

KIC 004633434

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})
004633434-01	OBS	6431.01	22.271199	134.760125	179487.1	4.591	3120.1	2488.4	0.73	5068	46.66	16.65
004633434-02	OBS	No	22.271227	145.529343	14034.8	4.852	272.3	270.8	0.73	5068	14.78	16.65

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004633434-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
004633434-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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.

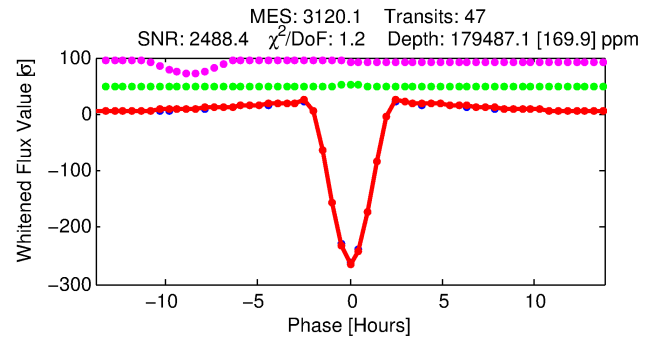
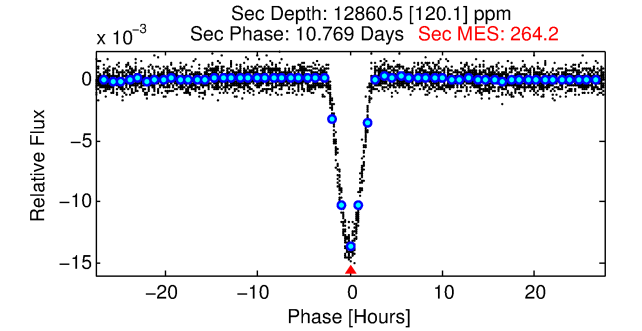
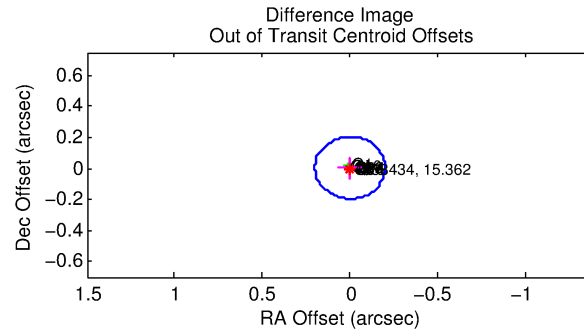
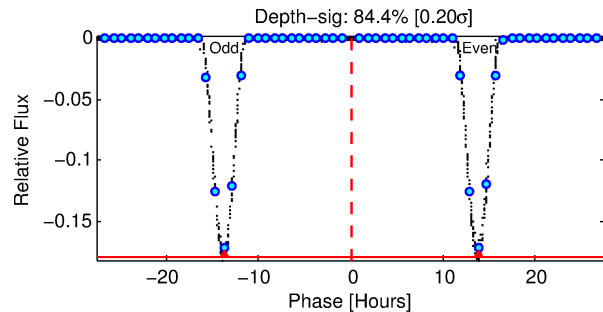
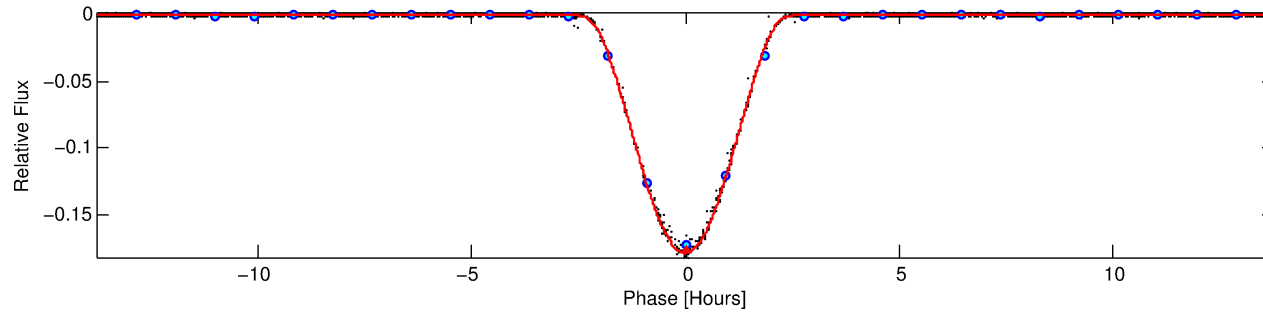
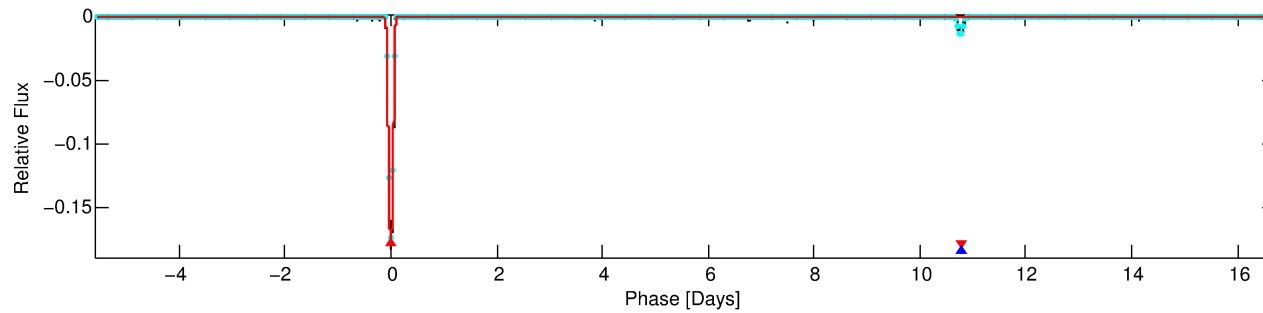
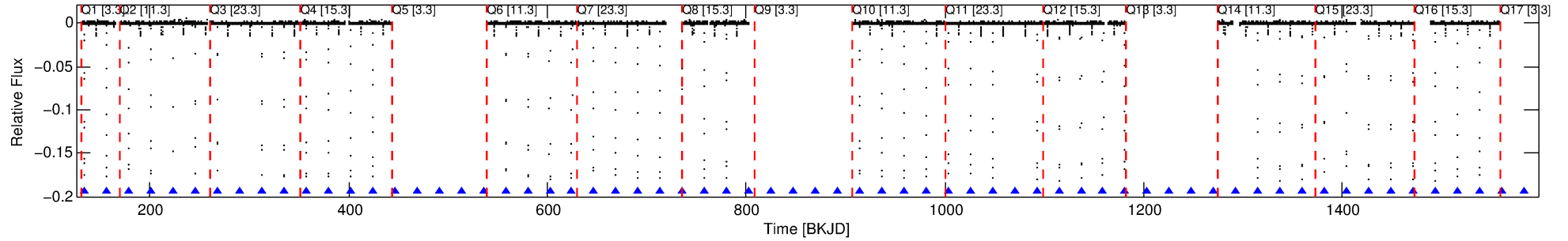
Ephemeris Match Information For 004633434-01

No Significant Match Found

DV One-Page Summary

KIC: 4633434 Candidate: 1 of 2 Period: 22.271 d
KOI: K06431.01 Corr: 1.000

Kp: 15.36 R*: 0.73 Rs Teff: 5068.0 K Logg: 4.56 Fe/H: -0.340



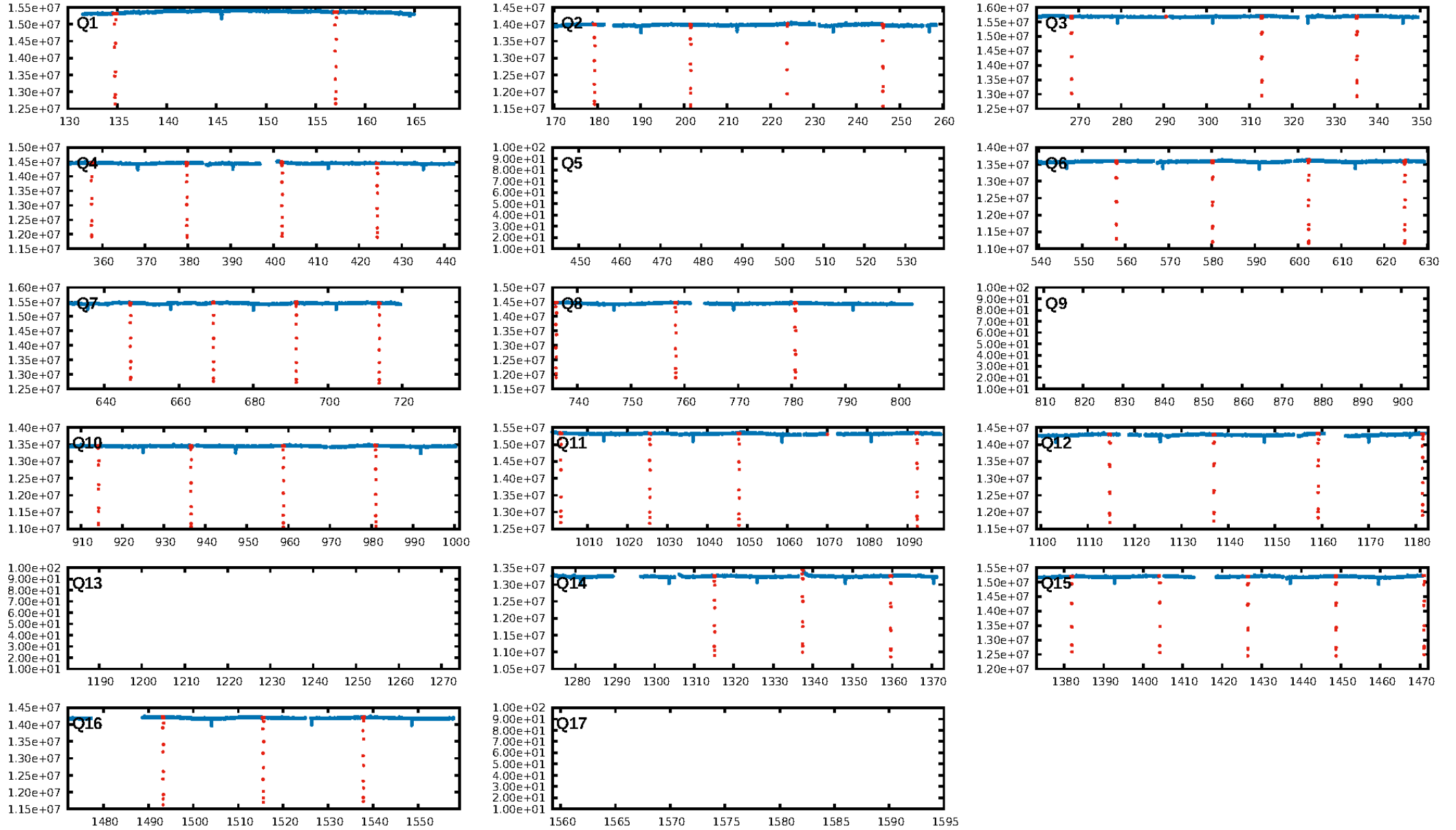
DV Fit Results:

Period = 22.27120 [0.00000] d
Epoch = 134.7601 [0.0000] BKJD
Rp/R* = 0.5857 [0.0269]
a/R* = 48.43 [0.32]
b = 0.90 [0.04]
Seff = 16.65 [3.04]
Teq = 515 [24] K
Rp = 46.66 [5.48] Re
a = 0.1375 [0.0128] AU
Ag = 61.48 [10.23] [5.91σ]
Teffp = 2230 [84] K [19.65σ]

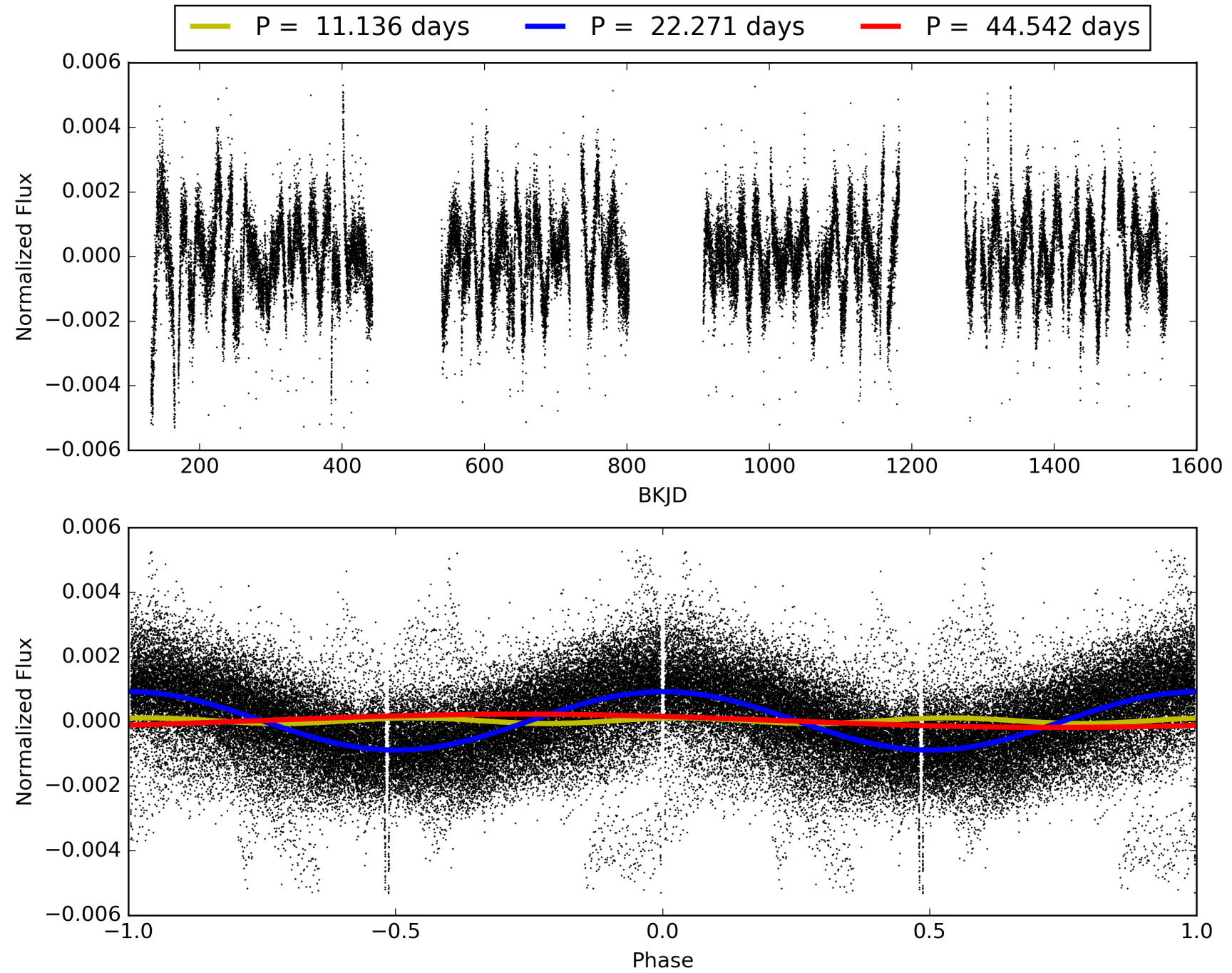
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 0.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [45/45]
GhostDiagnostic-chr: 2.466
Centroid-sig: 0.6%
Centroid-so: 0.382 arcsec [101.75σ]
OotOffset-rm: 0.005 arcsec [0.07σ]
KicOffset-rm: 0.121 arcsec [1.75σ]
OotOffset-st: 4/4/4/1 [13]
KicOffset-st: 4/4/4/1 [13]
DiffImageQuality-fgm: 1.00 [13/13]
DiffImageOverlap-fno: 1.00 [13/13]

TCE 004633434-01, PDC Light Curves

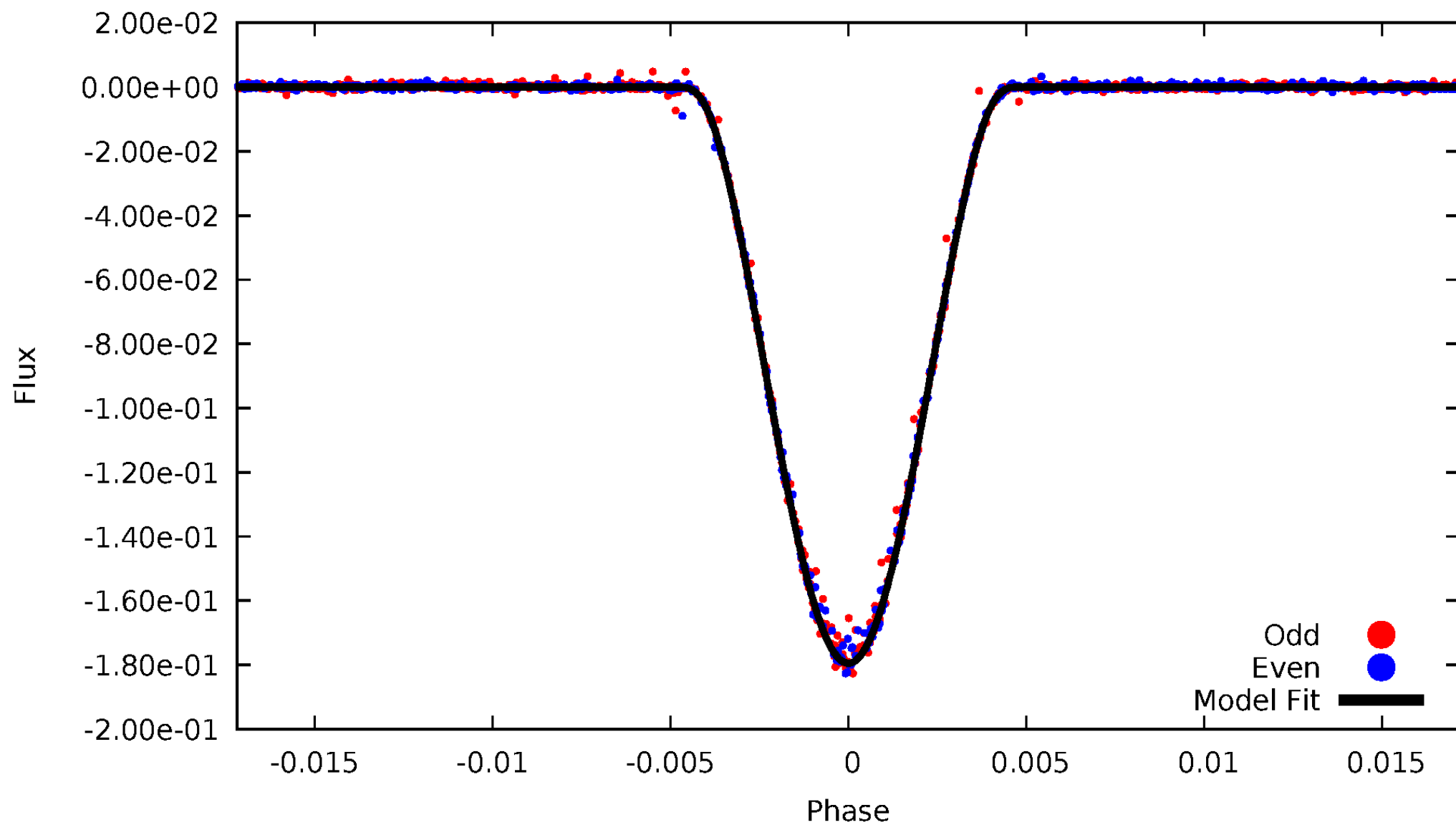


TCE 004633434-01



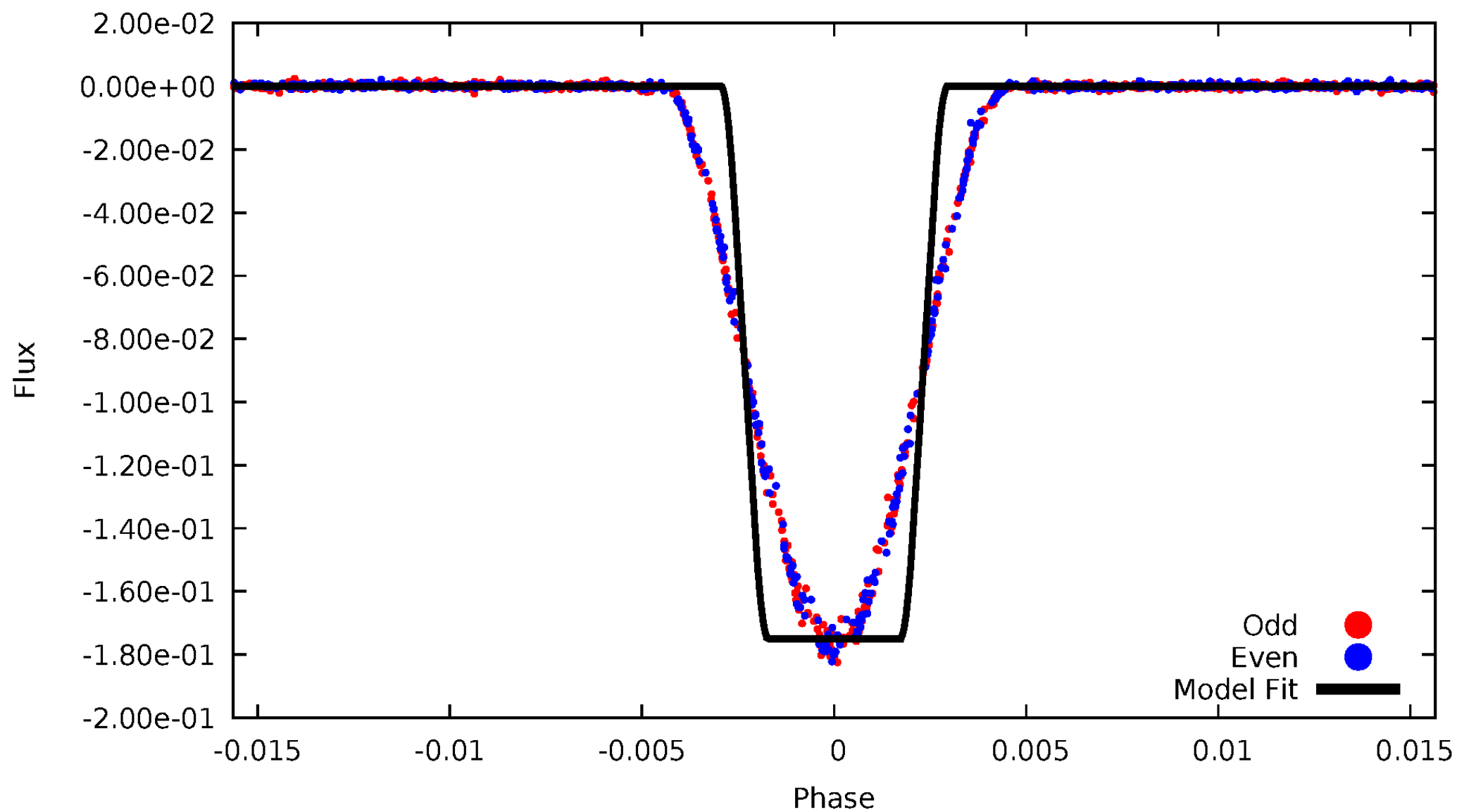
DV Odd/Even

TCE 004633434-01



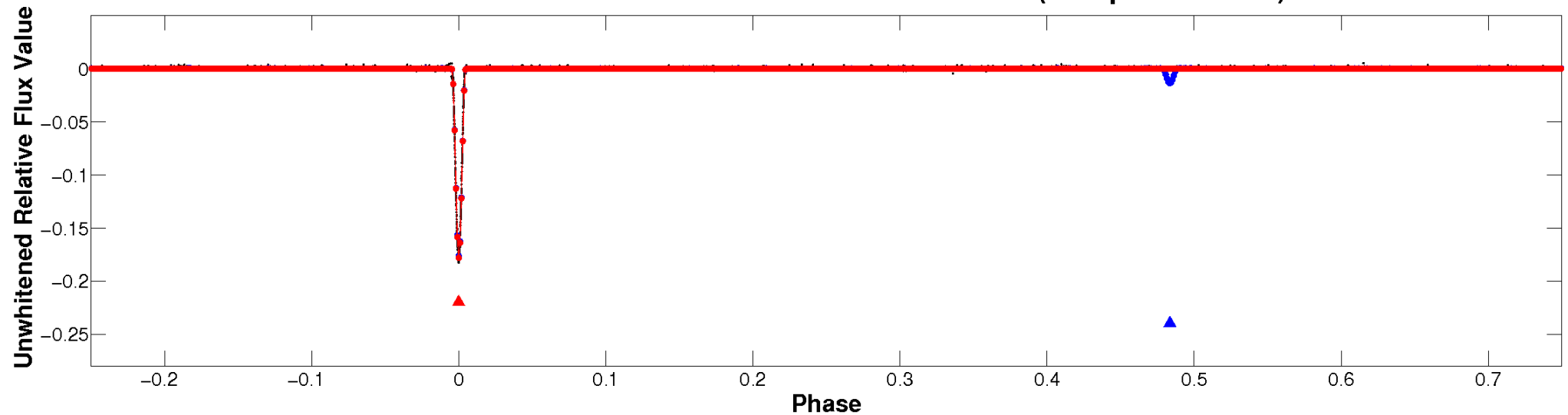
ALT Odd/Even

TCE 004633434-01

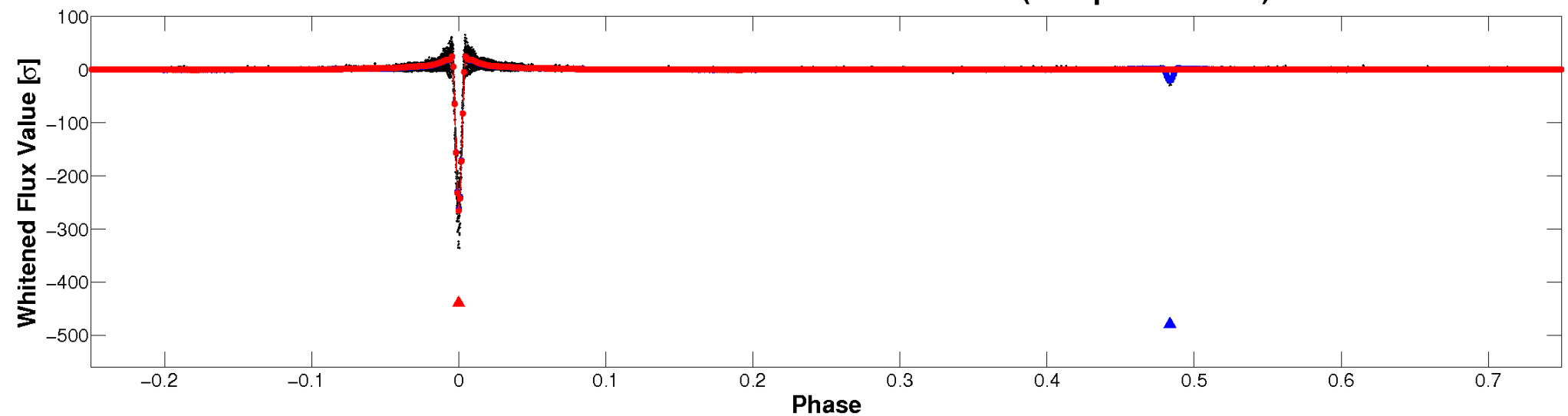


Non-Whitened Vs. Whitened Light Curve

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

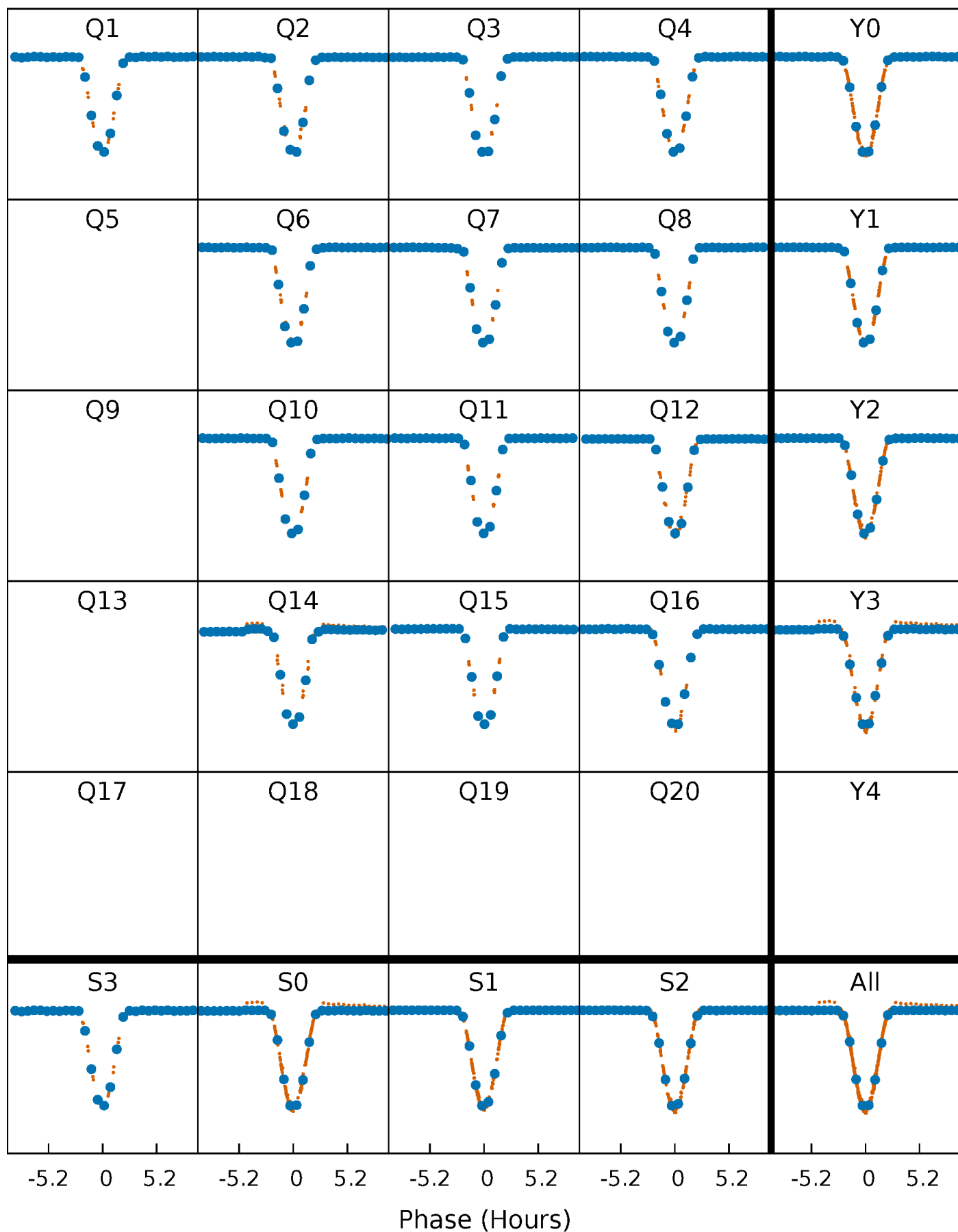


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



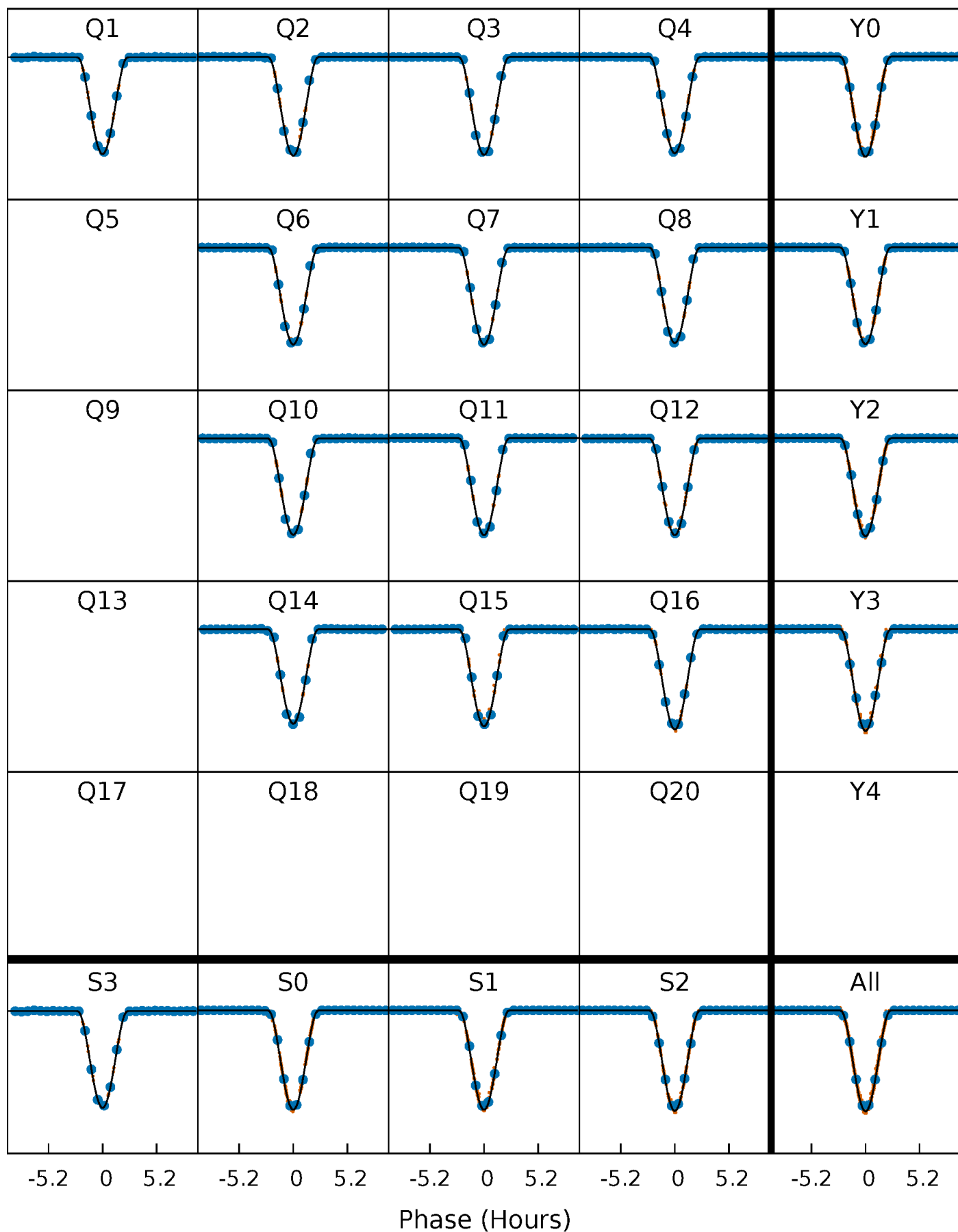
PDC Quarter-Phased Transit Curves

TCE 004633434-01 P= 22.271199 Days $T_0=134.760125$ (BKJD)



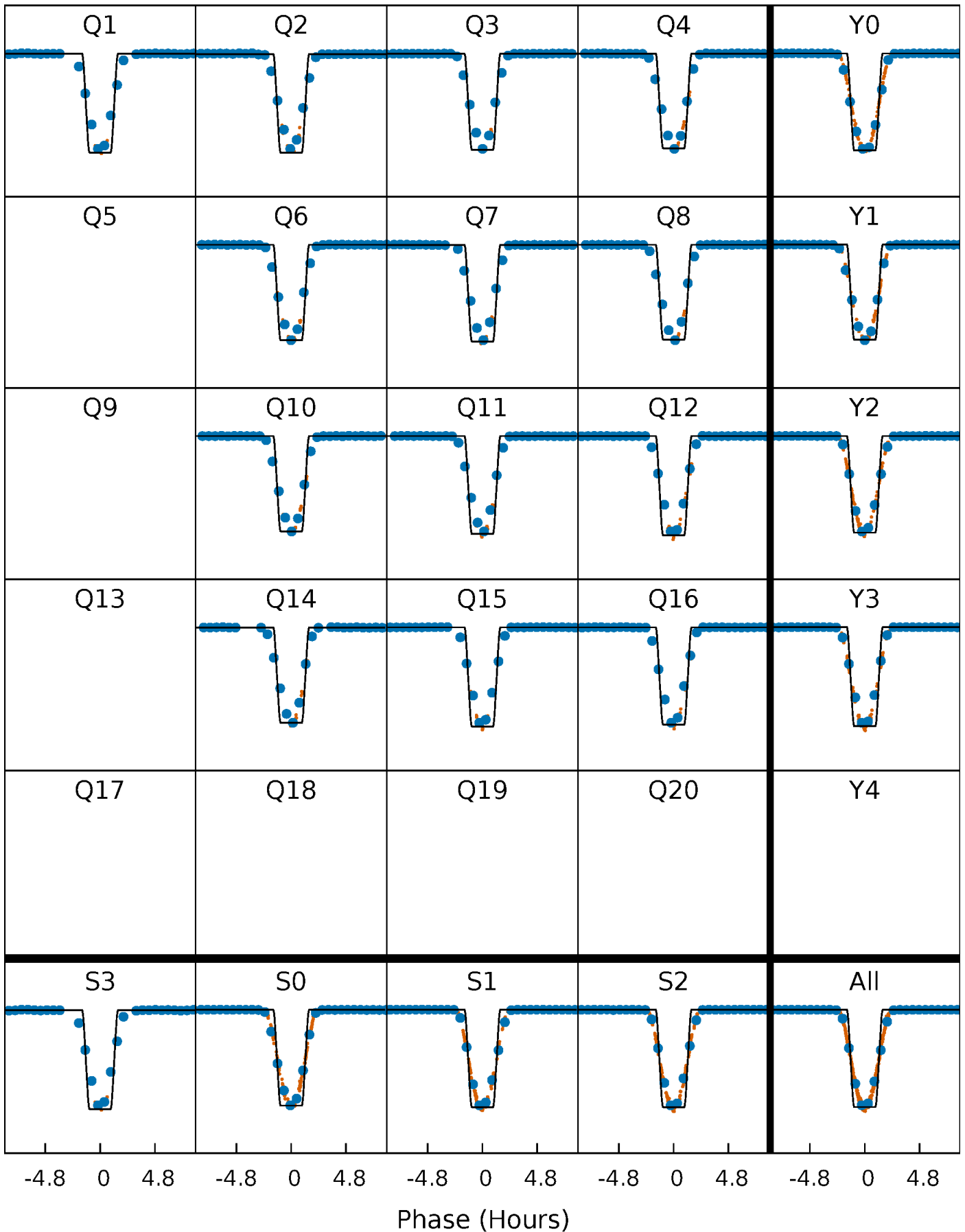
DV Quarter-Phased Transit Curves

TCE 004633434-01 P= 22.271199 Days $T_0=134.760125$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

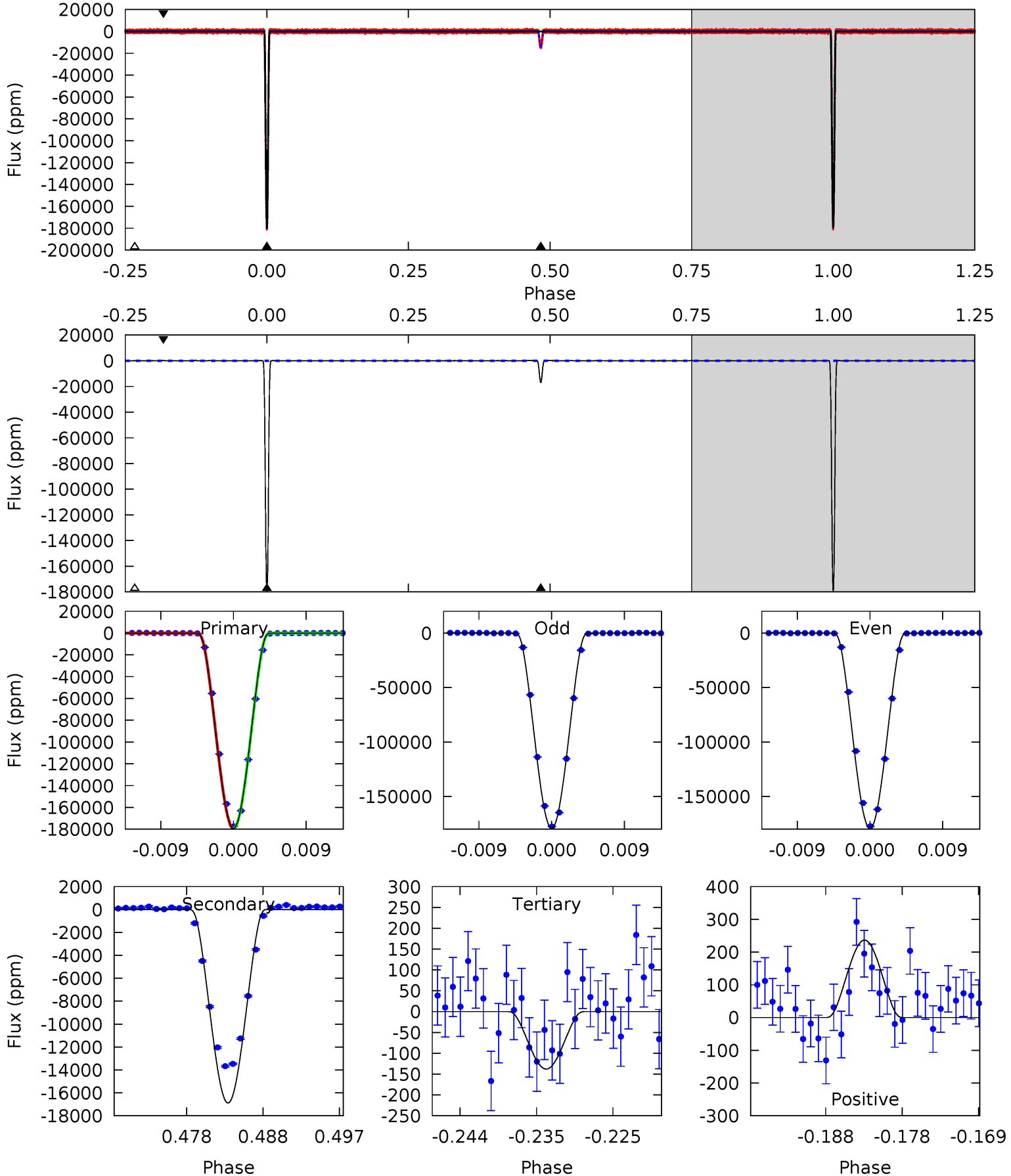
TCE 004633434-01 P= 22.271236 Days $T_0=134.758956$ (BKJD)



DV Model-Shift Uniqueness Test

004633434-01, P = 22.271199 Days, E = 112.488926 Days

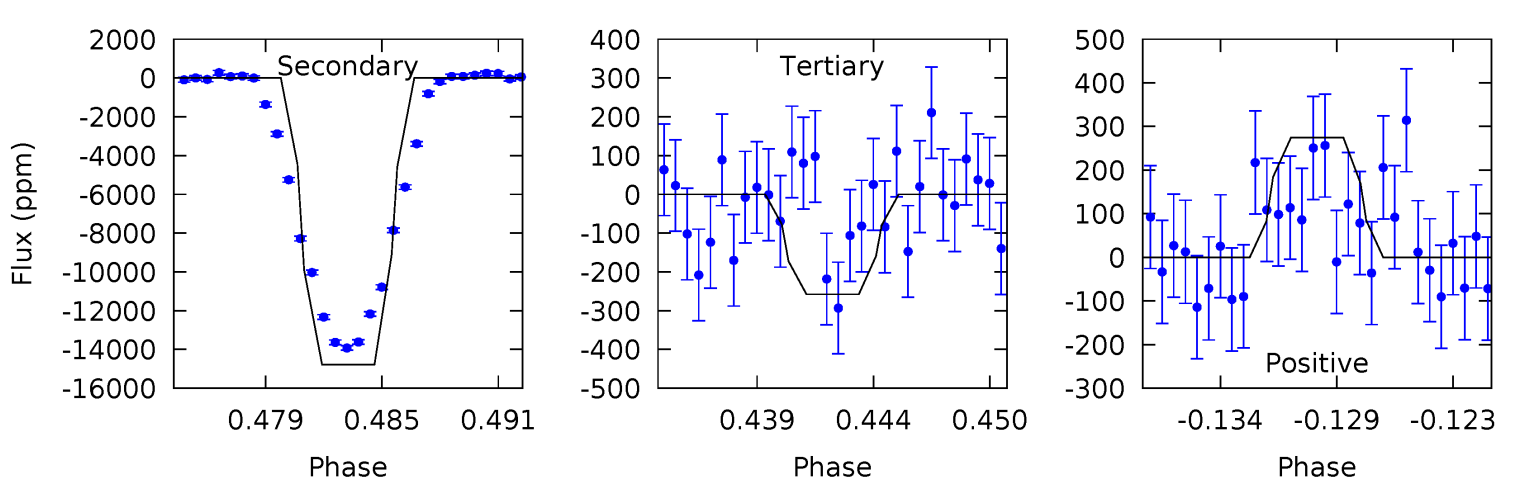
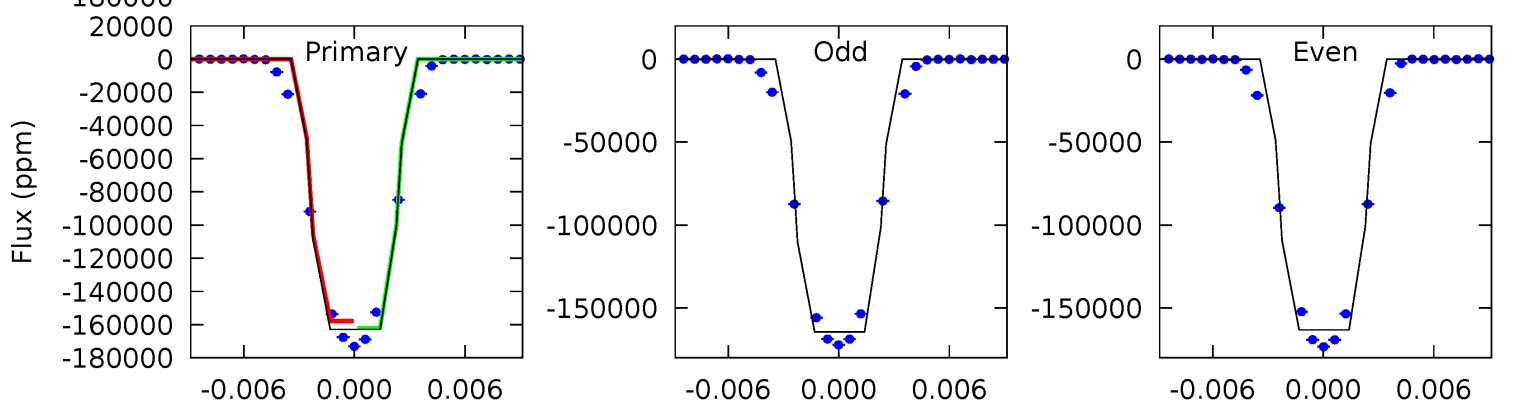
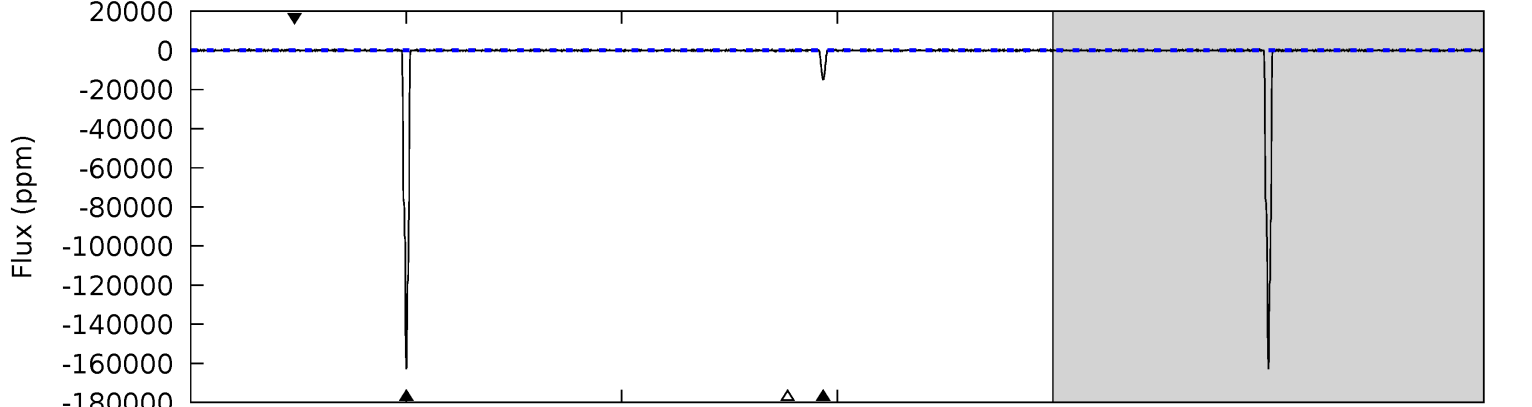
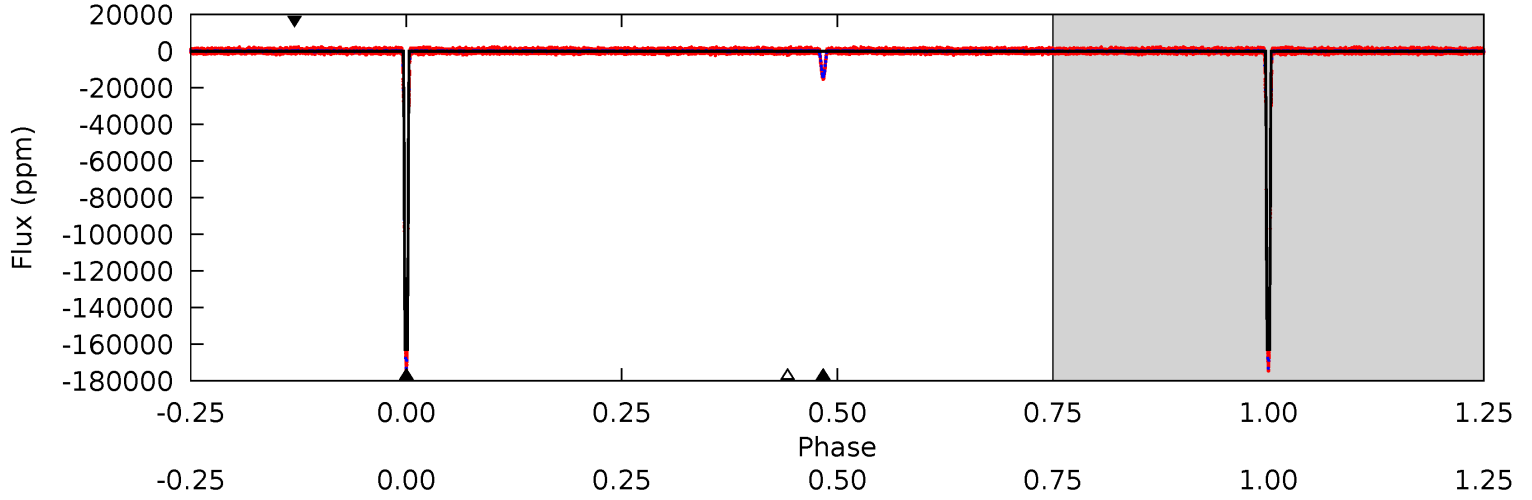
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6152	579.3	4.73	8.12	5.04	2.60	2.45	6147	6144	574.5	571.2	2.73	0.99	0.00	0



Alt Model-Shift Uniqueness Test

004633434-01, P = 22.271236 Days, E = 112.487720 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2590	235.0	4.10	4.37	5.13	2.76	1.22	2586	2586	230.9	230.7	8.70	1.00	0.00	0



Stellar Parameters For KIC 004633434

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5068^{+151}_{-136}	$4.556^{+0.077}_{-0.056}$	$-0.340^{+0.350}_{-0.300}$	$0.730^{+0.079}_{-0.079}$	$0.698^{+0.100}_{-0.050}$	$2.532^{+0.863}_{-0.541}$
	+3%/-3%	+2%/-1%	+103%/-88%	+11%/-11%	+14%/-7%	+34%/-21%
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 004633434-01 / KOI 6431.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-16890 ± 29	$46.76^{+3.61}_{-3.66}$	716^{+29}_{-26}	3021^{+72}_{-69}	83^{+13}_{-10}
Alt.	-14781 ± 63	$33.39^{+2.95}_{-2.98}$	718^{+26}_{-27}	3273^{+90}_{-90}	142^{+27}_{-20}

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

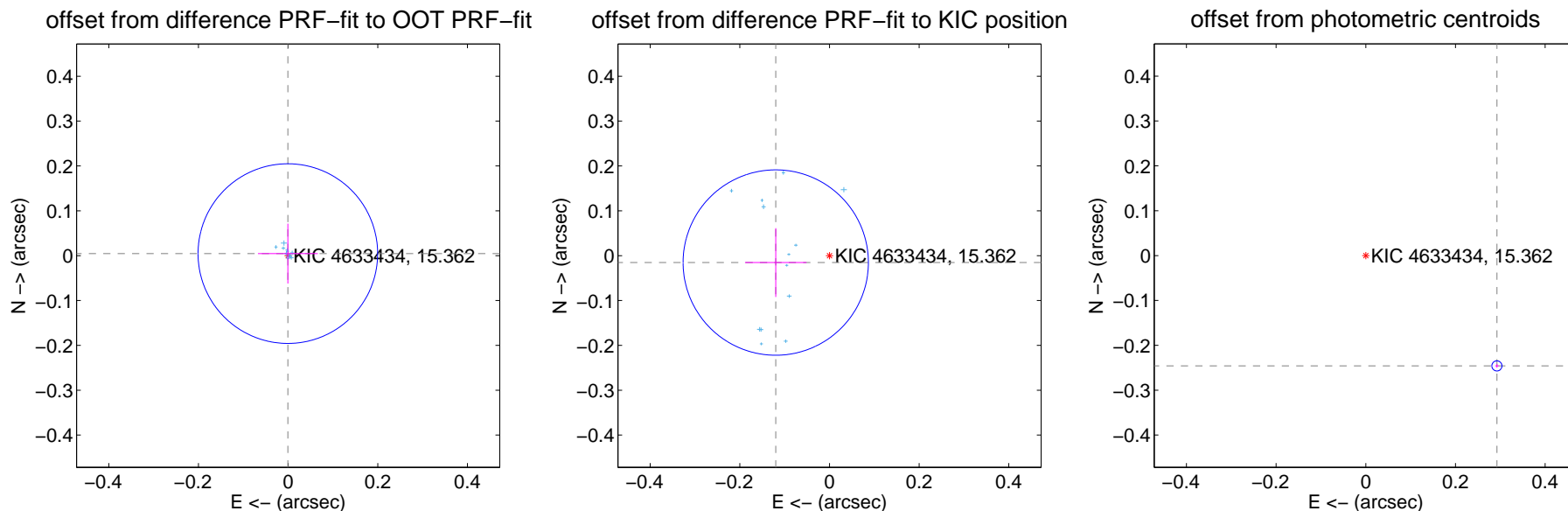
DV Centroid Data

Supplemental centroid analysis for 004633434-01. Kepler magnitude: 15.36. Transit SNR 2488.41

There are 13 quarters with good PRF difference image offsets

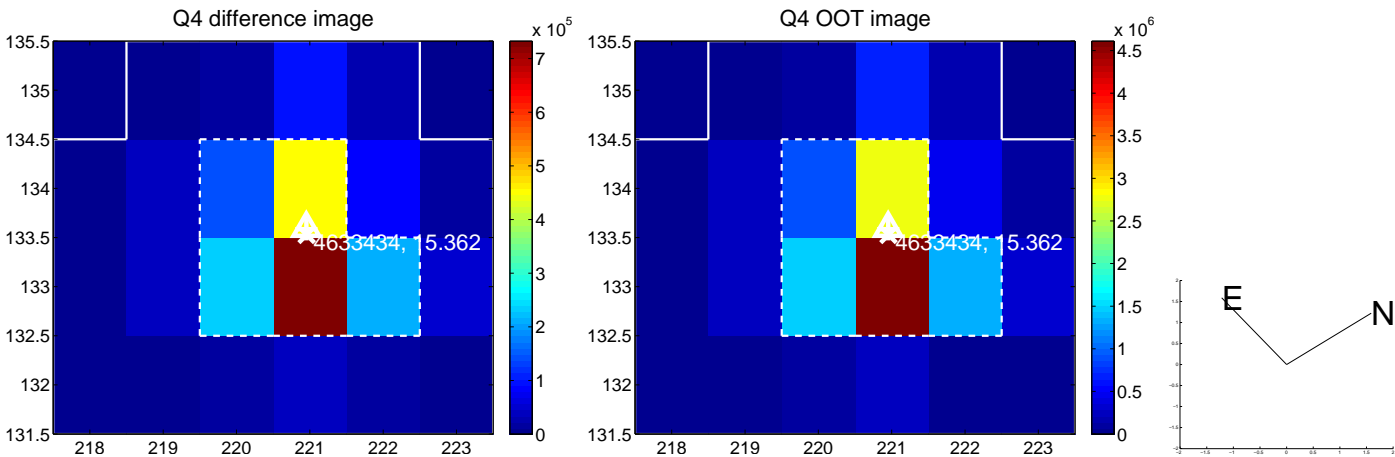
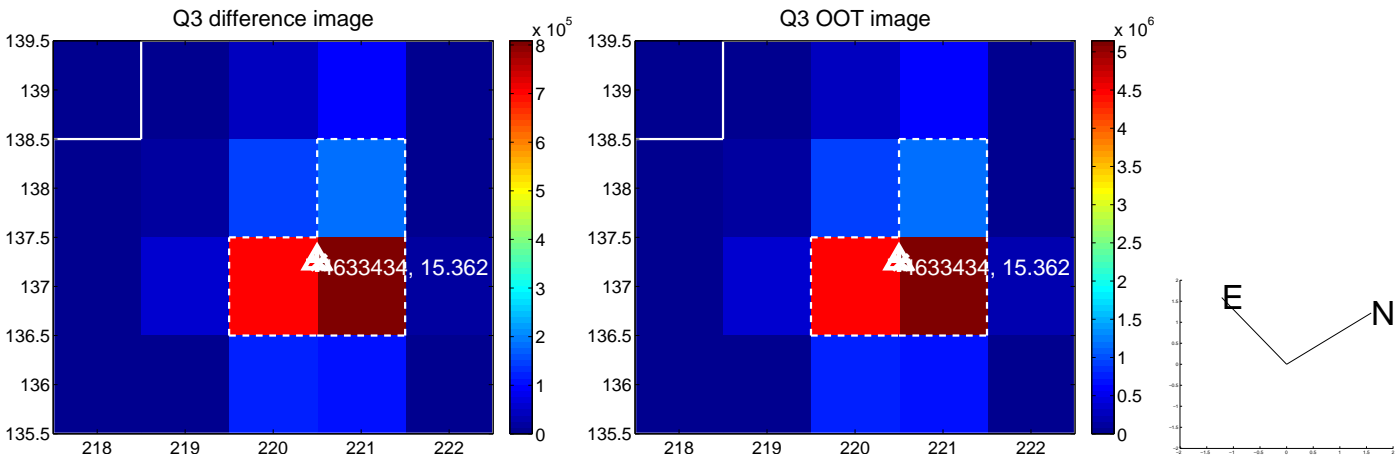
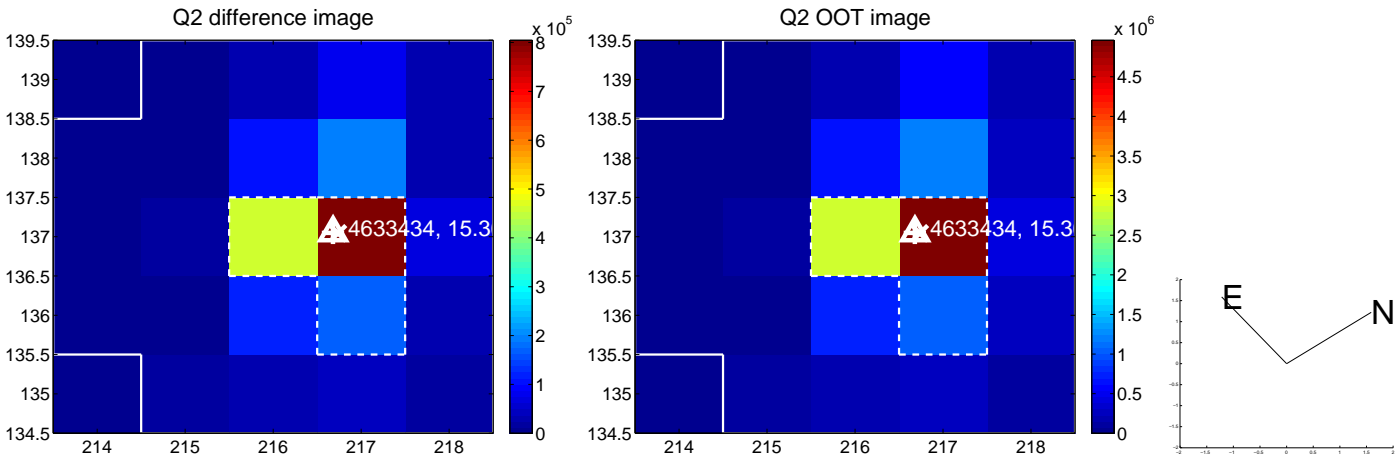
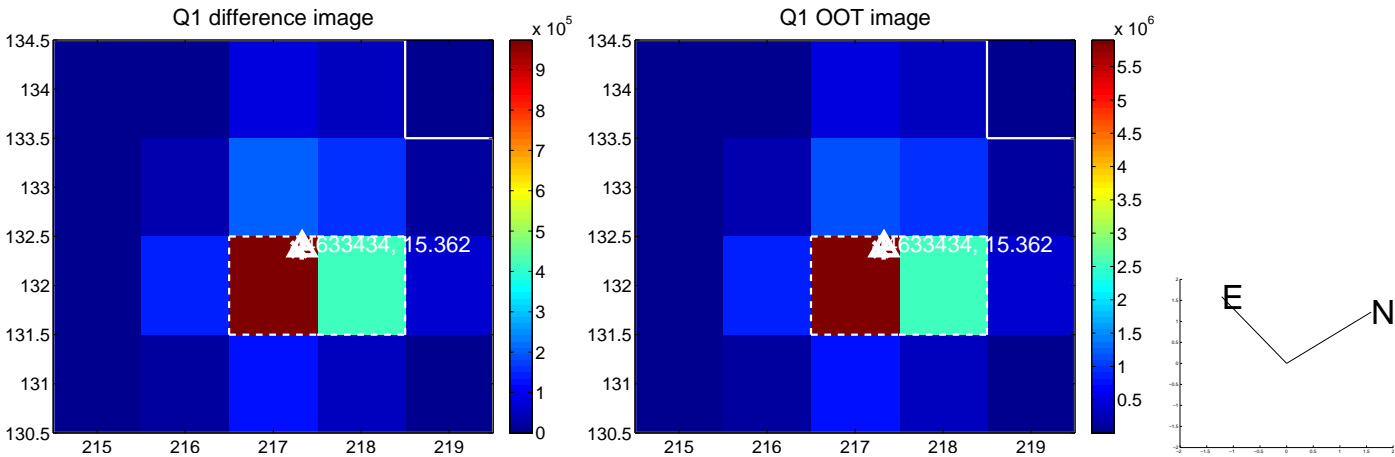
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.005 ± 0.067	0.07	0.001 ± 0.067	0.005 ± 0.067
PRF-fit source offset from KIC position	0.121 ± 0.069	1.75	0.120 ± 0.069	-0.015 ± 0.077
photometric centroid source offset	0.38 ± 0.00	101.75	-0.29 ± 0.00	-0.25 ± 0.00

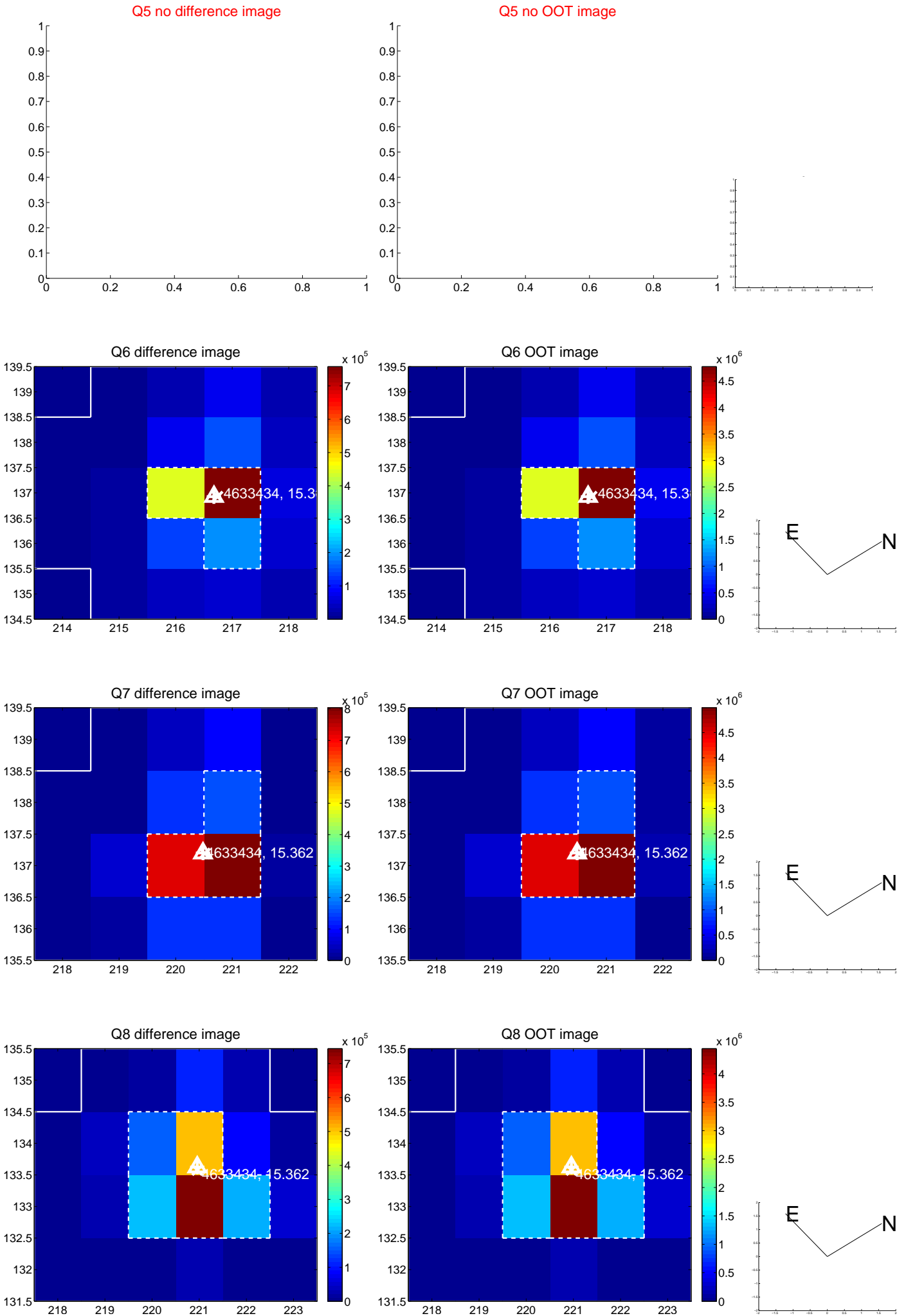


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

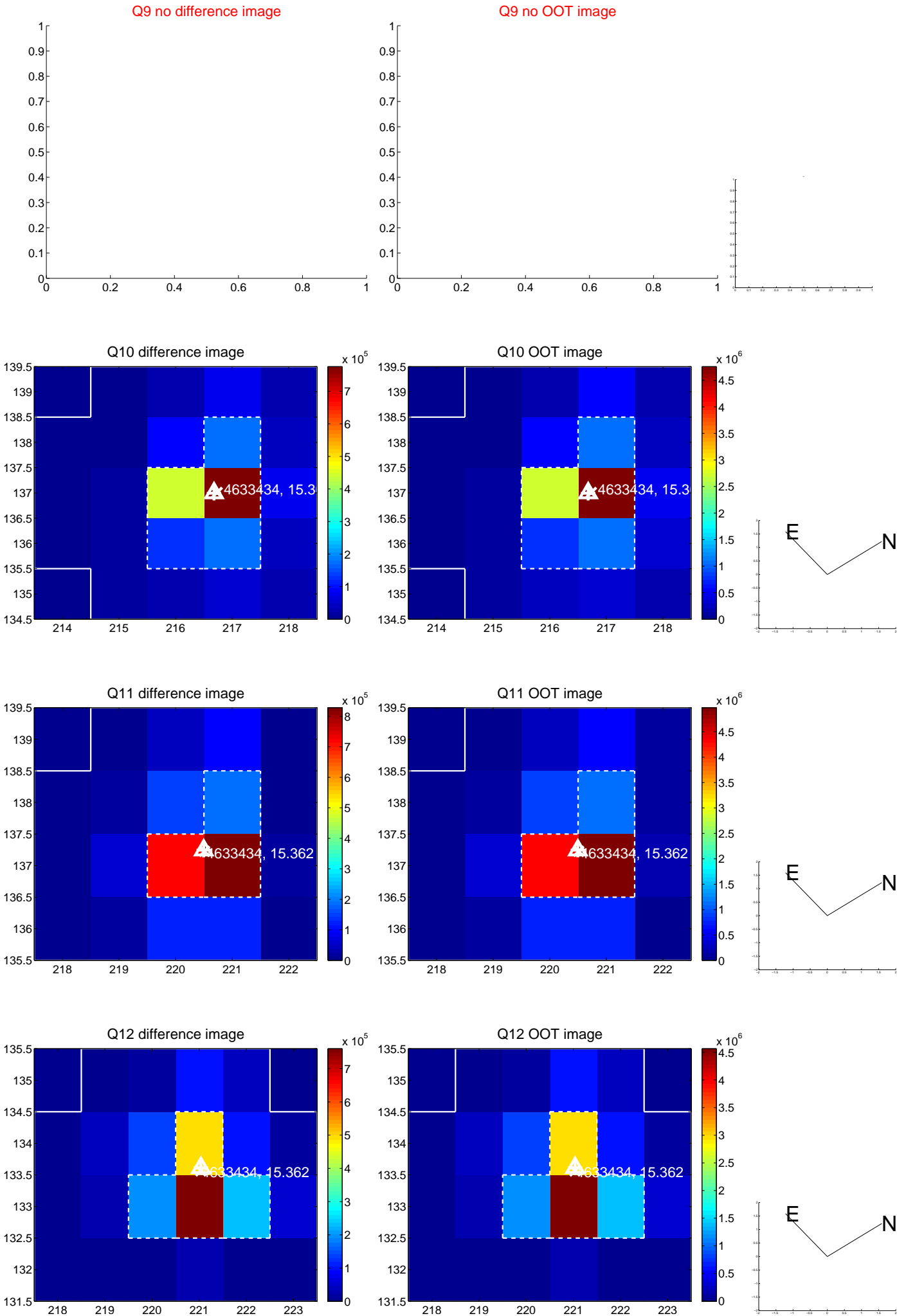
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



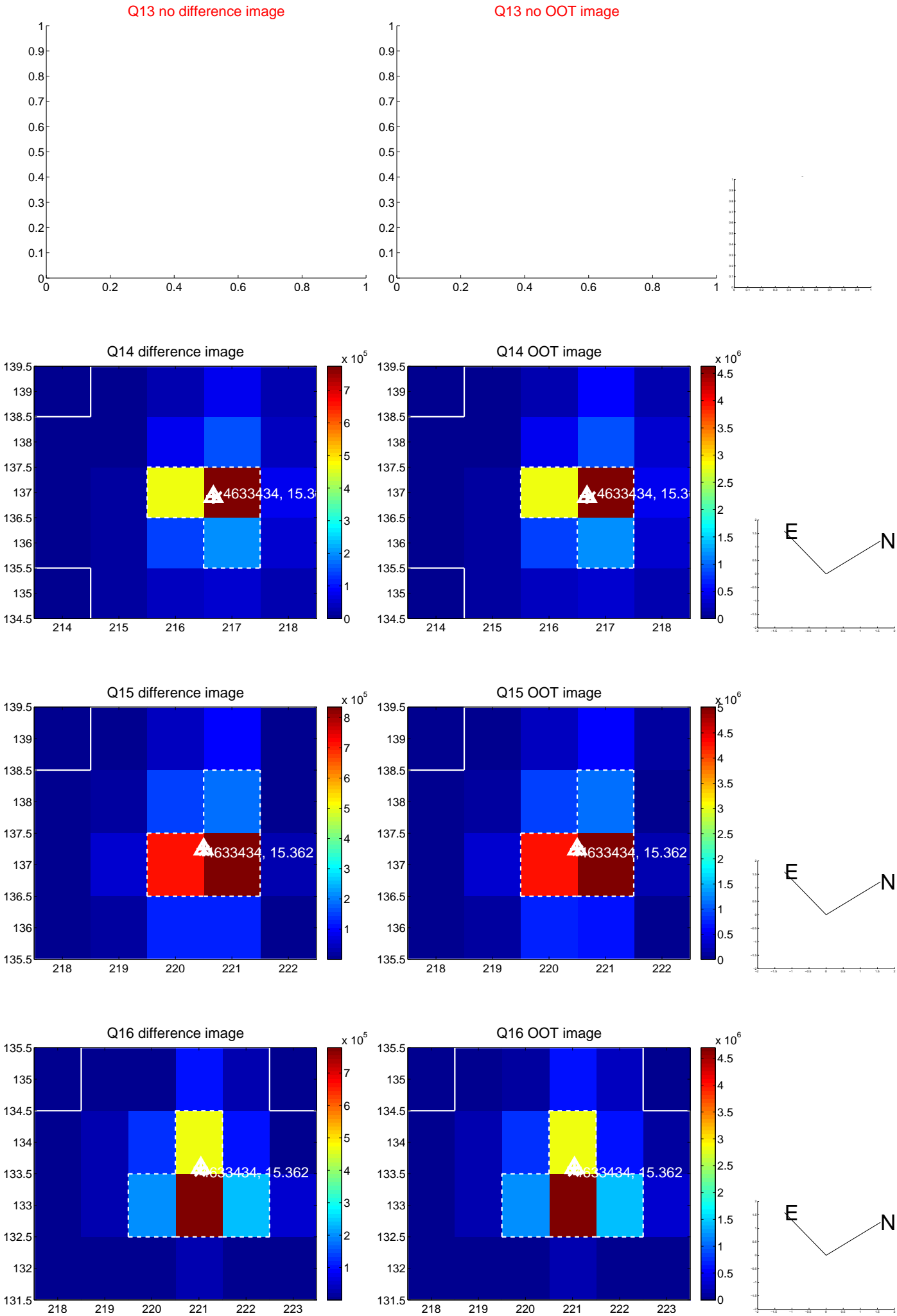
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



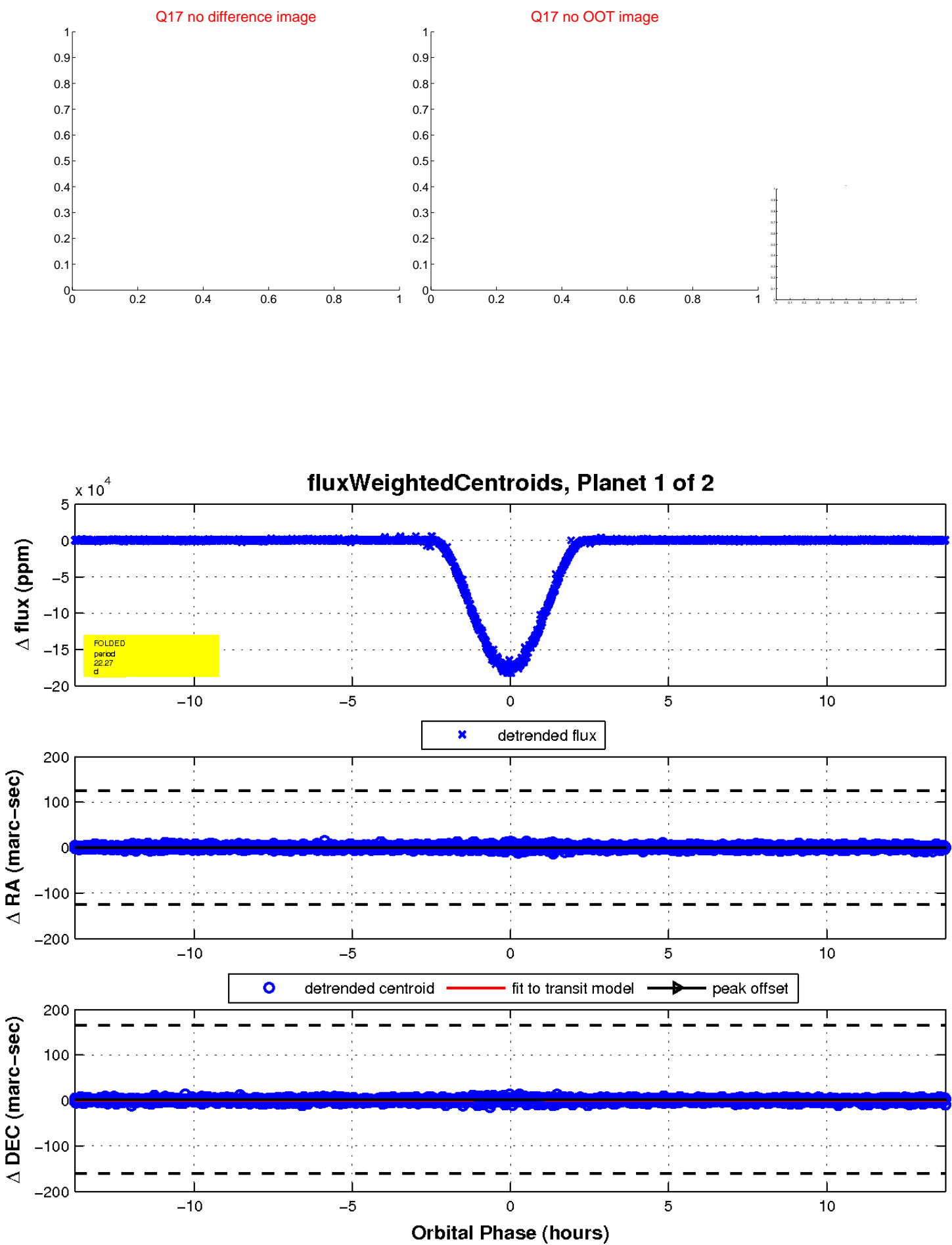
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

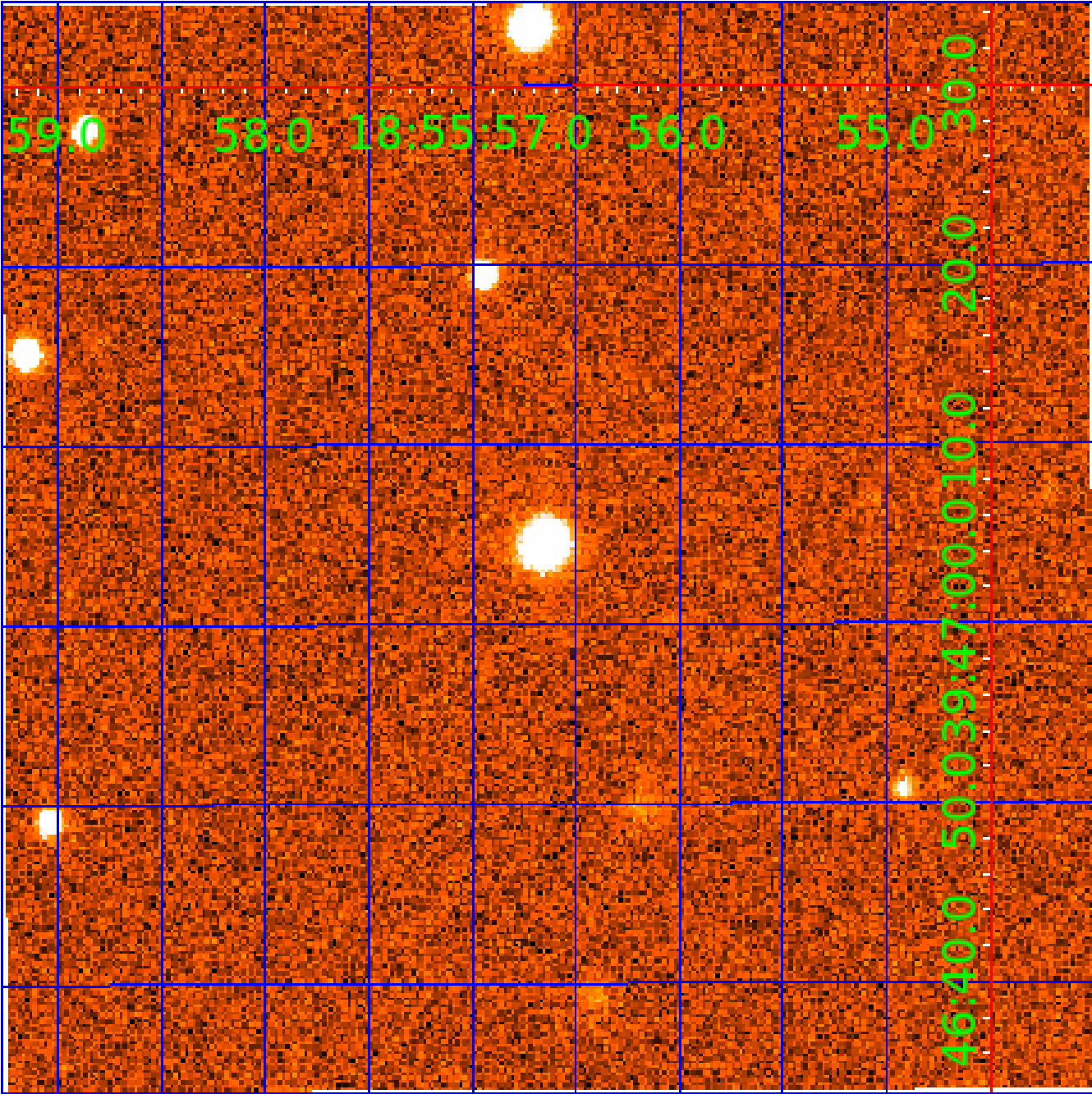


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004633434

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})
004633434-01	OBS	6431.01	22.271199	134.760125	179487.1	4.591	3120.1	2488.4	0.73	5068	46.66	16.65
004633434-02	OBS	No	22.271227	145.529343	14034.8	4.852	272.3	270.8	0.73	5068	14.78	16.65

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004633434-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
004633434-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

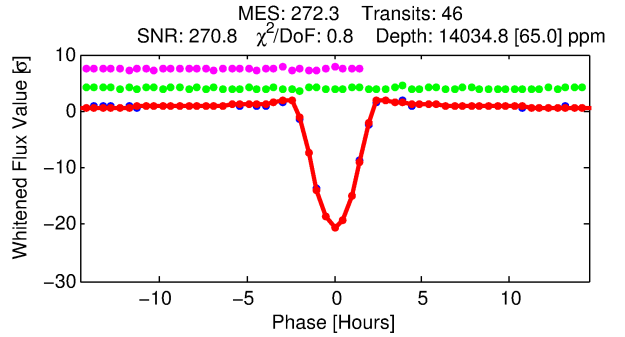
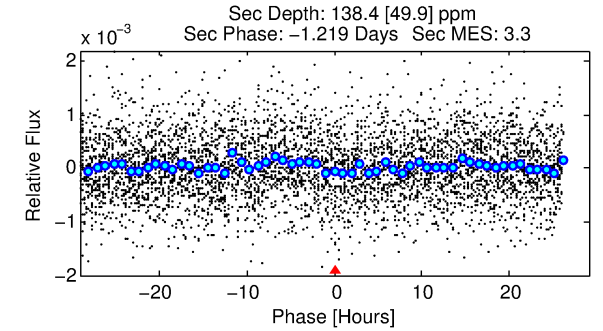
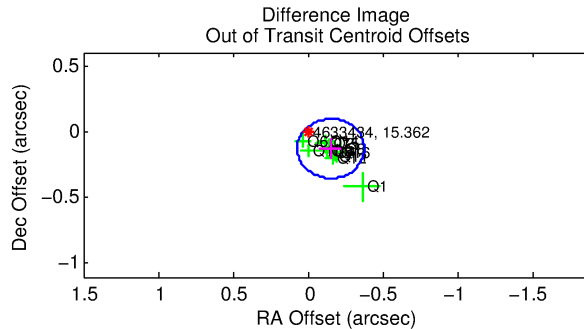
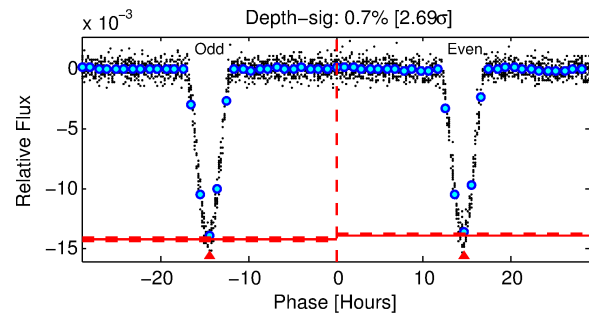
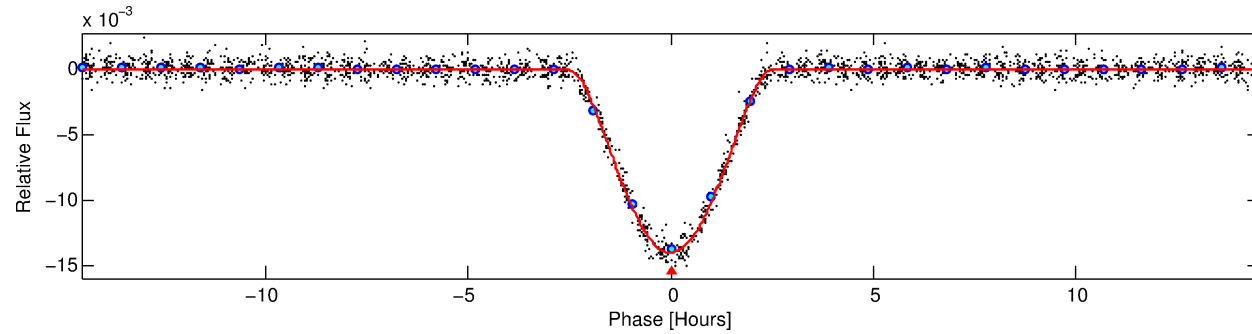
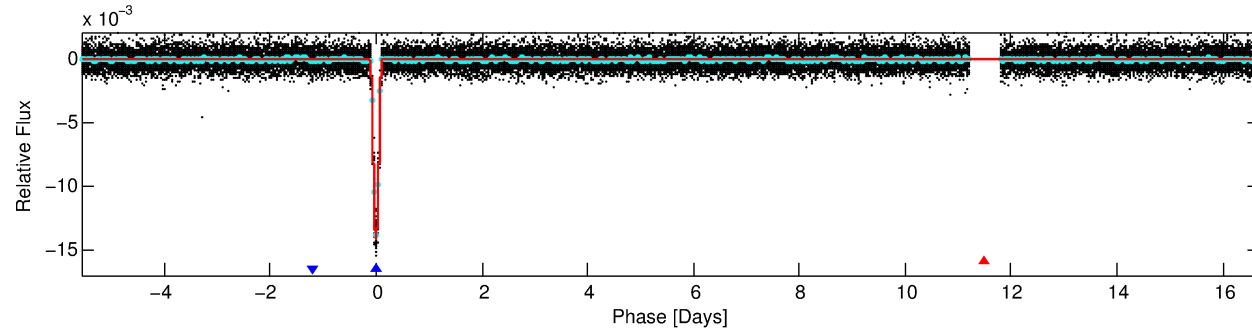
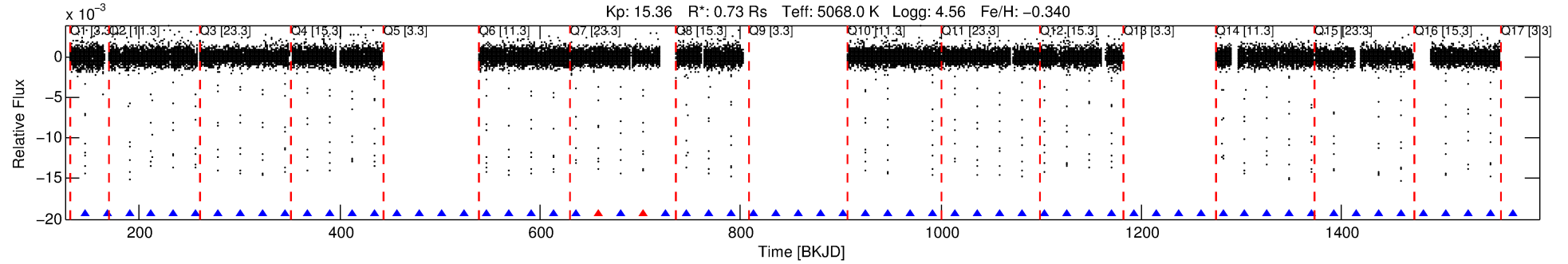
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004633434-02

No Significant Match Found

DV One-Page Summary

KIC: 4633434 Candidate: 2 of 2 Period: 22.271 d
KOI: K06431 Corr: No Ephemeris Match



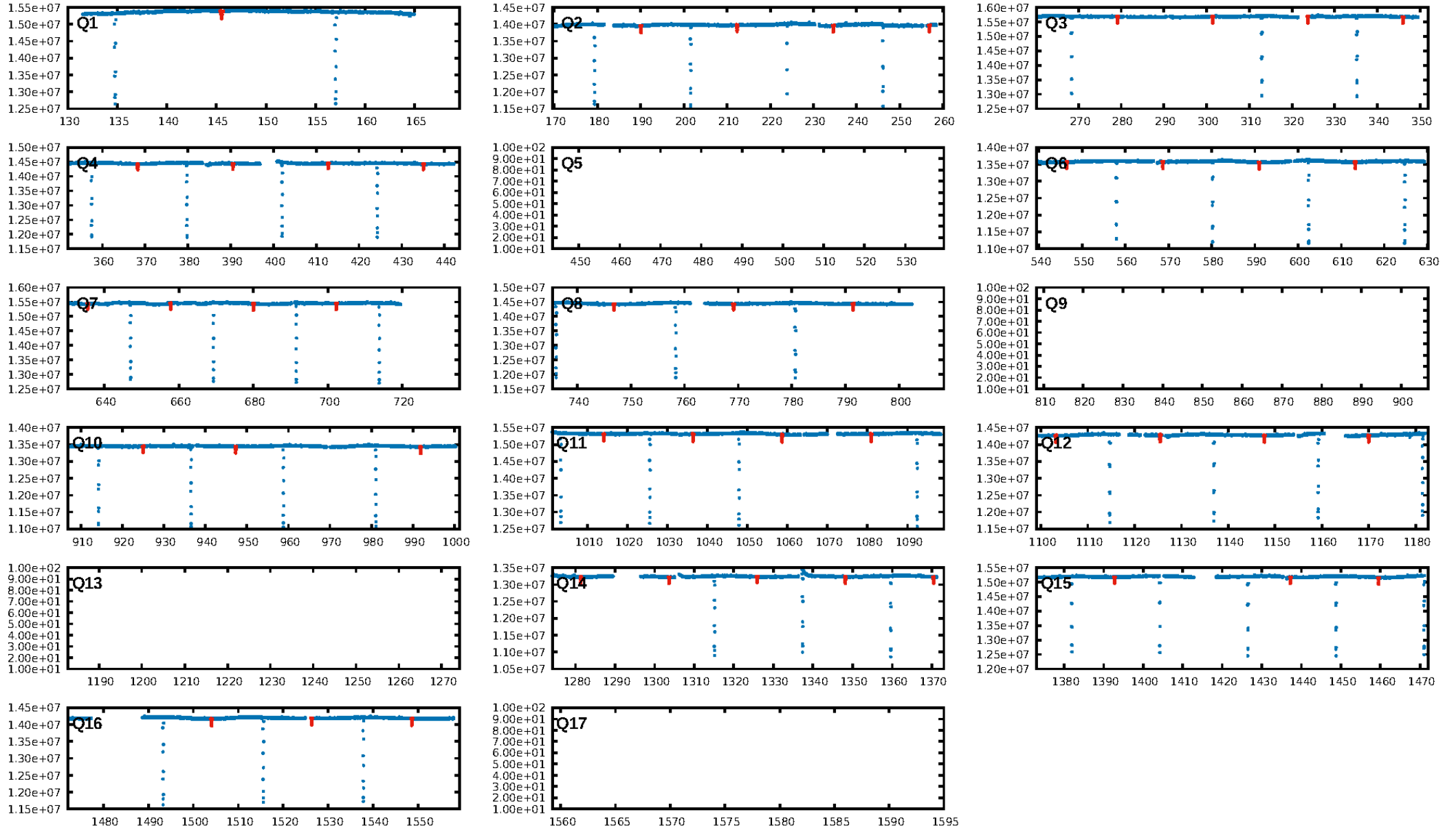
DV Fit Results:

Period = 22.27123 [0.00001] d
Epoch = 145.5293 [0.0004] BKJD
Rp/R* = 0.1855 [0.0283]
a/R* = 23.31 [0.49]
b = 0.98 [0.04]
Seff = 16.65 [3.04]
Teq = 515 [24] K
Rp = 14.78 [2.77] Re
a = 0.1375 [0.0128] AU
Ag = 6.60 [3.25] [1.72σ]
Teffp = 1276 [155] K [4.84σ]

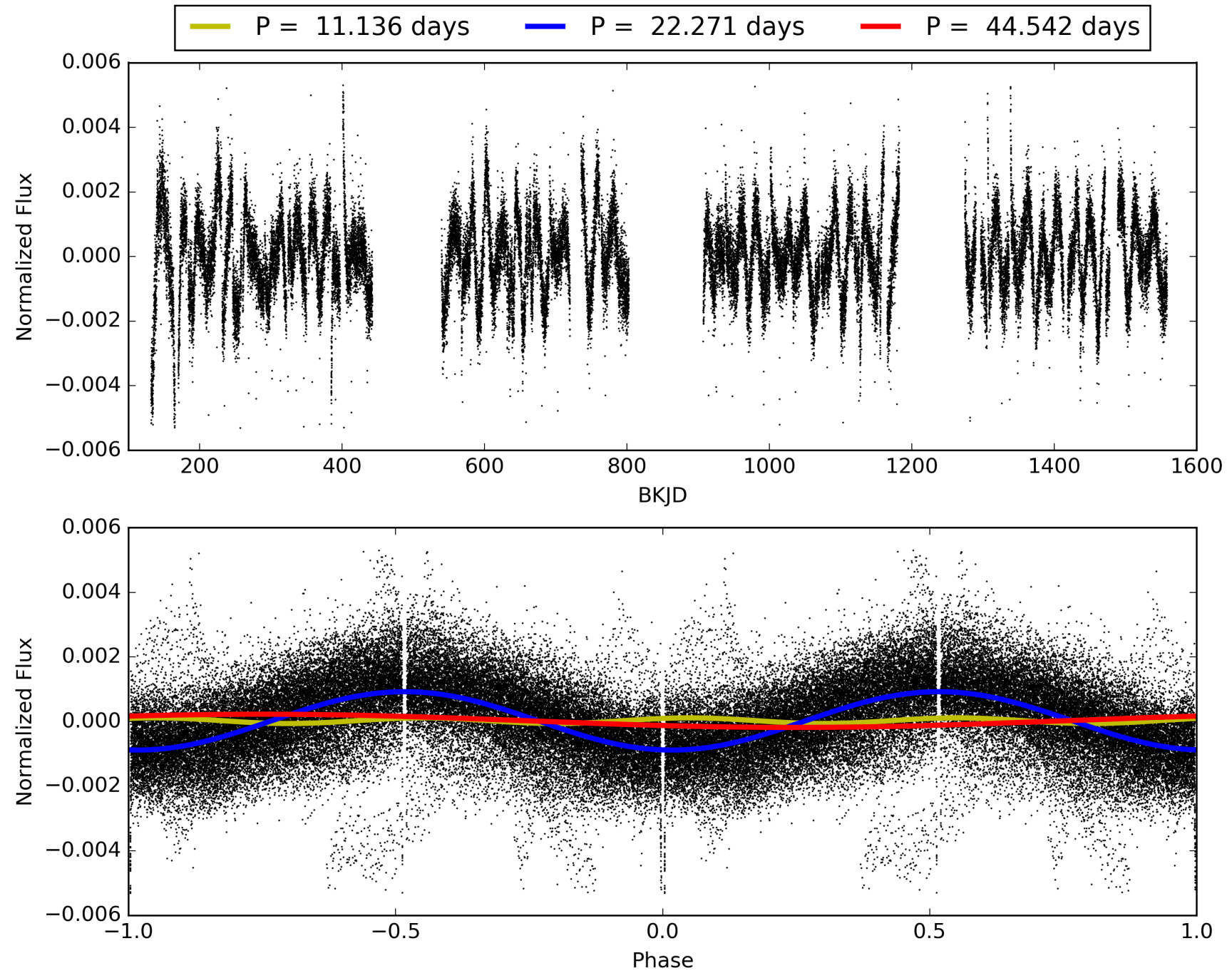
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 19.8%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 0.96 [43/45]
GhostDiagnostic-chr: 3.33
Centroid-sig: 0.3%
Centroid-so: 0.472 arcsec [10.57σ]
OotOffset-rm: 0.200 arcsec [2.67σ]
KicOffset-rm: 0.166 arcsec [2.26σ]
OotOffset-st: 4/4/4/1 [13]
KicOffset-st: 4/4/4/1 [13]
DiffImageQuality-fgm: 1.00 [13/13]
DiffImageOverlap-fno: 1.00 [13/13]

TCE 004633434-02, PDC Light Curves

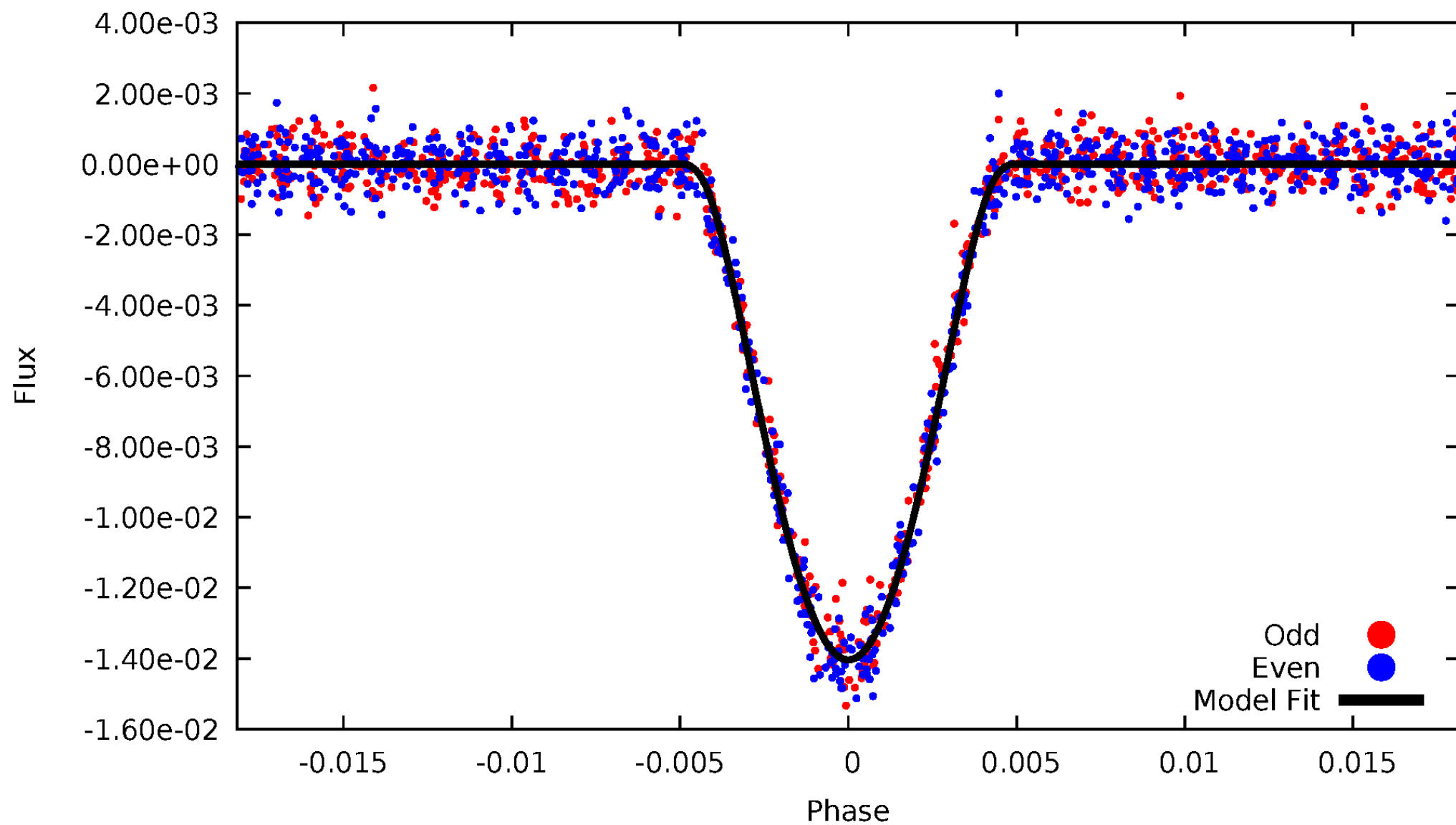


TCE 004633434-02



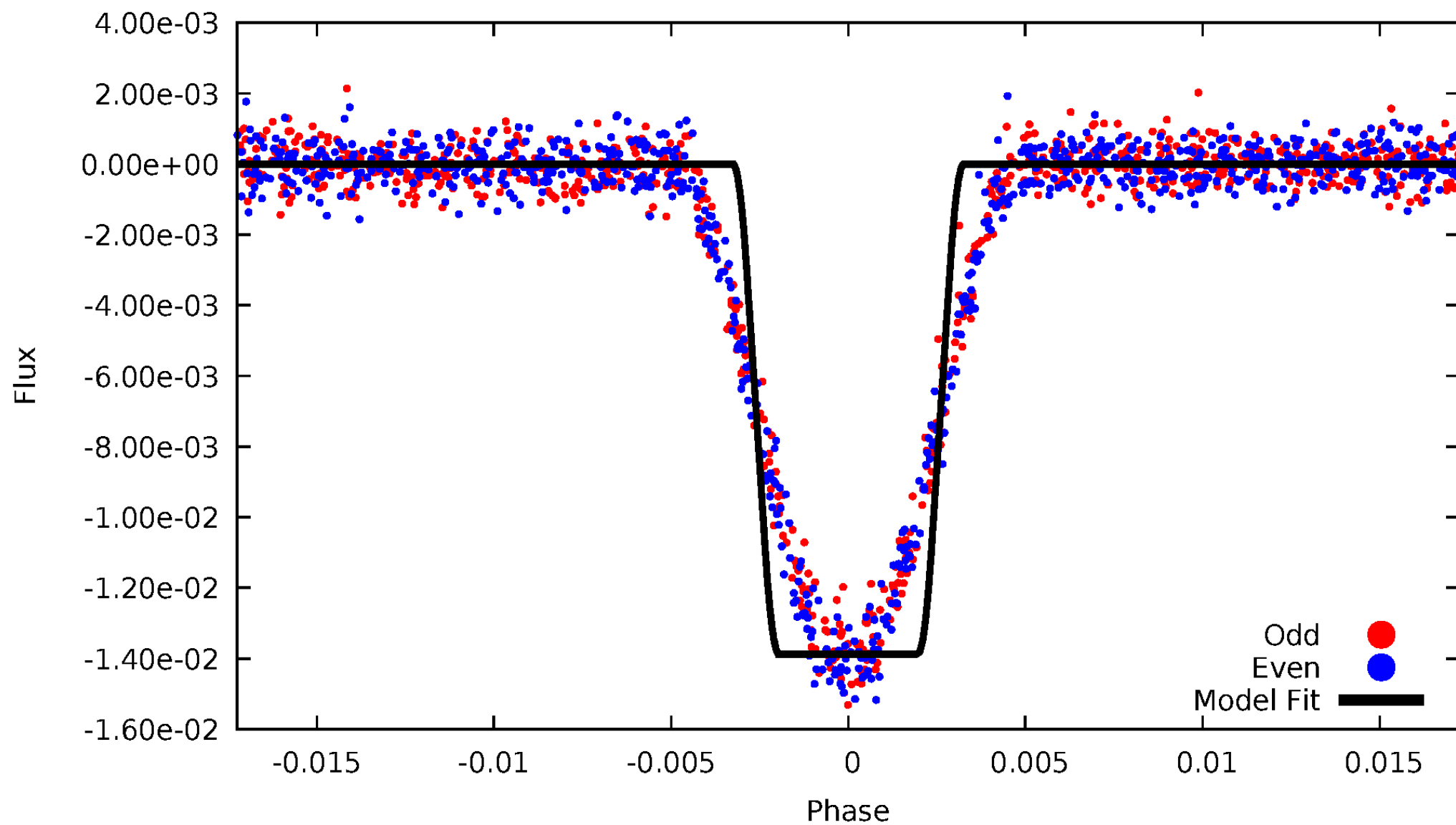
DV Odd/Even

TCE 004633434-02



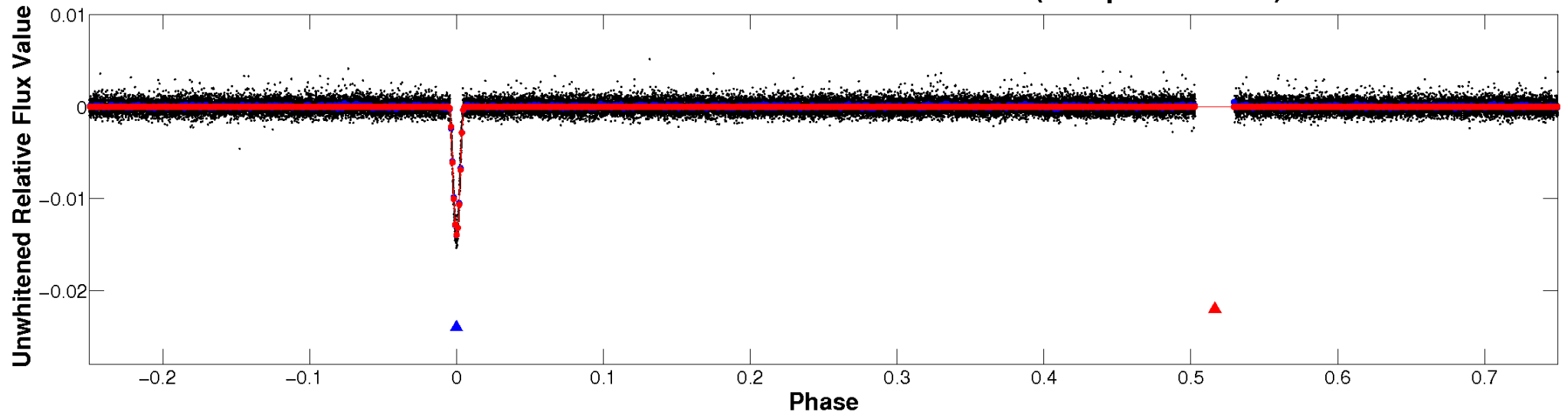
ALT Odd/Even

TCE 004633434-02

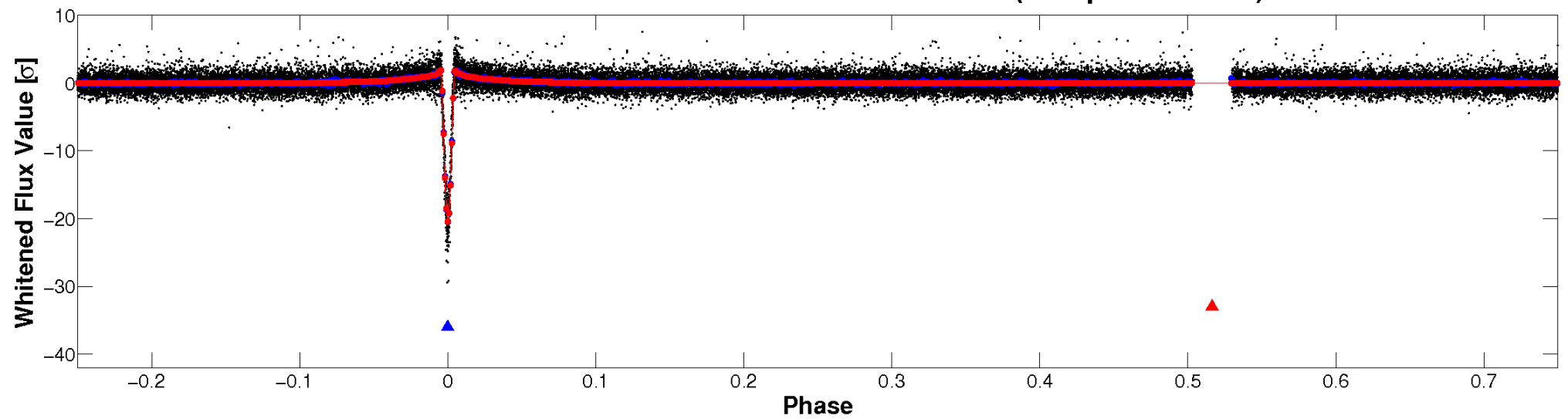


Non-Whitened Vs. Whitened Light Curve

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

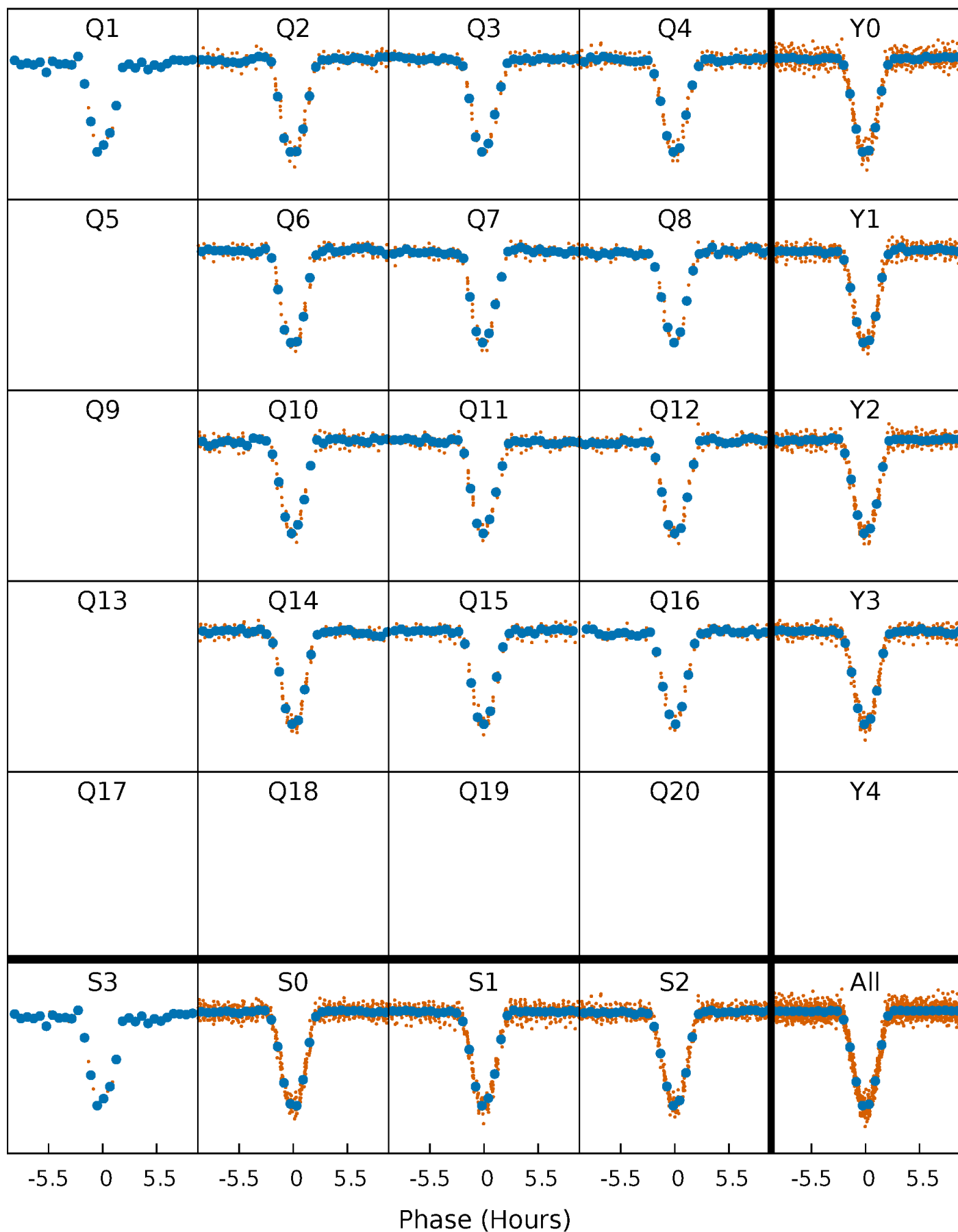


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



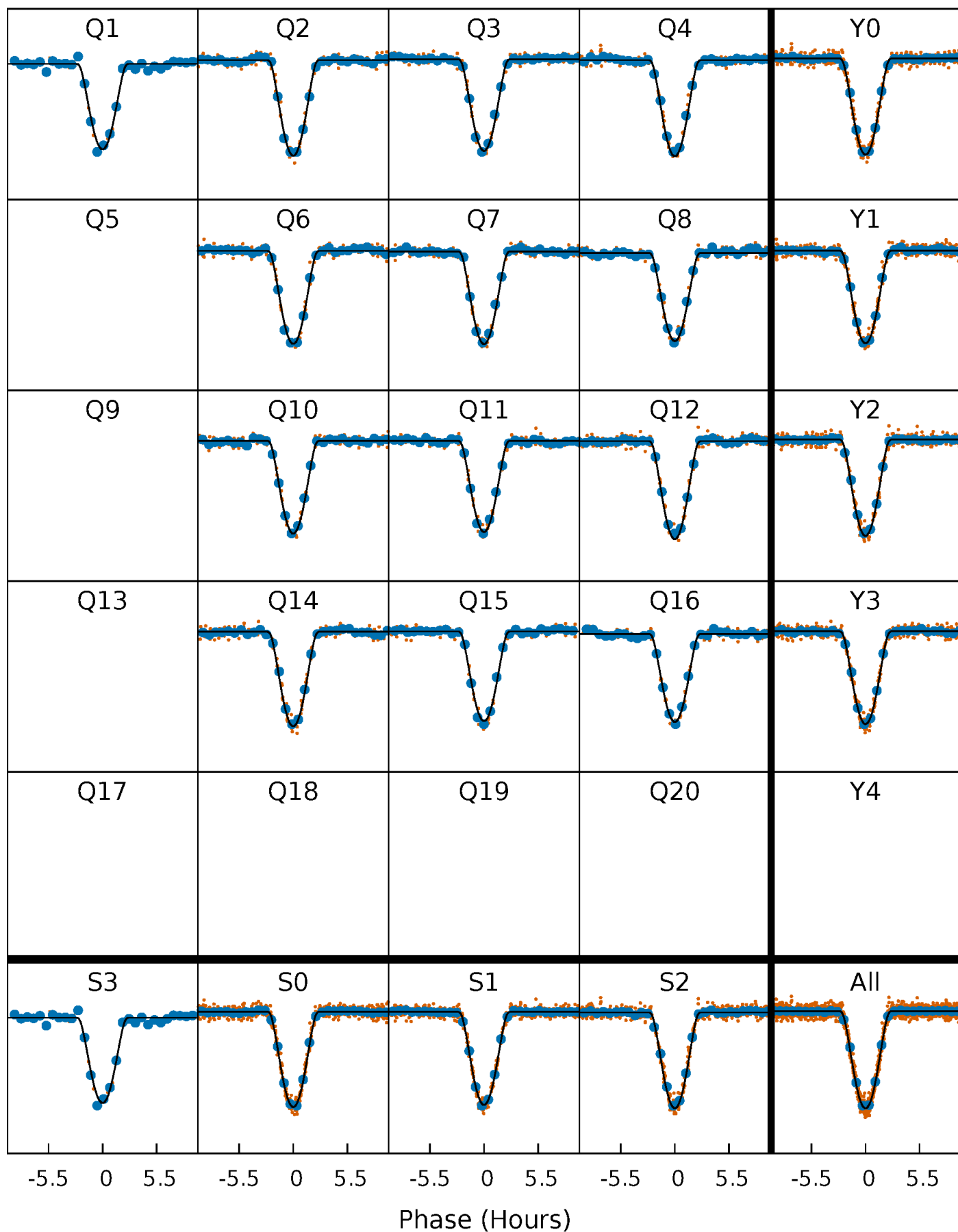
PDC Quarter-Phased Transit Curves

TCE 004633434-02 P= 22.271227 Days $T_0=145.529343$ (BKJD)



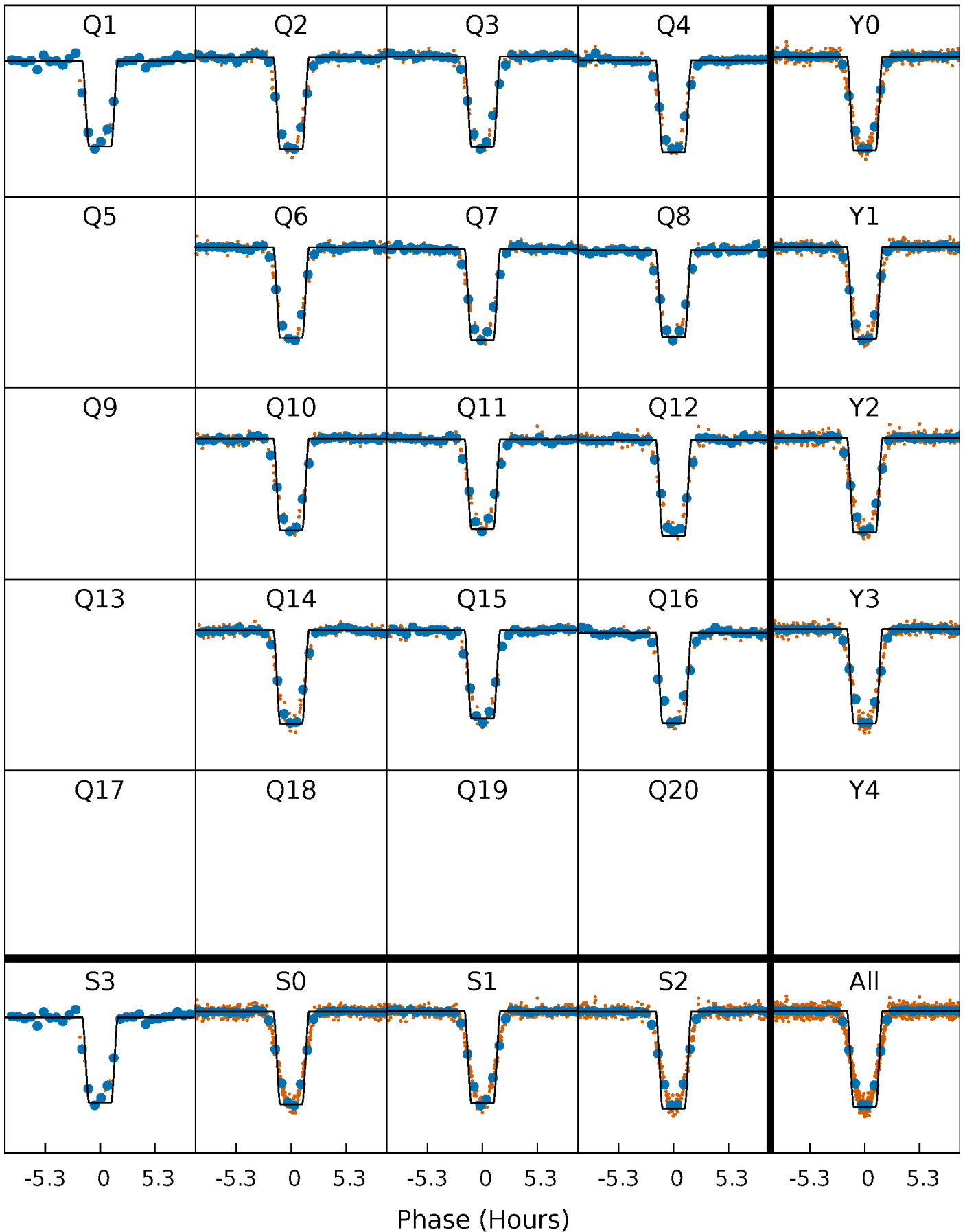
DV Quarter-Phased Transit Curves

TCE 004633434-02 P= 22.271227 Days $T_0=145.529343$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

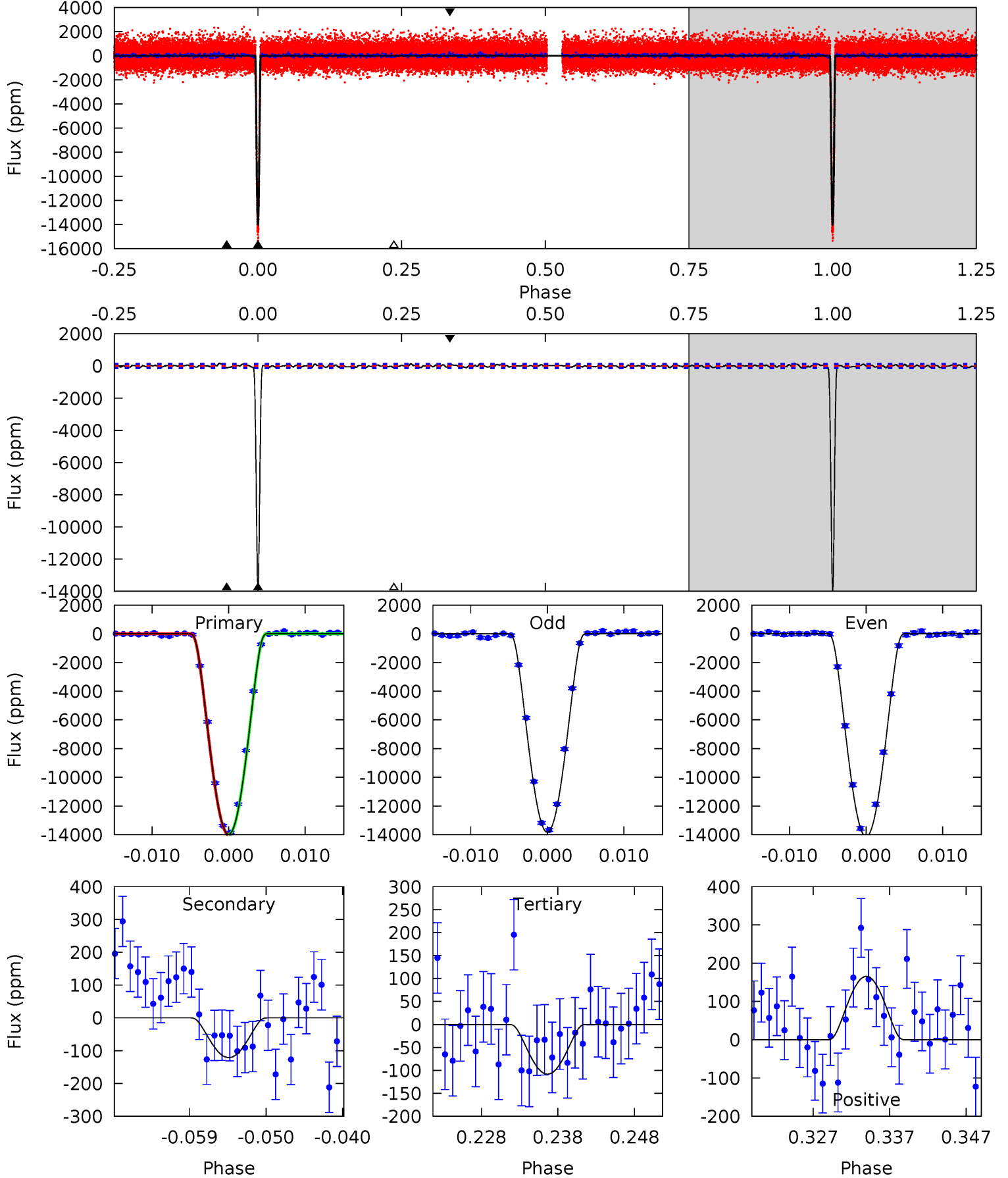
TCE 004633434-02 P= 22.271181 Days $T_0=145.530647$ (BKJD)



DV Model-Shift Uniqueness Test

004633434-02, P = 22.271227 Days, E = 123.258116 Days

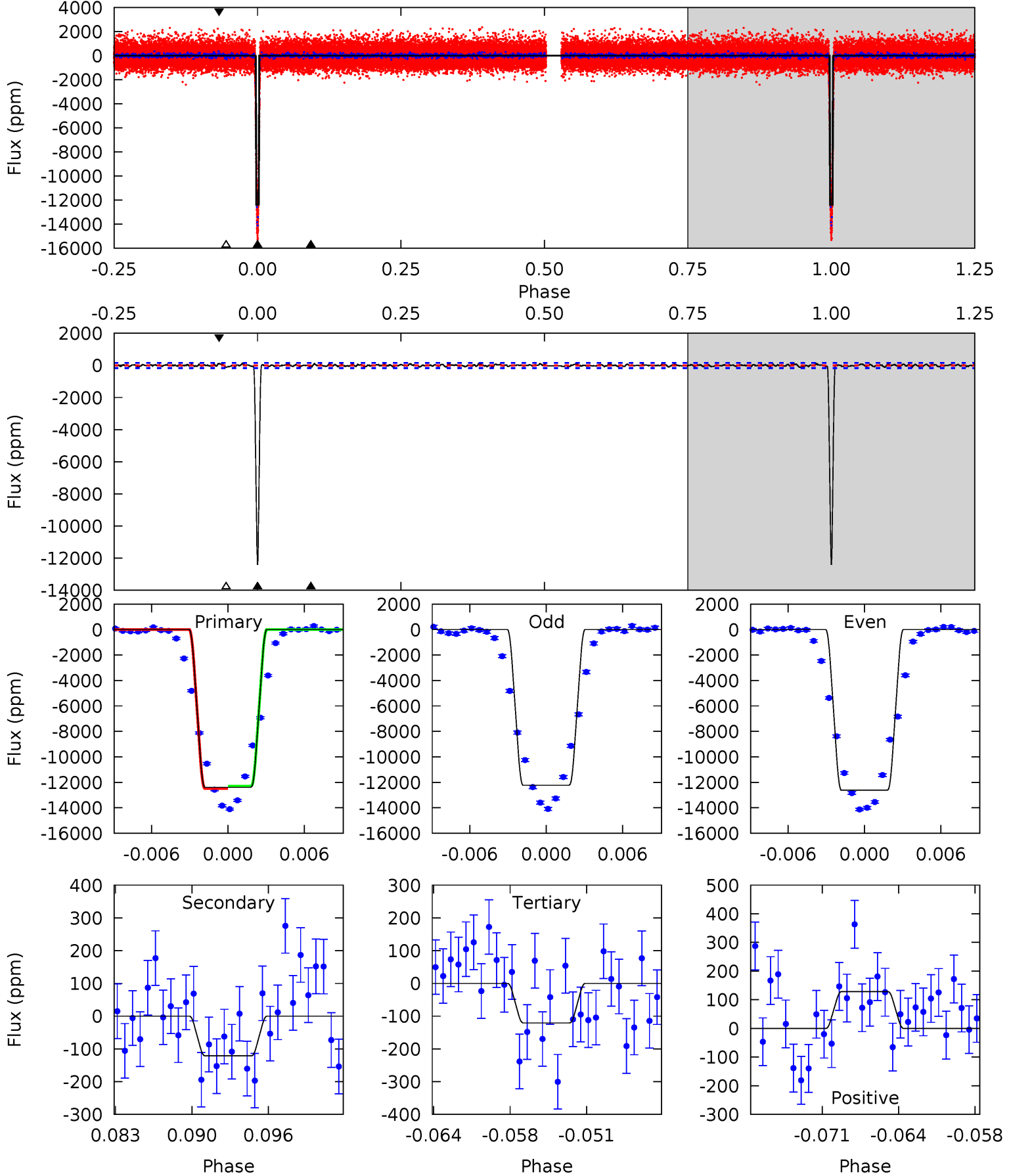
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
539.3	4.67	4.17	6.38	5.03	2.58	1.83	535.1	532.9	0.50	-1.71	5.97	1.00	0.01	0.19



Alt Model-Shift Uniqueness Test

004633434-02, P = 22.271181 Days, E = 123.259466 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
388.5	3.81	3.79	4.03	5.11	2.73	1.26	384.7	384.5	0.02	-0.22	5.97	1.00	0.01	2.65



Stellar Parameters For KIC 004633434

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5068^{+151}_{-136}	$4.556^{+0.077}_{-0.056}$	$-0.340^{+0.350}_{-0.300}$	$0.730^{+0.079}_{-0.079}$	$0.698^{+0.100}_{-0.050}$	$2.532^{+0.863}_{-0.541}$
	+3%/-3%	+2%/-1%	+103%/-88%	+11%/-11%	+14%/-7%	+34%/-21%
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 004633434-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-121 ± 26	$14.82^{+2.35}_{-2.35}$	717^{+28}_{-26}	2162^{+103}_{-91}	$5.823^{+2.696}_{-1.758}$
Alt.	-121 ± 32	$9.29^{+2.33}_{-2.23}$	719^{+28}_{-25}	2415^{+177}_{-152}	15^{+11}_{-6}

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

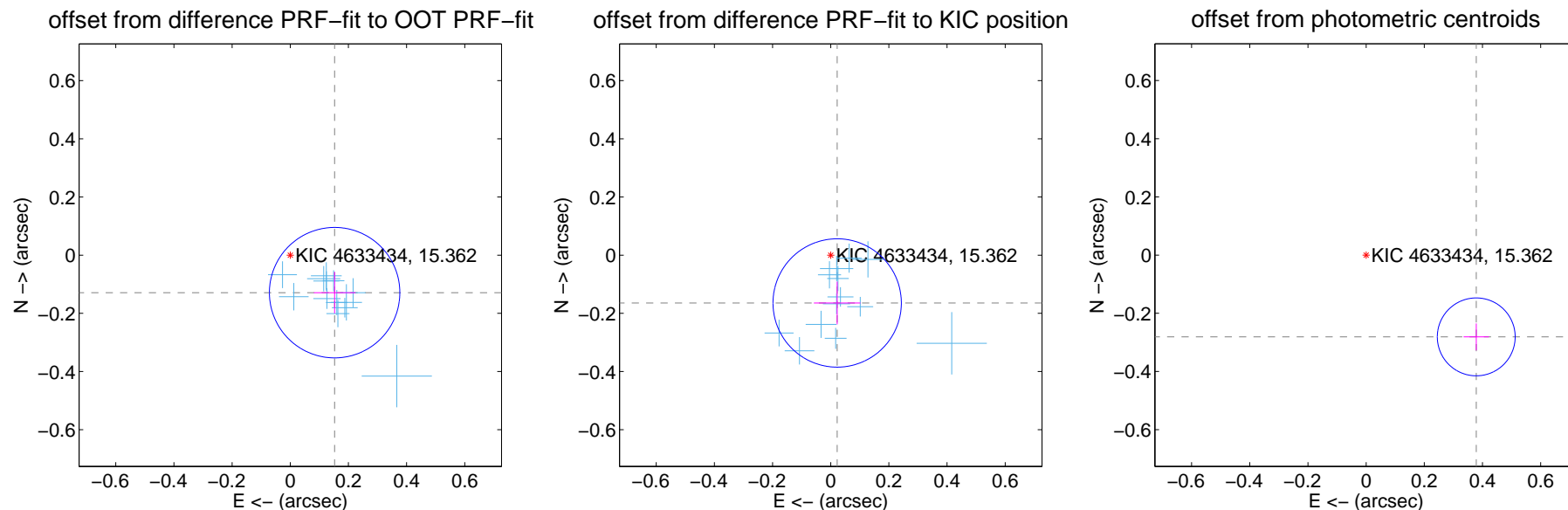
DV Centroid Data

Supplemental centroid analysis for 004633434-02. Kepler magnitude: 15.36. Transit SNR 270.77

There are 13 quarters with good PRF difference image offsets

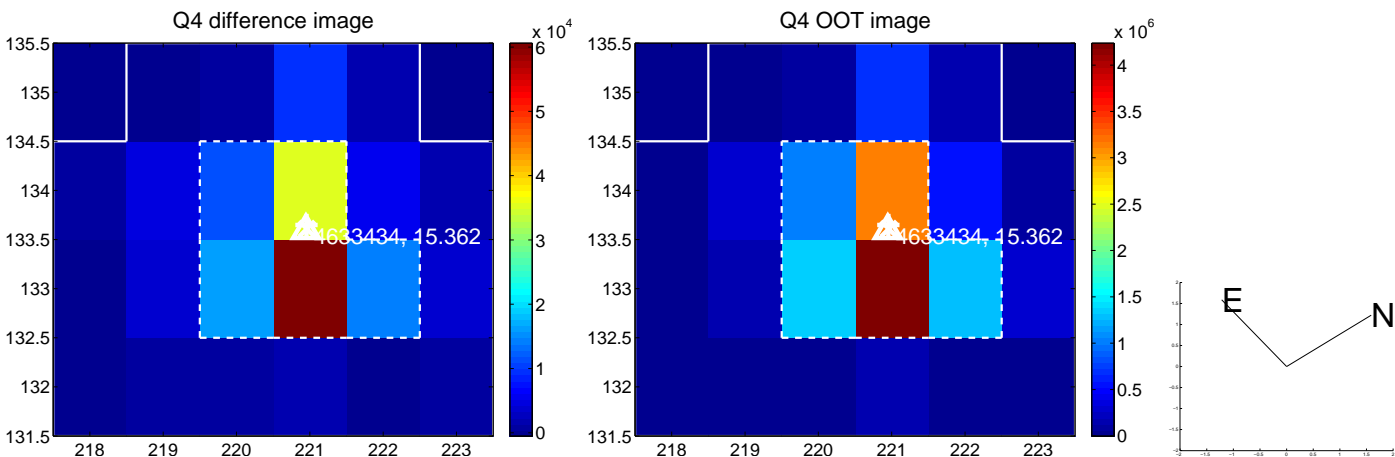
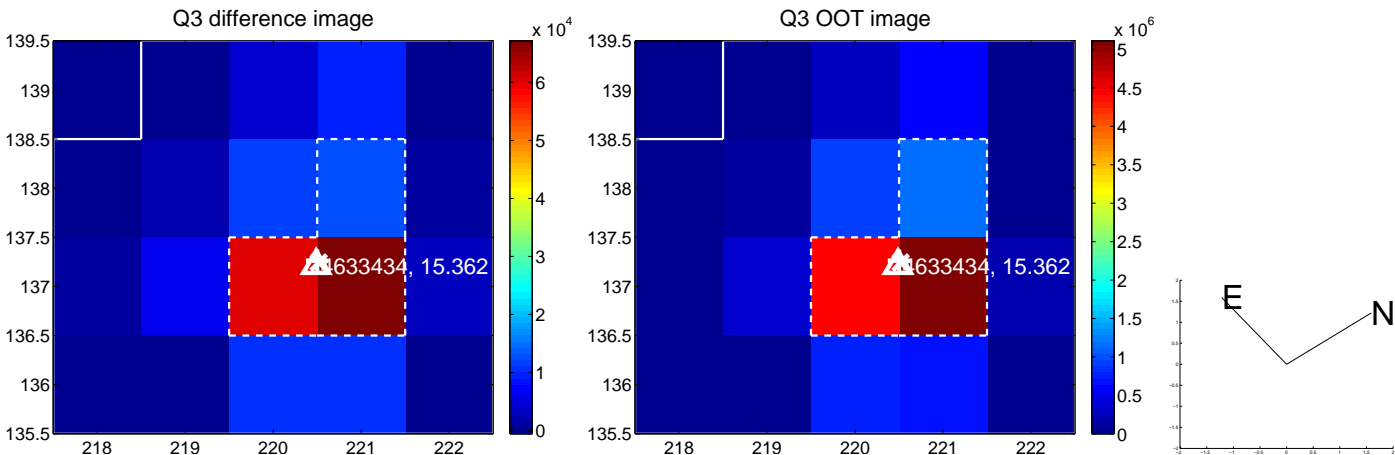
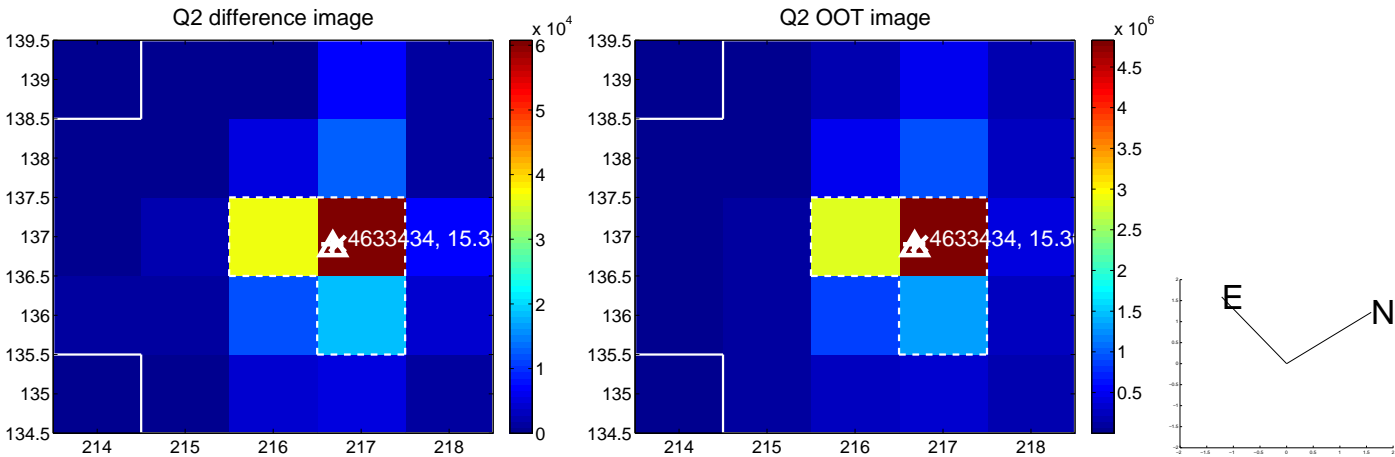
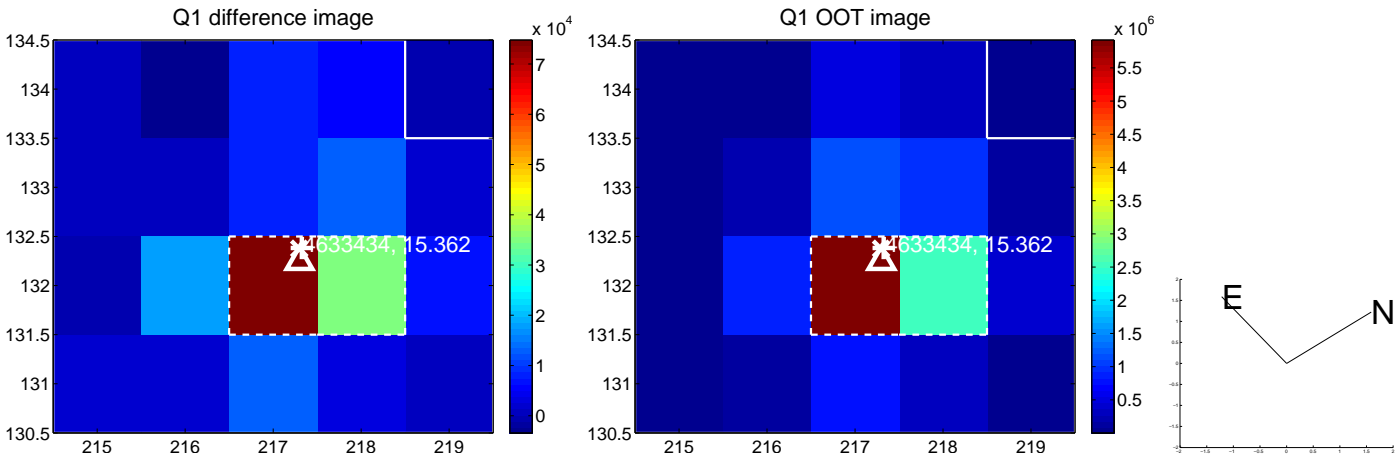
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.200 ± 0.075	2.67	-0.153 ± 0.072	-0.129 ± 0.071
PRF-fit source offset from KIC position	0.166 ± 0.074	2.26	-0.022 ± 0.080	-0.164 ± 0.074
photometric centroid source offset	0.47 ± 0.04	10.57	-0.38 ± 0.04	-0.28 ± 0.05

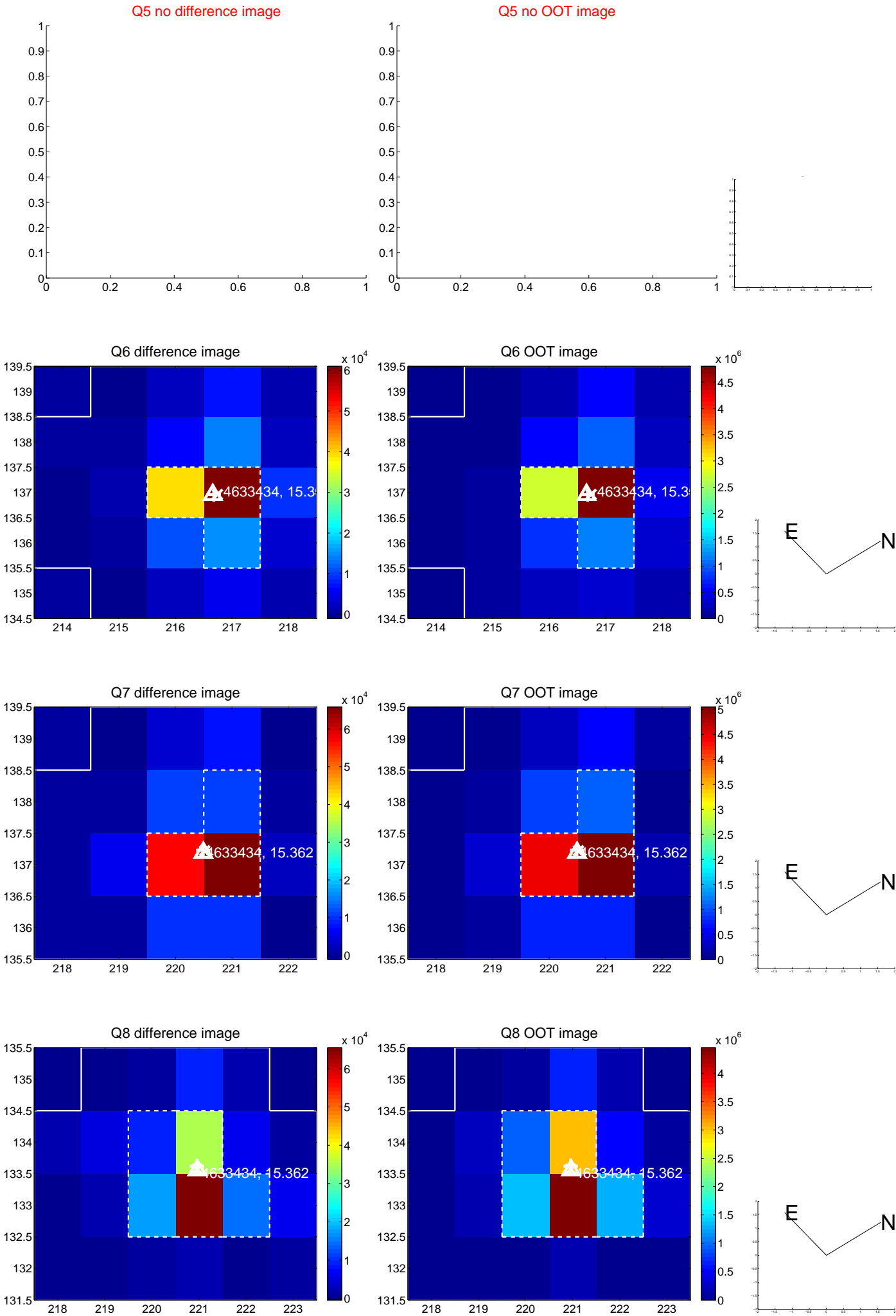


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

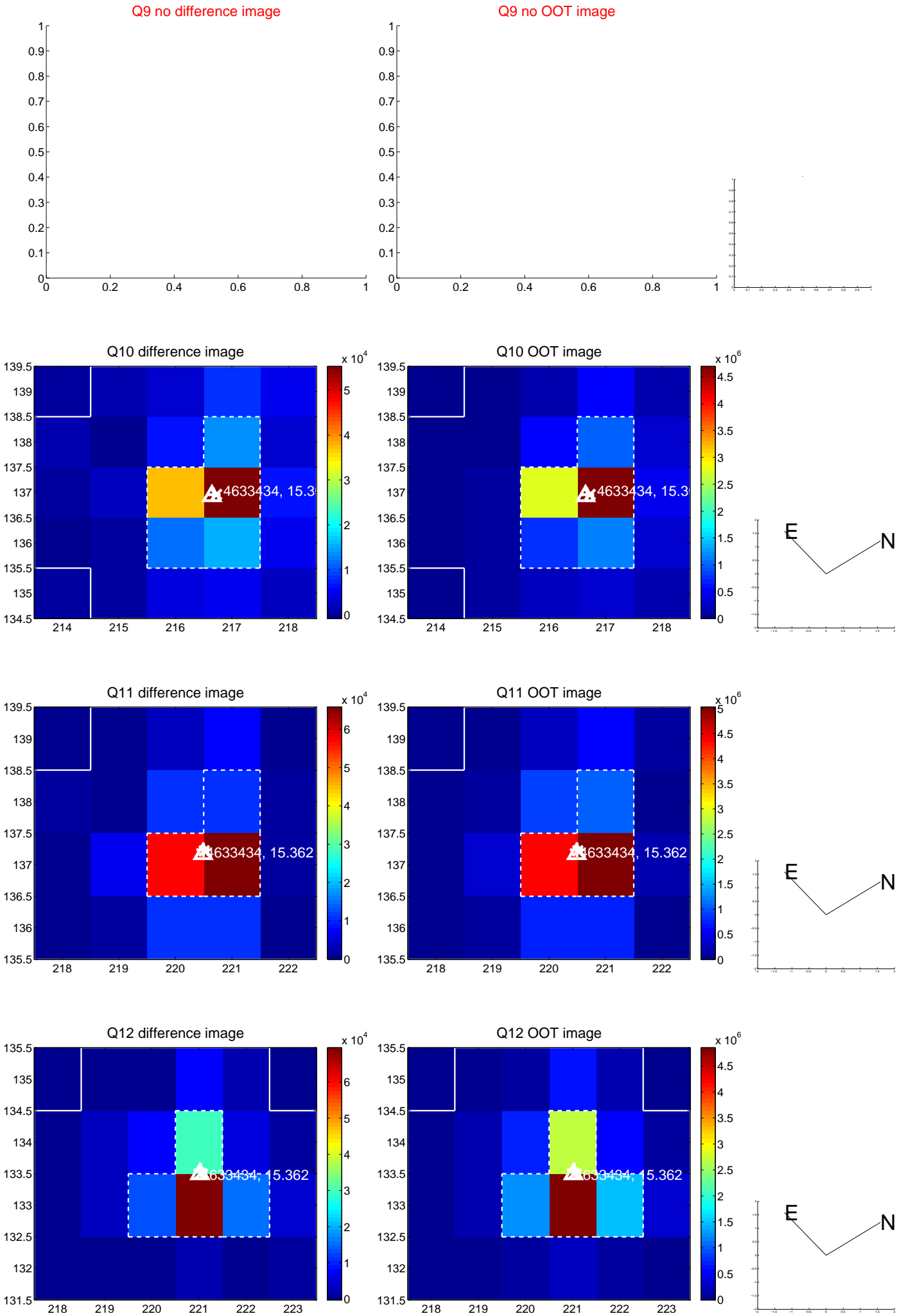
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



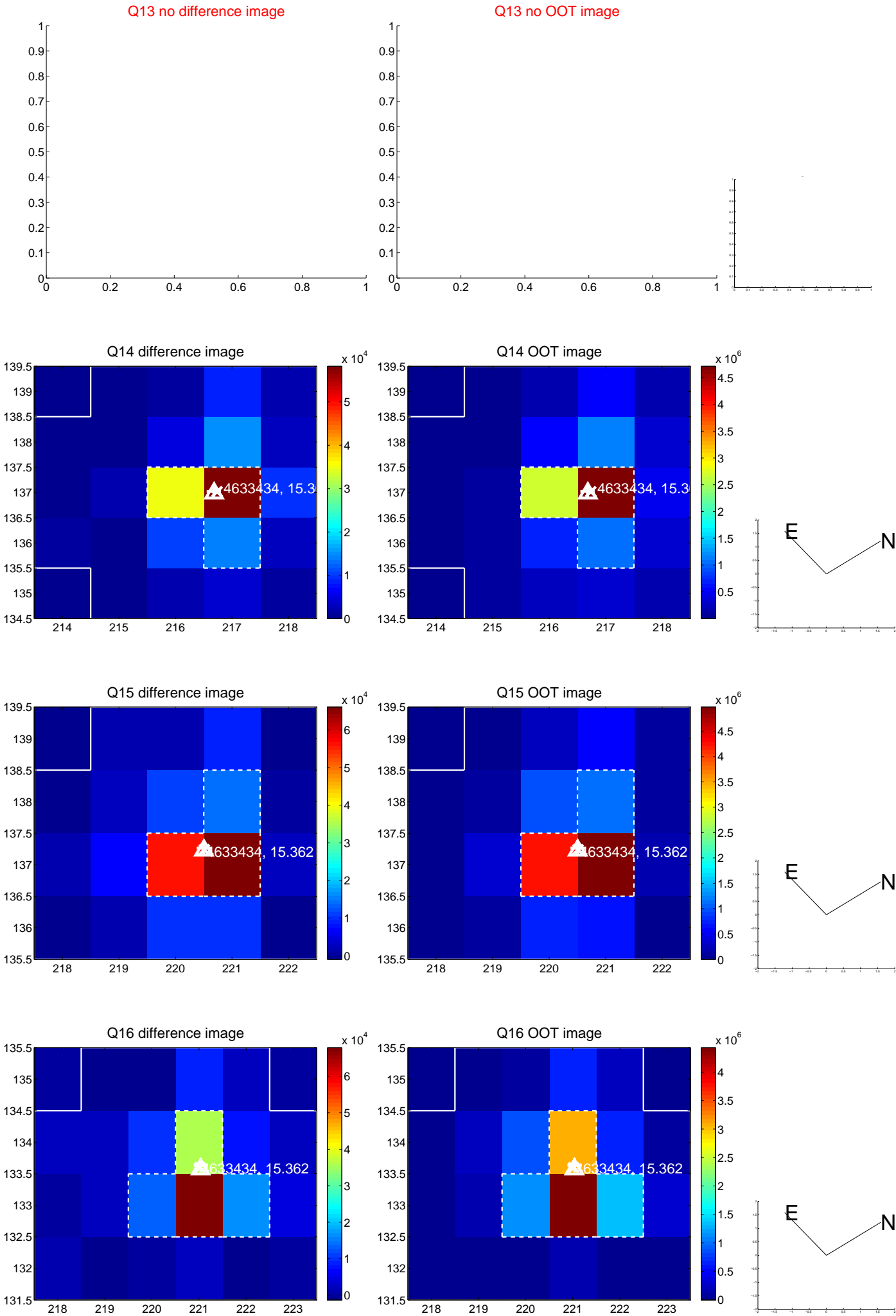
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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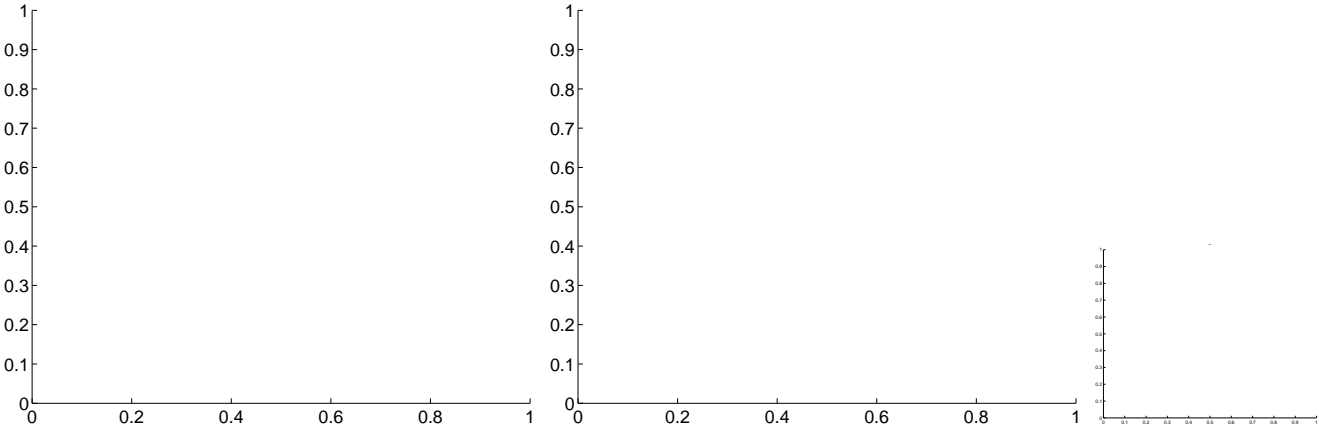
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



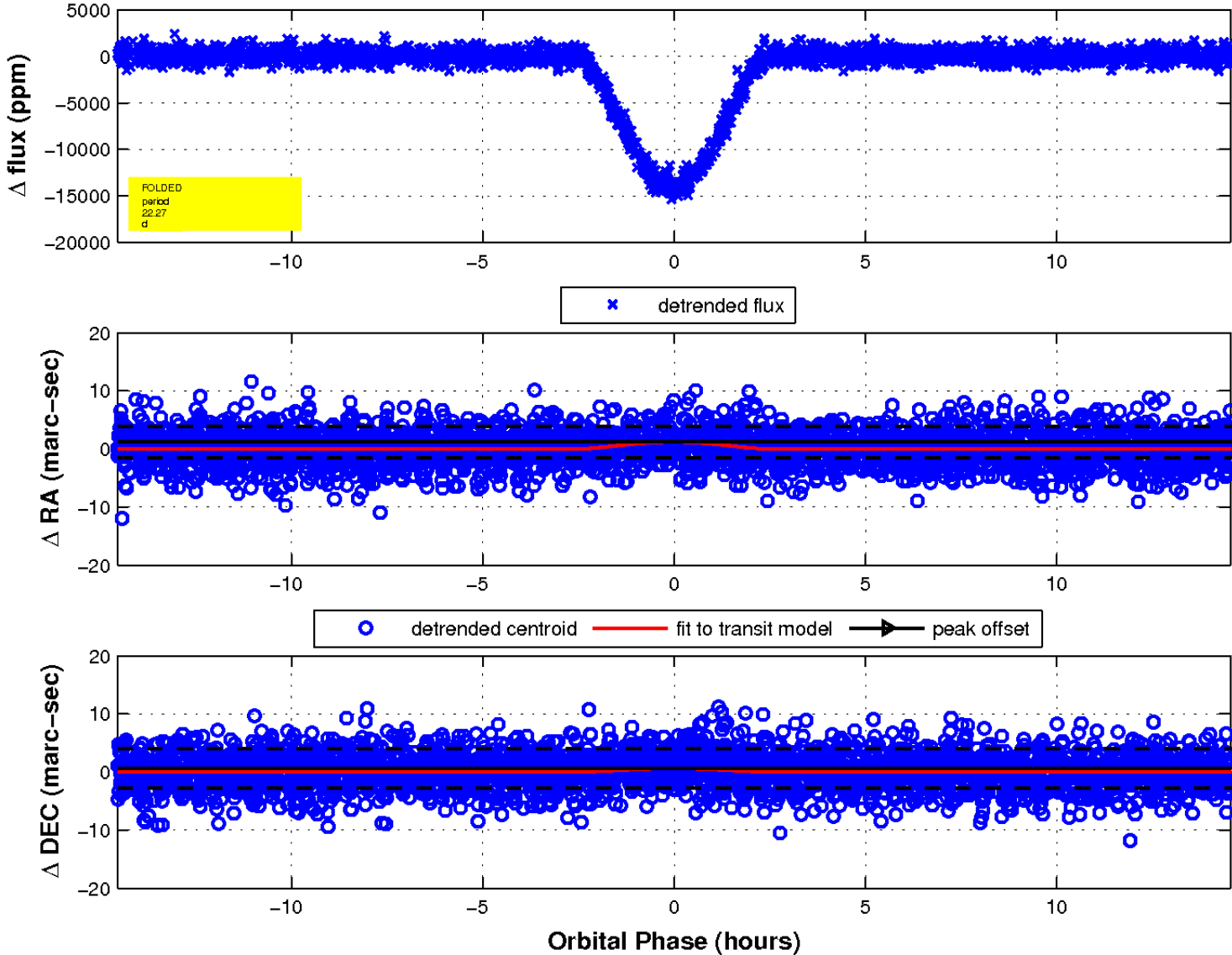
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

Q17 no difference image

Q17 no OOT image



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

