

KIC 004757437

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})
004757437-01	OBS	0497.01	13.193217	136.031097	571.0	5.213	40.6	44.6	1.22	5946	3.27	130.70
004757437-02	OBS	0497.02	4.425343	134.562892	165.0	3.579	18.7	18.8	1.22	5946	1.80	560.81

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004757437-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004757437-02	OBS	PC	1.00	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.

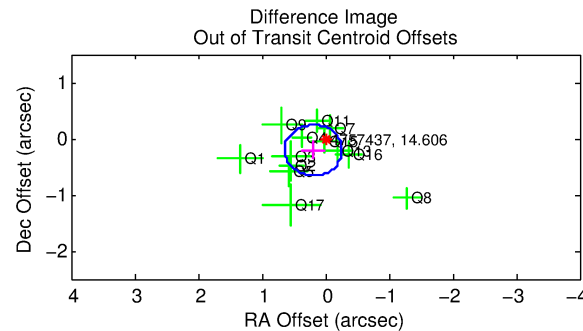
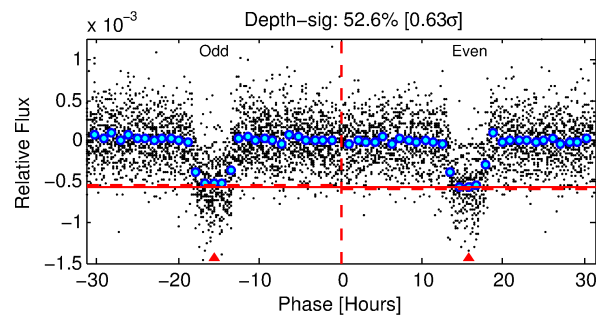
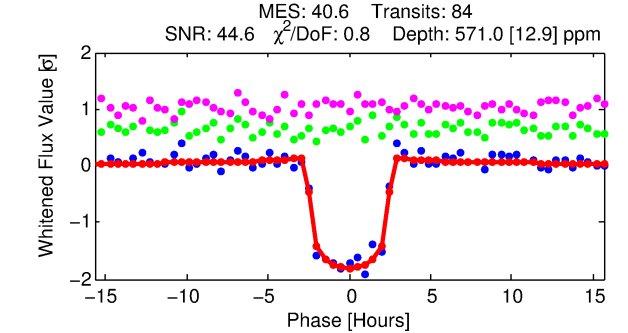
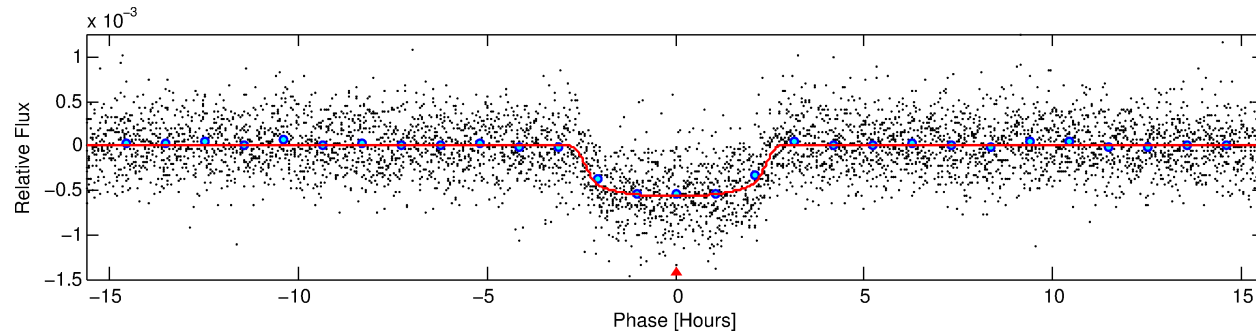
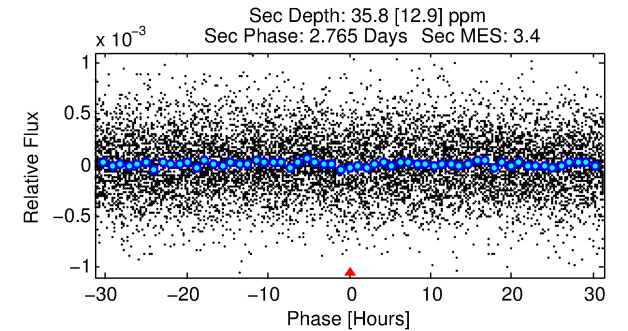
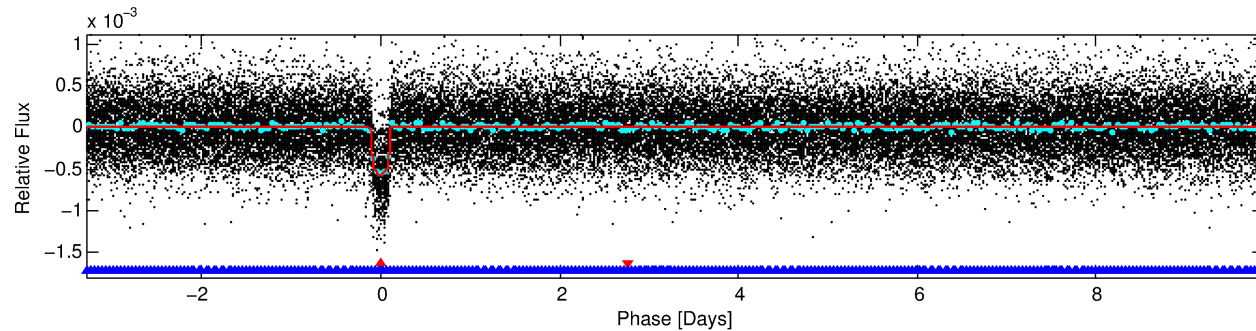
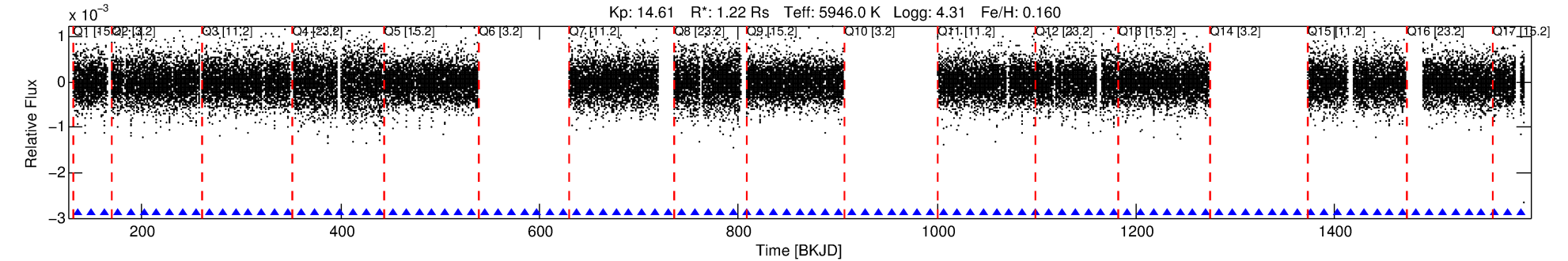
Ephemeris Match Information For 004757437-01

No Significant Match Found

DV One-Page Summary

KIC: 4757437 Candidate: 1 of 2 Period: 13.193 d
KOI: K00497.01 Name: Kepler-168c Corr: 0.976

Kp: 14.61 R*: 1.22 Rs T_{eff}: 5946.0 K Logg: 4.31 Fe/H: 0.160



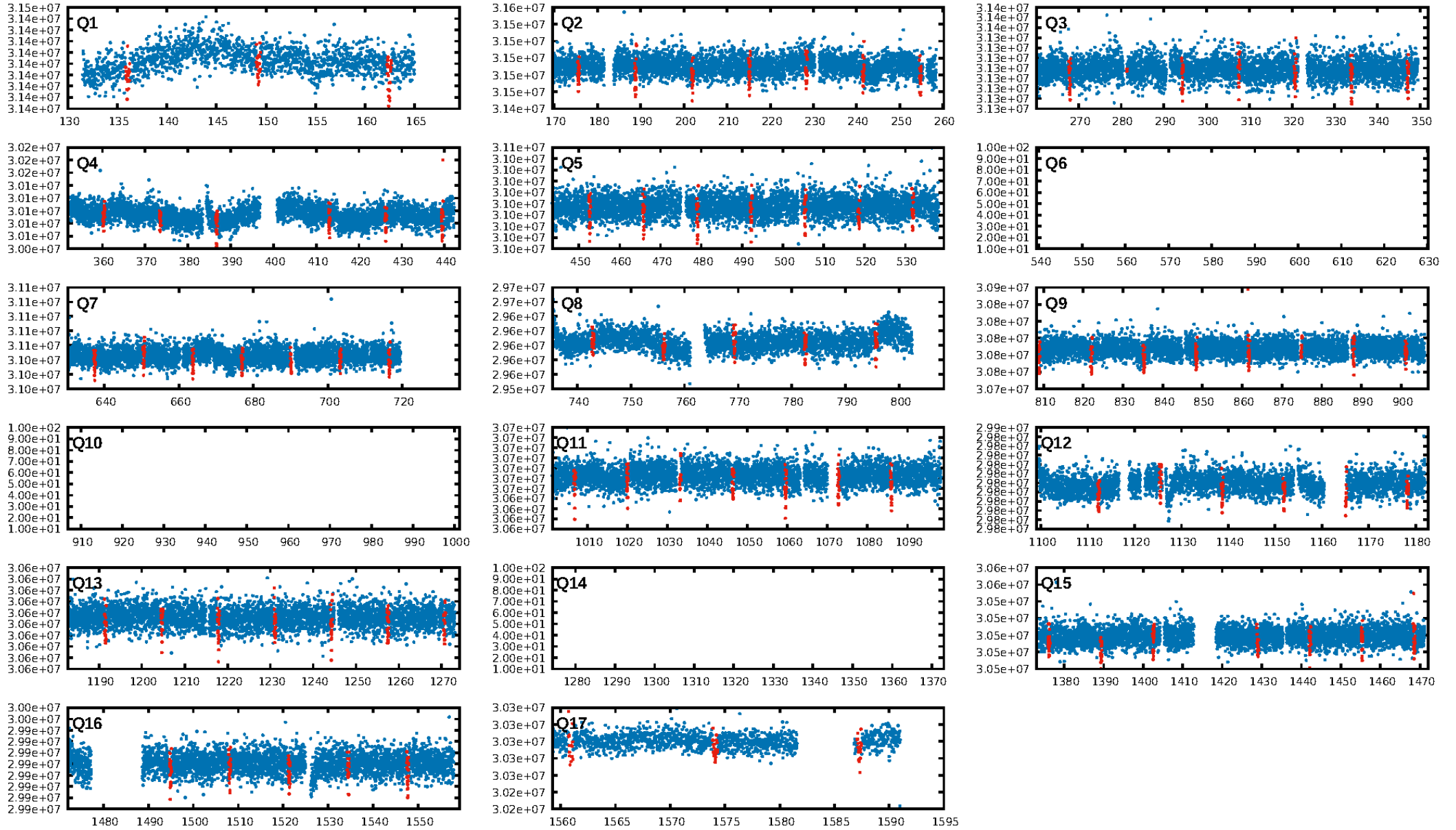
DV Fit Results:

Period = 13.19322 [0.00003] d
Epoch = 136.0311 [0.0021] BKJD
Rp/R* = 0.0245 [0.0023]
a/R* = 12.01 [5.23]
b = 0.82 [0.18]
Seff = 130.70 [29.24]
T_{eq} = 862 [48] K
Rp = 3.27 [0.64] Re
a = 0.1132 [0.0165] AU
Ag = 23.65 [10.91] [2.08σ]
T_{eff} = 2940 [301] K [6.80σ]

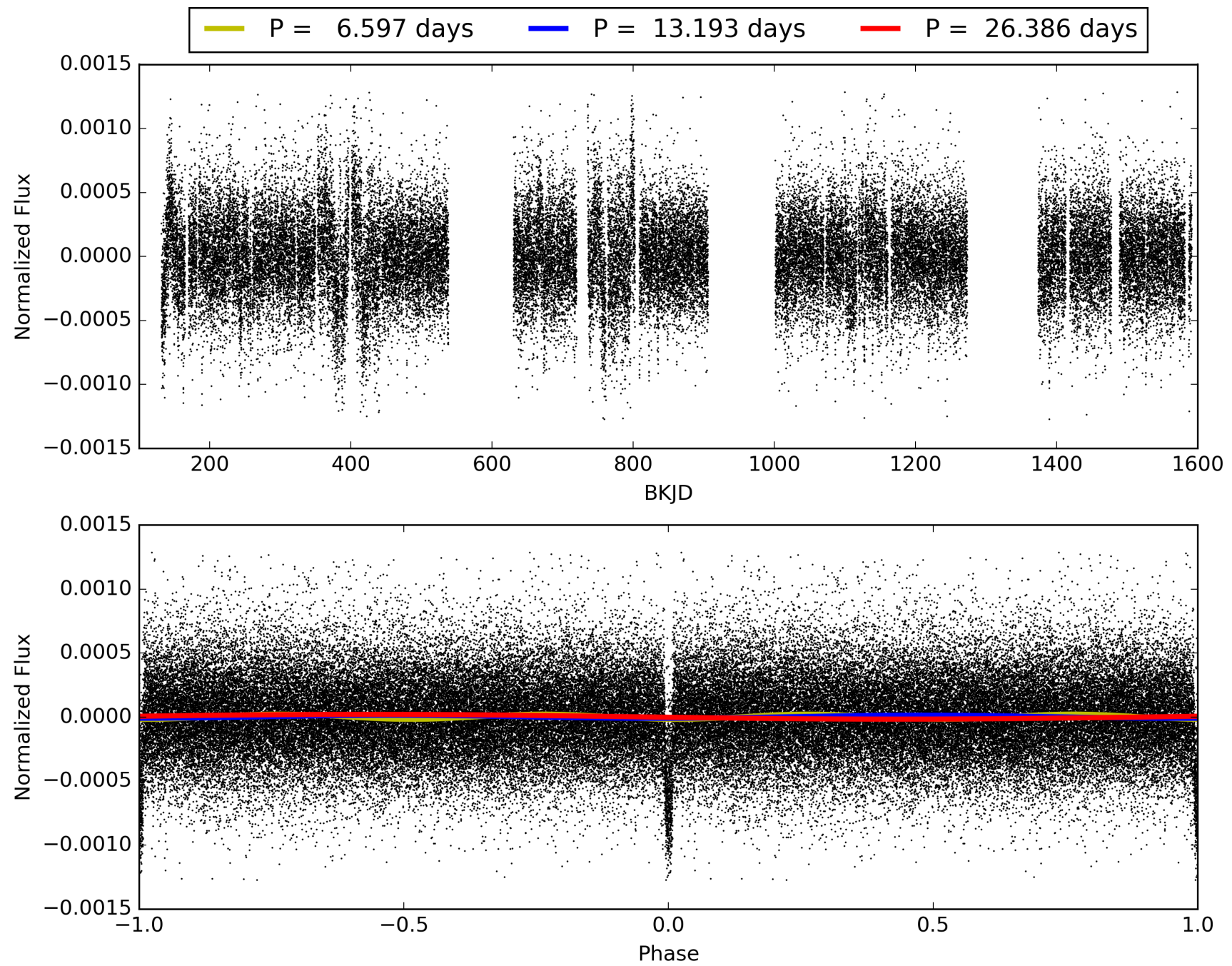
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [33.28σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 17.2%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [78/78]
GhostDiagnostic-chr: 6.836
Centroid-sig: 0.0%
Centroid-so: 0.465 arcsec [2.03σ]
OotOffset-rm: 0.281 arcsec [1.87σ]
KicOffset-rm: 0.276 arcsec [2.14σ]
OotOffset-st: 1/4/3/5 [13]
KicOffset-st: 1/4/3/5 [13]
DiffImageQuality-fgm: 1.00 [13/13]
DiffImageOverlap-fno: 0.86 [12/14]

TCE 004757437-01, PDC Light Curves

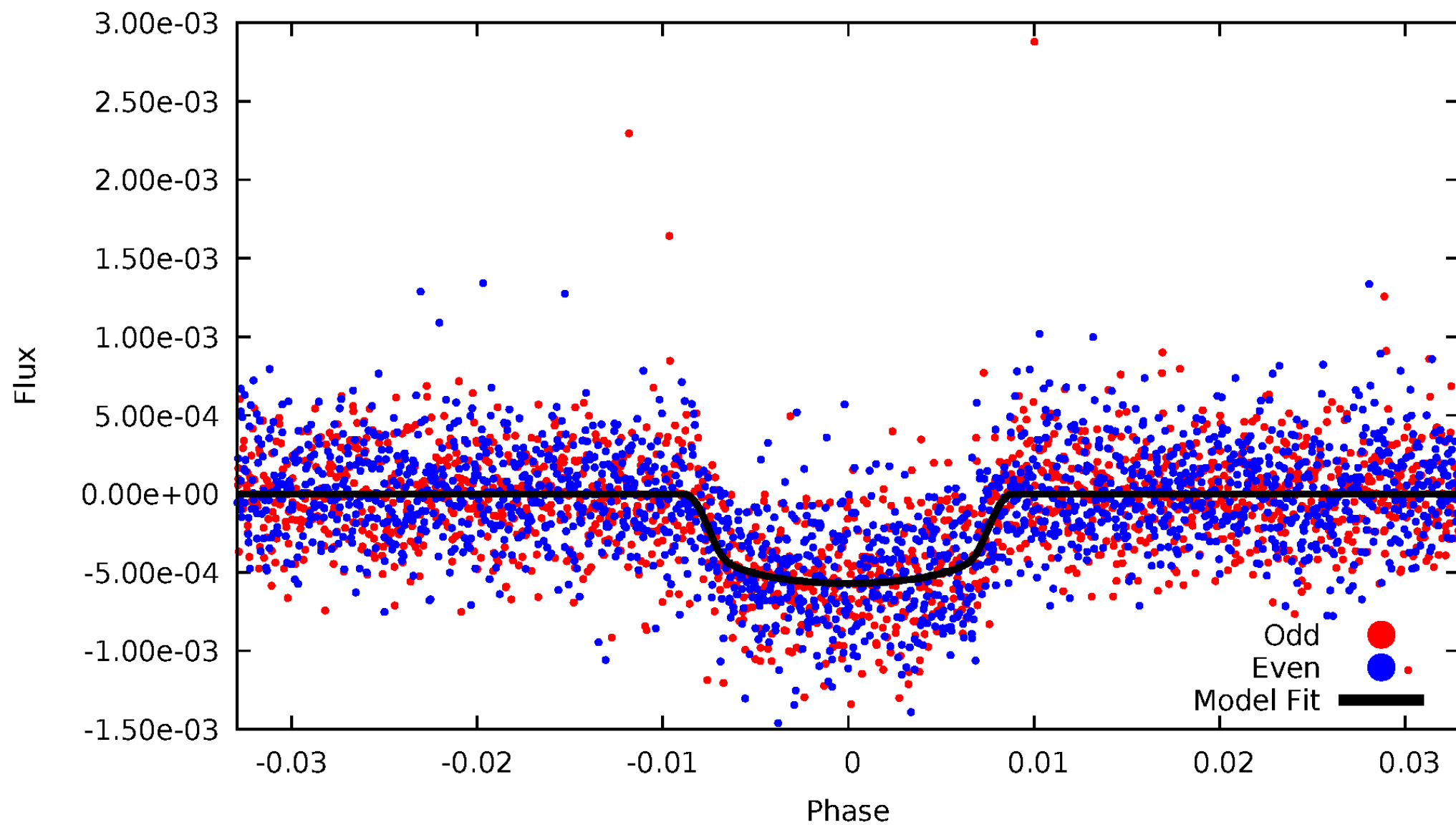


TCE 004757437-01



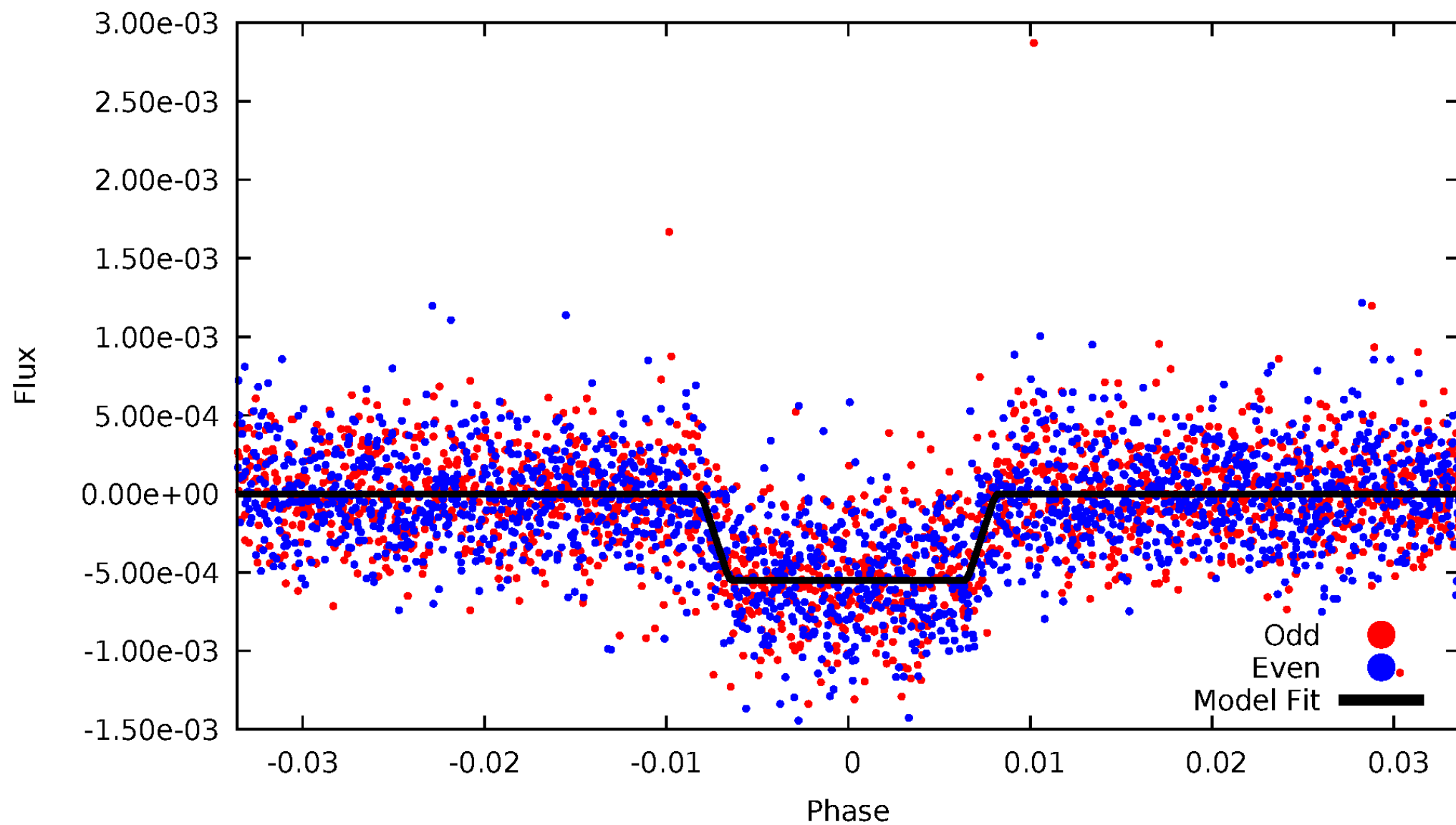
DV Odd/Even

TCE 004757437-01



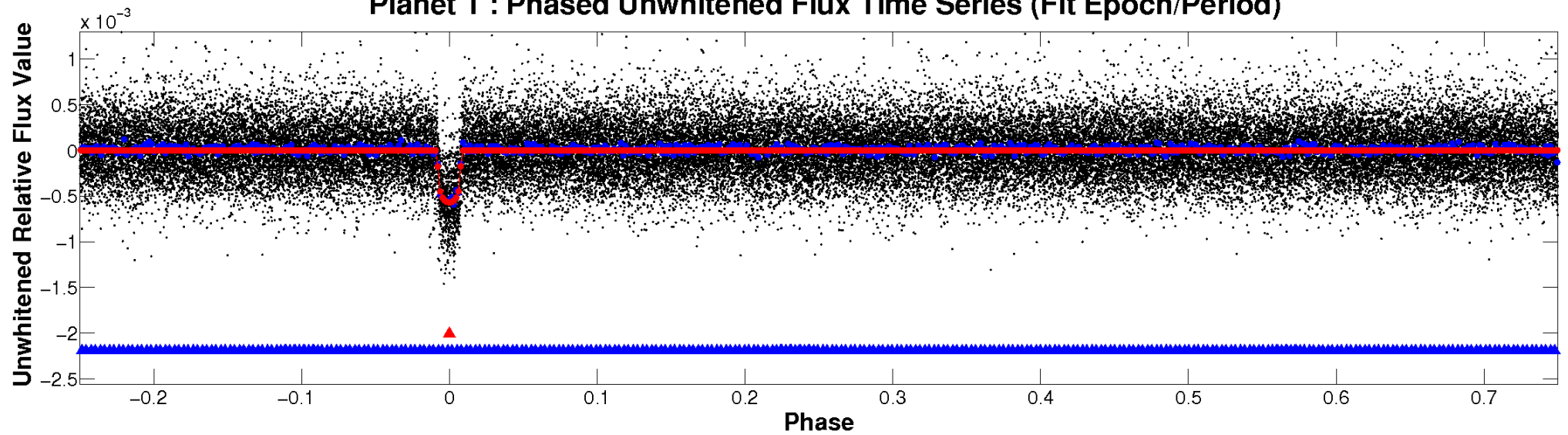
ALT Odd/Even

TCE 004757437-01

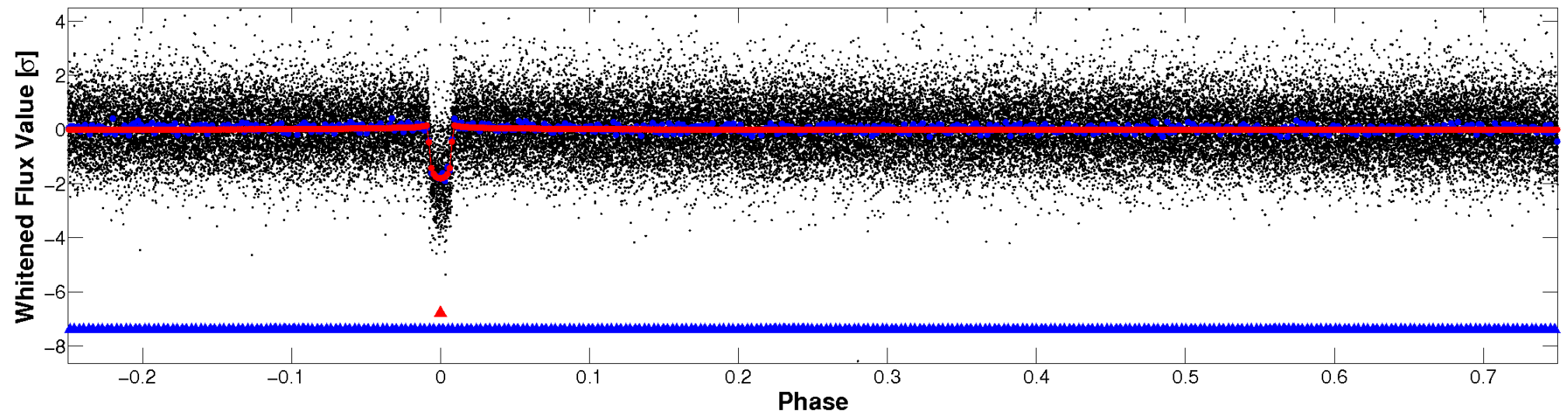


Non-Whitened Vs. Whitened Light Curve

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

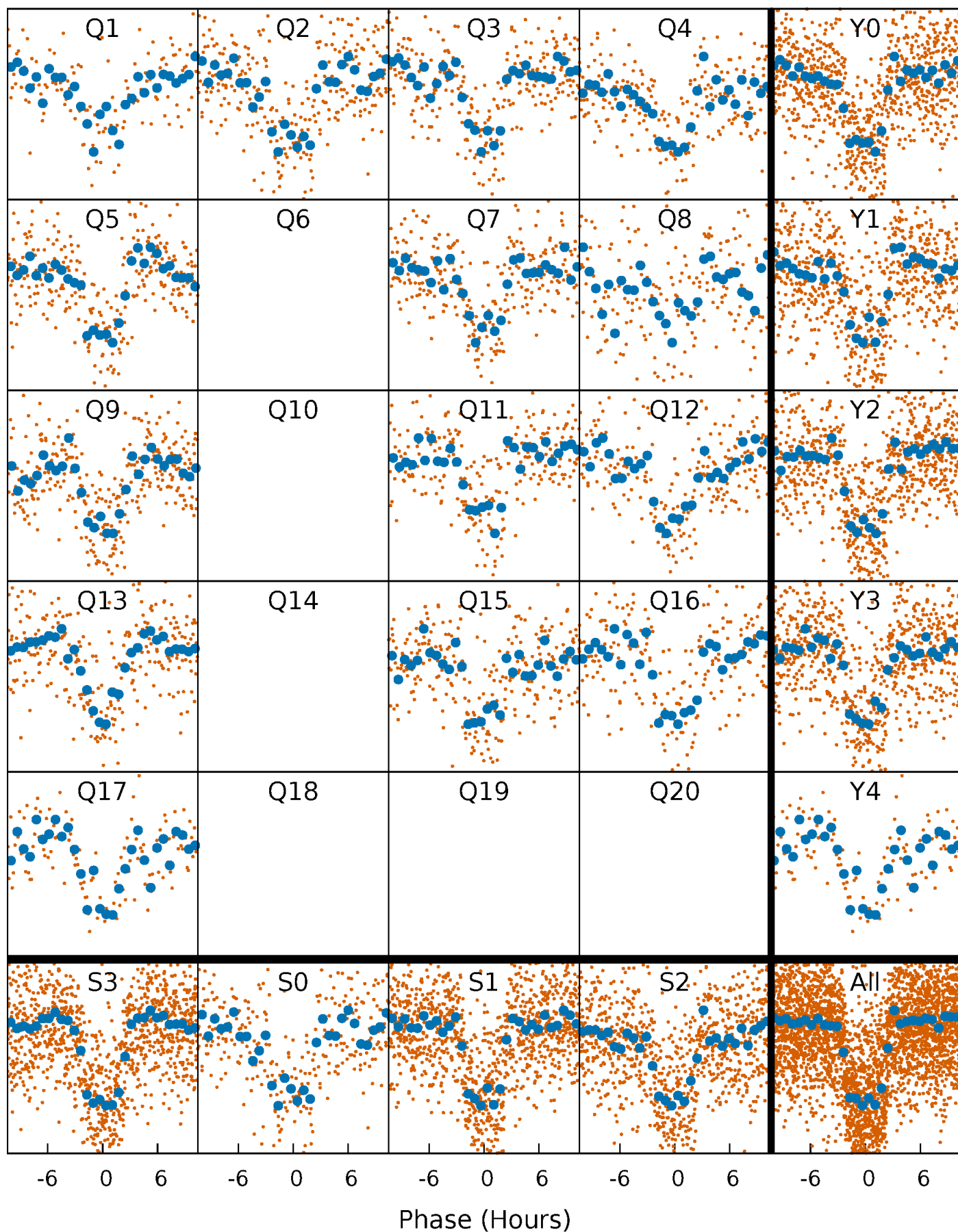


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



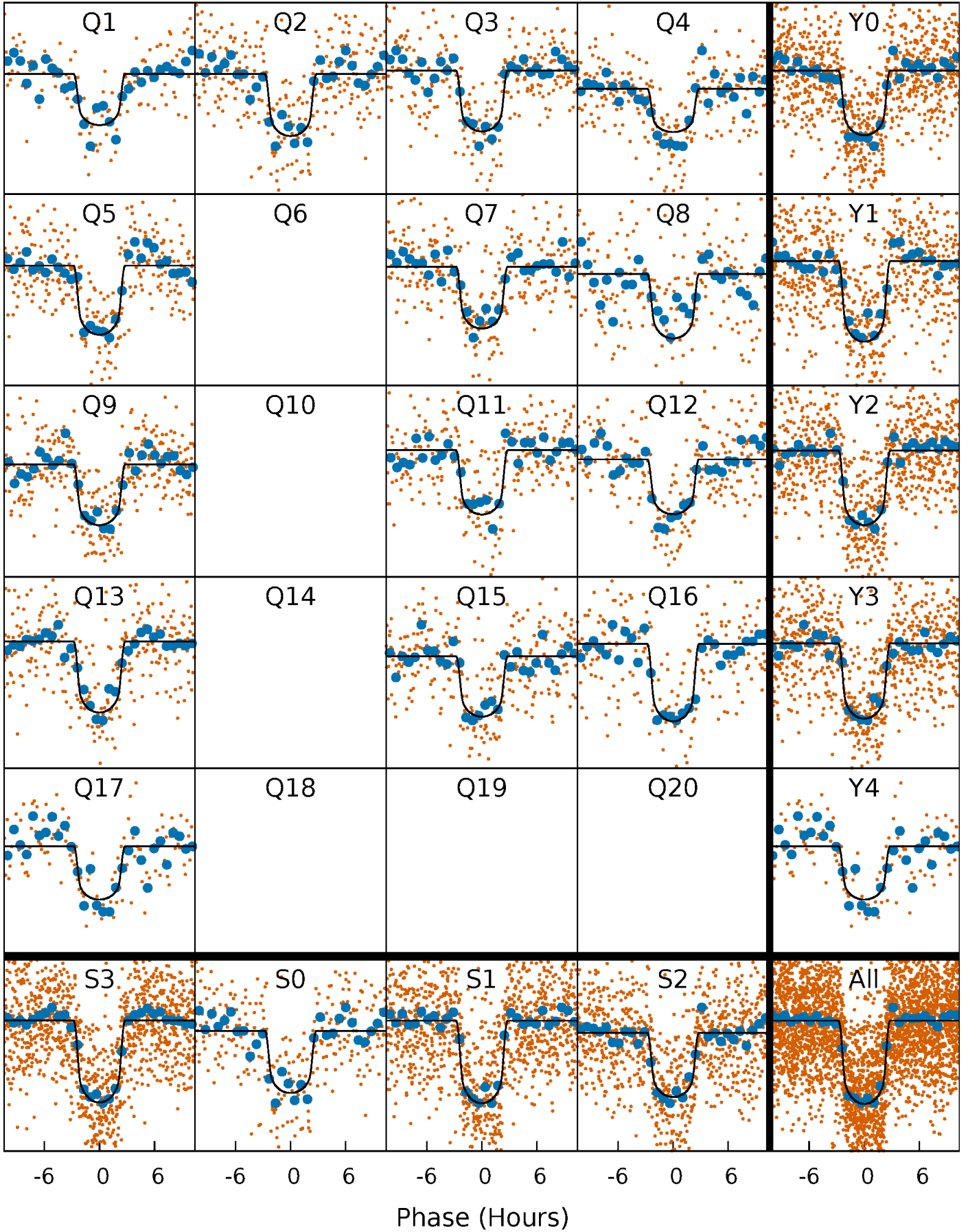
PDC Quarter-Phased Transit Curves

TCE 004757437-01 P= 13.193217 Days $T_0=136.031097$ (BKJD)



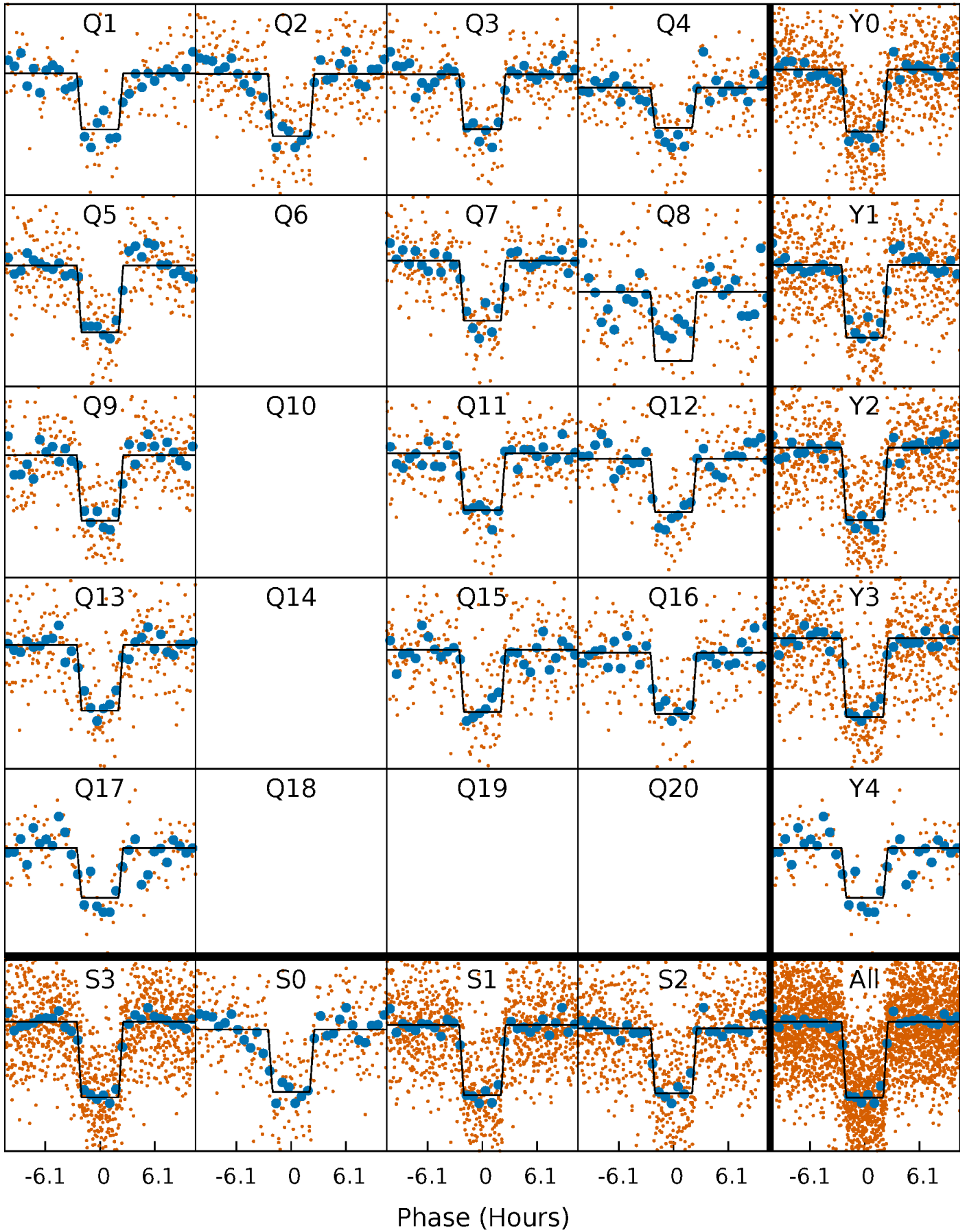
DV Quarter-Phased Transit Curves

TCE 004757437-01 P= 13.193217 Days $T_0=136.031097$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

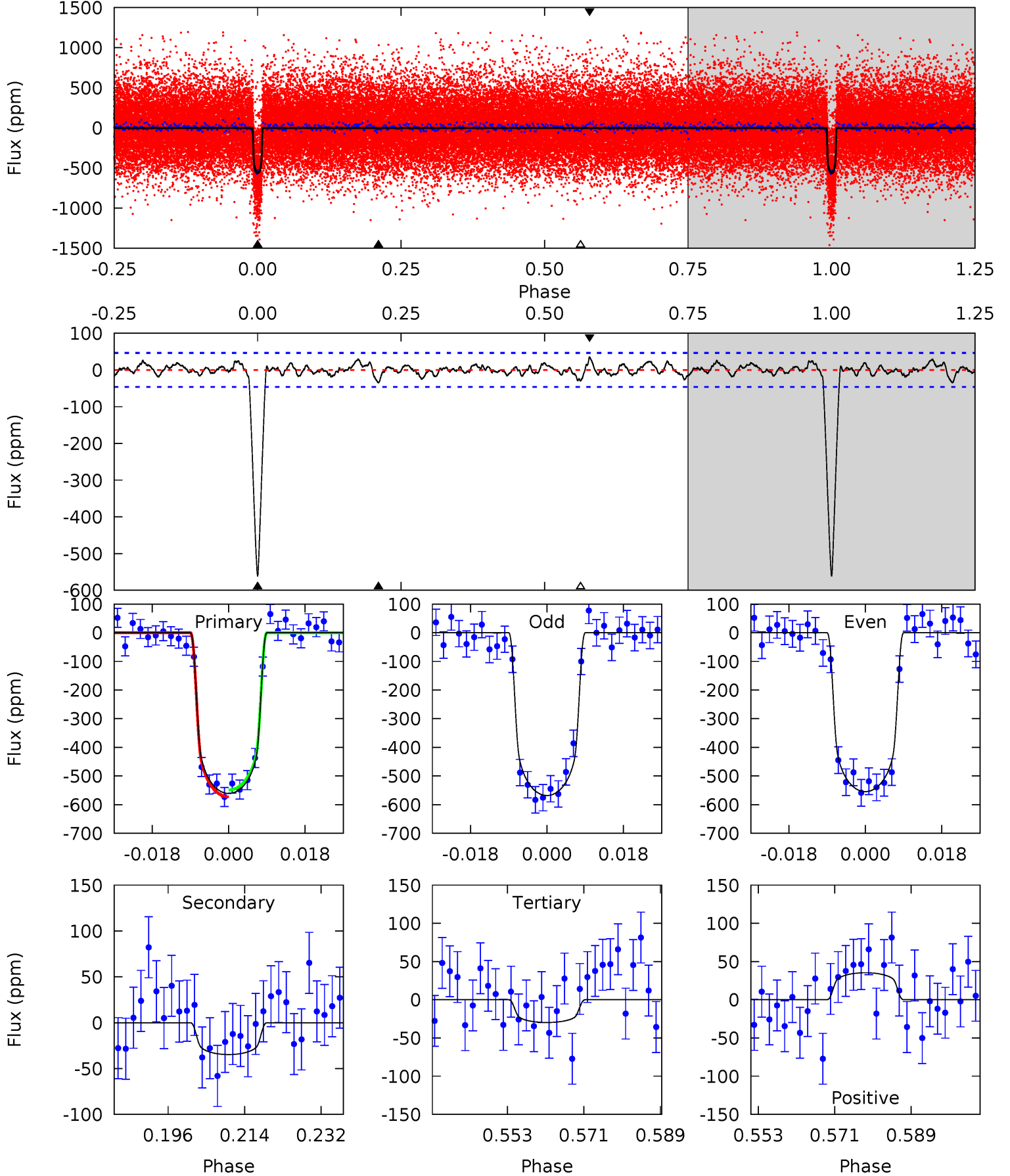
TCE 004757437-01 P= 13.193282 Days $T_0=136.027350$ (BKJD)



DV Model-Shift Uniqueness Test

004757437-01, P = 13.193217 Days, E = 122.837880 Days

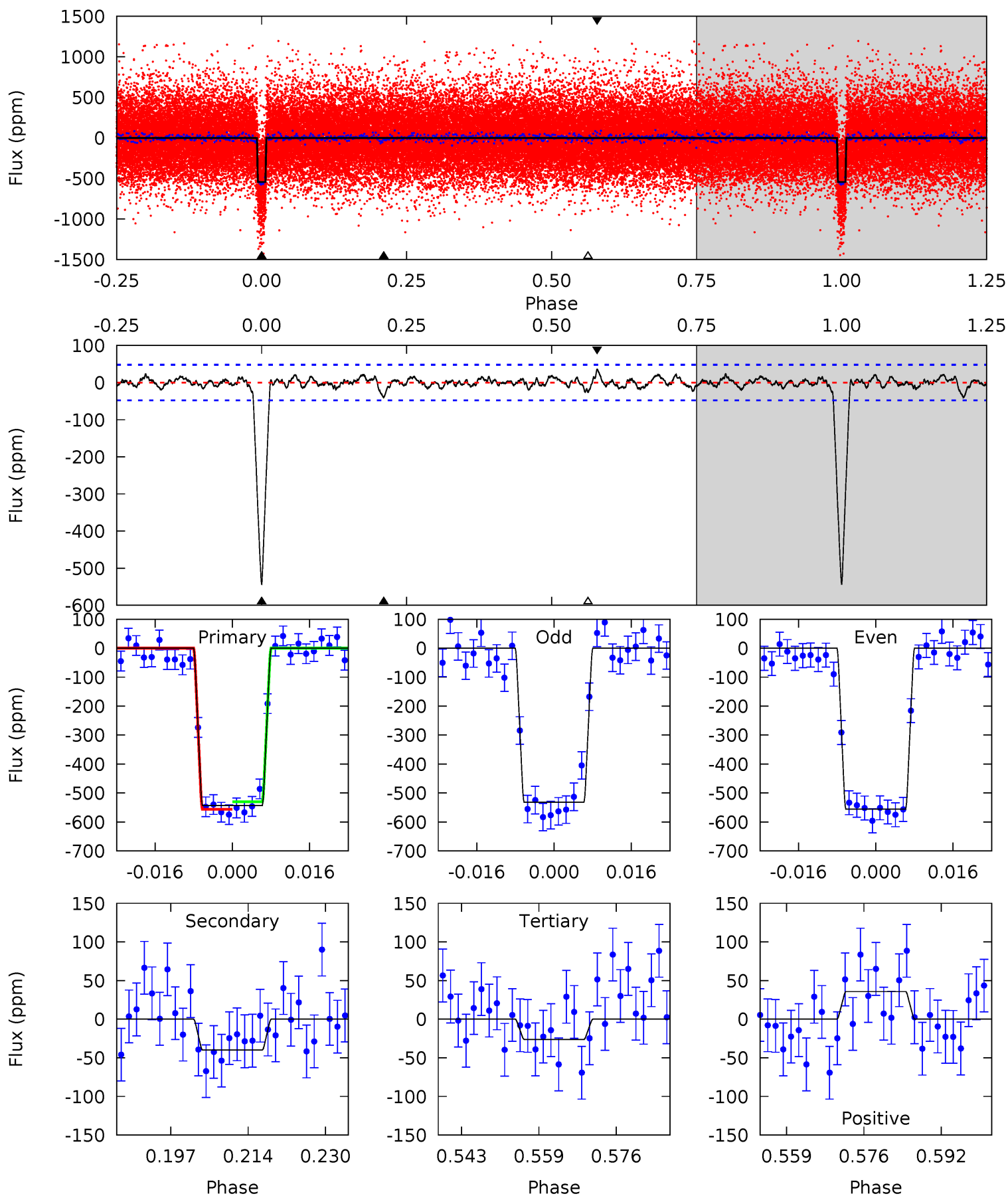
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
59.7	3.69	3.16	3.76	4.91	2.37	1.15	56.5	55.9	0.53	-0.06	0.73	1.01	0.06	1.29



Alt Model-Shift Uniqueness Test

004757437-01, $P = 13.193282$ Days, $E = 122.834068$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
55.8	4.09	2.69	3.67	4.93	2.40	0.98	53.1	52.1	1.40	0.42	1.23	1.02	0.06	1.35



Stellar Parameters For KIC 004757437

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5946^{+71}_{-79}	$4.309^{+0.110}_{-0.121}$	$0.160^{+0.150}_{-0.150}$	$1.223^{+0.207}_{-0.155}$	$1.113^{+0.069}_{-0.085}$	$0.856^{+0.405}_{-0.296}$
	+1%/-1%	+3%/-3%	+94%/-94%	+17%/-13%	+6%/-8%	+47%/-35%
Source	SPE90	SPE90	SPE90	DSEP		

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

Secondary Eclipse Parameters for KIC 004757437-01 / KOI 0497.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-35 ± 9	$3.28^{+0.42}_{-0.40}$	1205^{+53}_{-45}	3420^{+175}_{-167}	23^{+9}_{-7}
Alt.	-40 ± 10	$3.16^{+0.44}_{-0.41}$	1204^{+55}_{-45}	3531^{+177}_{-182}	28^{+12}_{-10}

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 $A_{obs} \gg 1.0$

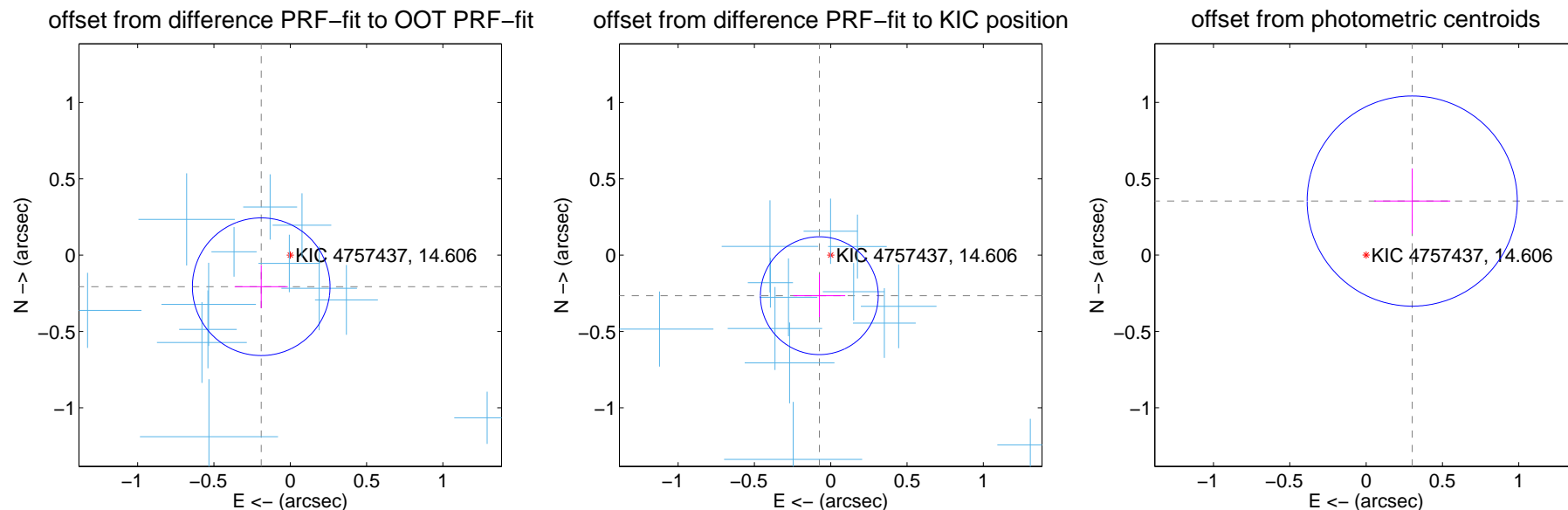
DV Centroid Data

Supplemental centroid analysis for 004757437-01. Kepler magnitude: 14.61. Transit SNR 44.60

There are 13 quarters with good PRF difference image offsets

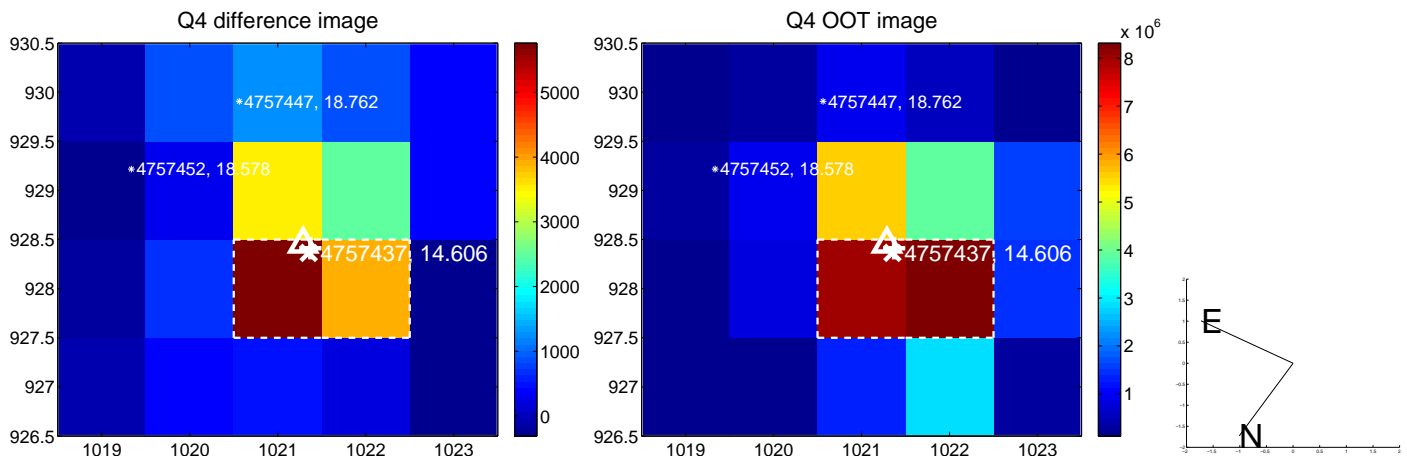
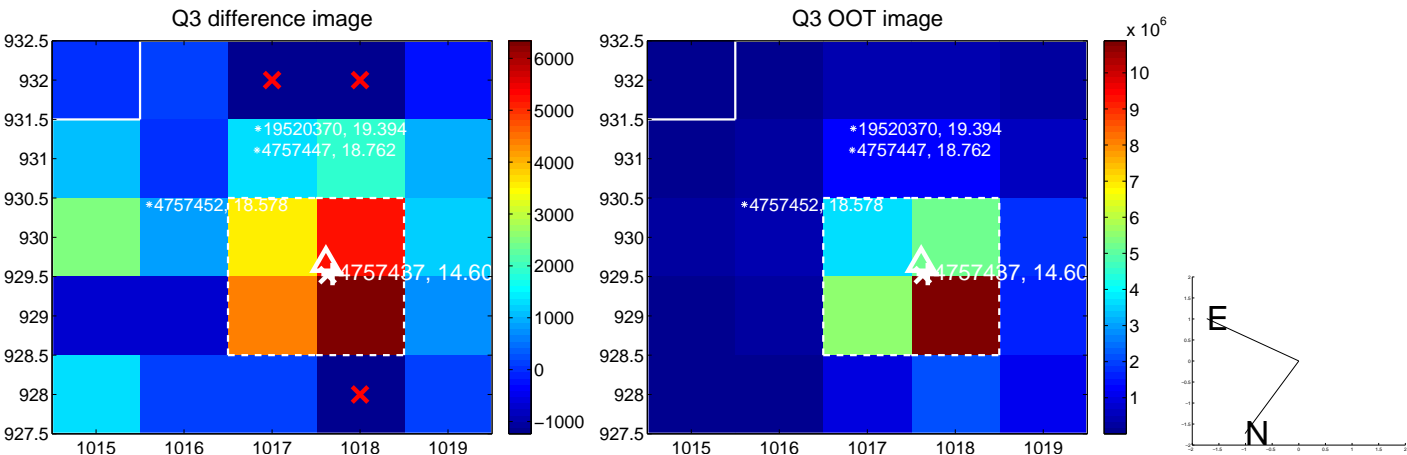
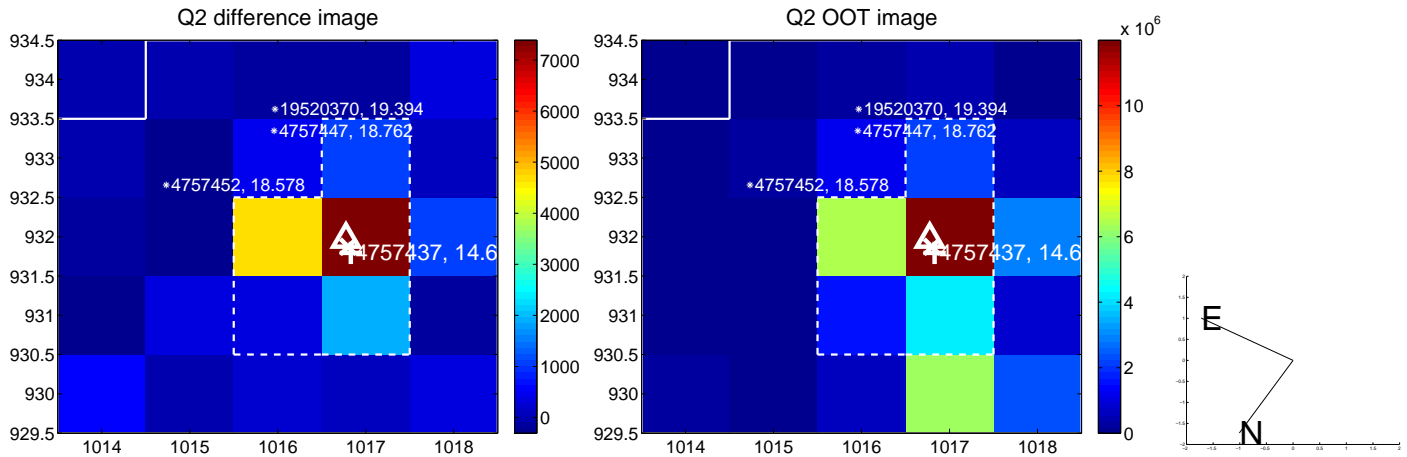
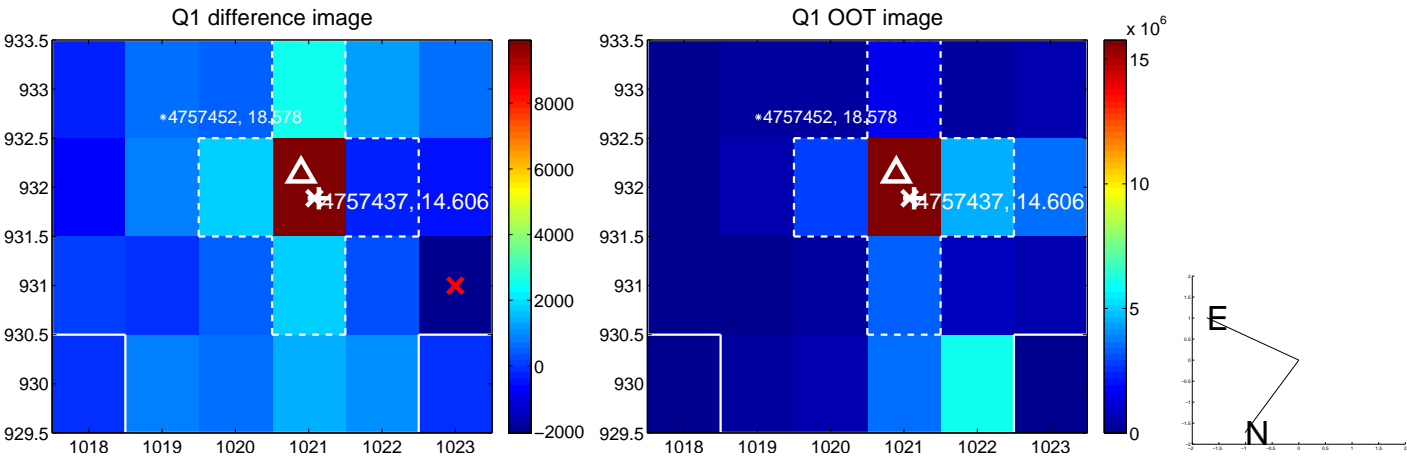
The direct PRF centroid is offset from the target star catalog position by about 0.32 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.281 ± 0.150	1.87	0.190 ± 0.174	-0.207 ± 0.141
PRF-fit source offset from KIC position	0.276 ± 0.129	2.14	0.075 ± 0.170	-0.266 ± 0.139
photometric centroid source offset	0.47 ± 0.23	2.03	-0.30 ± 0.25	0.35 ± 0.21

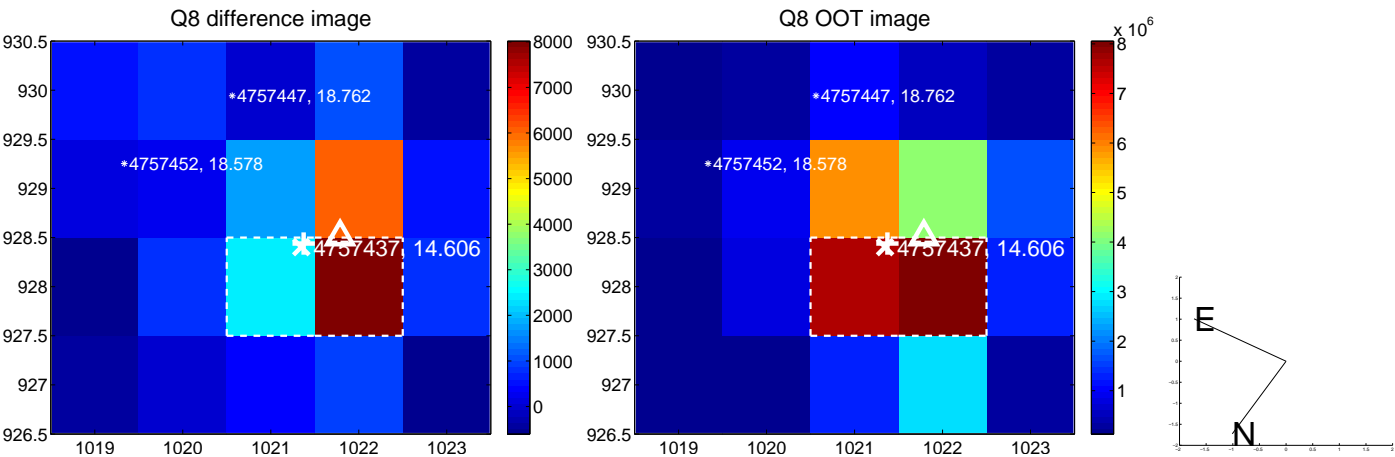
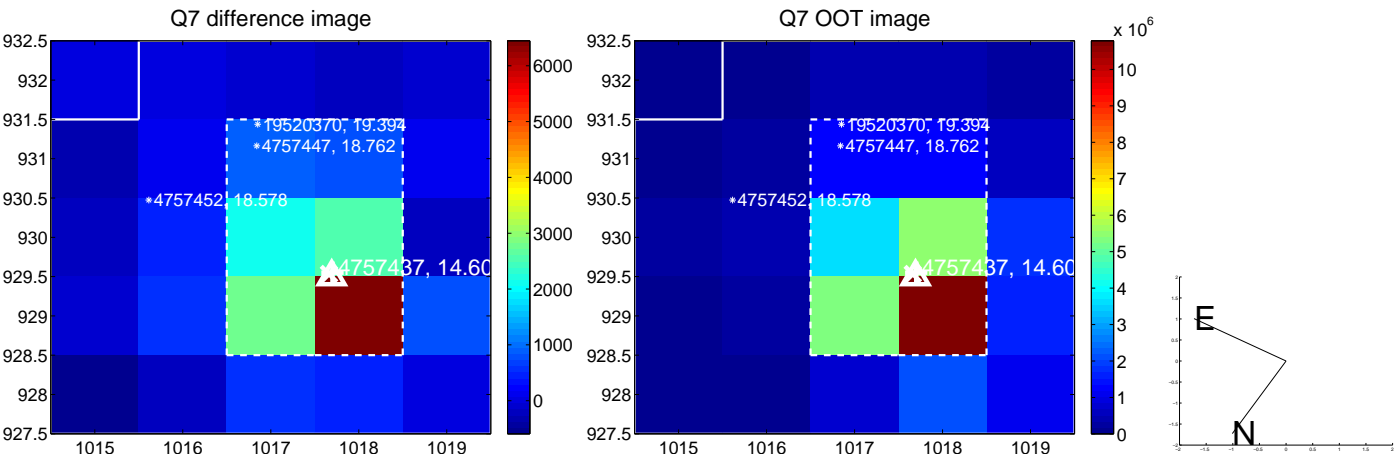
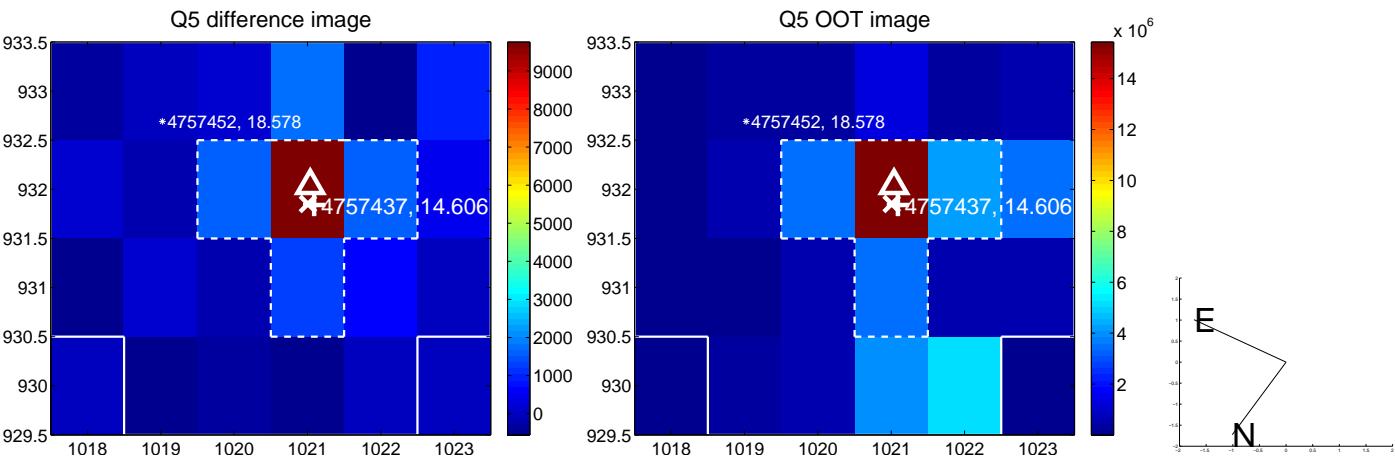


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

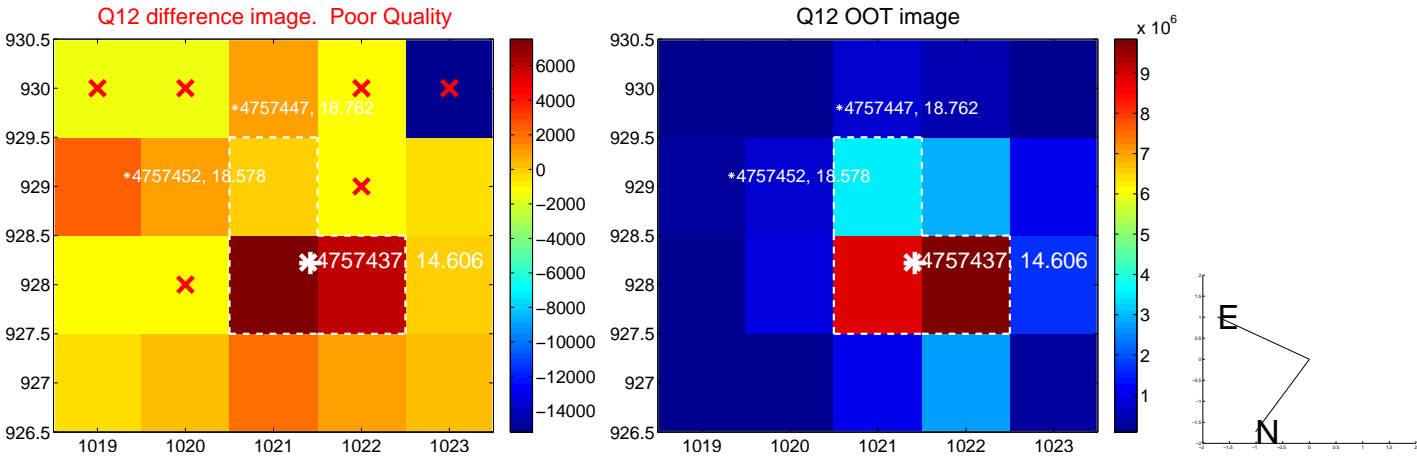
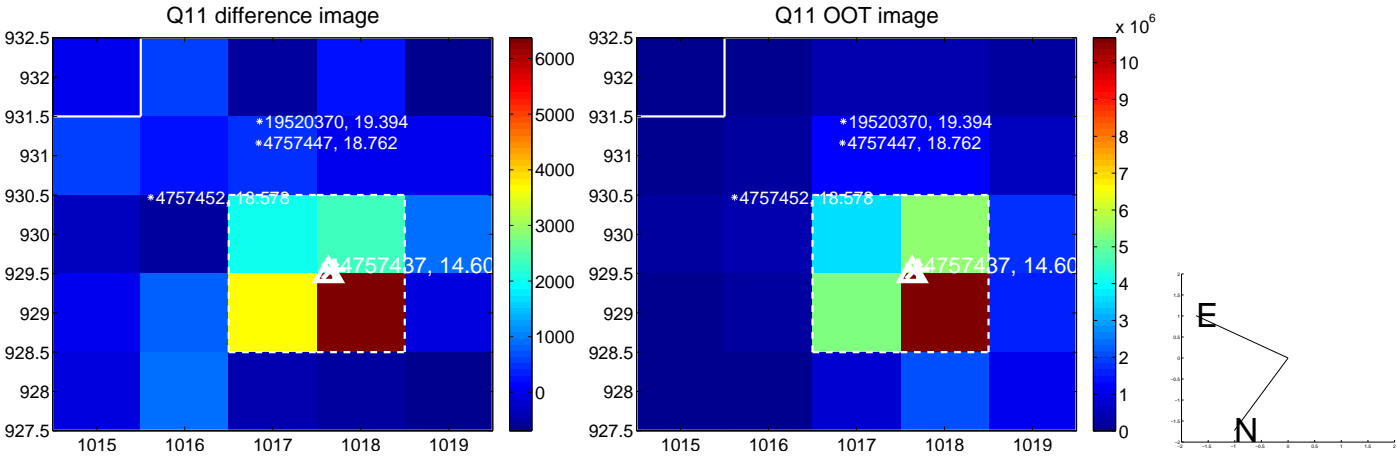
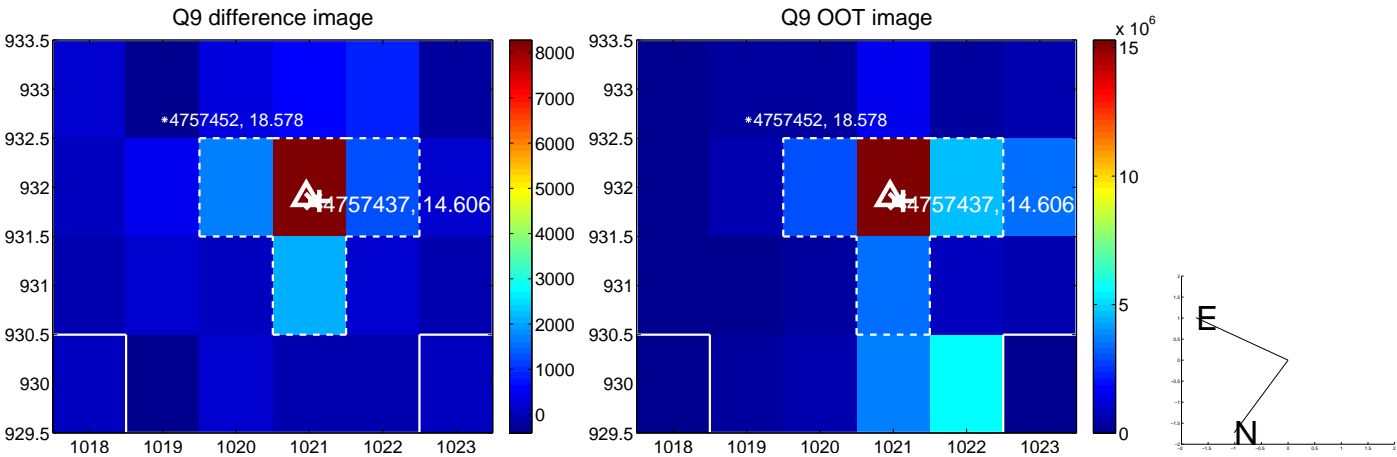
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



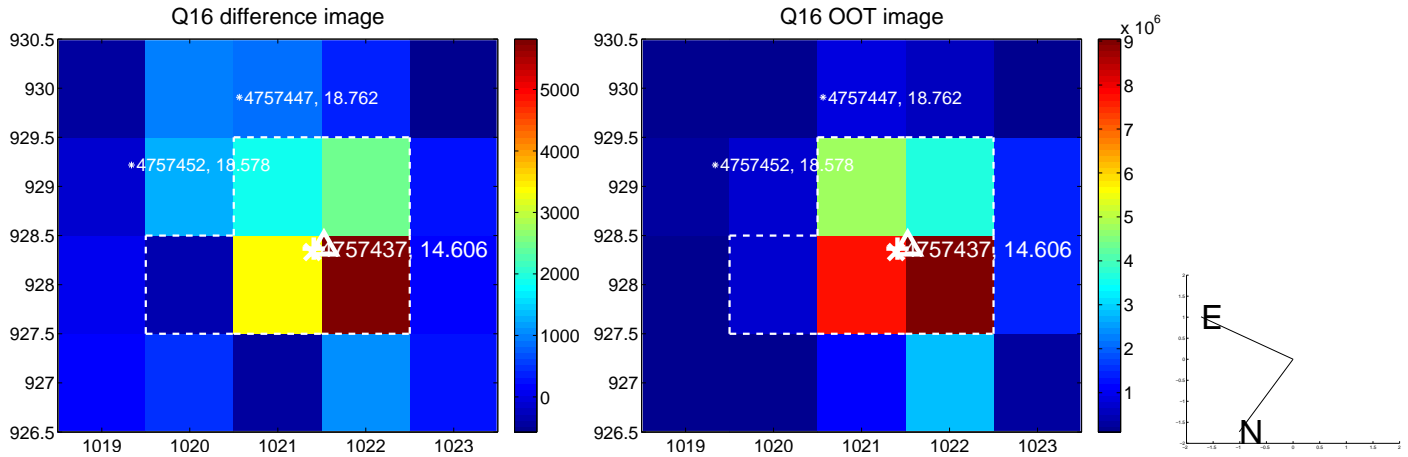
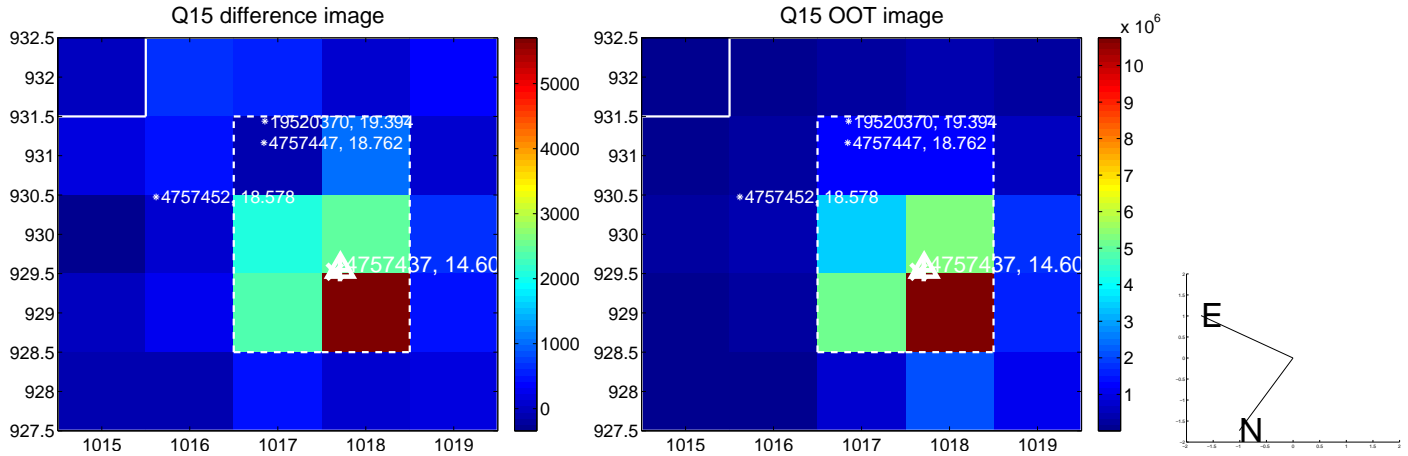
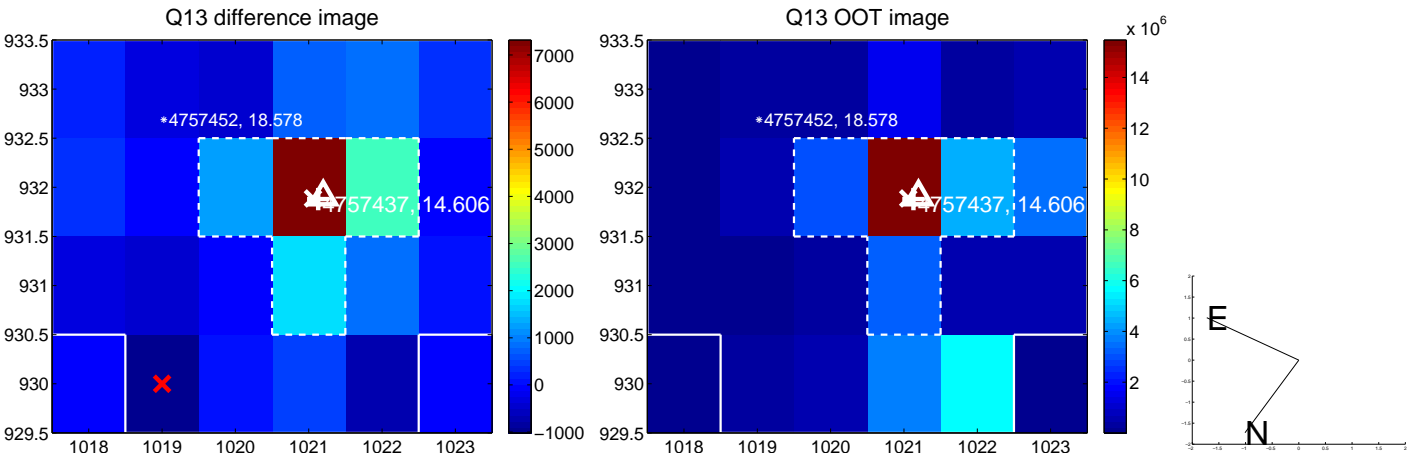
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



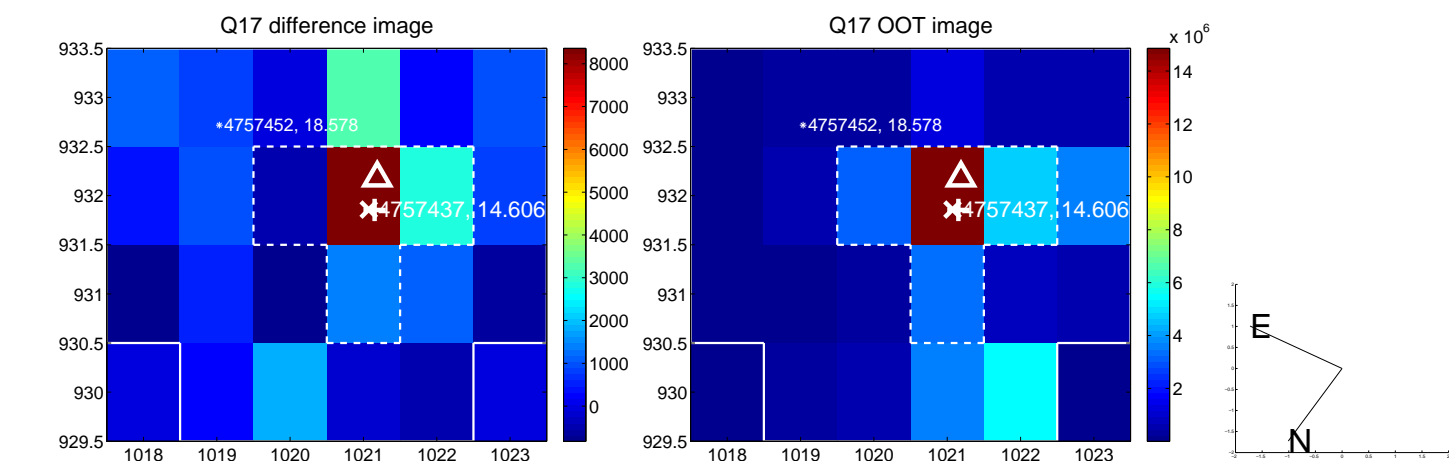
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



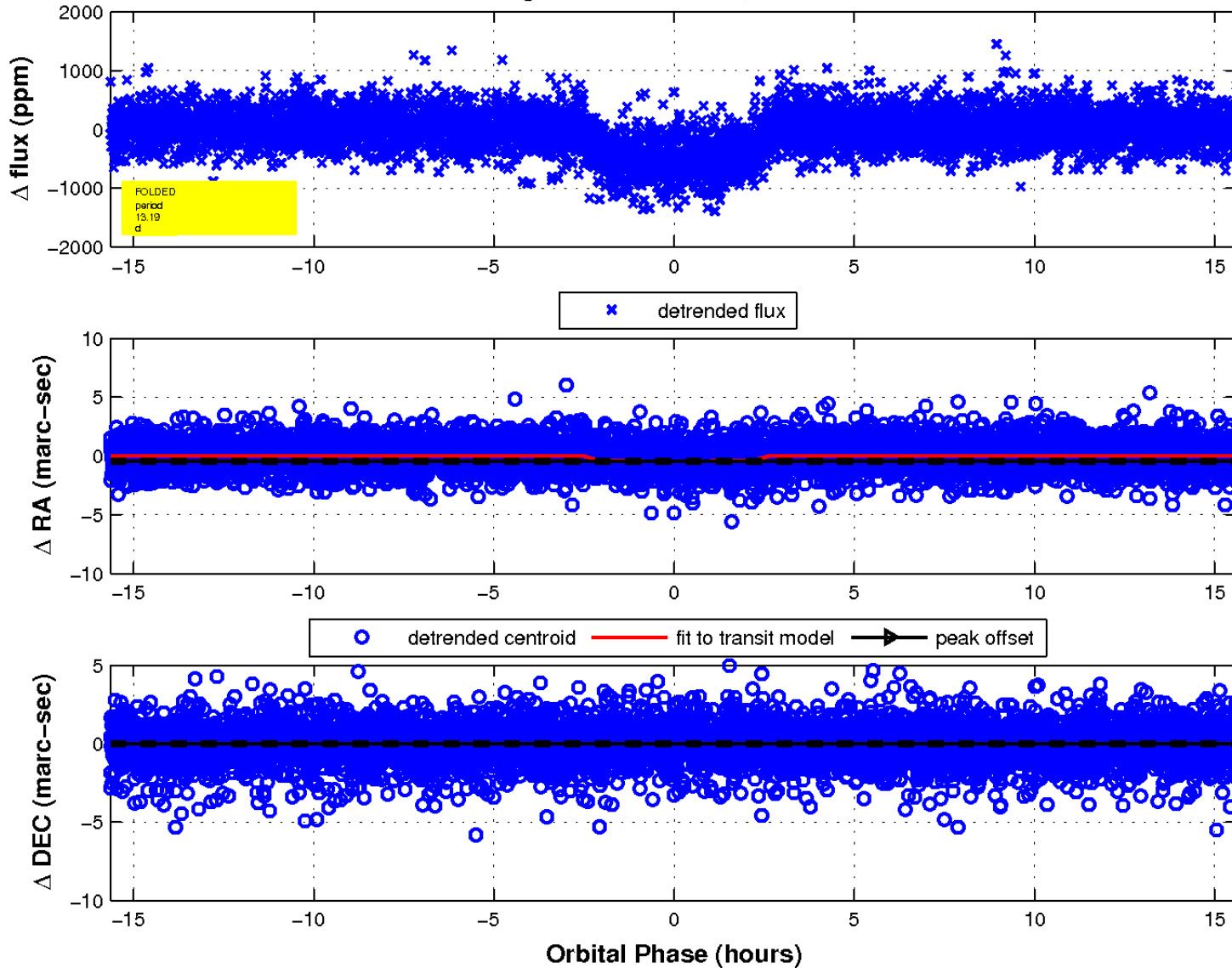
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



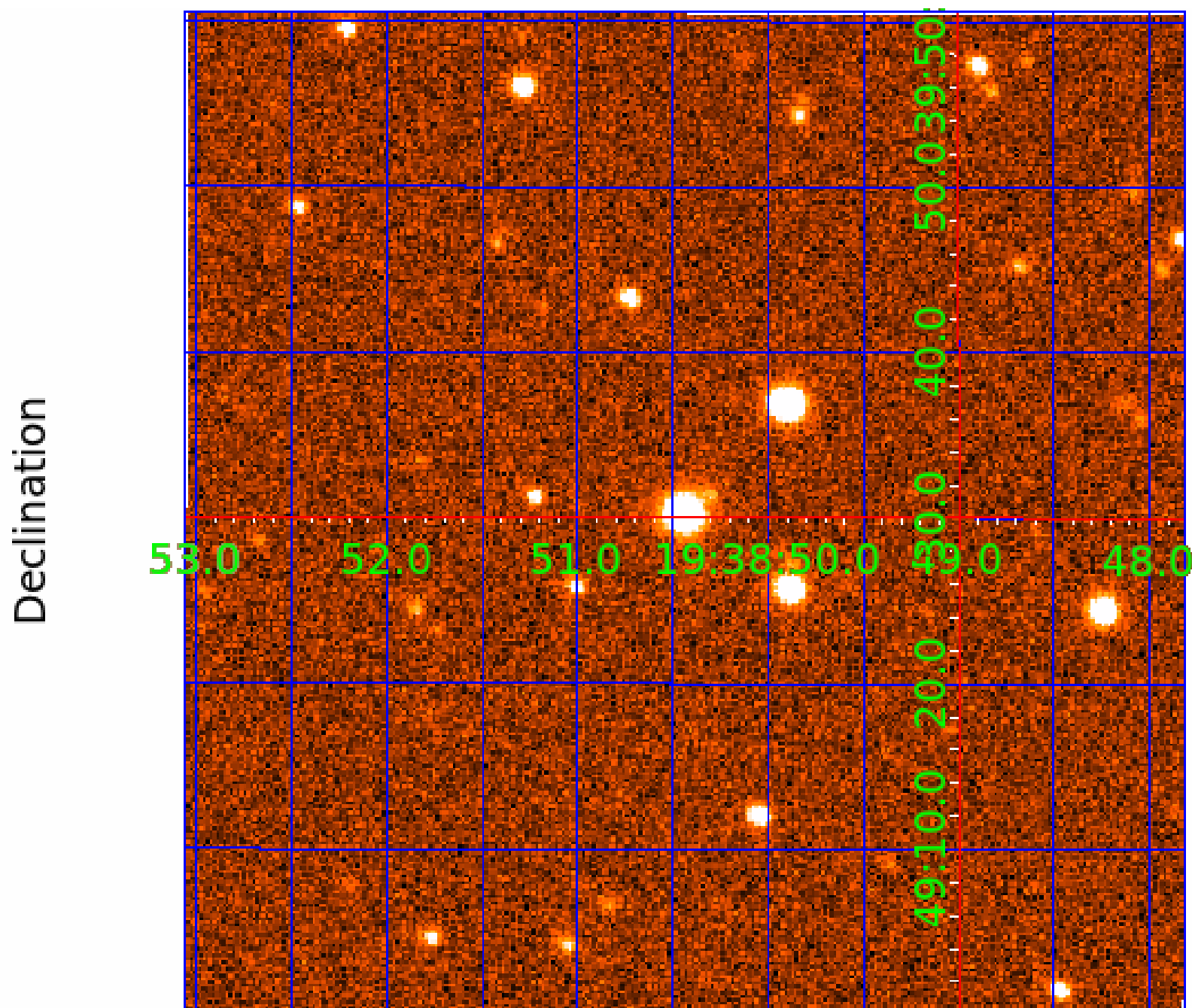
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 2



UKIRT Image



KIC 004757437

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})
004757437-01	OBS	0497.01	13.193217	136.031097	571.0	5.213	40.6	44.6	1.22	5946	3.27	130.70
004757437-02	OBS	0497.02	4.425343	134.562892	165.0	3.579	18.7	18.8	1.22	5946	1.80	560.81

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004757437-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004757437-02	OBS	PC	1.00	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.

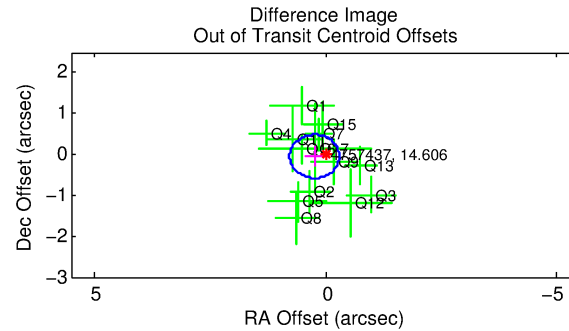
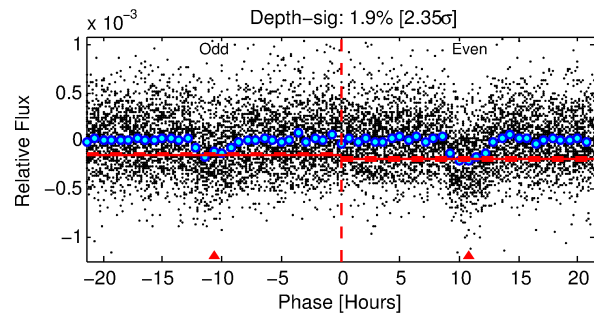
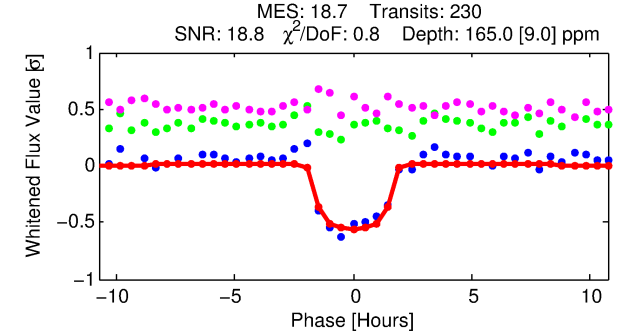
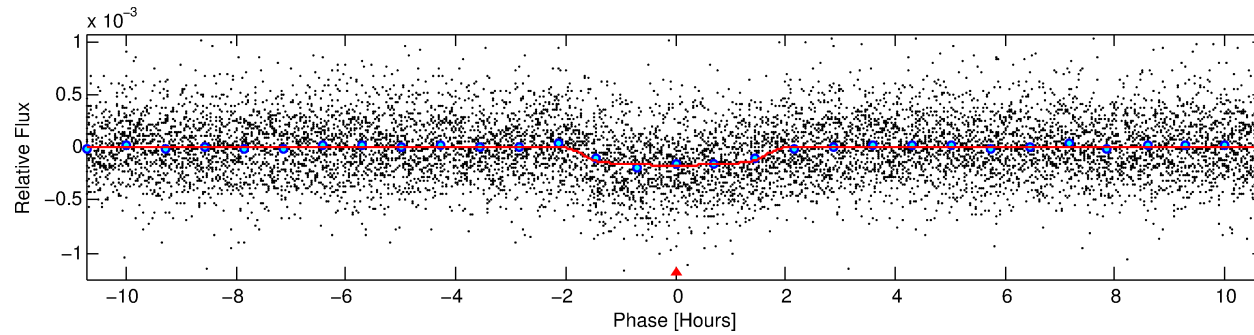
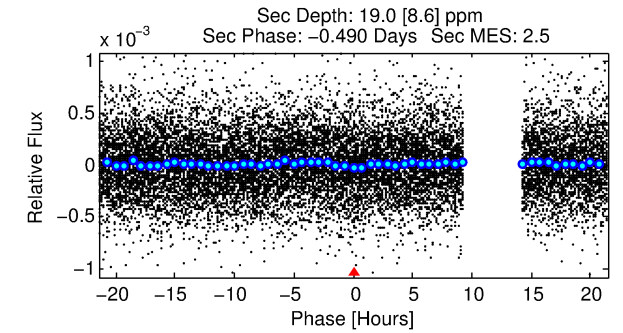
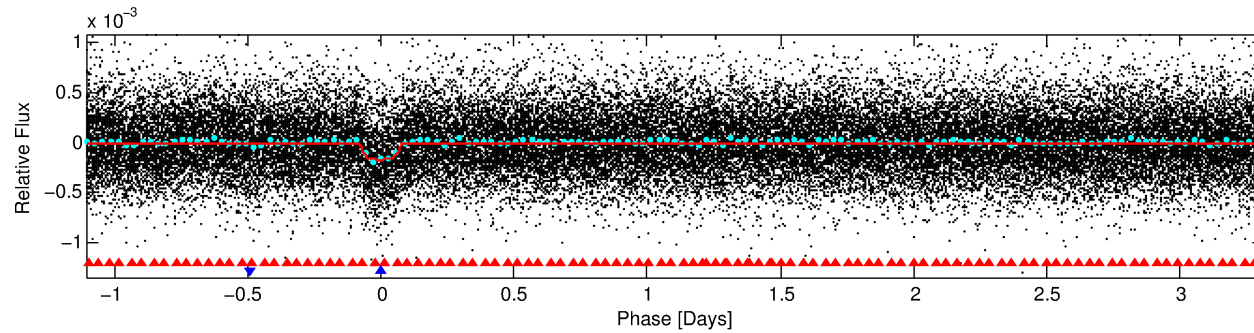
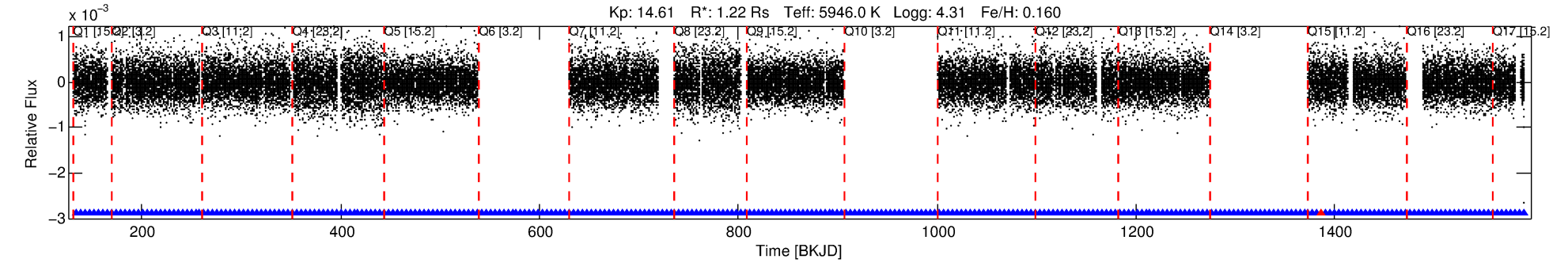
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004757437-02

No Significant Match Found

DV One-Page Summary

KIC: 4757437 Candidate: 2 of 2 Period: 4.425 d
KOI: K00497.02 Name: Kepler-168b Corr: 0.989



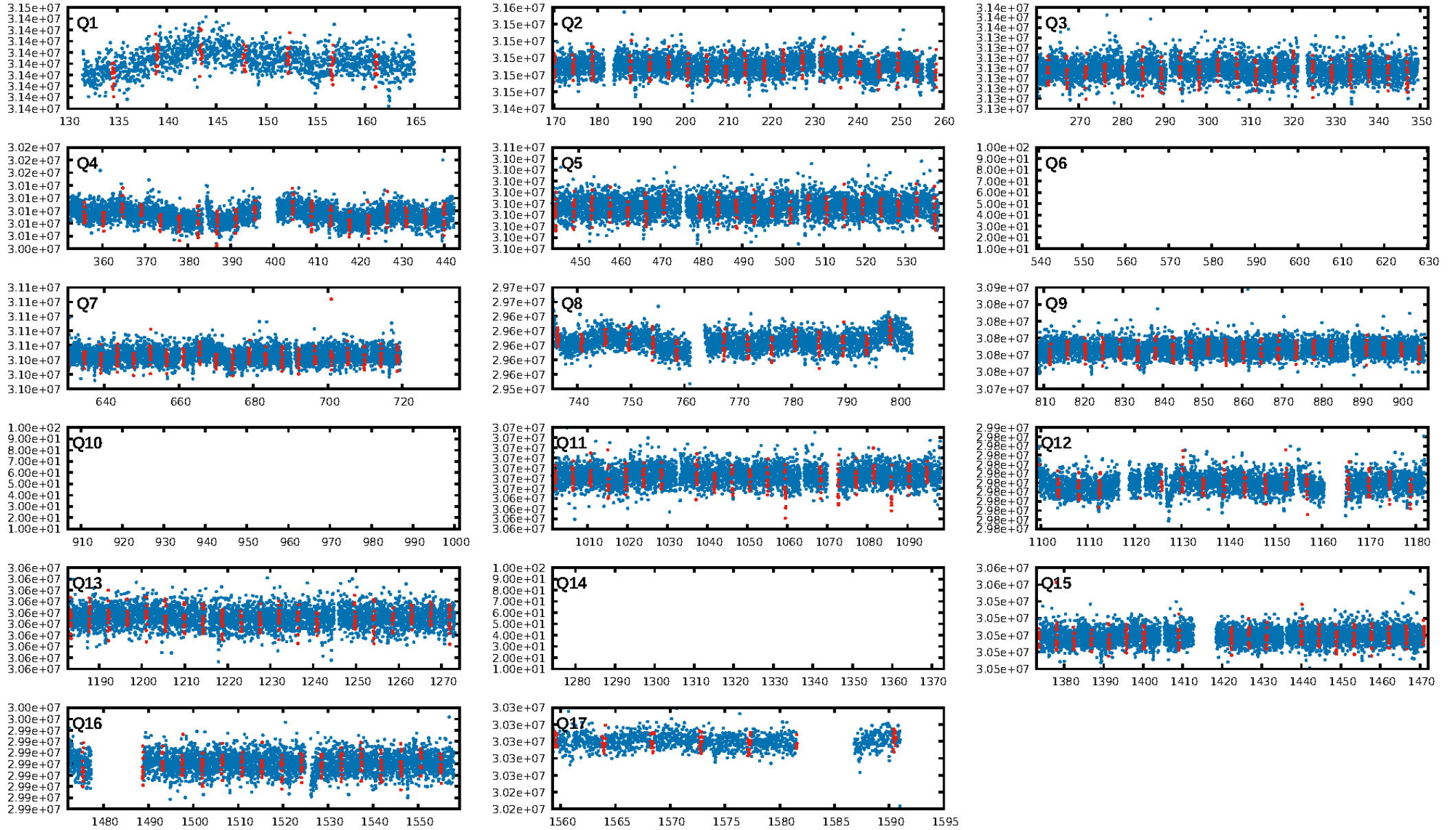
DV Fit Results:

Period = 4.42534 [0.00002] d
Epoch = 134.5629 [0.0030] BKJD
Rp/R* = 0.0135 [0.0048]
a/R* = 5.13 [8.37]
b = 0.86 [0.52]
Seff = 560.81 [125.47]
Teq = 1241 [69] K
Rp = 1.80 [0.71] Re
a = 0.0547 [0.0080] AU
Ag = 9.57 [8.30] [1.03σ]
Teffp = 3374 [710] K [2.99σ]

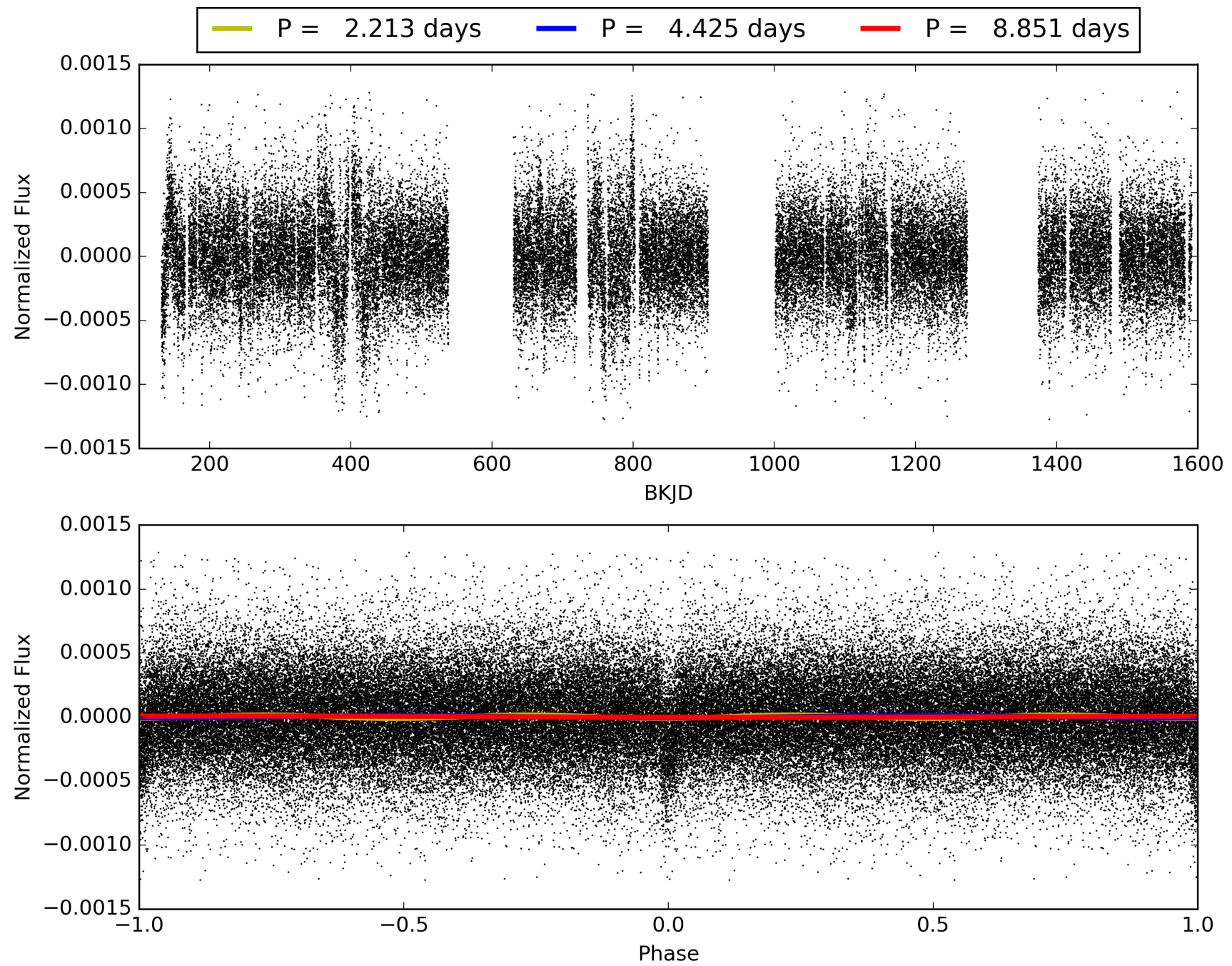
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [33.28σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.94e-76
RollingBand-fgt: 1.00 [215/216]
GhostDiagnostic-chr: 1.024
Centroid-sig: 24.8%
Centroid-so: 0.498 arcsec [0.88σ]
OotOffset-rm: 0.245 arcsec [1.38σ]
KicOffset-rm: 0.219 arcsec [1.00σ]
OotOffset-st: 1/4/4/5 [14]
KicOffset-st: 1/4/4/5 [14]
DiffImageQuality-fgm: 0.93 [13/14]
DiffImageOverlap-fno: 1.00 [14/14]

TCE 004757437-02, PDC Light Curves

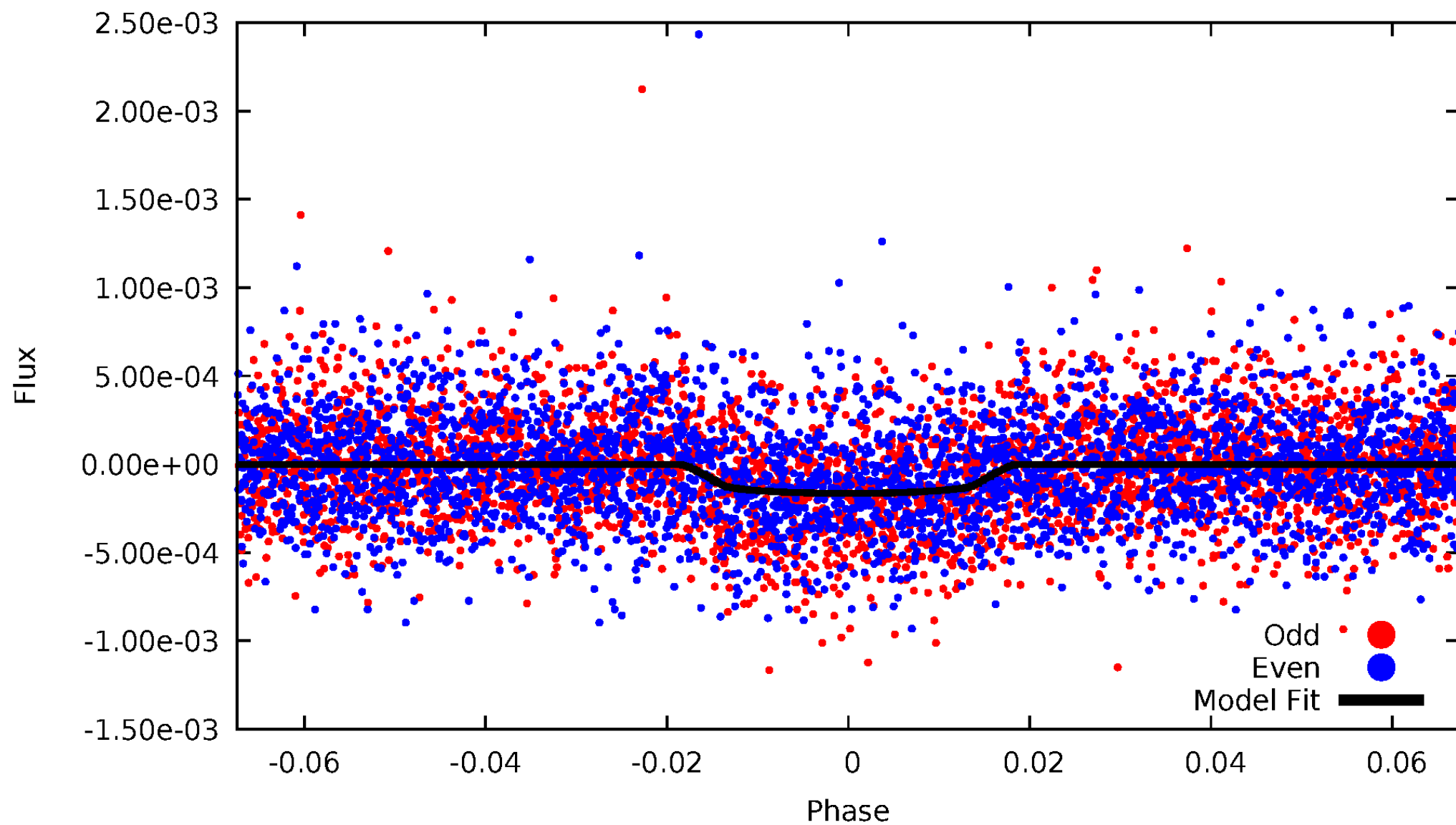


TCE 004757437-02



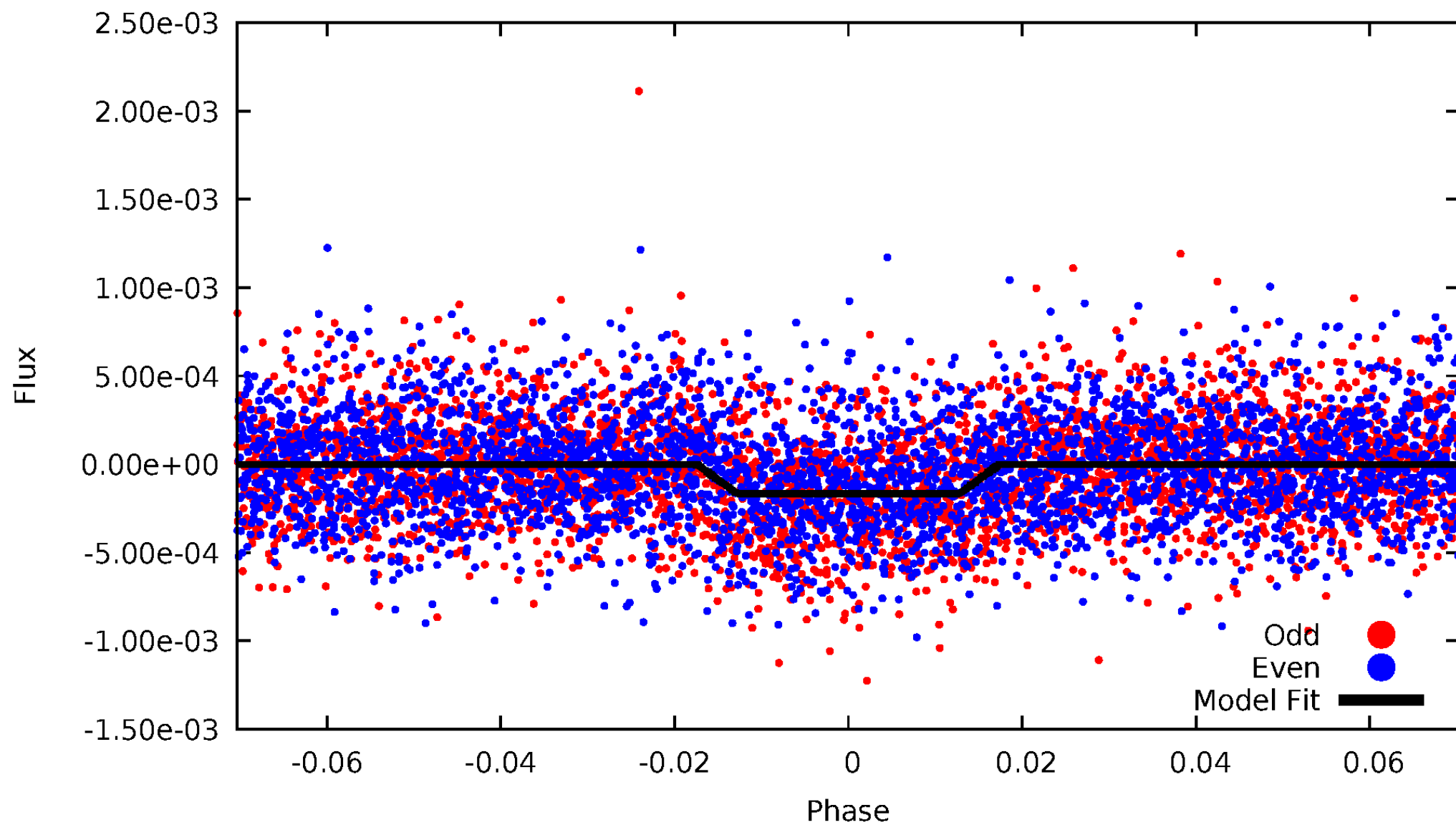
DV Odd/Even

TCE 004757437-02



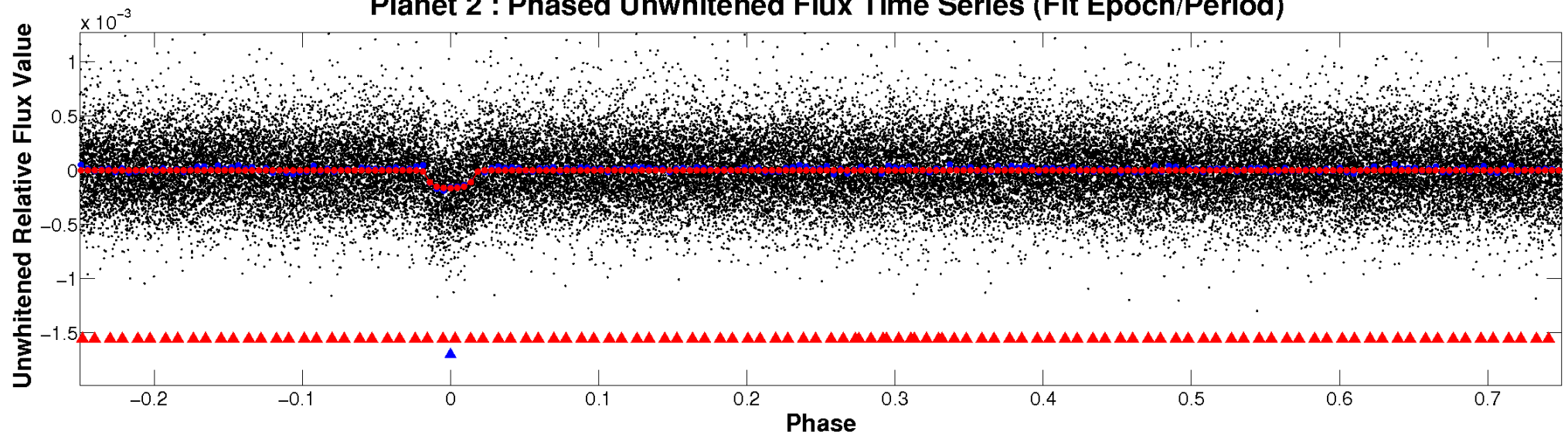
ALT Odd/Even

TCE 004757437-02

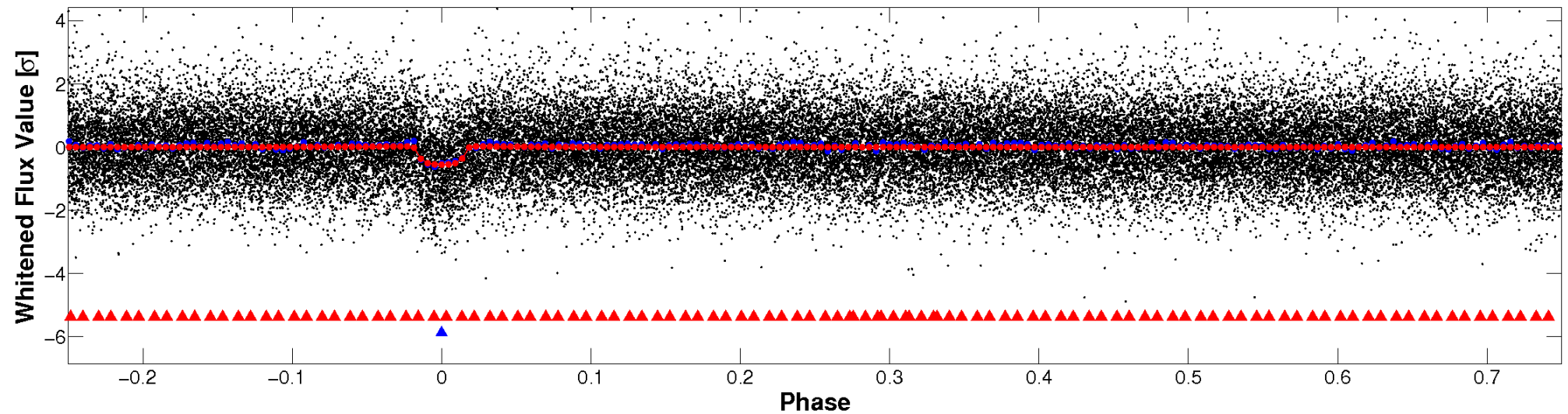


Non-Whitened Vs. Whitened Light Curve

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

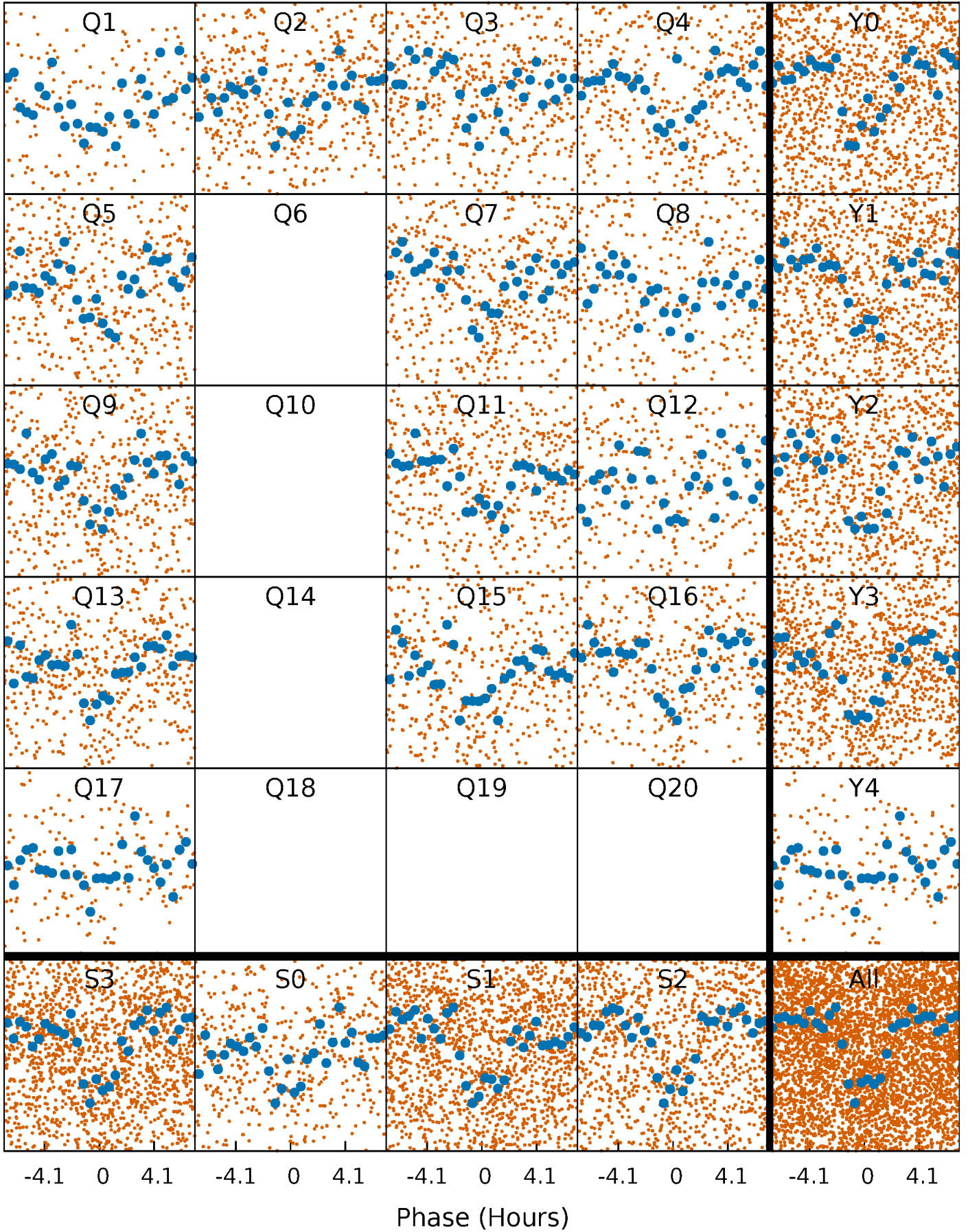


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



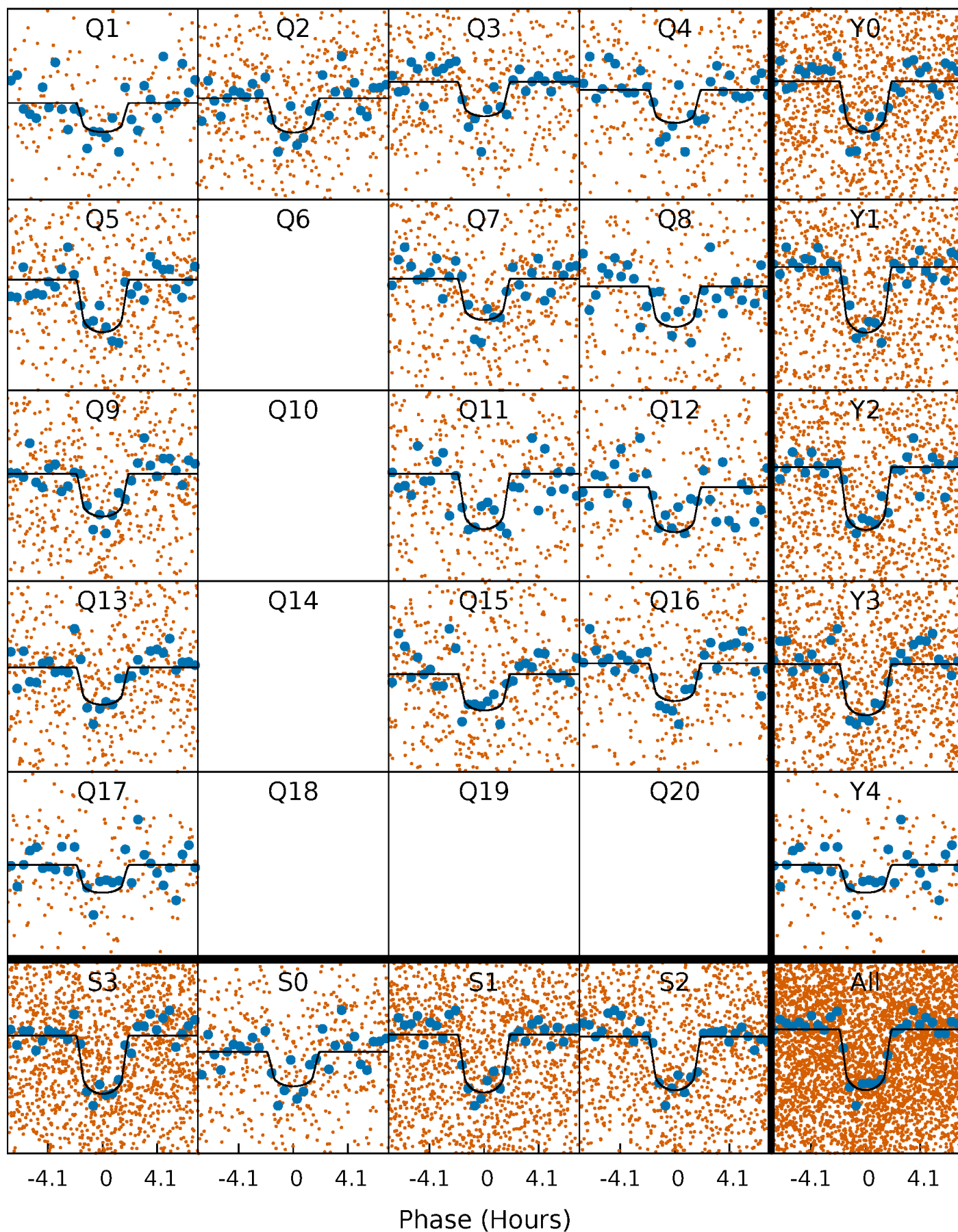
PDC Quarter-Phased Transit Curves

TCE 004757437-02 $P = 4.425343$ Days $T_0 = 134.562892$ (BKJD)



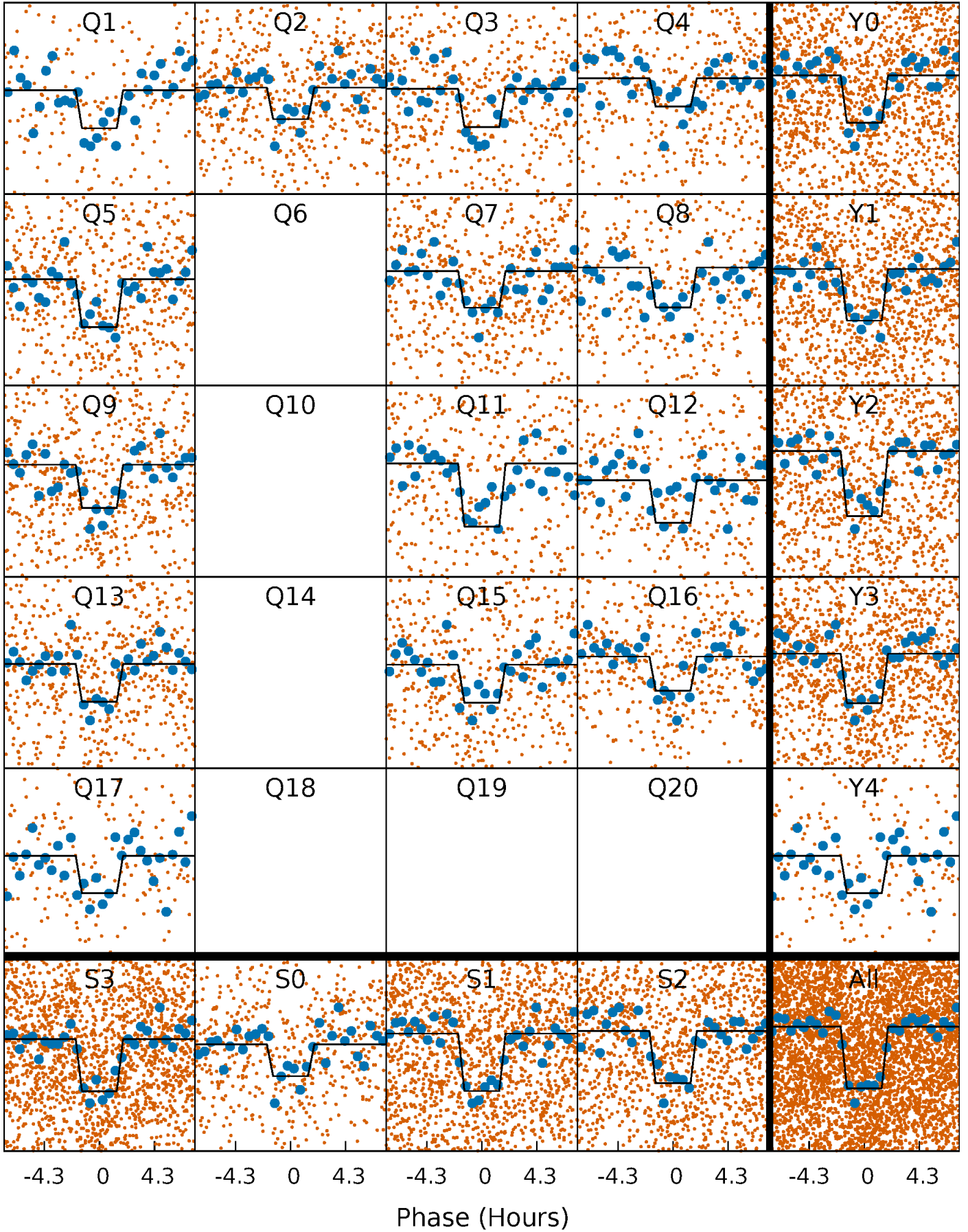
DV Quarter-Phased Transit Curves

TCE 004757437-02 P= 4.425343 Days $T_0=134.562892$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

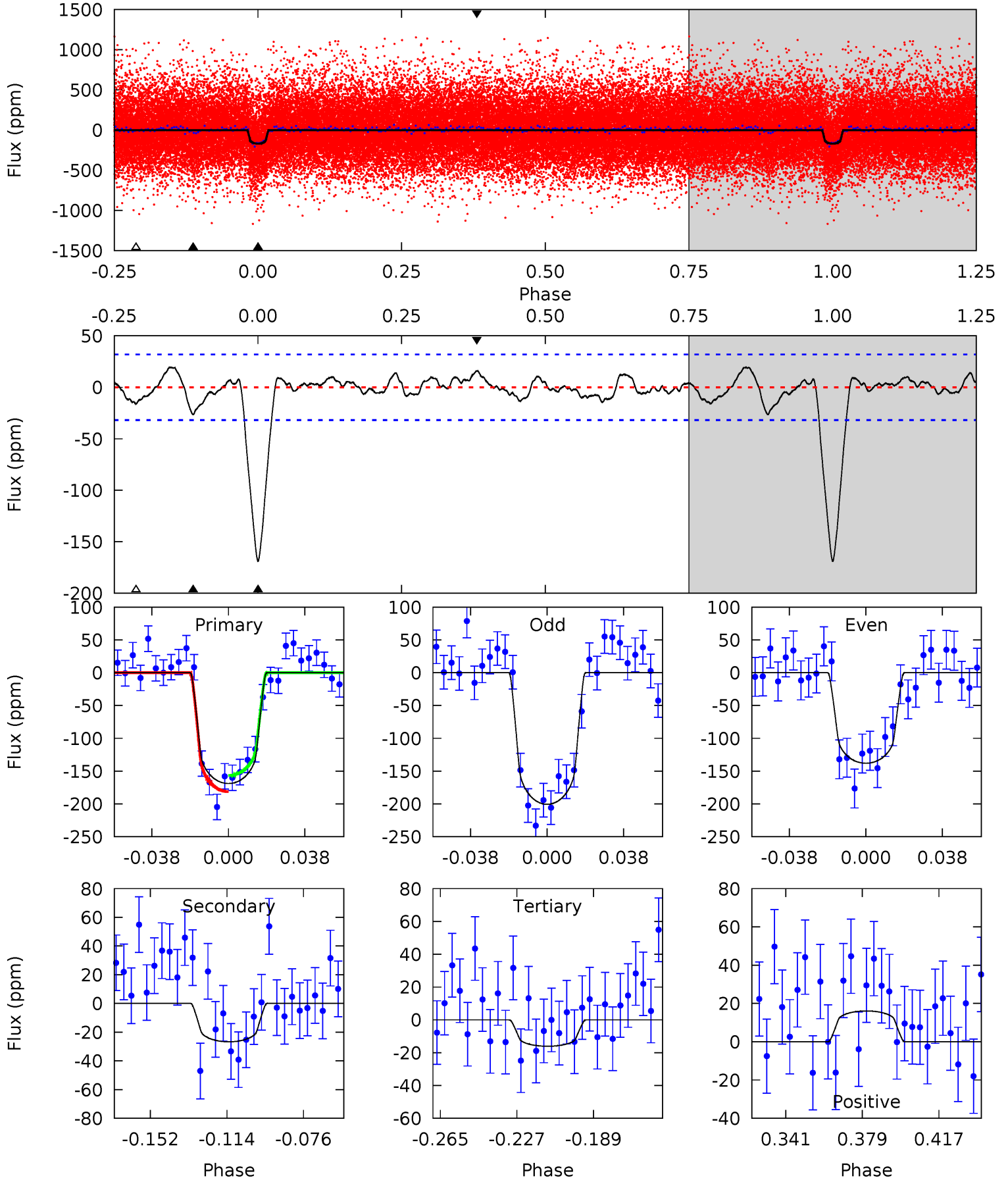
TCE 004757437-02 $P = 4.425387$ Days $T_0 = 134.556627$ (BKJD)



DV Model-Shift Uniqueness Test

004757437-02, P = 4.425343 Days, E = 130.137549 Days

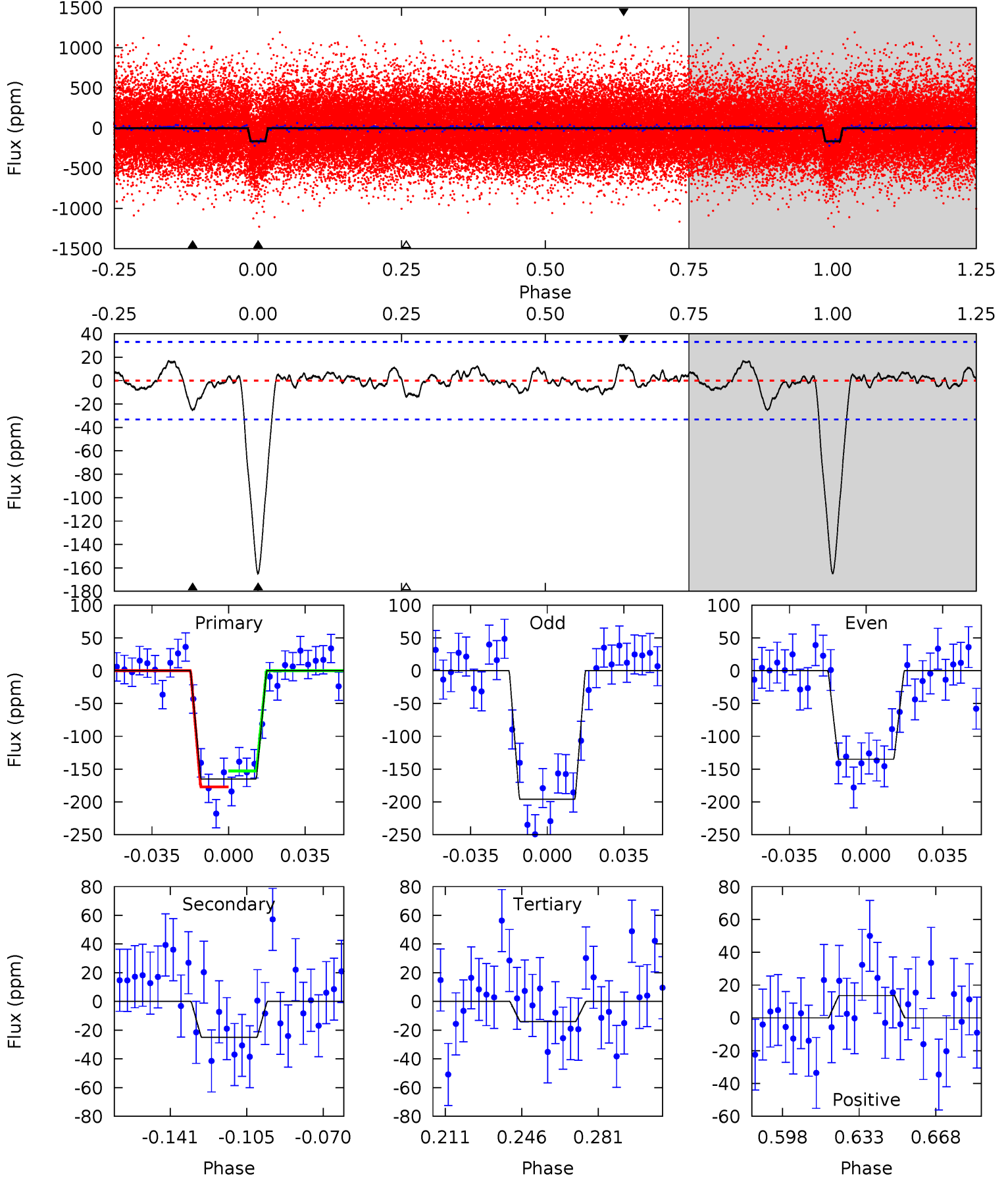
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
25.2	3.99	2.40	2.40	4.76	2.08	1.06	22.8	22.8	1.59	1.59	4.68	0.97	0.10	1.84



Alt Model-Shift Uniqueness Test

004757437-02, P = 4.425387 Days, E = 130.131240 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.8	3.61	2.02	1.97	4.78	2.11	0.85	21.8	21.8	1.59	1.65	4.40	0.96	0.09	1.76



Stellar Parameters For KIC 004757437

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5946^{+71}_{-79}	$4.309^{+0.110}_{-0.121}$	$0.160^{+0.150}_{-0.150}$	$1.223^{+0.207}_{-0.155}$	$1.113^{+0.069}_{-0.085}$	$0.856^{+0.405}_{-0.296}$
	+1%/-1%	+3%/-3%	+94%/-94%	+17%/-13%	+6%/-8%	+47%/-35%
Source	SPE90	SPE90	SPE90	DSEP		

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

Secondary Eclipse Parameters for KIC 004757437-02 / KOI 0497.02

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-27 ± 7	$1.82^{+0.67}_{-0.67}$	1733^{+77}_{-68}	3962^{+776}_{-435}	13^{+21}_{-6}
Alt.	-25 ± 7	$1.73^{+0.69}_{-0.73}$	1732^{+88}_{-63}	4018^{+856}_{-504}	14^{+26}_{-8}

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 $A_{obs} \gg 1.0$

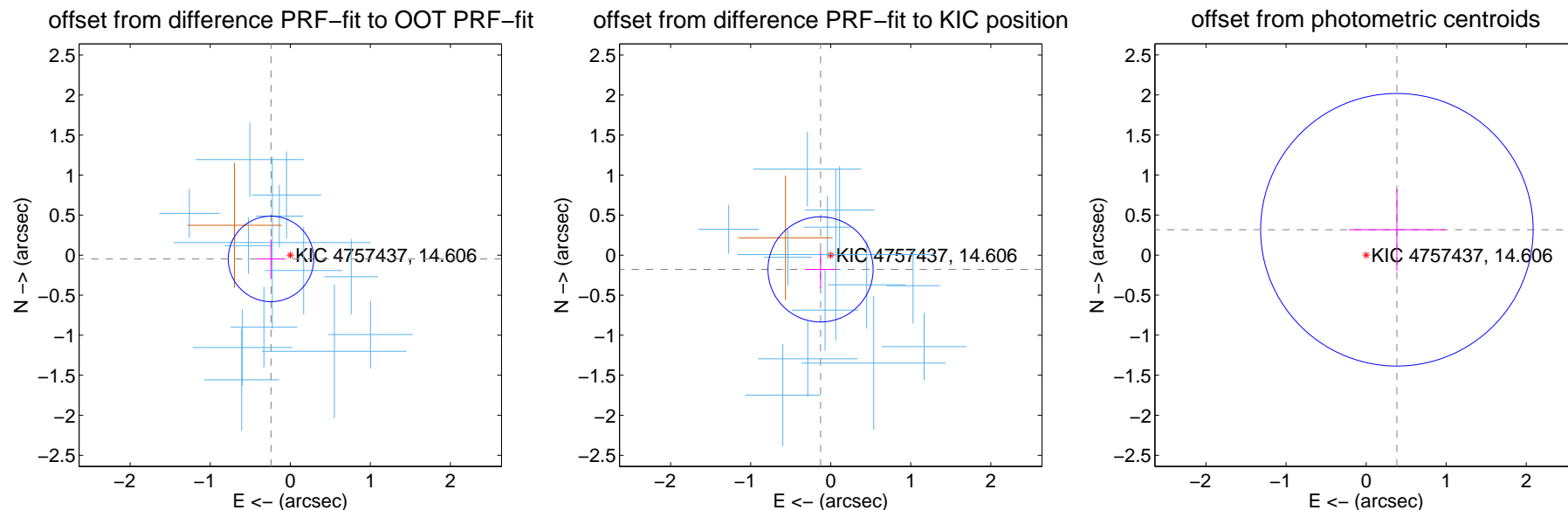
DV Centroid Data

Supplemental centroid analysis for 004757437-02. Kepler magnitude: 14.61. Transit SNR 18.84

There are 13 quarters with good PRF difference image offsets

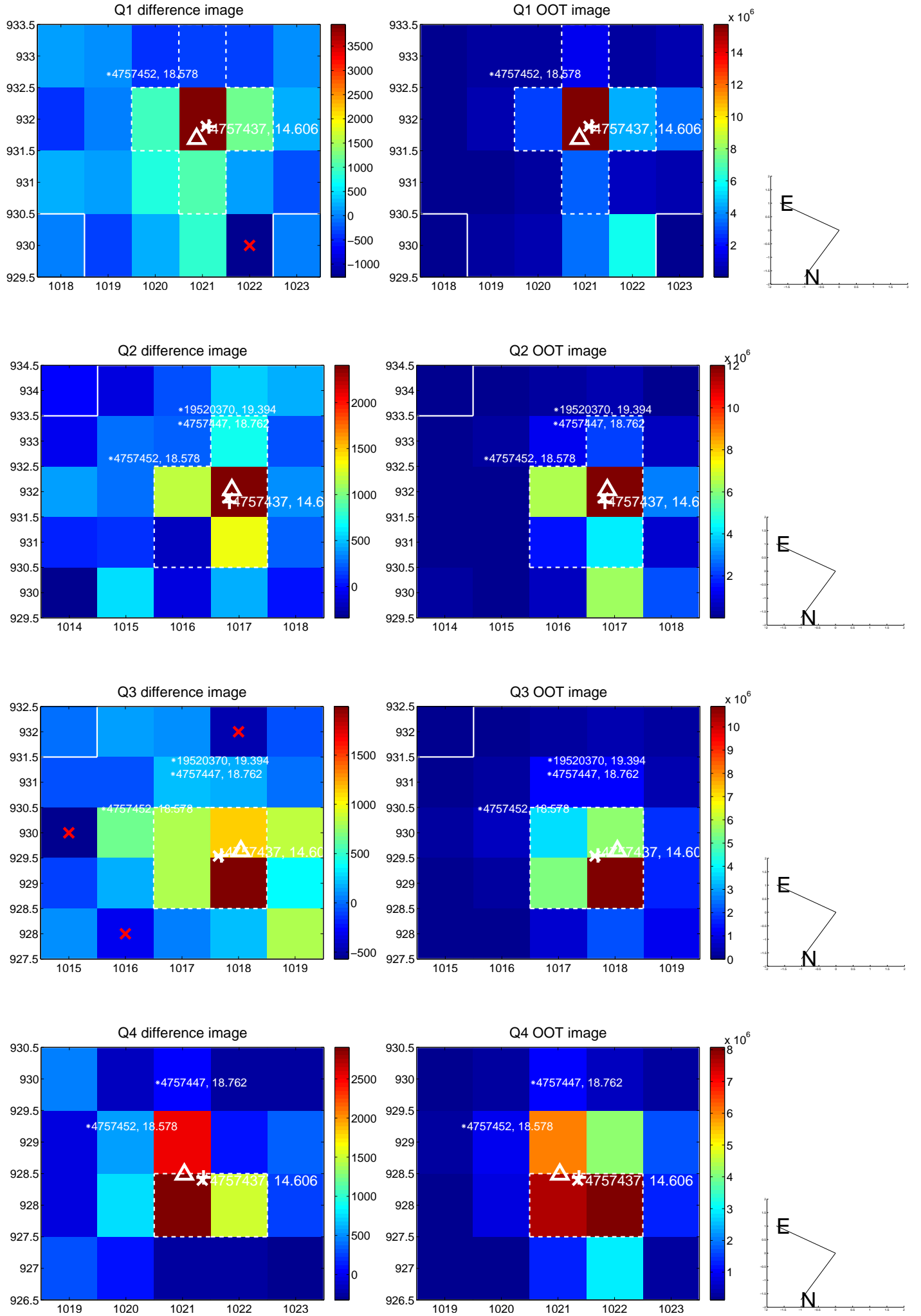
The direct PRF centroid is offset from the target star catalog position by about 0.32 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.245 ± 0.178	1.38	0.241 ± 0.175	-0.047 ± 0.241
PRF-fit source offset from KIC position	0.219 ± 0.219	1.00	0.127 ± 0.190	-0.178 ± 0.232
photometric centroid source offset	0.50 ± 0.57	0.88	-0.38 ± 0.60	0.32 ± 0.51

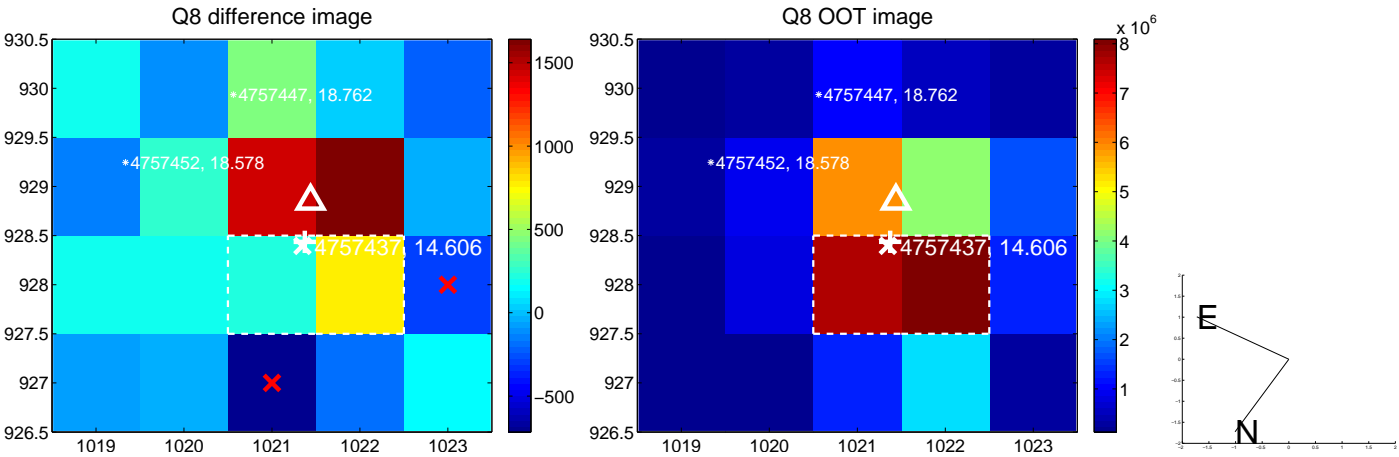
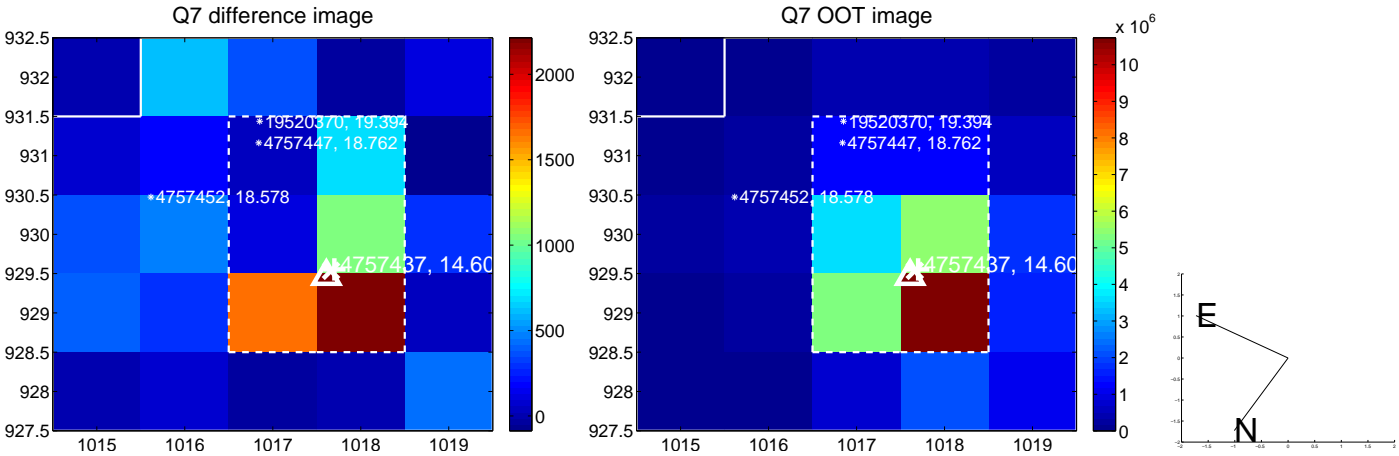
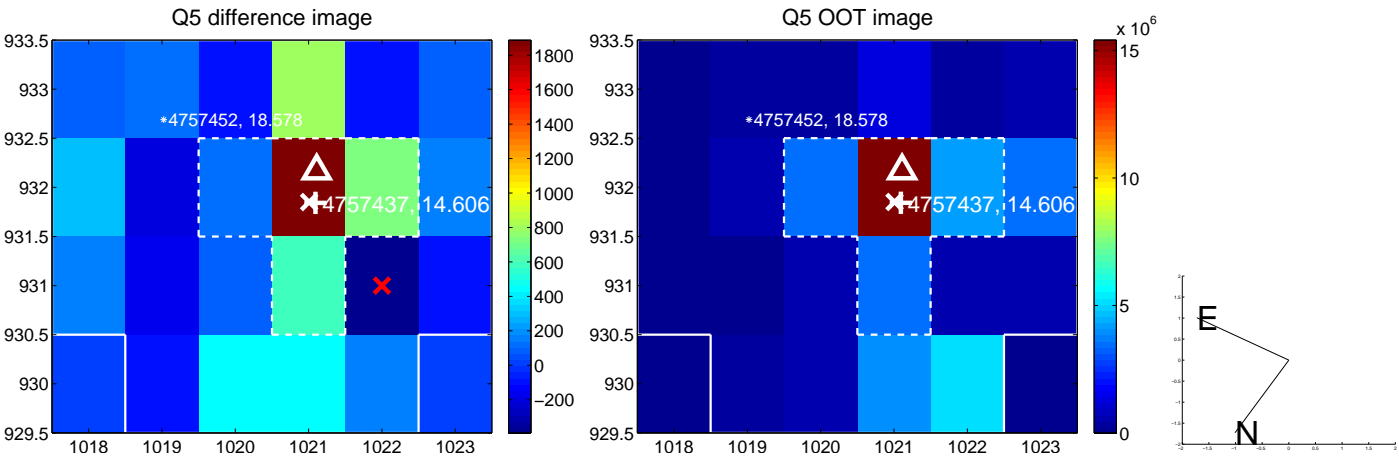


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

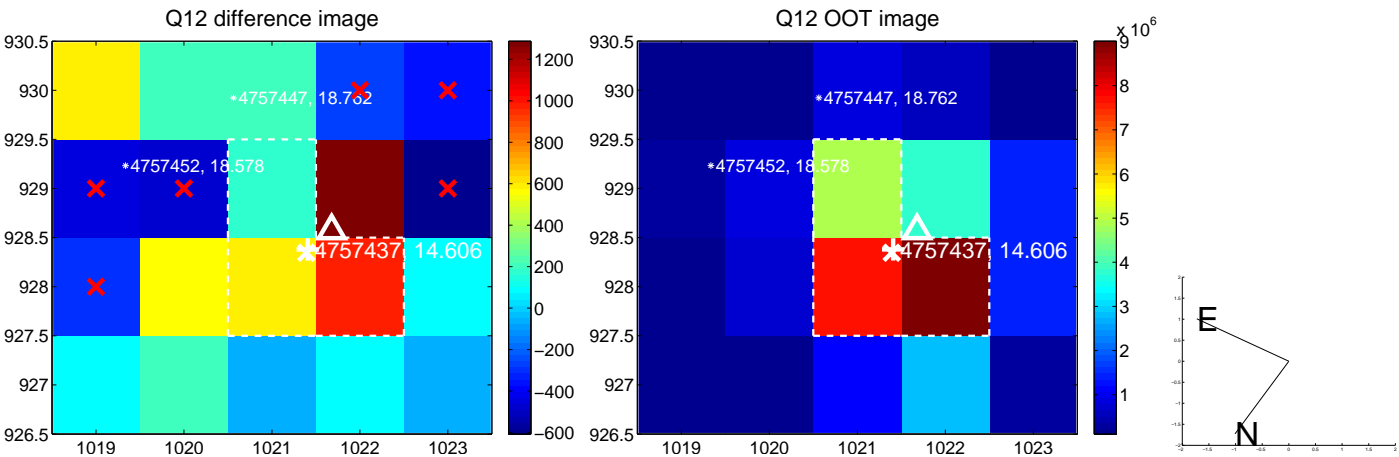
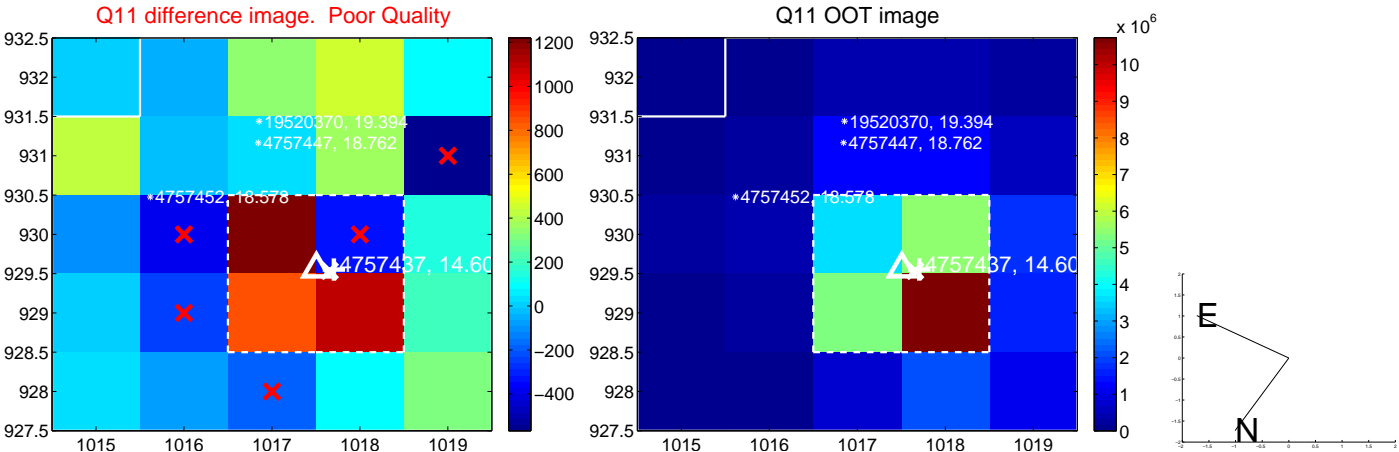
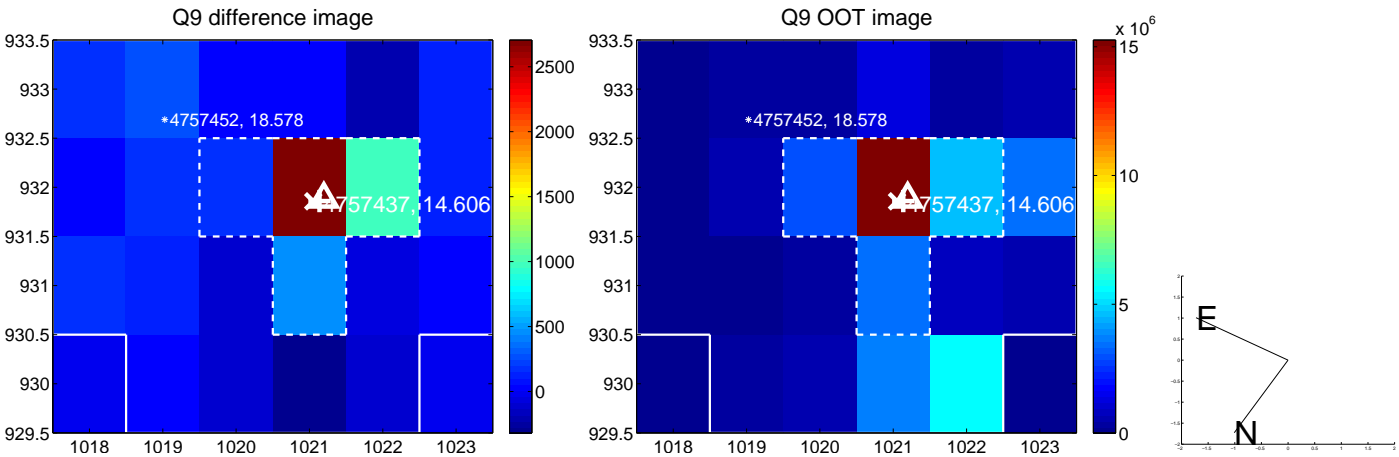
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



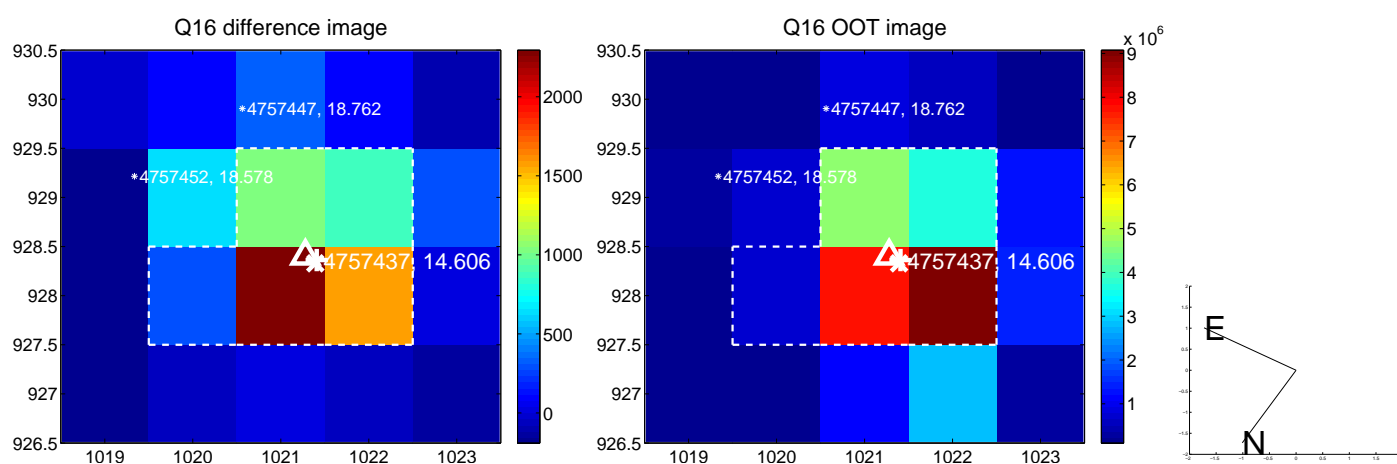
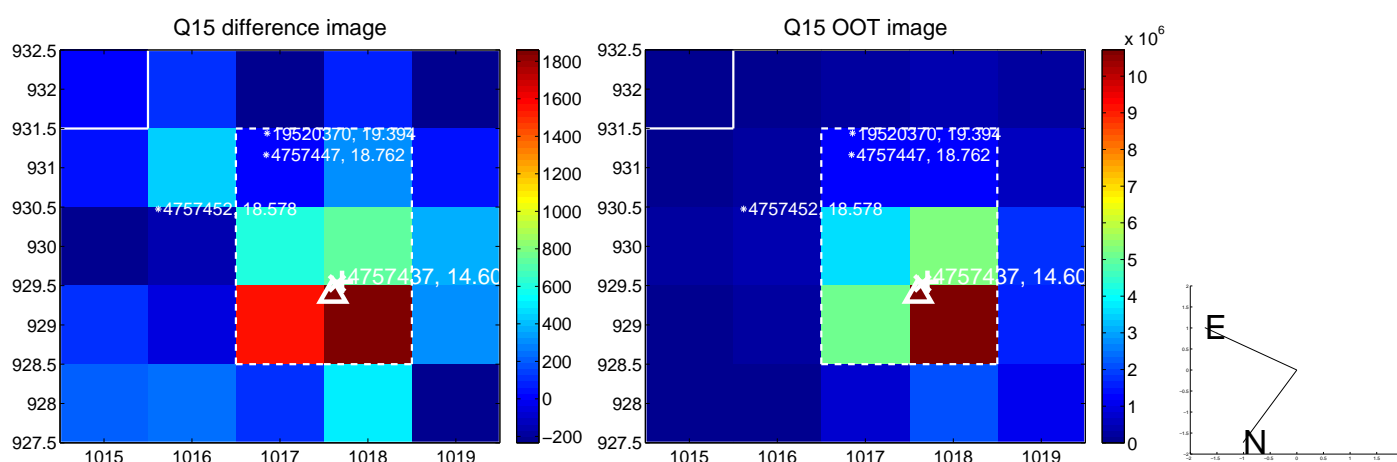
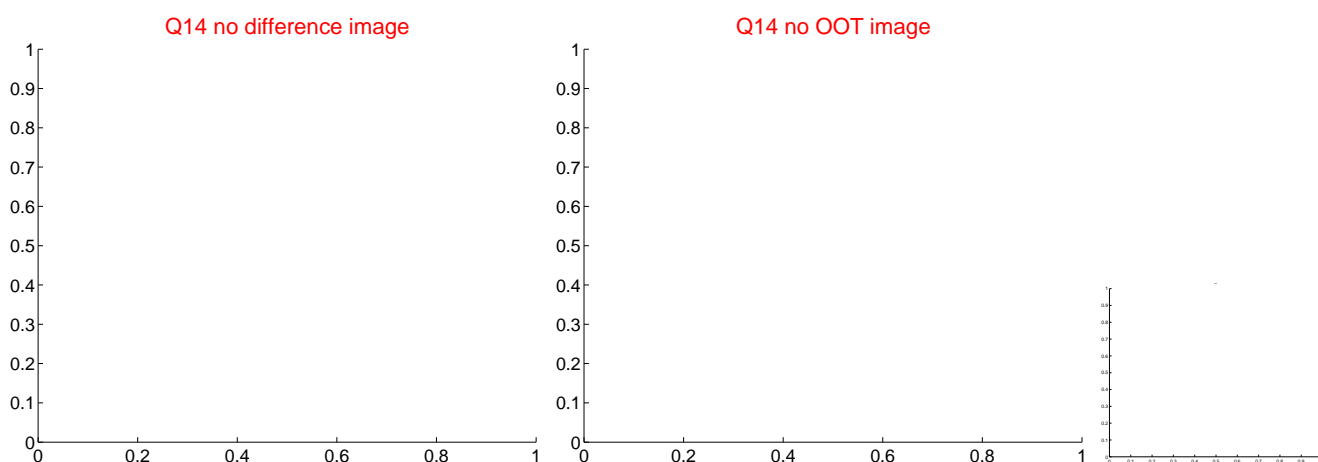
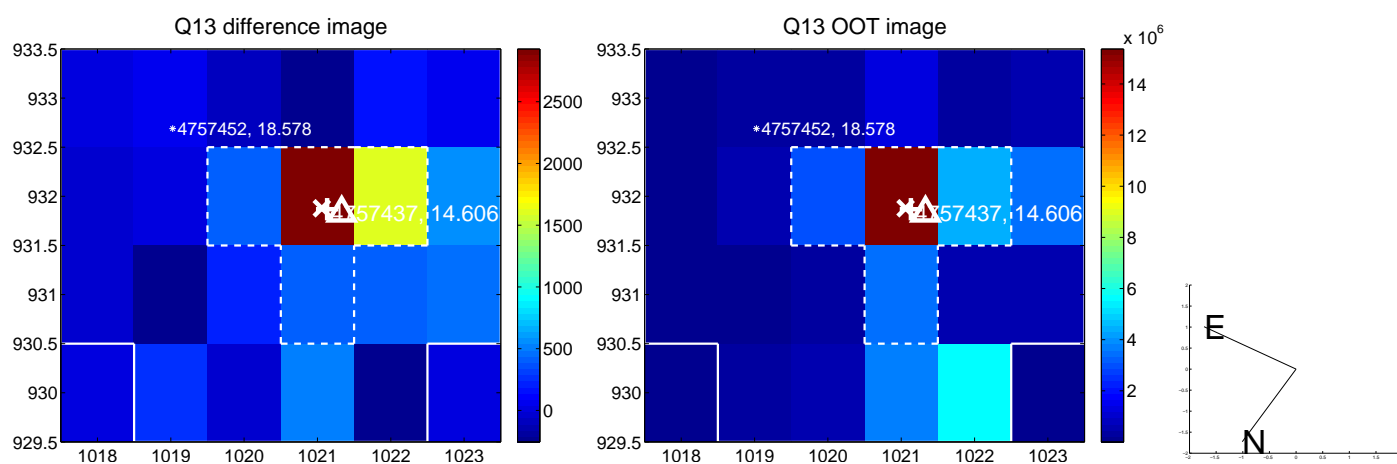
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



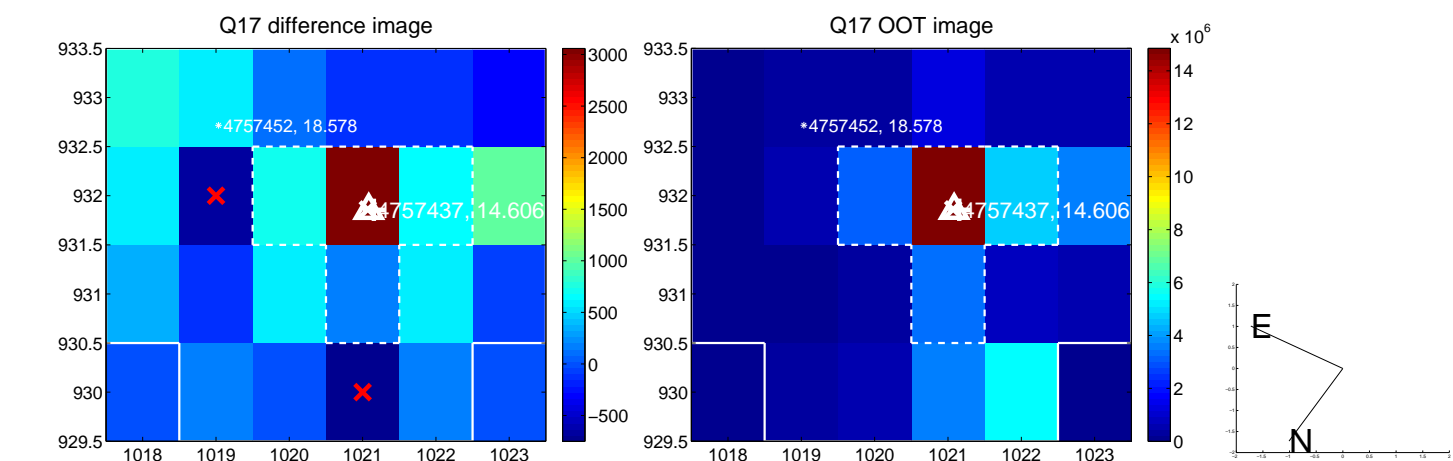
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



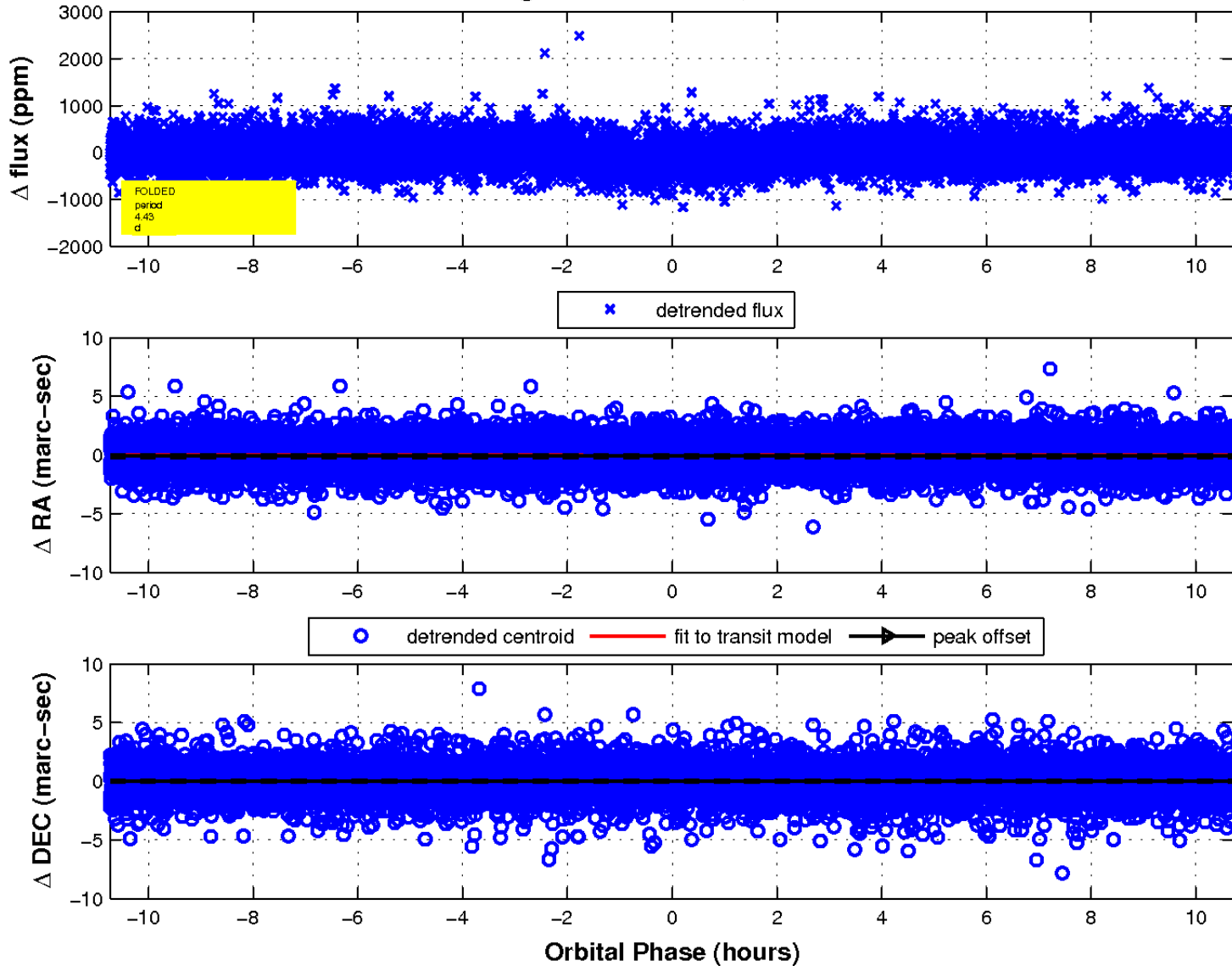
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

