

KIC 008193178

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})
008193178-01	OBS	0572.01	10.640256	137.214062	441.7	5.617	46.6	51.0	1.23	6112	2.99	204.02
008193178-02	OBS	0572.02	4.938867	135.952682	121.0	4.453	16.8	18.8	1.23	6112	1.54	567.67

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008193178-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008193178-02	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.

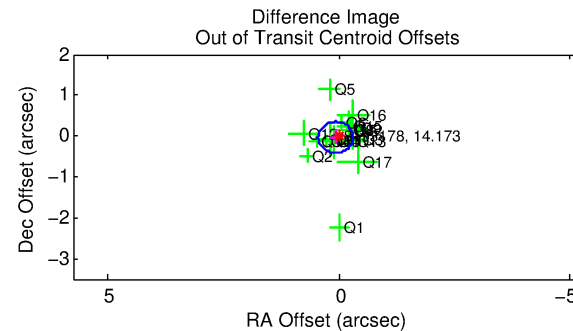
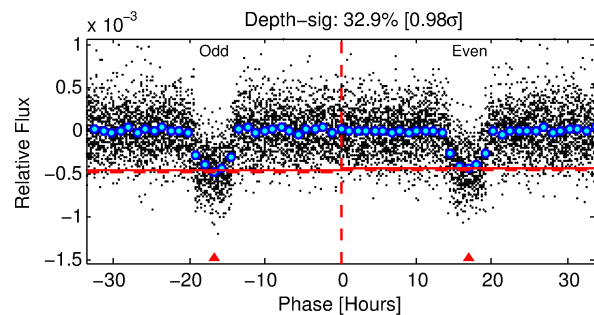
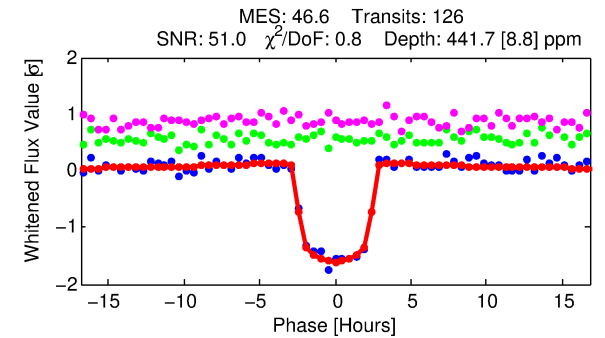
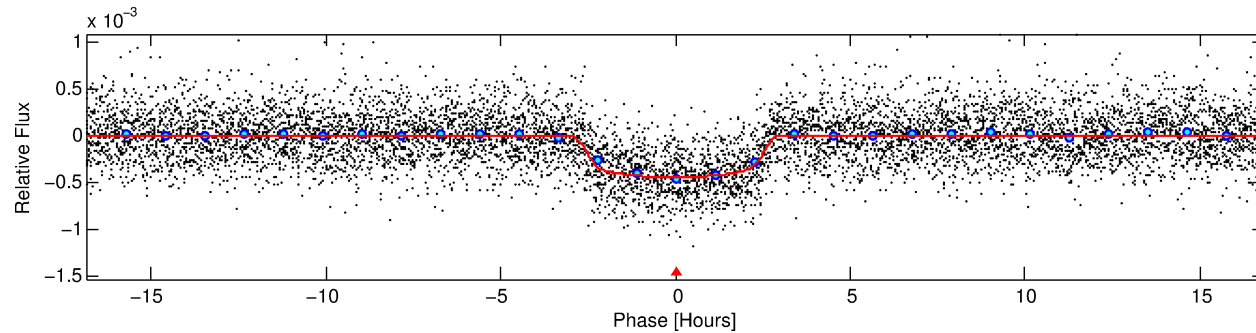
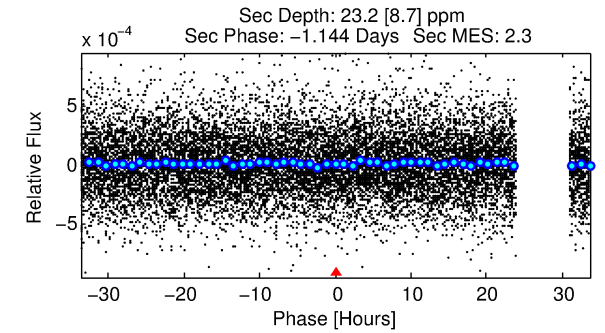
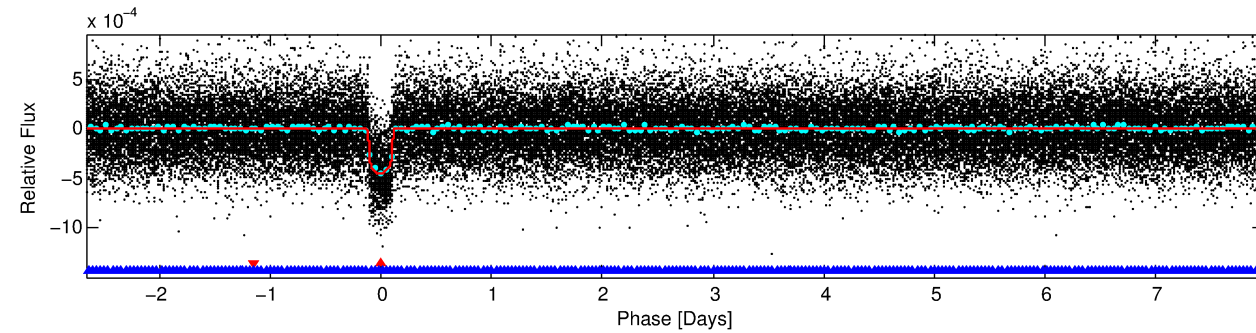
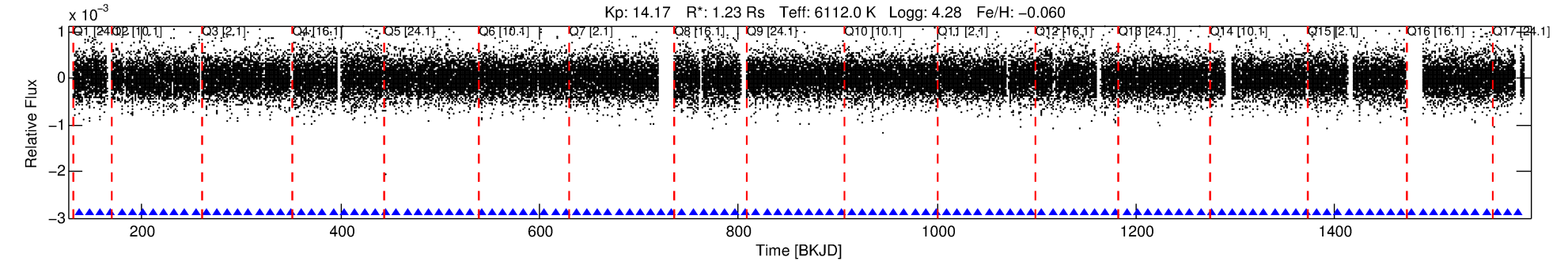
Ephemeris Match Information For 008193178-01

No Significant Match Found

DV One-Page Summary

KIC: 8193178 Candidate: 1 of 2 Period: 10.640 d
KOI: K00572.01 Name: Kepler-187c Corr: 0.984

Kp: 14.17 R*: 1.23 Rs Teff: 6112.0 K Logg: 4.28 Fe/H: -0.060



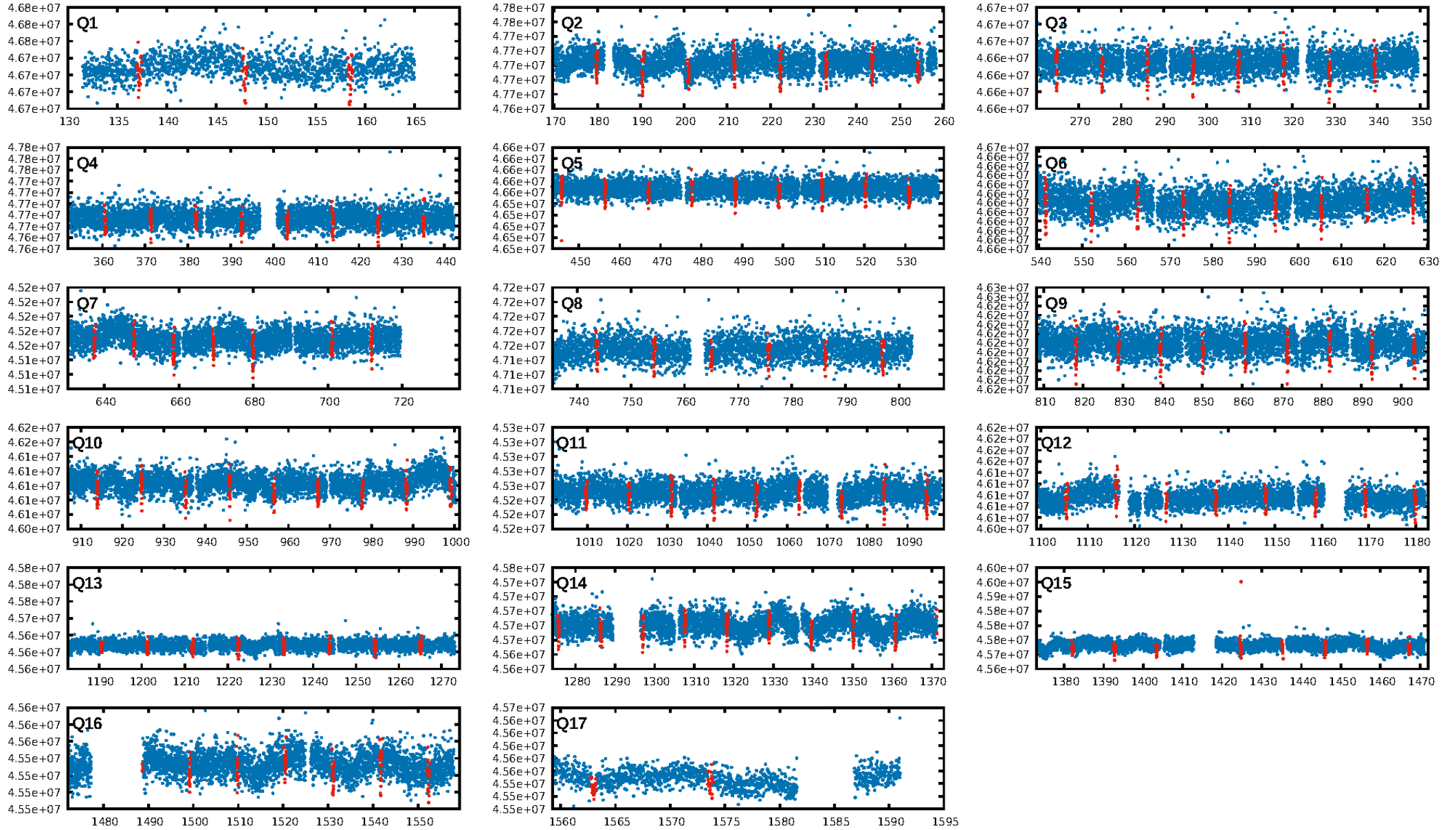
DV Fit Results:

Period = 10.64026 [0.00003] d
Epoch = 137.2141 [0.0021] BKJD
Rp/R* = 0.0222 [0.0010]
a/R* = 7.69 [1.73]
b = 0.88 [0.06]
Seff = 204.02 [49.41]
Teq = 964 [58] K
Rp = 2.99 [0.55] Re
a = 0.0965 [0.0148] AU
Ag = 13.30 [5.92] [2.08σ]
Teffp = 2846 [280] K [6.58σ]

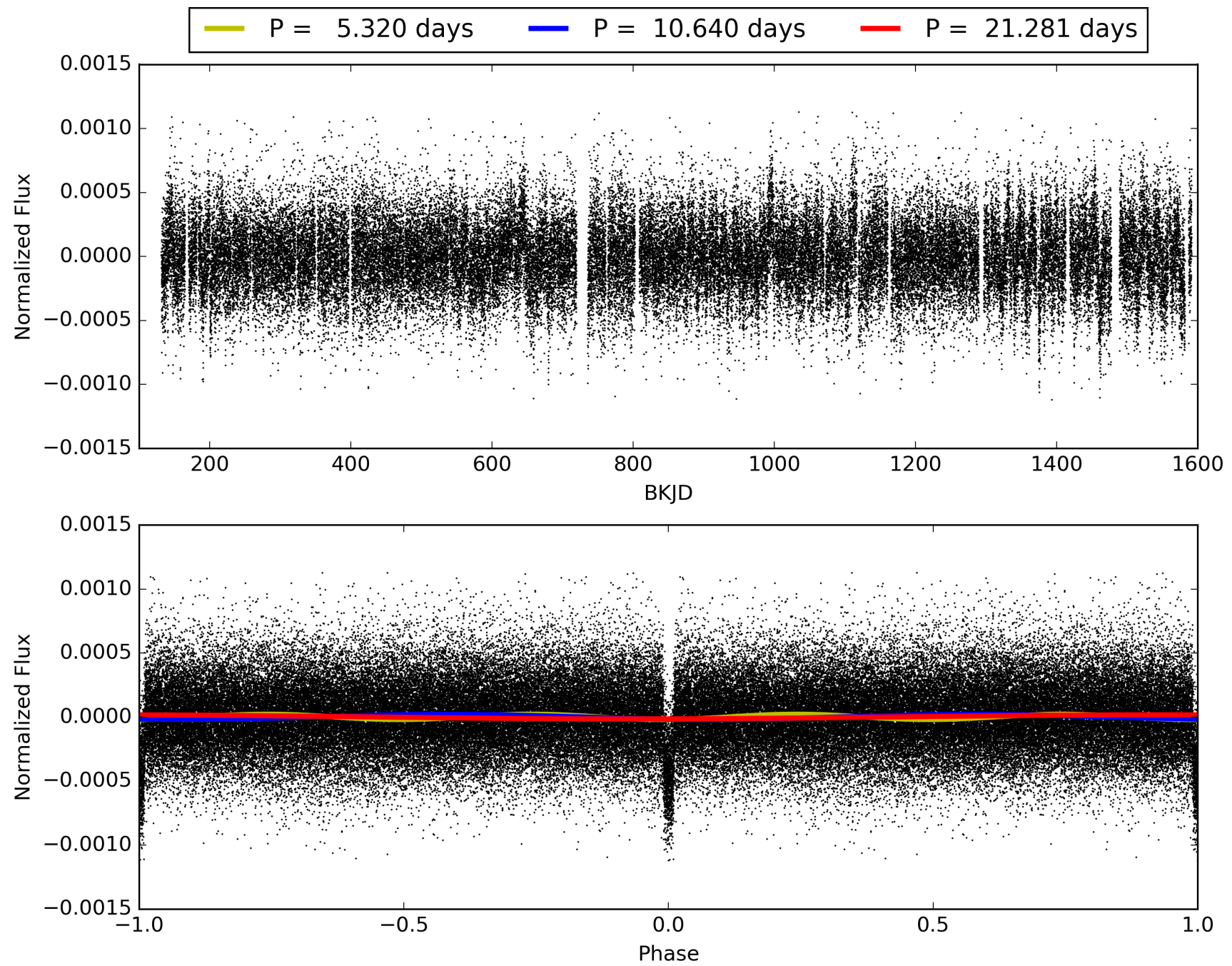
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [19.09σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 99.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [121/121]
GhostDiagnostic-chr: 3.753
Centroid-sig: 0.0%
Centroid-so: 0.790 arcsec [3.30σ]
OotOffset-rm: 0.080 arcsec [0.64σ]
KicOffset-rm: 0.258 arcsec [1.99σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 0.94 [16/17]

TCE 008193178-01, PDC Light Curves

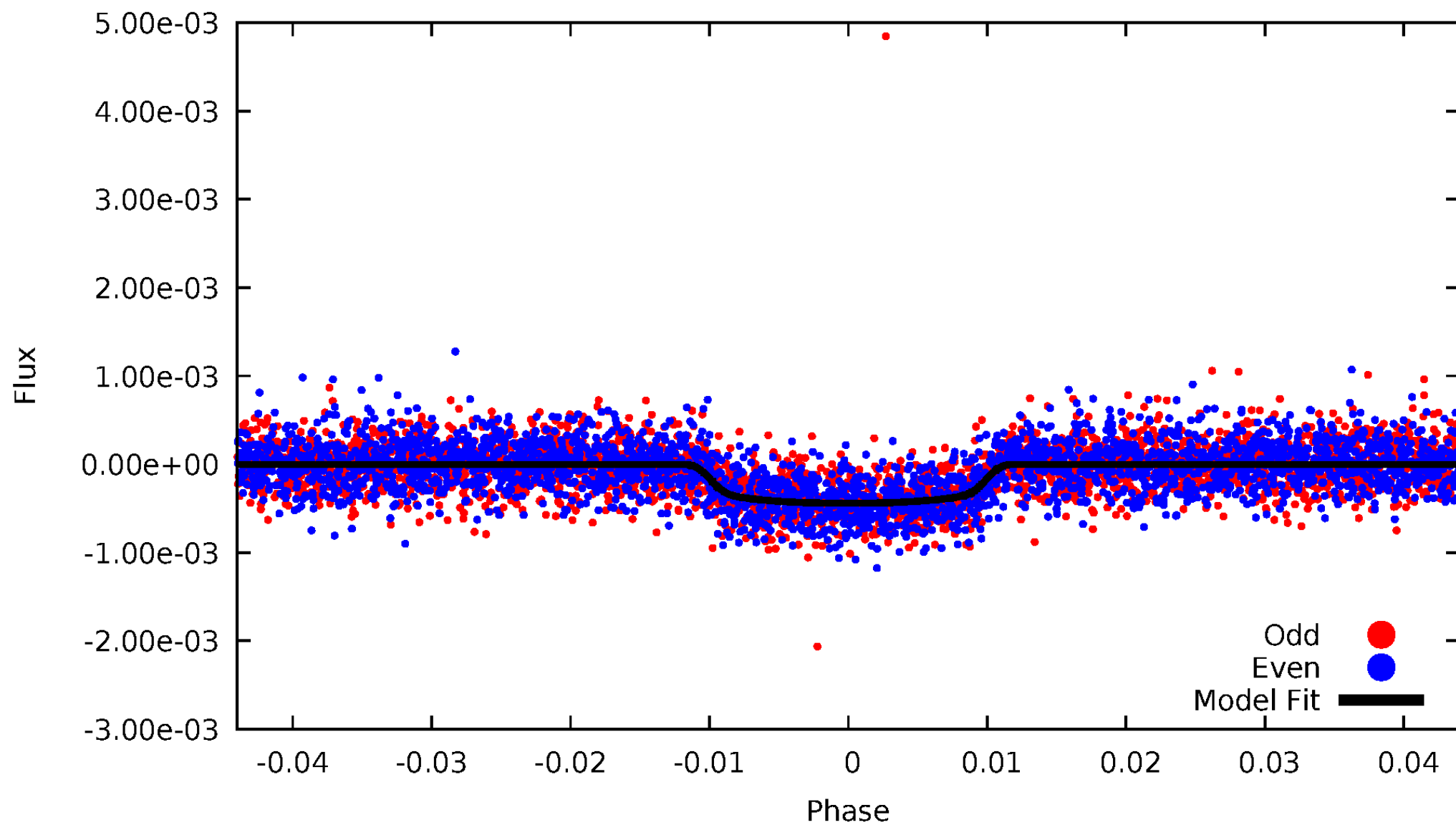


TCE 008193178-01



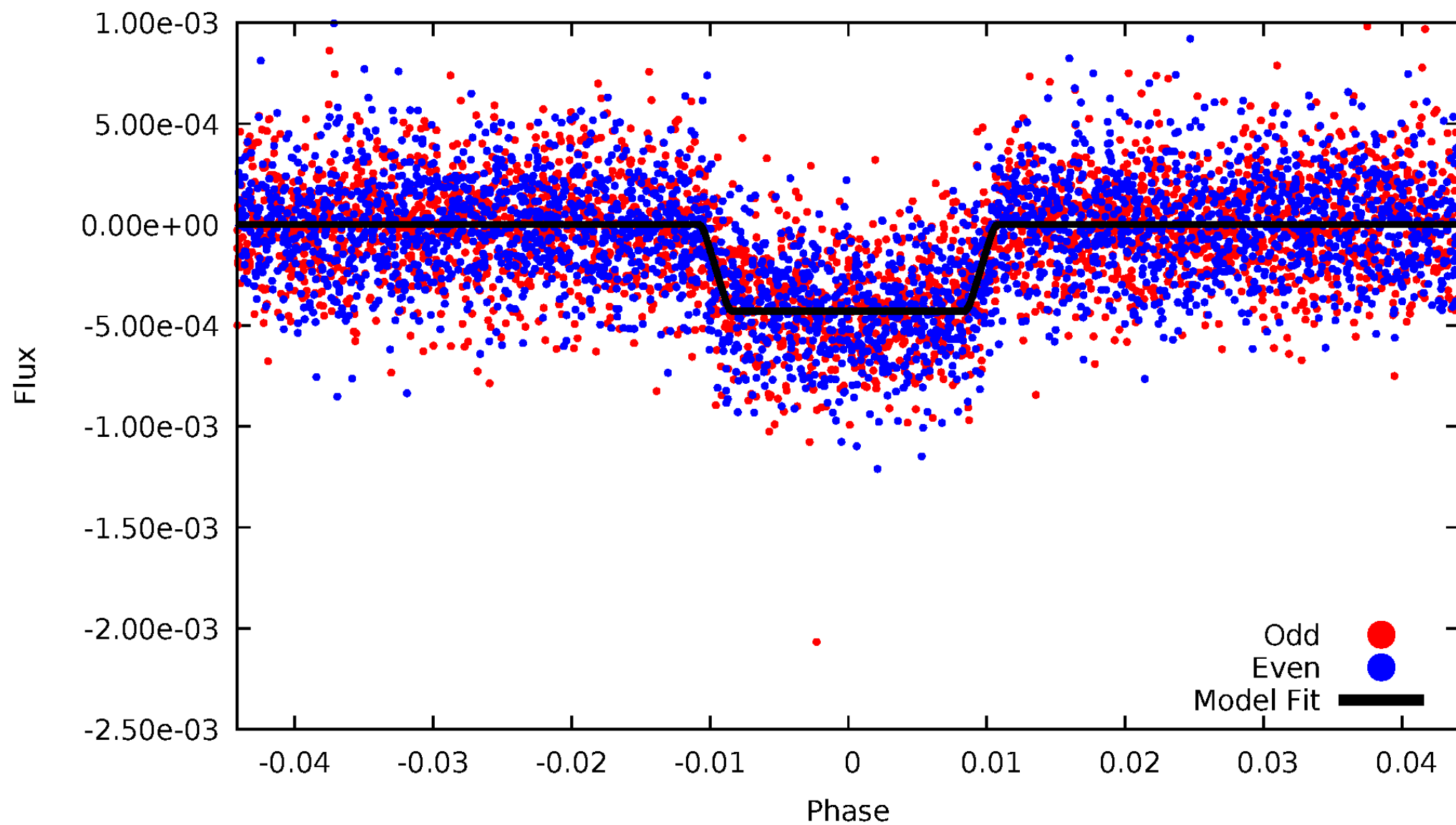
DV Odd/Even

TCE 008193178-01



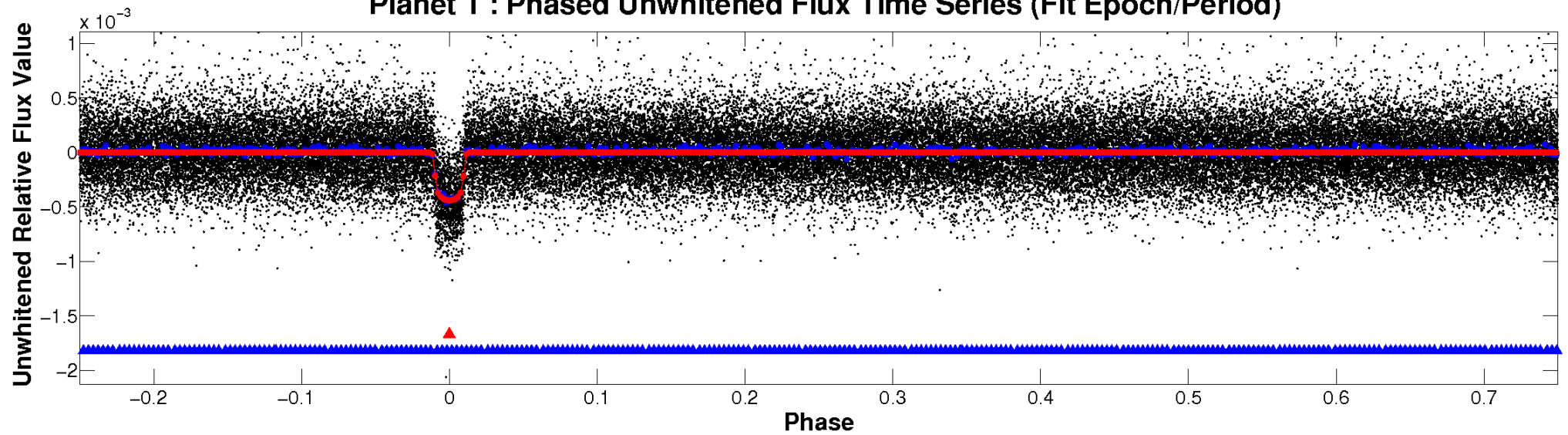
ALT Odd/Even

TCE 008193178-01

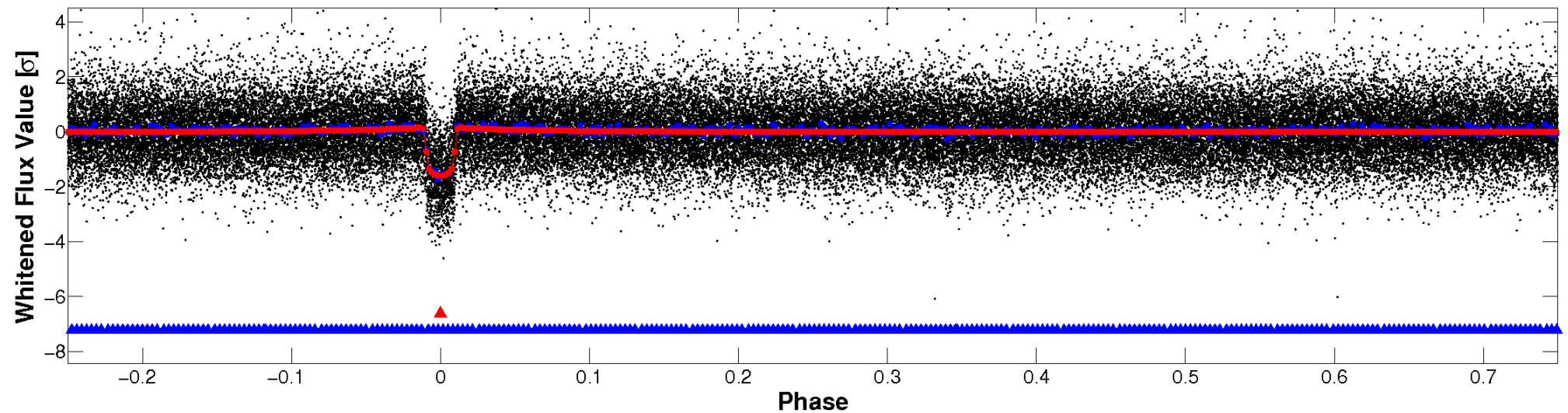


Non-Whitened Vs. Whitened Light Curve

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

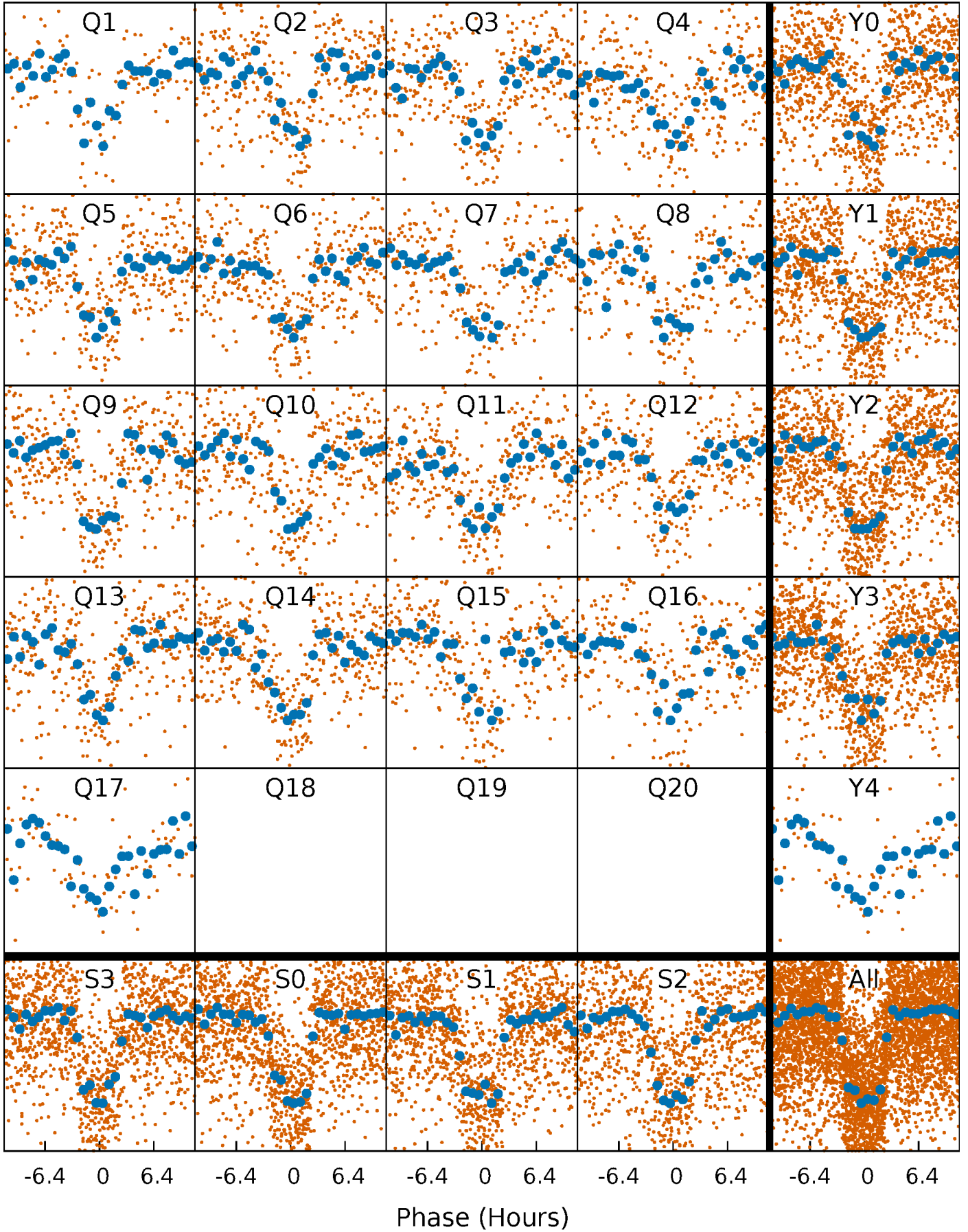


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



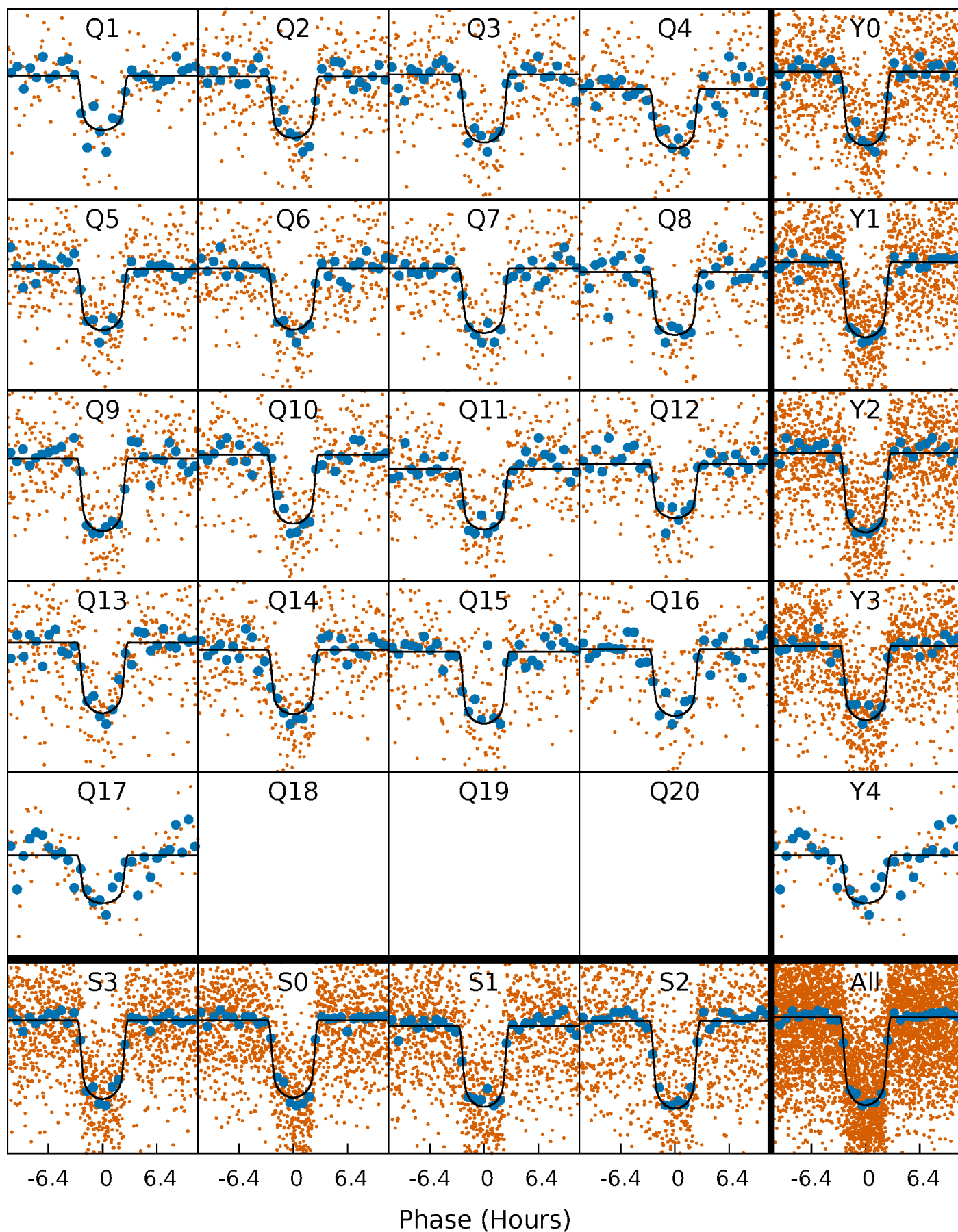
PDC Quarter-Phased Transit Curves

TCE 008193178-01 P= 10.640256 Days $T_0=137.214062$ (BKJD)



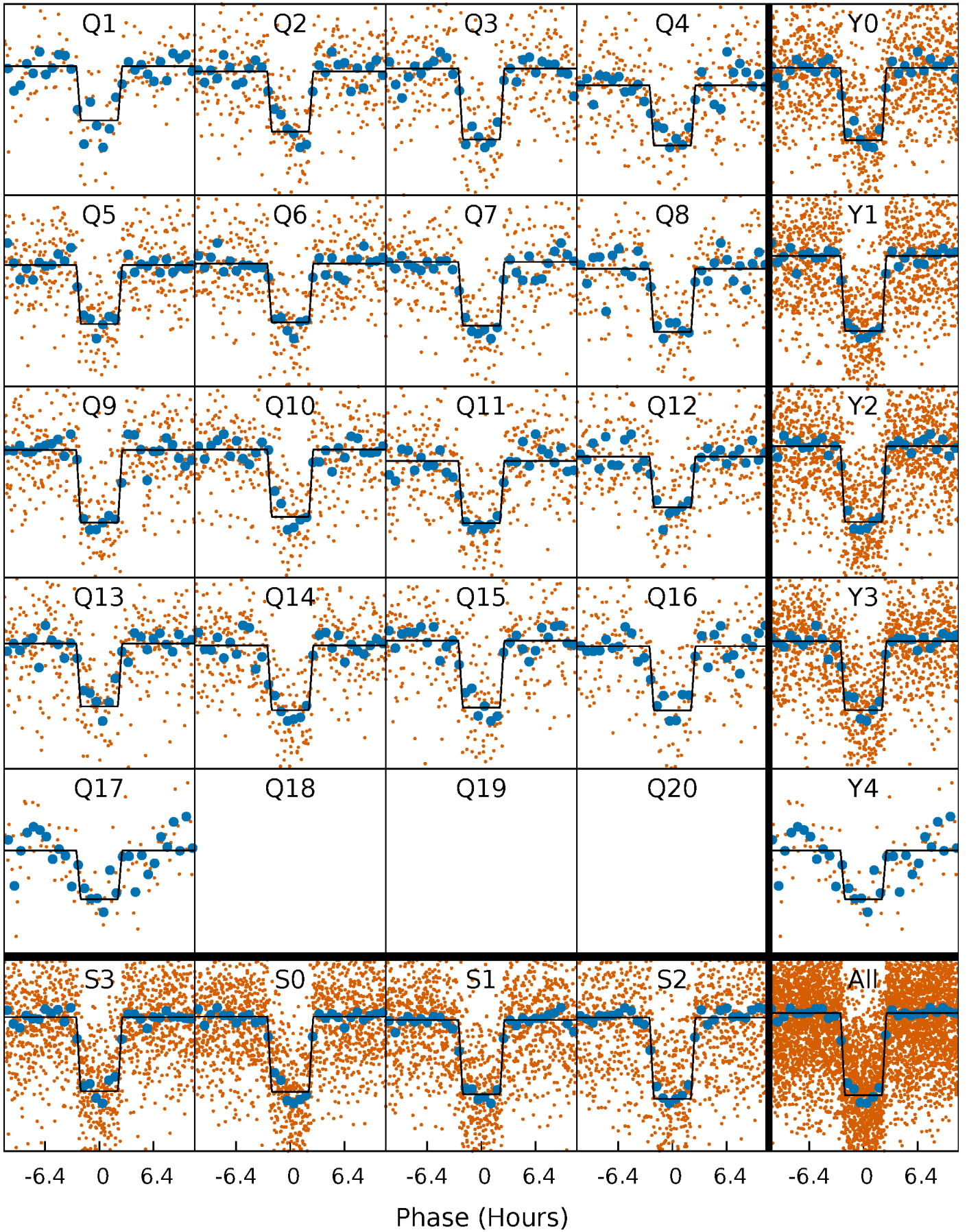
DV Quarter-Phased Transit Curves

TCE 008193178-01 P= 10.640256 Days $T_0=137.214062$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

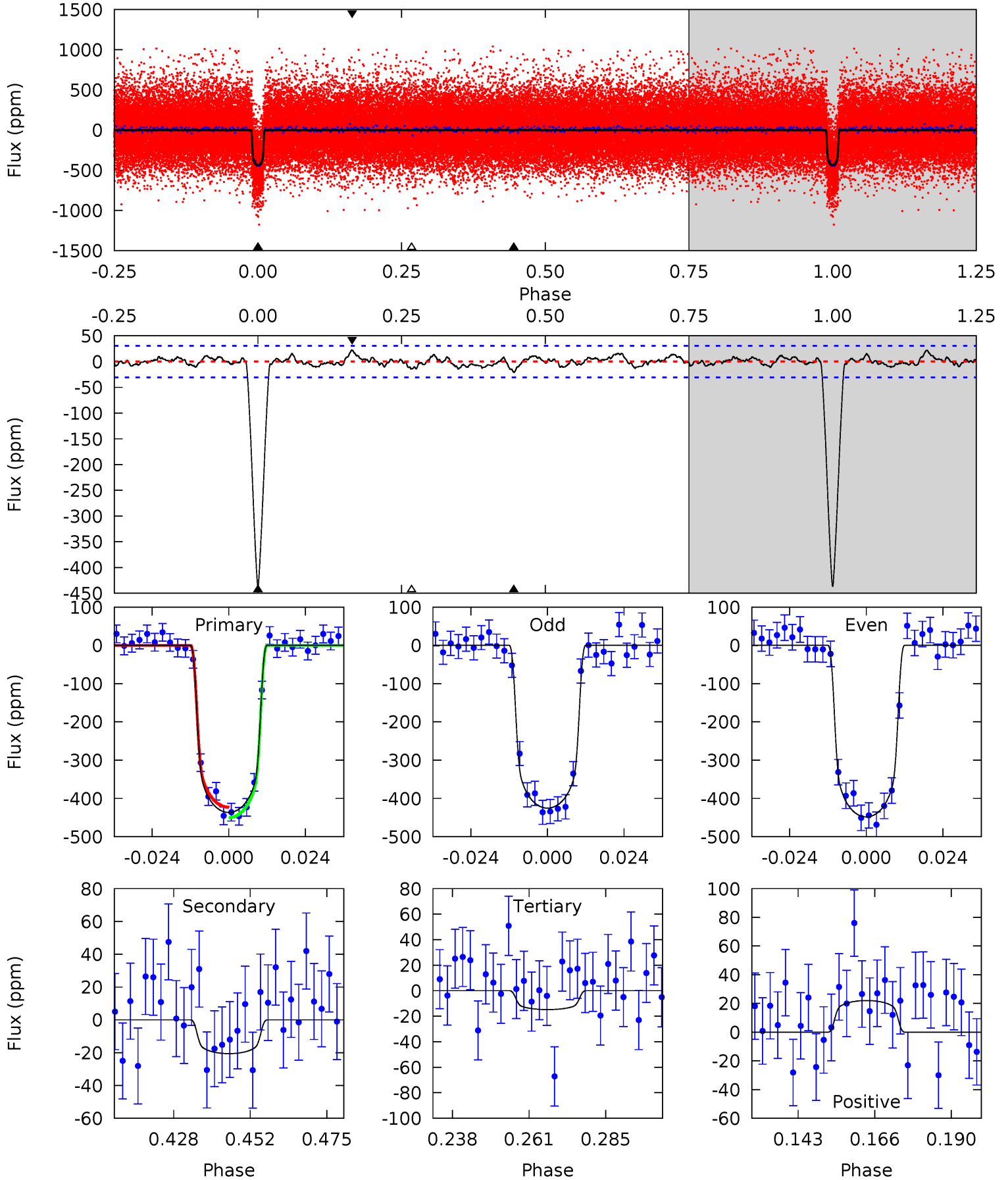
TCE 008193178-01 P= 10.640226 Days $T_0=137.215694$ (BKJD)



DV Model-Shift Uniqueness Test

008193178-01, $P = 10.640256$ Days, $E = 126.573806$ Days

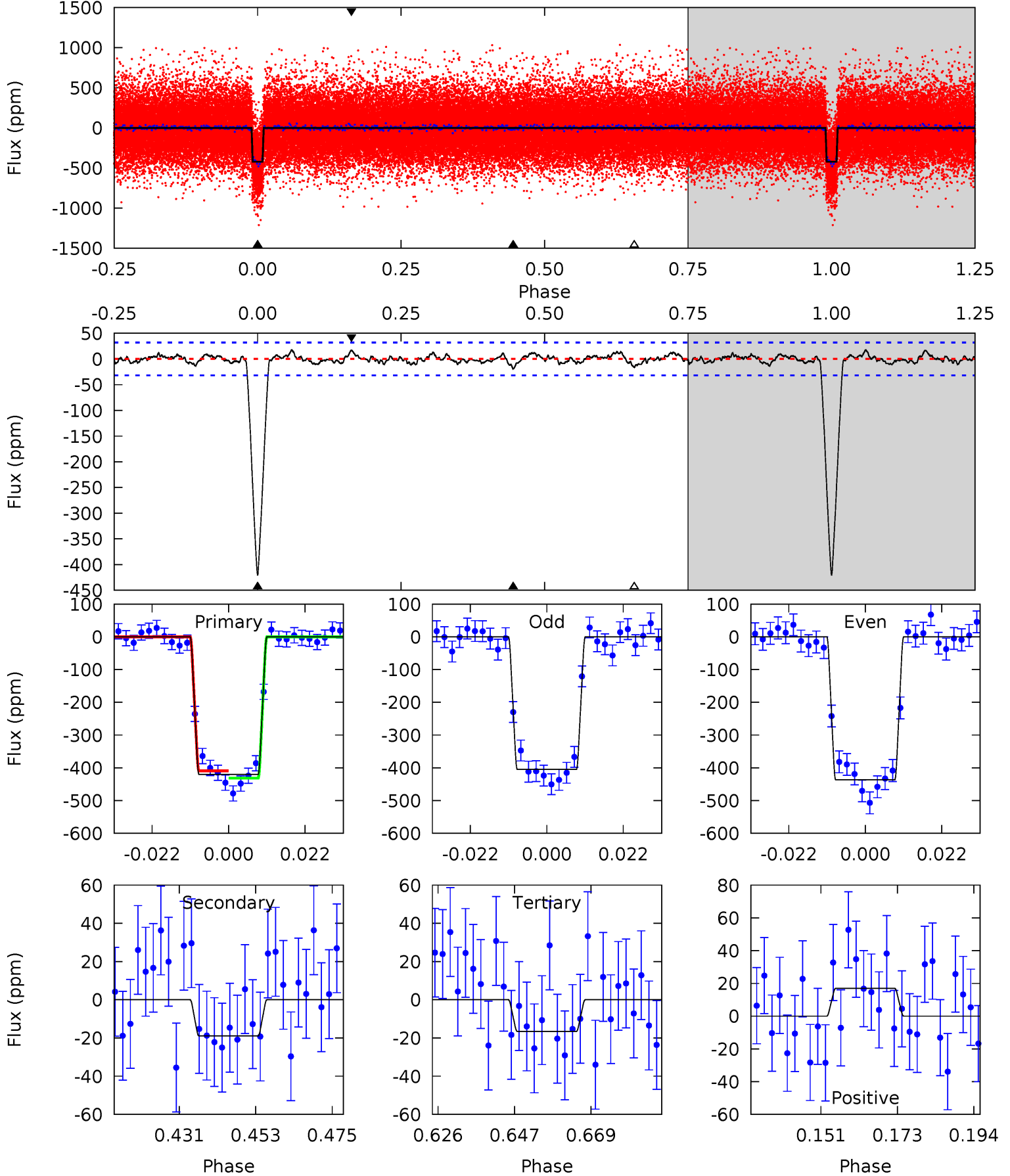
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
69.4	3.27	2.35	3.50	4.86	2.26	1.09	67.0	65.9	0.92	-0.23	1.83	1.00	0.05	2.18



Alt Model-Shift Uniqueness Test

008193178-01, P = 10.640226 Days, E = 126.575468 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
64.2	2.90	2.53	2.59	4.88	2.30	0.93	61.7	61.6	0.37	0.31	2.40	1.02	0.04	1.68



Stellar Parameters For KIC 008193178

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6112^{+122}_{-134}	$4.281^{+0.125}_{-0.125}$	$-0.060^{+0.150}_{-0.150}$	$1.233^{+0.220}_{-0.180}$	$1.057^{+0.096}_{-0.072}$	$0.794^{+0.442}_{-0.259}$
	+2%/-2%	+3%/-3%	+250%/-250%	+18%/-15%	+9%/-7%	+56%/-33%
Source	SPE58	SPE58	SPE58	DSEP		

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

Secondary Eclipse Parameters for KIC 008193178-01 / KOI 0572.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-21 ± 6	$3.02^{+0.34}_{-0.31}$	1346^{+76}_{-63}	3298^{+148}_{-188}	11^{+5}_{-4}
Alt.	-19 ± 7	$2.79^{+0.31}_{-0.28}$	1342^{+78}_{-68}	3341^{+164}_{-211}	13^{+6}_{-4}

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

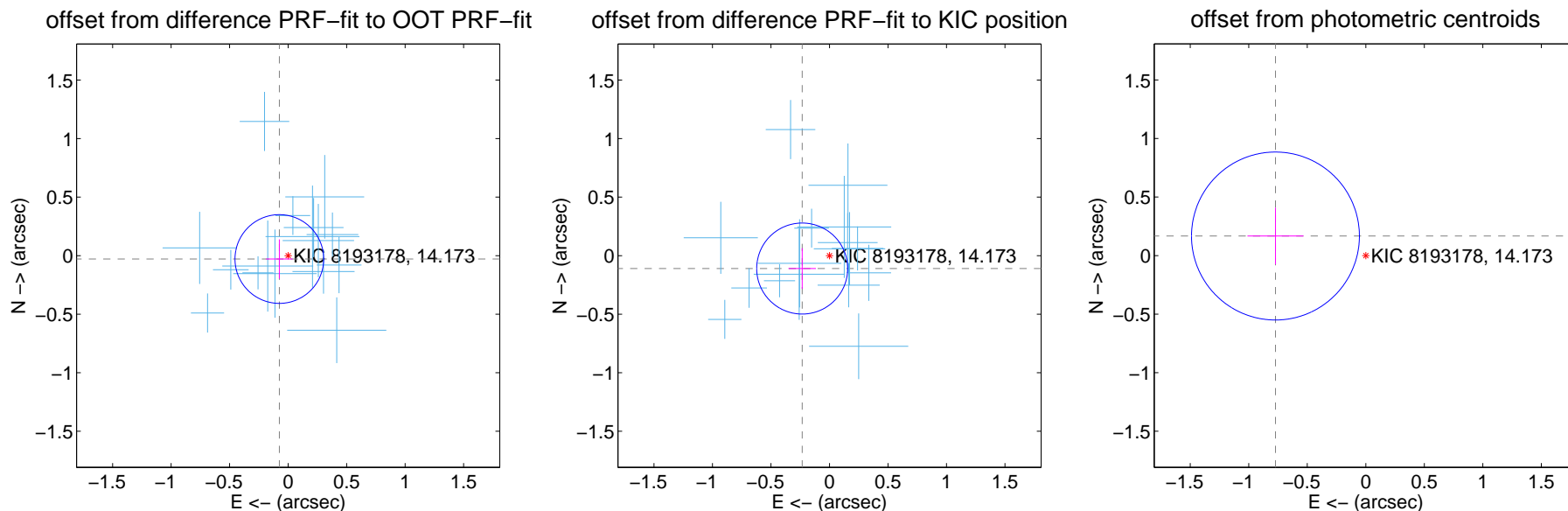
DV Centroid Data

Supplemental centroid analysis for 008193178-01. Kepler magnitude: 14.17. Transit SNR 51.04

There are 17 quarters with good PRF difference image offsets

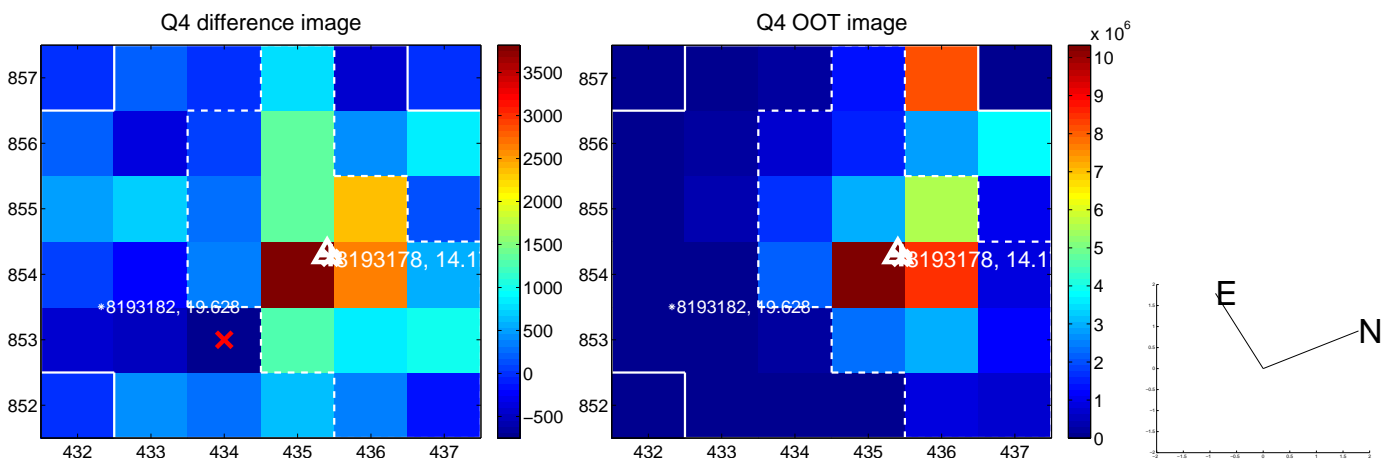
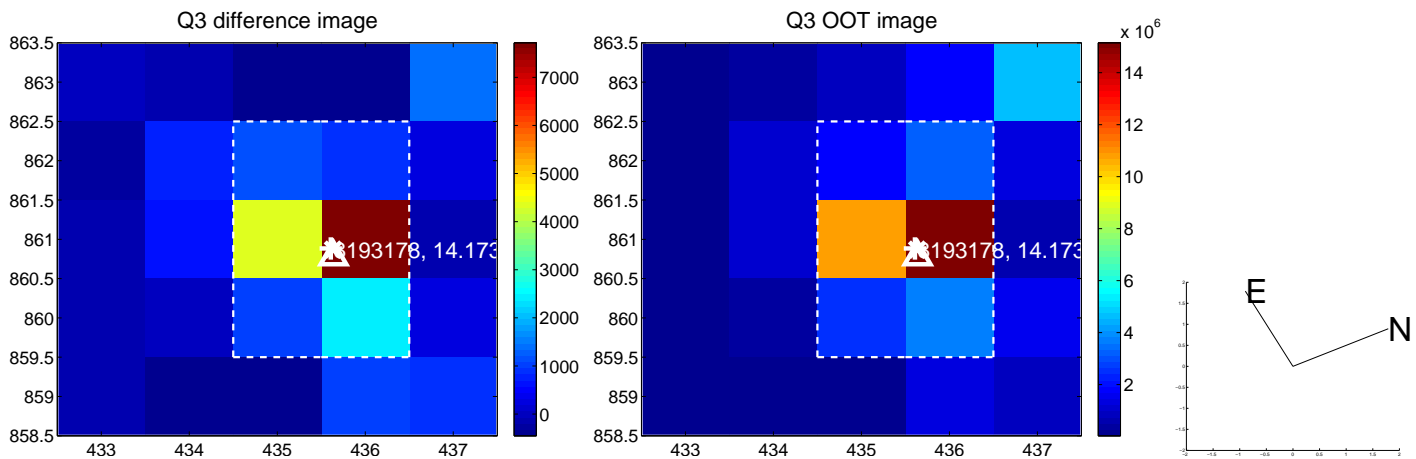
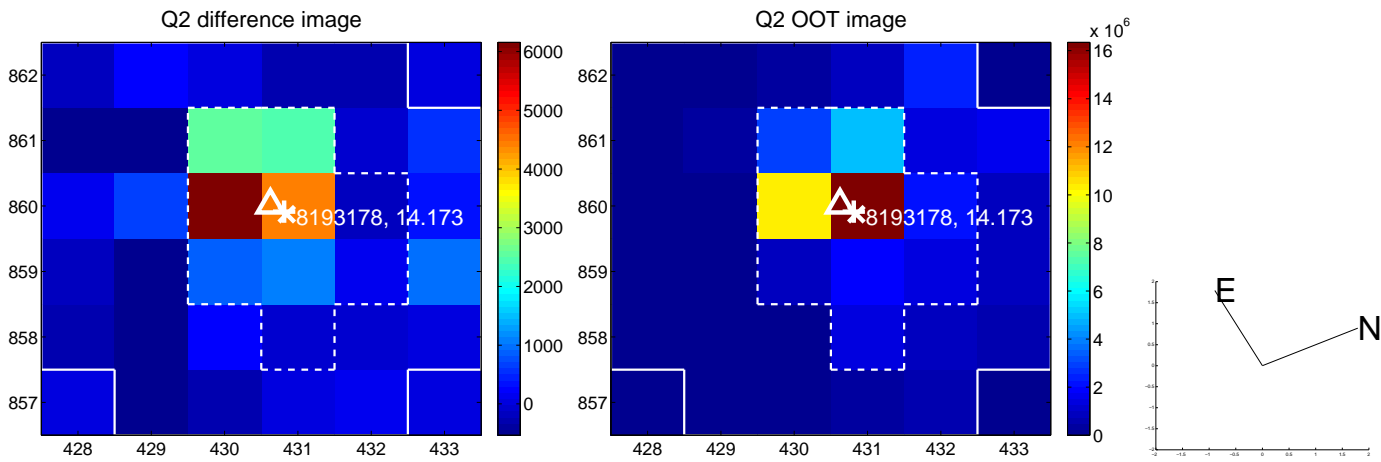
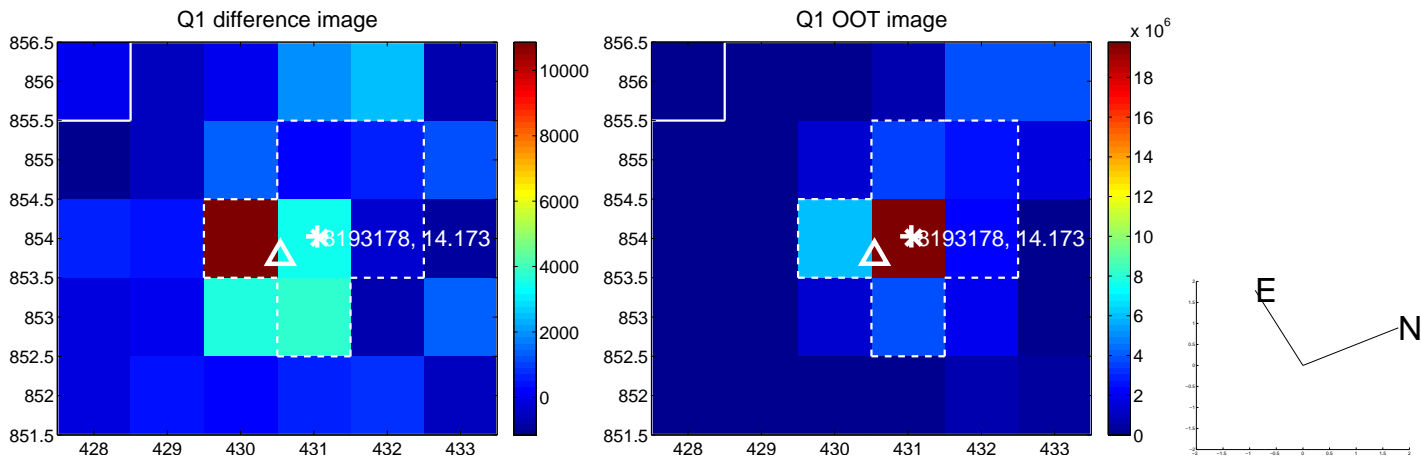
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.080 ± 0.126	0.64	0.075 ± 0.114	-0.029 ± 0.168
PRF-fit source offset from KIC position	0.258 ± 0.130	1.99	0.233 ± 0.117	-0.110 ± 0.173
photometric centroid source offset	0.79 ± 0.24	3.30	0.77 ± 0.24	0.17 ± 0.24

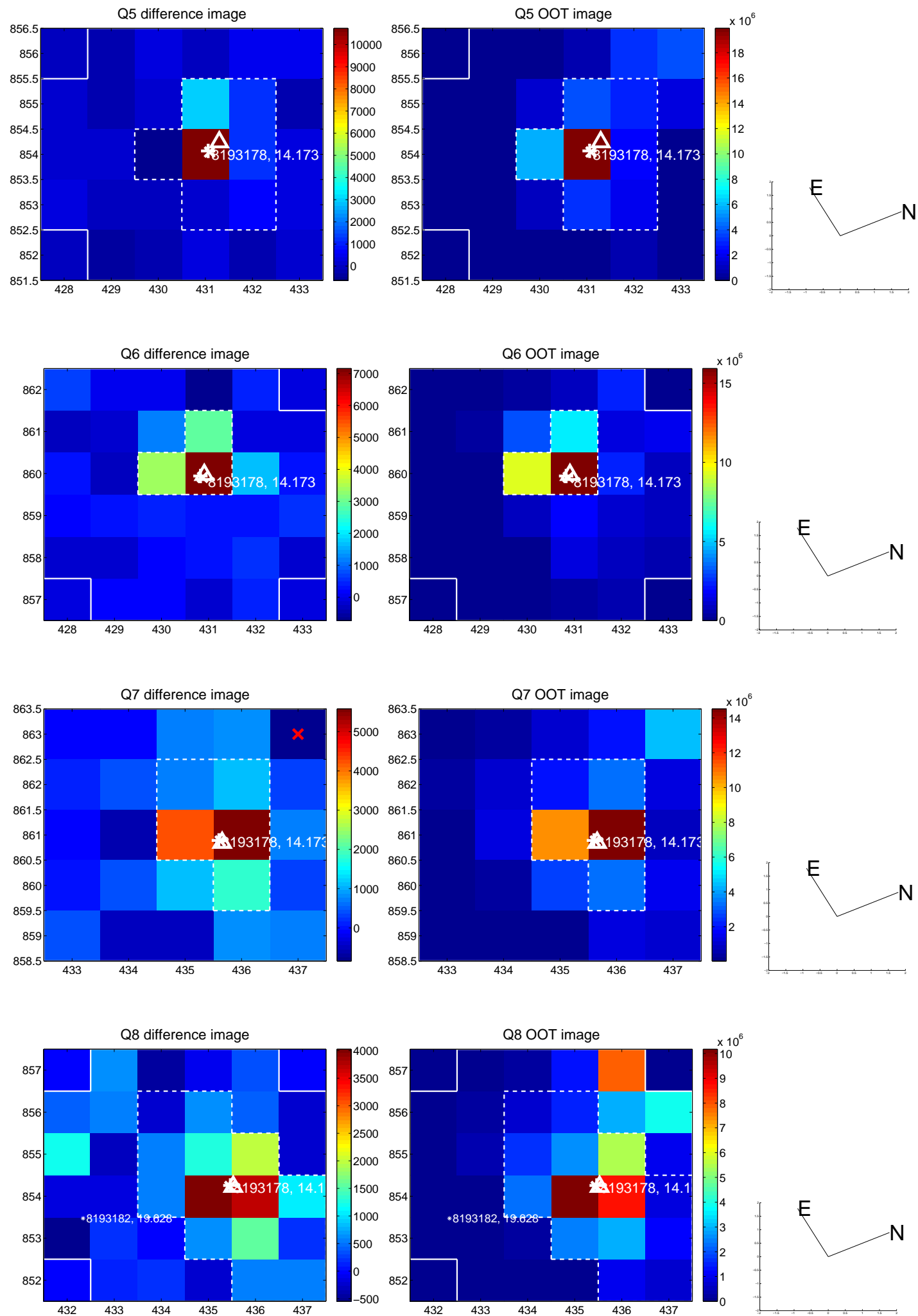


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

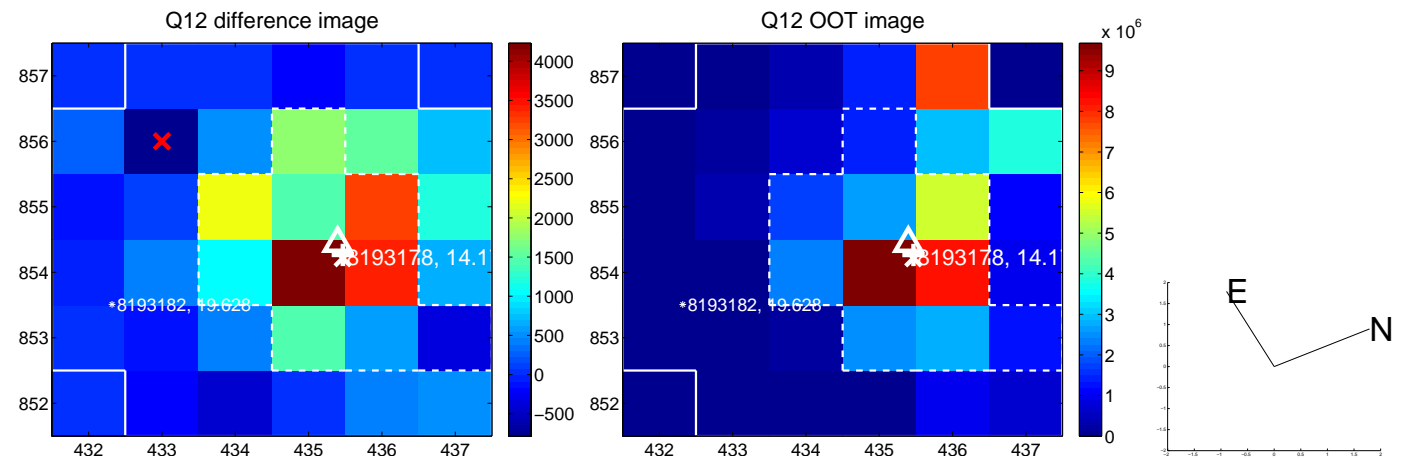
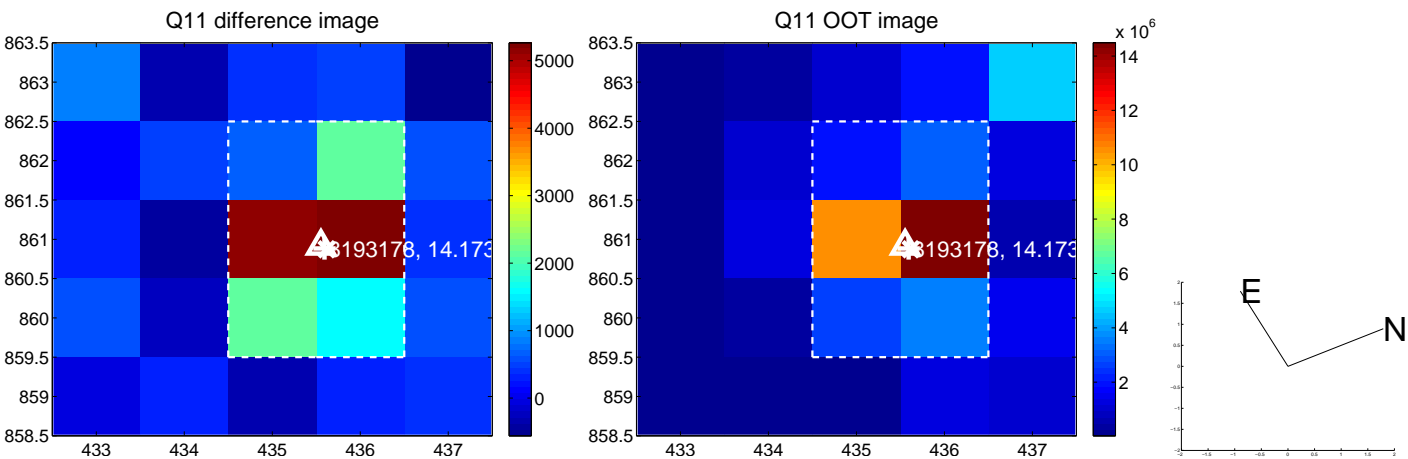
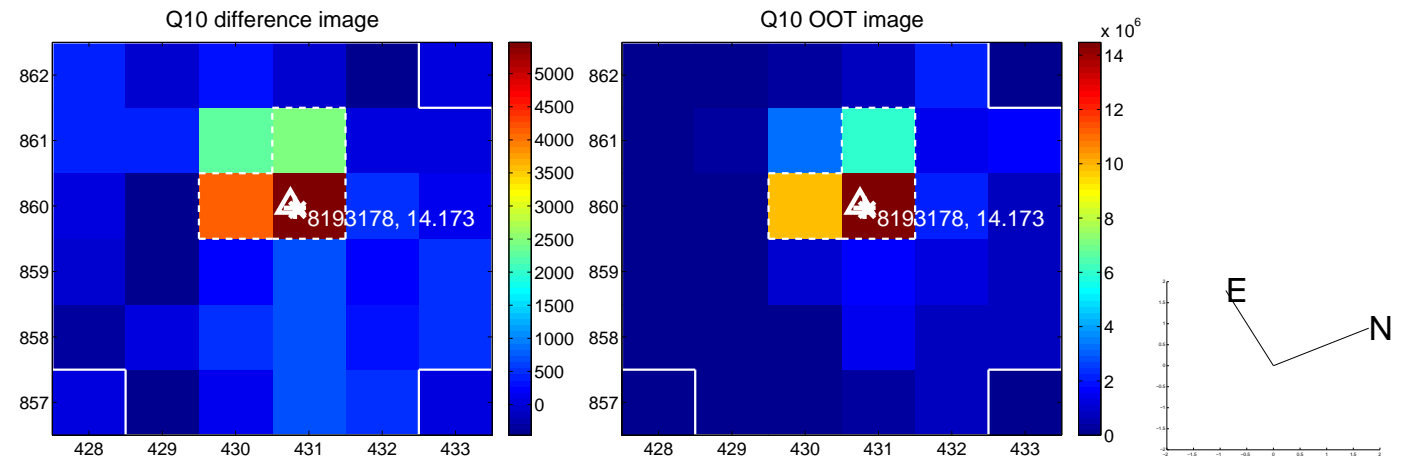
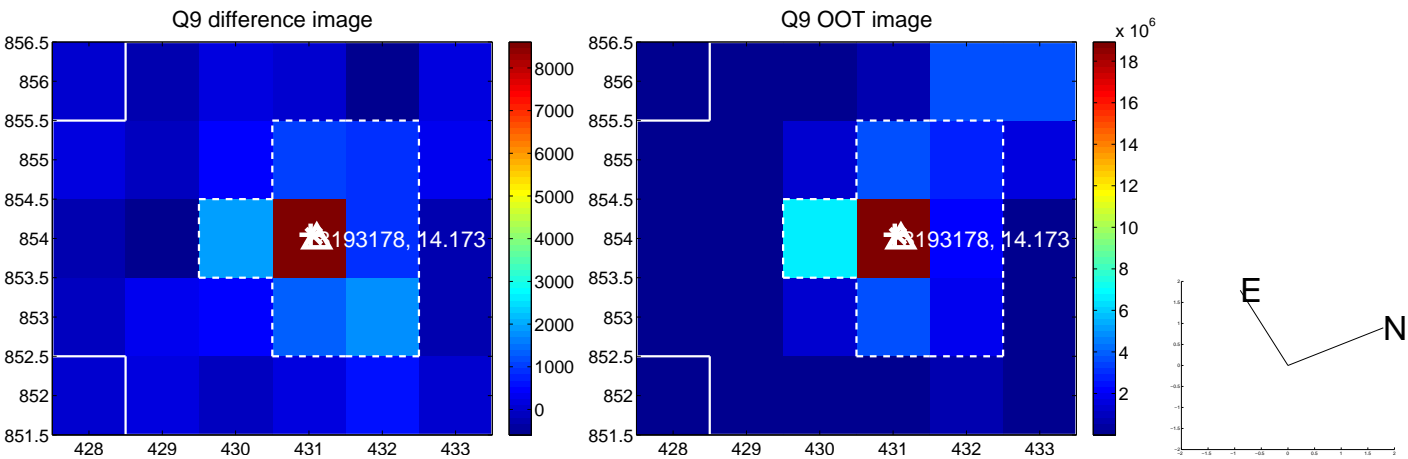
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



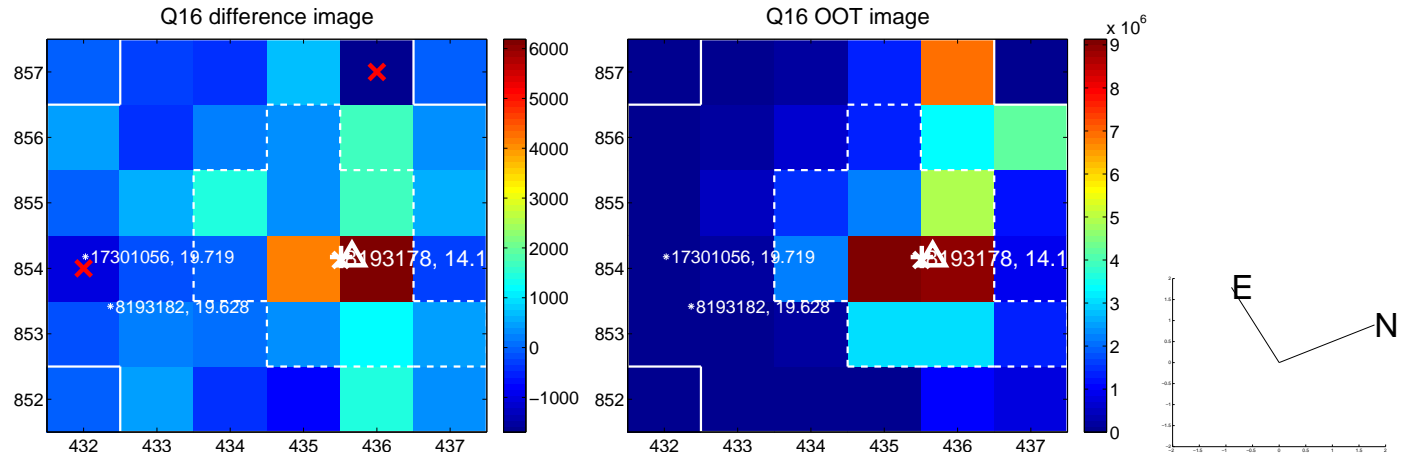
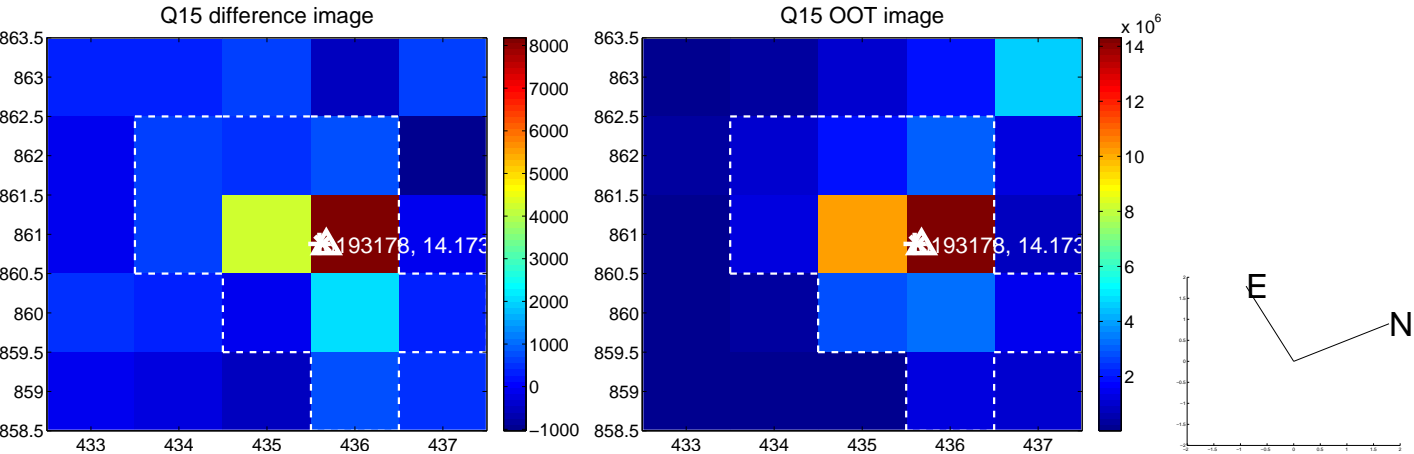
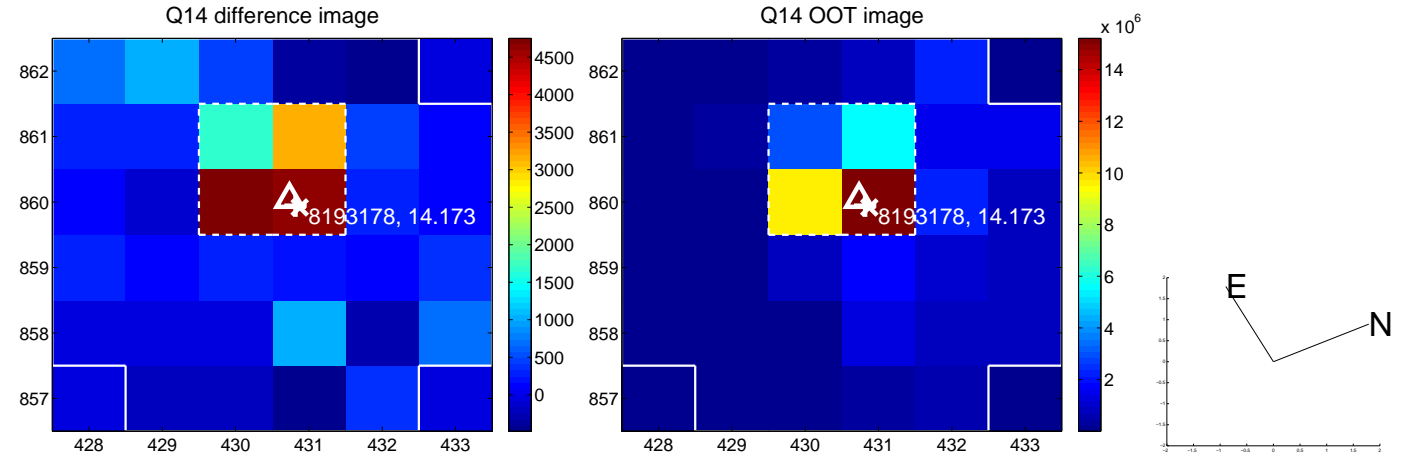
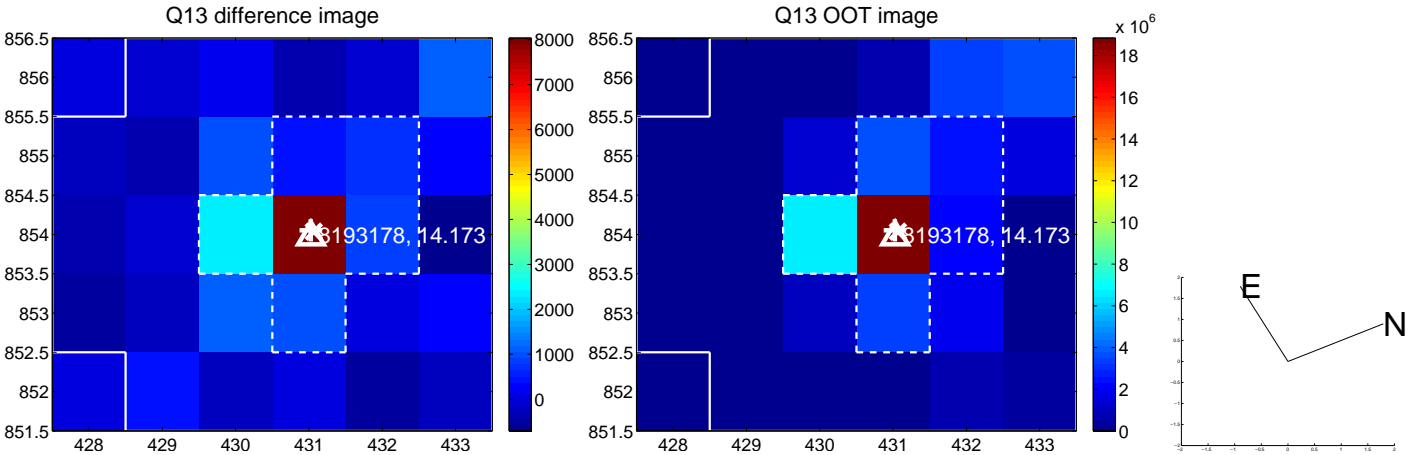
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



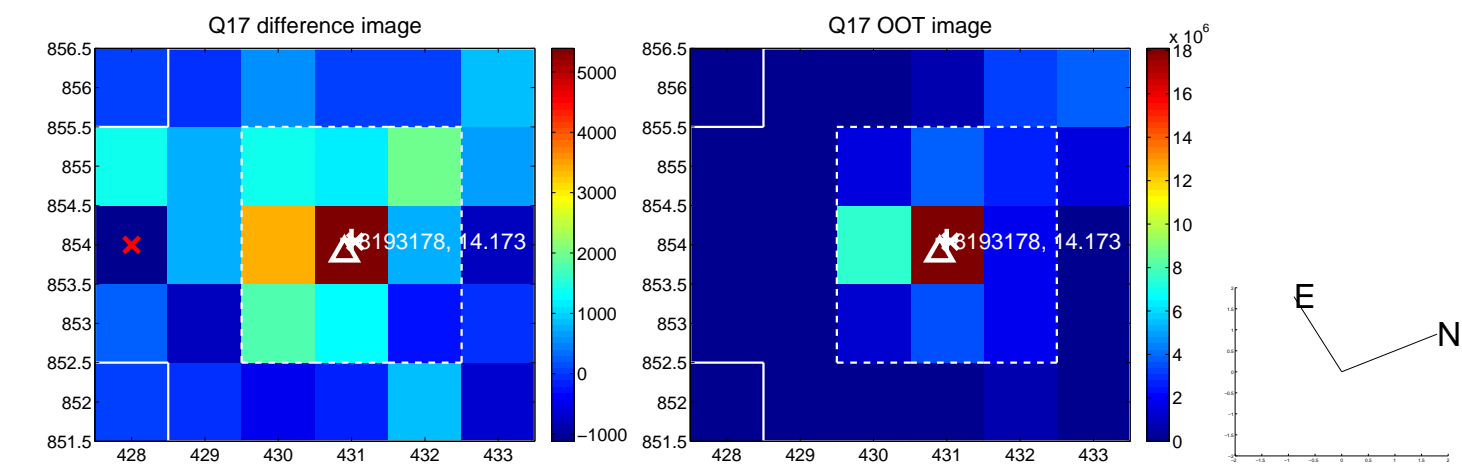
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



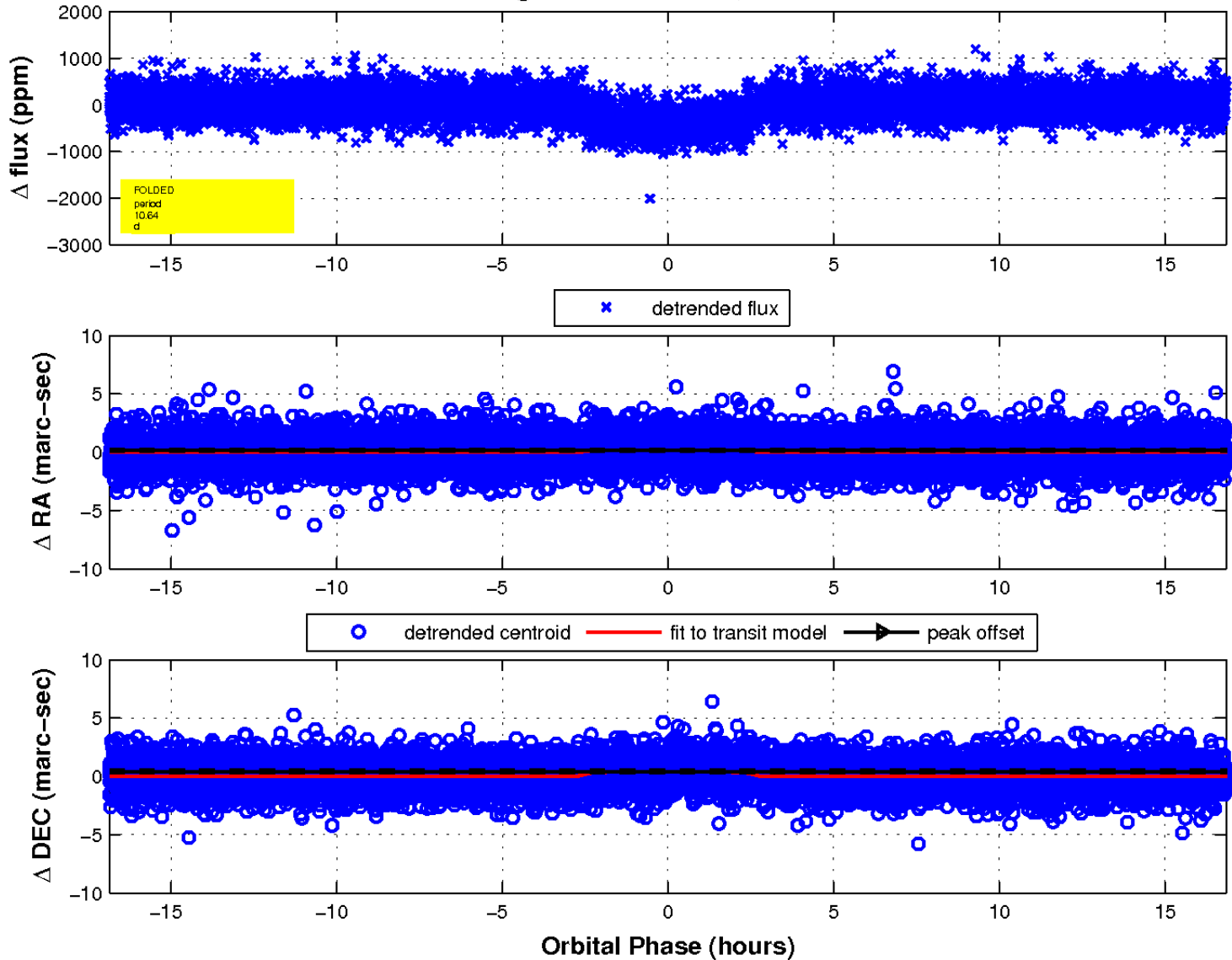
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

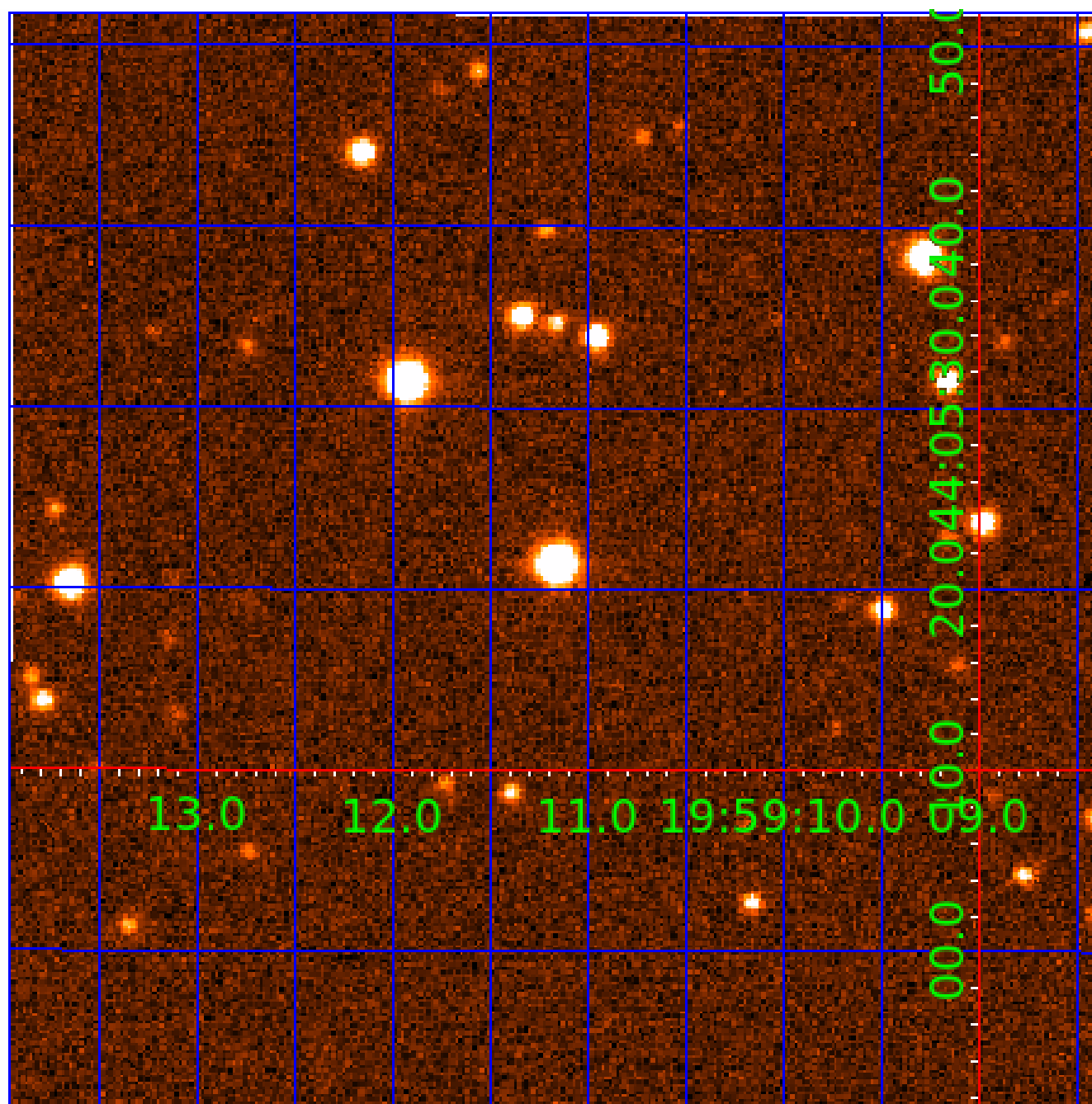


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 008193178

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})
008193178-01	OBS	0572.01	10.640256	137.214062	441.7	5.617	46.6	51.0	1.23	6112	2.99	204.02
008193178-02	OBS	0572.02	4.938867	135.952682	121.0	4.453	16.8	18.8	1.23	6112	1.54	567.67

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008193178-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008193178-02	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.

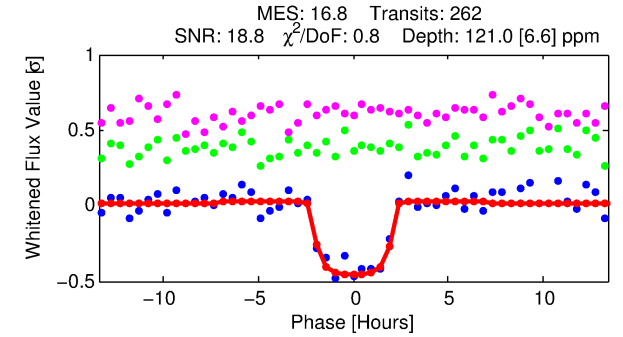
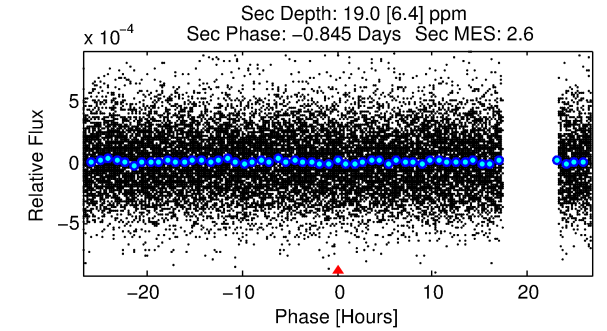
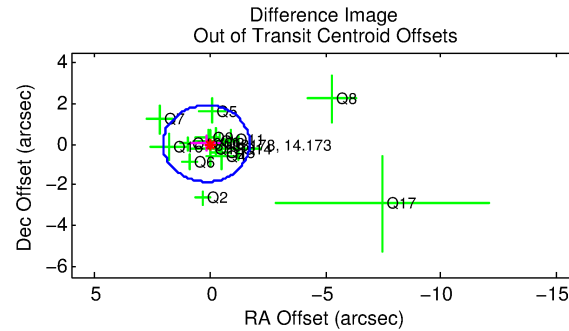
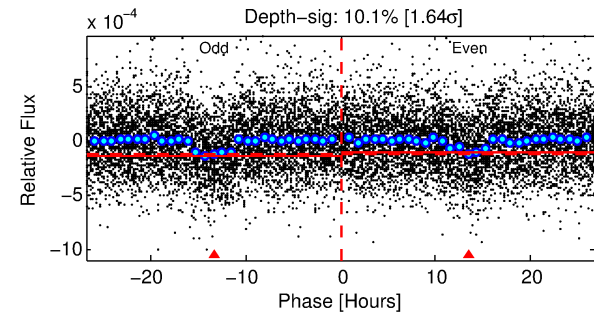
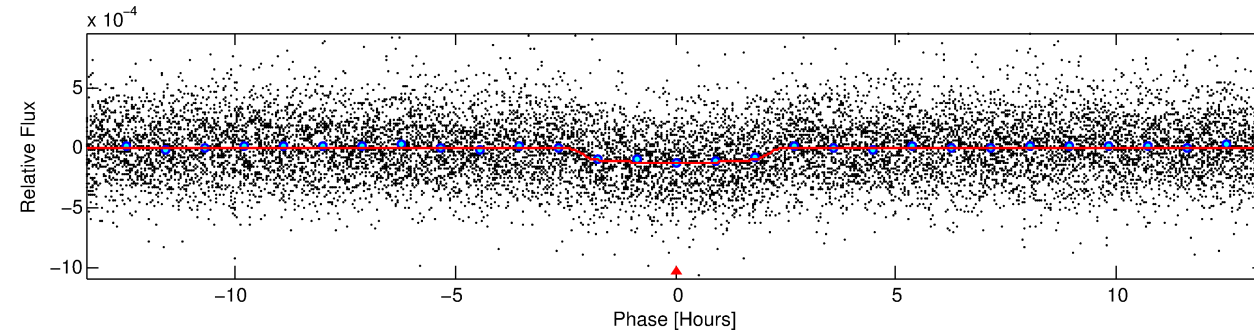
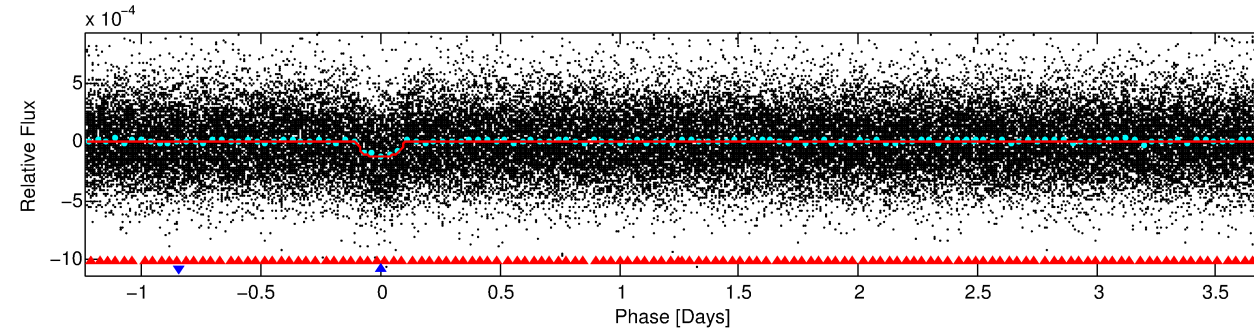
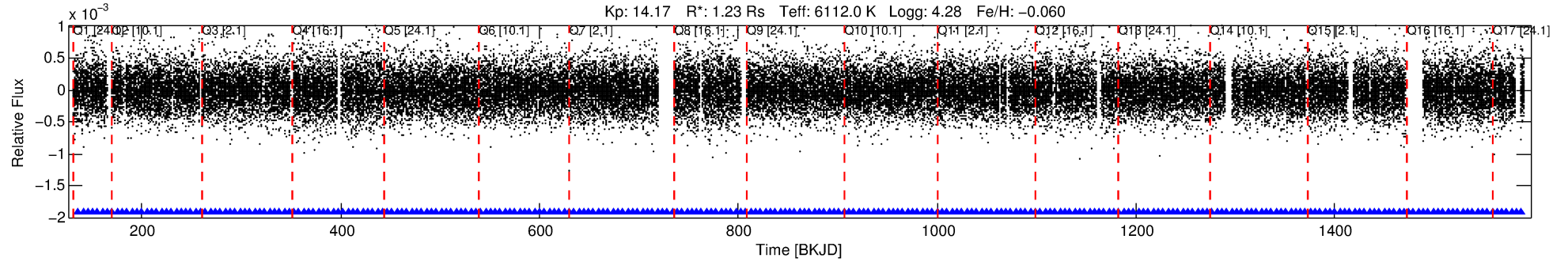
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008193178-02

No Significant Match Found

DV One-Page Summary

KIC: 8193178 Candidate: 2 of 2 Period: 4.939 d
KOI: K00572.02 Name: Kepler-187b Corr: 0.991



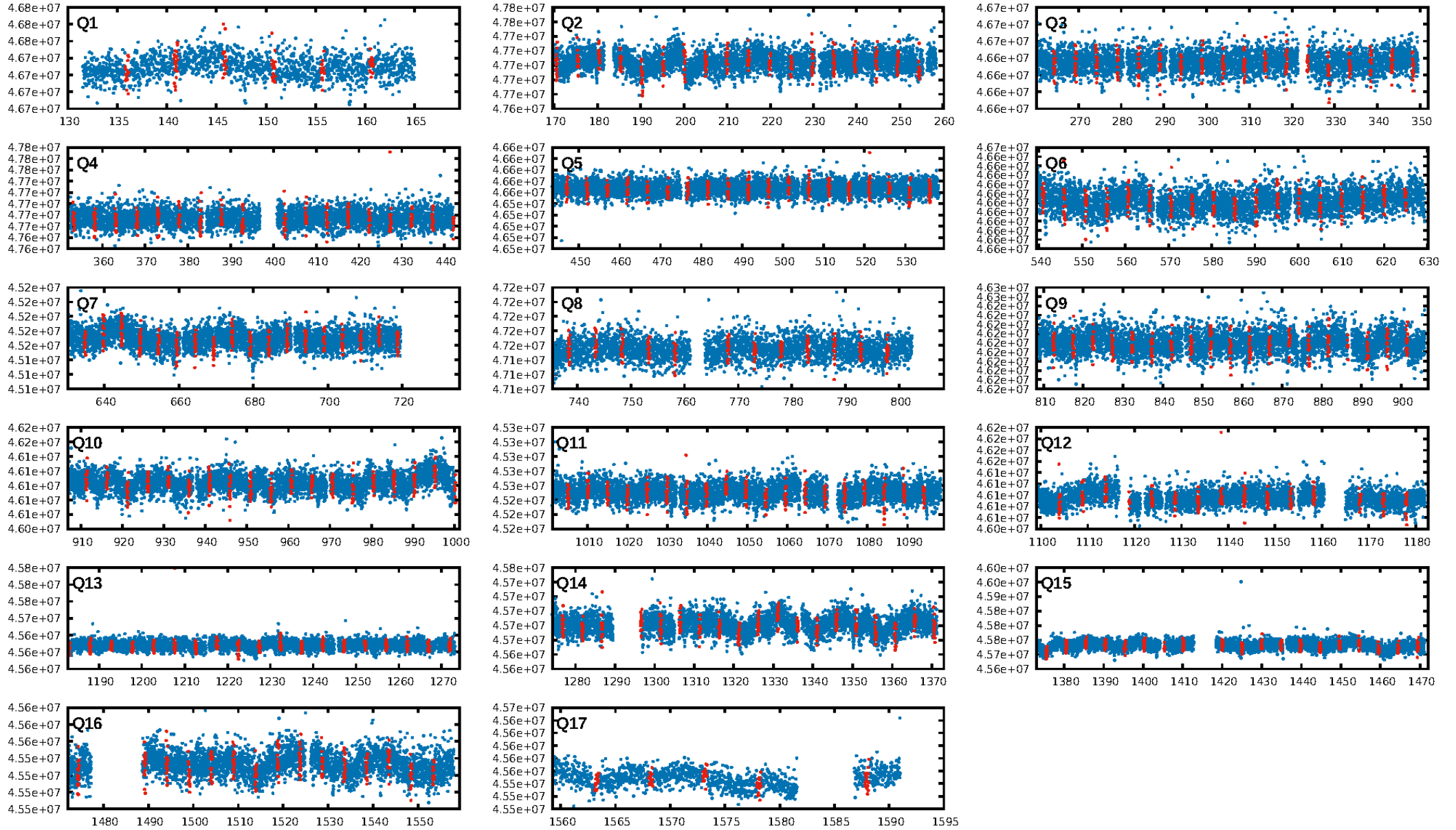
DV Fit Results:

Period = 4.93887 [0.00003] d
Epoch = 135.9527 [0.0037] BKJD
Rp/R* = 0.0115 [0.0037]
a/R* = 4.71 [7.52]
b = 0.85 [0.55]
Seff = 567.68 [137.49]
Teff = 1245 [75] K
Rp = 1.54 [0.57] Re
a = 0.0579 [0.0088] AU
Ag = 14.75 [11.28] [1.22 σ]
Teffp = 3771 [694] K [3.62 σ]

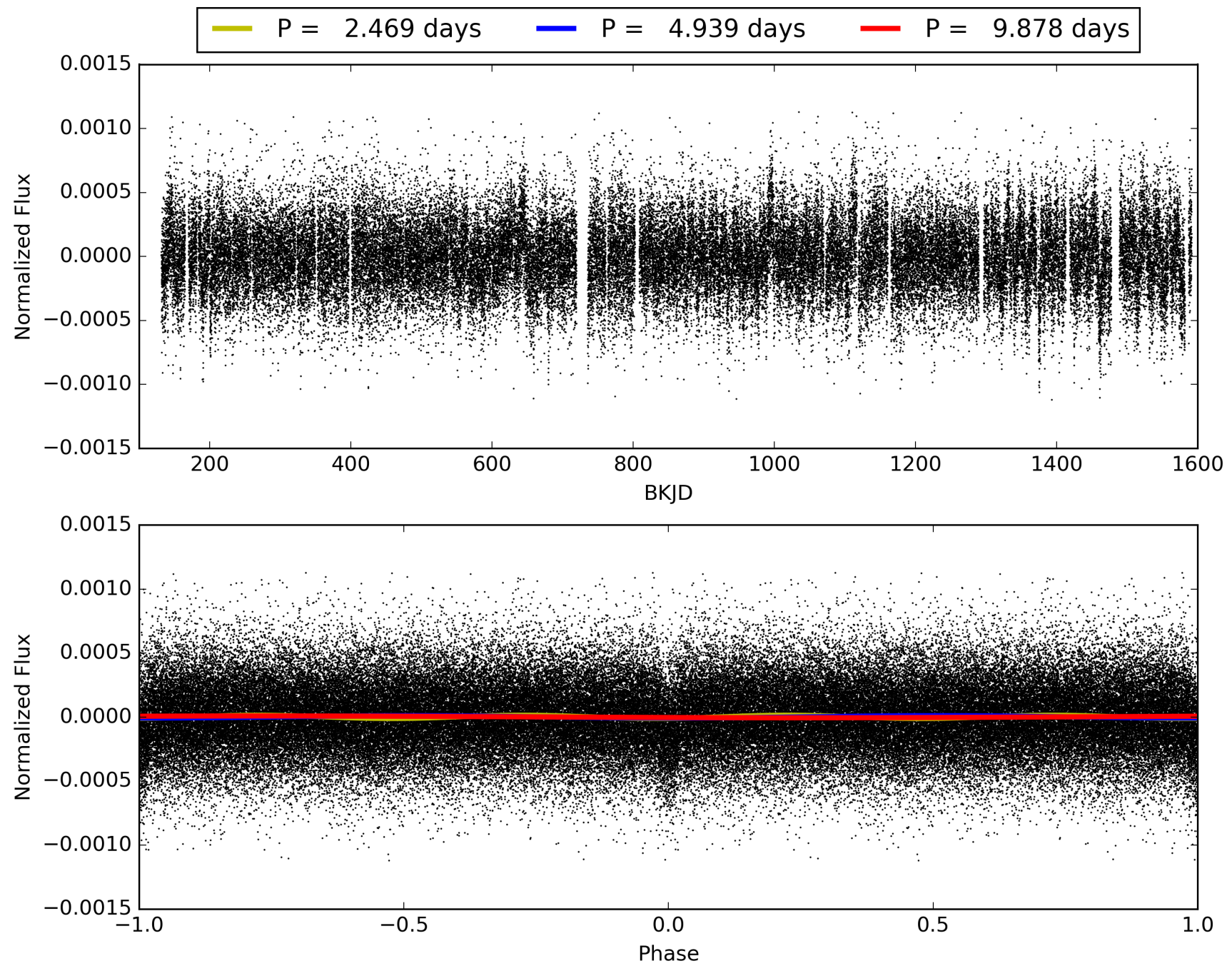
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [19.09 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.33e-64
RollingBand-fgt: 1.00 [251/251]
GhostDiagnostic-chr: 2.05
Centroid-sig: 25.2%
Centroid-so: 0.988 arcsec [1.54 σ]
OotOffset-rm: 0.157 arcsec [0.25 σ]
KicOffset-rm: 0.301 arcsec [0.52 σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.75 [12/16]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 008193178-02, PDC Light Curves

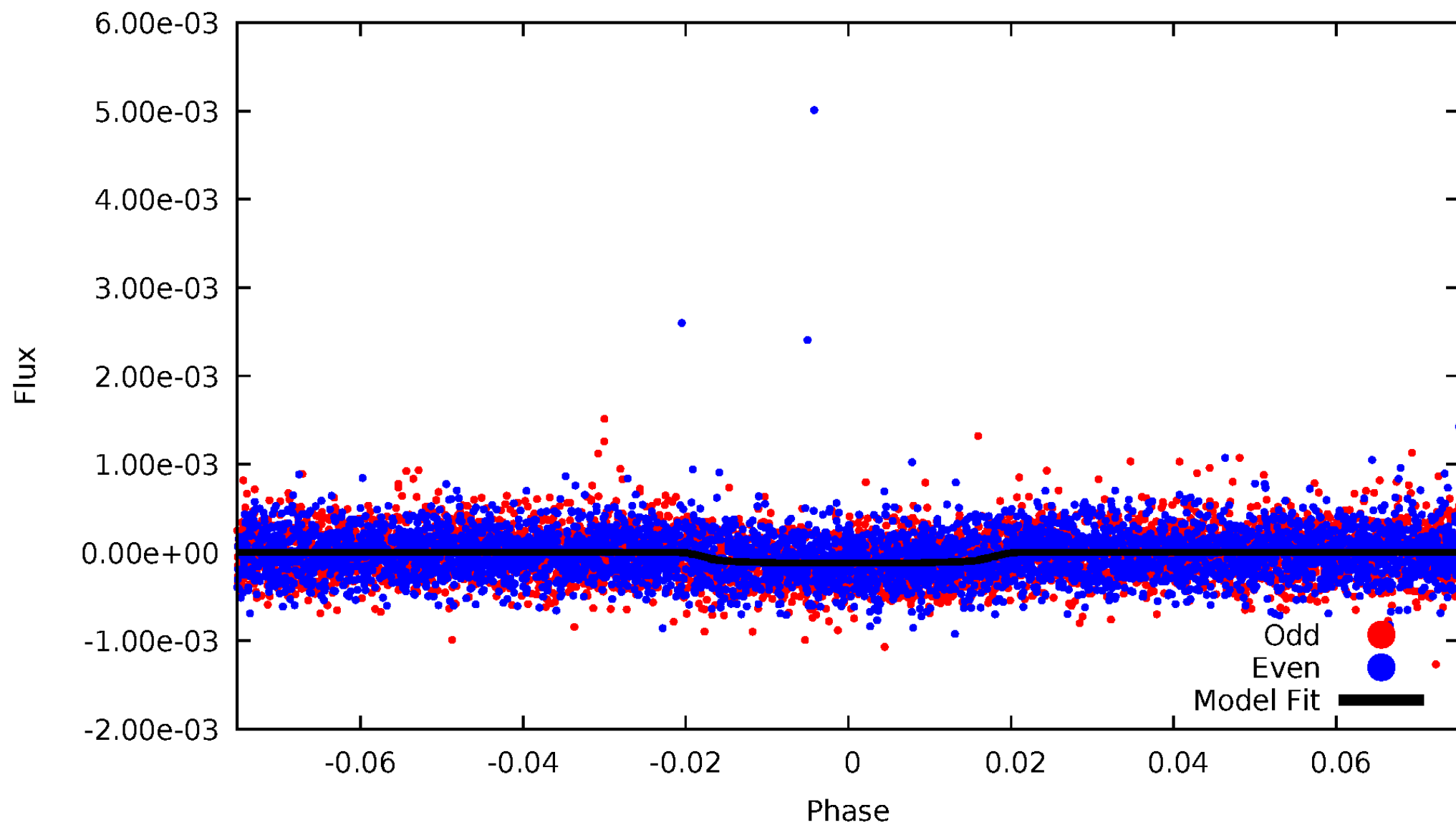


TCE 008193178-02



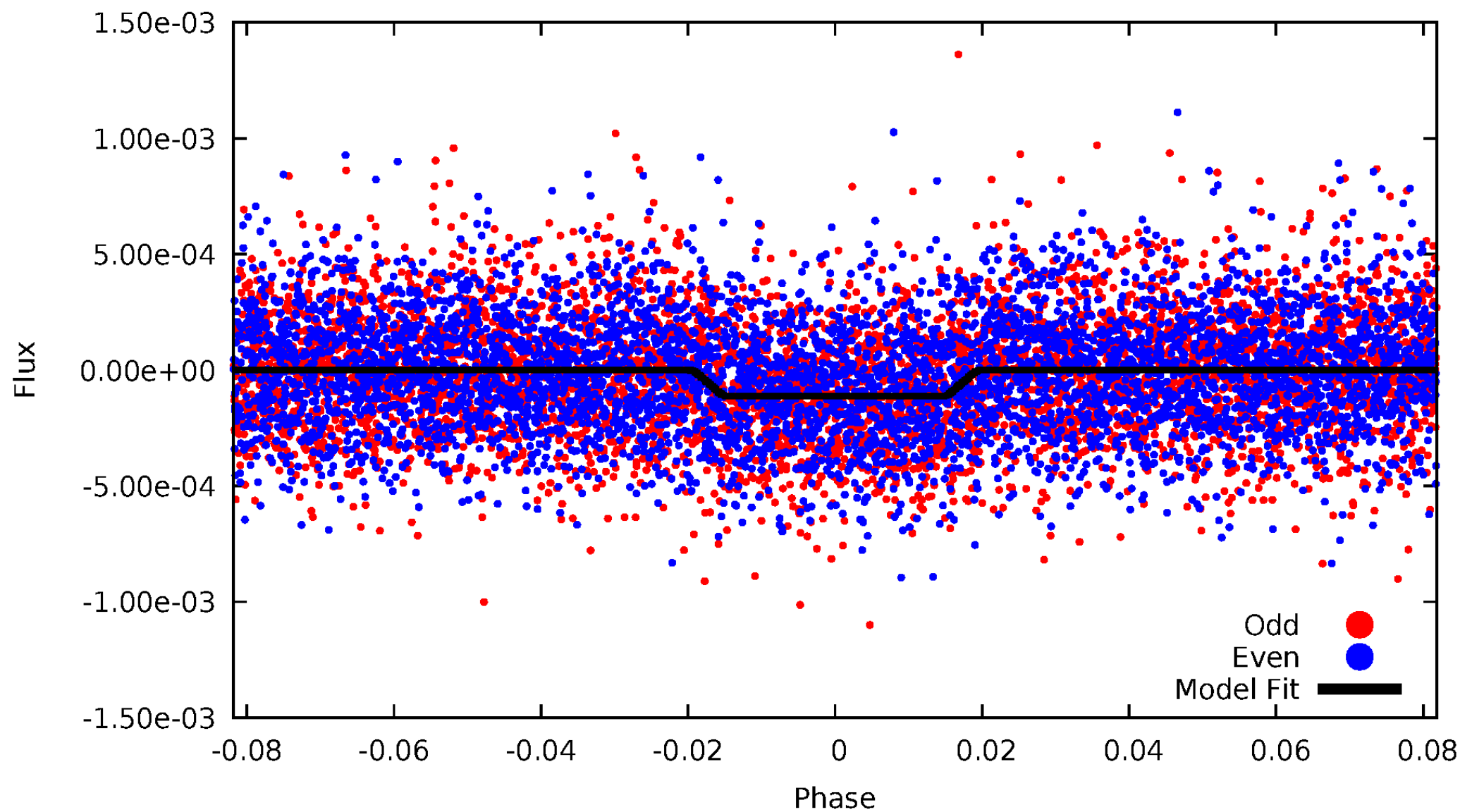
DV Odd/Even

TCE 008193178-02



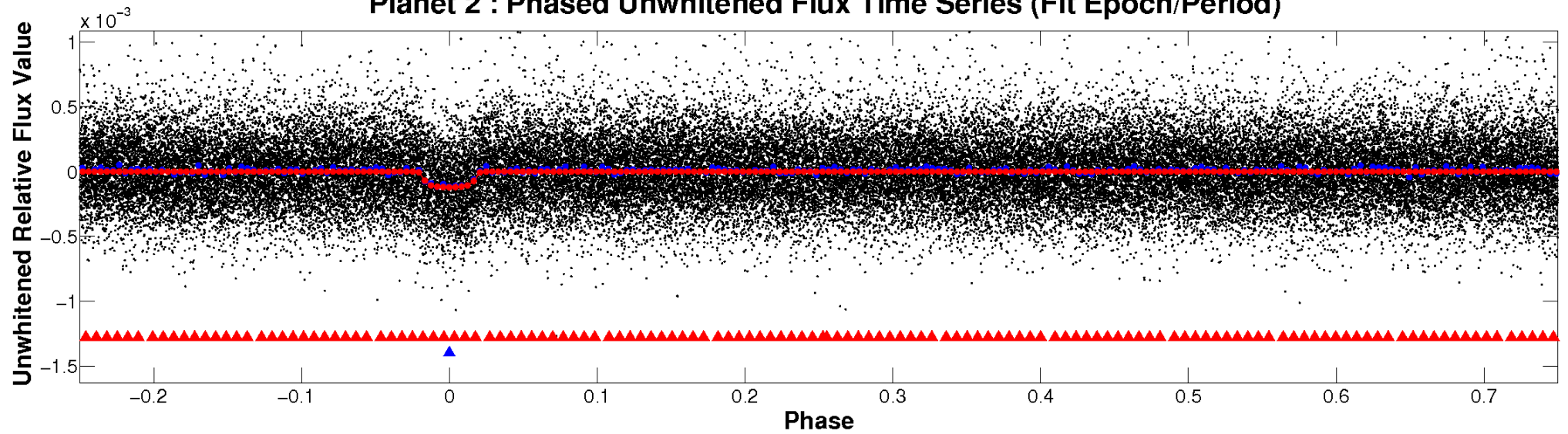
ALT Odd/Even

TCE 008193178-02

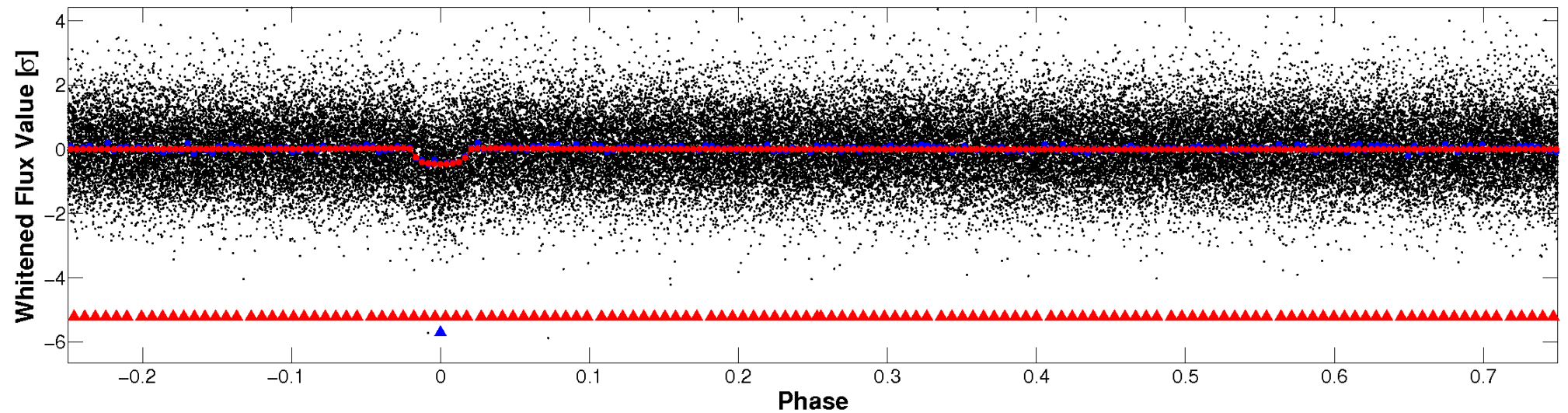


Non-Whitened Vs. Whitened Light Curve

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

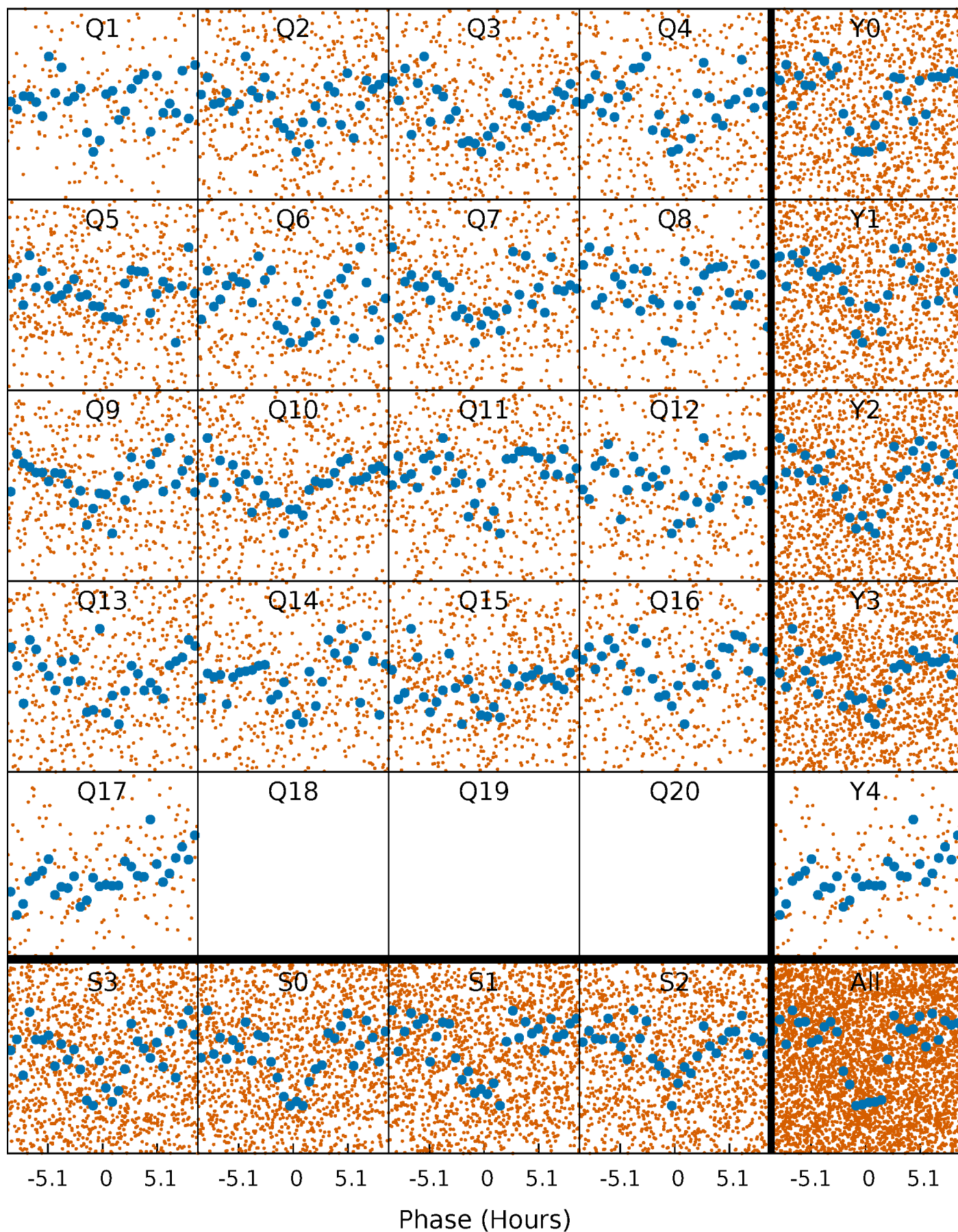


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



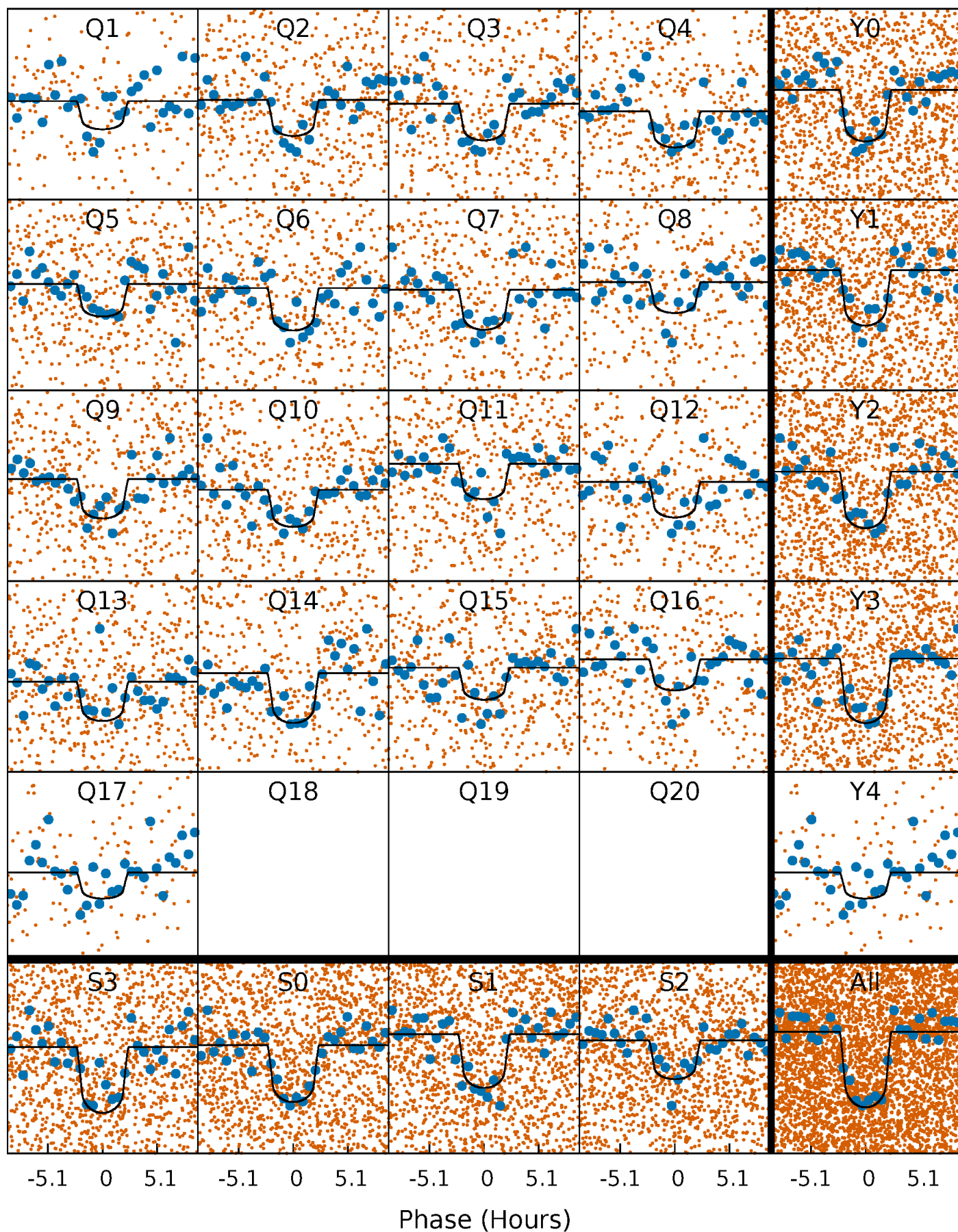
PDC Quarter-Phased Transit Curves

TCE 008193178-02 P= 4.938867 Days $T_0=135.952682$ (BKJD)



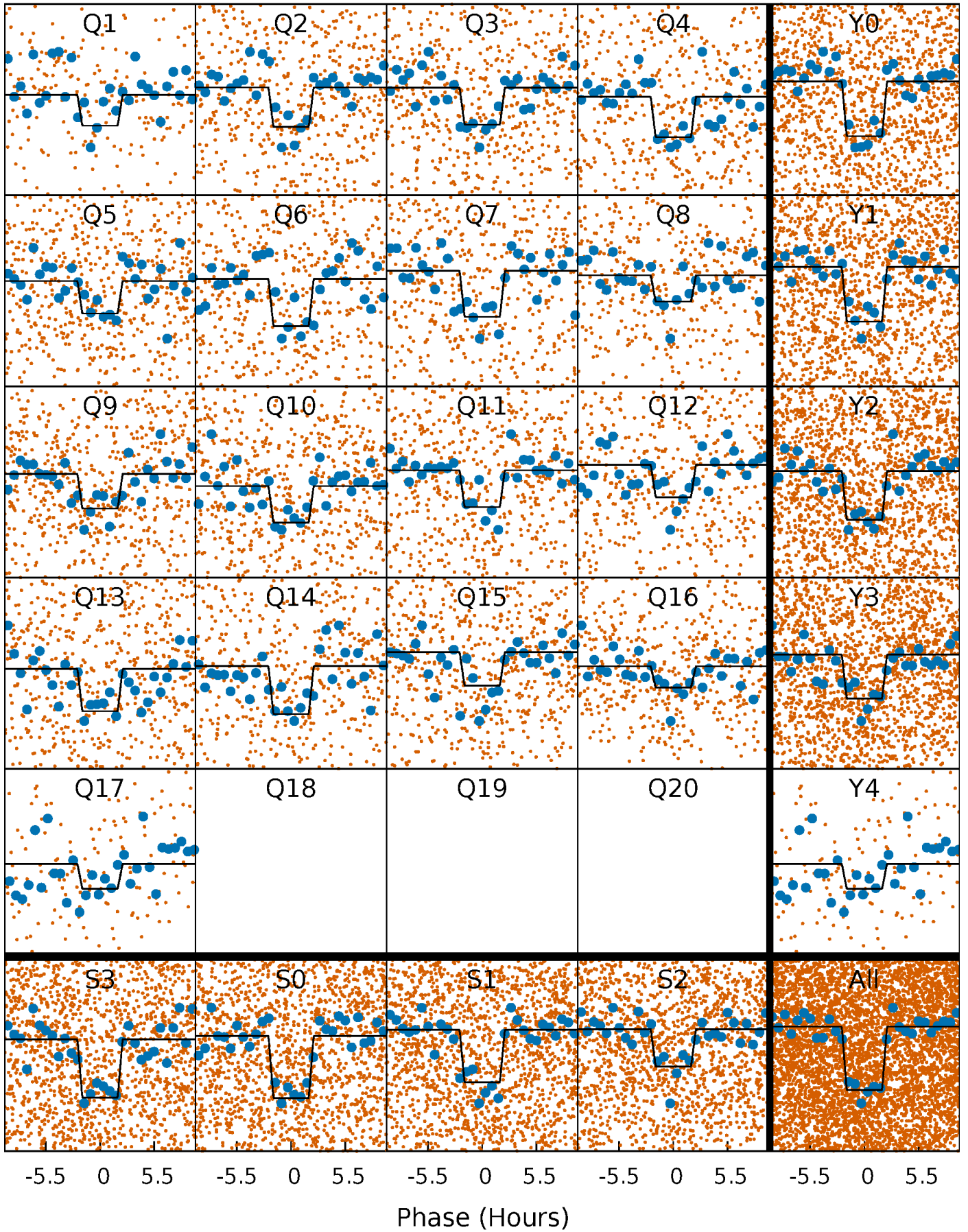
DV Quarter-Phased Transit Curves

TCE 008193178-02 P= 4.938867 Days $T_0=135.952682$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

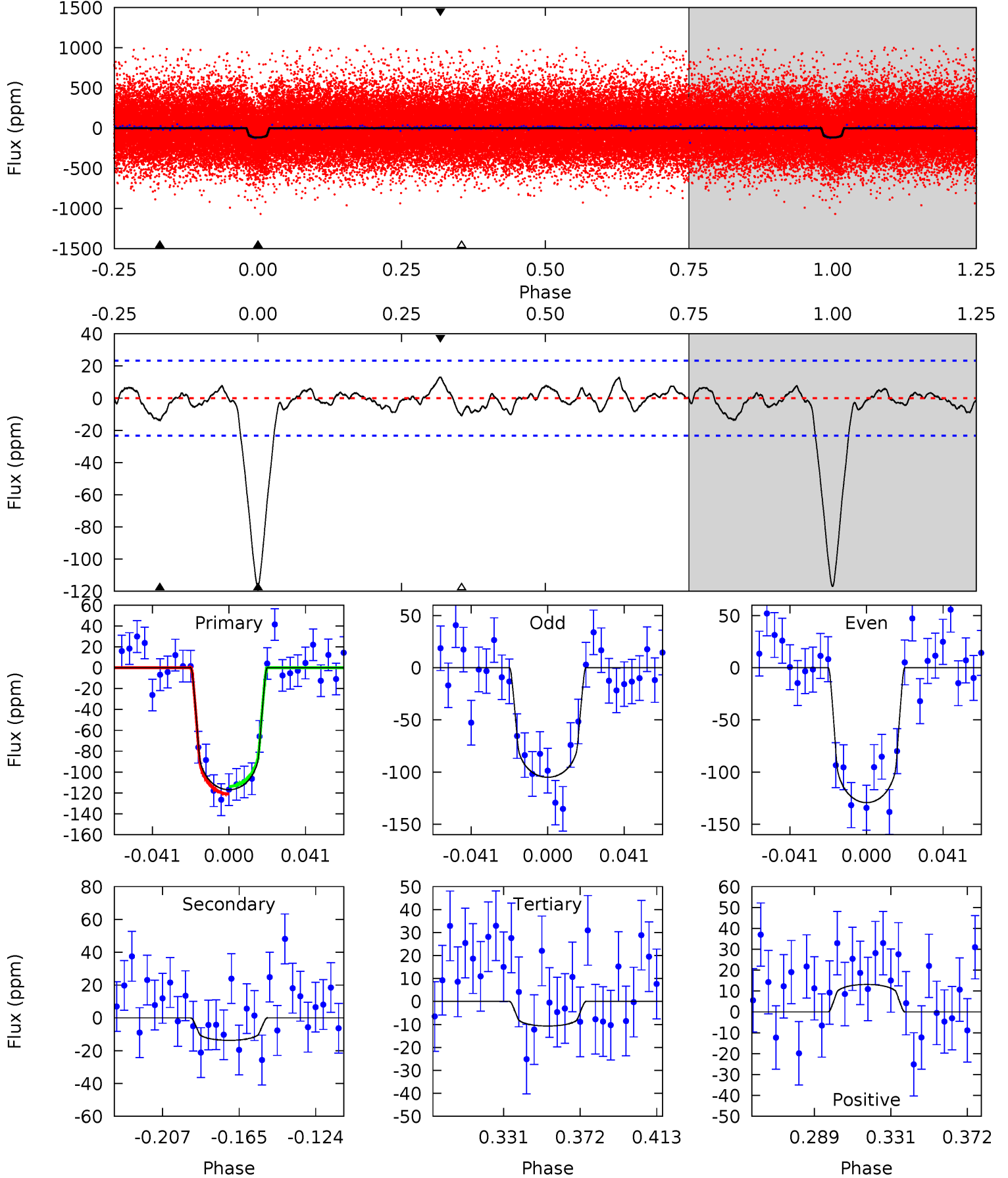
TCE 008193178-02 P= 4.938888 Days $T_0=135.946970$ (BKJD)



DV Model-Shift Uniqueness Test

008193178-02, P = 4.938867 Days, E = 131.013815 Days

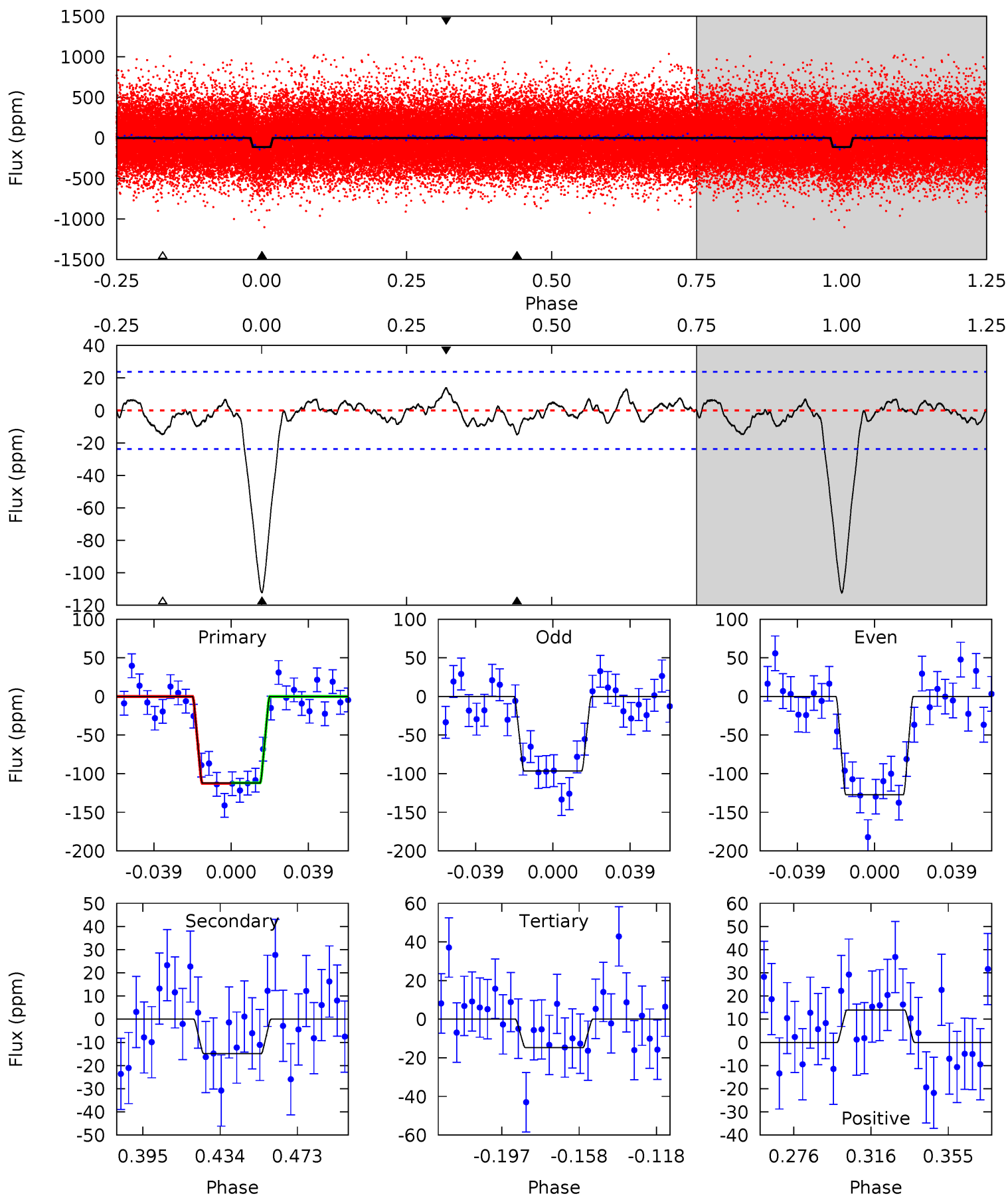
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.8	2.79	2.18	2.68	4.75	2.04	0.97	21.6	21.1	0.61	0.11	2.48	0.93	0.10	0.74



Alt Model-Shift Uniqueness Test

008193178-02, P = 4.938888 Days, E = 131.008082 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.5	2.97	2.94	2.80	4.76	2.06	1.06	19.5	19.7	0.03	0.18	3.08	0.92	0.11	0.09



Stellar Parameters For KIC 008193178

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6112^{+122}_{-134}	$4.281^{+0.125}_{-0.125}$	$-0.060^{+0.150}_{-0.150}$	$1.233^{+0.220}_{-0.180}$	$1.057^{+0.096}_{-0.072}$	$0.794^{+0.442}_{-0.259}$
	+2%/-2%	+3%/-3%	+250%/-250%	+18%/-15%	+9%/-7%	+56%/-33%
Source	SPE58	SPE58	SPE58	DSEP		

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

Secondary Eclipse Parameters for KIC 008193178-02 / KOI 0572.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-14 ± 5	$1.57^{+0.49}_{-0.51}$	1741^{+91}_{-76}	3828^{+595}_{-451}	10^{+13}_{-5}
Alt.	-15 ± 5	$1.45^{+0.48}_{-0.53}$	1732^{+96}_{-80}	3958^{+799}_{-449}	13^{+21}_{-7}

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 $A_{obs} \gg 1.0$

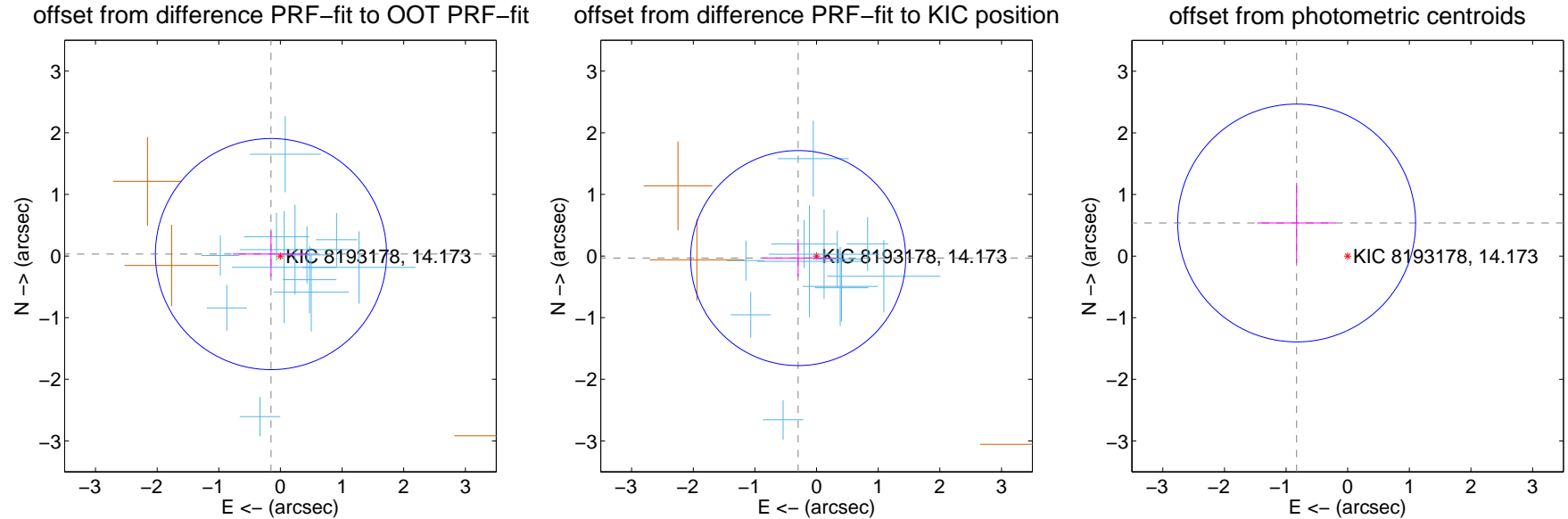
DV Centroid Data

Supplemental centroid analysis for 008193178-02. Kepler magnitude: 14.17. Transit SNR 18.82

There are 12 quarters with good PRF difference image offsets

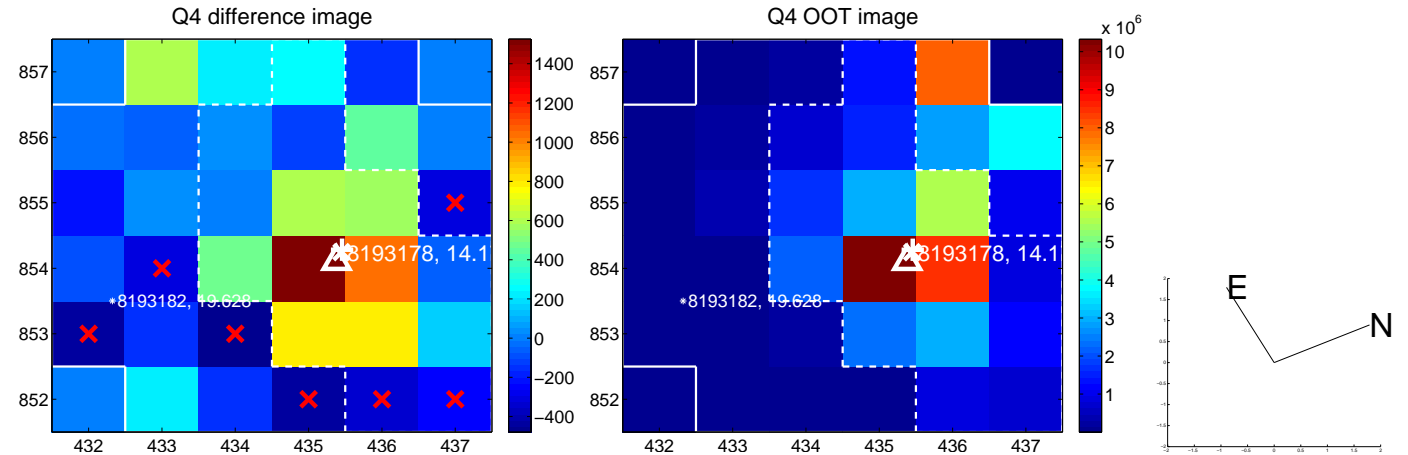
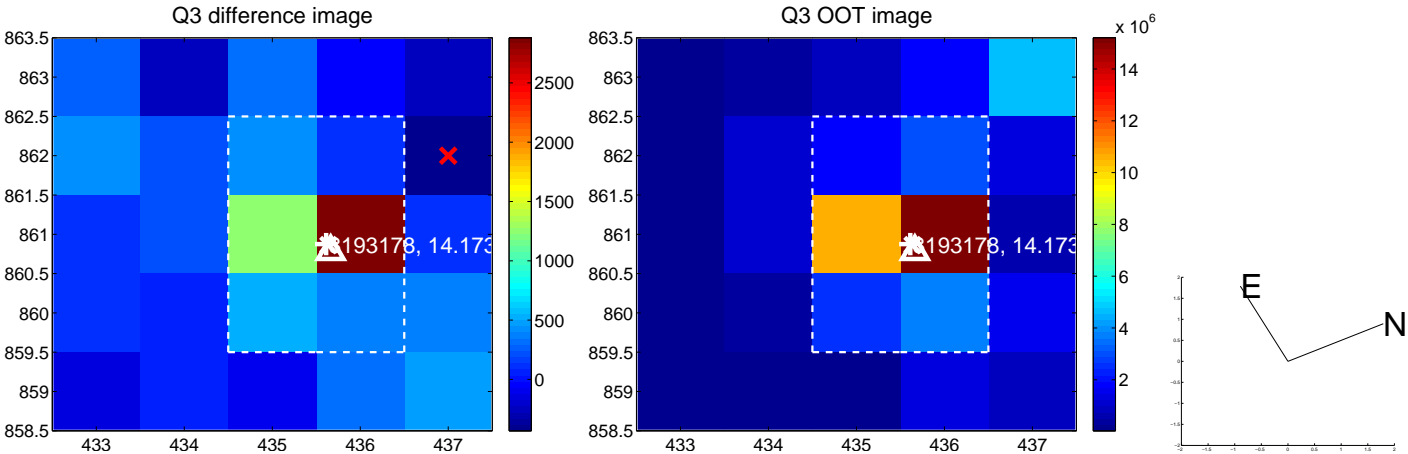
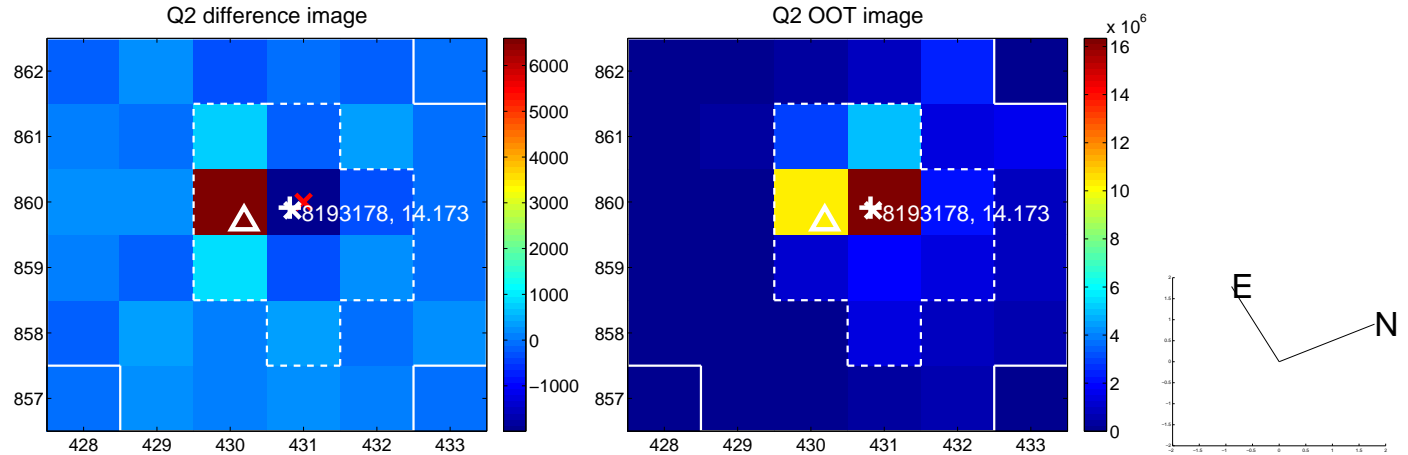
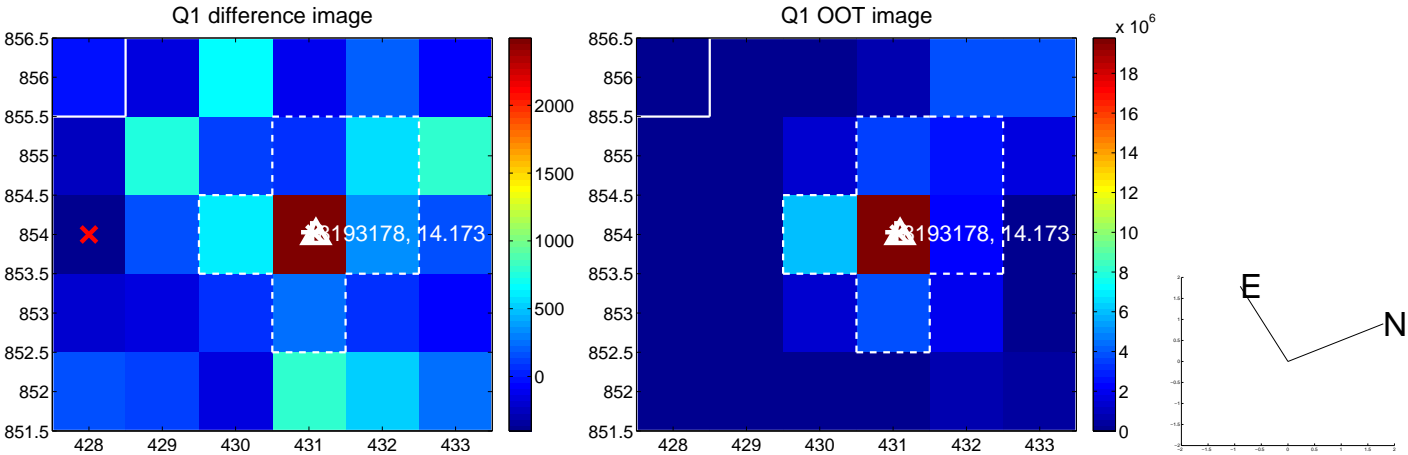
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.157 ± 0.625	0.25	0.153 ± 0.621	0.032 ± 0.371
PRF-fit source offset from KIC position	0.301 ± 0.582	0.52	0.299 ± 0.591	-0.033 ± 0.307
photometric centroid source offset	0.99 ± 0.64	1.54	0.83 ± 0.64	0.54 ± 0.65

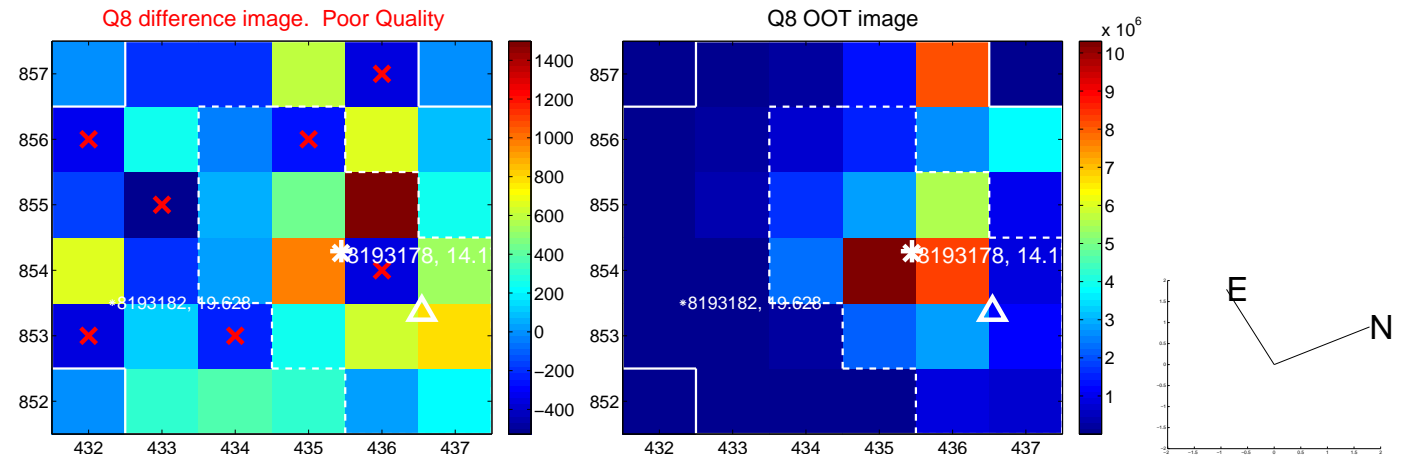
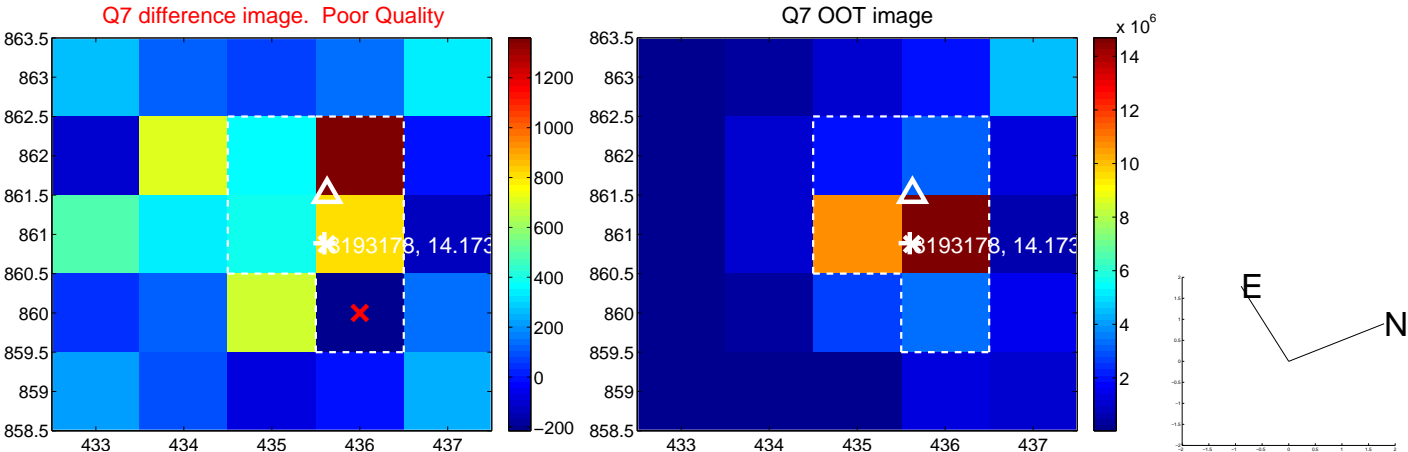
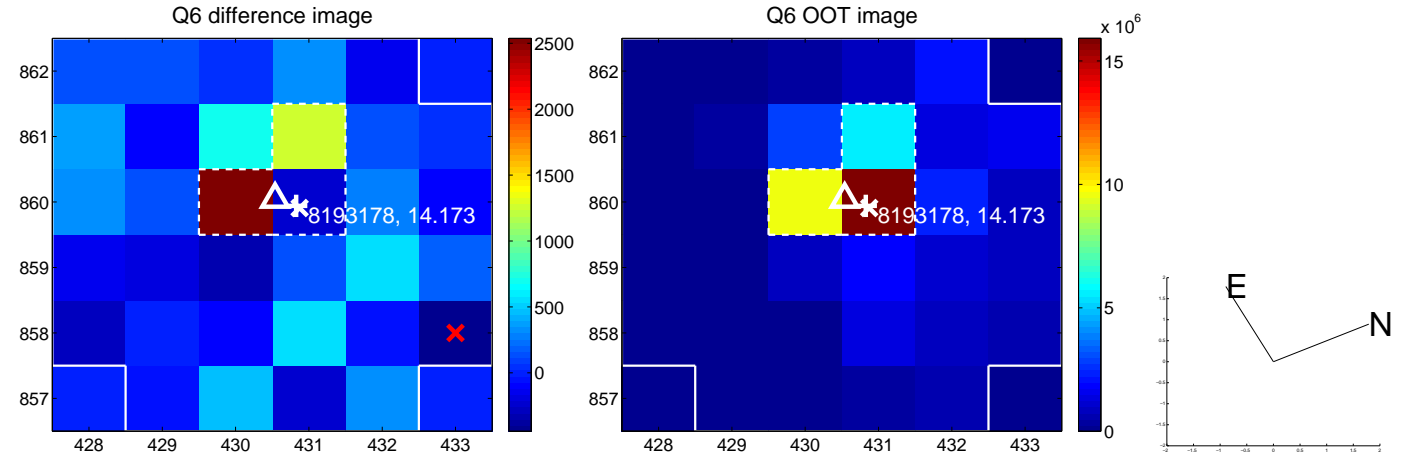
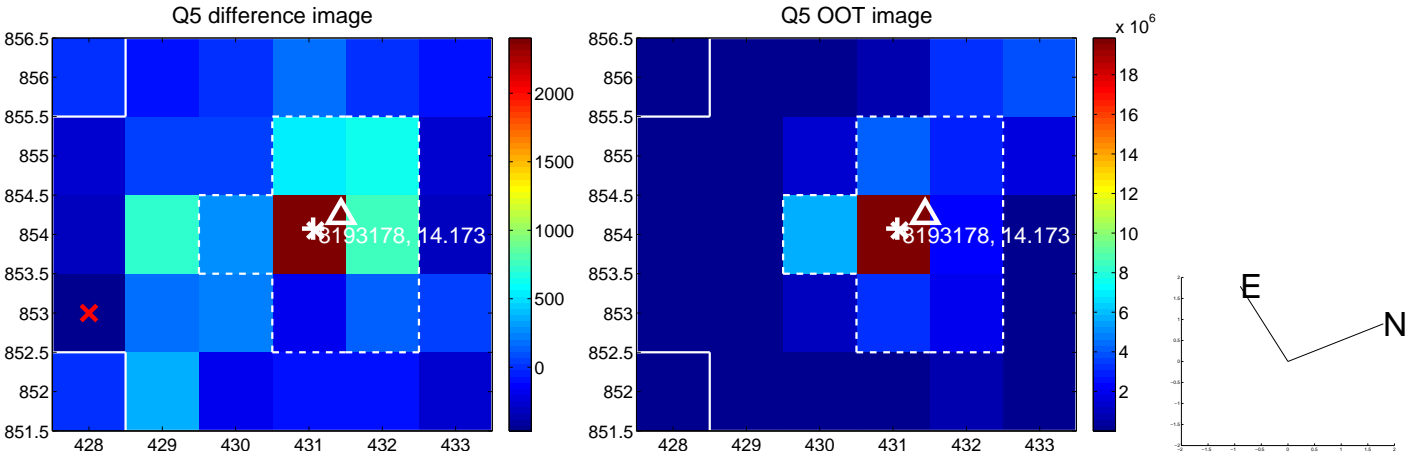


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

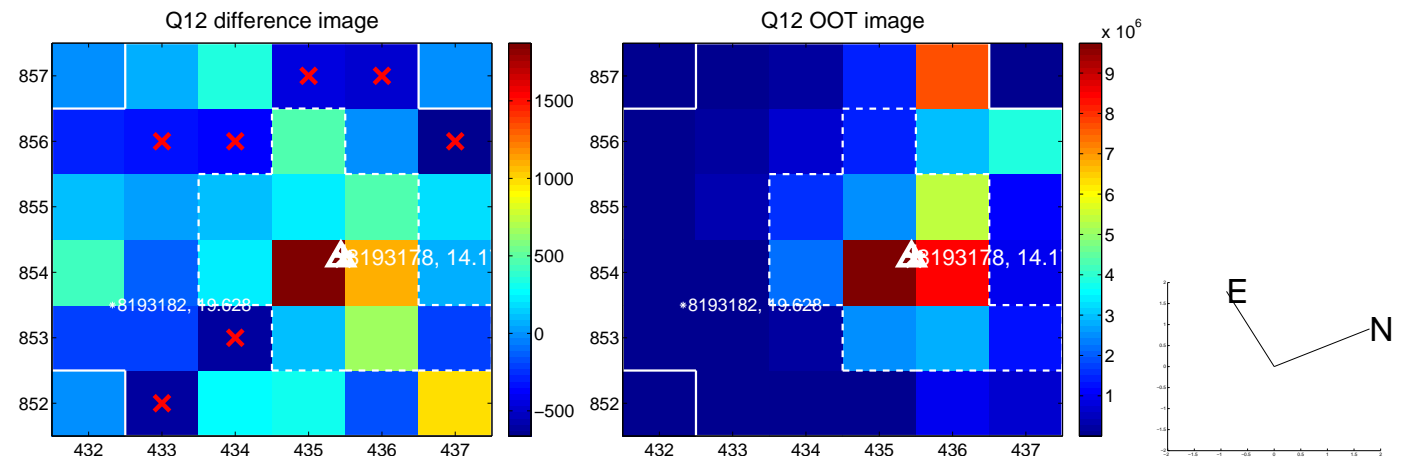
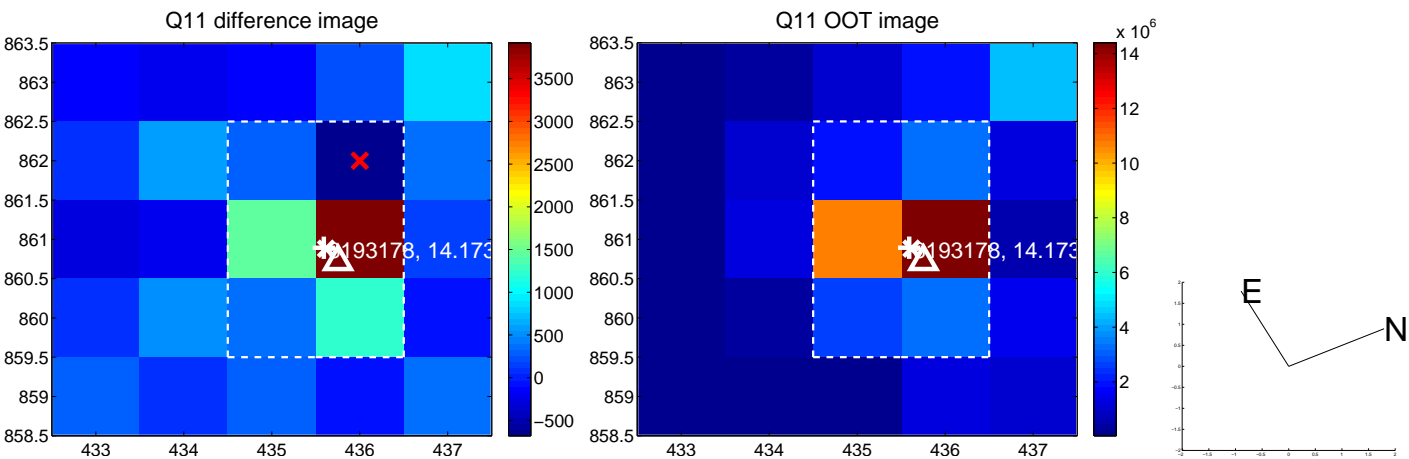
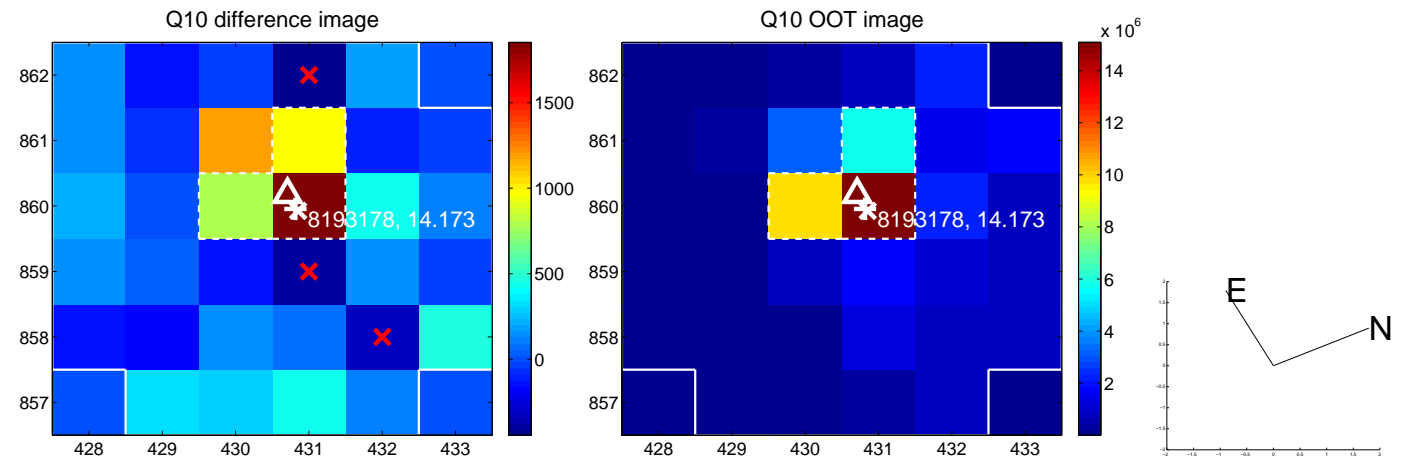
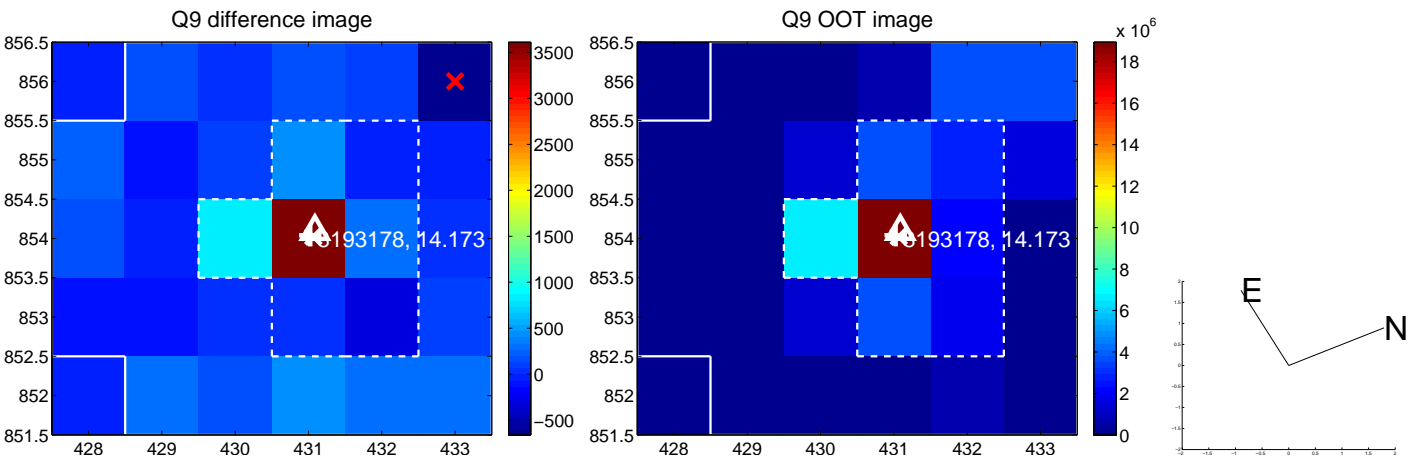
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



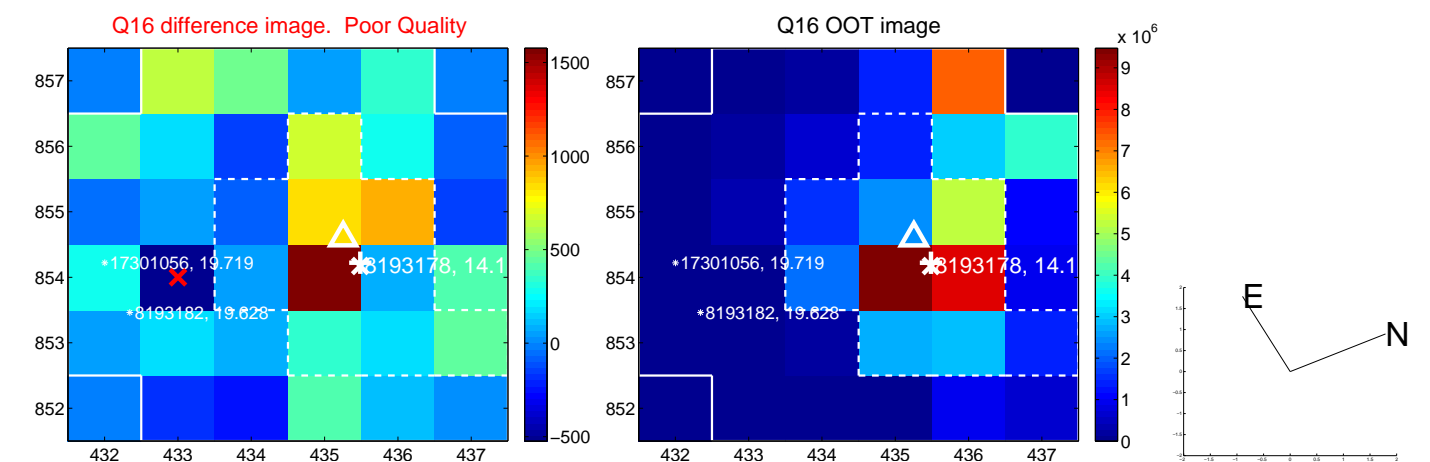
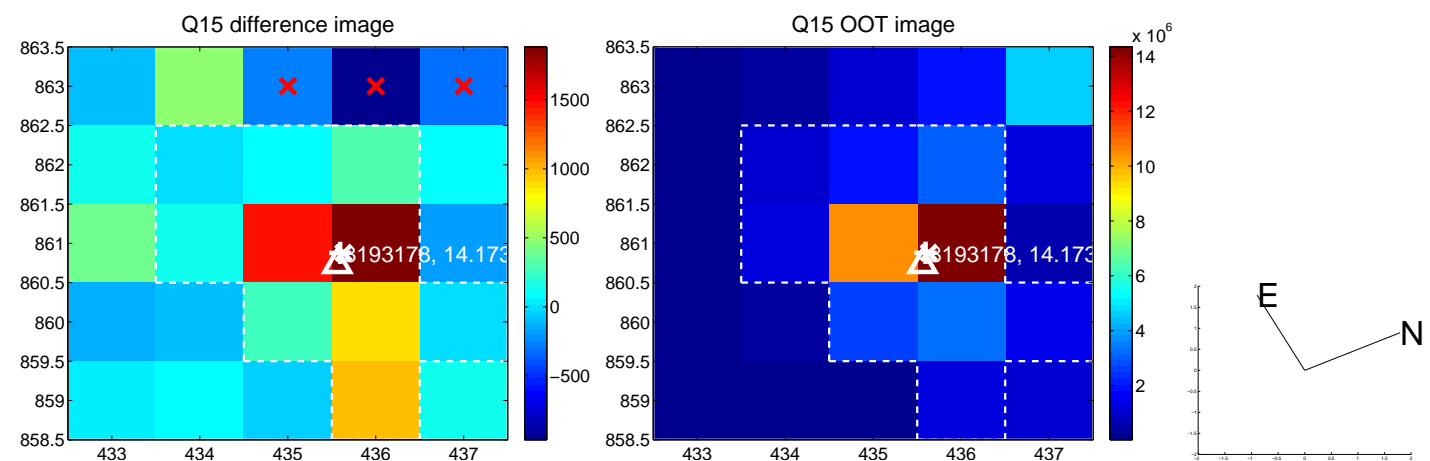
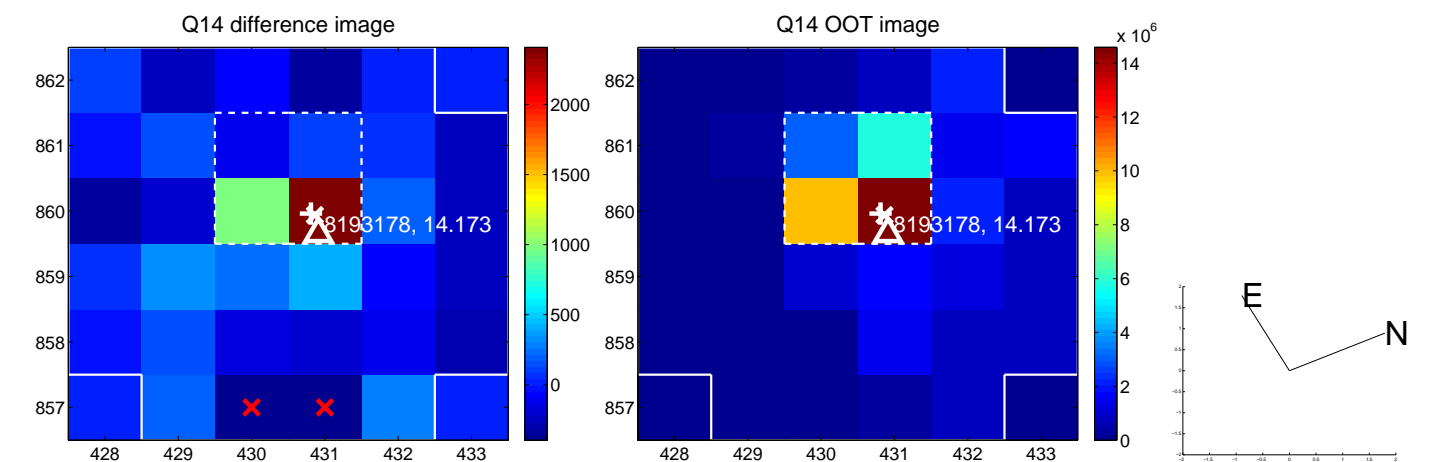
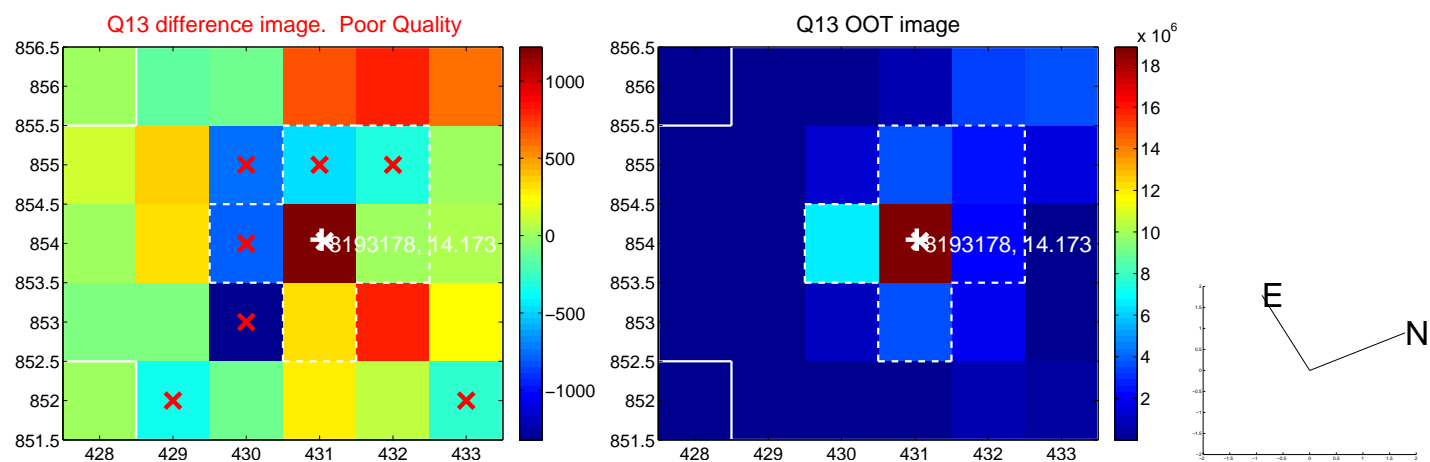
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



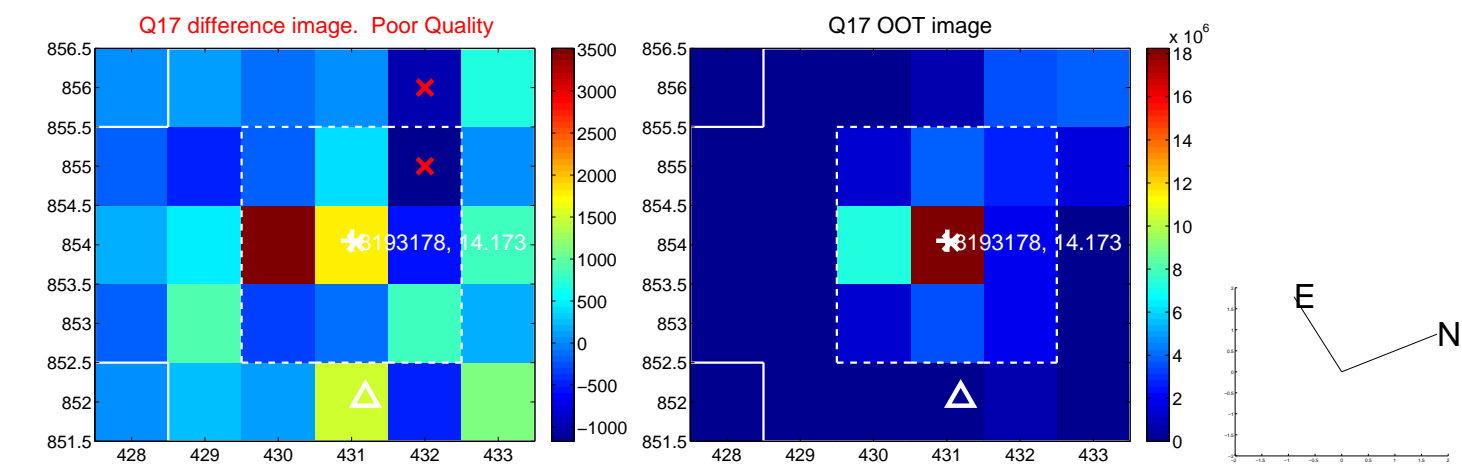
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



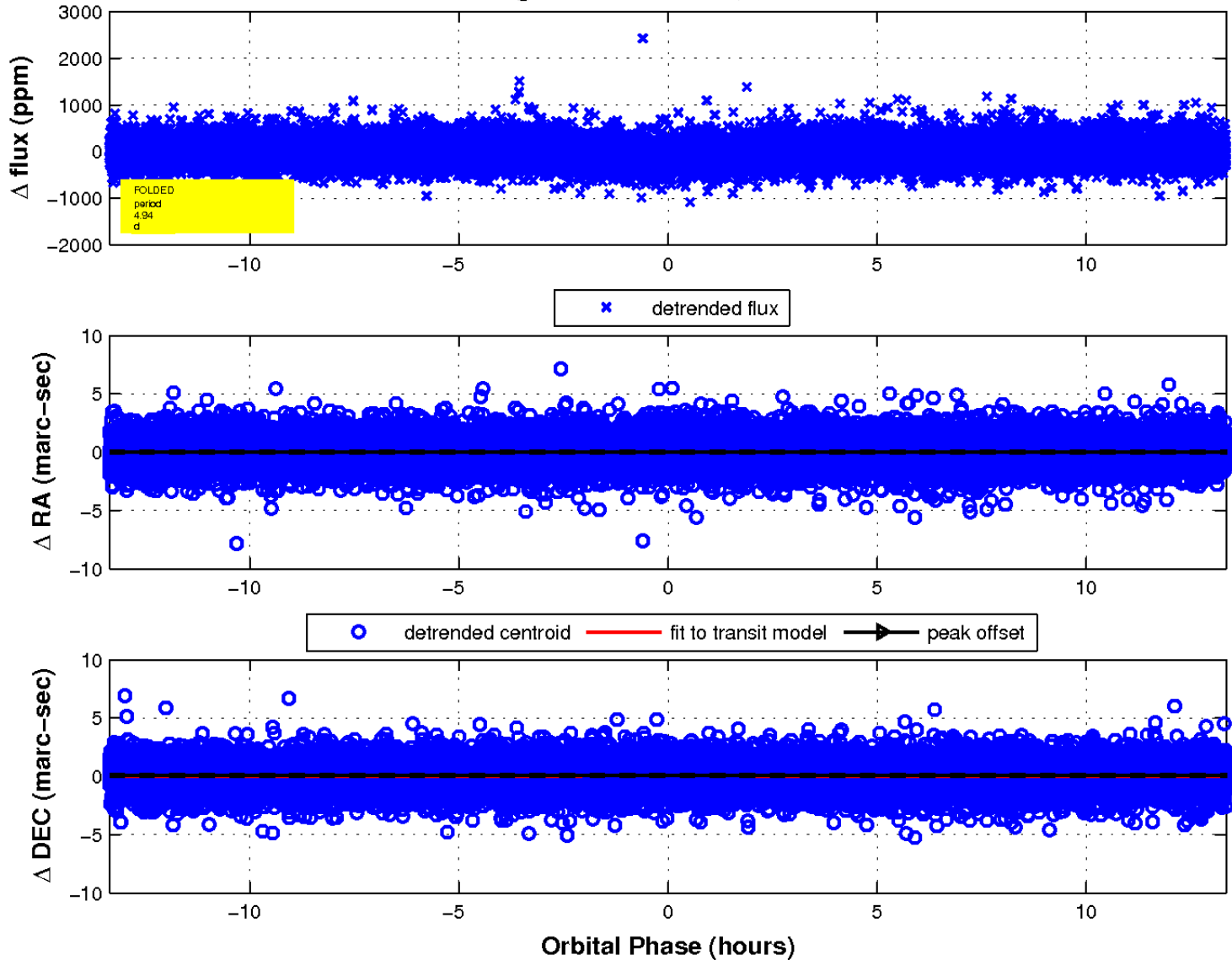
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

