

KIC 010031907

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})
010031907-01	OBS	3828.01	8.589663	132.018649	1029.3	8.499	67.2	76.1	0.89	5697	5.26	111.11
010031907-02	OBS	No	8.589611	136.187785	269.8	11.262	21.2	24.2	0.89	5697	2.97	111.11

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010031907-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_KIC_POS—HALO_GHOST—EPHEM_MATCH
010031907-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_KIC_POS—HALO_GHOST—EPHEM_MATCH

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.

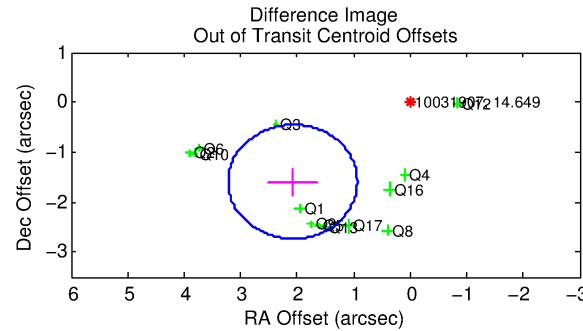
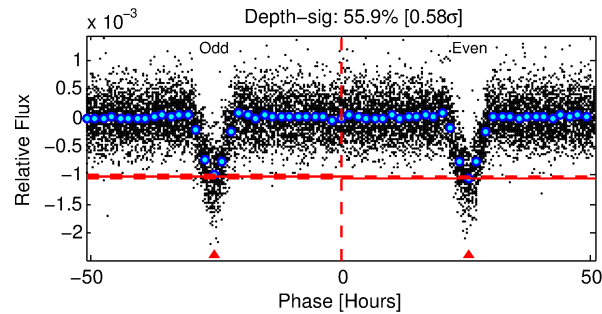
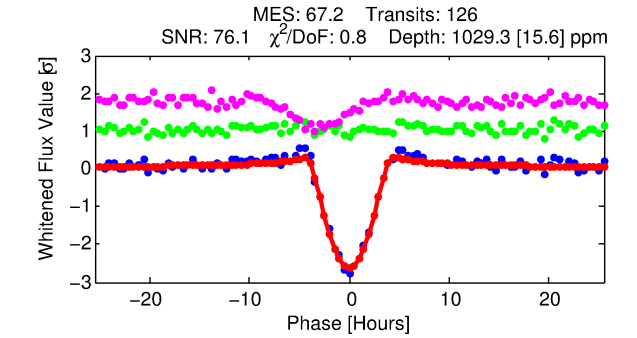
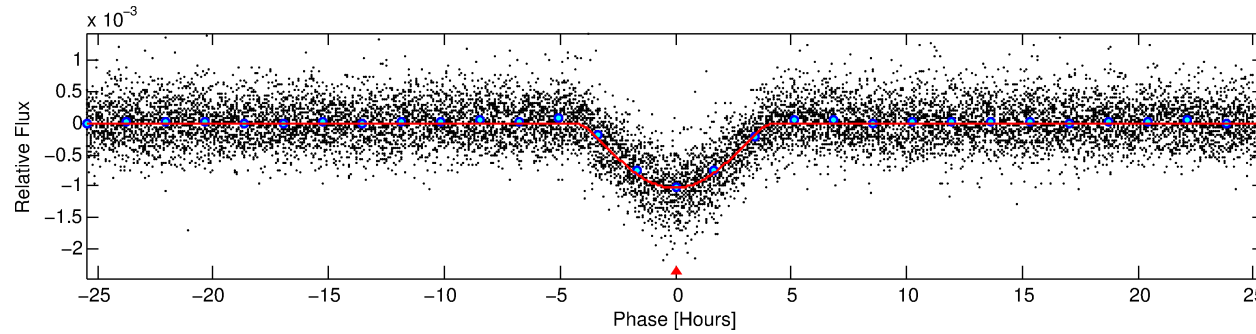
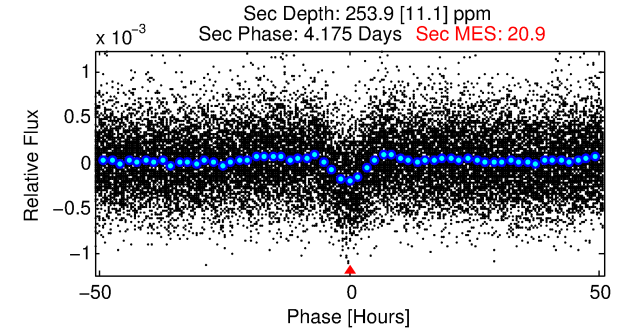
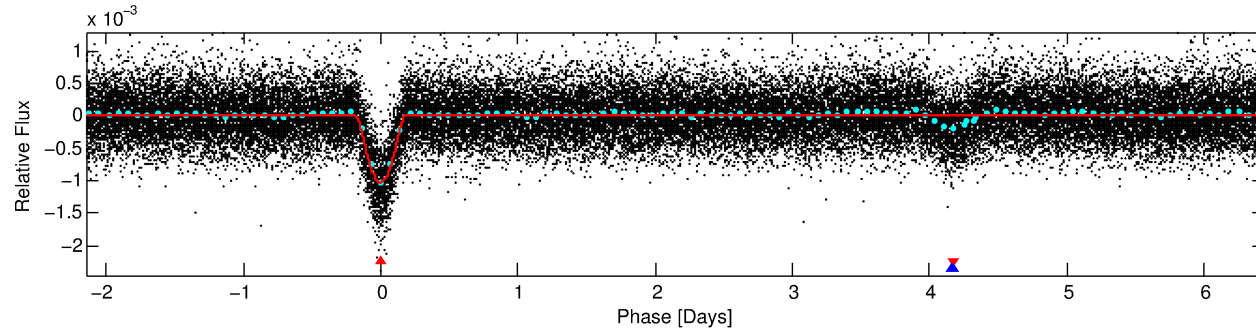
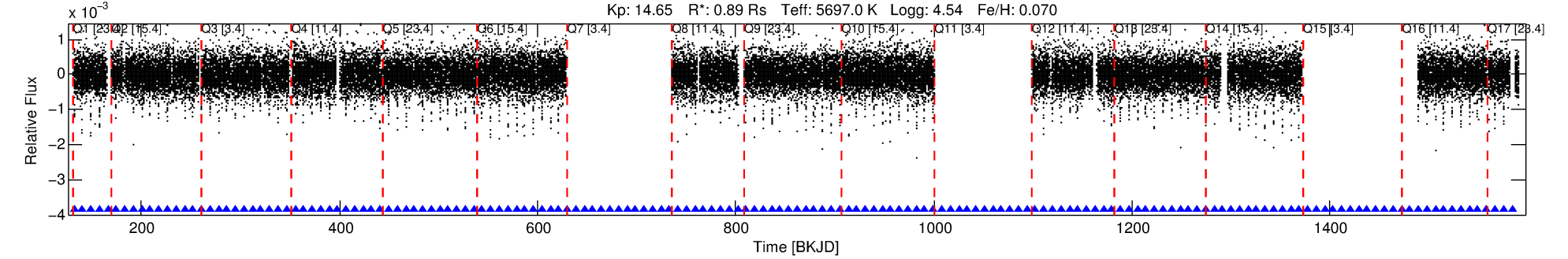
Ephemeris Match Information For 010031907-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
010031907-01	10031907	010031808-01	10031808	1:1	69.4	-17	0	9.56	14.65	262.53	Direct-PRF	0	0.50	0.46

Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 10031907 Candidate: 1 of 2 Period: 8.590 d
KOI: K03828.01 Corr: 0.963



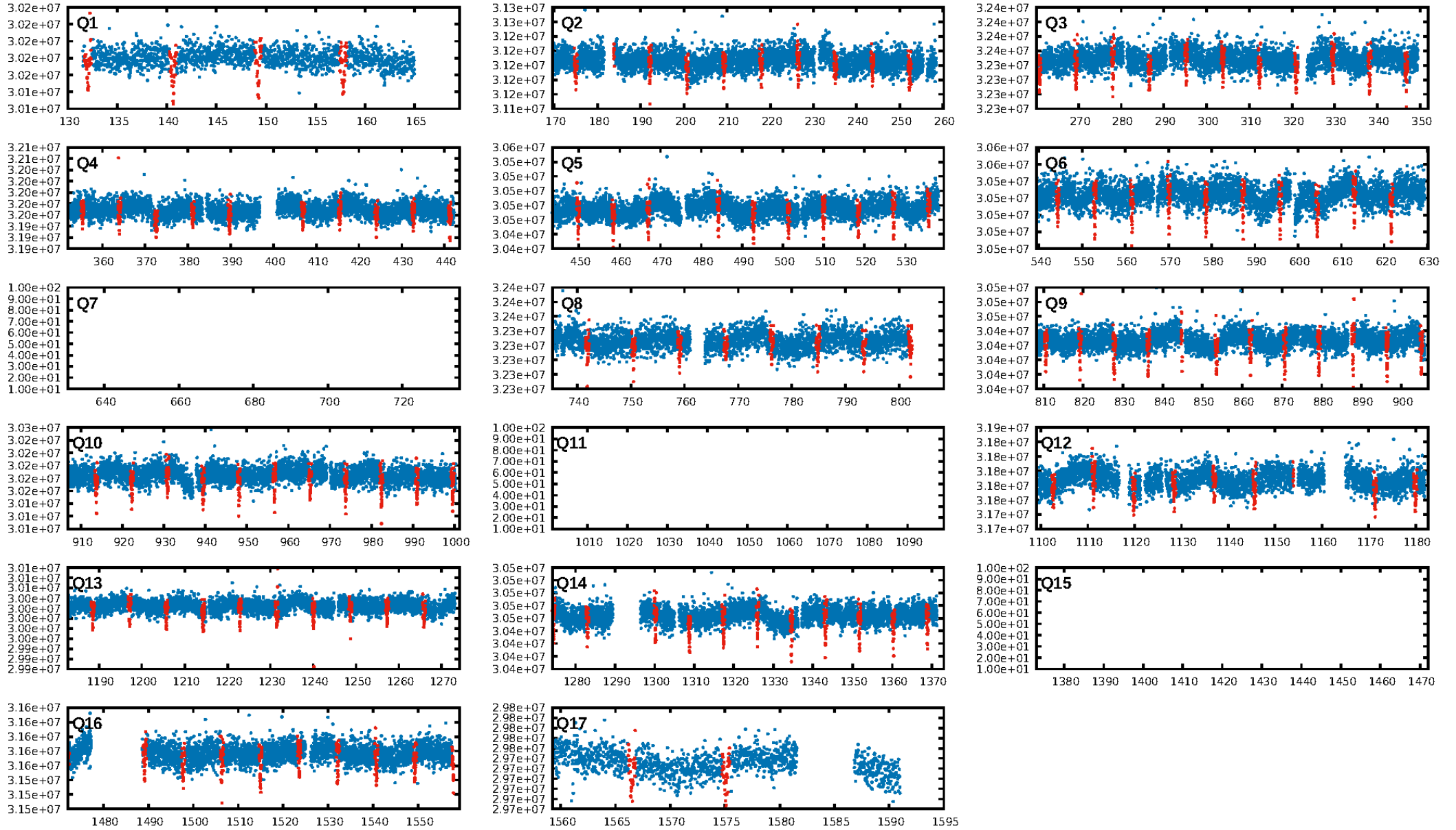
DV Fit Results:

Period = 8.58966 [0.00002] d
Epoch = 132.0186 [0.0022] BKJD
Rp/R* = 0.0540 [0.0190]
a/R* = 2.88 [0.22]
b = 0.99 [0.03]
Seff = 111.11 [42.69]
Teff = 828 [80] K
Rp = 5.26 [2.42] Re
a = 0.0822 [0.0206] AU
Ag = 34.17 [27.13] [1.22 σ]
Teffp = 3095 [553] K [4.05 σ]

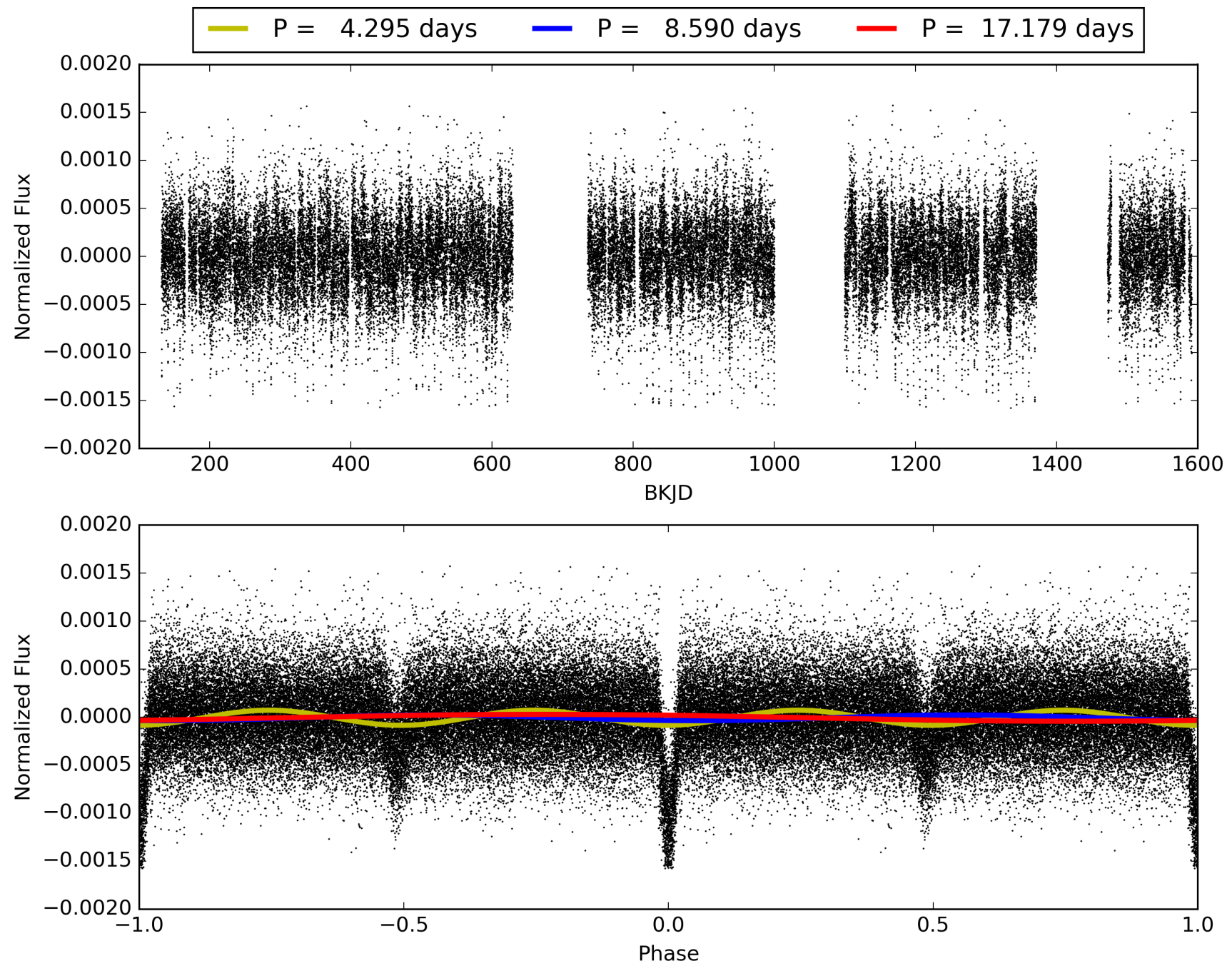
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [120/120]
GhostDiagnostic-chr: 0.1481
Centroid-sig: 0.0%
Centroid-so: 2.145 arcsec [14.10 σ]
OotOffset-rm: 2.619 arcsec [6.88 σ]
KicOffset-rm: 2.248 arcsec [8.91 σ]
OotOffset-st: 3/1/4/5 [13]
KicOffset-st: 4/1/4/5 [14]
DiffImageQuality-fgm: 0.14 [2/14]
DiffImageOverlap-fno: 1.00 [14/14]

TCE 010031907-01, PDC Light Curves

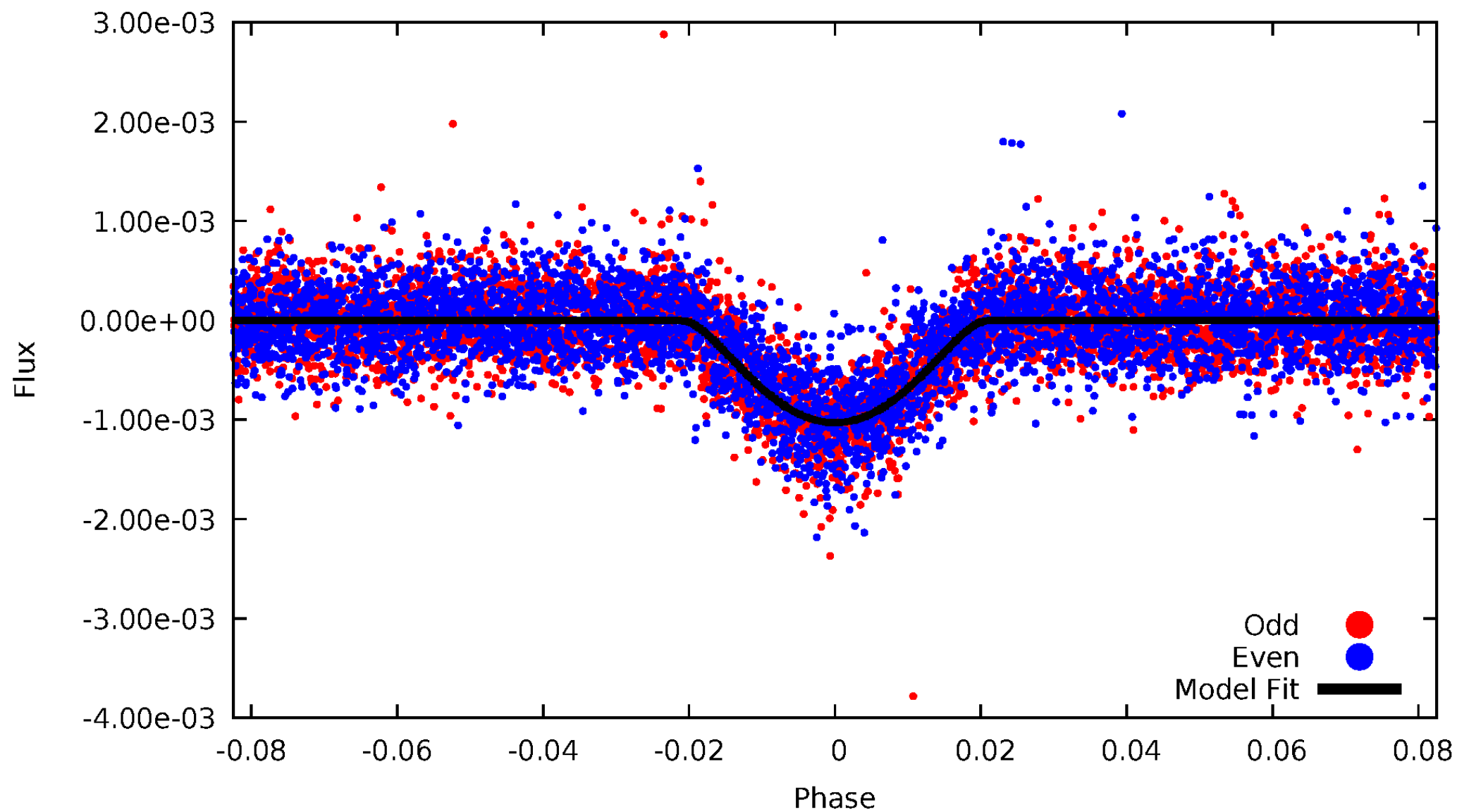


TCE 010031907-01



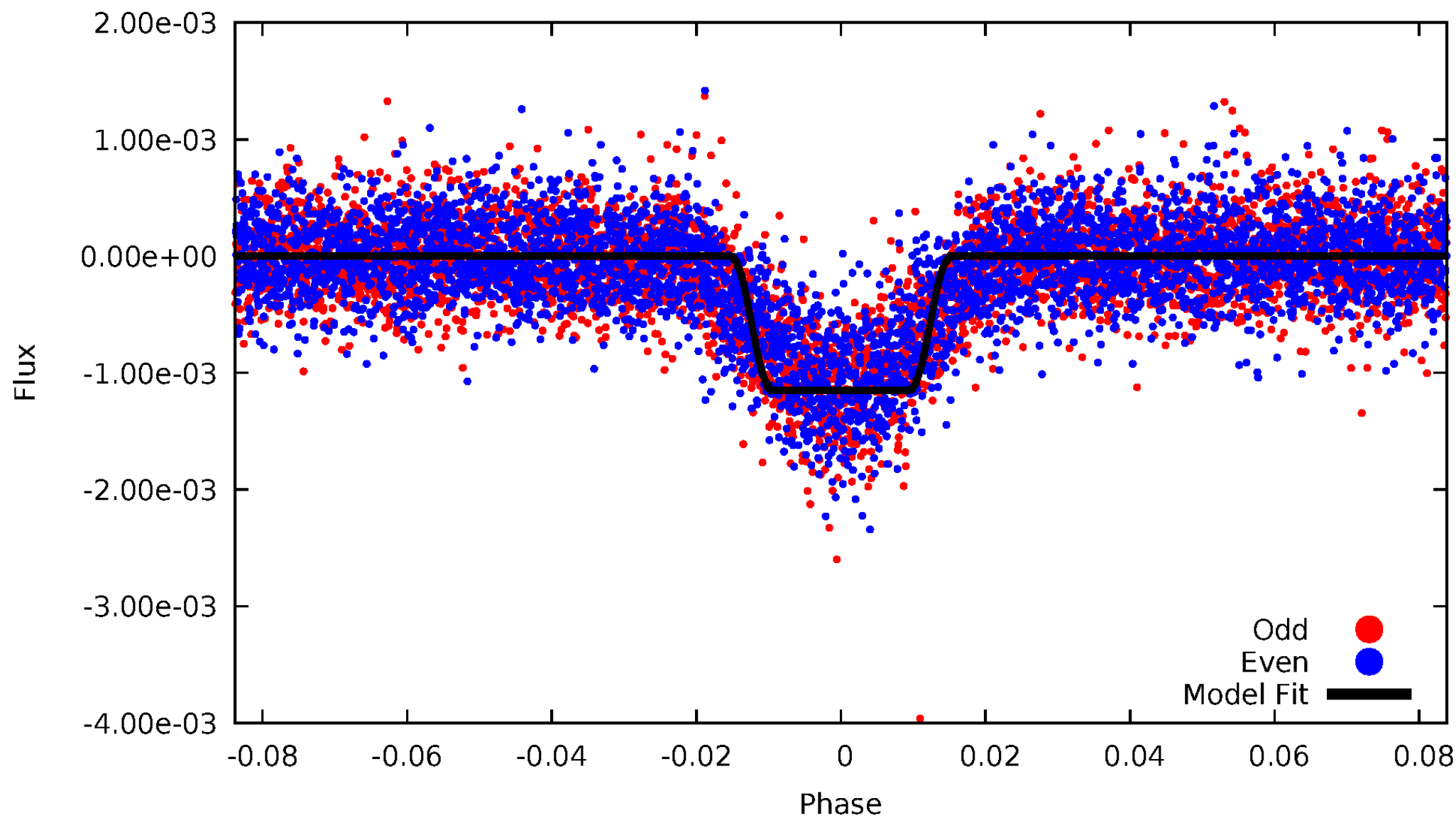
DV Odd/Even

TCE 010031907-01



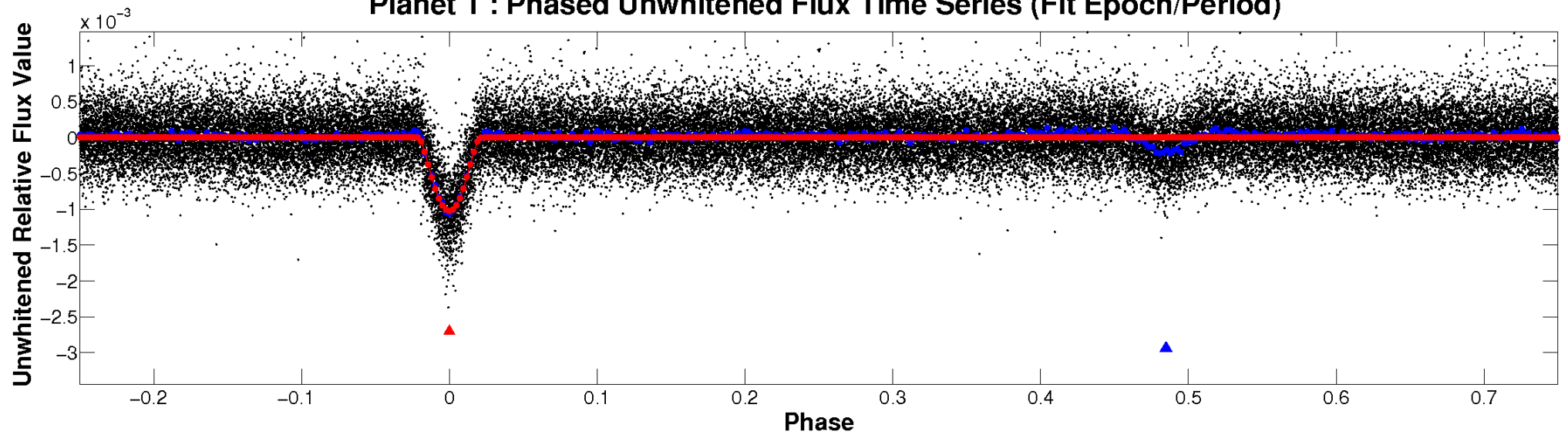
ALT Odd/Even

TCE 010031907-01

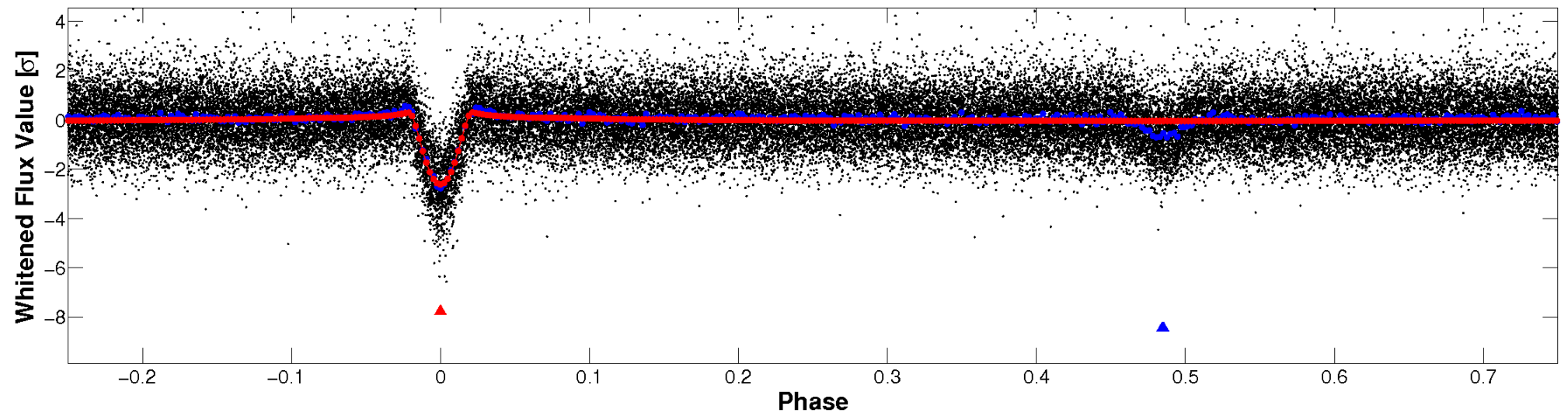


Non-Whitened Vs. Whitened Light Curve

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

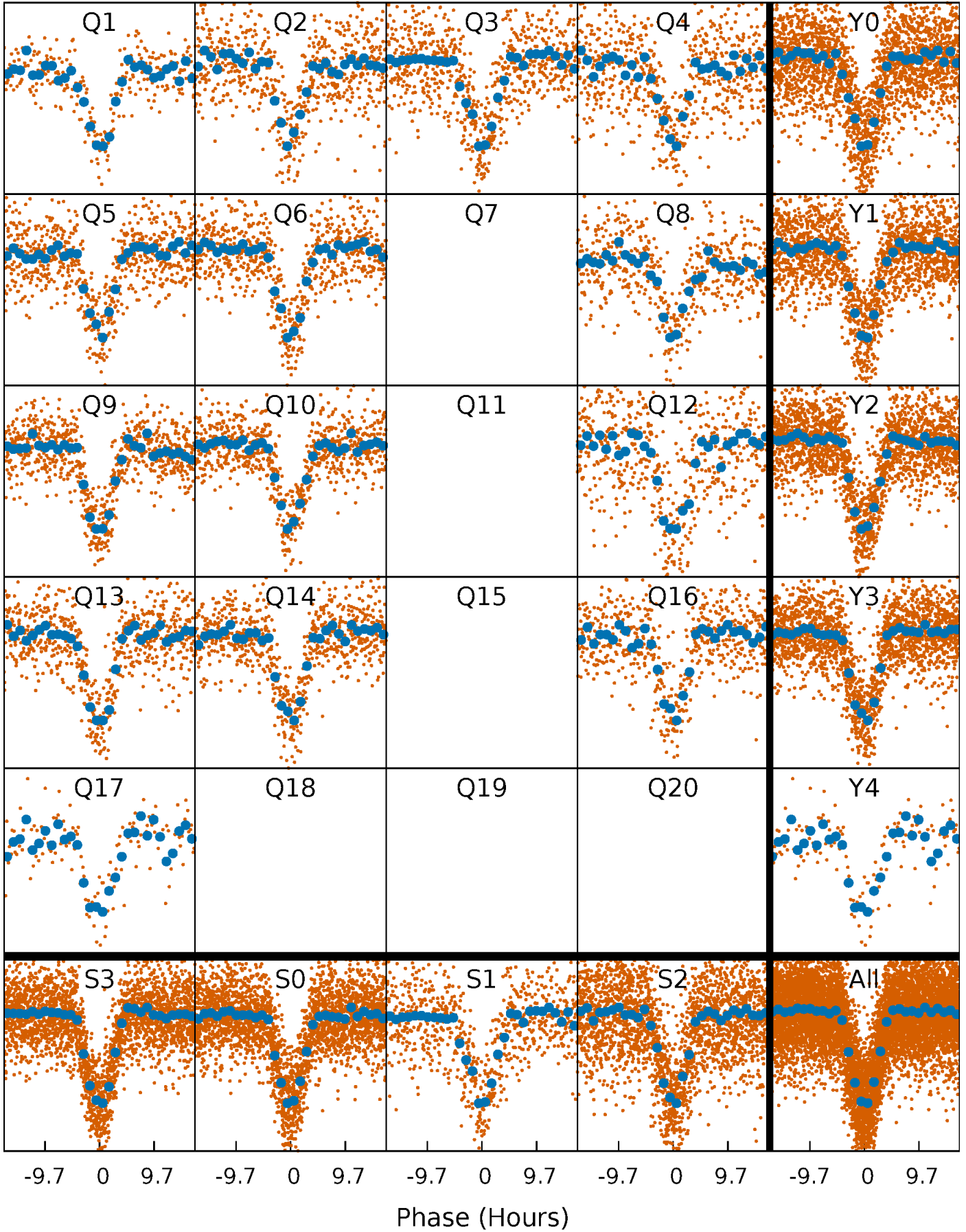


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



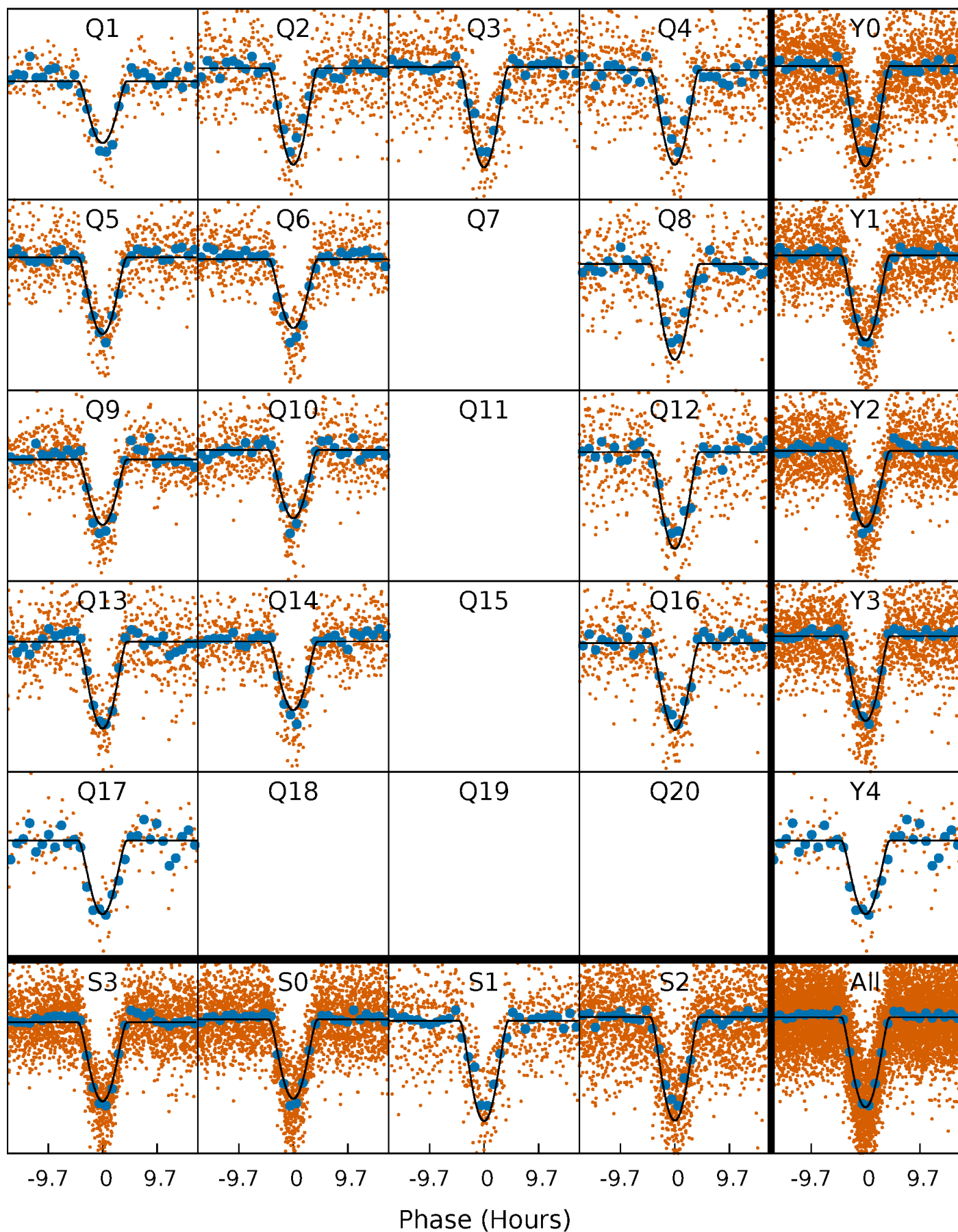
PDC Quarter-Phased Transit Curves

TCE 010031907-01 P= 8.589663 Days $T_0=132.018649$ (BKJD)



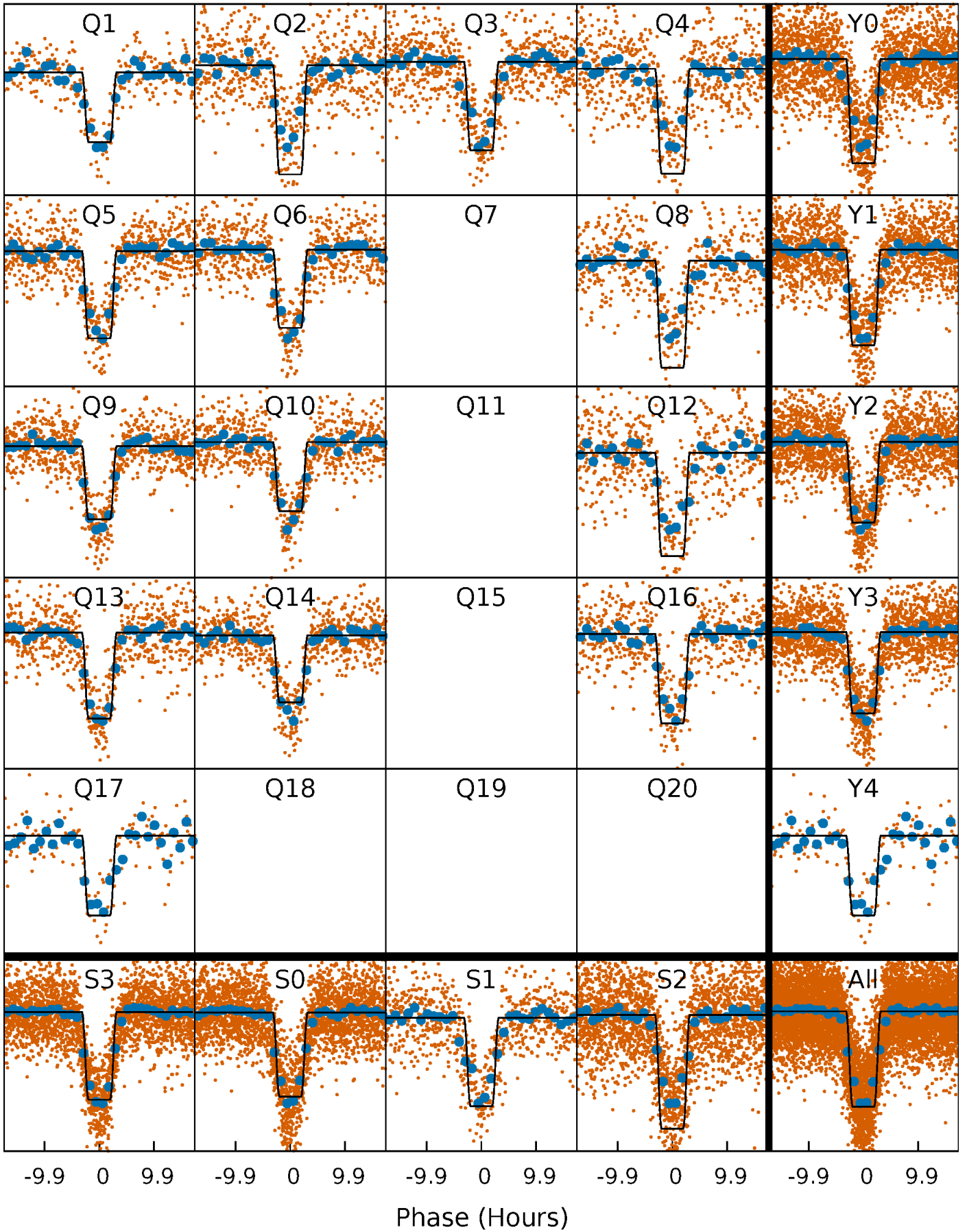
DV Quarter-Phased Transit Curves

TCE 010031907-01 P= 8.589663 Days $T_0=132.018649$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

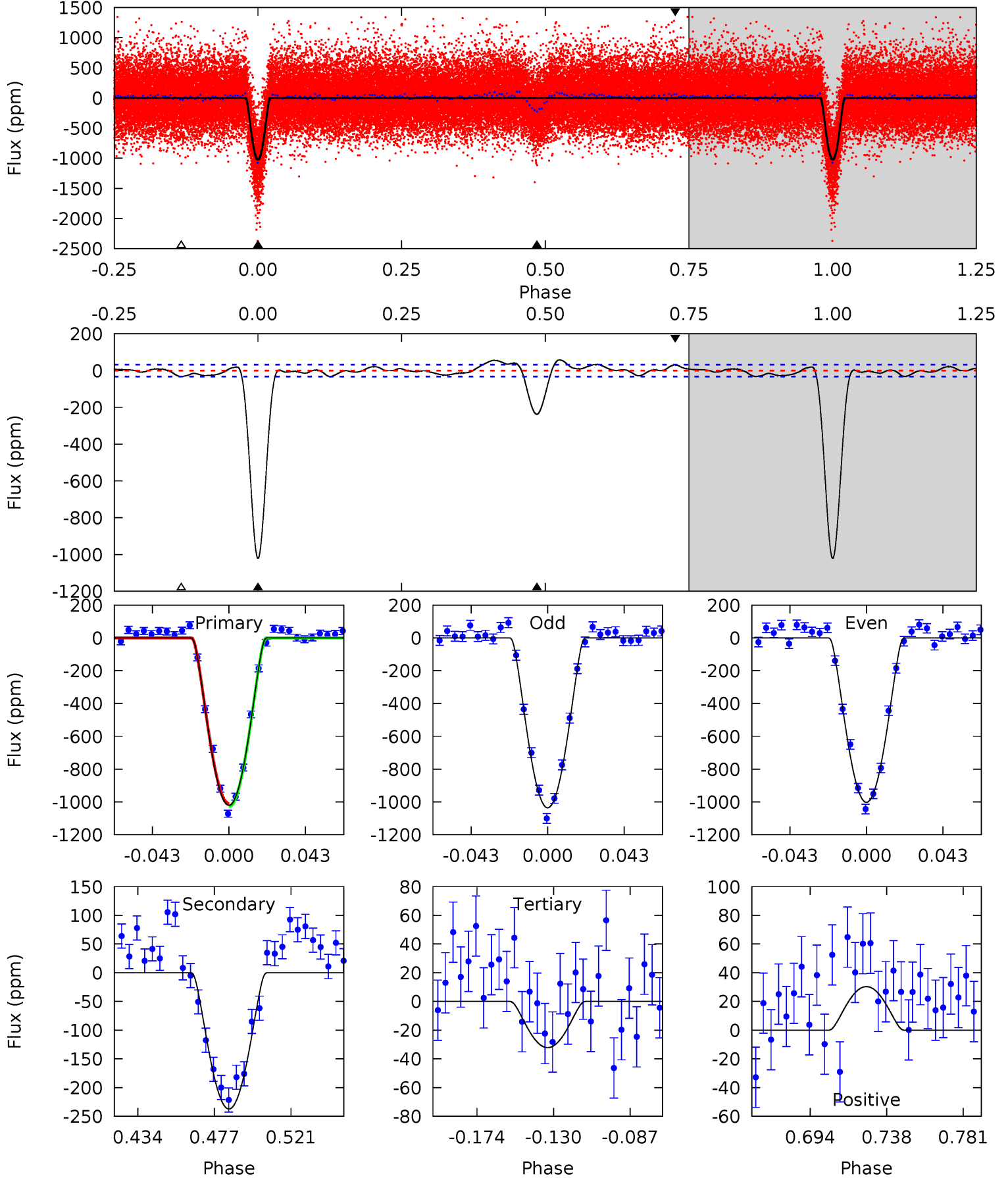
TCE 010031907-01 P= 8.589616 Days $T_0=132.022764$ (BKJD)



DV Model-Shift Uniqueness Test

010031907-01, P = 8.589663 Days, E = 123.428986 Days

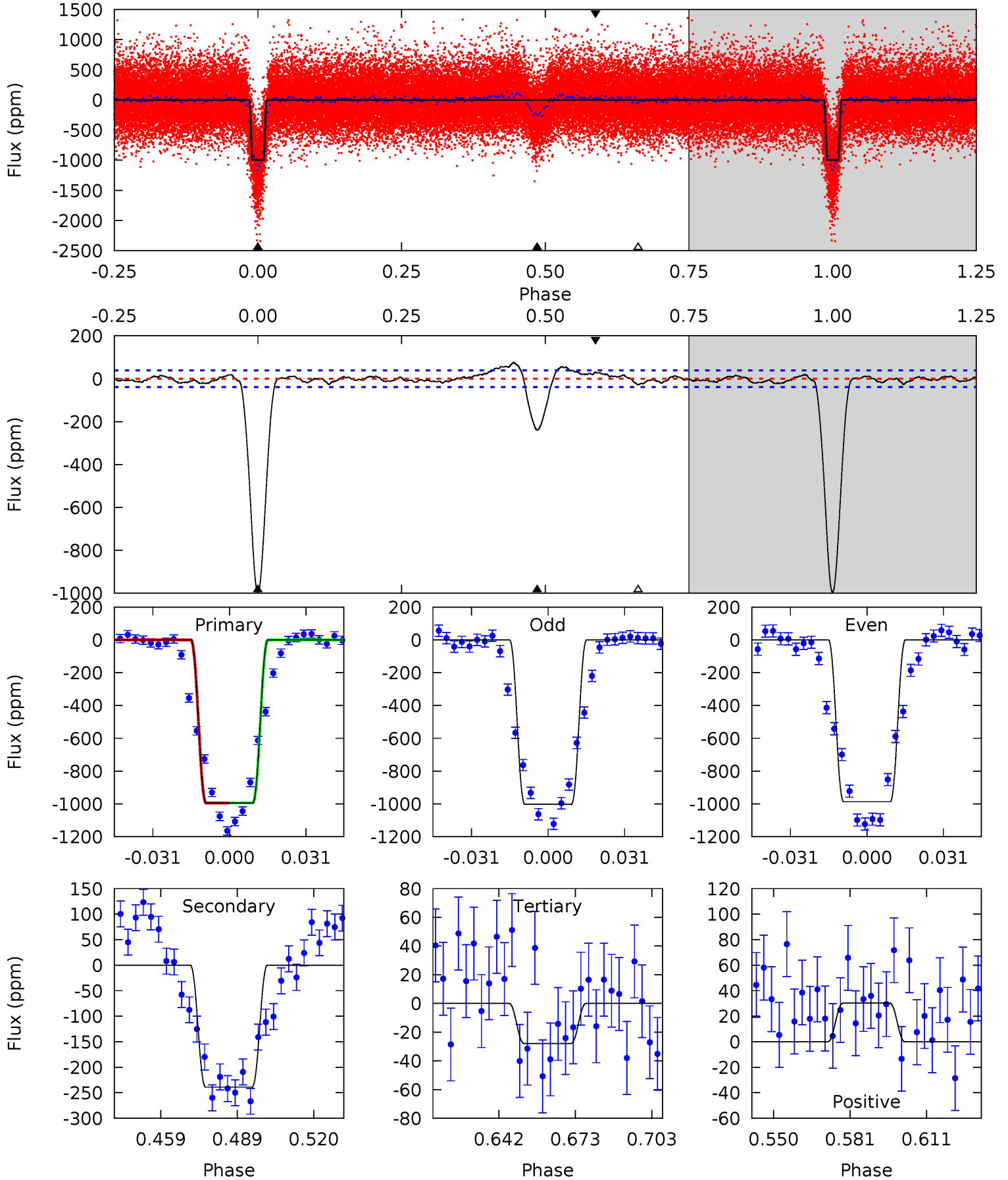
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
148.7	34.6	4.68	4.42	4.74	2.02	2.82	144.0	144.3	29.9	30.1	2.42	1.03	0.05	1.13



Alt Model-Shift Uniqueness Test

010031907-01, P = 8.589616 Days, E = 123.433148 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
123.7	29.7	3.47	3.77	4.81	2.16	2.50	120.2	119.9	26.2	25.9	0.98	1.00	0.07	0.04



Stellar Parameters For KIC 010031907

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5697^{+154}_{-171}	$4.539^{+0.037}_{-0.200}$	$0.070^{+0.250}_{-0.300}$	$0.892^{+0.264}_{-0.070}$	$1.004^{+0.100}_{-0.122}$	$1.990^{+0.399}_{-1.084}$
	+3%/-3%	+1%/-4%	+357%/-429%	+30%/-8%	+10%/-12%	+20%/-54%
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 010031907-01 / KOI 3828.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-237 ± 7	$5.53^{+2.11}_{-2.00}$	1186^{+75}_{-51}	3507^{+562}_{-332}	28^{+41}_{-13}
Alt.	-239 ± 8	$3.54^{+1.99}_{-1.77}$	1181^{+74}_{-49}	4086^{+1371}_{-566}	71^{+205}_{-42}

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

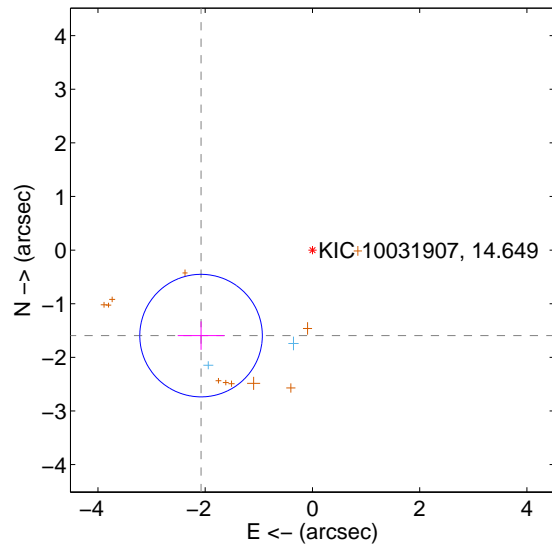
Supplemental centroid analysis for 010031907-01. Kepler magnitude: 14.65. Transit SNR 76.09

There are 2 quarters with good PRF difference image offsets

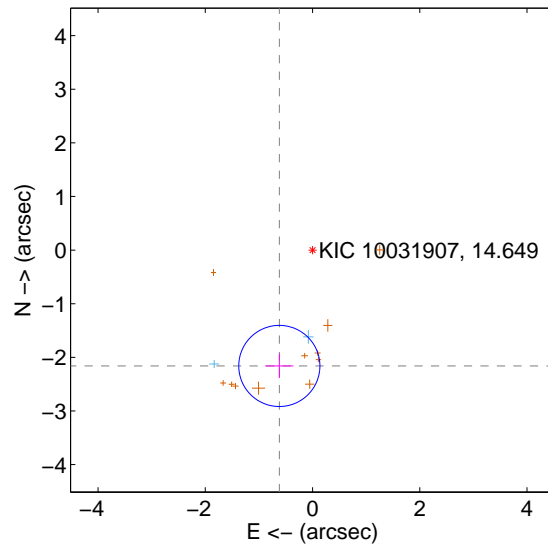
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.619 ± 0.381	6.88	2.078 ± 0.435	-1.595 ± 0.264
PRF-fit source offset from KIC position	2.248 ± 0.252	8.91	0.619 ± 0.263	-2.161 ± 0.227
photometric centroid source offset	2.14 ± 0.15	14.10	2.11 ± 0.15	-0.36 ± 0.12

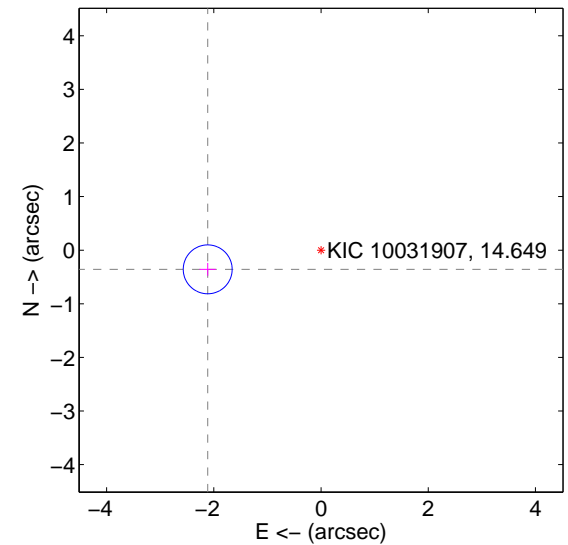
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

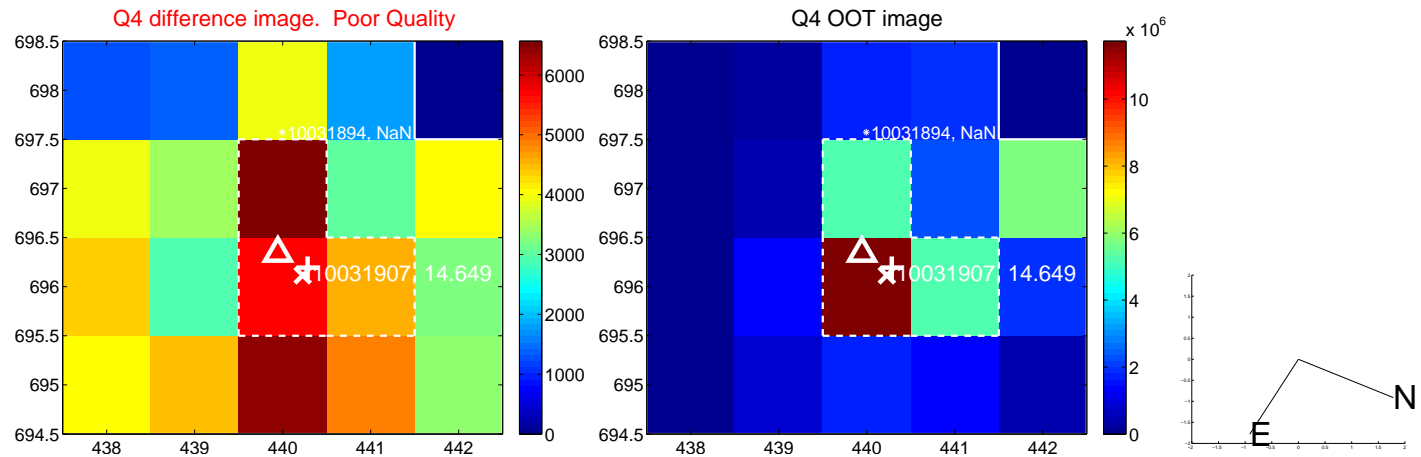
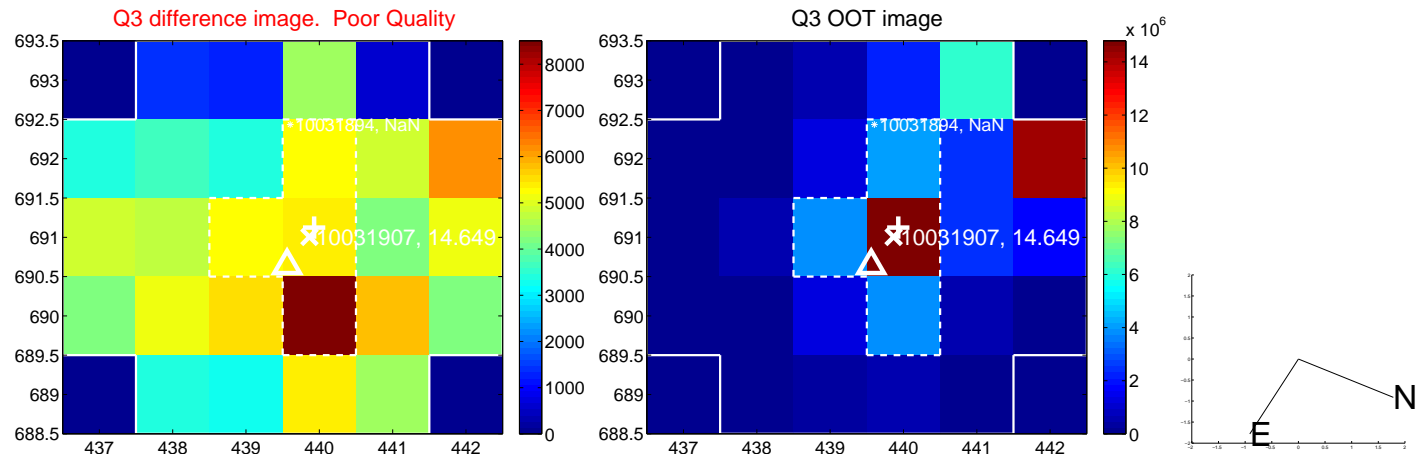
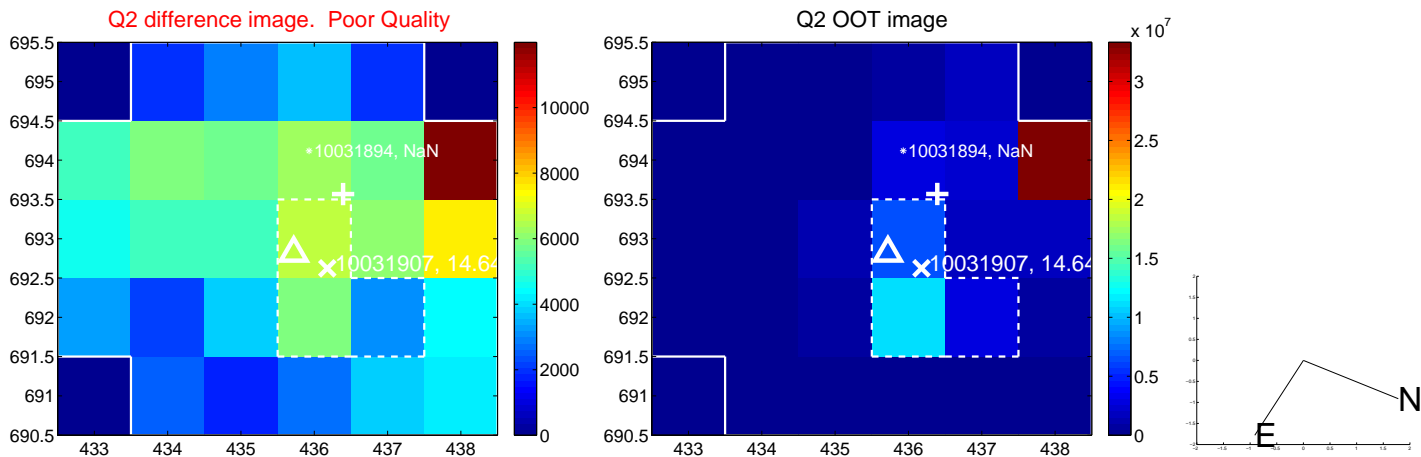
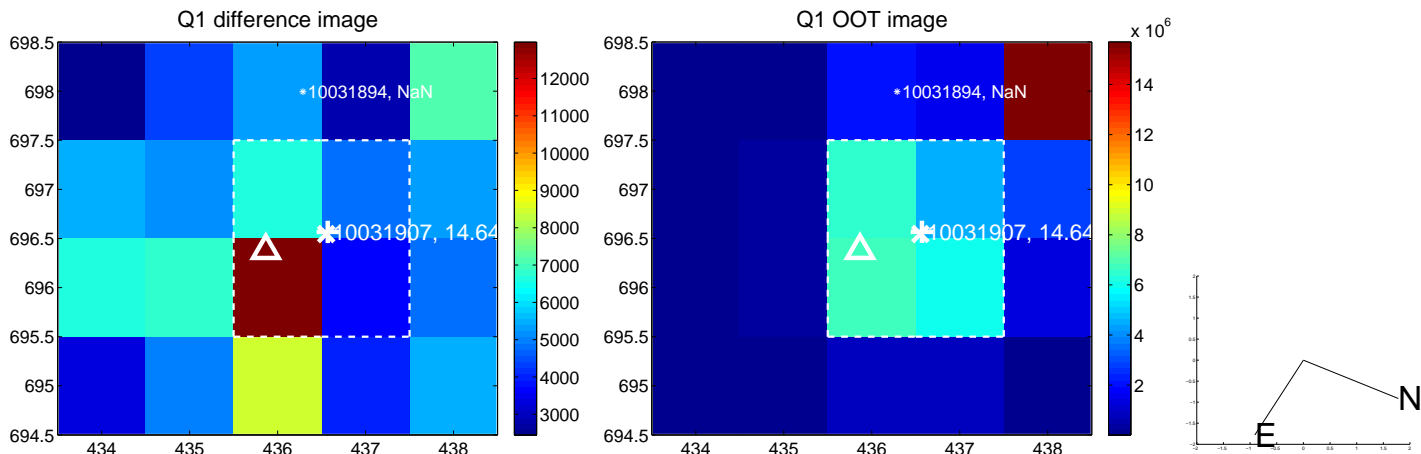


offset from photometric centroids

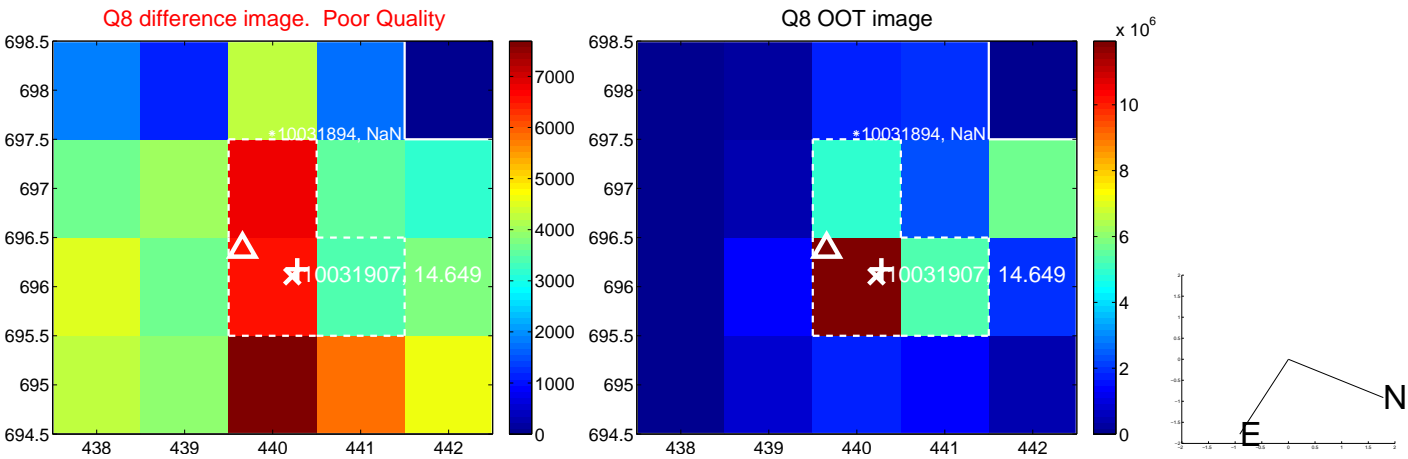
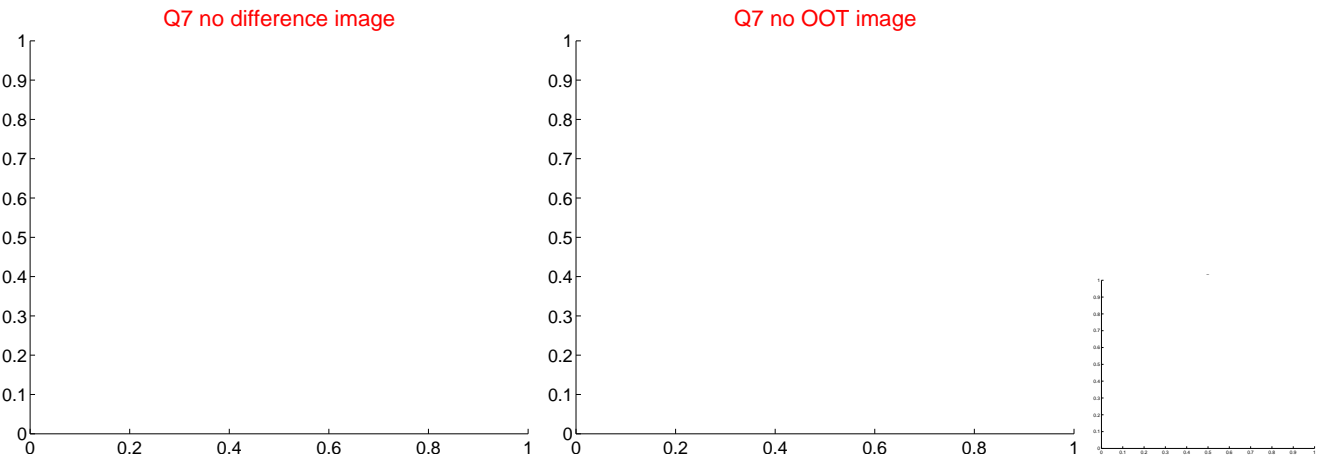
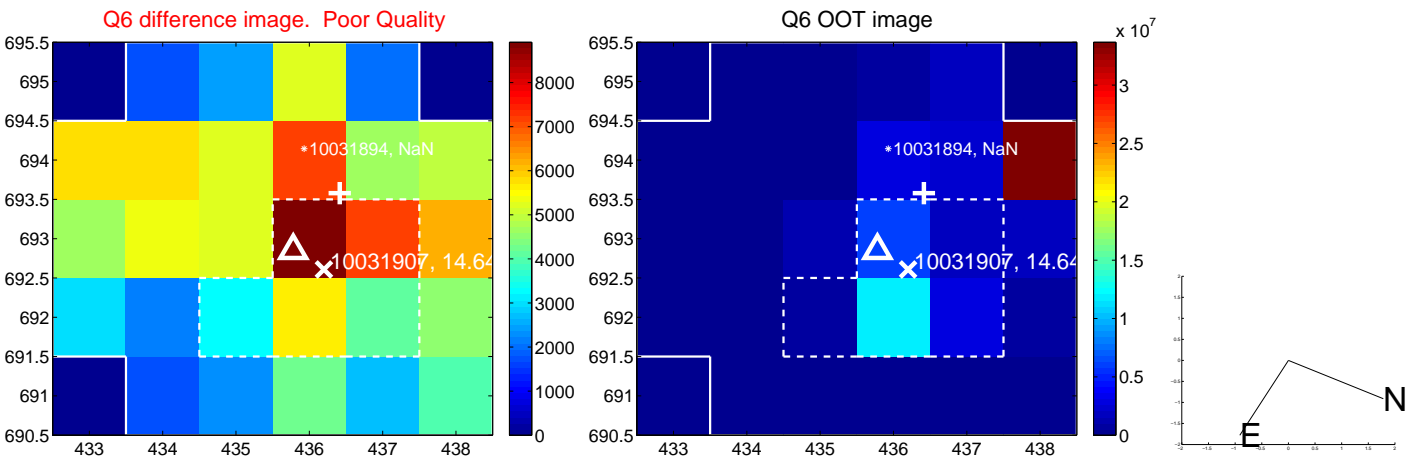
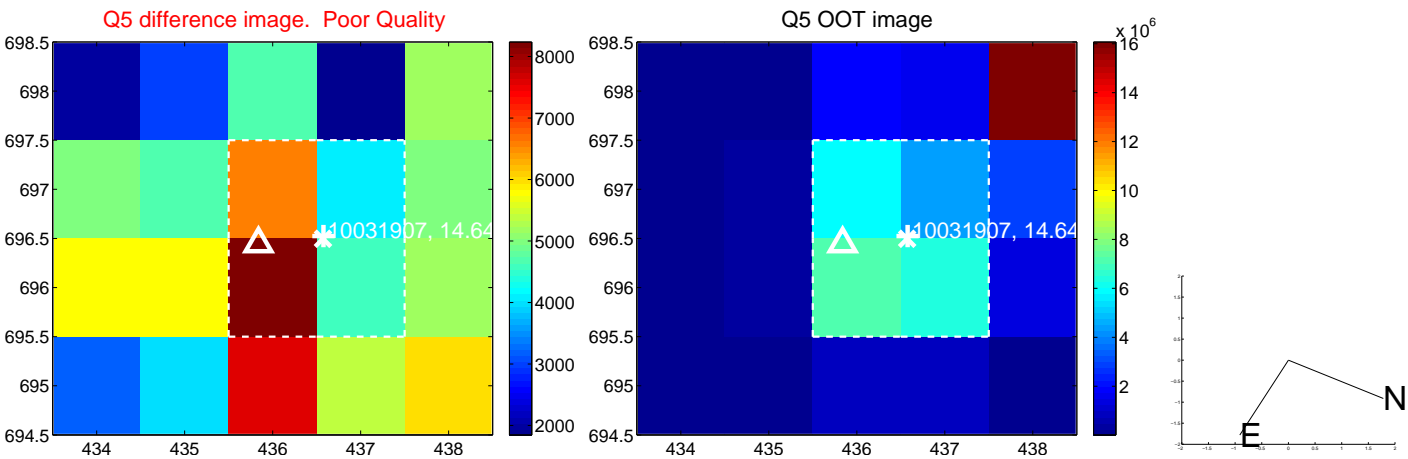


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

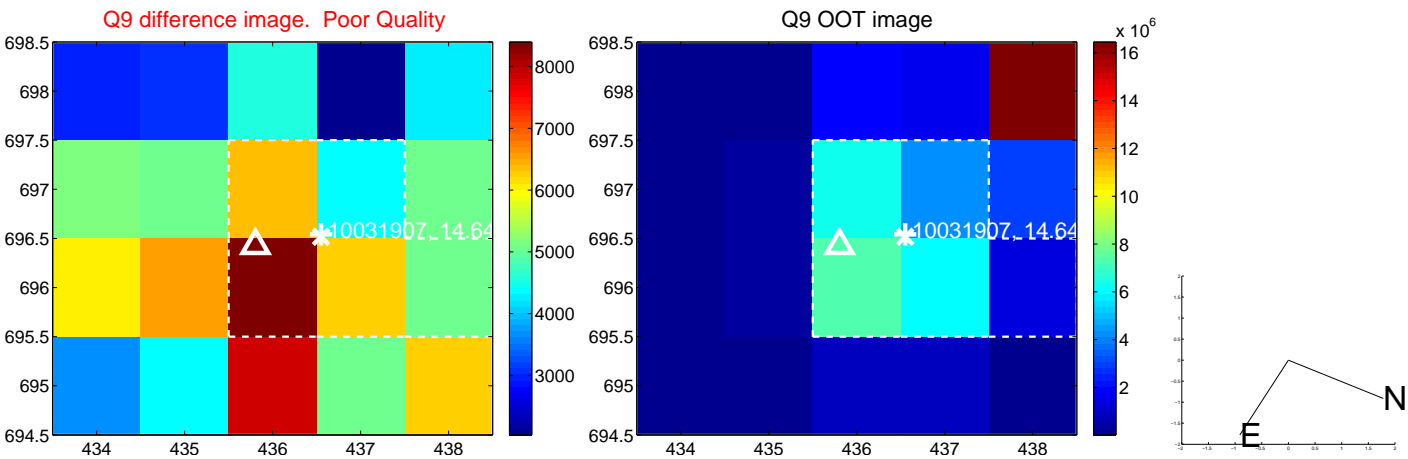
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



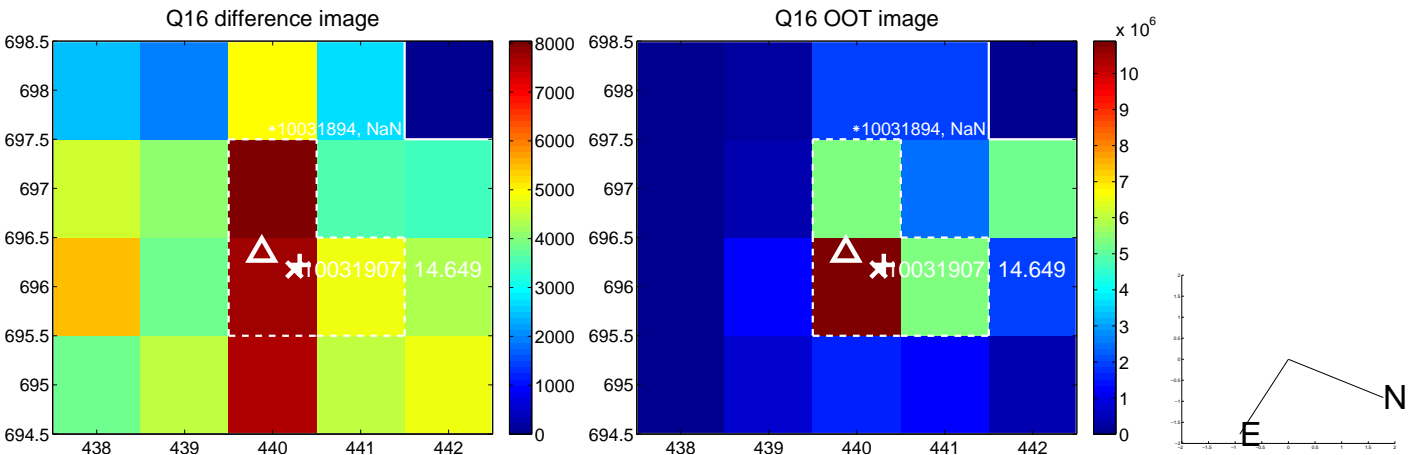
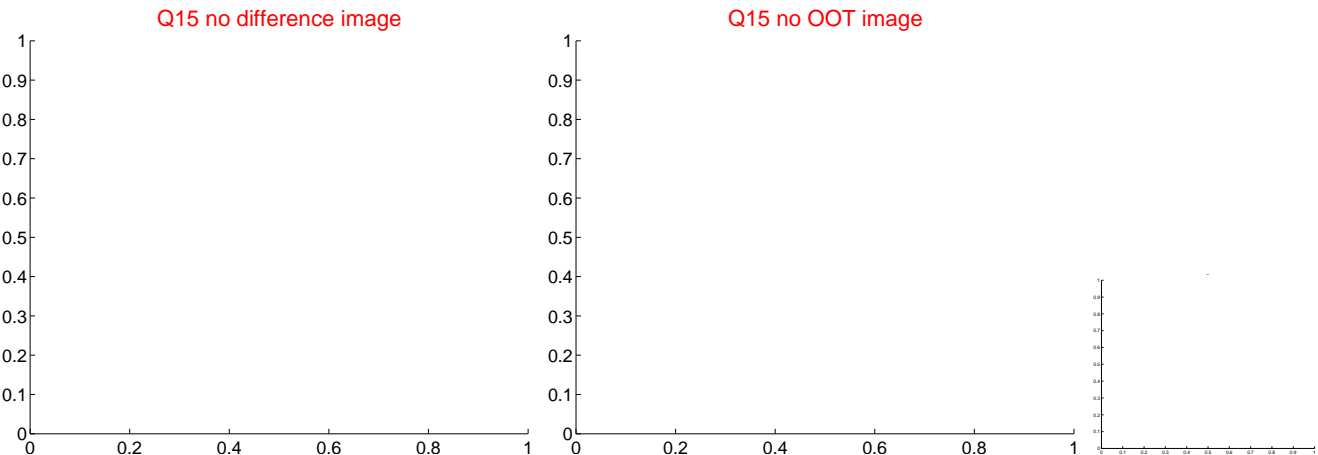
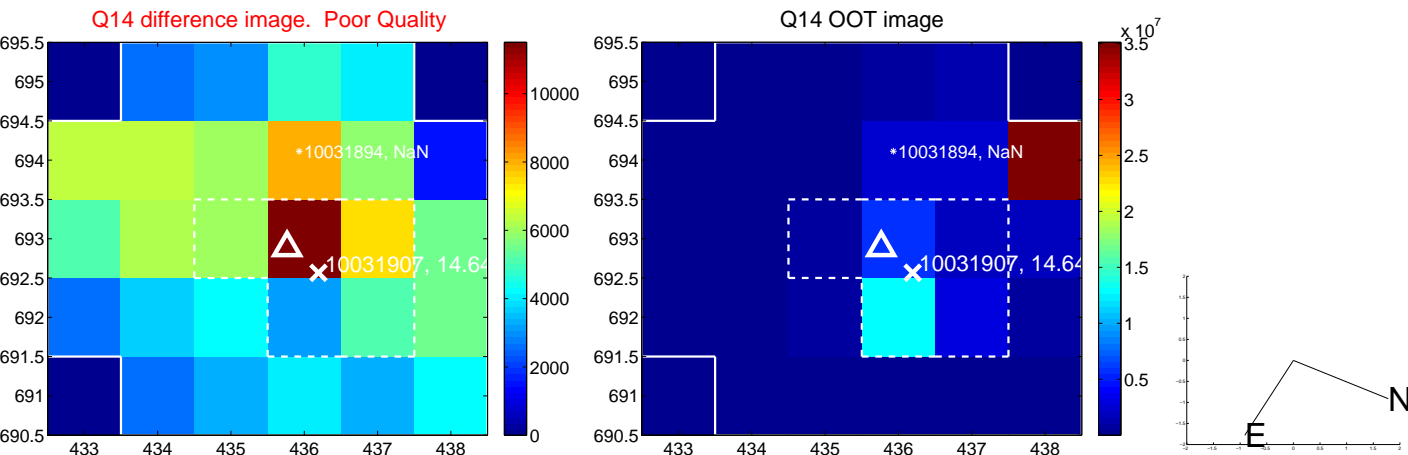
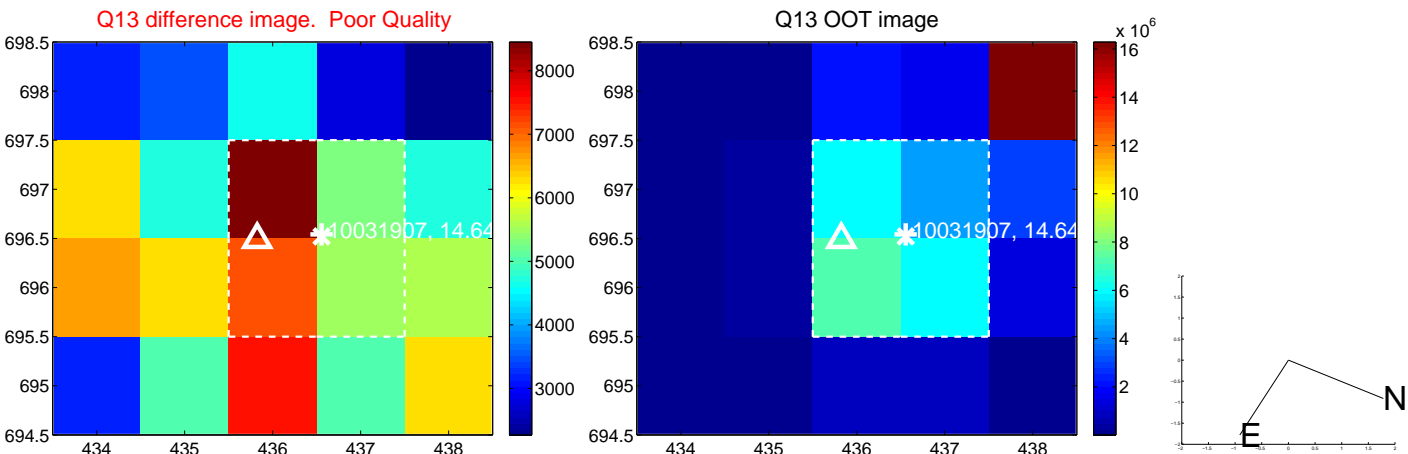
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



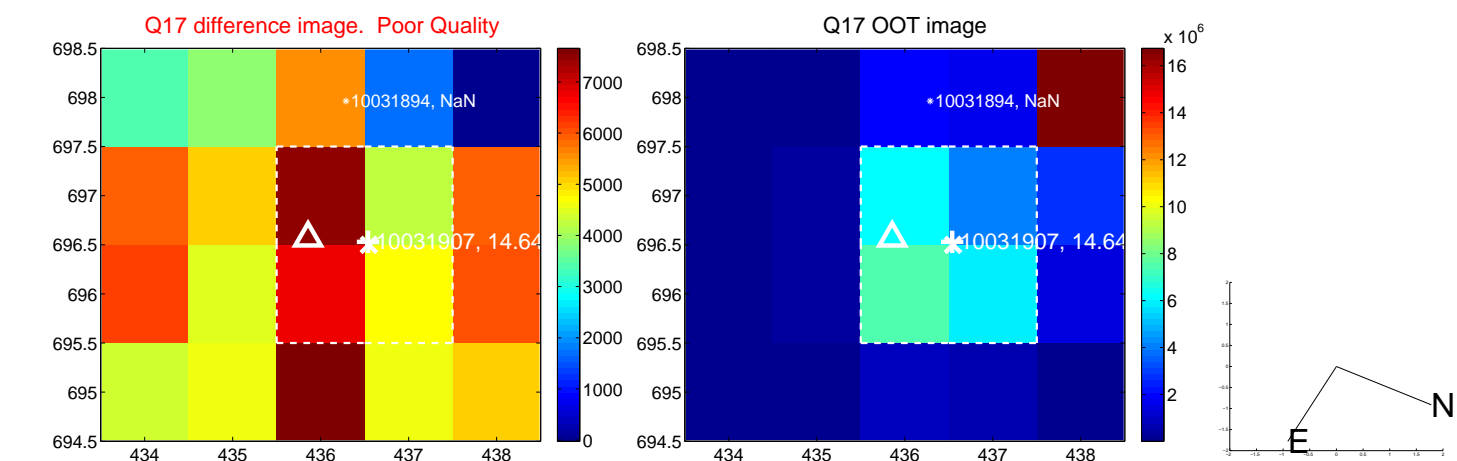
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



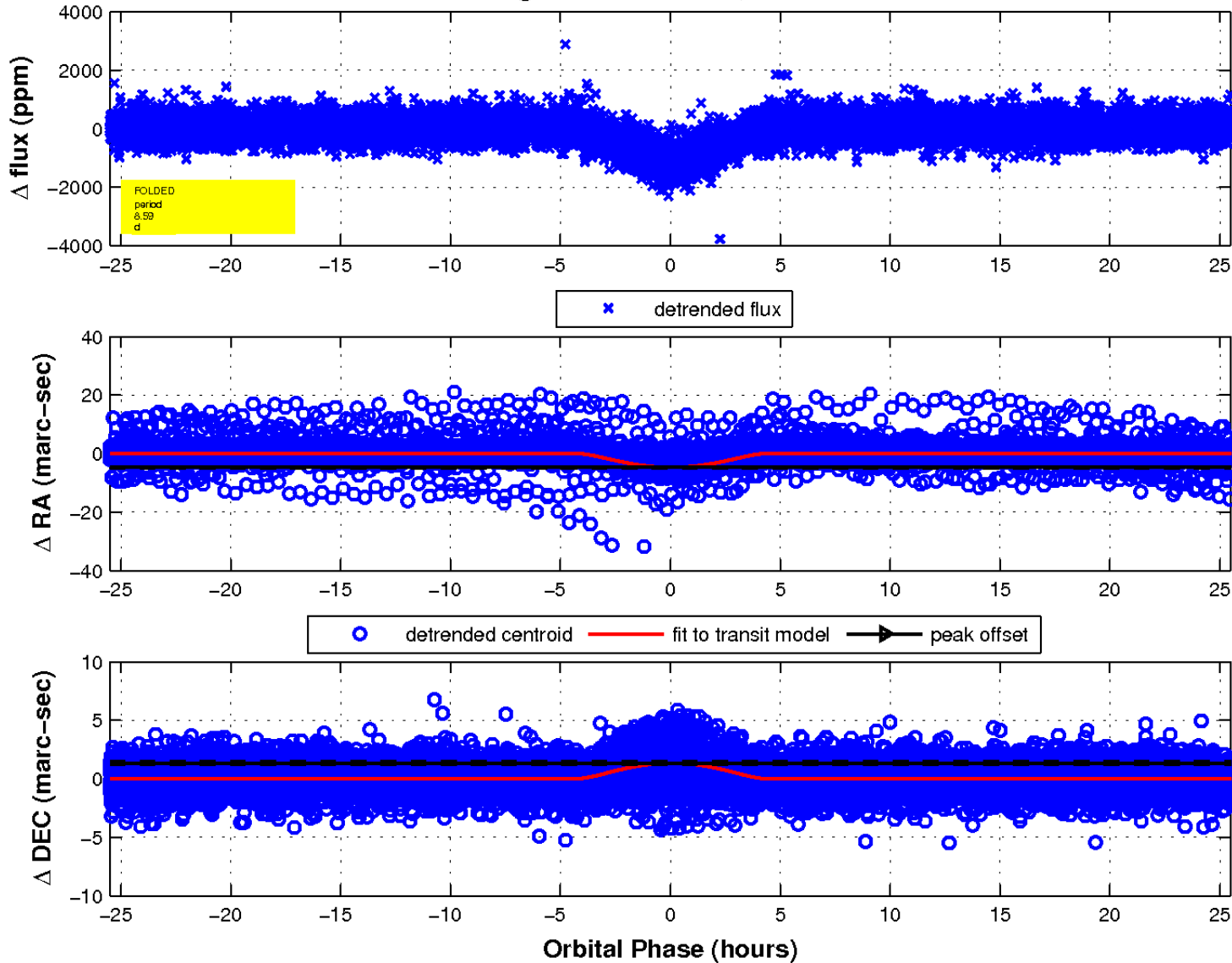
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

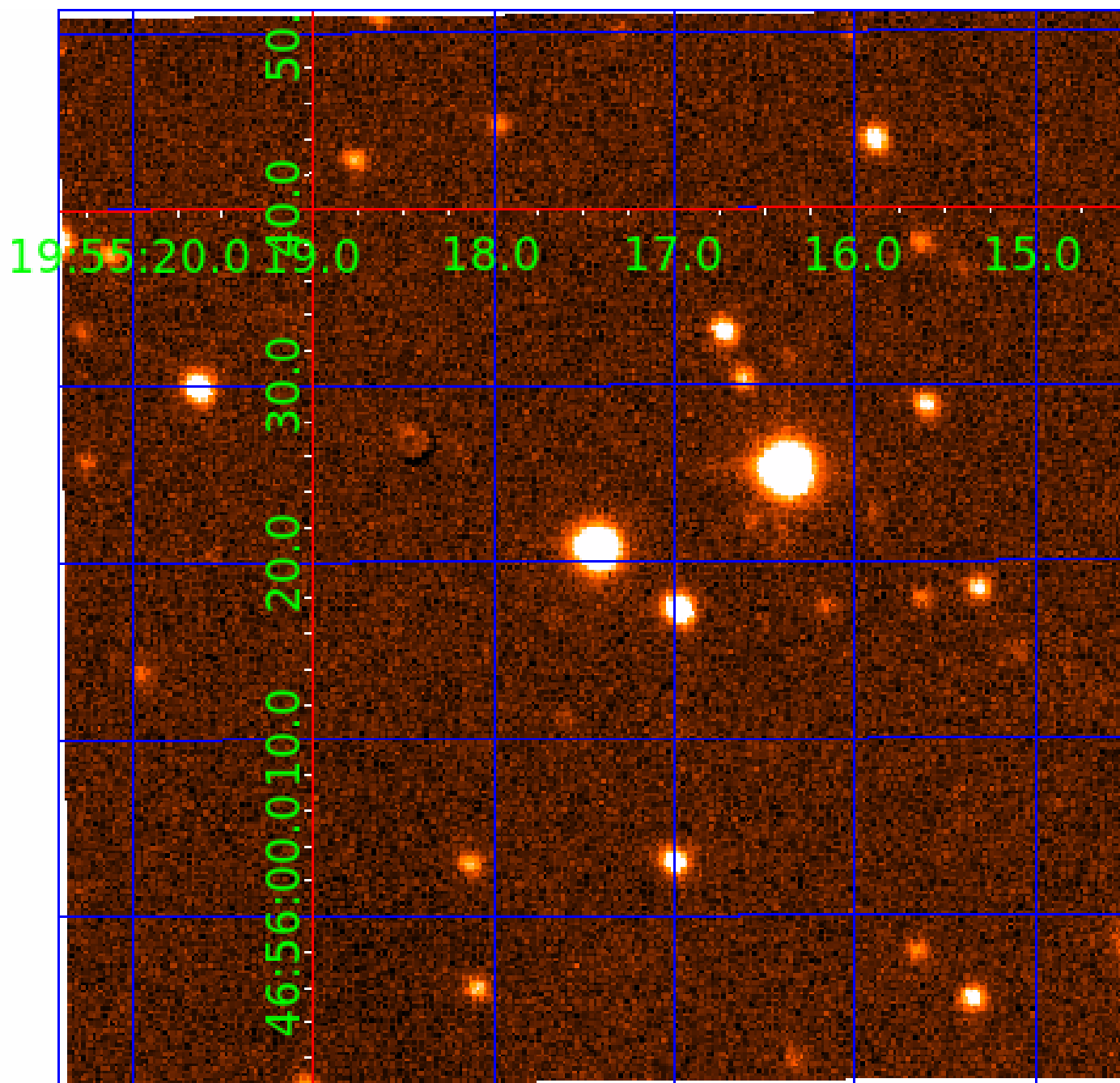


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 010031907

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})
010031907-01	OBS	3828.01	8.589663	132.018649	1029.3	8.499	67.2	76.1	0.89	5697	5.26	111.11
010031907-02	OBS	No	8.589611	136.187785	269.8	11.262	21.2	24.2	0.89	5697	2.97	111.11

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010031907-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_KIC_POS—HALO_GHOST—EPHEM_MATCH
010031907-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_KIC_POS—HALO_GHOST—EPHEM_MATCH

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.

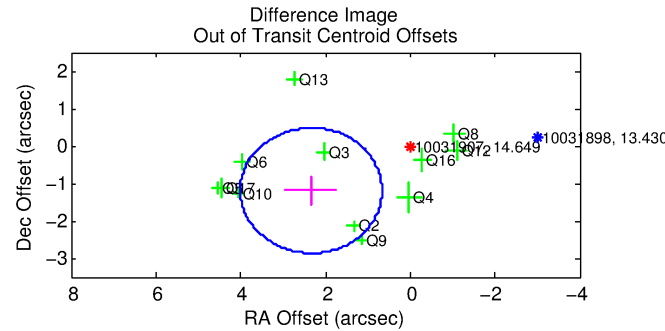
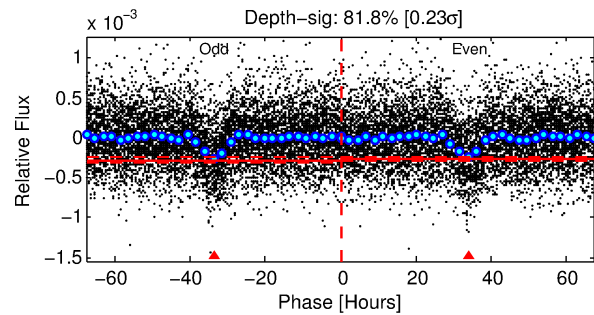
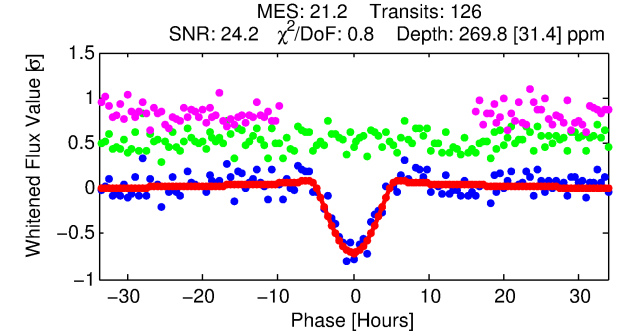
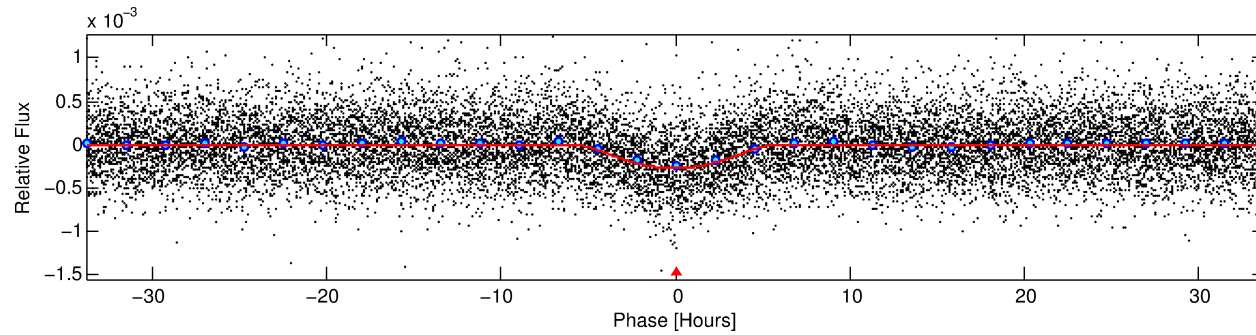
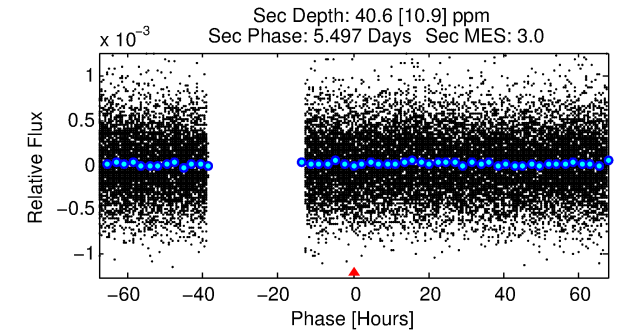
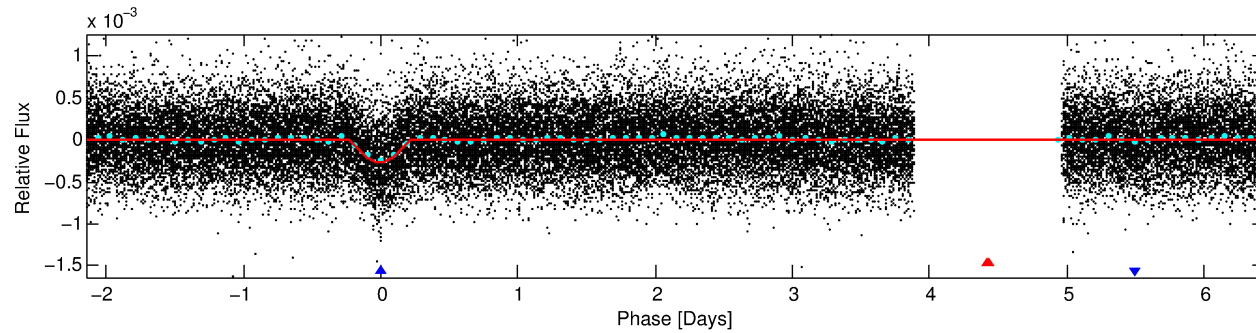
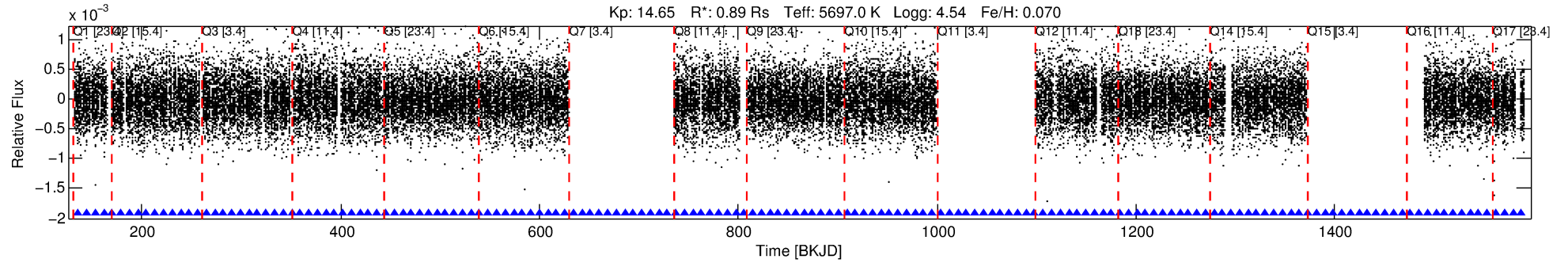
Ephemeris Match Information For 010031907-02

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
010031907-02	10031907	010031808-02	10031808	1:1	69.4	-17	0	9.56	14.65	298.88	Direct-PRF	0	0.04	0.64

Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 10031907 Candidate: 2 of 2 Period: 8.590 d
KOI: K03828 Corr: No Ephemeris Match



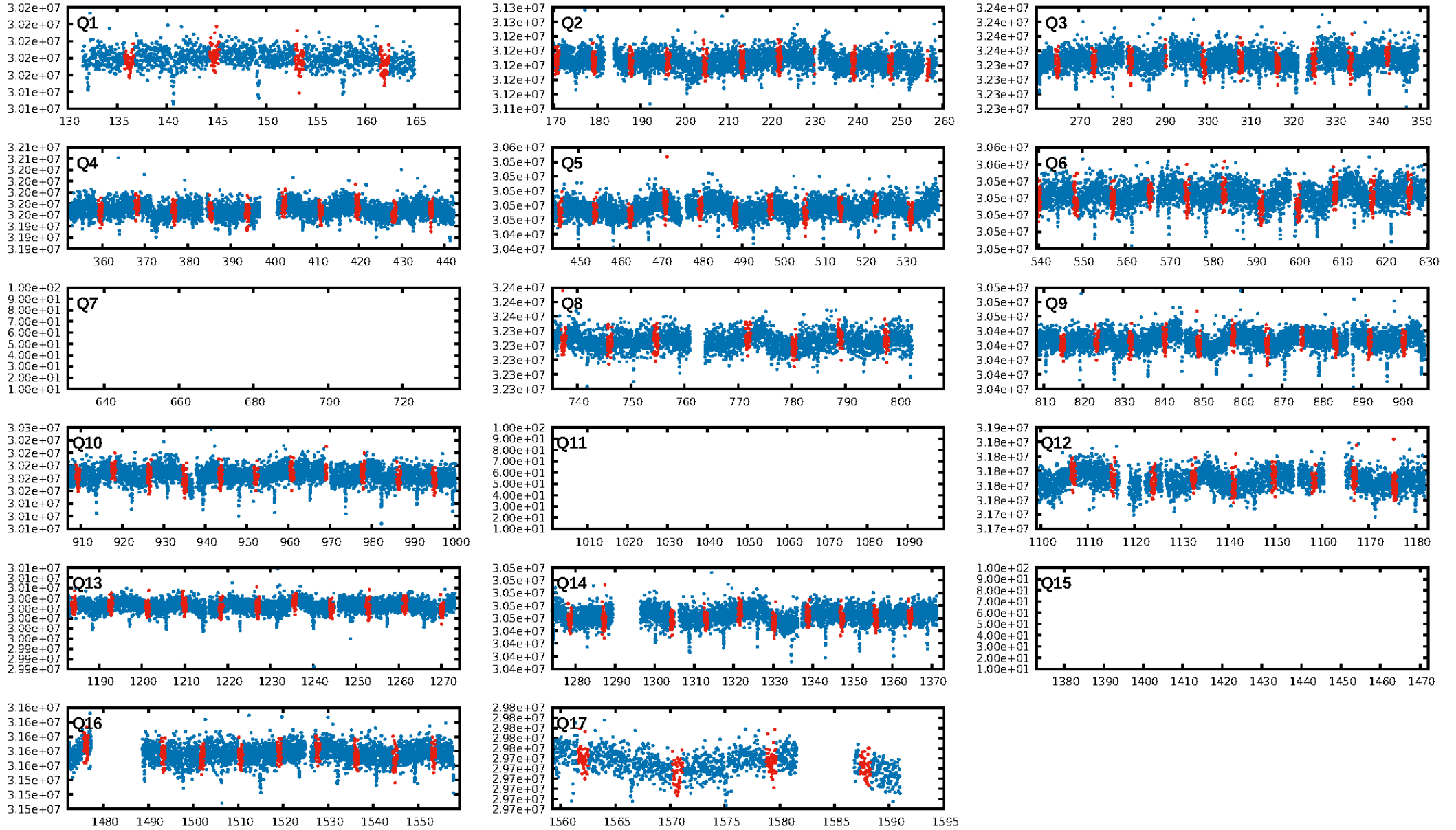
DV Fit Results:

Period = 8.58961 [0.00010] d
Epoch = 136.1878 [0.0093] BKJD
Rp/R* = 0.0305 [0.0401]
a/R* = 1.78 [0.39]
b = 1.00 [0.06]
Seff = 111.11 [42.69]
Teff = 828 [80] K
Rp = 2.97 [4.00] Re
a = 0.0822 [0.0206] AU
Ag = 17.15 [45.81] [0.35σ]
Teffp = 2605 [1725] K [1.03σ]

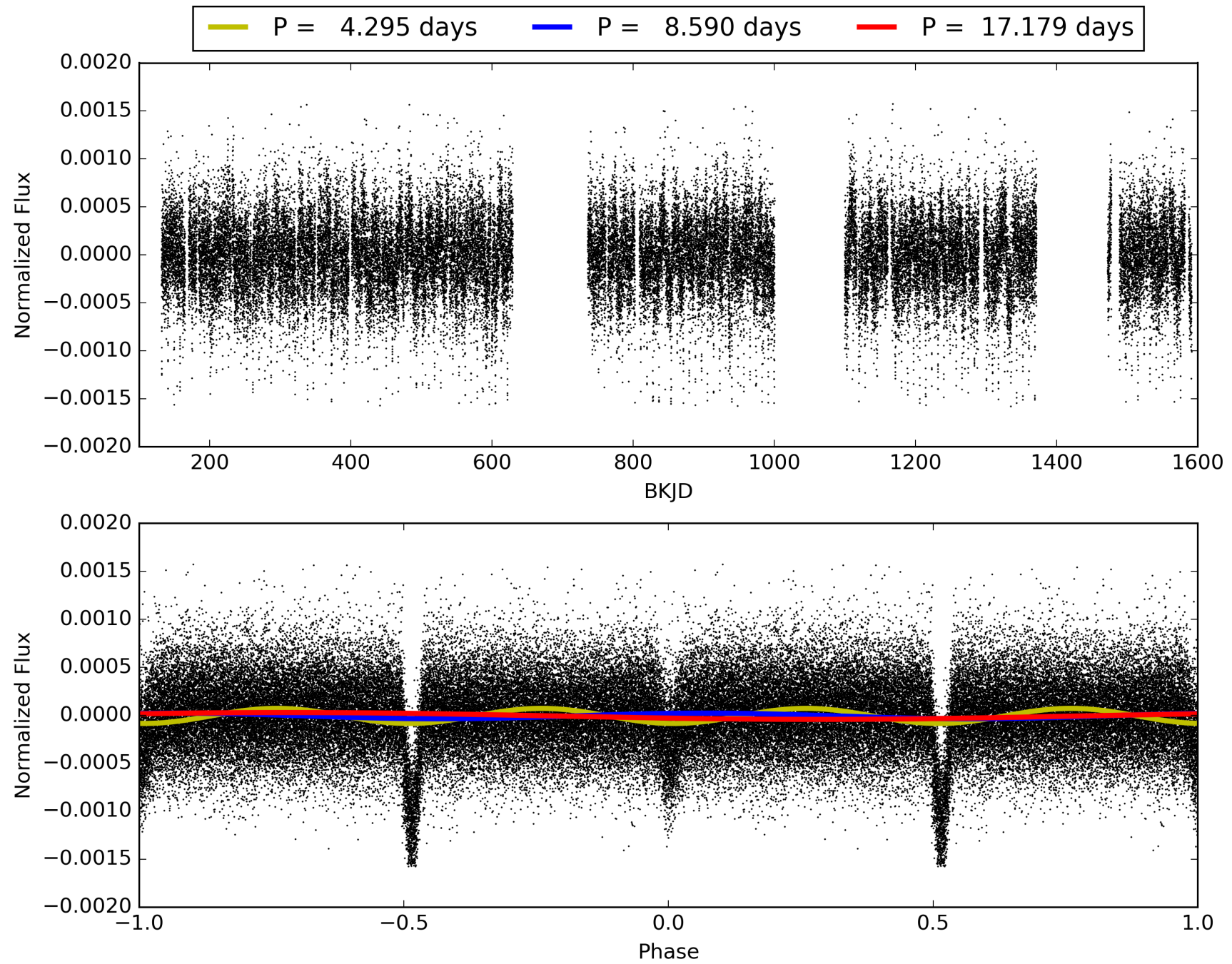
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: 99.6%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.13e-95
RollingBand-fgt: 1.00 [118/118]
GhostDiagnostic-chr: 0.1447
Centroid-sig: 0.0%
Centroid-so: 1.393 arcsec [3.33σ]
OotOffset-rm: 2.623 arcsec [4.70σ]
KicOffset-rm: 1.701 arcsec [3.89σ]
OotOffset-st: 3/1/4/4 [12]
KicOffset-st: 4/1/4/4 [13]
DiffImageQuality-fgm: 0.00 [0/13]
DiffImageOverlap-fno: 1.00 [14/14]

TCE 010031907-02, PDC Light Curves

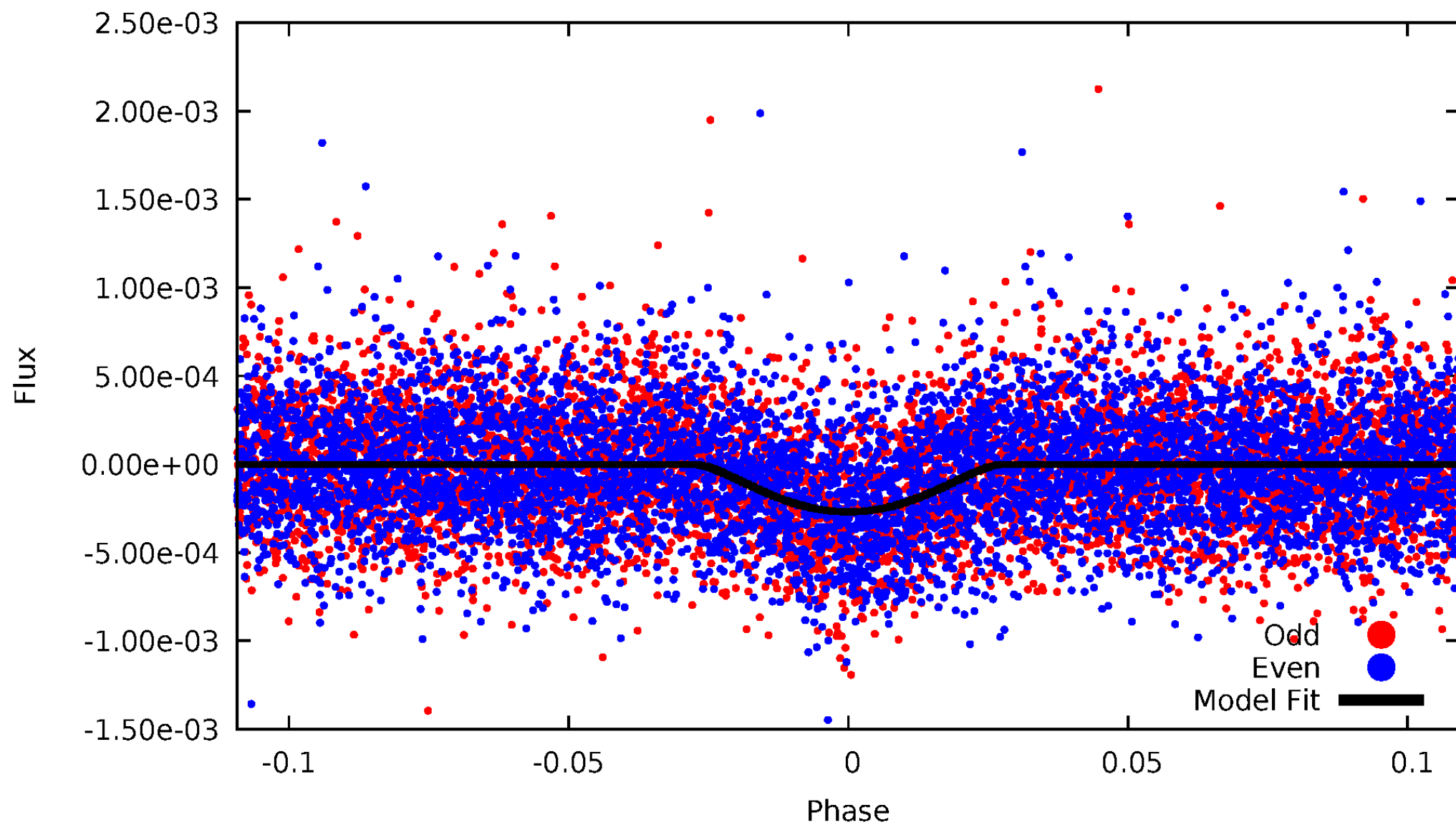


TCE 010031907-02



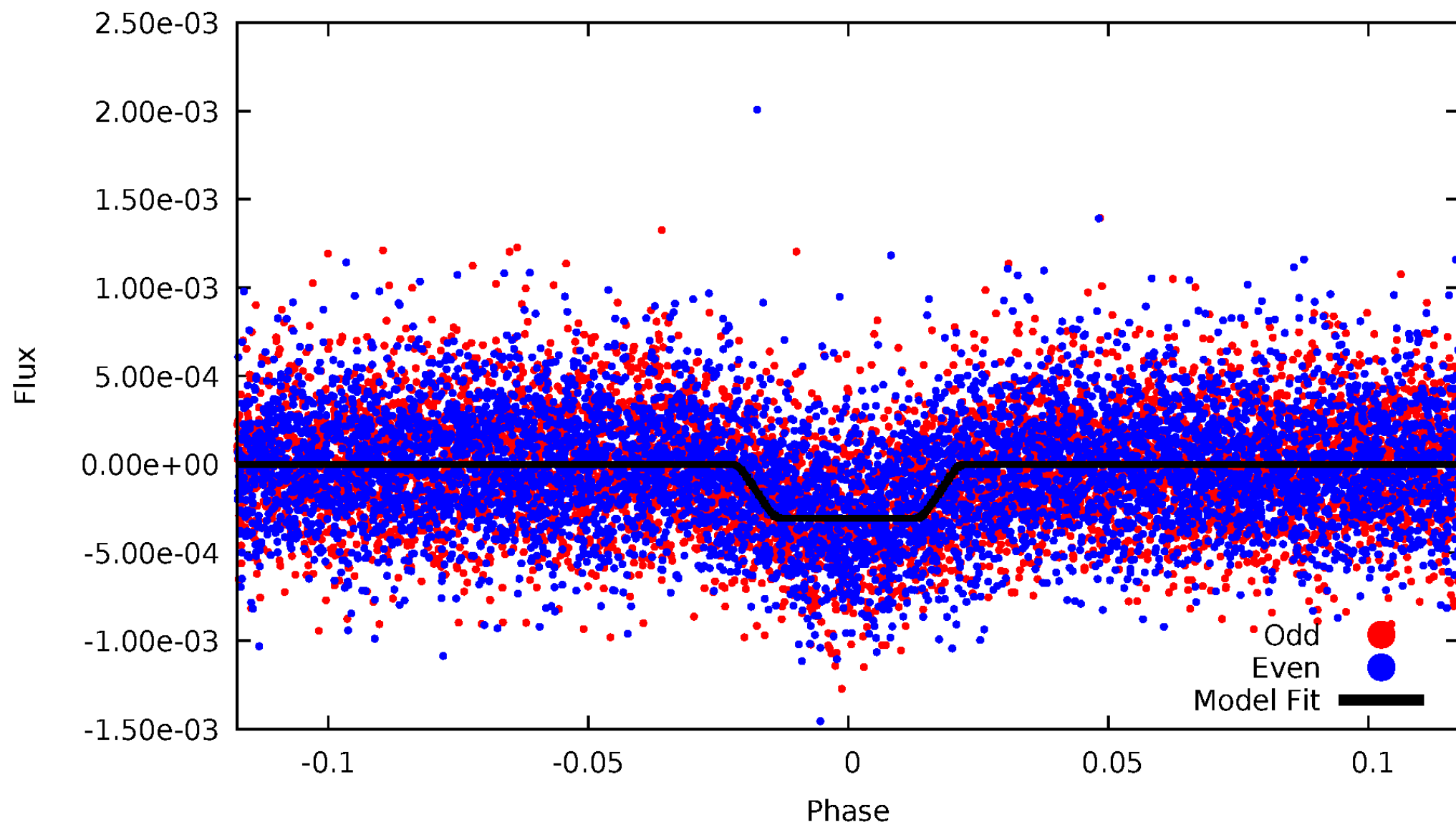
DV Odd/Even

TCE 010031907-02



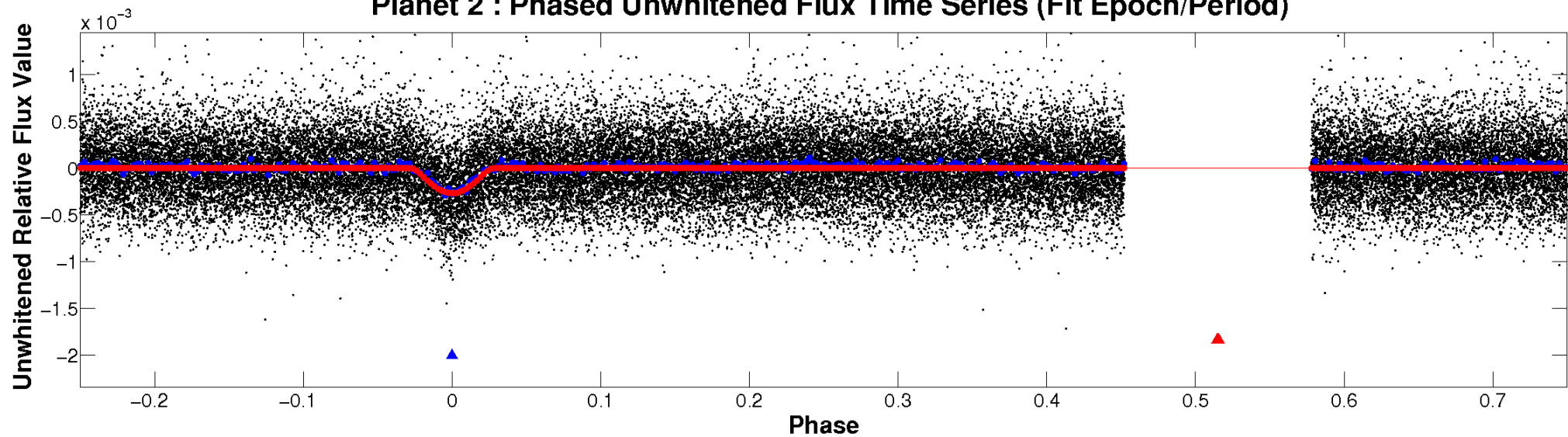
ALT Odd/Even

TCE 010031907-02

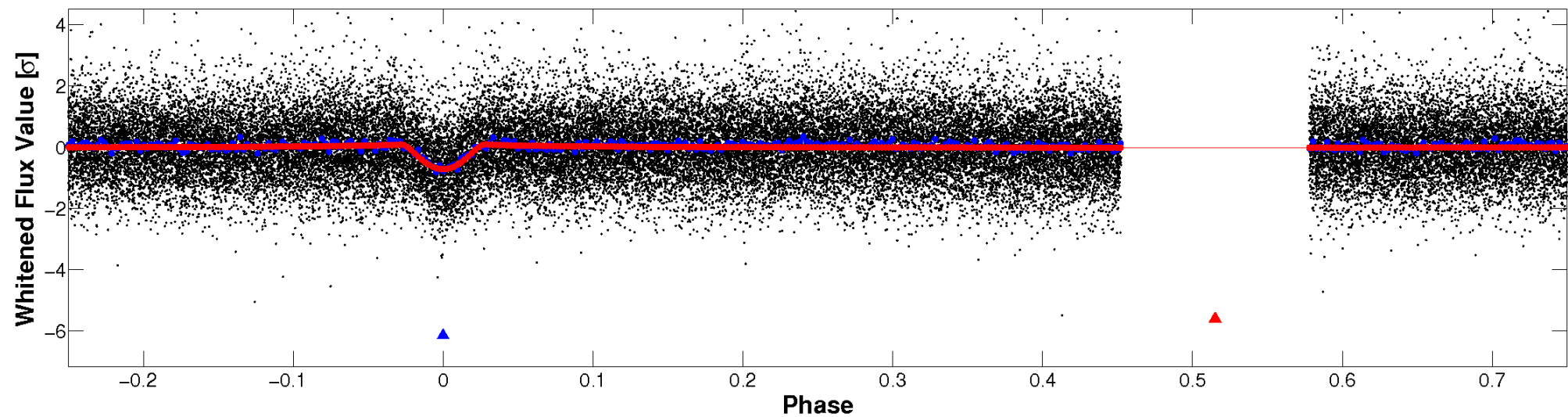


Non-Whitened Vs. Whitened Light Curve

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

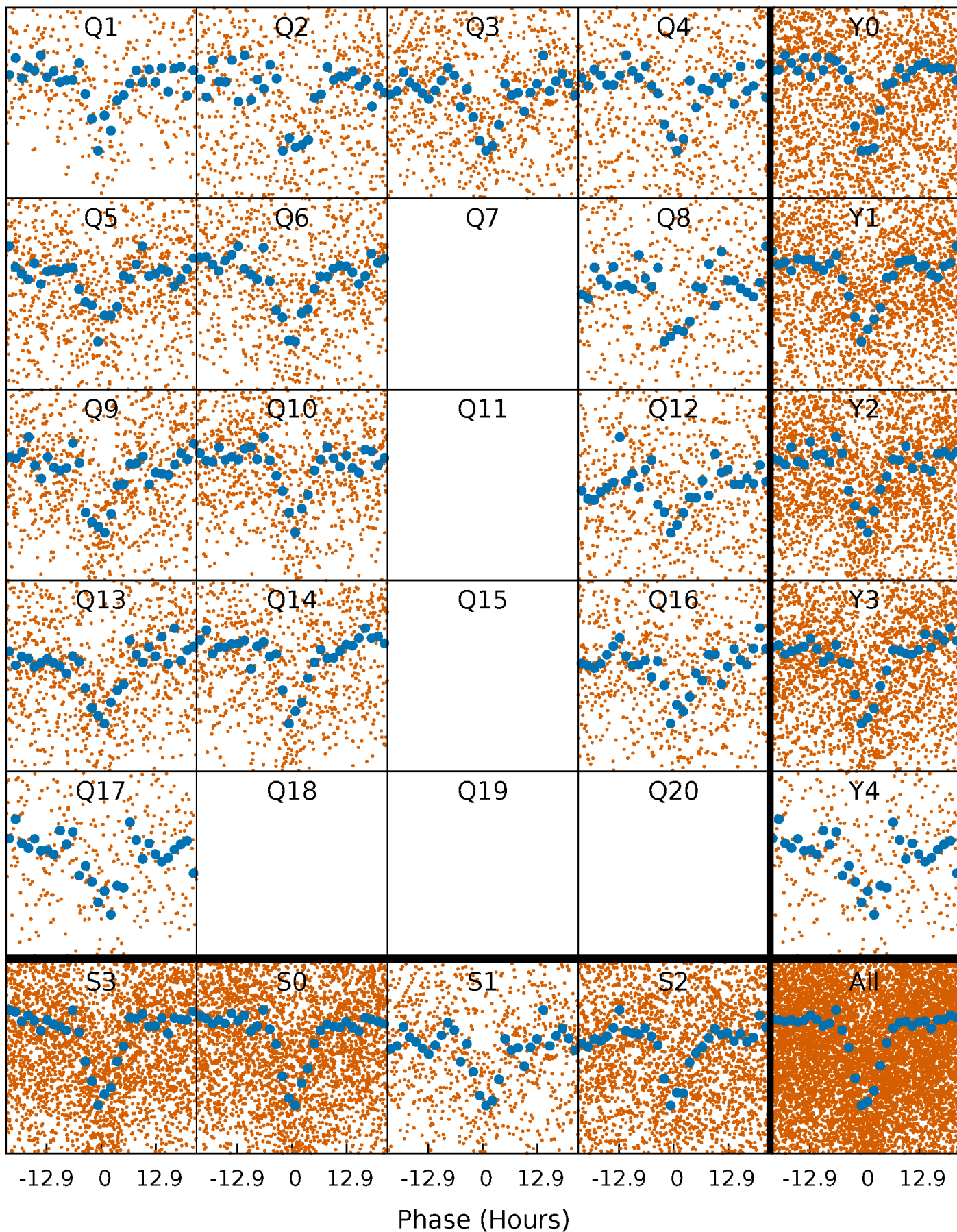


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



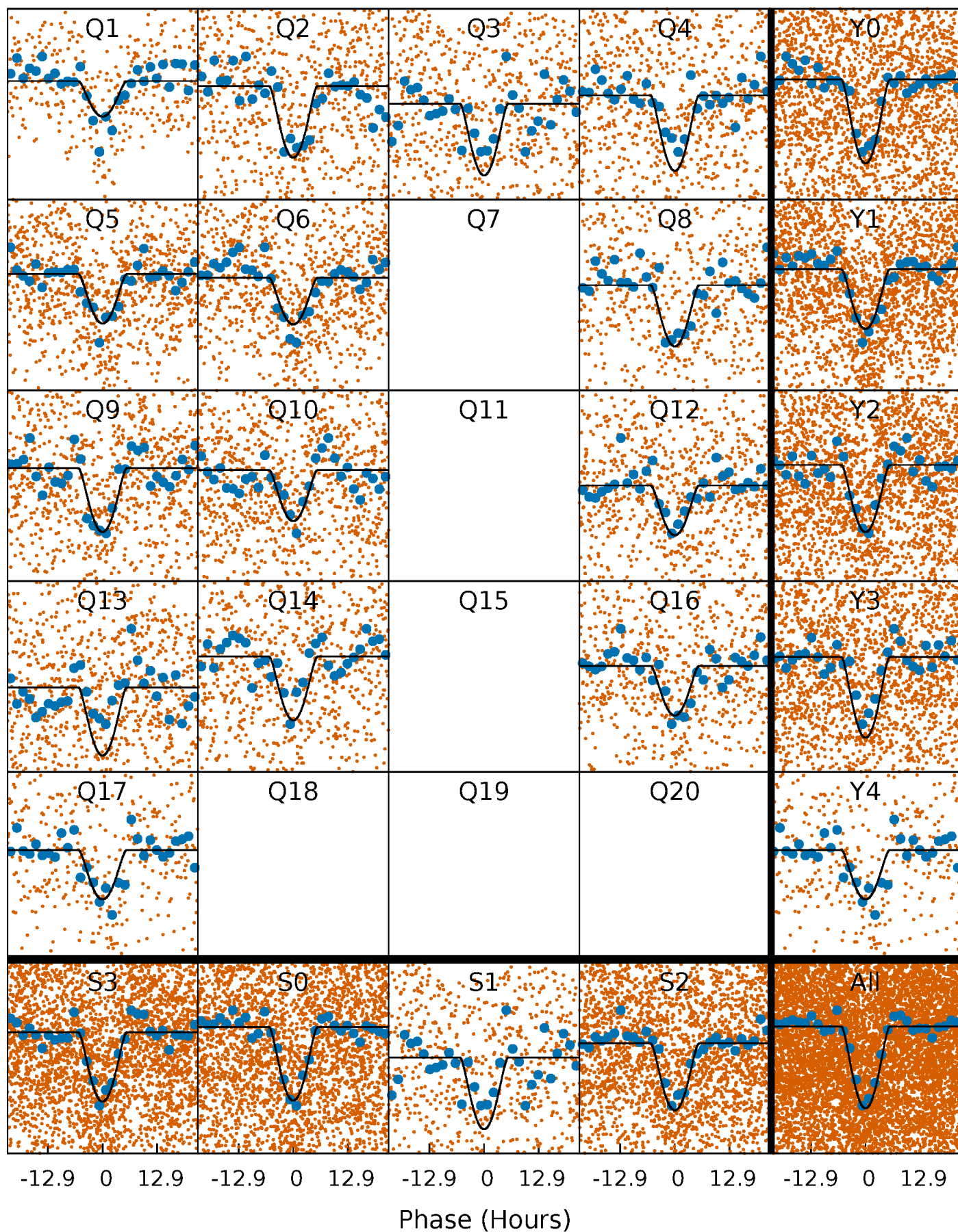
PDC Quarter-Phased Transit Curves

TCE 010031907-02 P= 8.589611 Days $T_0=136.187785$ (BKJD)



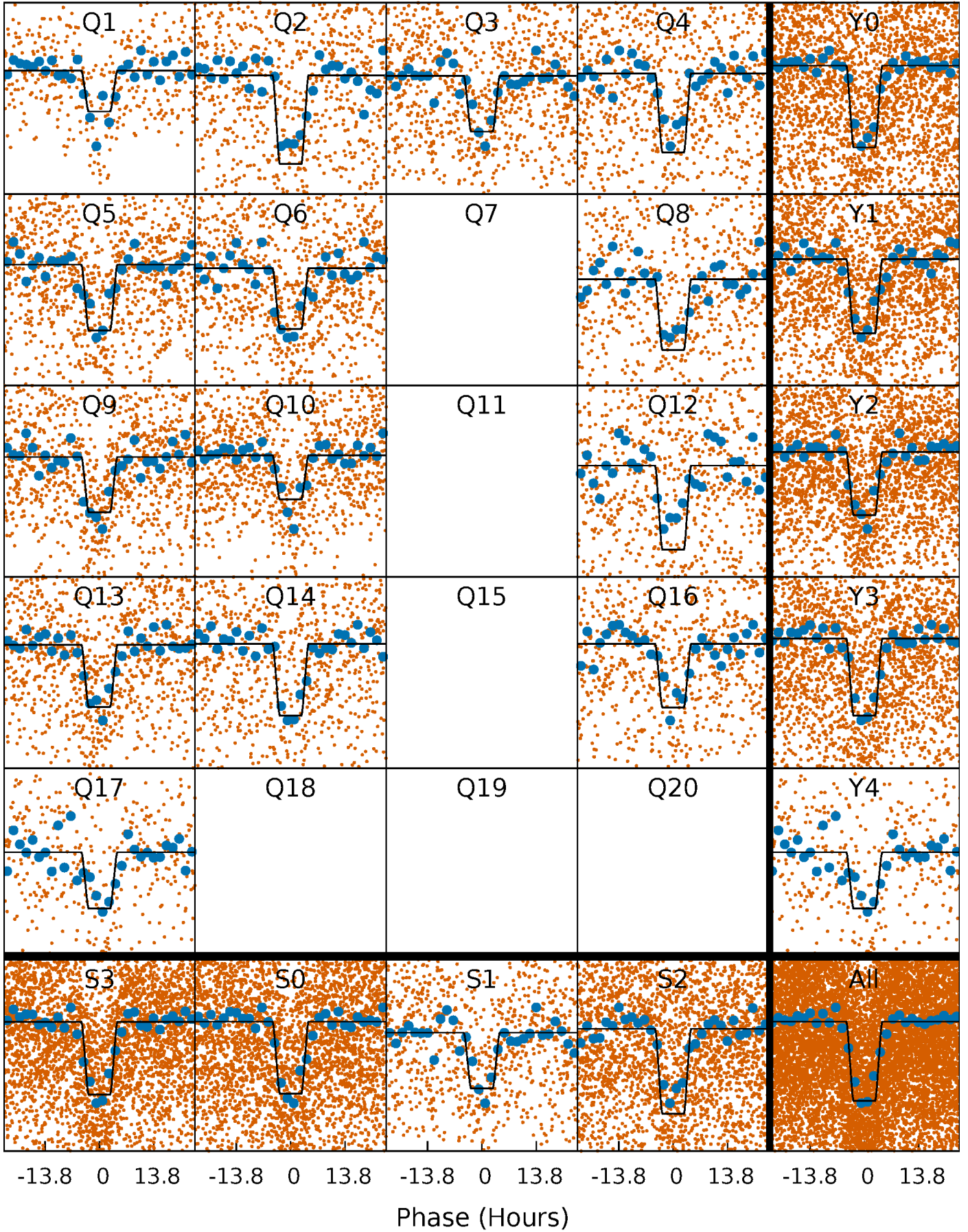
DV Quarter-Phased Transit Curves

TCE 010031907-02 P= 8.589611 Days $T_0=136.187785$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

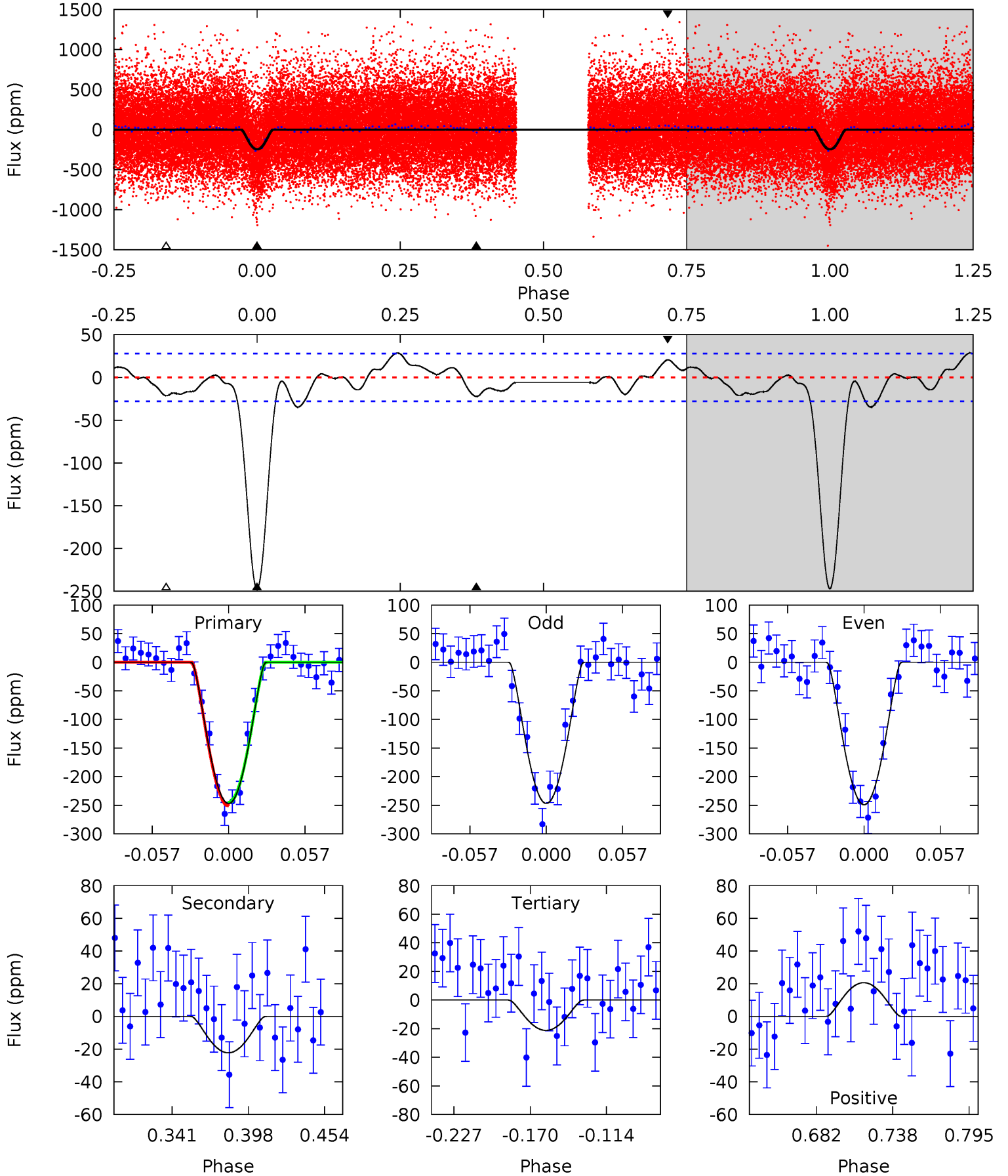
TCE 010031907-02 P= 8.589616 Days $T_0=136.202715$ (BKJD)



DV Model-Shift Uniqueness Test

010031907-02, P = 8.589611 Days, E = 127.598174 Days

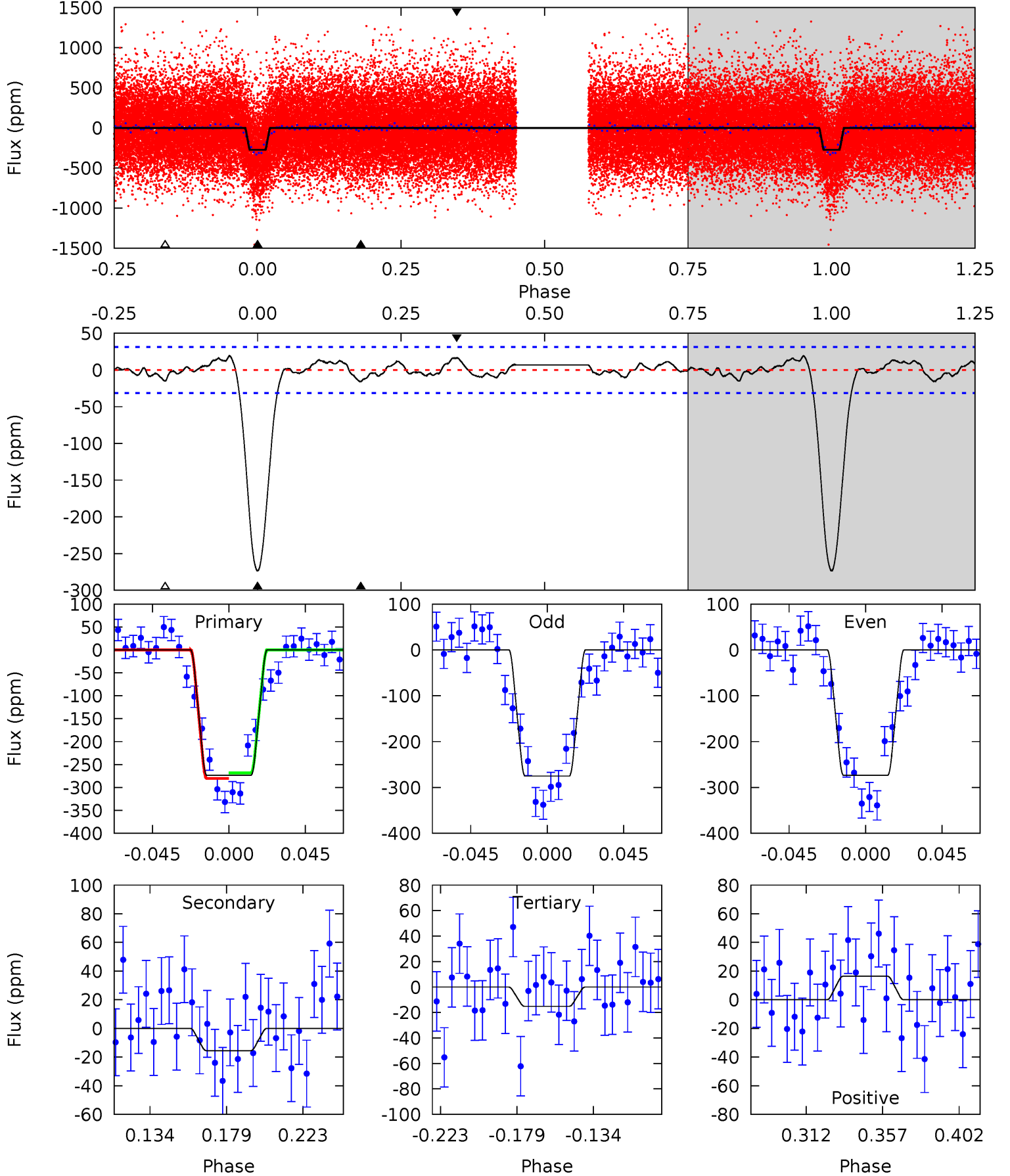
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
41.4	3.73	3.56	3.46	4.68	1.90	2.24	37.8	38.0	0.17	0.27	0.19	0.96	0.10	0.46



Alt Model-Shift Uniqueness Test

010031907-02, P = 8.589616 Days, E = 127.613099 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
41.3	2.34	2.30	2.48	4.73	2.01	1.08	39.0	38.8	0.05	-0.13	0.14	0.97	0.07	0.91



Stellar Parameters For KIC 010031907

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5697^{+154}_{-171}	$4.539^{+0.037}_{-0.200}$	$0.070^{+0.250}_{-0.300}$	$0.892^{+0.264}_{-0.070}$	$1.004^{+0.100}_{-0.122}$	$1.990^{+0.399}_{-1.084}$
	+3%/-3%	+1%/-4%	+357%/-429%	+30%/-8%	+10%/-12%	+20%/-54%
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 010031907-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-22 ± 6	$4.23^{+3.44}_{-2.80}$	1181^{+80}_{-50}	2665^{+1057}_{-415}	$4.353^{+35.029}_{-3.054}$
Alt.	-16 ± 7	$3.48^{+3.38}_{-2.23}$	1183^{+81}_{-52}	2666^{+964}_{-520}	$4.392^{+31.561}_{-3.388}$

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 $A_{obs} \gg 1.0$

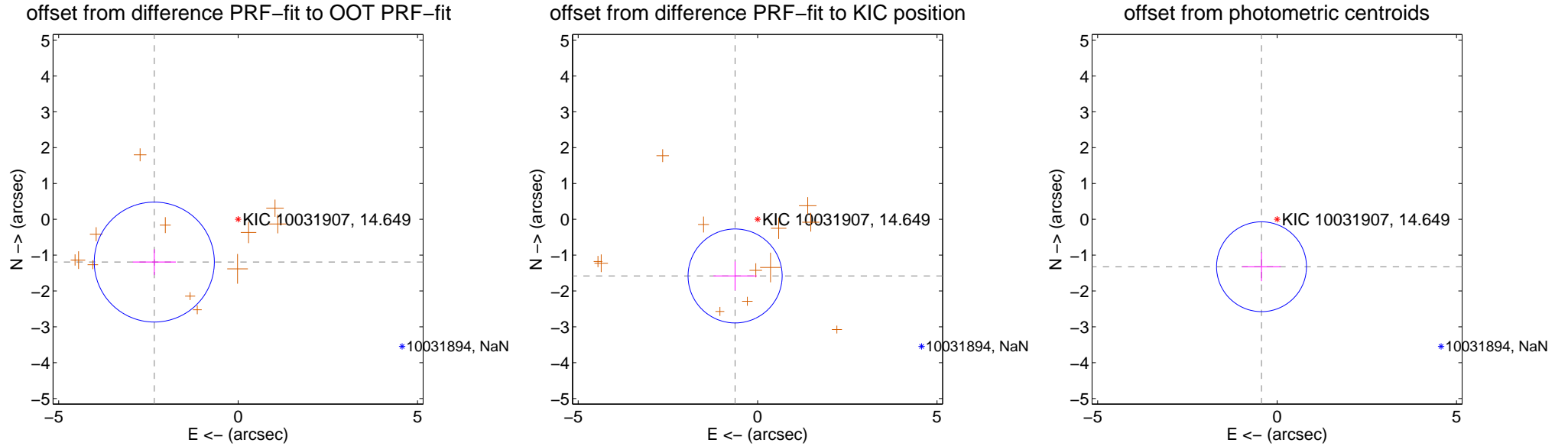
DV Centroid Data

Supplemental centroid analysis for 010031907-02. Kepler magnitude: 14.65. Transit SNR 24.17

There are 0 quarters with good PRF difference image offsets

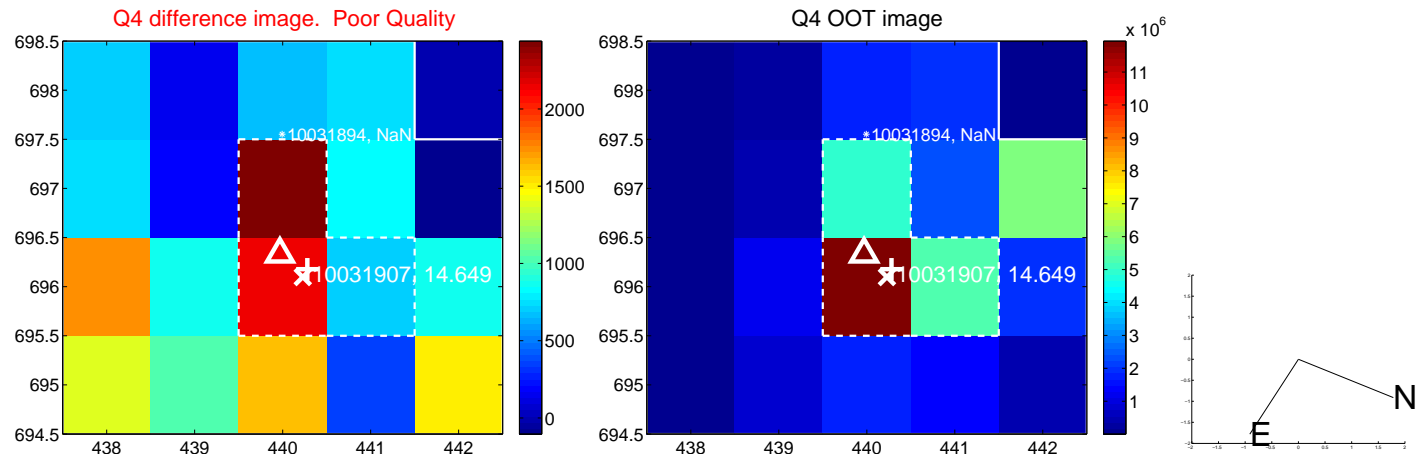
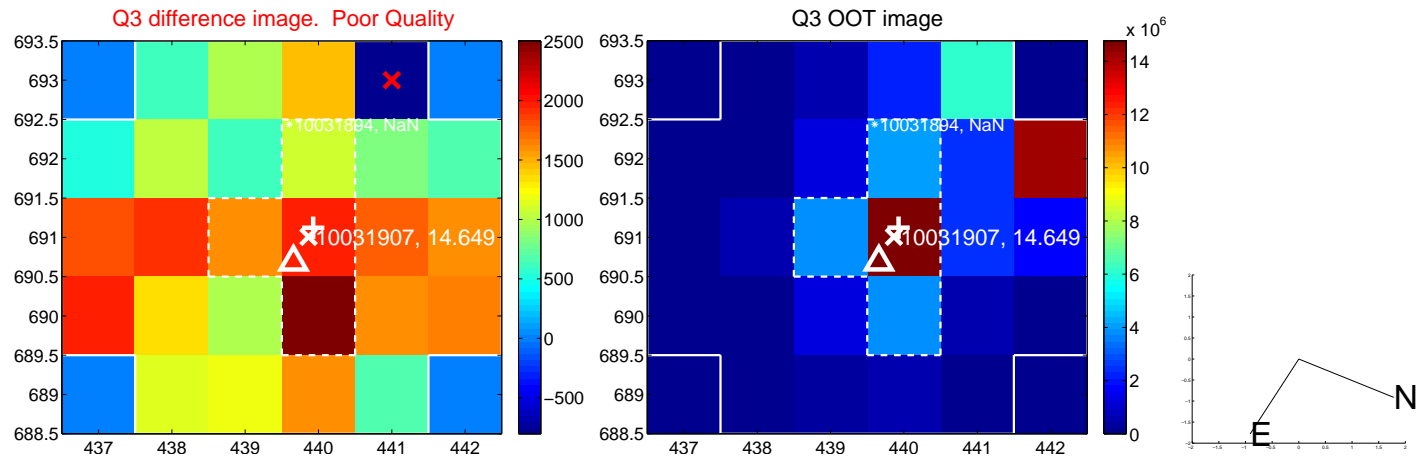
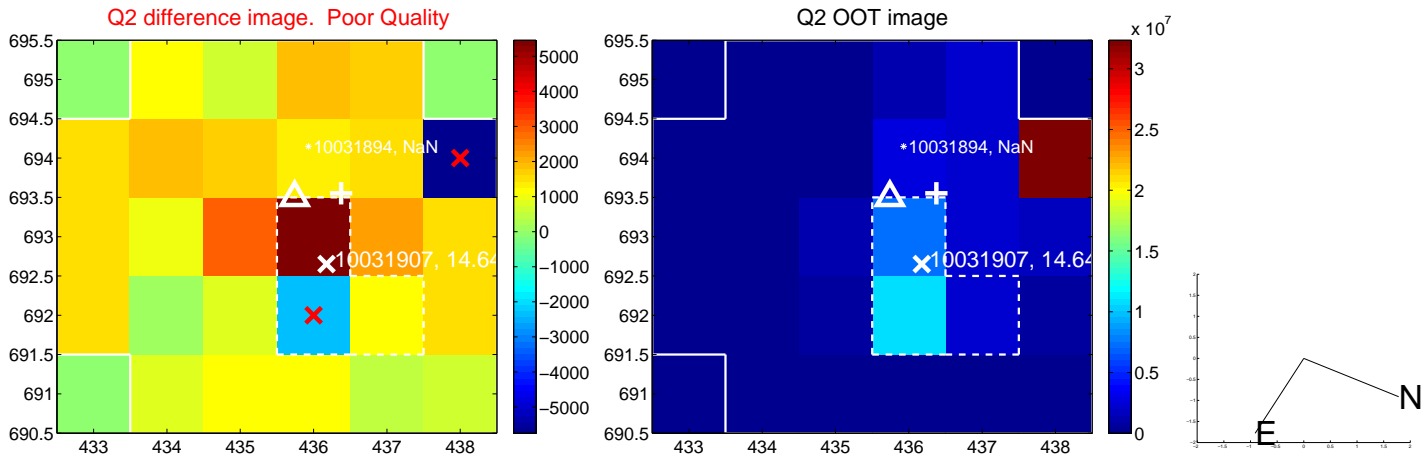
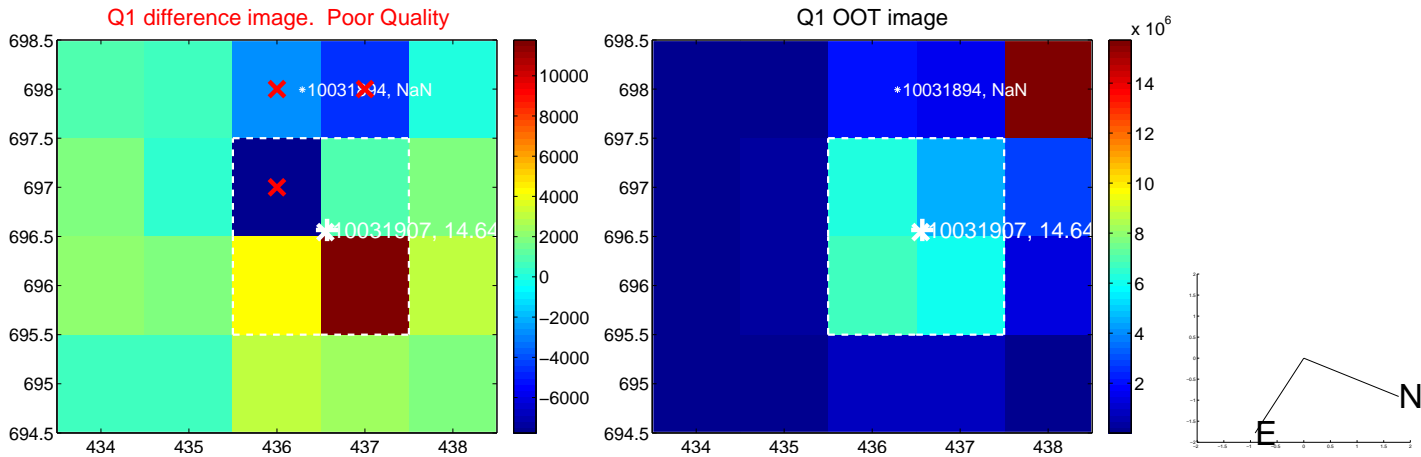
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.623 ± 0.558	4.70	2.336 ± 0.599	-1.193 ± 0.359
PRF-fit source offset from KIC position	1.701 ± 0.437	3.89	0.627 ± 0.605	-1.581 ± 0.404
photometric centroid source offset	1.39 ± 0.42	3.33	0.43 ± 0.54	-1.32 ± 0.40

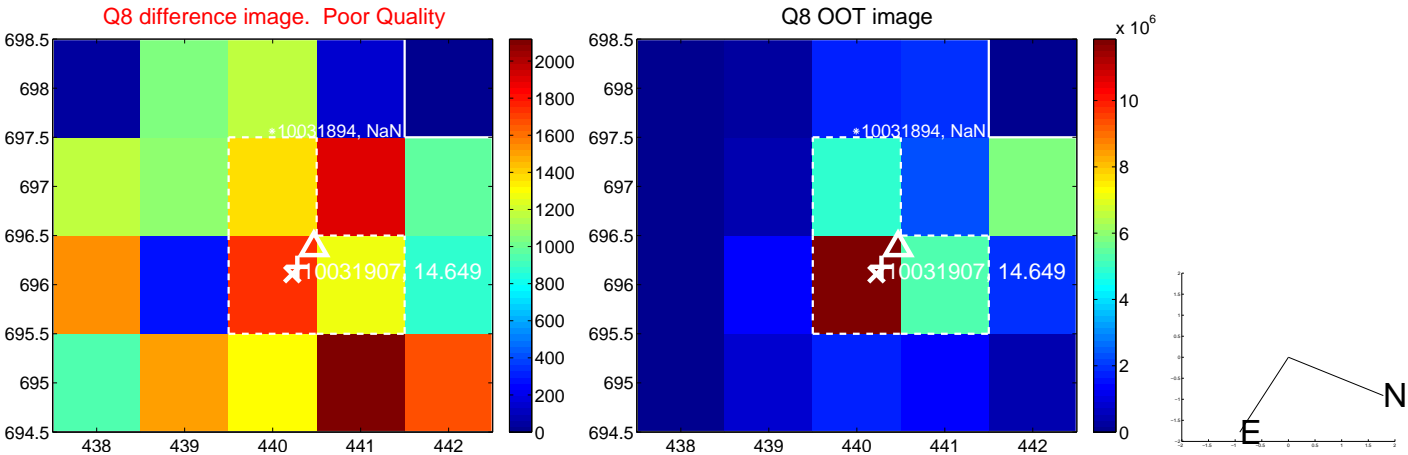
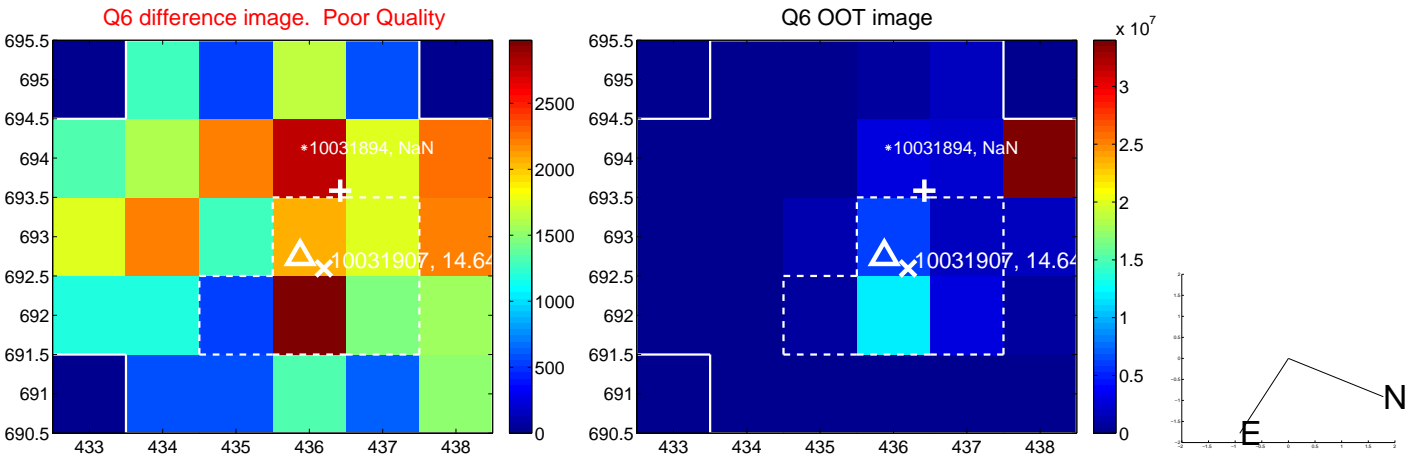
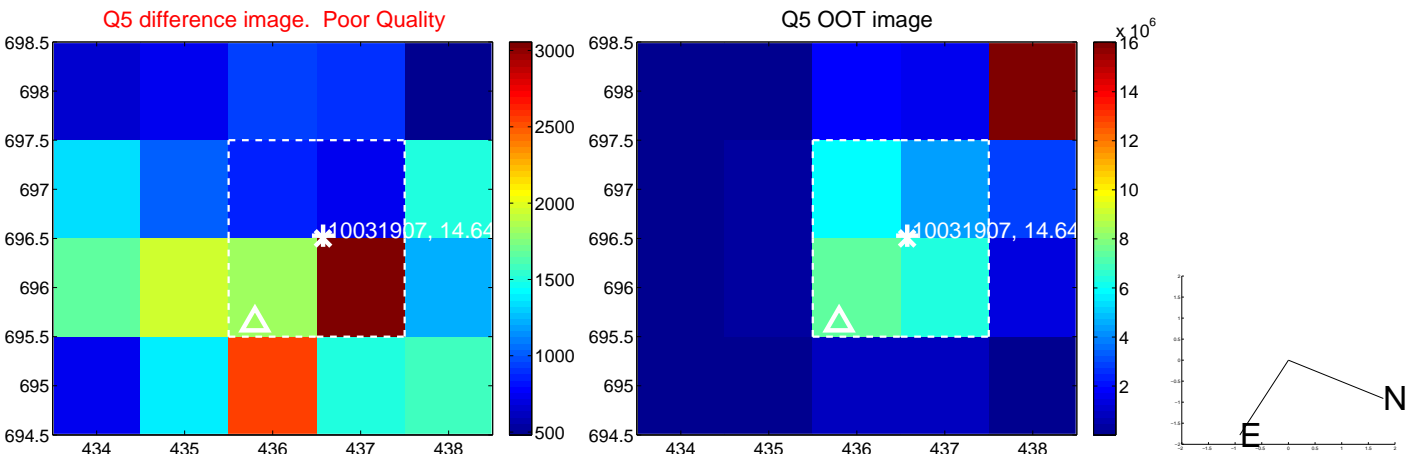


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

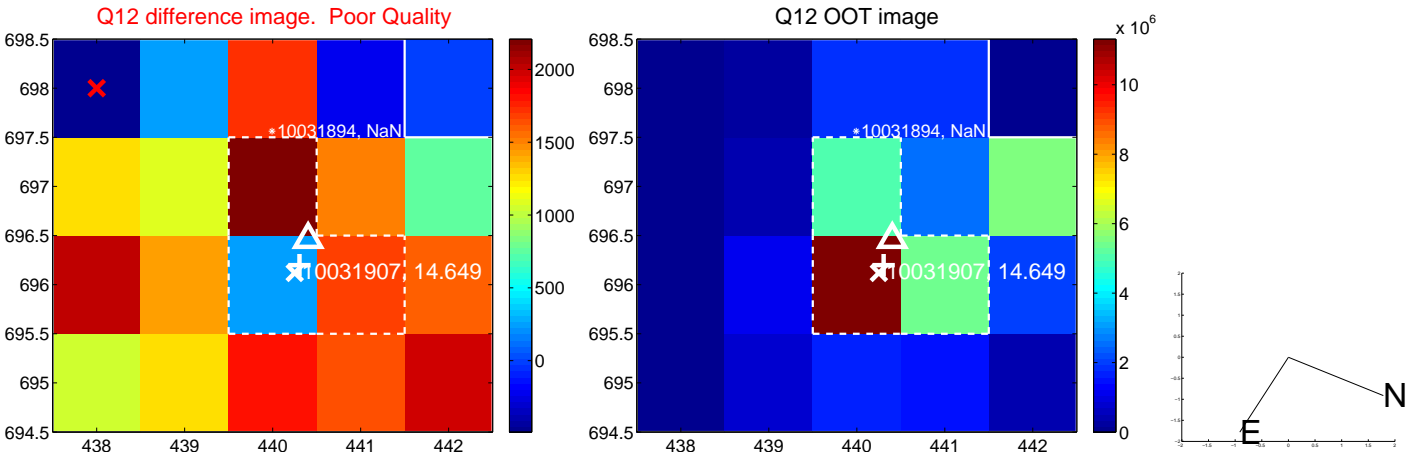
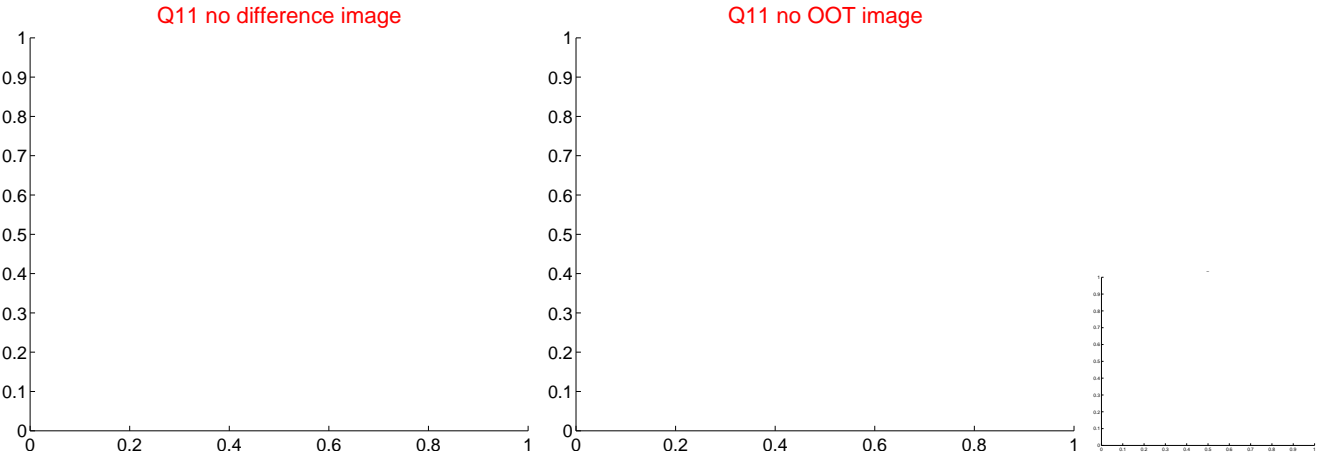
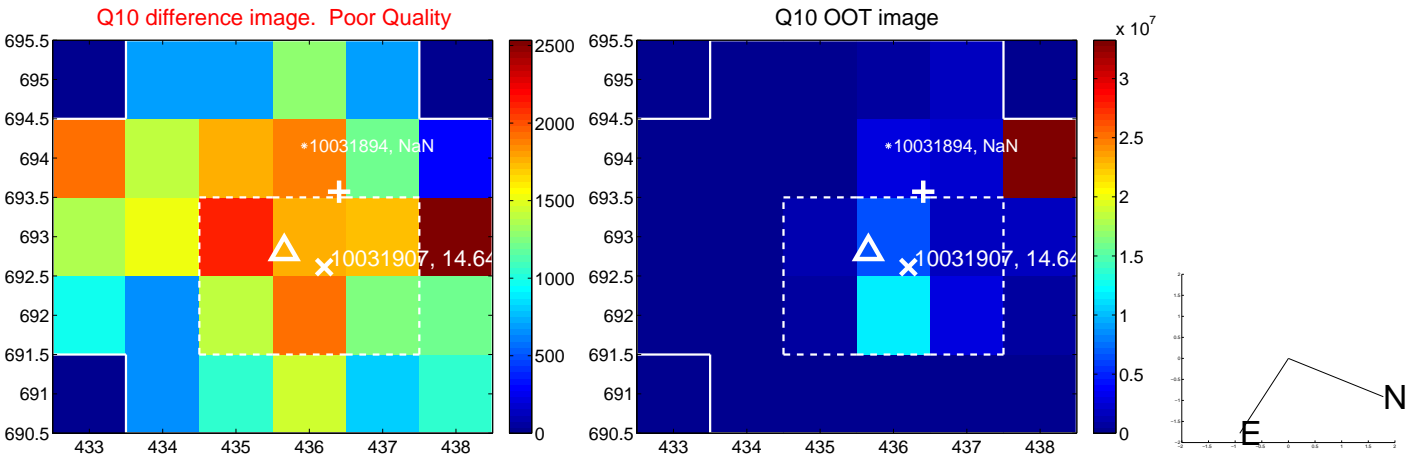
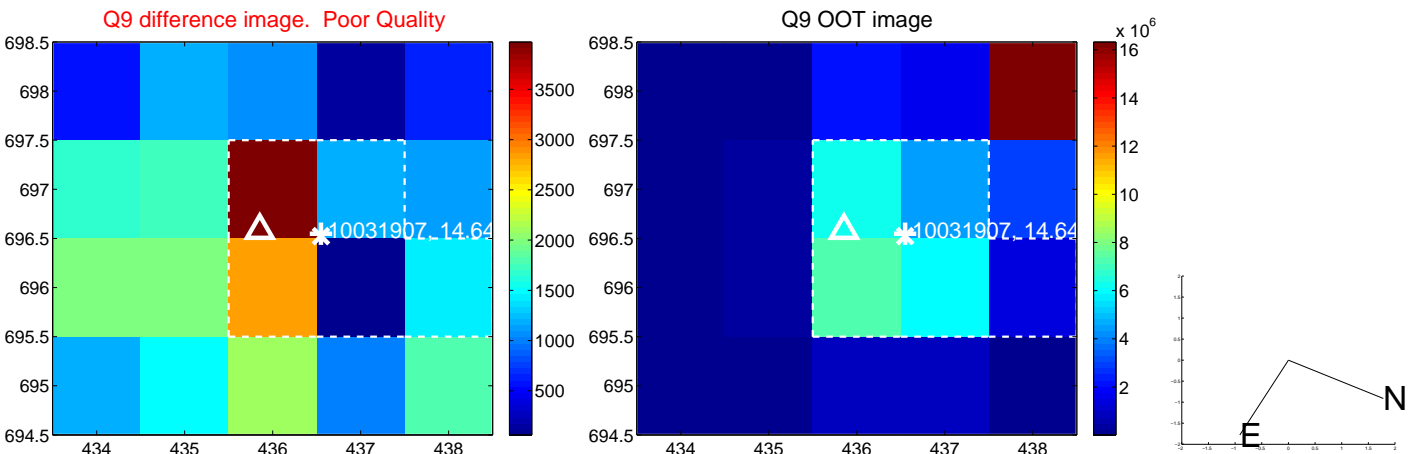
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



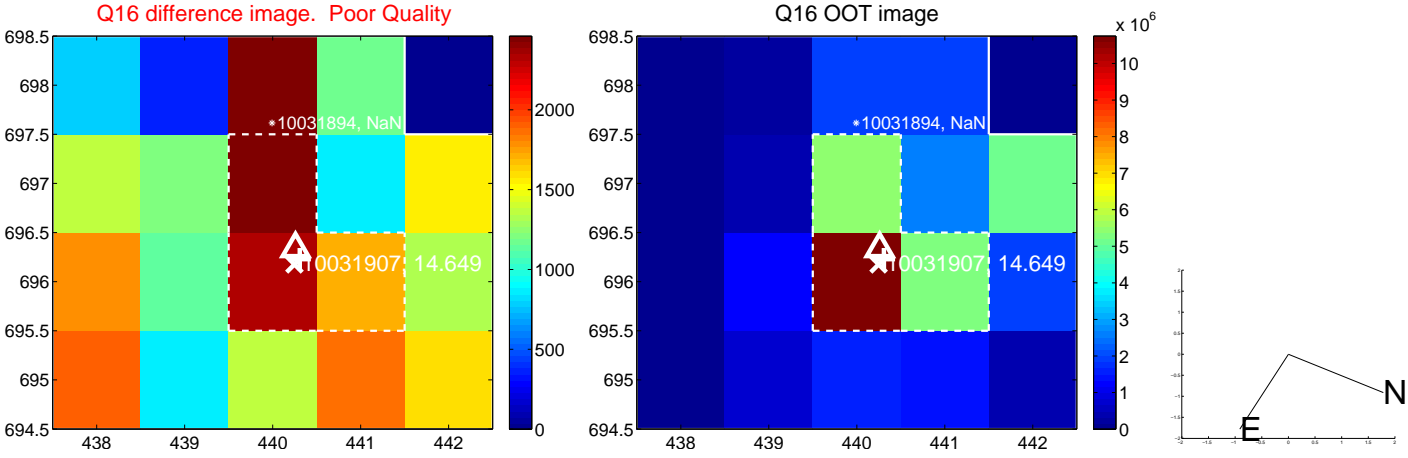
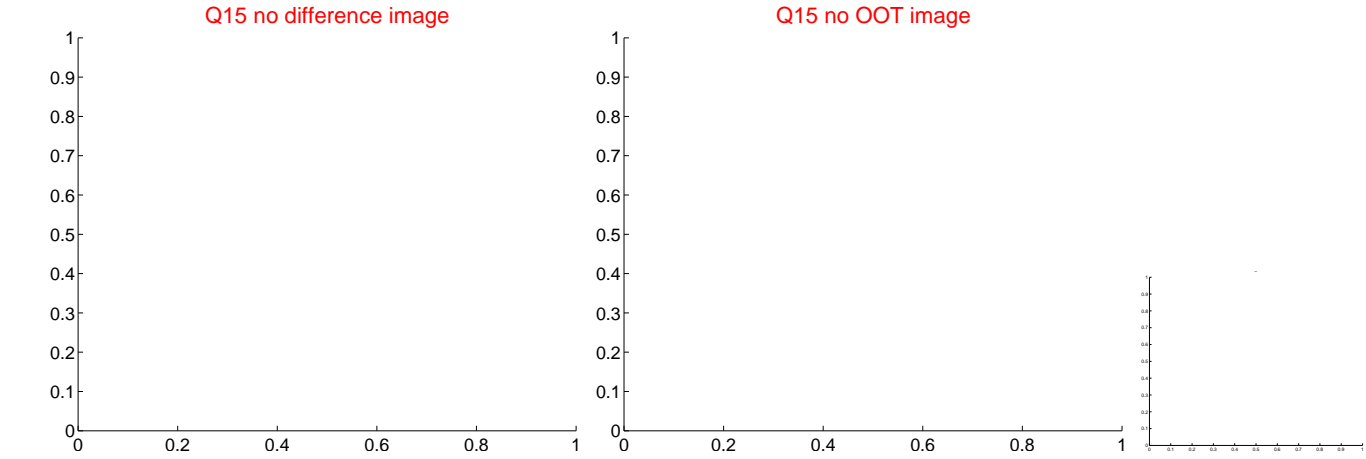
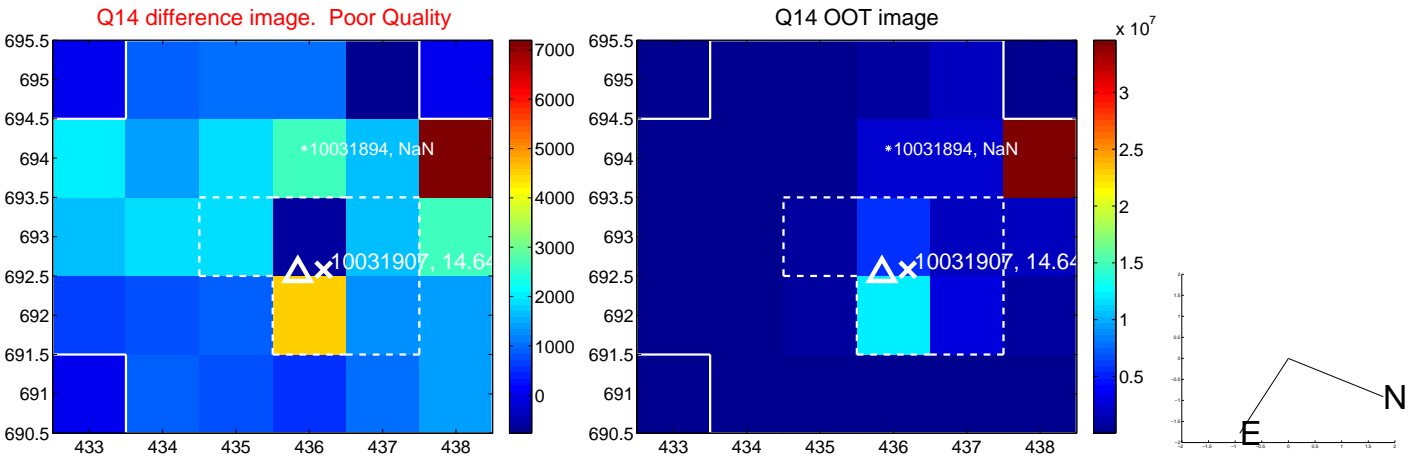
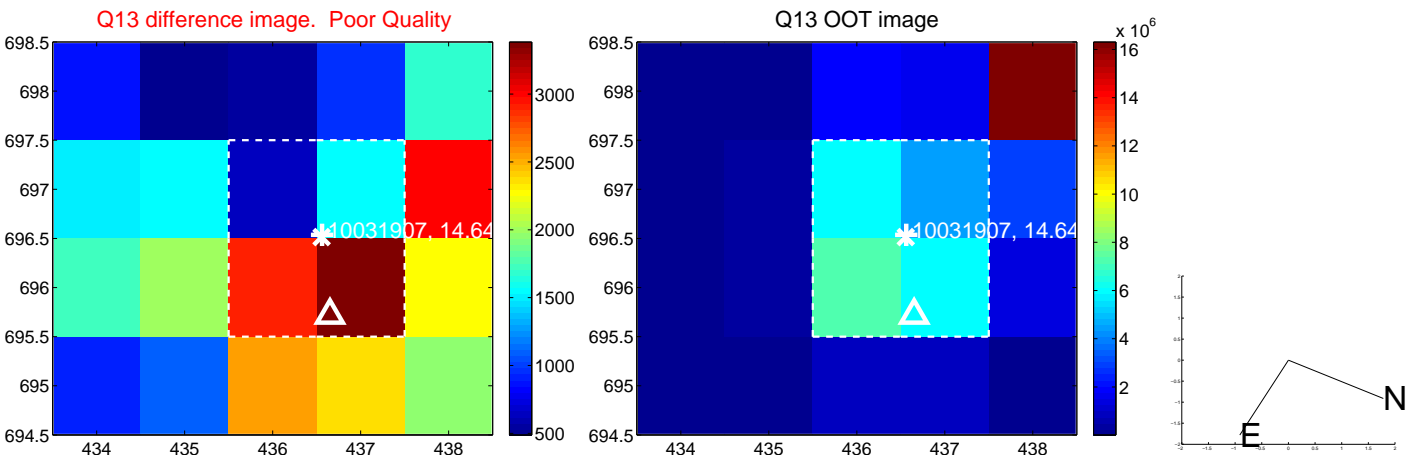
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



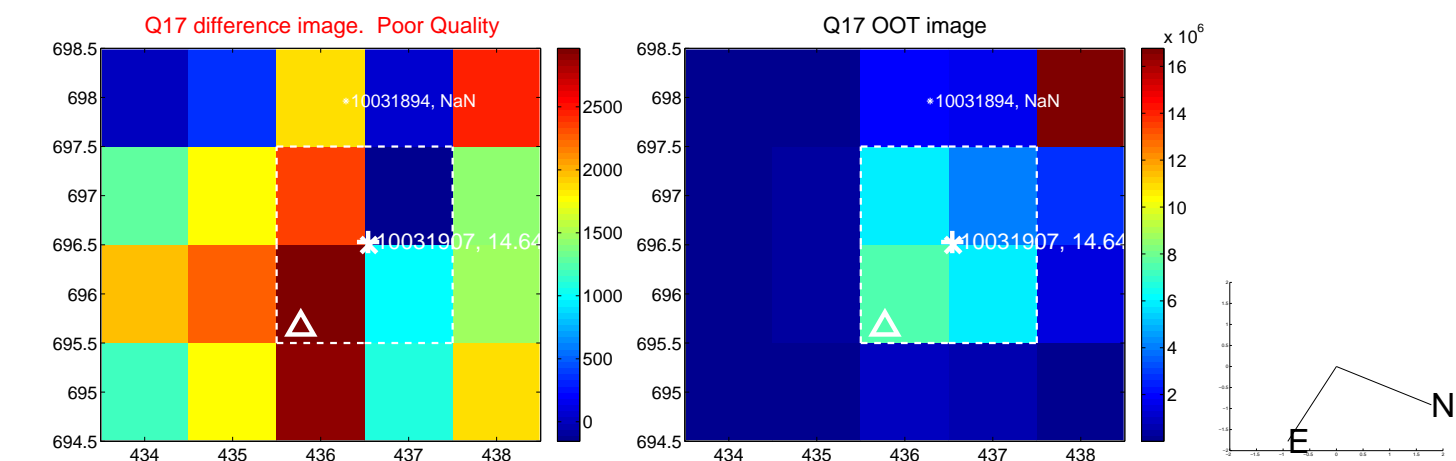
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



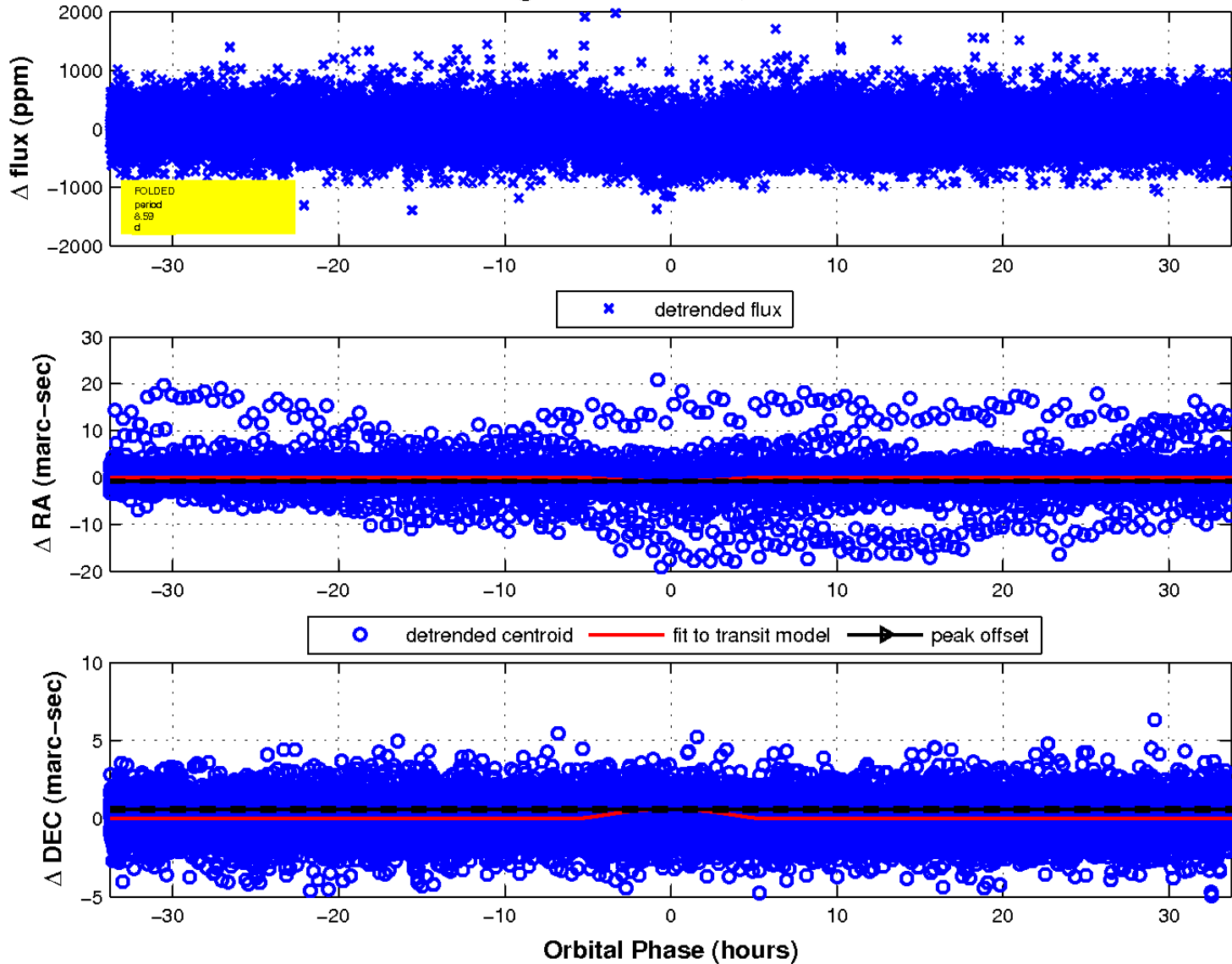
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

