.43	5.31	3.06	0.98	194.2	206.3	5.54	17.7	0.71	1.00	0.04	0.71



Stellar Parameters For KIC 005437945

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6340^{+171}_{-209}	$4.163^{+0.246}_{-0.164}$	$-0.380^{+0.300}_{-0.300}$	$1.393^{+0.385}_{-0.385}$	$1.031^{+0.171}_{-0.128}$	$0.538^{+0.700}_{-0.247}$
	+3%/-3%	+6%/-4%	+79%/-79%	+28%/-28%	+17%/-12%	+130%/-46%
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 005437945-01 / KOI 3791.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-361 ± 12	$7.34^{+1.09}_{-1.22}$	428^{+33}_{-33}	4238^{+91}_{-105}	4925^{+1910}_{-1119}
Alt.	-267 ± 12	$7.52^{+1.34}_{-1.16}$	429^{+34}_{-37}	3963^{+85}_{-89}	3412^{+1344}_{-879}

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 $A_{obs} \gg 1.0$

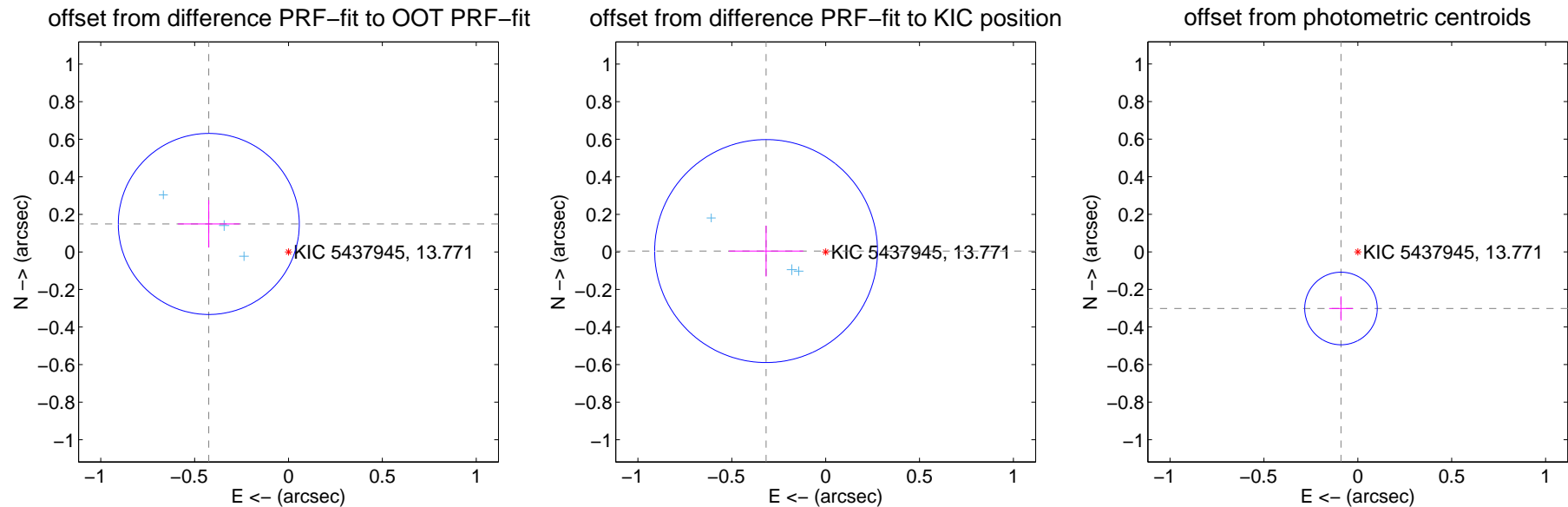
DV Centroid Data

Supplemental centroid analysis for 005437945-01. Kepler magnitude: 13.77. Transit SNR 99.45

There are 3 quarters with good PRF difference image offsets

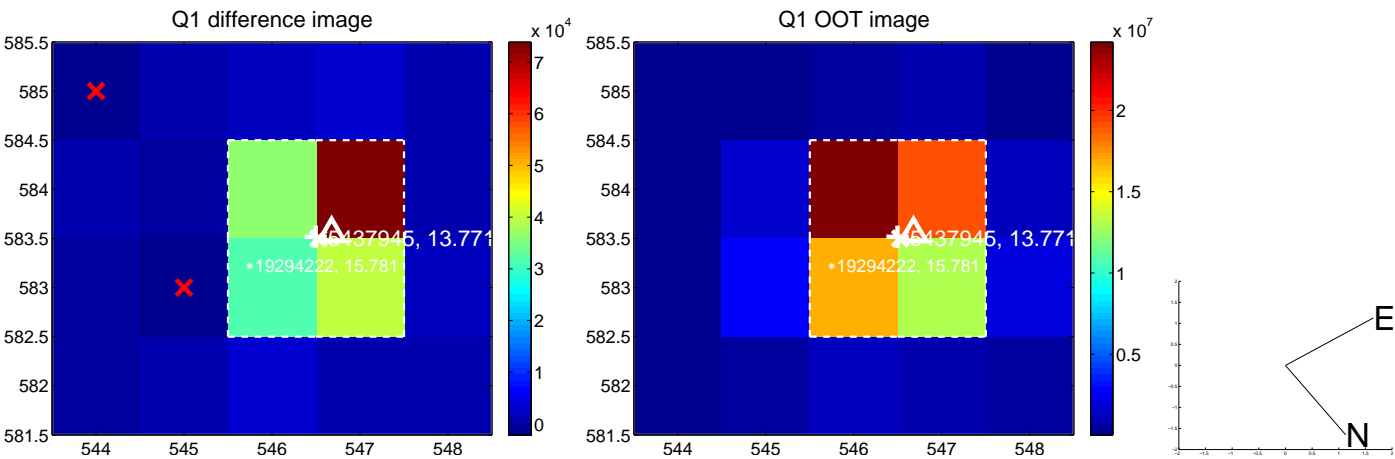
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.450 ± 0.161	2.80	0.424 ± 0.164	0.149 ± 0.126
PRF-fit source offset from KIC position	0.317 ± 0.198	1.60	0.317 ± 0.198	0.005 ± 0.135
photometric centroid source offset	0.31 ± 0.06	4.88	0.09 ± 0.06	-0.30 ± 0.06

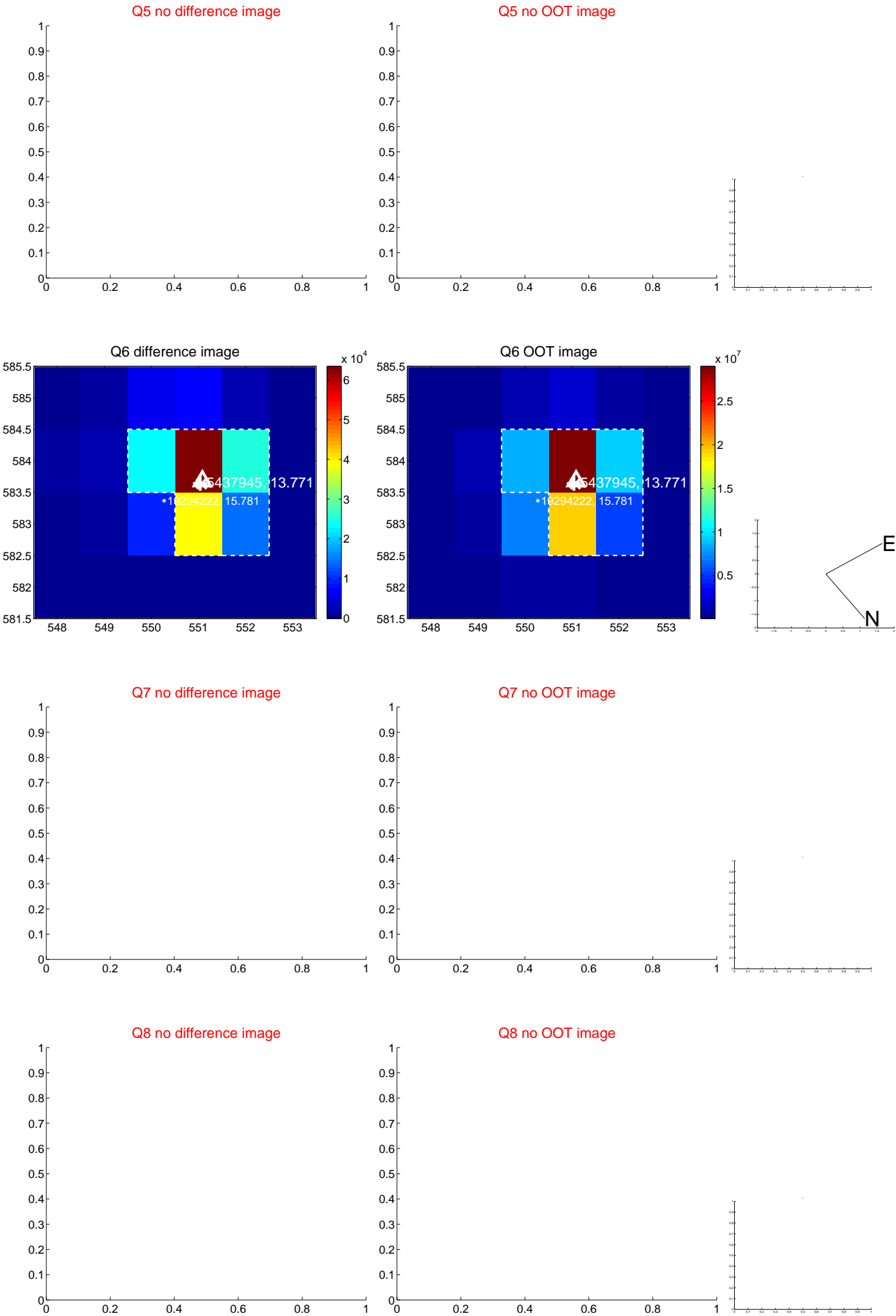


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

Q13 no difference image



Q13 no OOT image



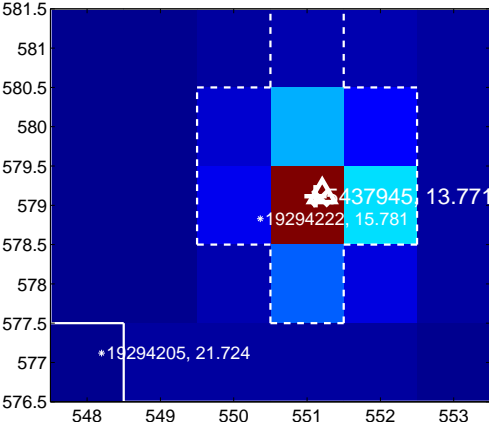
Q14 no difference image



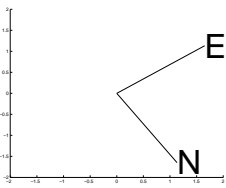
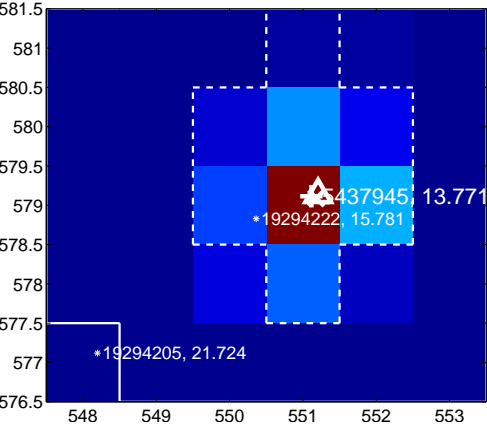
Q14 no OOT image



Q15 difference image



Q15 OOT image



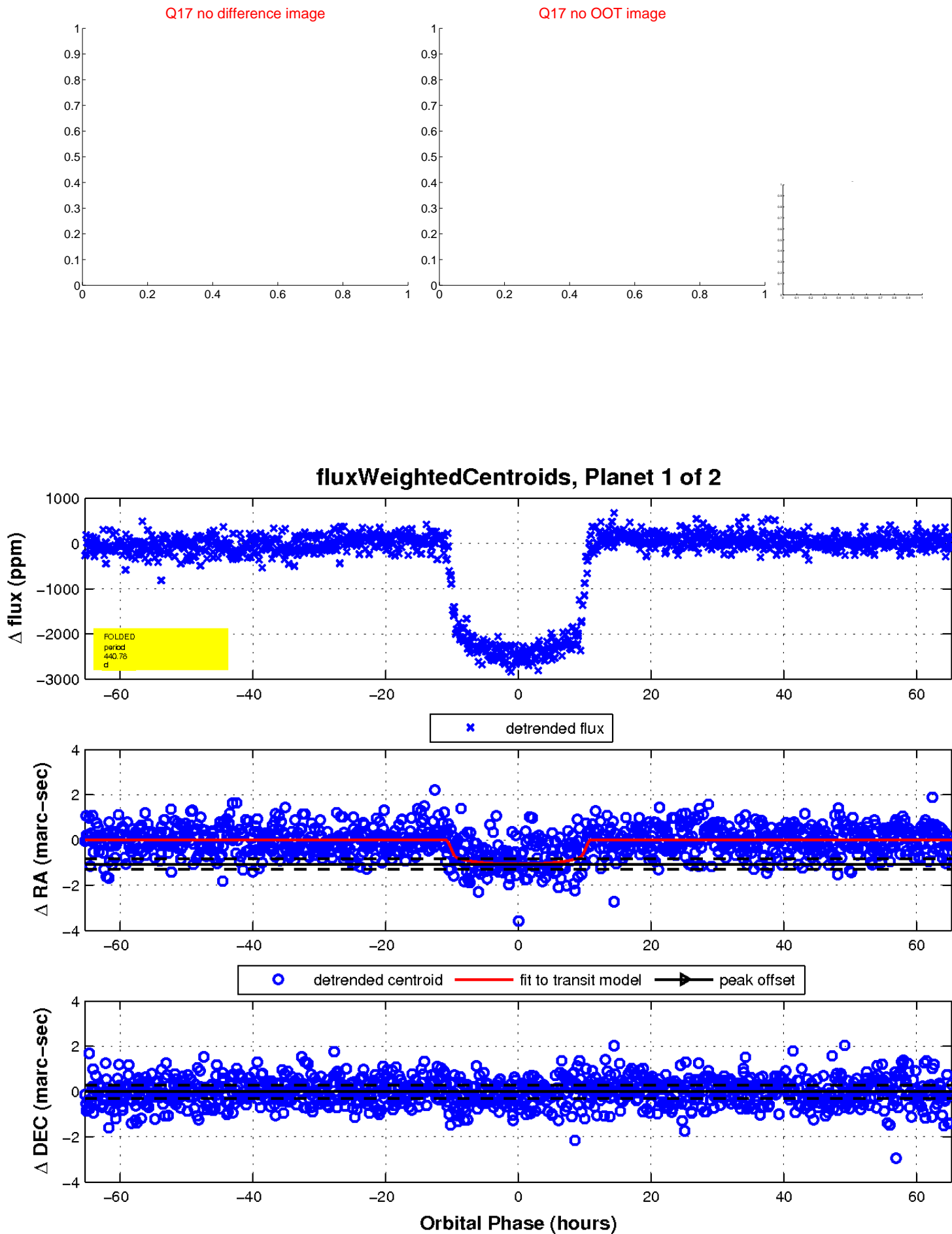
Q16 no difference image



Q16 no OOT image

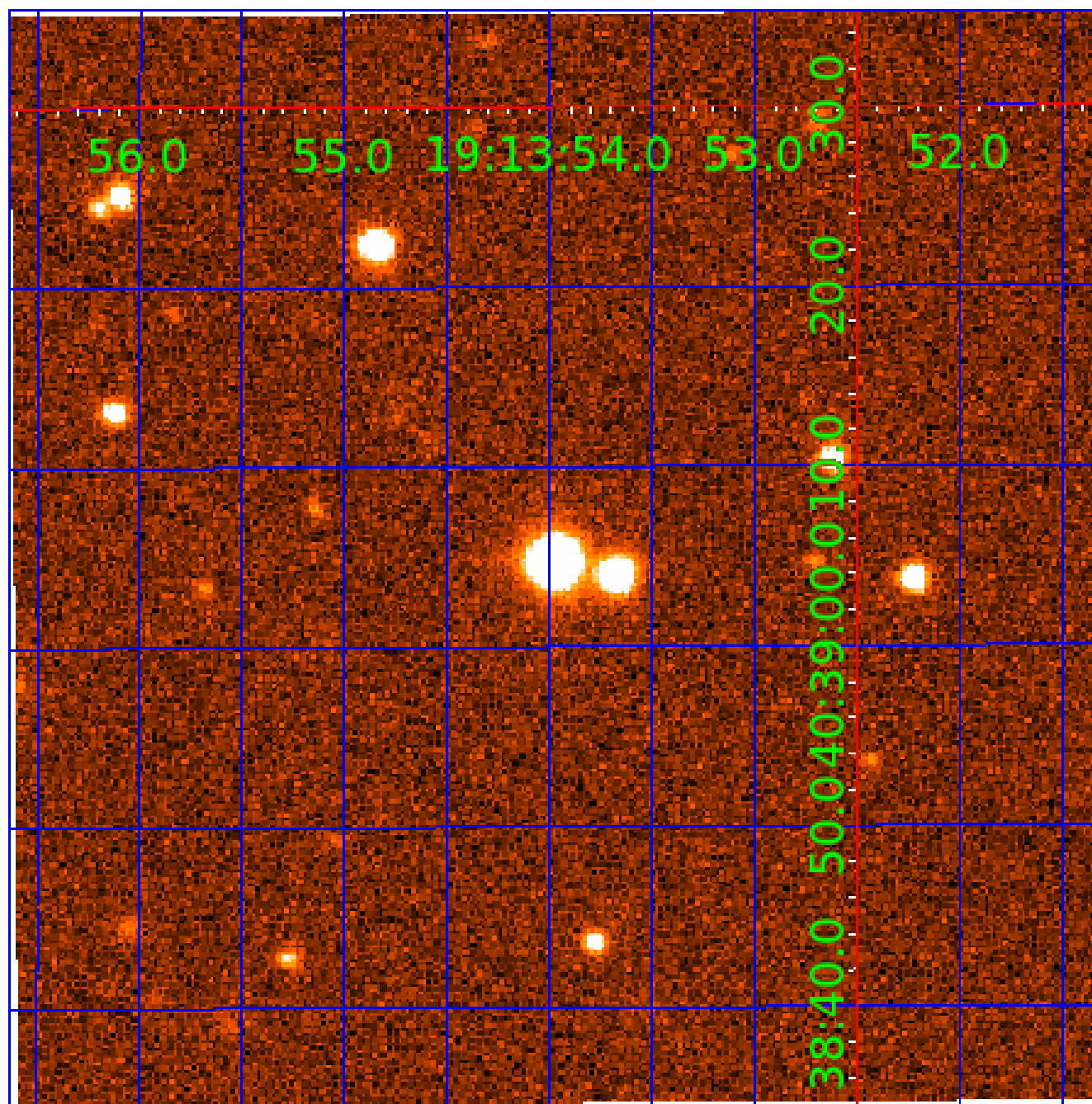


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 005437945

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})
005437945-01	OBS	3791.01	440.784976	139.352861	2590.5	21.793	79.5	99.4	1.39	6340	7.32	2.14
005437945-02	OBS	3791.02	220.129333	245.990846	1692.5	21.340	56.6	72.1	1.39	6340	5.77	5.41

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005437945-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT
005437945-02	OBS	PC	0.90	0	0	0	0	NO_COMMENT

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

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

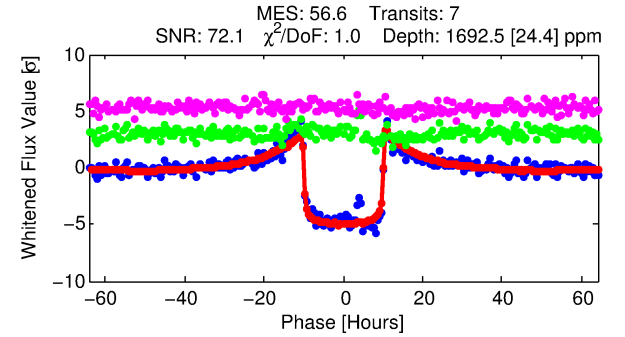
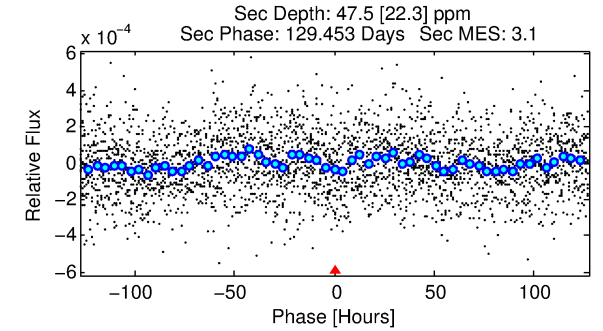
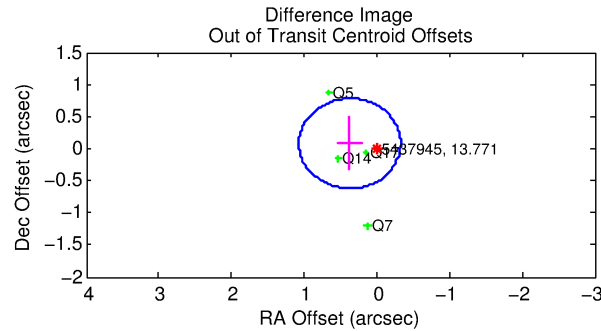
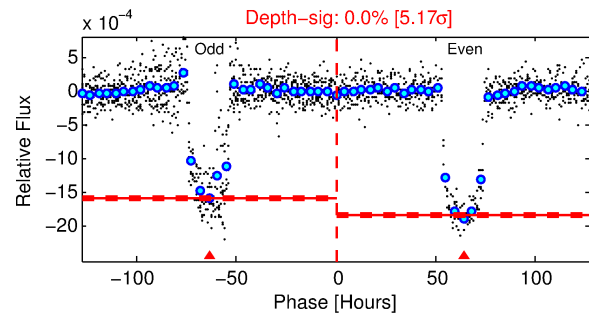
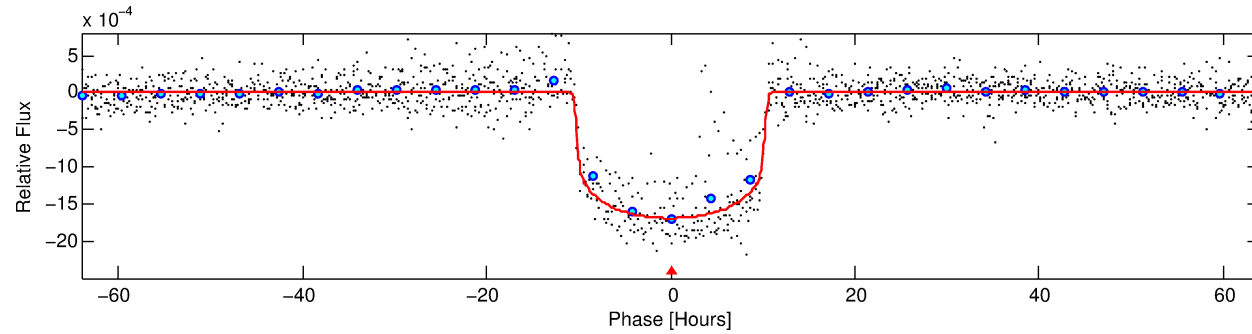
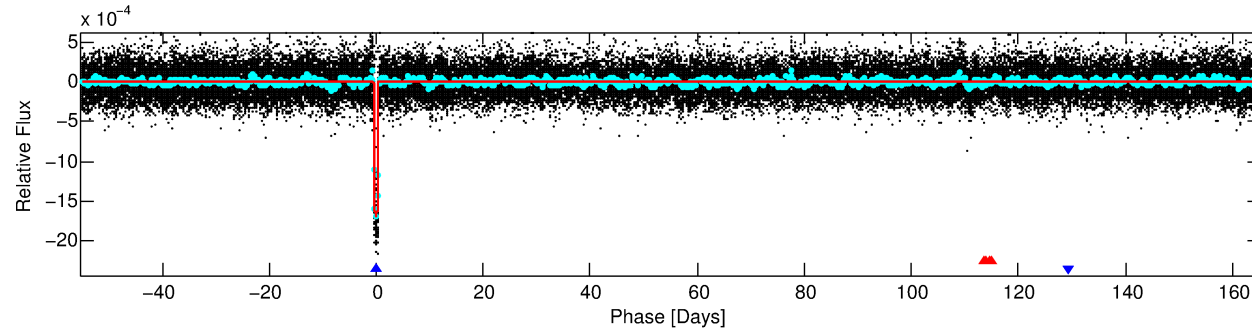
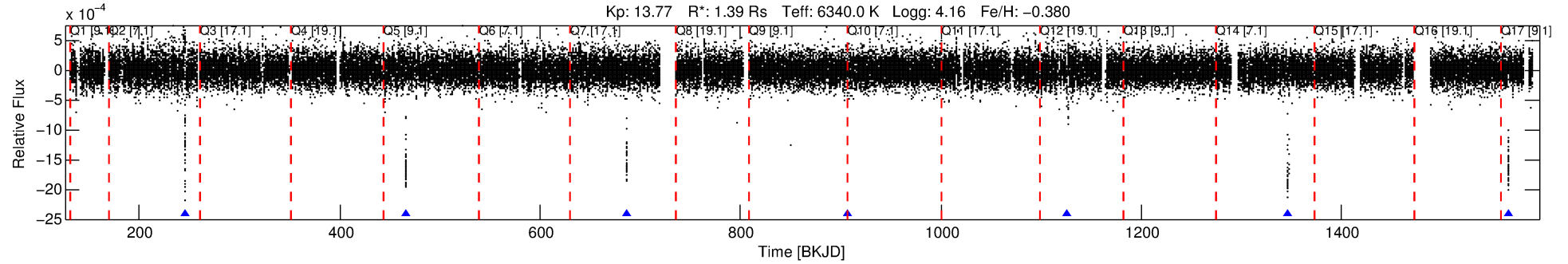
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005437945-02

No Significant Match Found

DV One-Page Summary

KIC: 5437945 Candidate: 2 of 2 Period: 220.129 d
KOI: K03791.02 Corr: 0.997



DV Fit Results:

Period = 220.12933 [0.00060] d
Epoch = 245.9908 [0.0023] BKJD
Rp/R* = 0.0379 [0.0010]
a/R* = 80.65 [10.48]
b = 0.17 [0.73]
Seff = 5.41 [2.38]
Teq = 389 [43] K
Rp = 5.77 [1.60] Re
a = 0.7207 [0.1901] AU
Ag = 408.22 [258.27] [1.58σ]
Teffp = 2702 [332] K [6.92σ]

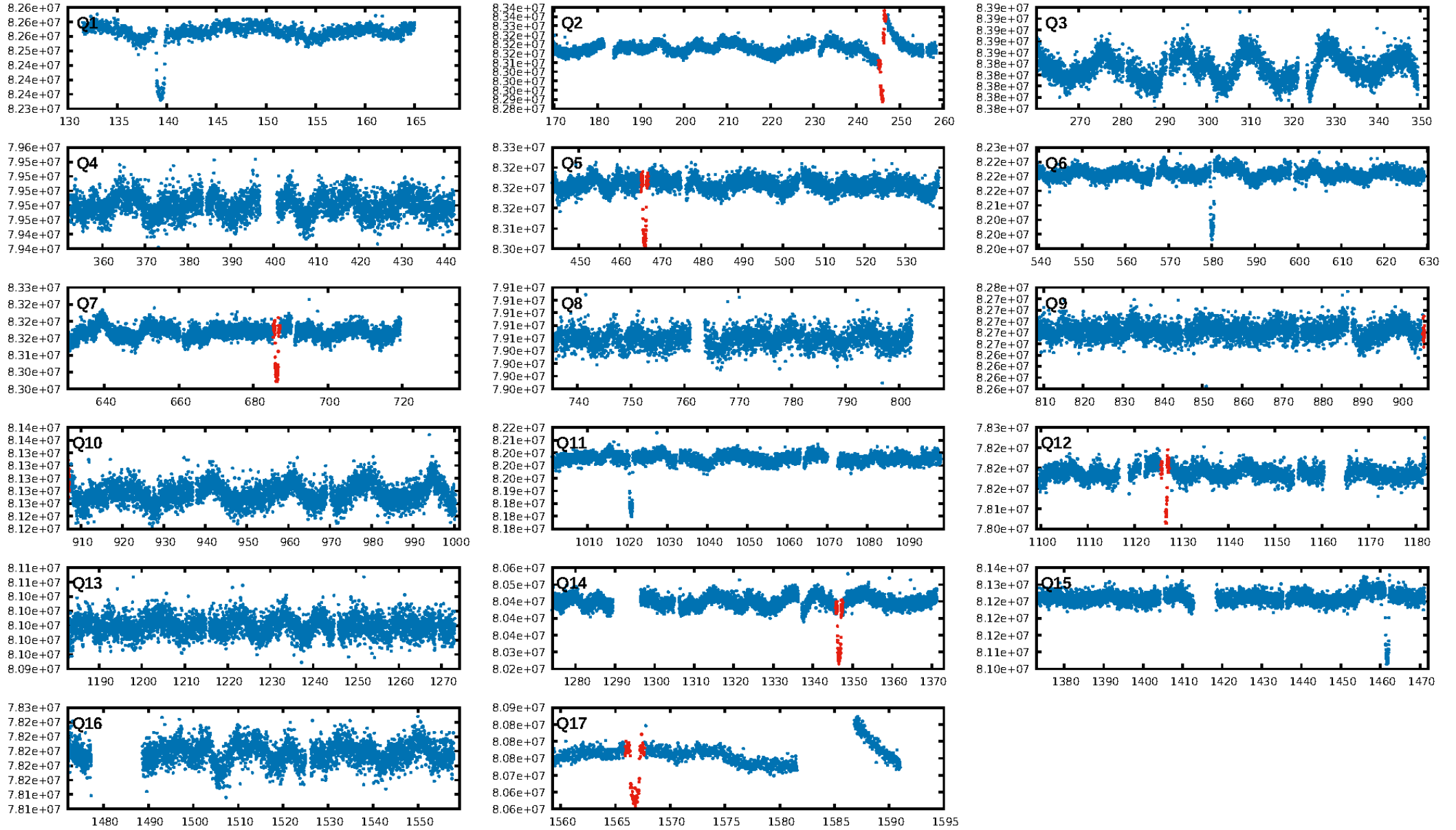
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [173.63σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [6/6]
GhostDiagnostic-chr: 5.302
Centroid-sig: 0.0%
Centroid-so: 0.293 arcsec [3.42σ]
OotOffset-rm: 0.382 arcsec [1.64σ]
KicOffset-rm: 0.280 arcsec [1.43σ]
OotOffset-st: 1/1/0/2 [4]
KicOffset-st: 1/1/0/2 [4]
DiffImageQuality-fgm: 1.00 [4/4]
DiffImageOverlap-fno: 1.00 [4/4]

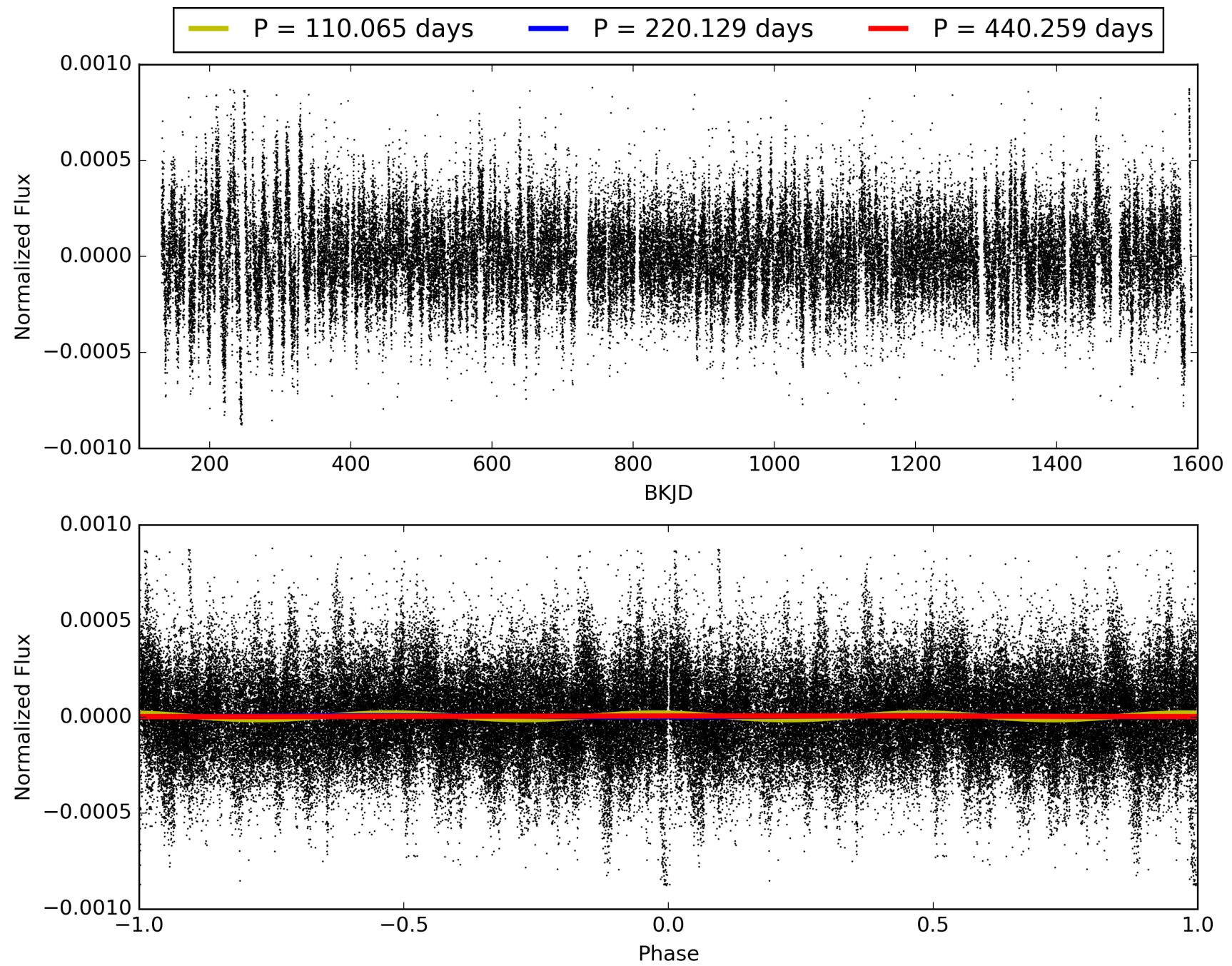
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:20:06 Z

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

TCE 005437945-02, PDC Light Curves

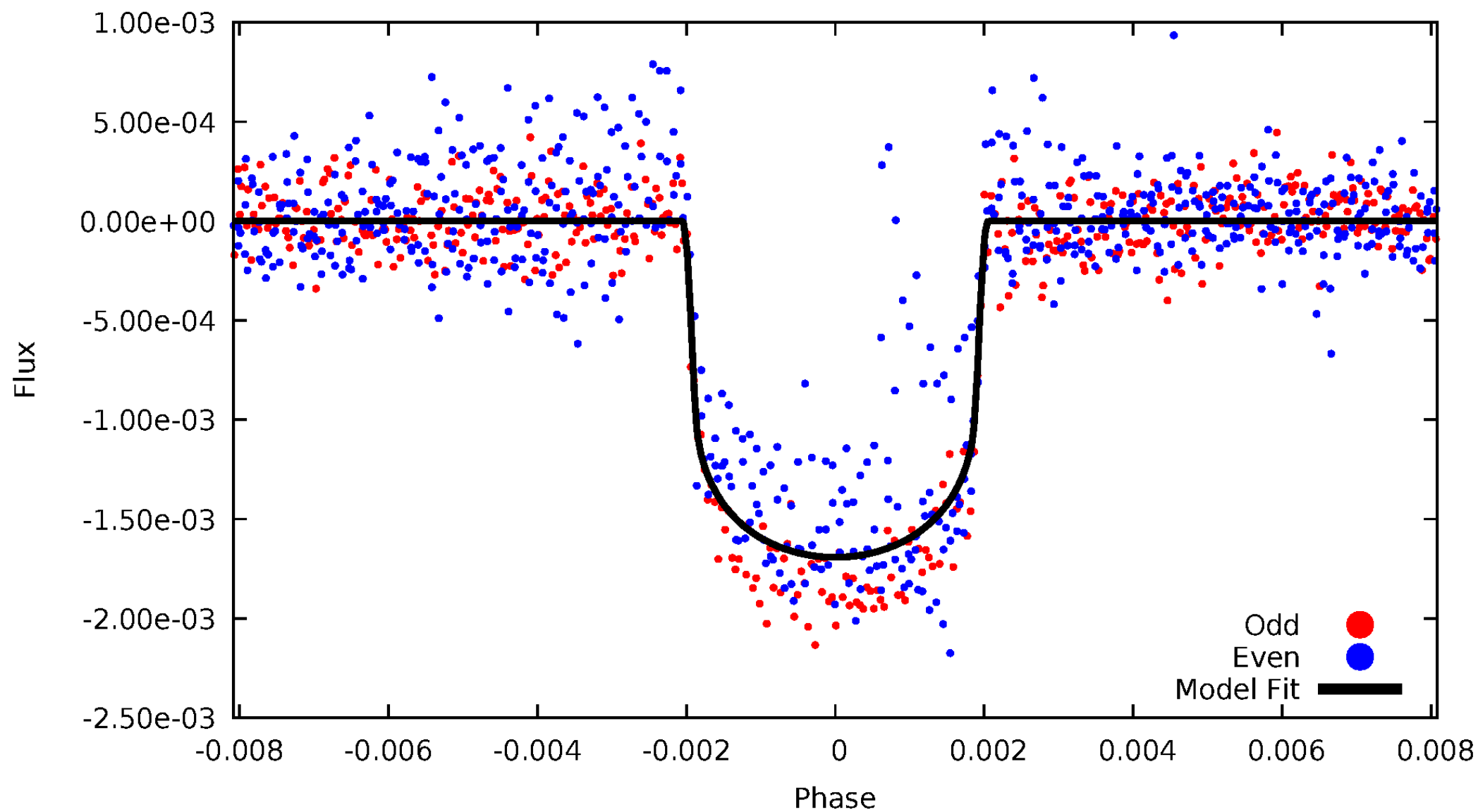


TCE 005437945-02



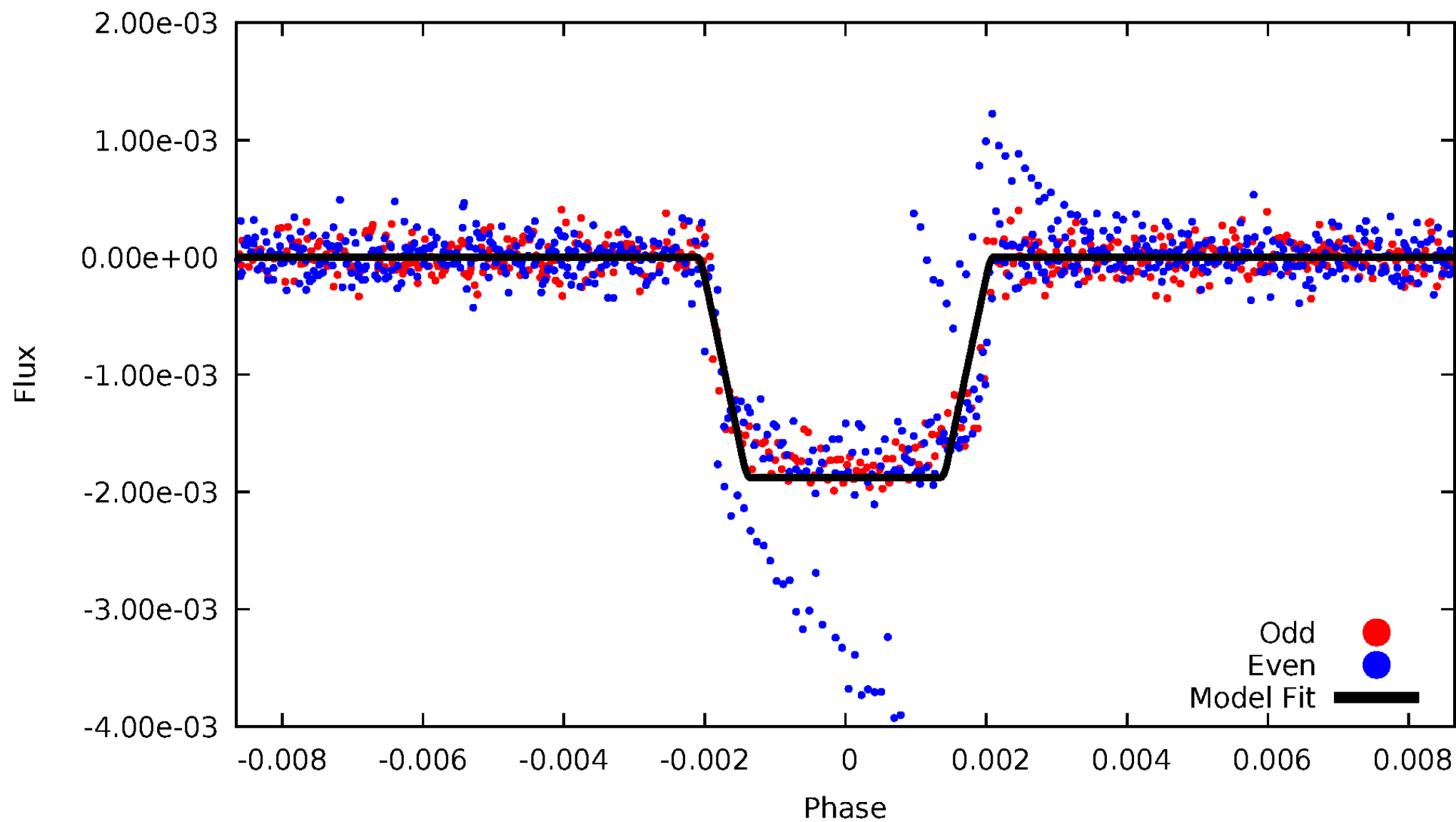
DV Odd/Even

TCE 005437945-02



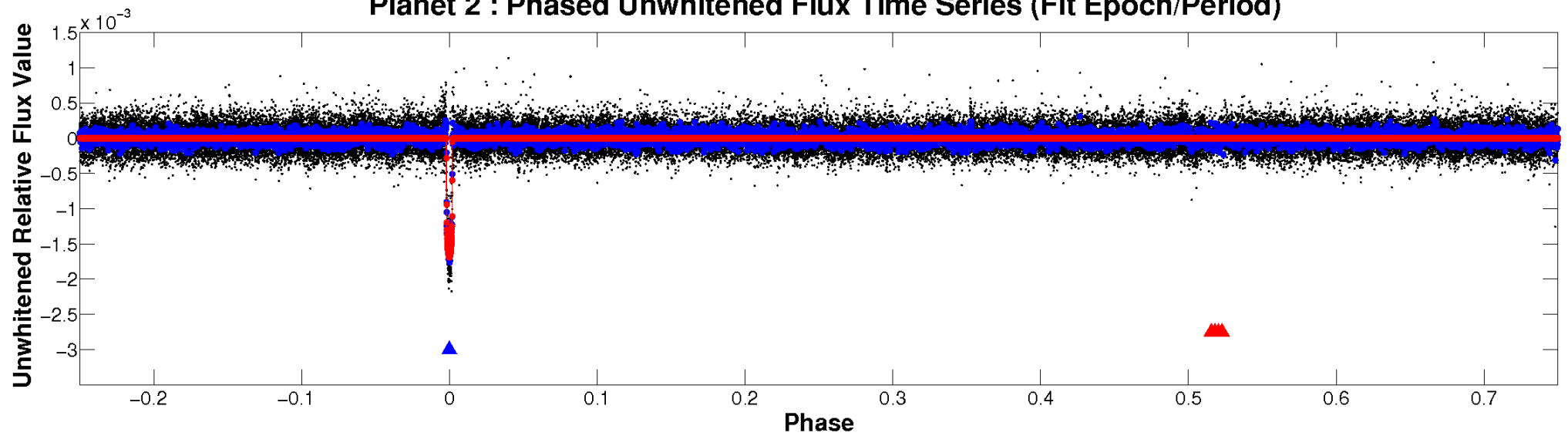
ALT Odd/Even

TCE 005437945-02

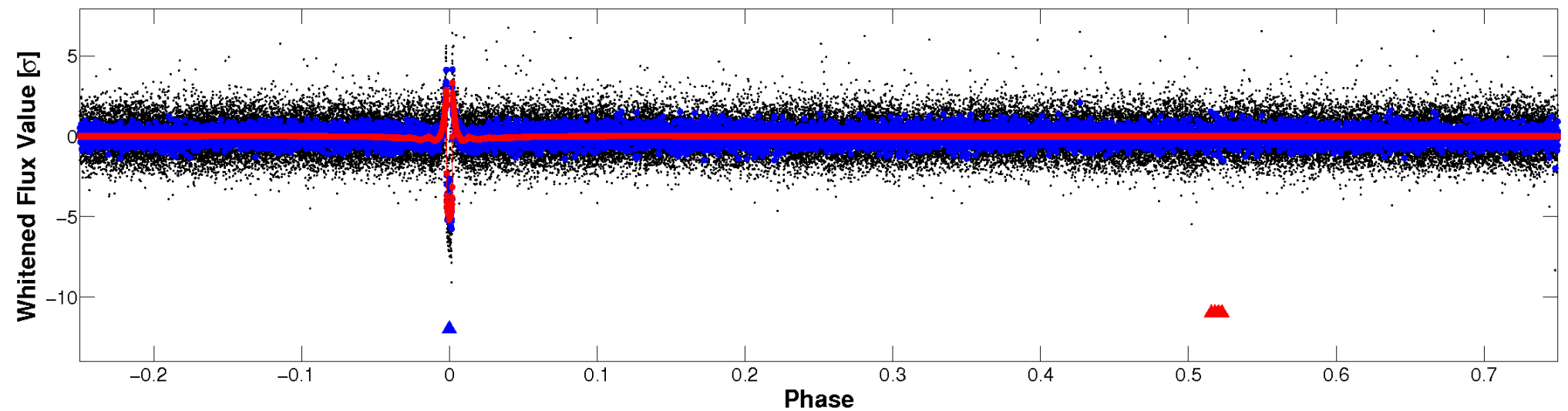


Non-Whitened Vs. Whitened Light Curve

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

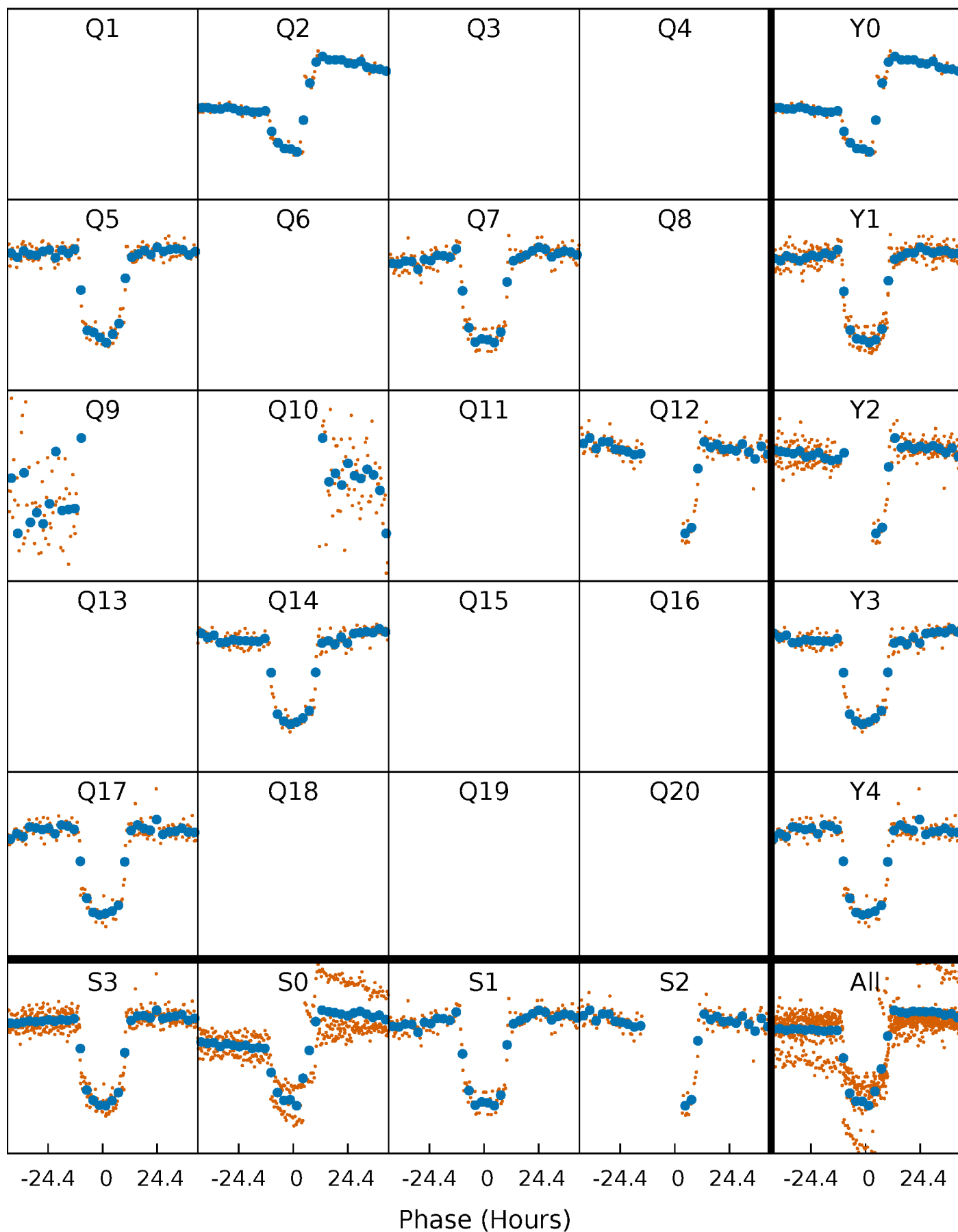


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



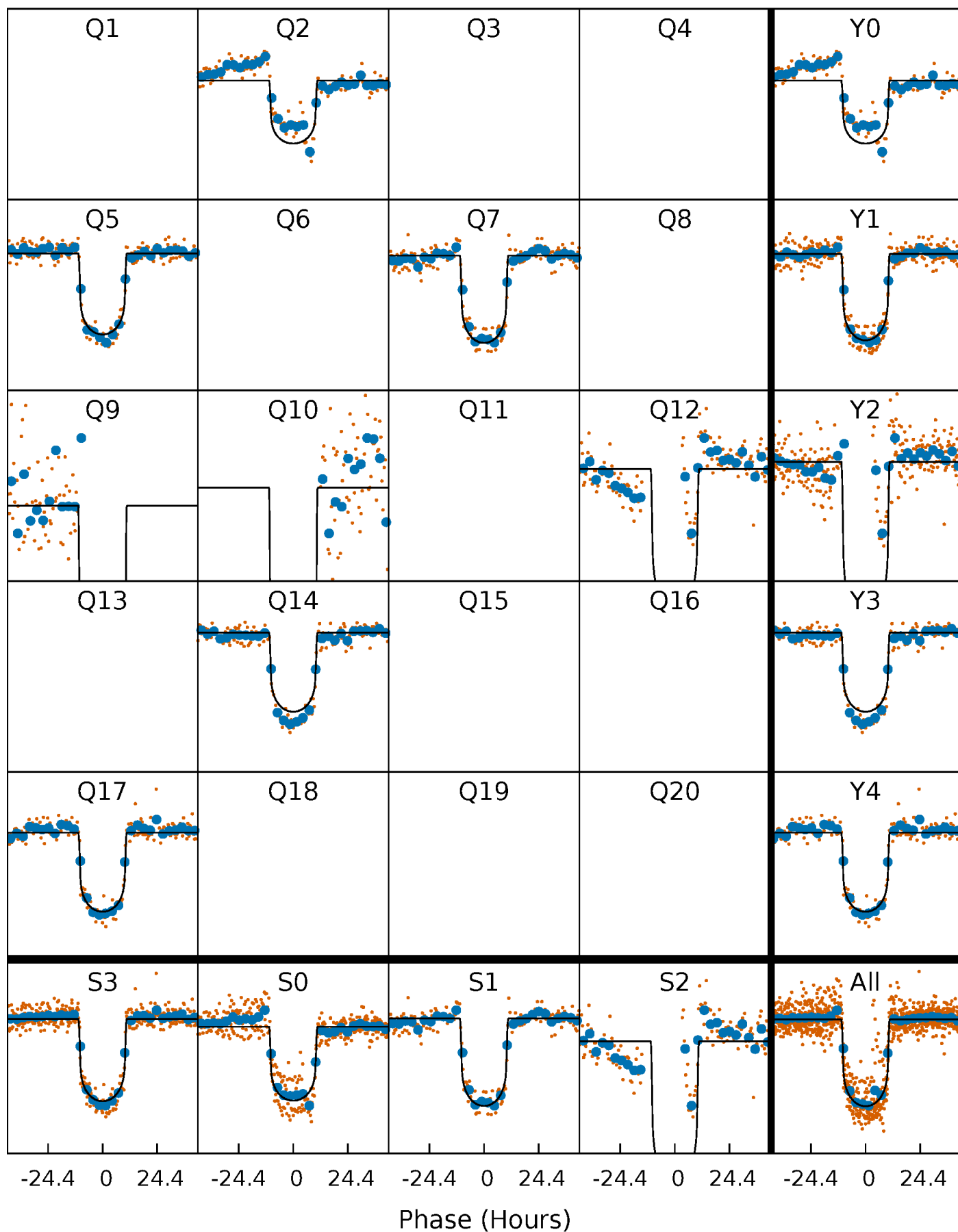
PDC Quarter-Phased Transit Curves

TCE 005437945-02 $P=220.129333$ Days $T_0=245.990846$ (BKJD)



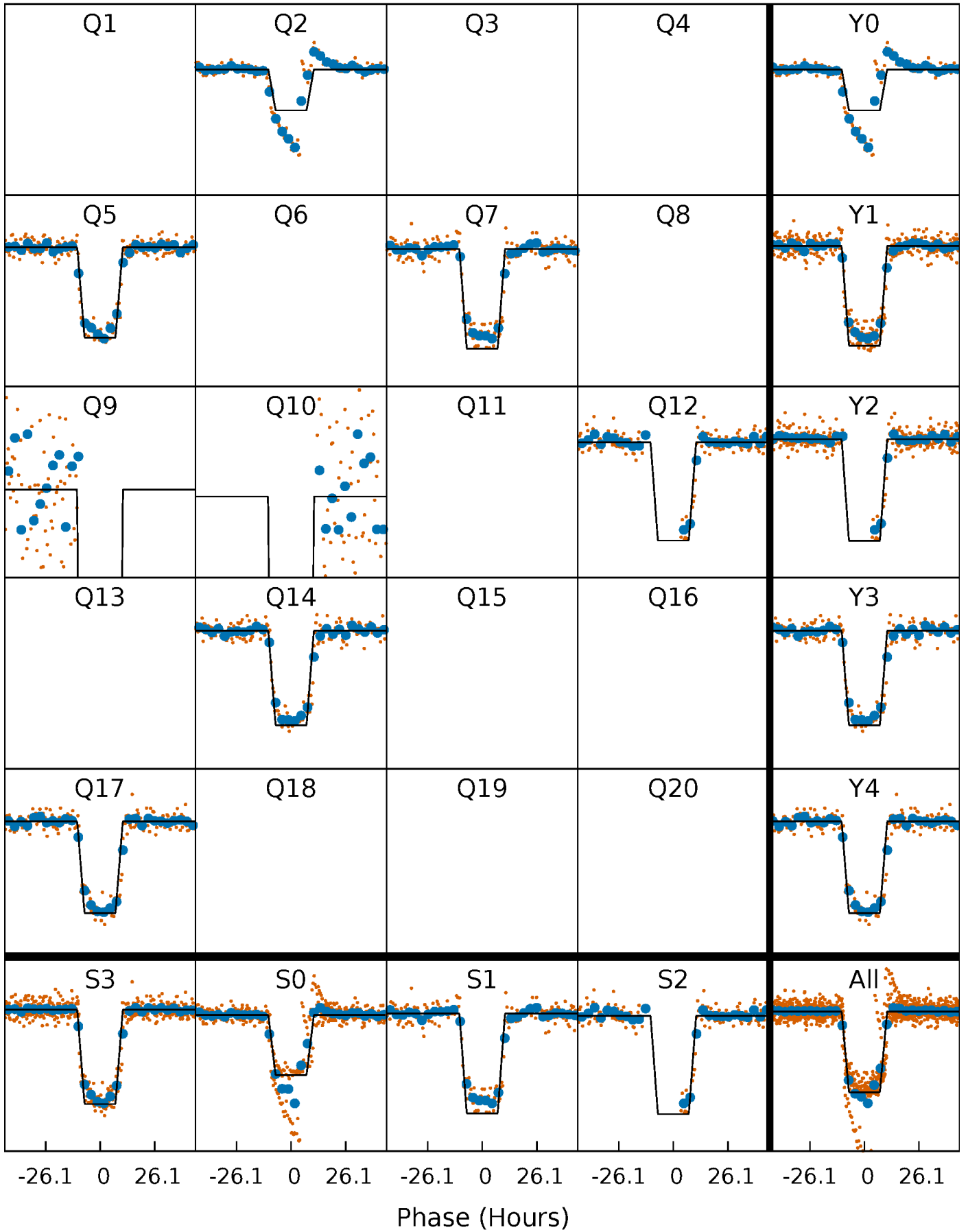
DV Quarter-Phased Transit Curves

TCE 005437945-02 P=220.129333 Days $T_0=245.990846$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

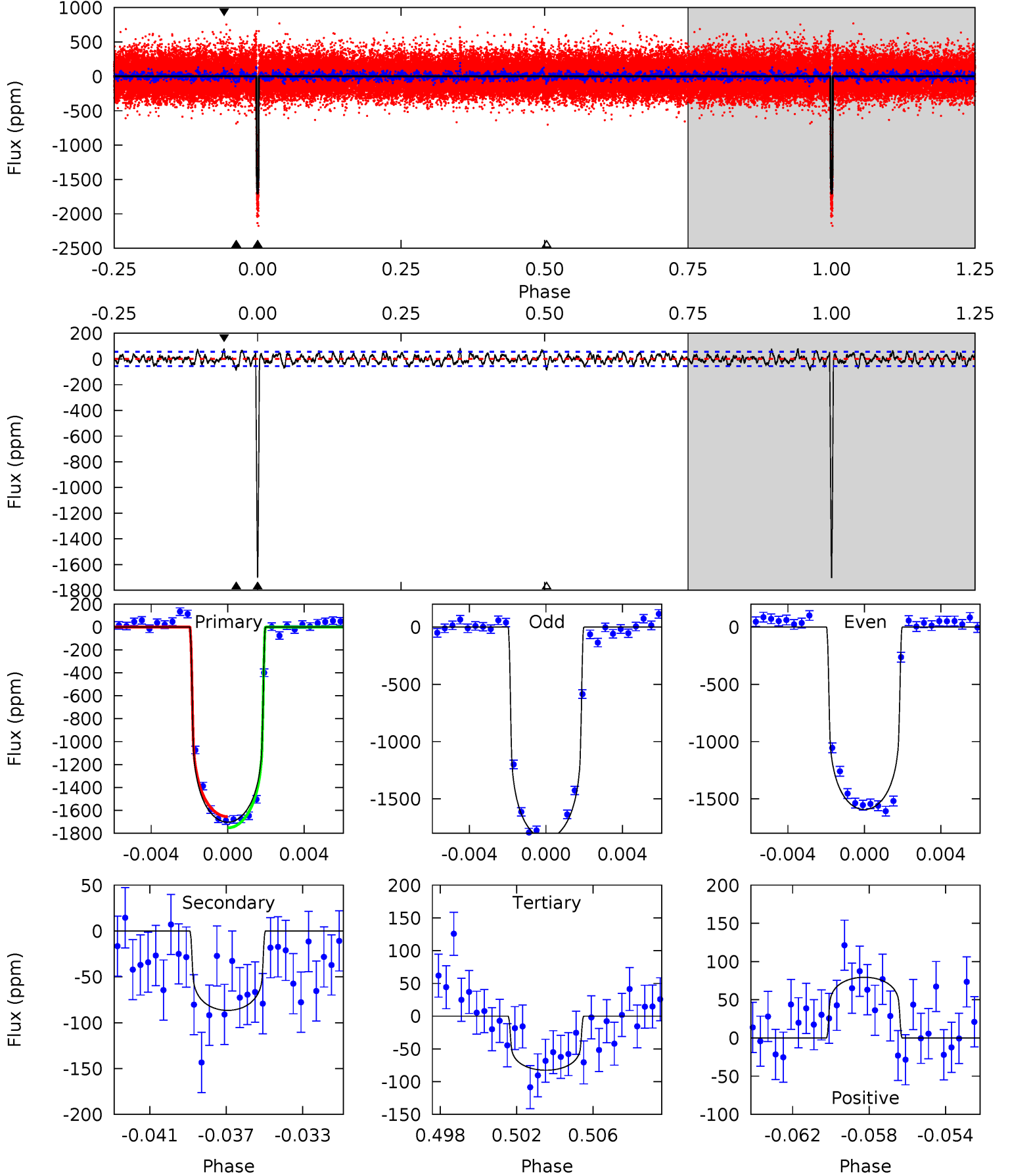
TCE 005437945-02 P=220.123931 Days $T_0=245.993700$ (BKJD)



DV Model-Shift Uniqueness Test

005437945-02, P = 220.129333 Days, E = 25.861513 Days

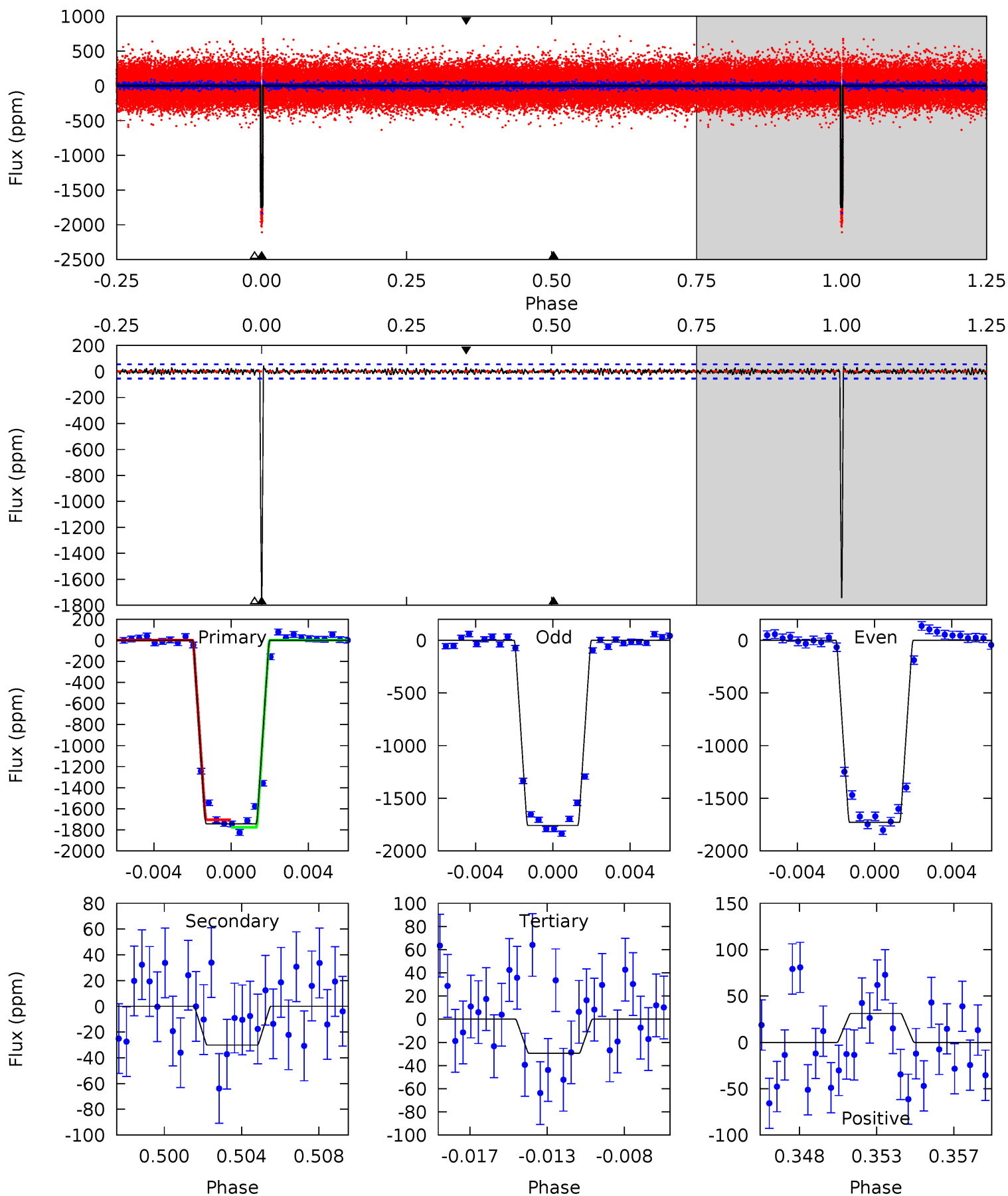
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
158.1	8.04	7.67	7.37	5.19	2.87	2.34	150.4	150.7	0.37	0.67	11.5	0.88	0.04	4.52



Alt Model-Shift Uniqueness Test

005437945-02, P = 220.123931 Days, E = 25.869769 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
164.4	2.84	2.79	2.94	5.19	2.86	0.86	161.6	161.5	0.05	-0.09	1.39	0.76	0.02	3.36



Stellar Parameters For KIC 005437945

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	ρ_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6340^{+171}_{-209}	$4.163^{+0.246}_{-0.164}$	$-0.380^{+0.300}_{-0.300}$	$1.393^{+0.385}_{-0.385}$	$1.031^{+0.171}_{-0.128}$	$0.538^{+0.700}_{-0.247}$
	+3%/-3%	+6%/-4%	+79%/-79%	+28%/-28%	+17%/-12%	+130%/-46%
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 005437945-02 / KOI 3791.02

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-87 ± 11	$5.72^{+0.82}_{-0.96}$	537^{+41}_{-43}	3588^{+107}_{-107}	764^{+318}_{-196}
Alt.	-30 ± 11	$6.59^{+1.04}_{-1.00}$	540^{+43}_{-43}	2941^{+137}_{-181}	194^{+118}_{-78}

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

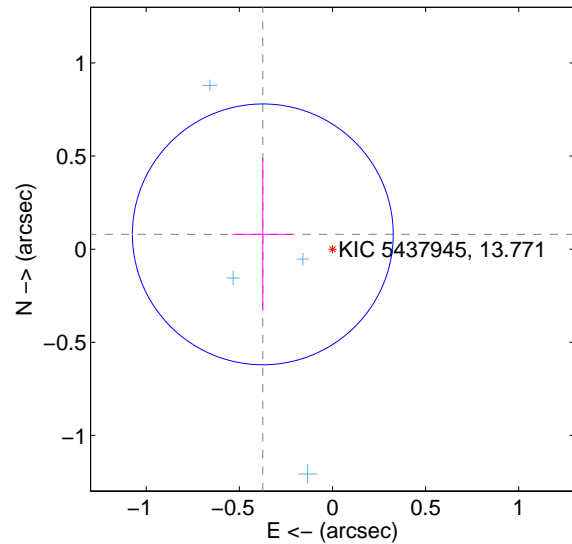
Supplemental centroid analysis for 005437945-02. Kepler magnitude: 13.77. Transit SNR 72.14

There are 4 quarters with good PRF difference image offsets

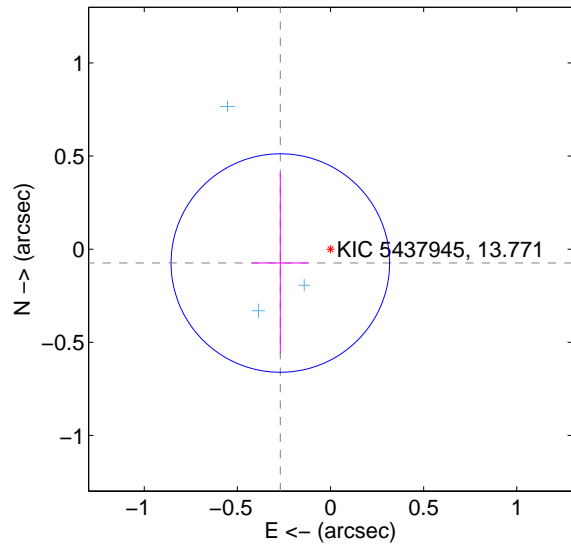
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.382 ± 0.233	1.64	0.374 ± 0.161	0.080 ± 0.409
PRF-fit source offset from KIC position	0.280 ± 0.196	1.43	0.270 ± 0.152	-0.074 ± 0.485
photometric centroid source offset	0.29 ± 0.09	3.42	-0.01 ± 0.09	-0.29 ± 0.09

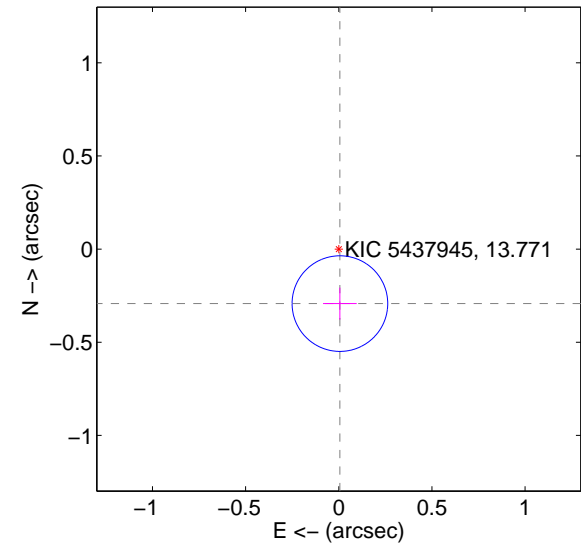
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

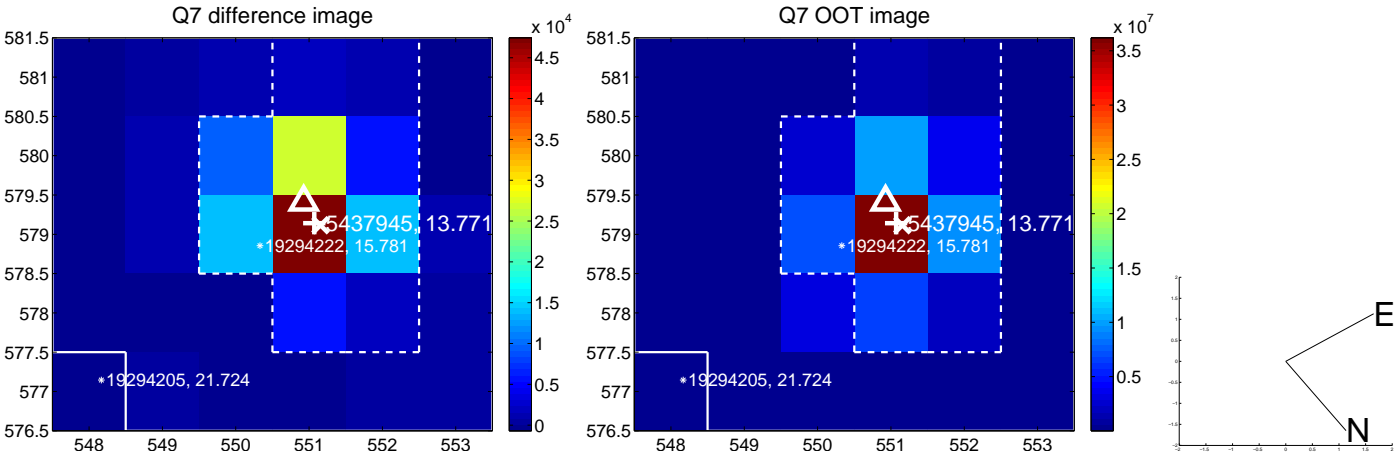
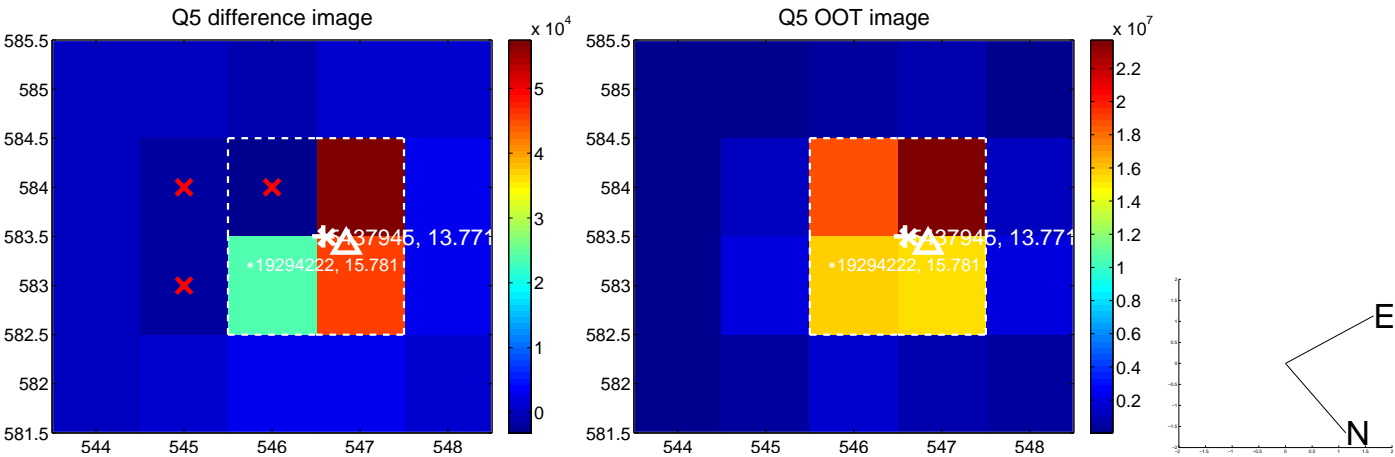


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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



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



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



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

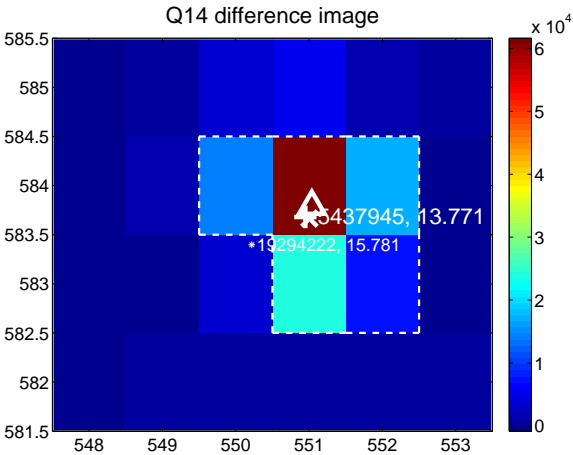
Q13 no difference image



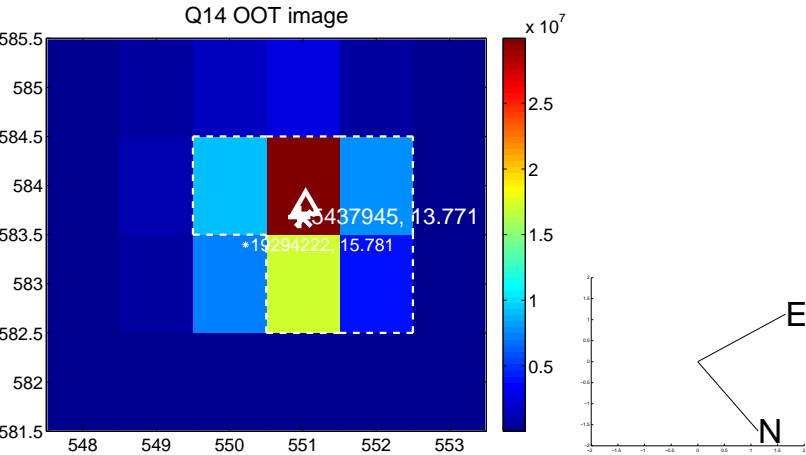
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



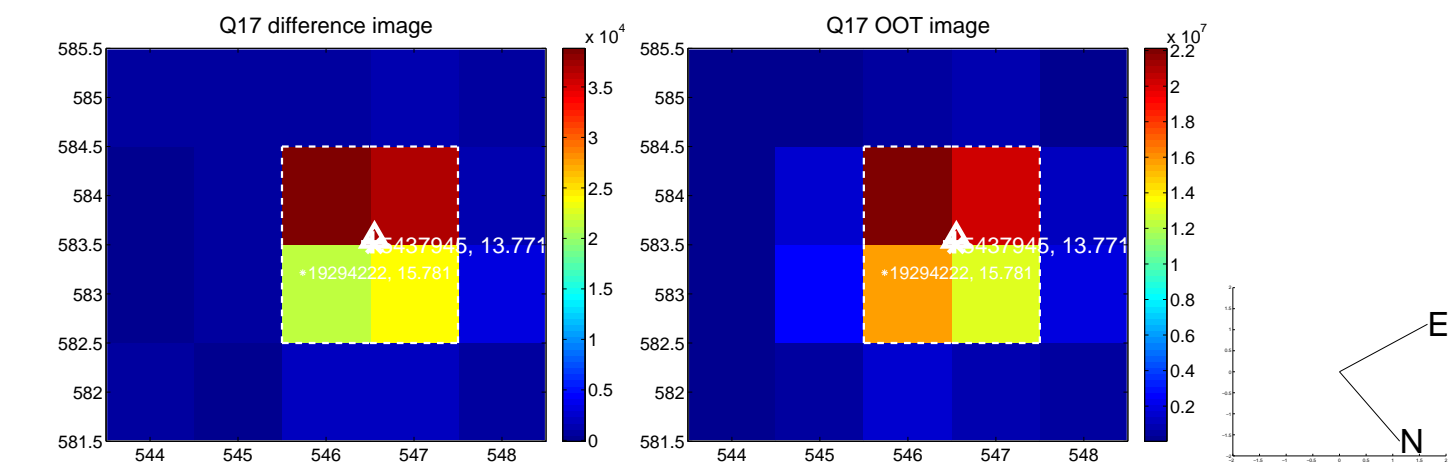
Q16 no difference image



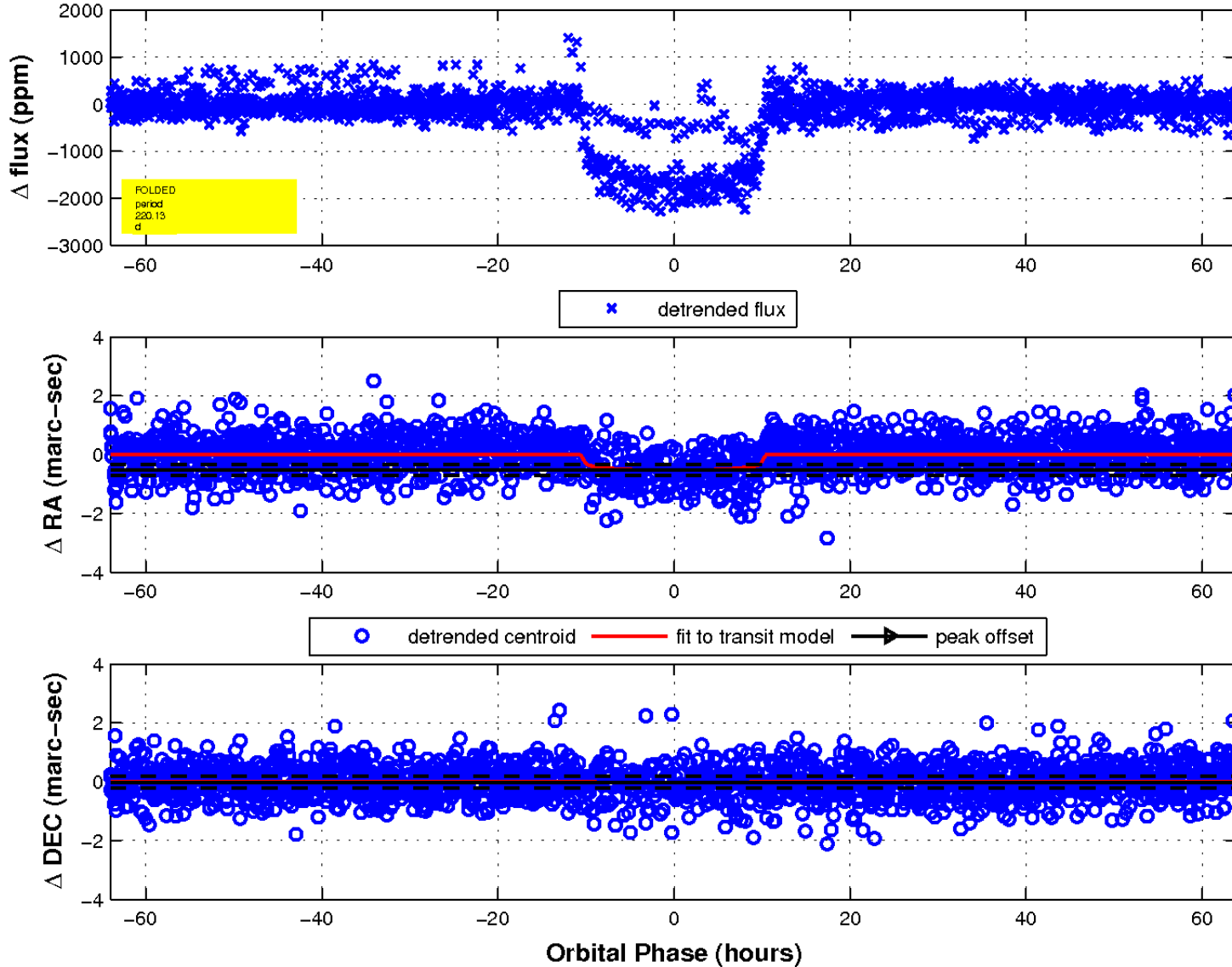
Q16 no OOT image



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

