

KIC 010964440

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})
010964440-01	OBS	1310.01	19.129423	139.436804	441.0	3.979	27.2	29.0	1.71	5372	4.29	105.48
010964440-02	OBS	1310.02	144.683905	256.346785	394.7	9.980	8.0	9.5	1.71	5372	4.30	7.11

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010964440-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010964440-02	OBS	PC	0.91	0	0	0	0	CENT_FEW_DIFFS

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

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

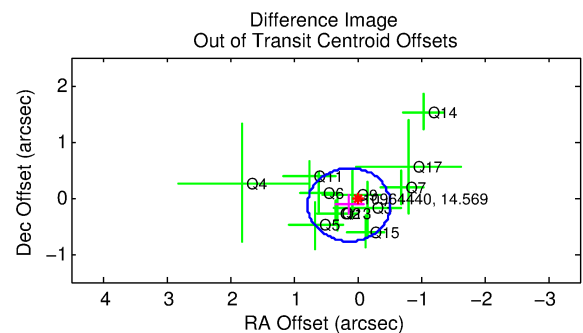
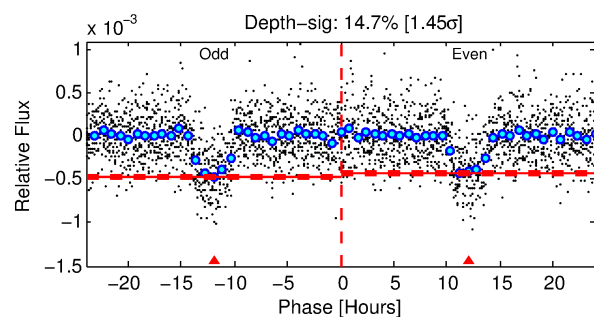
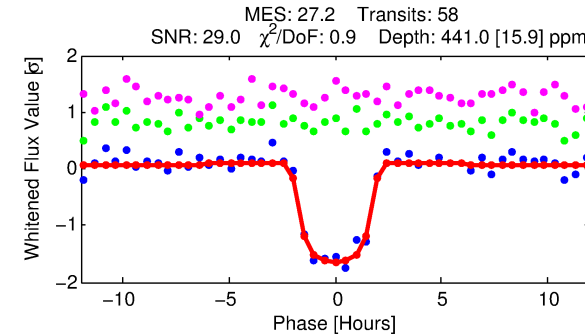
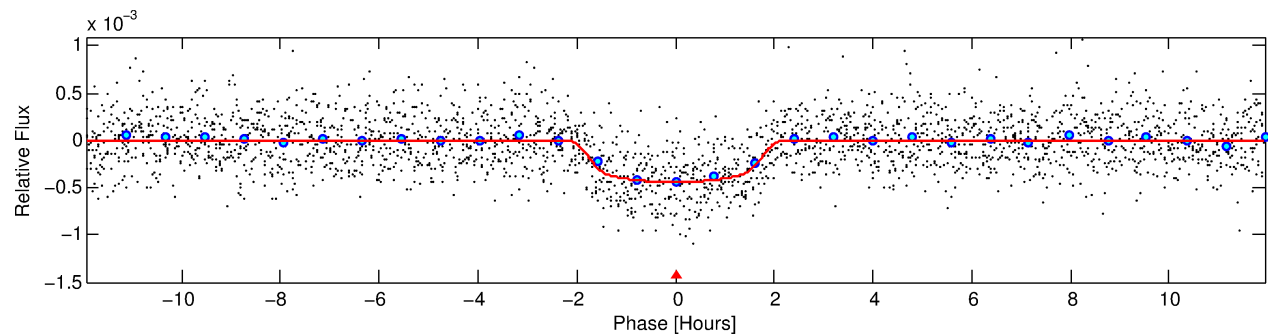
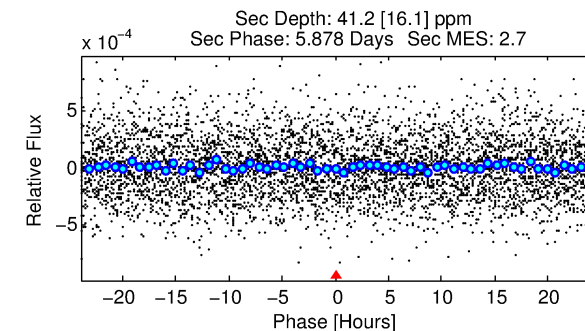
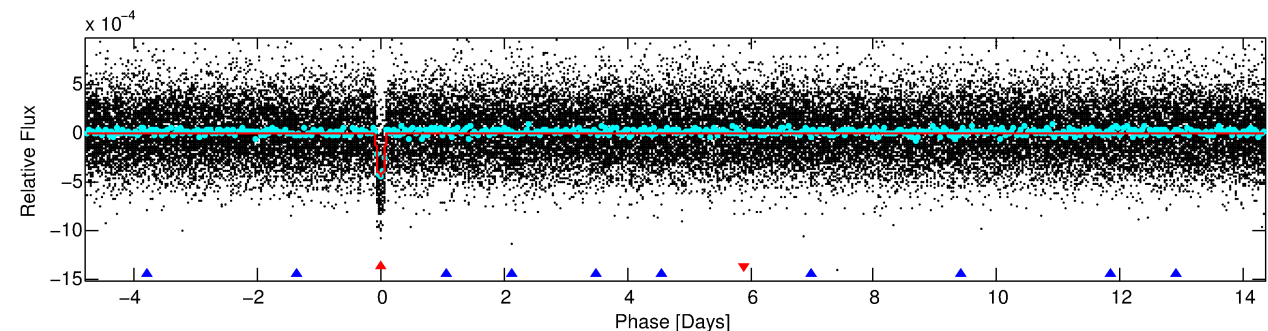
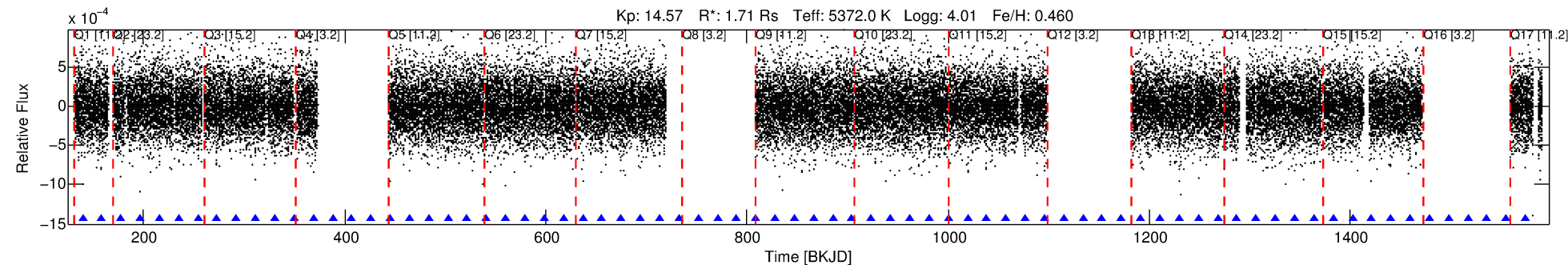
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010964440-01

No Significant Match Found

DV One-Page Summary

KIC: 10964440 Candidate: 1 of 2 Period: 19.129 d
KOI: K01310.01 Corr: 0.972



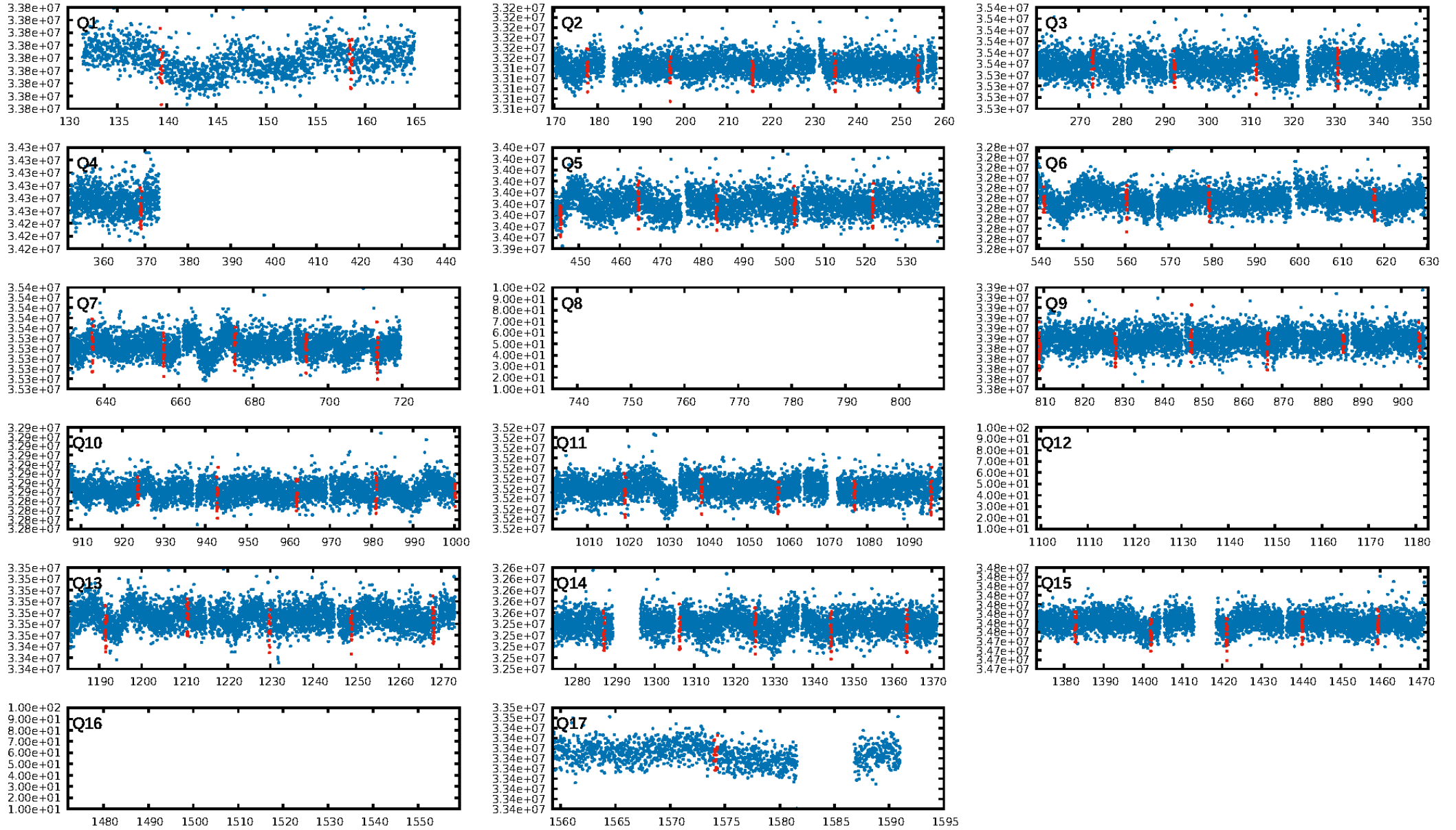
DV Fit Results:

Period = 19.12942 [0.00007] d
Epoch = 139.4368 [0.0031] BKJD
Rp/R* = 0.0230 [0.0032]
a/R* = 18.64 [10.18]
b = 0.89 [0.13]
Seff = 105.48 [40.03]
Teff = 817 [78] K
Rp = 4.29 [1.22] Re
a = 0.1438 [0.0339] AU
Ag = 25.41 [15.43] [1.58 σ]
Teffp = 2837 [343] K [5.75 σ]

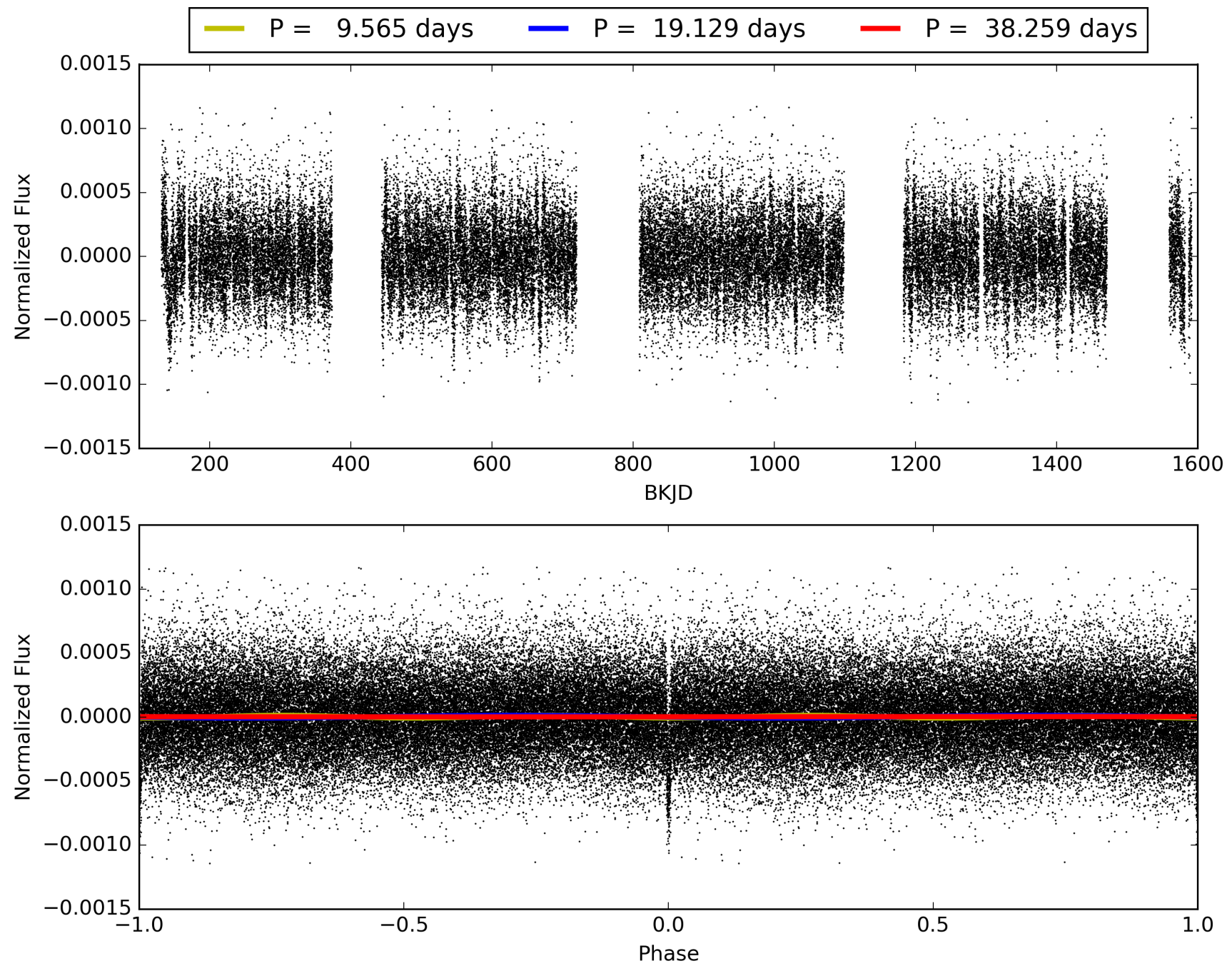
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [280.45 σ]
ModelChiSquare2-sig: 99.5%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.31e-159
RollingBand-fgt: 1.00 [54/54]
GhostDiagnostic-chr: 4.434
Centroid-sig: 74.1%
Centroid-so: 0.153 arcsec [0.33 σ]
OotOffset-rm: 0.180 arcsec [0.83 σ]
KicOffset-rm: 0.237 arcsec [1.12 σ]
OotOffset-st: 3/4/1/4 [12]
KicOffset-st: 3/4/1/4 [12]
DiffImageQuality-fgm: 1.00 [12/12]
DiffImageOverlap-fno: 1.00 [14/14]

TCE 010964440-01, PDC Light Curves

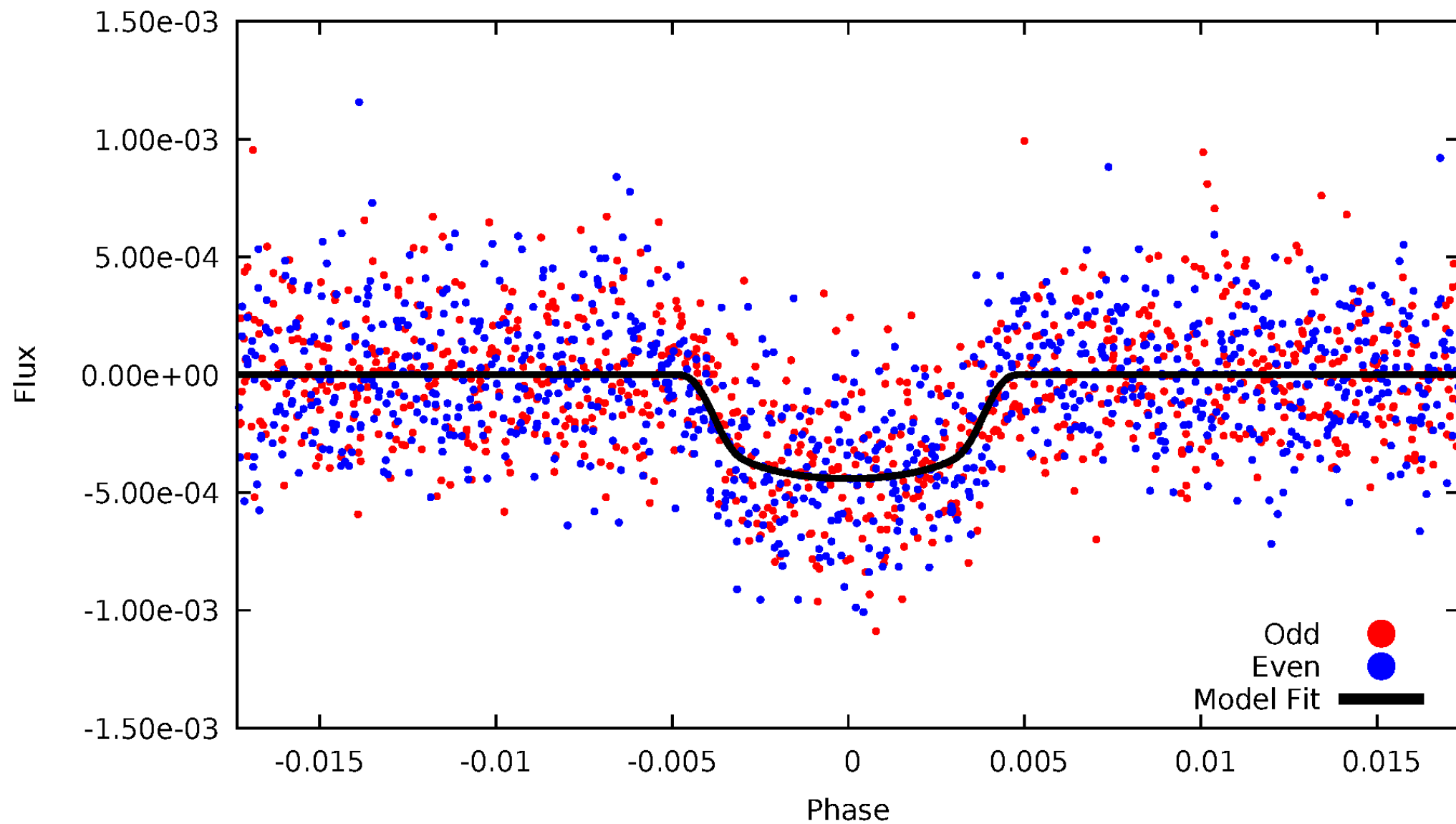


TCE 010964440-01



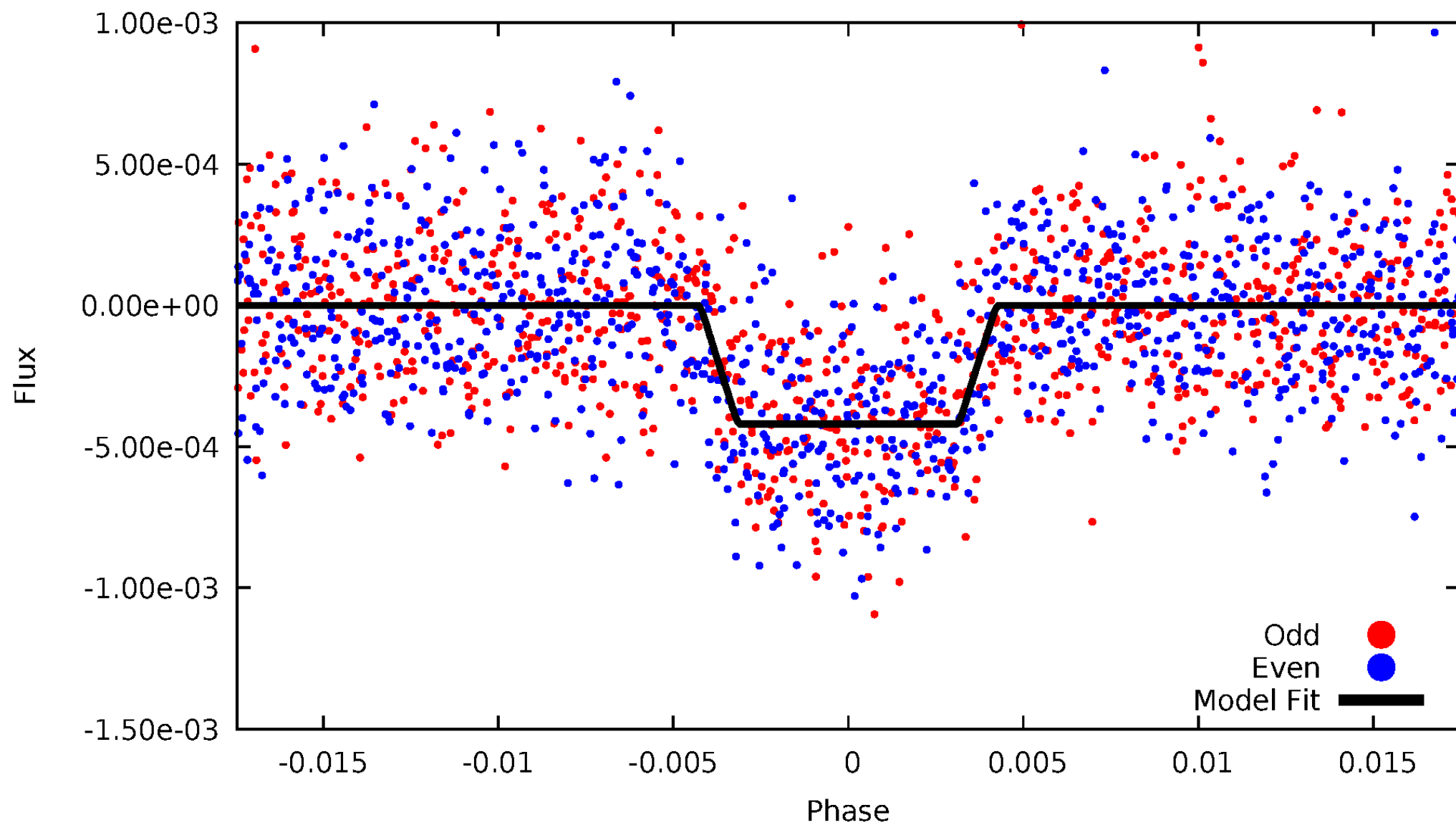
DV Odd/Even

TCE 010964440-01

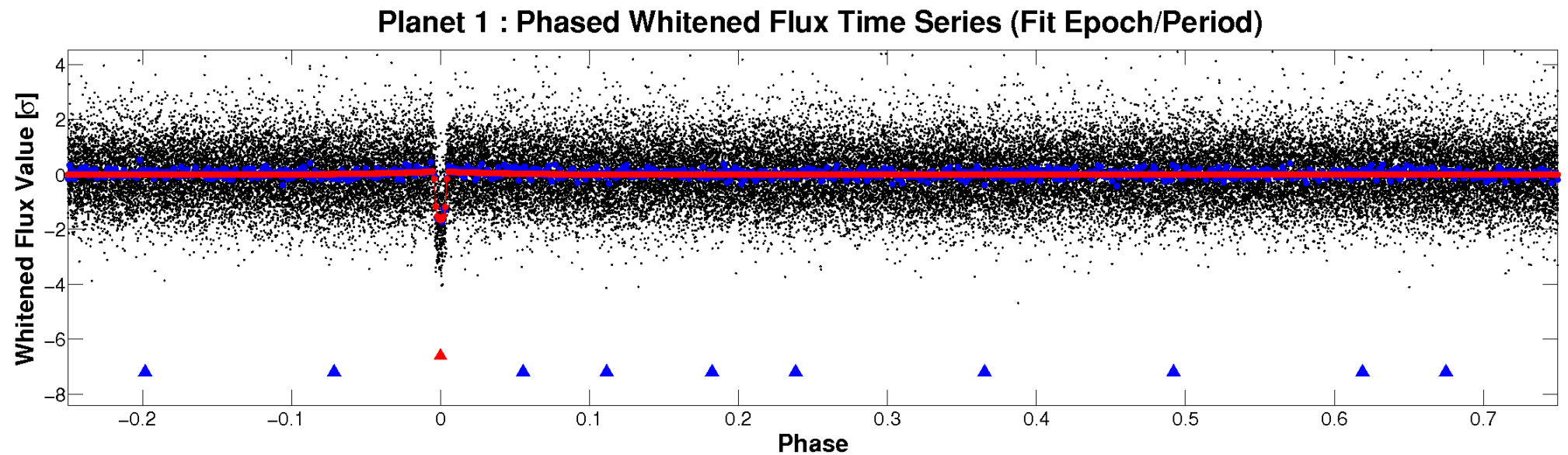
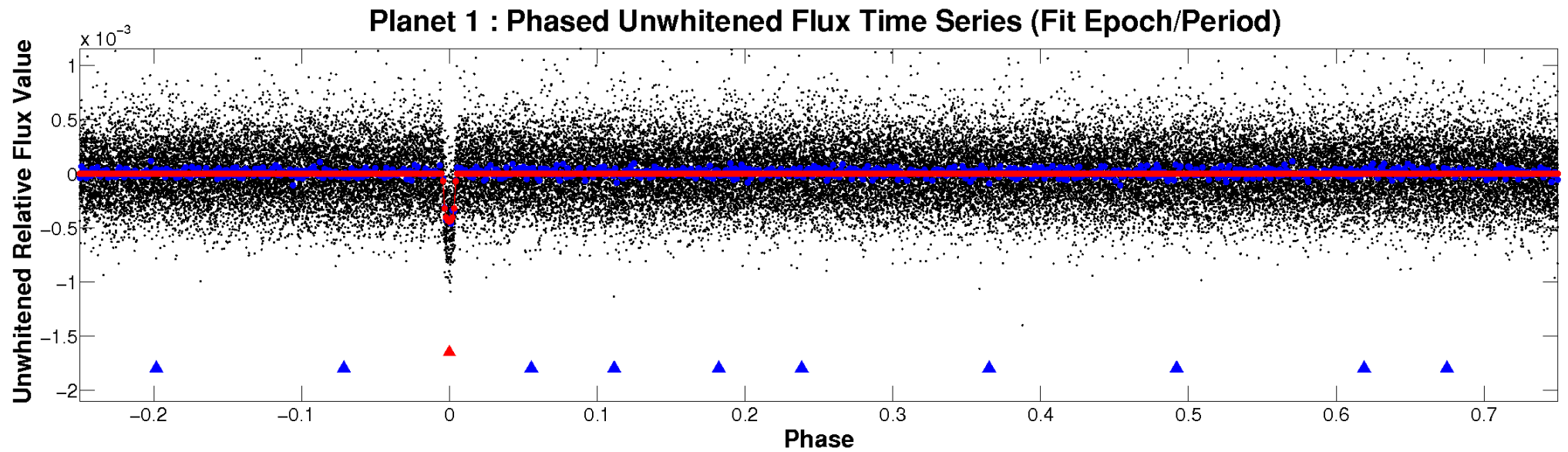


ALT Odd/Even

TCE 010964440-01

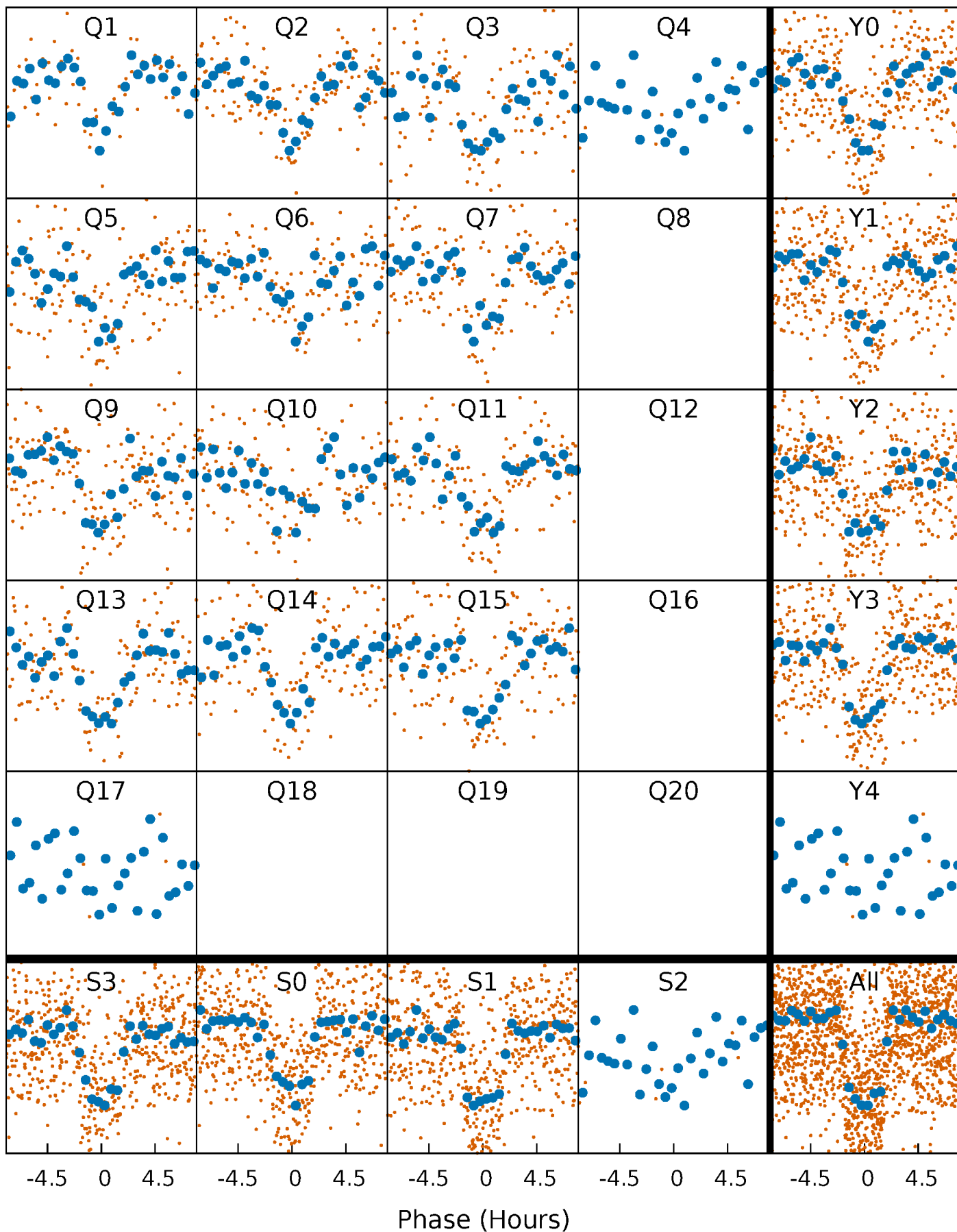


Non-Whitened Vs. Whitened Light Curve



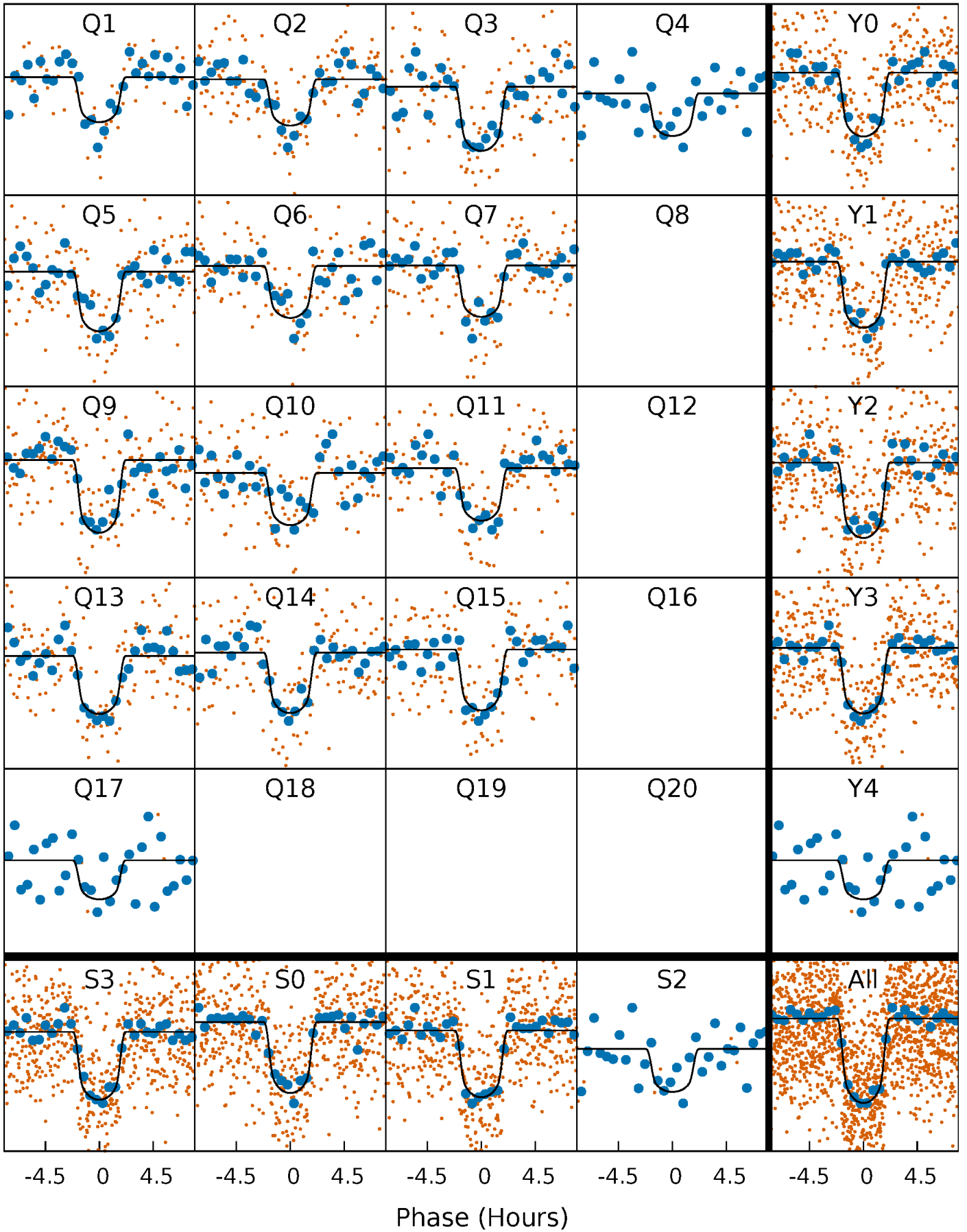
PDC Quarter-Phased Transit Curves

TCE 010964440-01 P= 19.129423 Days $T_0=139.436804$ (BKJD)



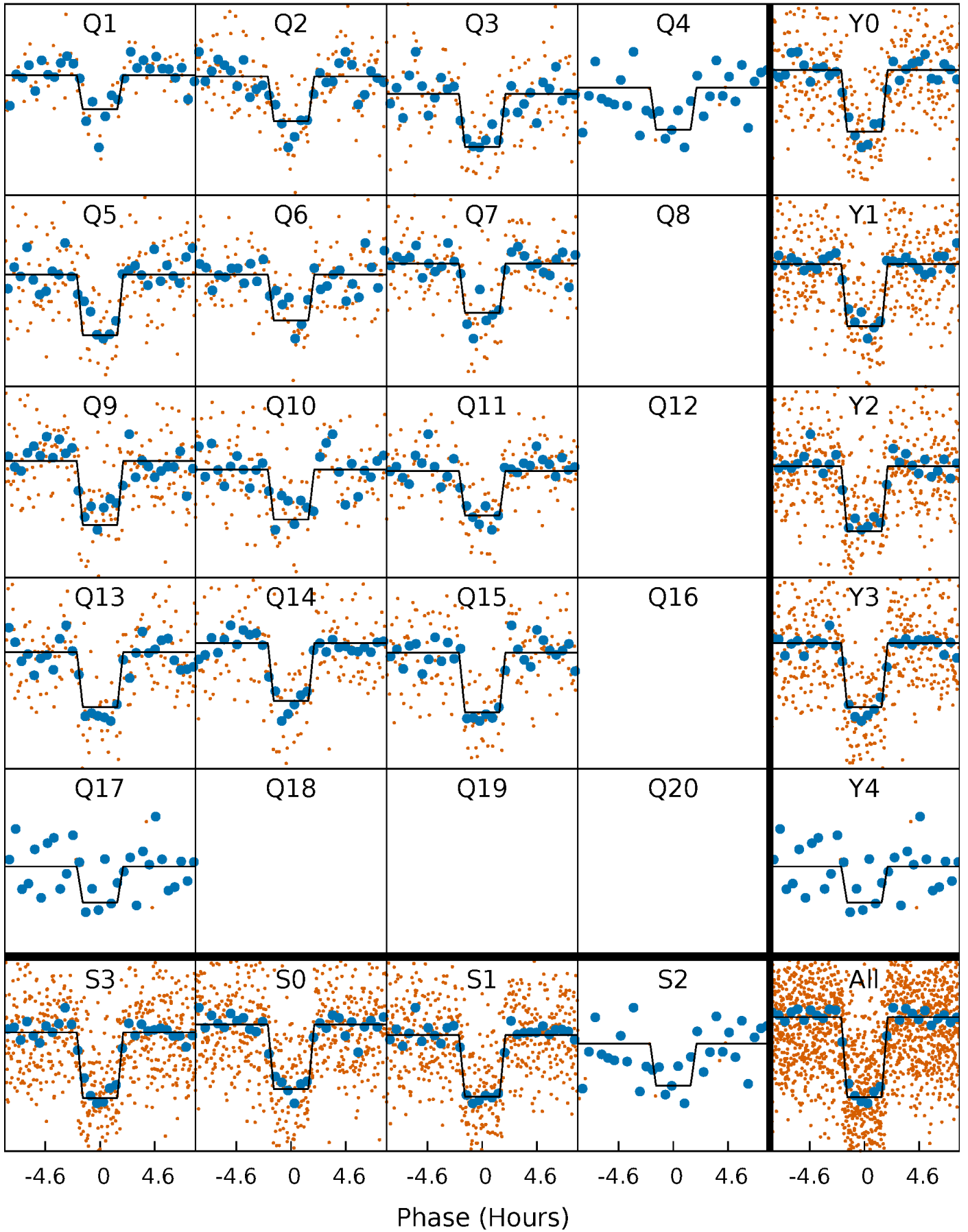
DV Quarter-Phased Transit Curves

TCE 010964440-01 P= 19.129423 Days $T_0=139.436804$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

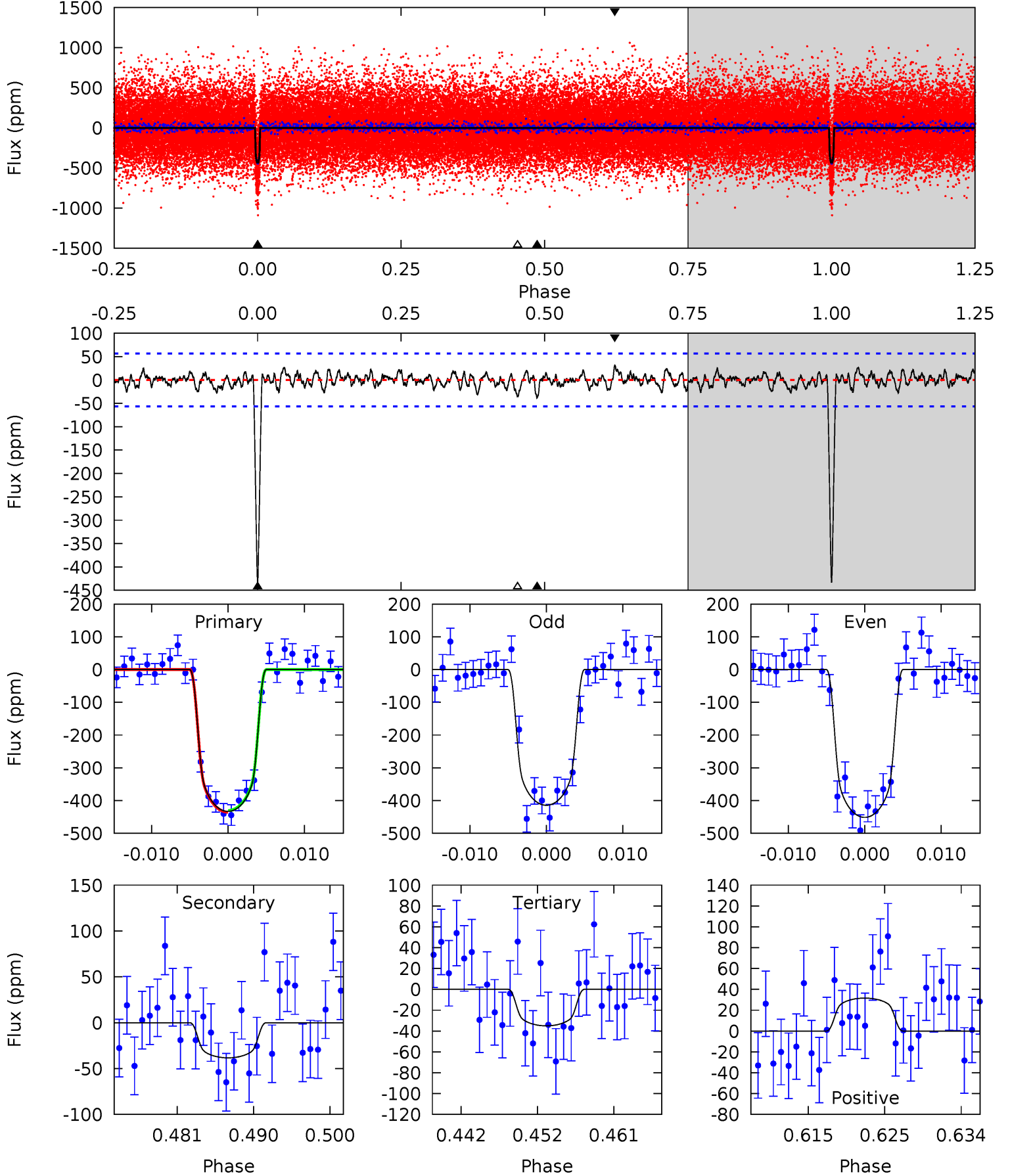
TCE 010964440-01 P= 19.129431 Days $T_0=139.437471$ (BKJD)



DV Model-Shift Uniqueness Test

010964440-01, $P = 19.129423$ Days, $E = 120.307381$ Days

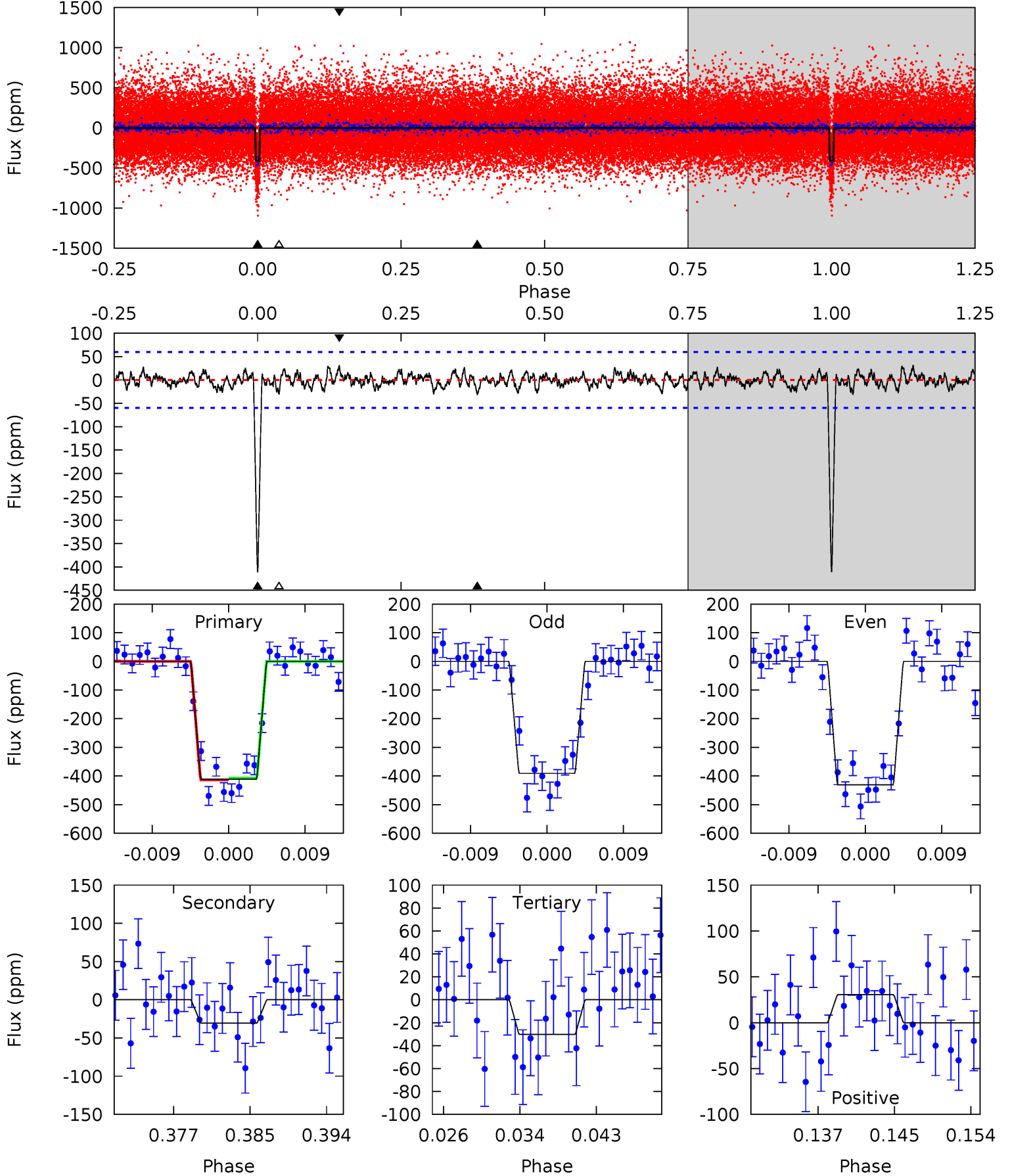
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
38.6	3.41	3.12	2.81	5.03	2.59	0.98	35.4	35.7	0.29	0.60	1.65	0.98	0.07	0.21



Alt Model-Shift Uniqueness Test

010964440-01, P = 19.129431 Days, E = 120.308040 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
34.7	2.59	2.56	2.59	5.06	2.63	0.92	32.1	32.1	0.03	0.00	1.69	0.98	0.07	0.26



Stellar Parameters For KIC 010964440

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5372^{+88}_{-64}	$4.007^{+0.218}_{-0.087}$	$0.460^{+0.050}_{-0.100}$	$1.710^{+0.249}_{-0.427}$	$1.084^{+0.095}_{-0.123}$	$0.305^{+0.357}_{-0.086}$
	+2%/-1%	+5%/-2%	+11%/-22%	+15%/-25%	+9%/-11%	+117%/-28%
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 010964440-01 / KOI 1310.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-38 ± 11	$4.14^{+0.75}_{-0.75}$	1132^{+49}_{-74}	3312^{+236}_{-210}	26^{+16}_{-10}
Alt.	-31 ± 12	$3.69^{+0.68}_{-0.72}$	1135^{+48}_{-72}	3315^{+241}_{-260}	24^{+18}_{-11}

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

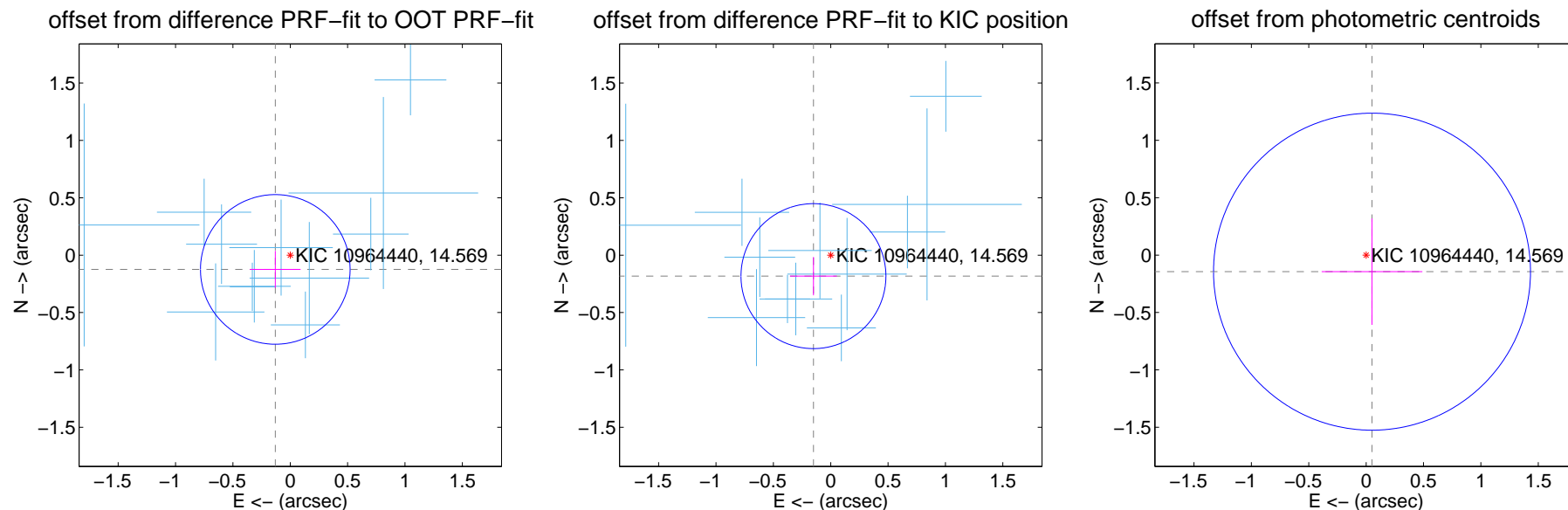
DV Centroid Data

Supplemental centroid analysis for 010964440-01. Kepler magnitude: 14.57. Transit SNR 29.04

There are 12 quarters with good PRF difference image offsets

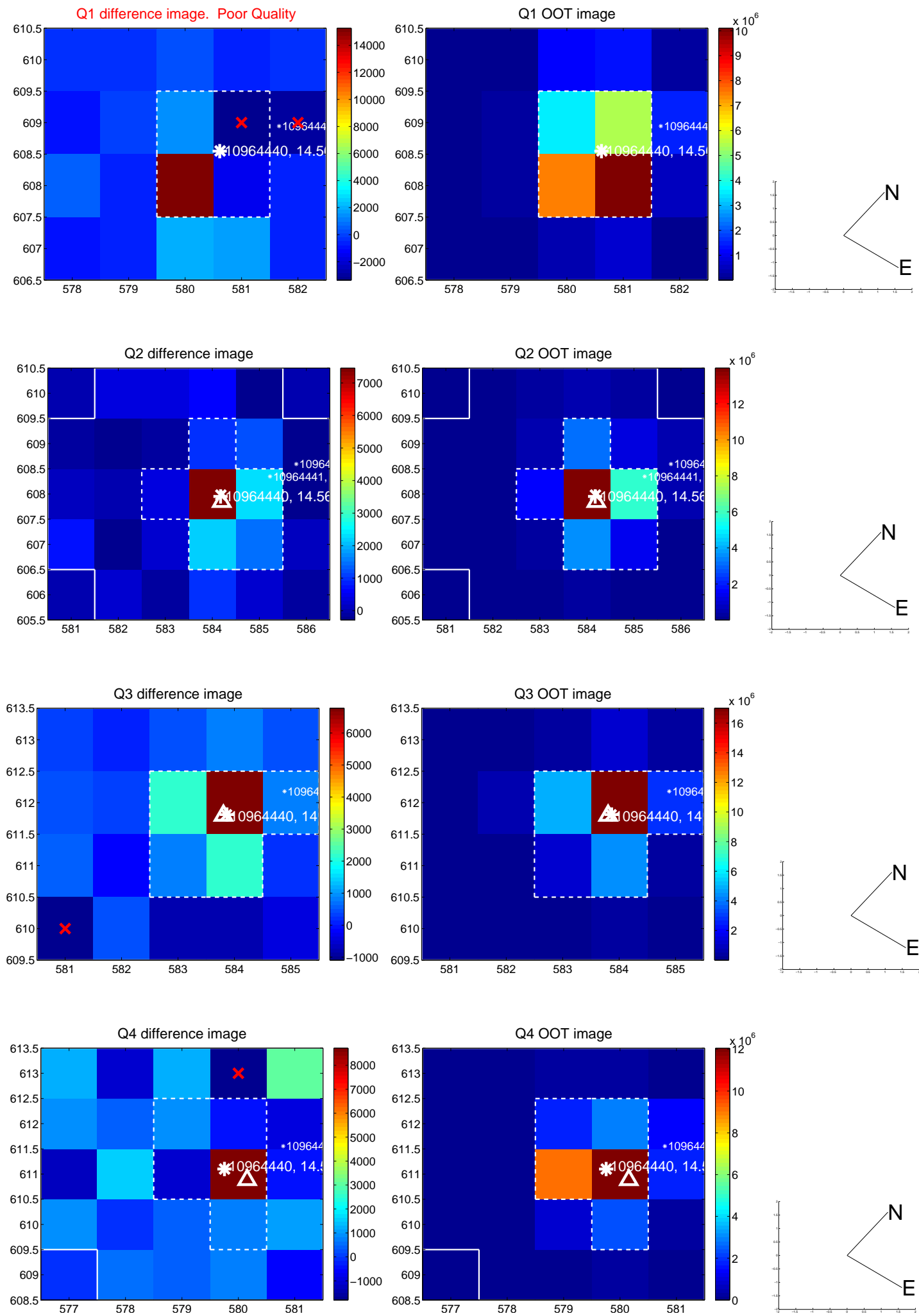
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.180 ± 0.217	0.83	0.131 ± 0.221	-0.124 ± 0.161
PRF-fit source offset from KIC position	0.237 ± 0.211	1.12	0.151 ± 0.205	-0.183 ± 0.167
photometric centroid source offset	0.15 ± 0.46	0.33	-0.05 ± 0.44	-0.14 ± 0.46

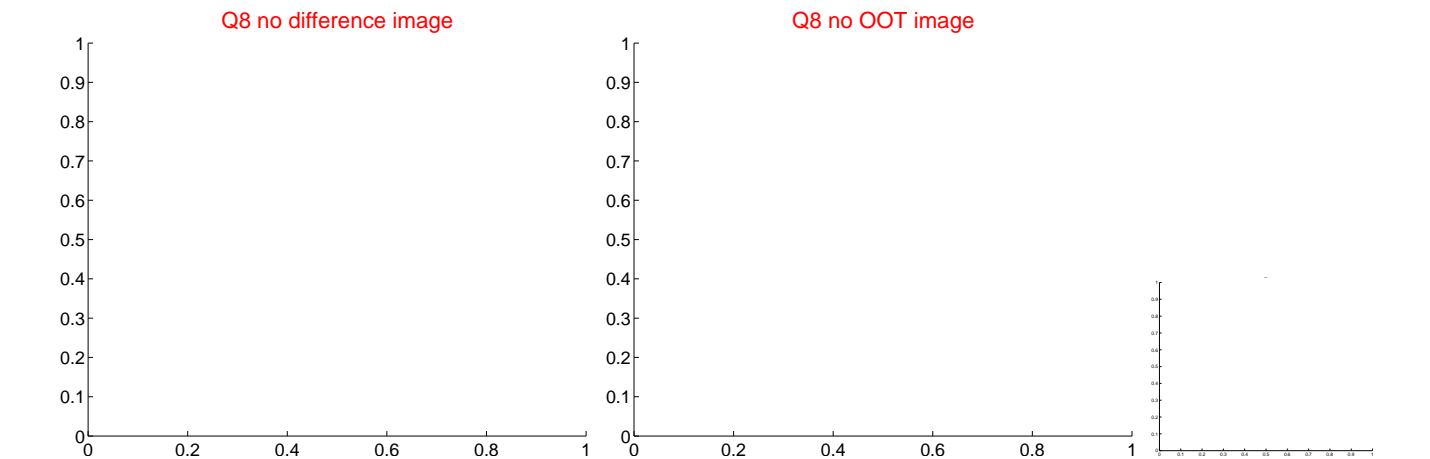
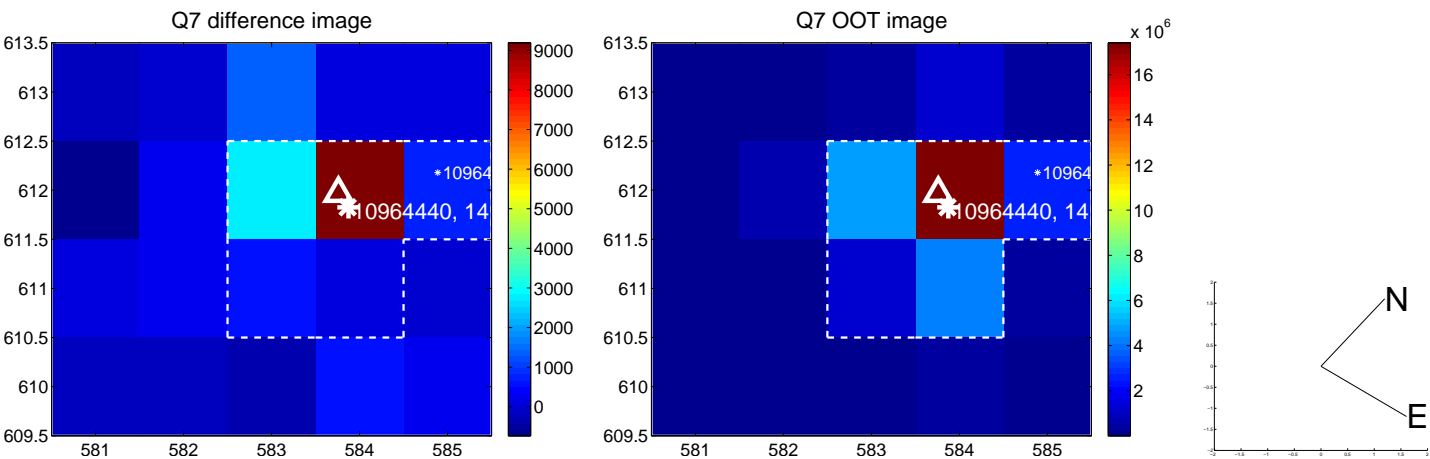
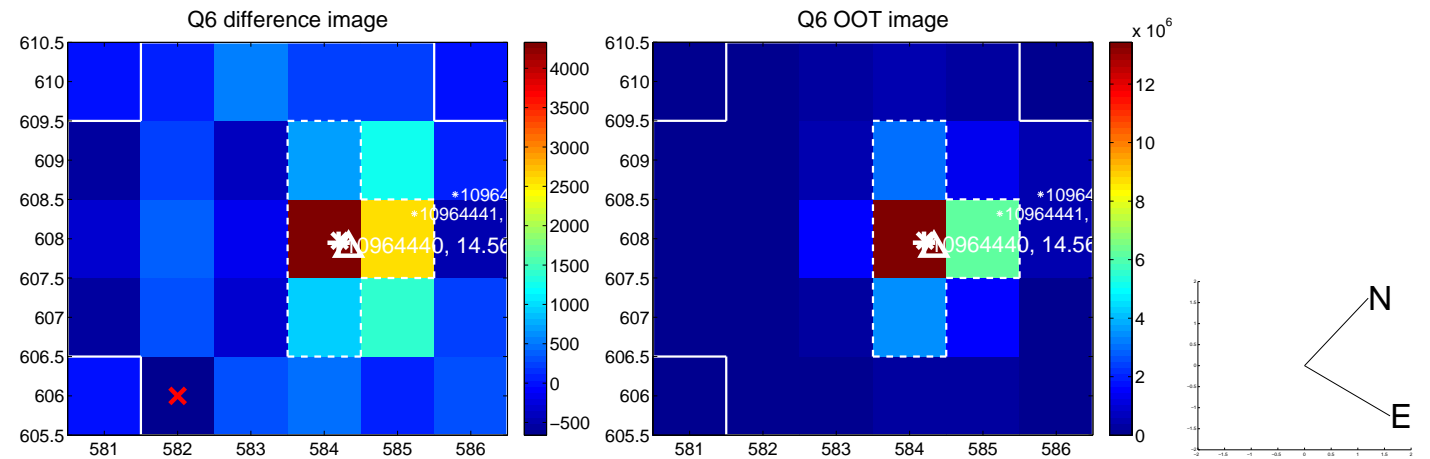
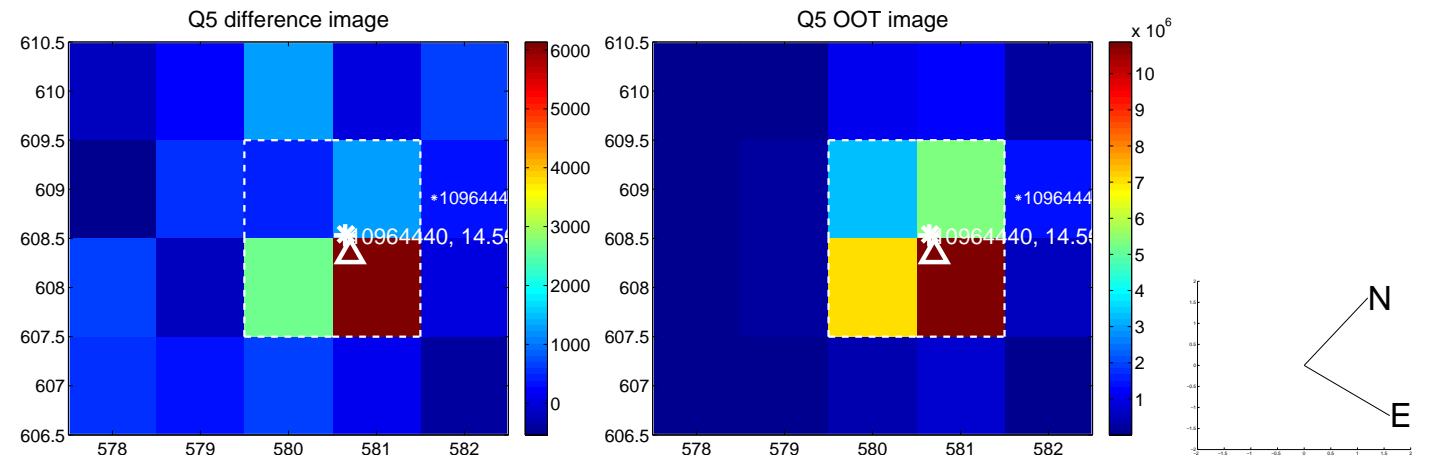


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

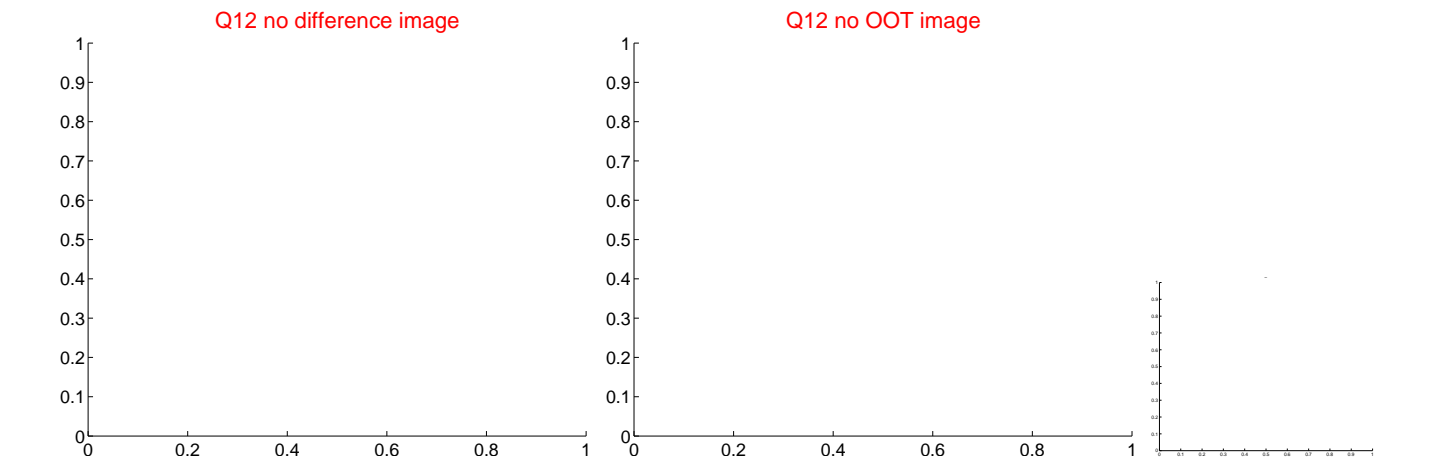
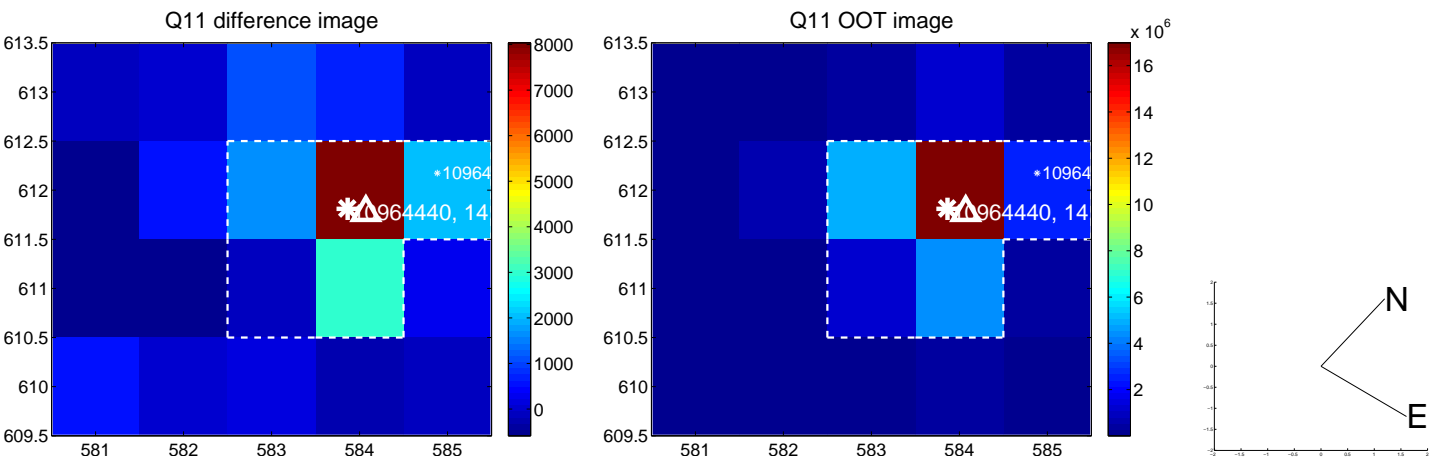
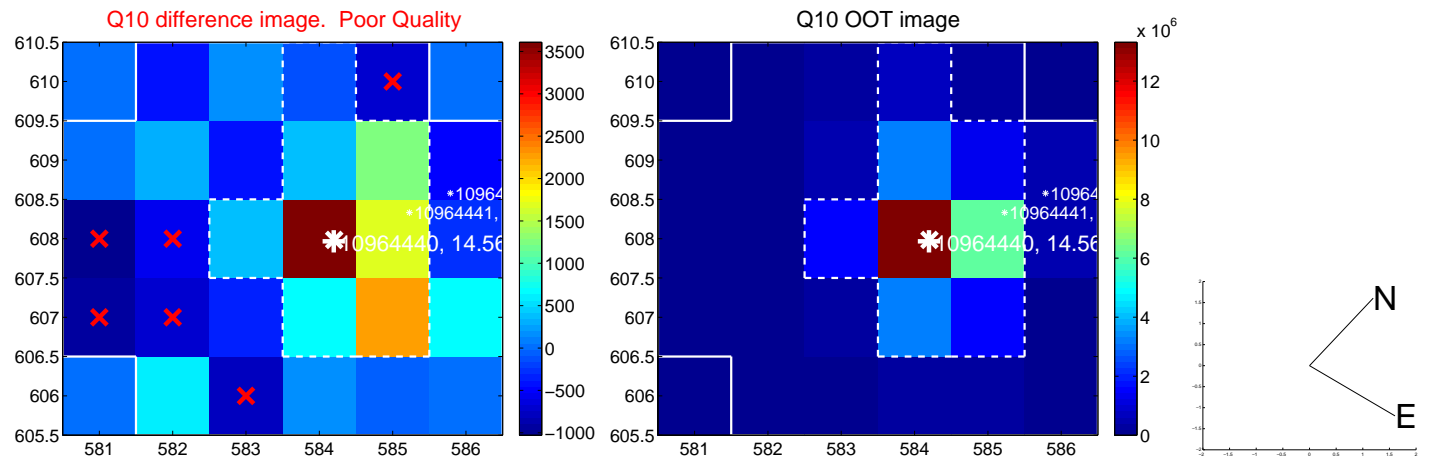
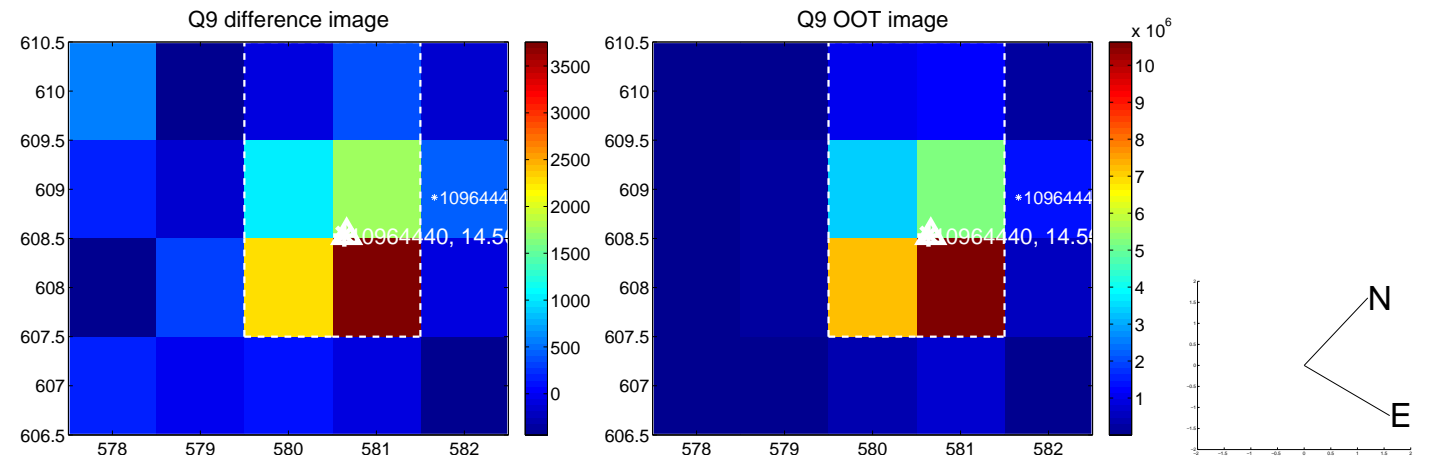
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



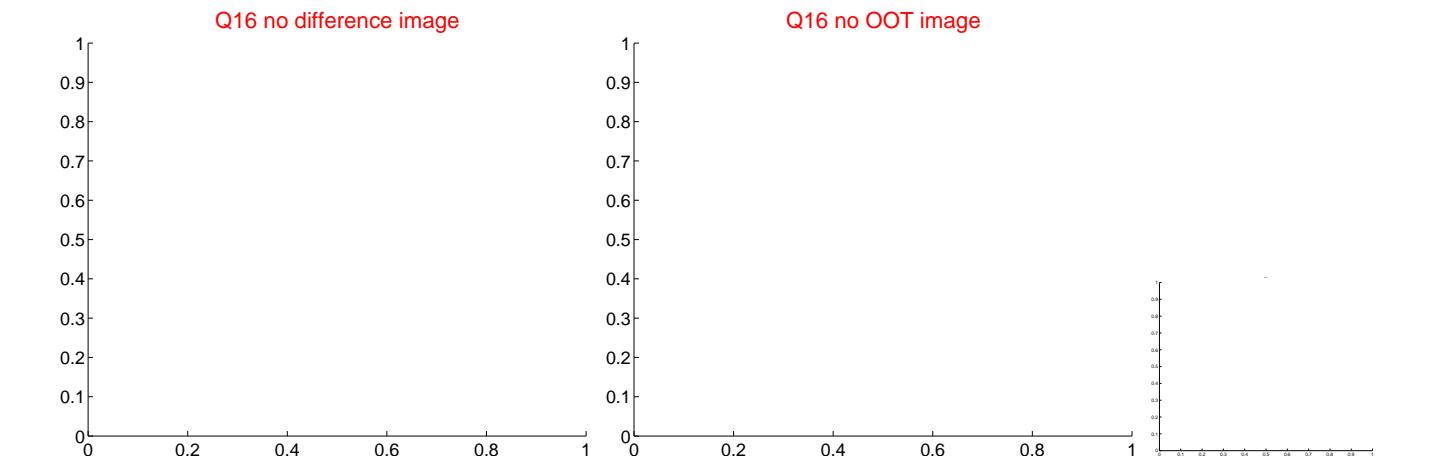
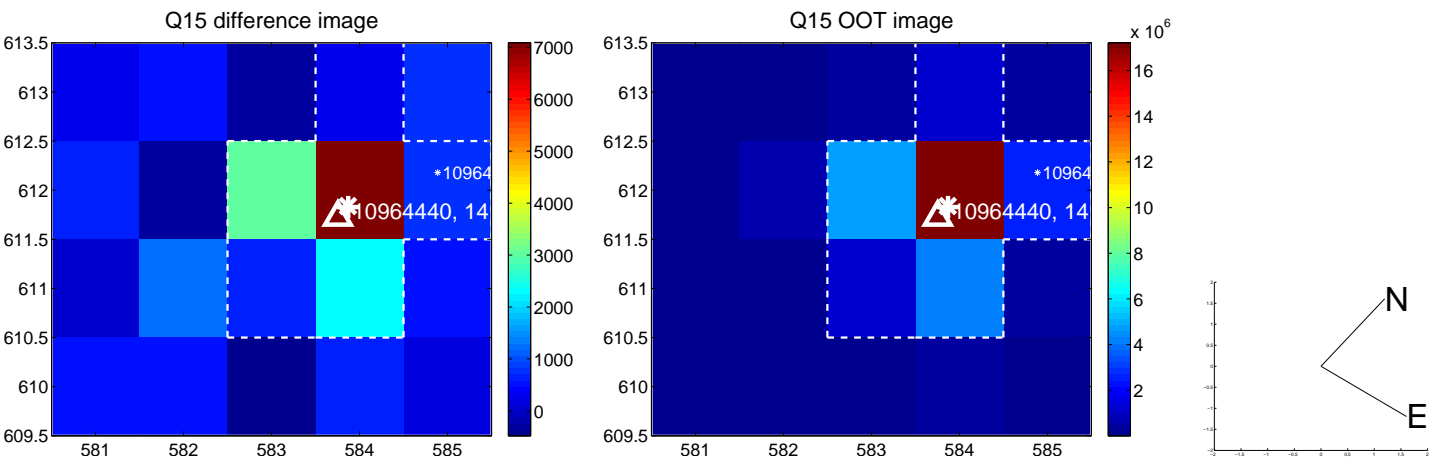
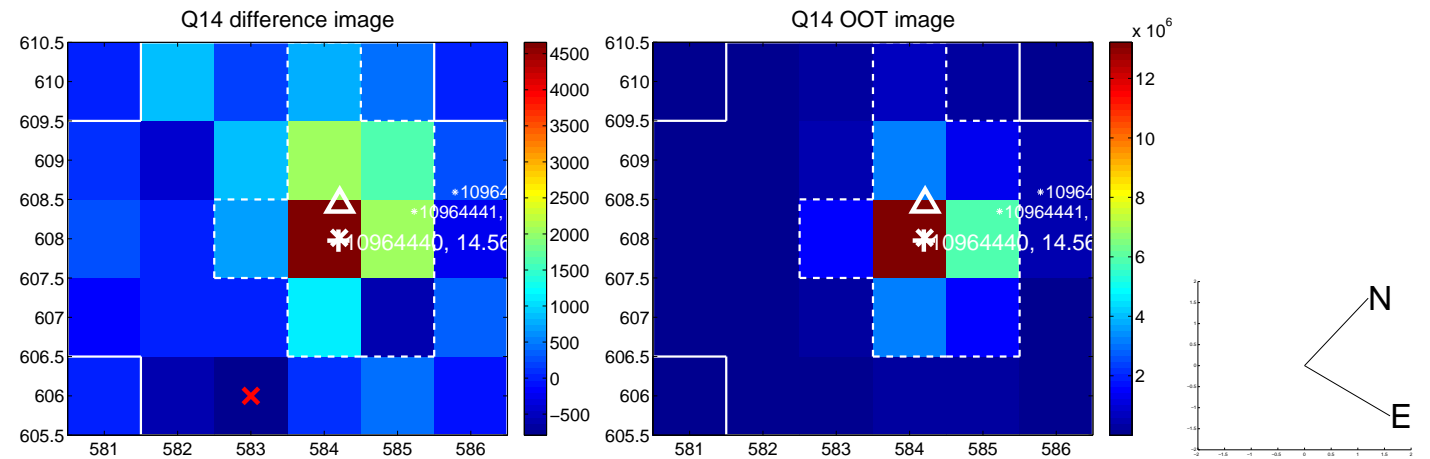
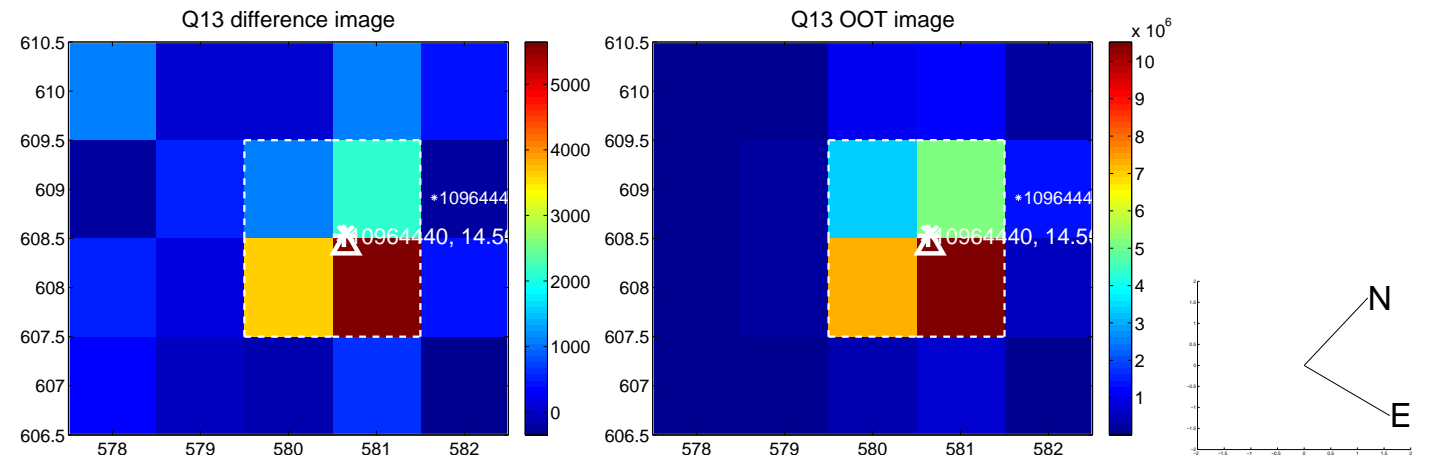
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



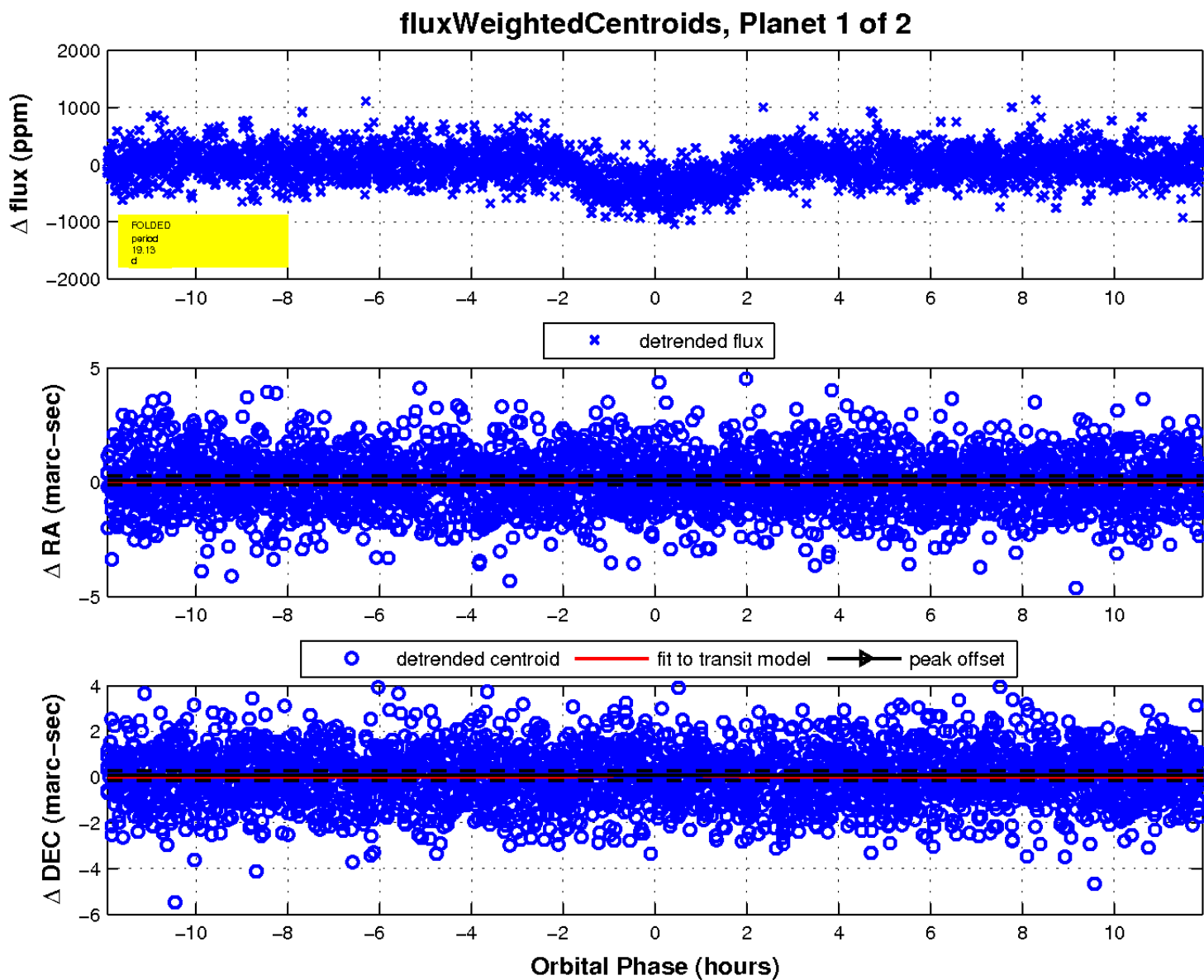
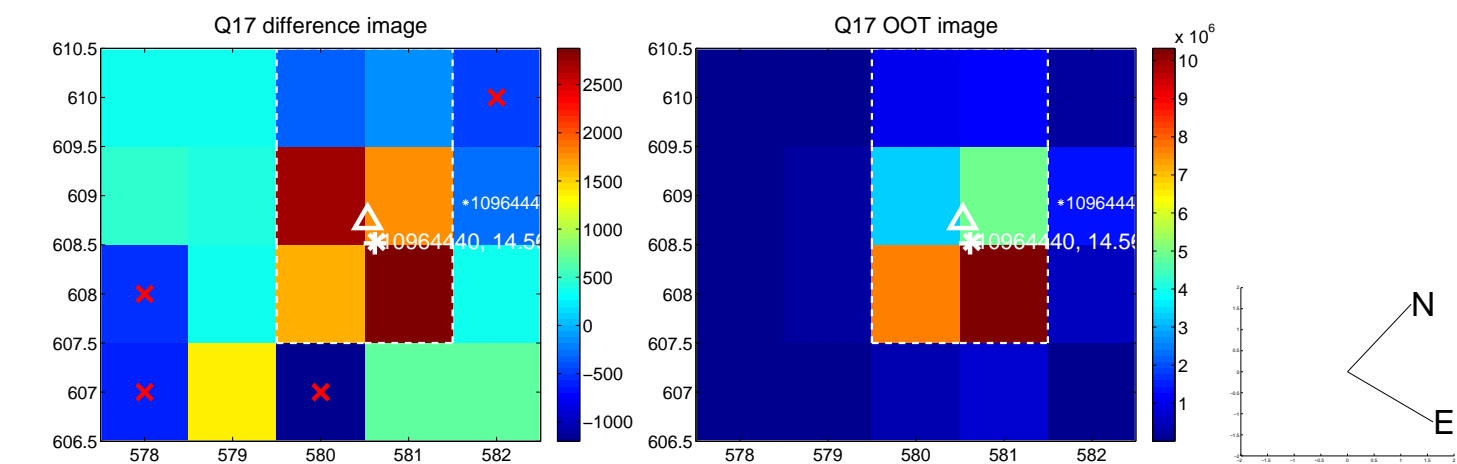
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

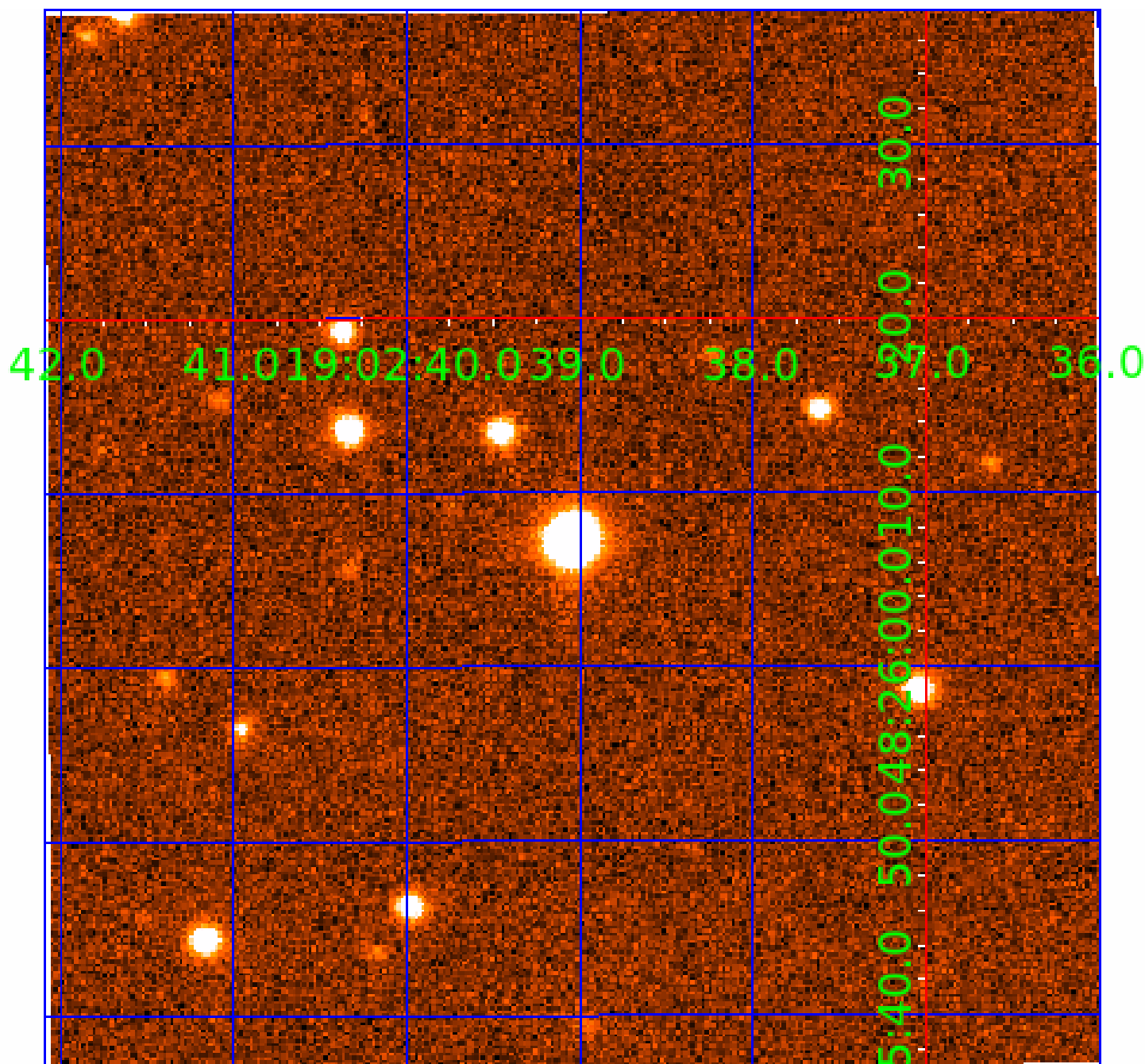


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010964440

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})
010964440-01	OBS	1310.01	19.129423	139.436804	441.0	3.979	27.2	29.0	1.71	5372	4.29	105.48
010964440-02	OBS	1310.02	144.683905	256.346785	394.7	9.980	8.0	9.5	1.71	5372	4.30	7.11

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010964440-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010964440-02	OBS	PC	0.91	0	0	0	0	CENT_FEW_DIFFS

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

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

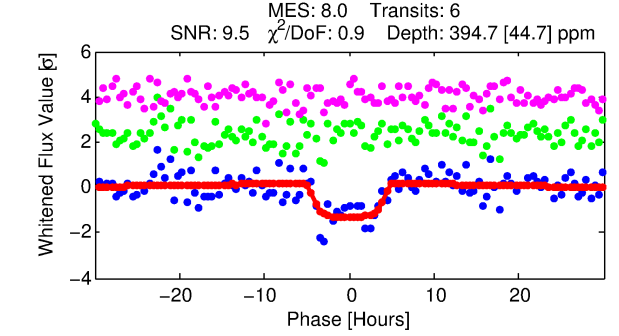
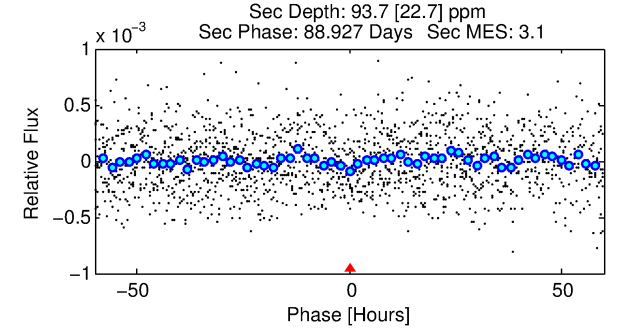
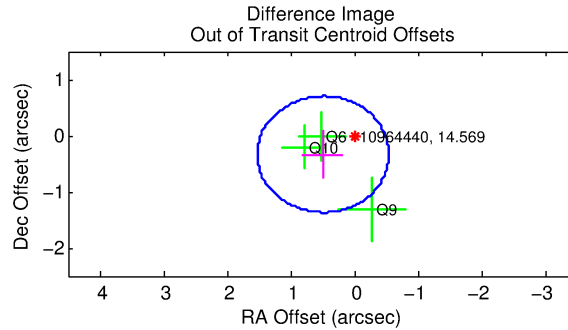
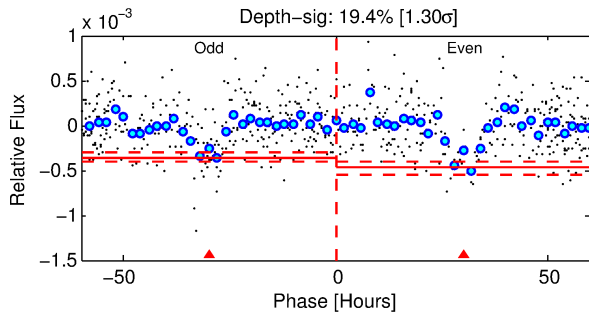
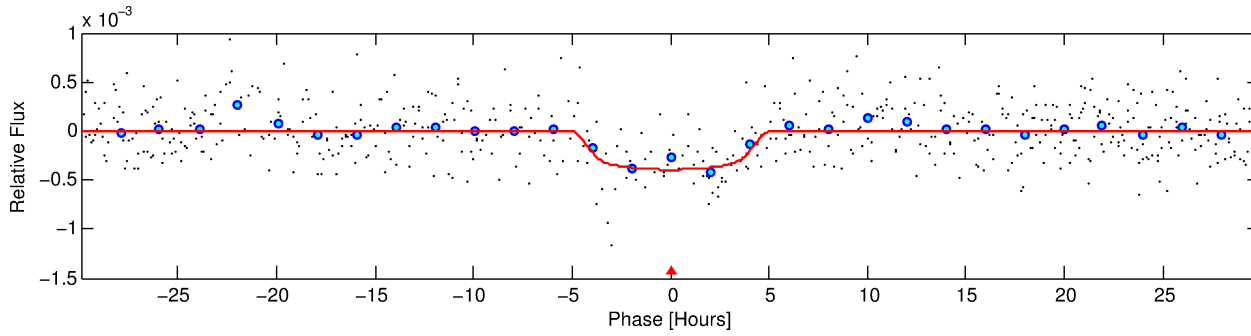
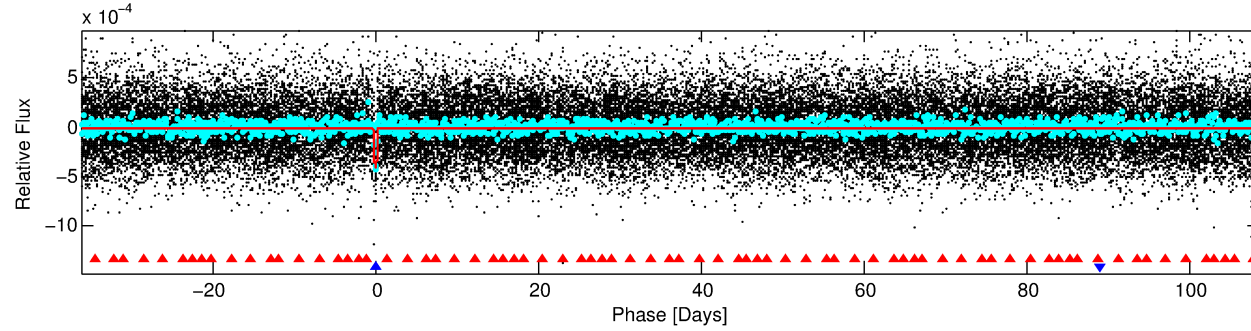
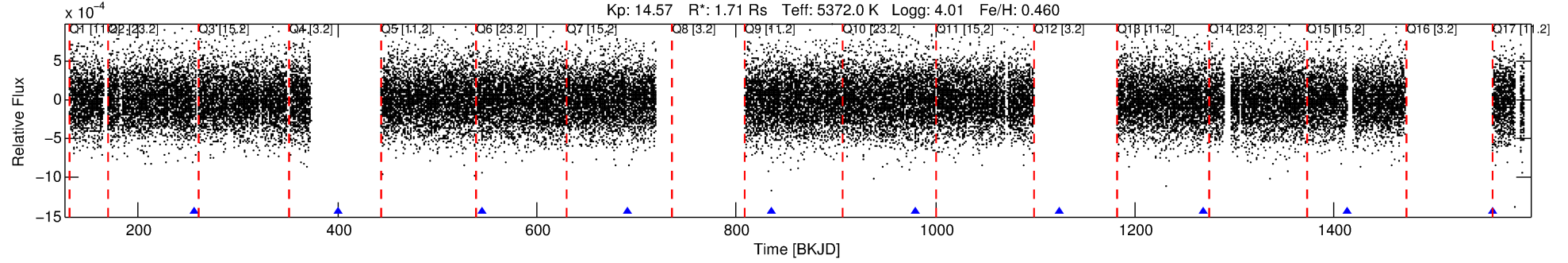
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010964440-02

No Significant Match Found

DV One-Page Summary

KIC: 10964440 Candidate: 2 of 2 Period: 144.684 d
KOI: K01310.02 Corr: 0.924



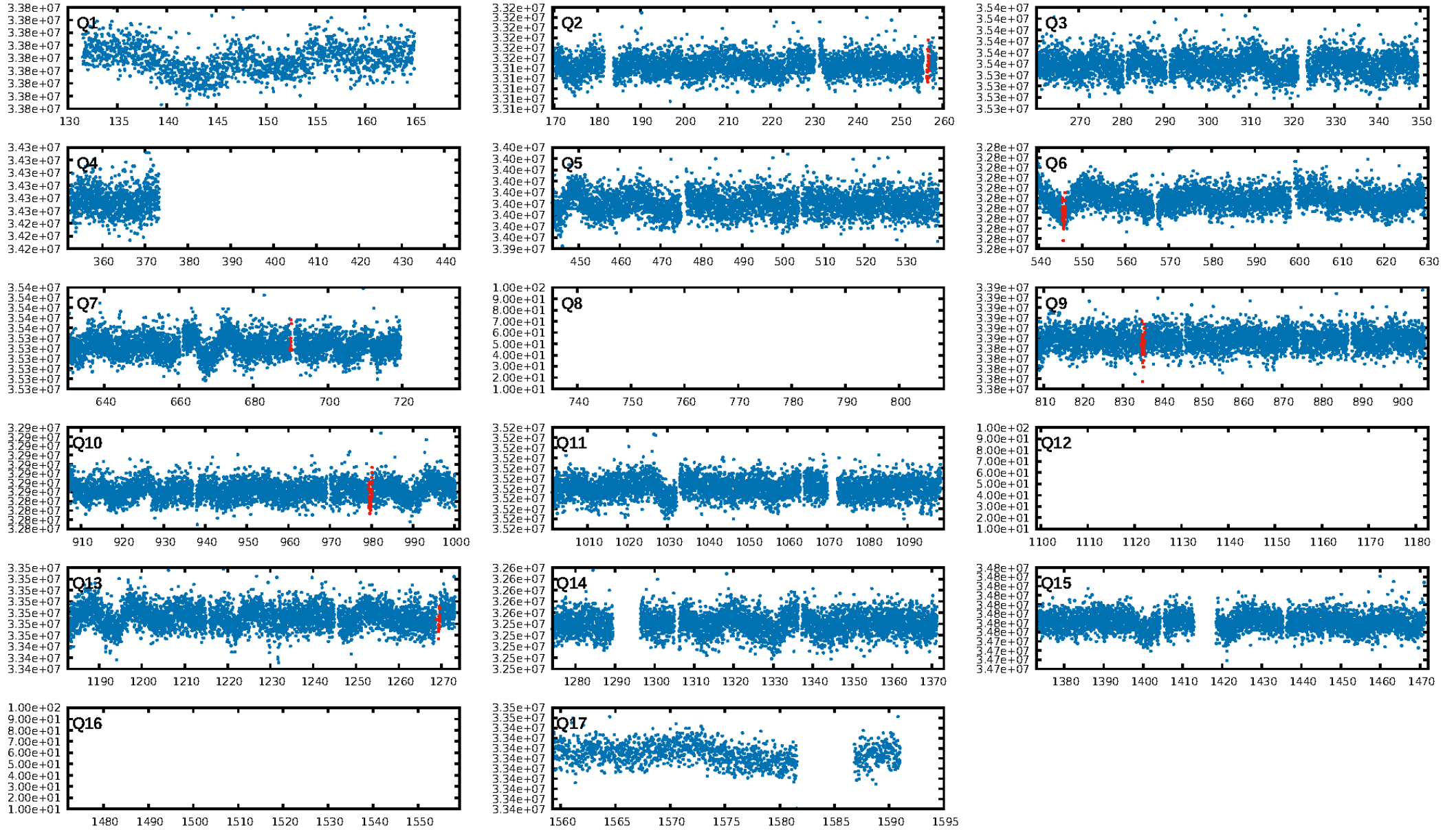
DV Fit Results:

Period = 144.68391 [0.00525] d
Epoch = 256.3468 [0.0208] BKJD
Rp/R* = 0.0230 [0.0029]
a/R* = 46.43 [21.25]
b = 0.93 [0.07]
Seff = 7.10 [2.70]
Teq = 416 [39] K
Rp = 4.30 [1.21] Re
a = 0.5542 [0.1308] AU
Ag = 857.65 [440.21] [1.95 σ]
Teffp = 3483 [312] K [9.76 σ]

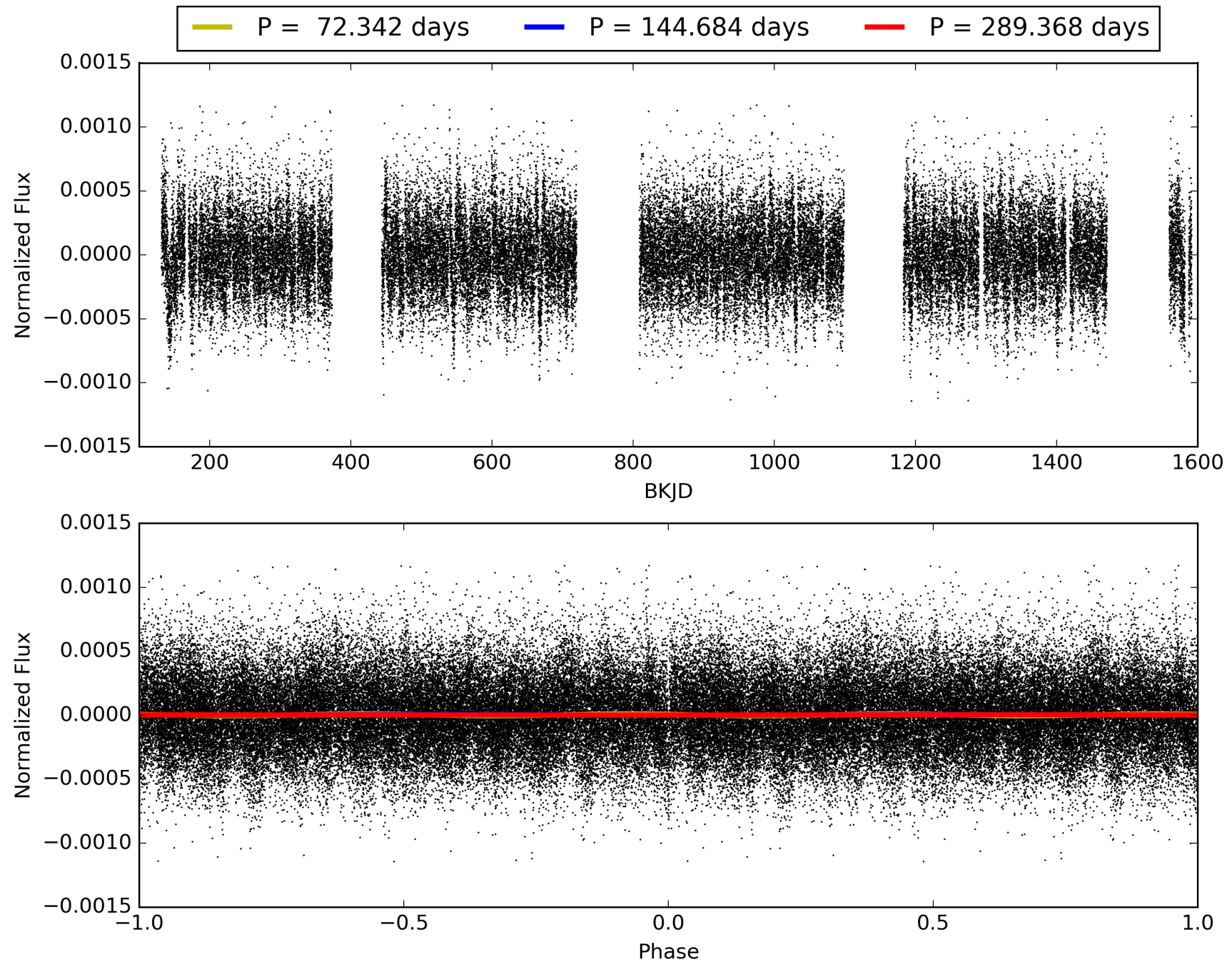
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [280.45 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 69.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.85e-15
RollingBand-fgt: 1.00 [6/6]
GhostDiagnostic-chr: 1.496
Centroid-sig: 8.8%
Centroid-so: 1.689 arcsec [1.21 σ]
OotOffset-rm: 0.594 arcsec [1.72 σ]
KicOffset-rm: 0.626 arcsec [1.80 σ]
OotOffset-st: 2/0/0/1 [3]
KicOffset-st: 2/0/0/1 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

TCE 010964440-02, PDC Light Curves

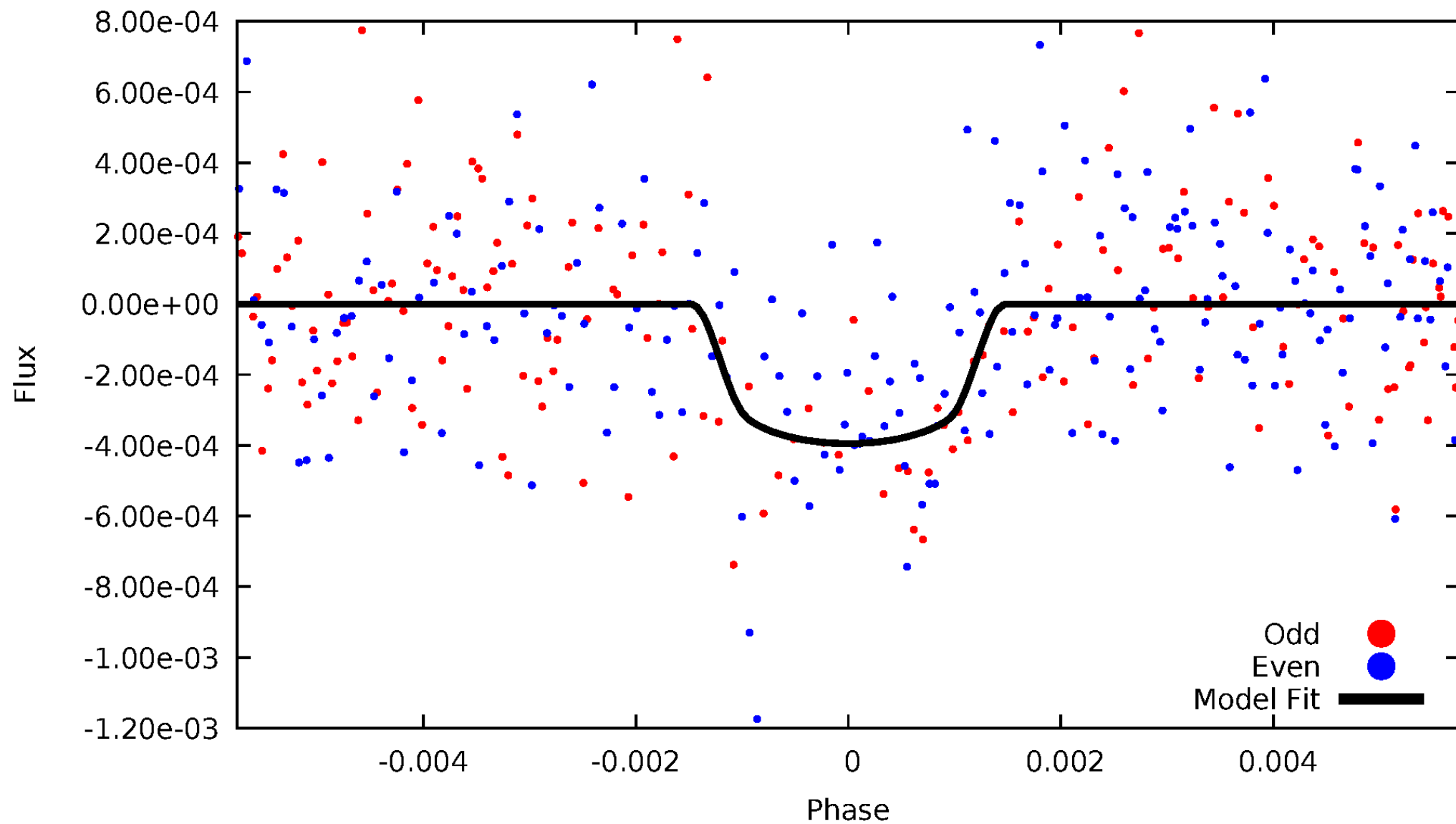


TCE 010964440-02



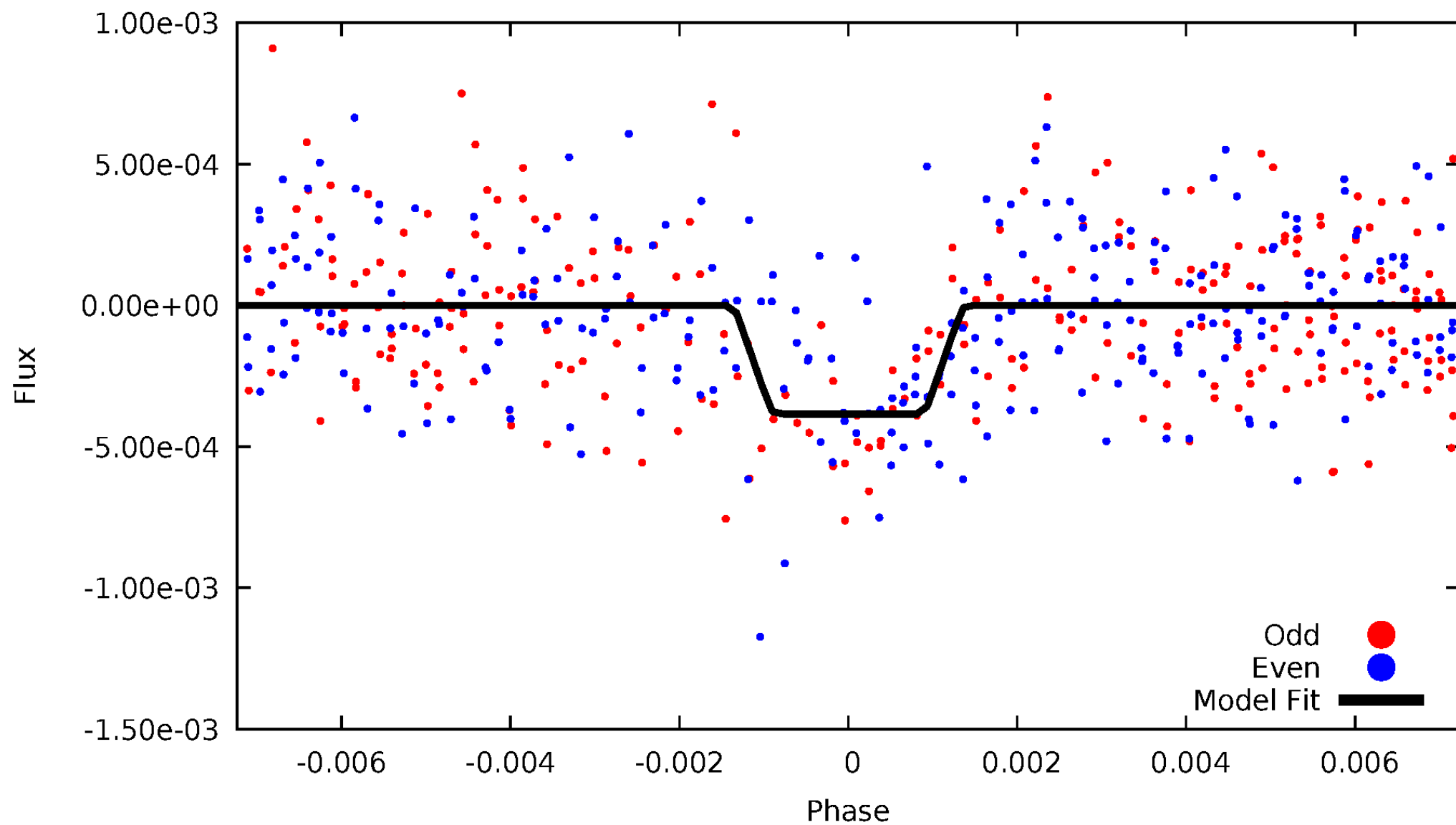
DV Odd/Even

TCE 010964440-02



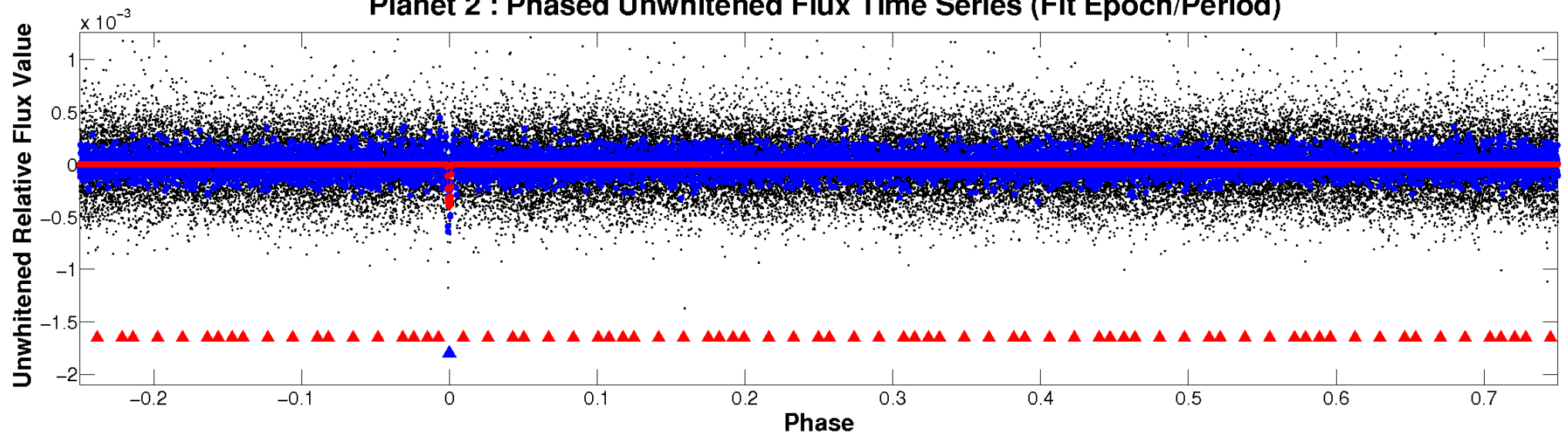
ALT Odd/Even

TCE 010964440-02

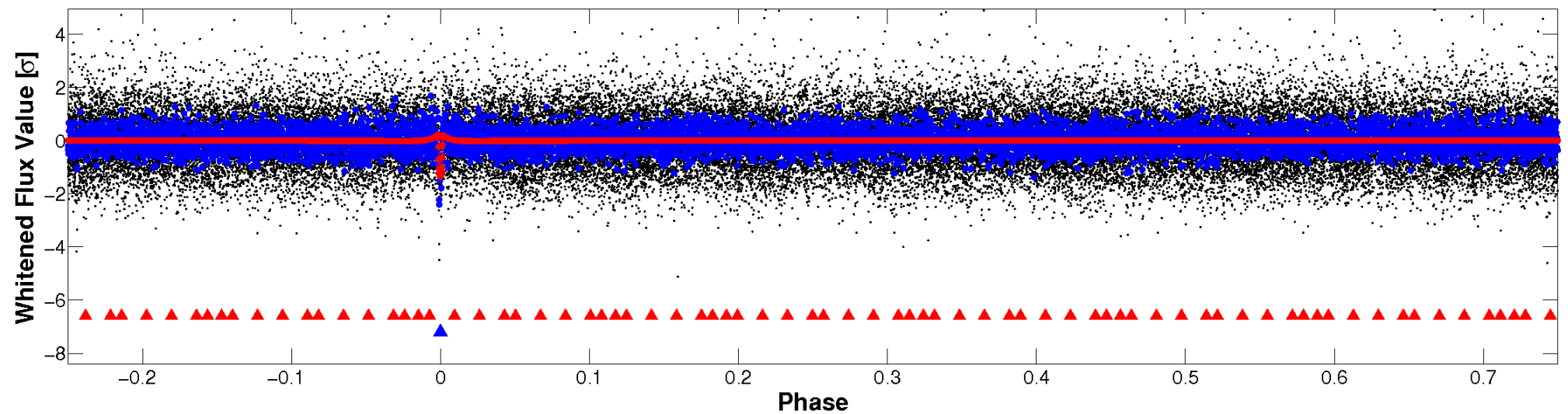


Non-Whitened Vs. Whitened Light Curve

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

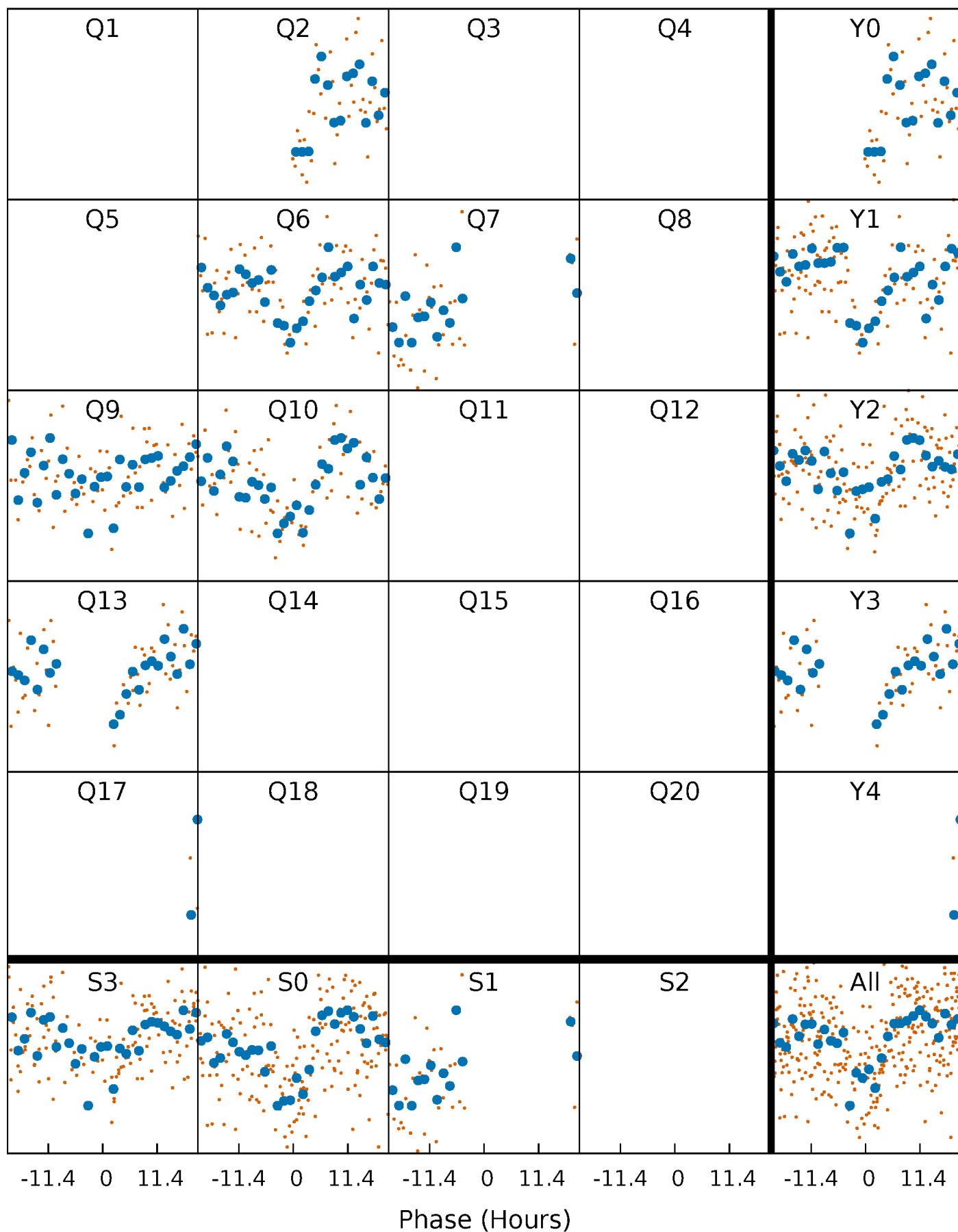


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



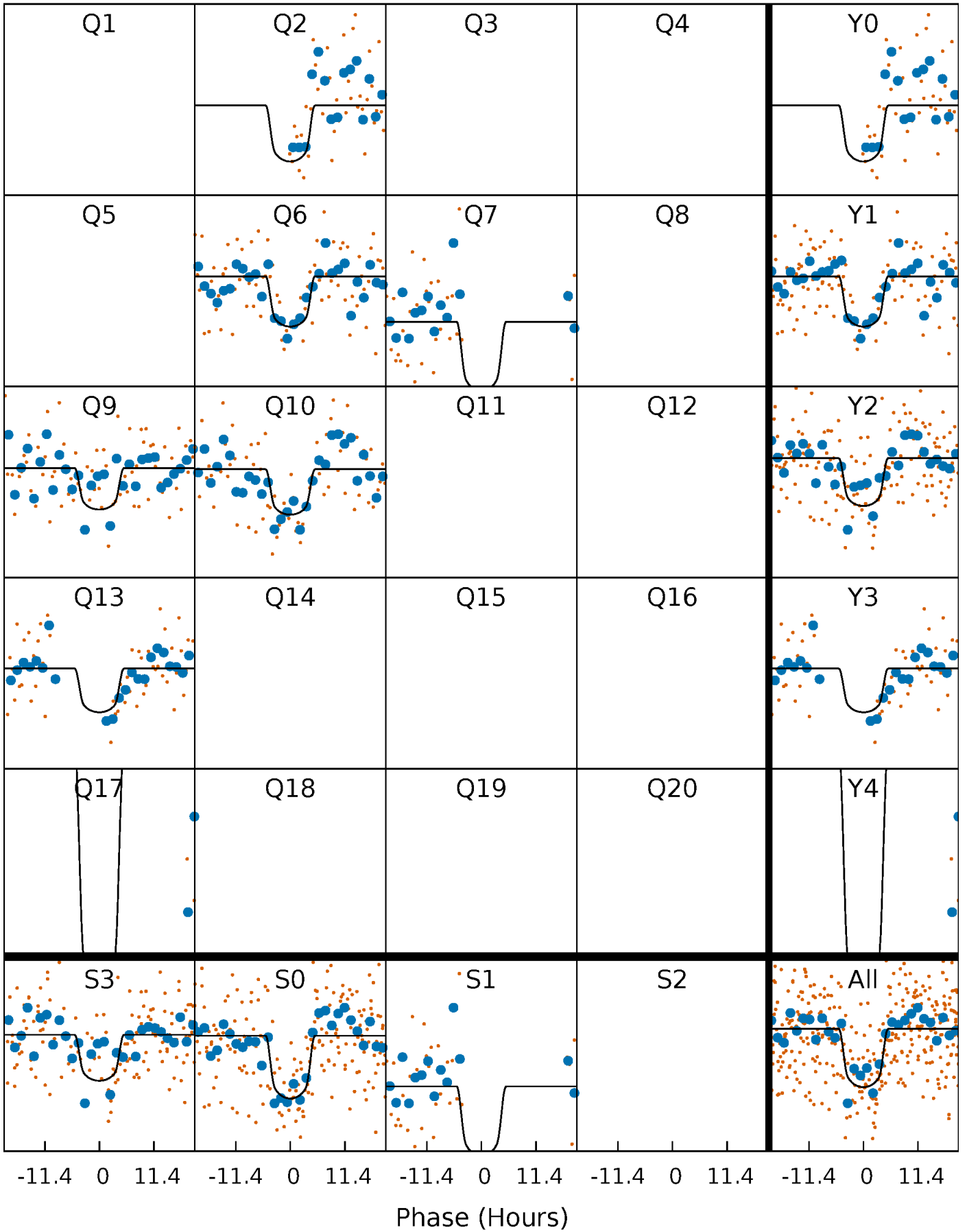
PDC Quarter-Phased Transit Curves

TCE 010964440-02 $P=144.683905$ Days $T_0=256.346785$ (BKJD)



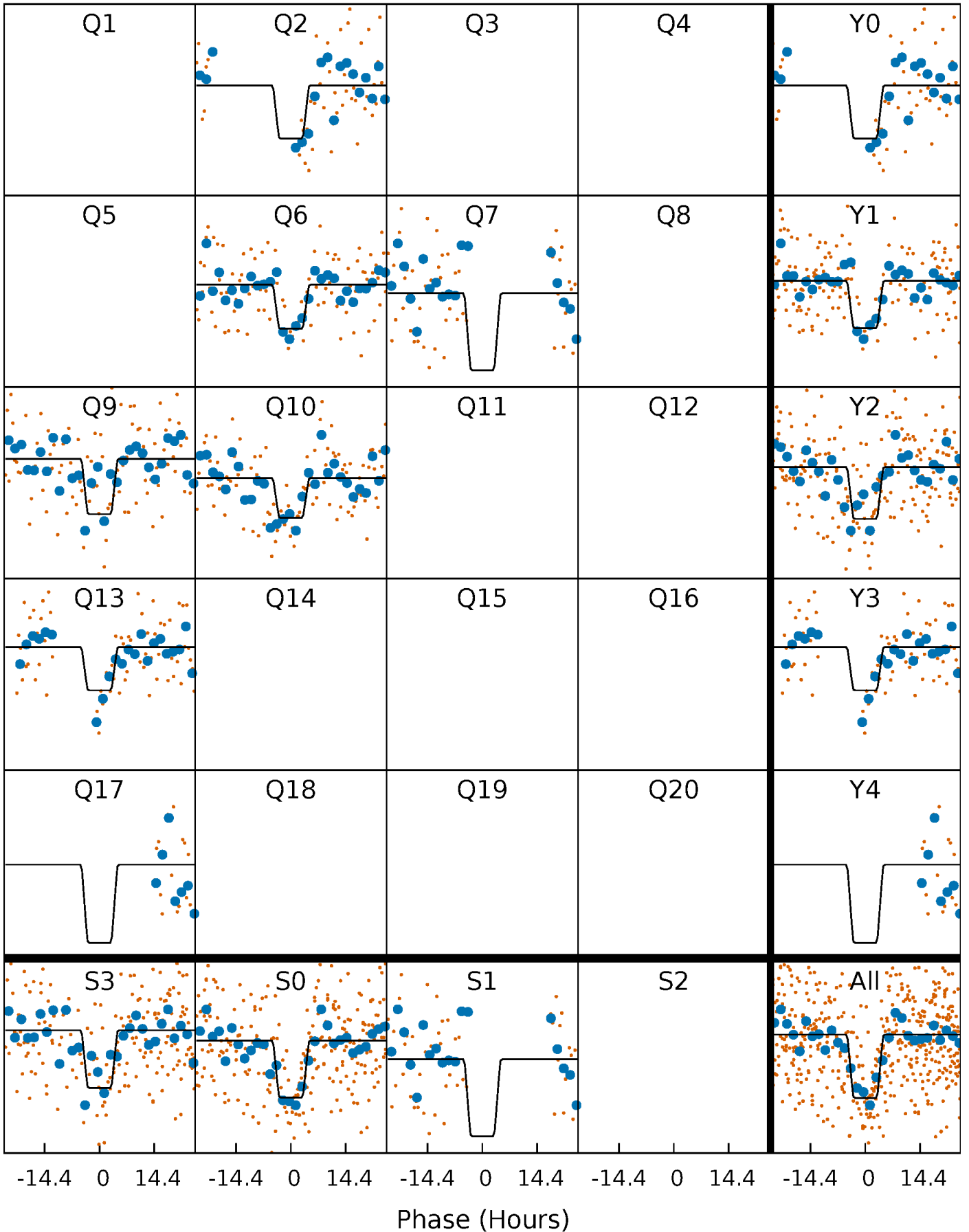
DV Quarter-Phased Transit Curves

TCE 010964440-02 $P=144.683905$ Days $T_0=256.346785$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

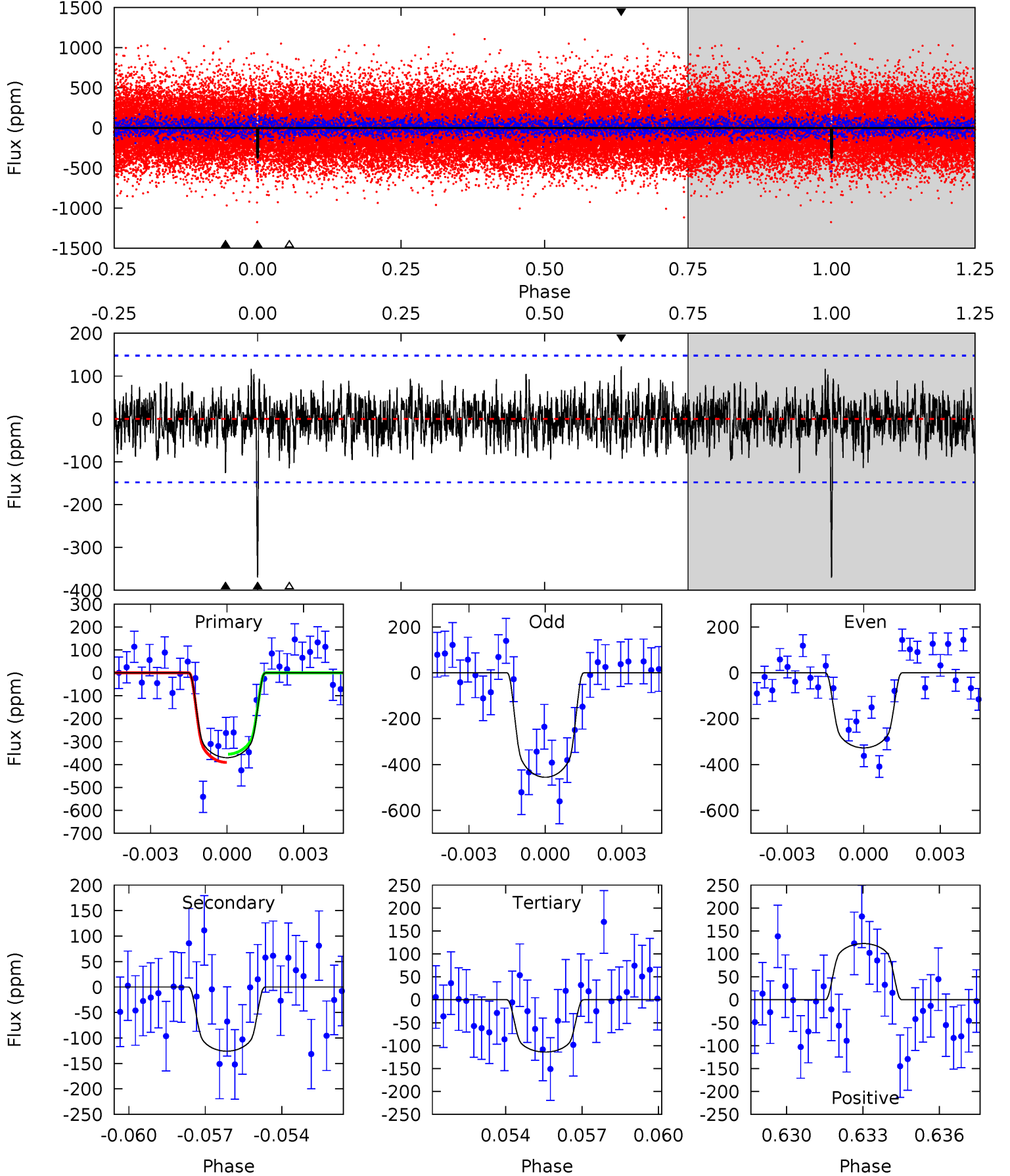
TCE 010964440-02 $P=144.710472$ Days $T_0=256.267758$ (BKJD)



DV Model-Shift Uniqueness Test

010964440-02, $P = 144.683905$ Days, $E = 111.662880$ Days

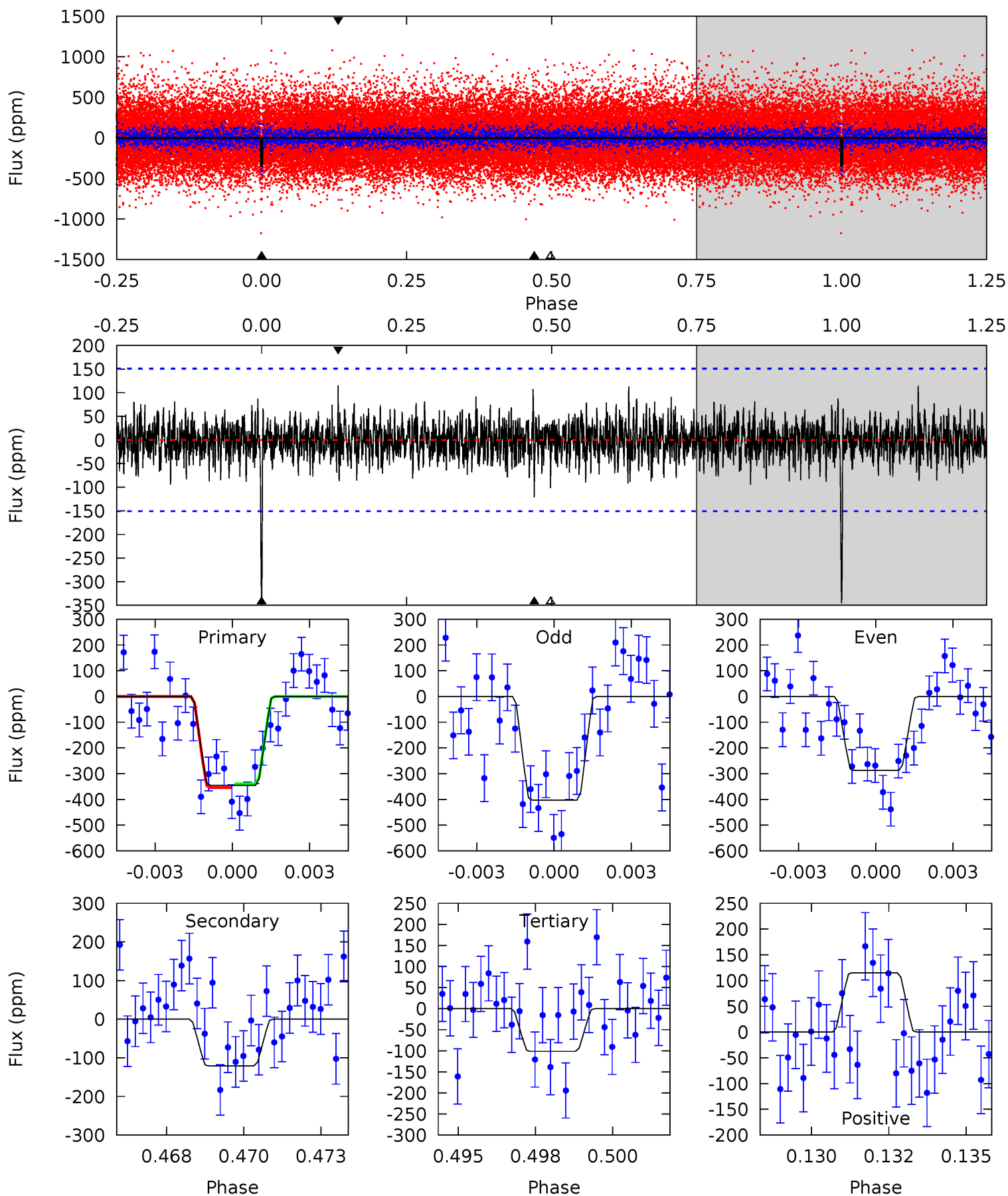
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.1	4.47	4.05	4.35	5.25	2.97	1.23	9.09	8.79	0.42	0.12	2.18	0.84	0.25	0.63



Alt Model-Shift Uniqueness Test

010964440-02, P = 144.710472 Days, E = 111.557286 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.1	4.23	3.54	4.03	5.27	3.00	1.03	8.54	8.05	0.69	0.21	1.95	0.89	0.25	0.26



Stellar Parameters For KIC 010964440

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5372^{+88}_{-64}	$4.007^{+0.218}_{-0.087}$	$0.460^{+0.050}_{-0.100}$	$1.710^{+0.249}_{-0.427}$	$1.084^{+0.095}_{-0.123}$	$0.305^{+0.357}_{-0.086}$
	+2%/-1%	+5%/-2%	+11%/-22%	+15%/-25%	+9%/-11%	+117%/-28%
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 010964440-02 / KOI 1310.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-126 ± 28	$4.13^{+0.70}_{-0.67}$	577^{+25}_{-36}	4035^{+282}_{-247}	1241^{+628}_{-425}
Alt.	-121 ± 29	$3.52^{+0.71}_{-0.64}$	578^{+26}_{-35}	4249^{+329}_{-278}	1640^{+927}_{-590}

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

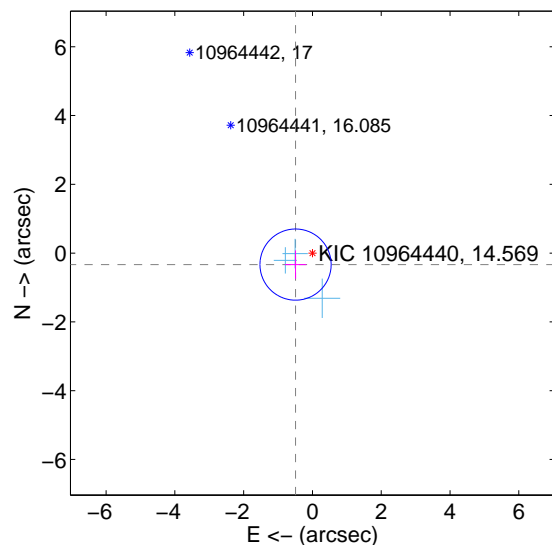
Supplemental centroid analysis for 010964440-02. Kepler magnitude: 14.57. Transit SNR 9.51

There are 3 quarters with good PRF difference image offsets

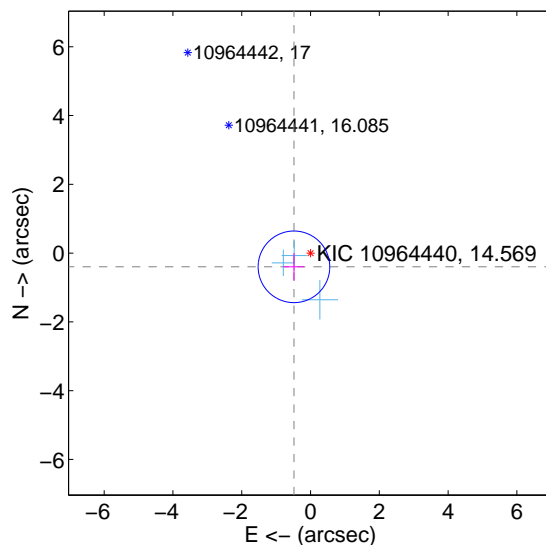
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.594 ± 0.345	1.72	0.491 ± 0.309	-0.334 ± 0.412
PRF-fit source offset from KIC position	0.626 ± 0.347	1.80	0.482 ± 0.304	-0.399 ± 0.401
photometric centroid source offset	1.69 ± 1.39	1.21	0.65 ± 1.31	-1.56 ± 1.41

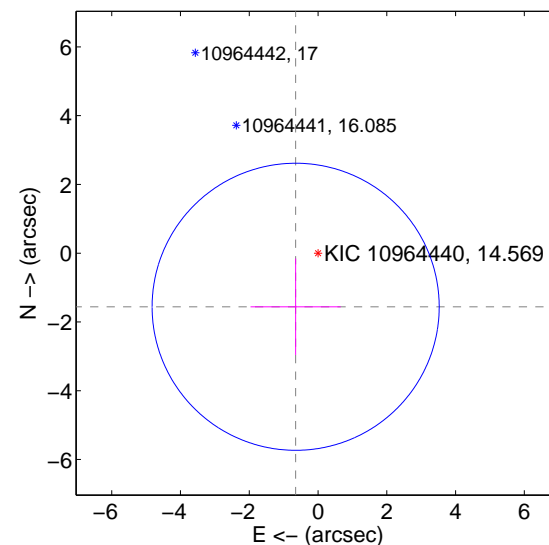
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

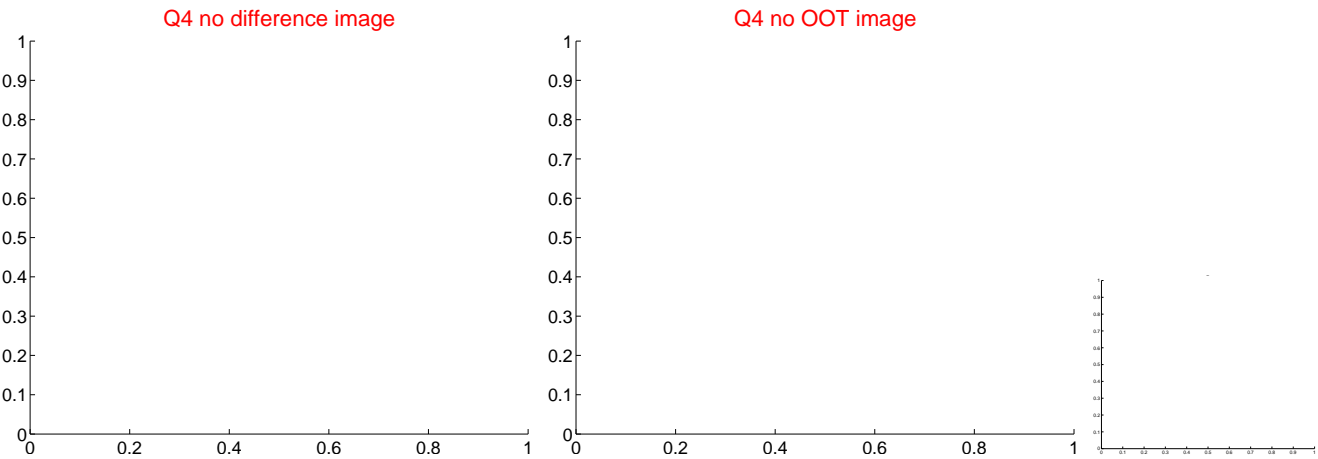
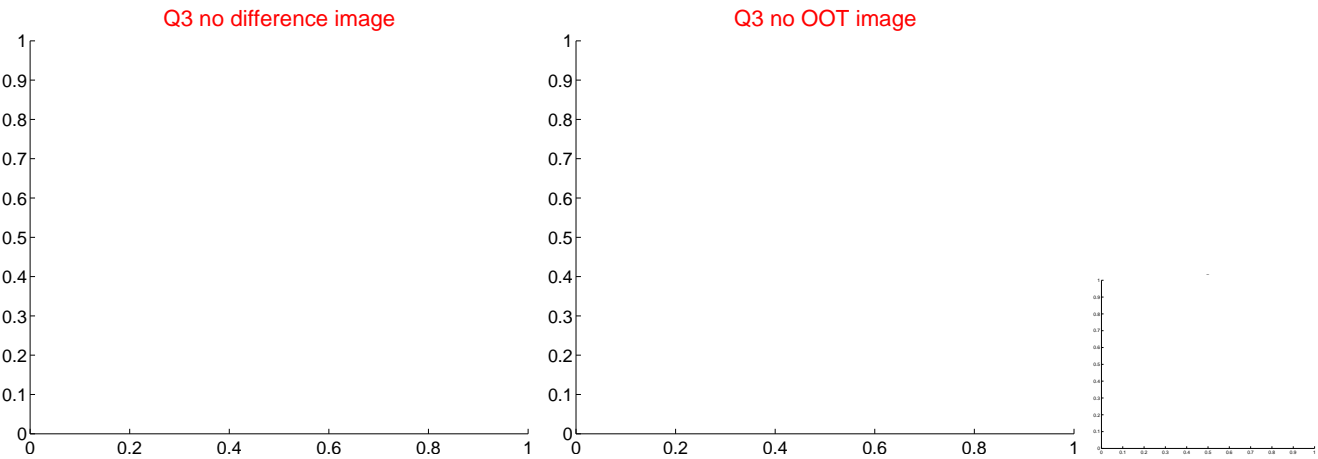
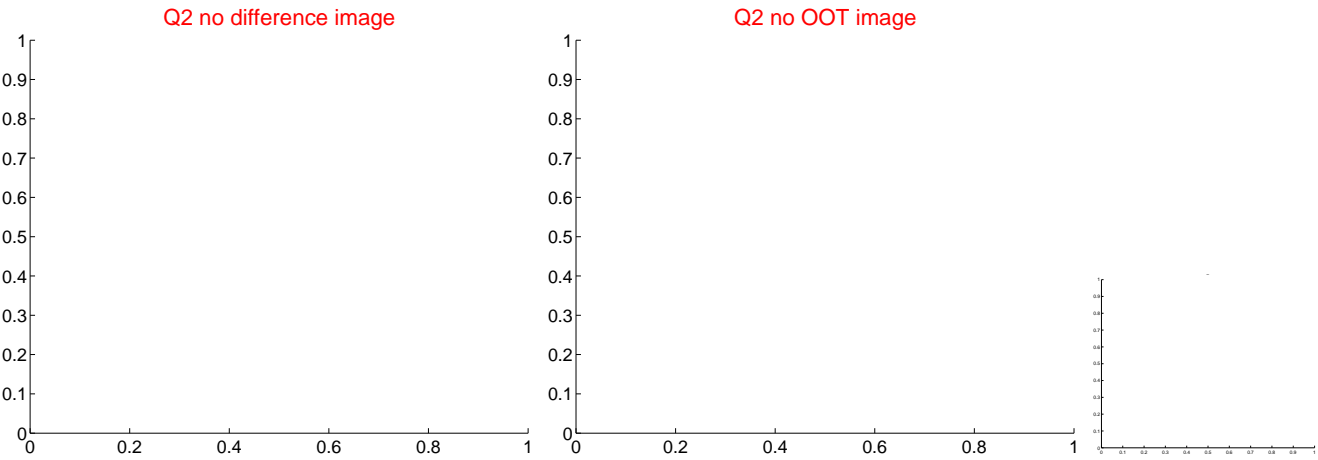
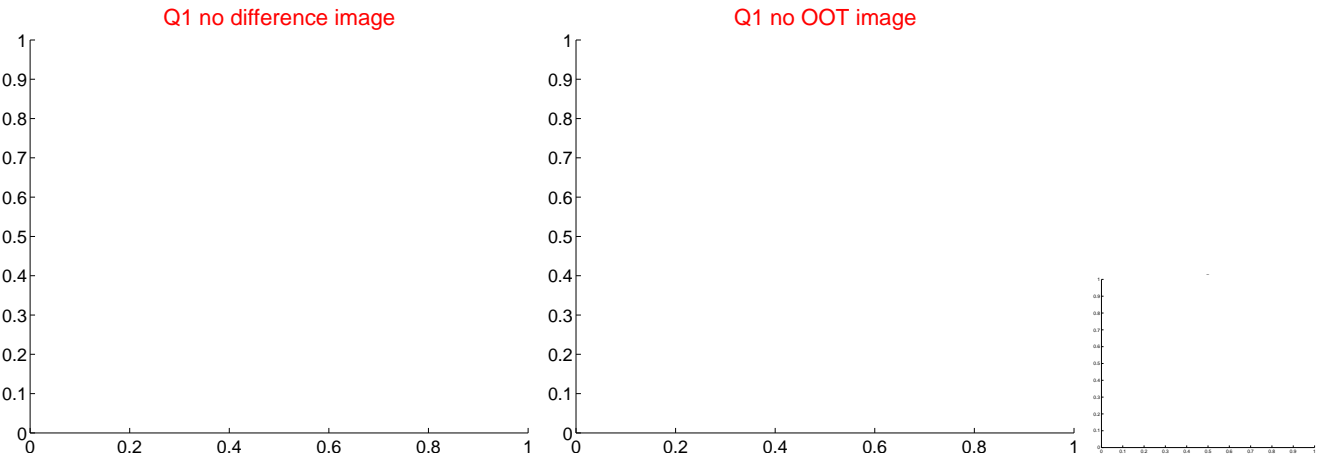


offset from photometric centroids

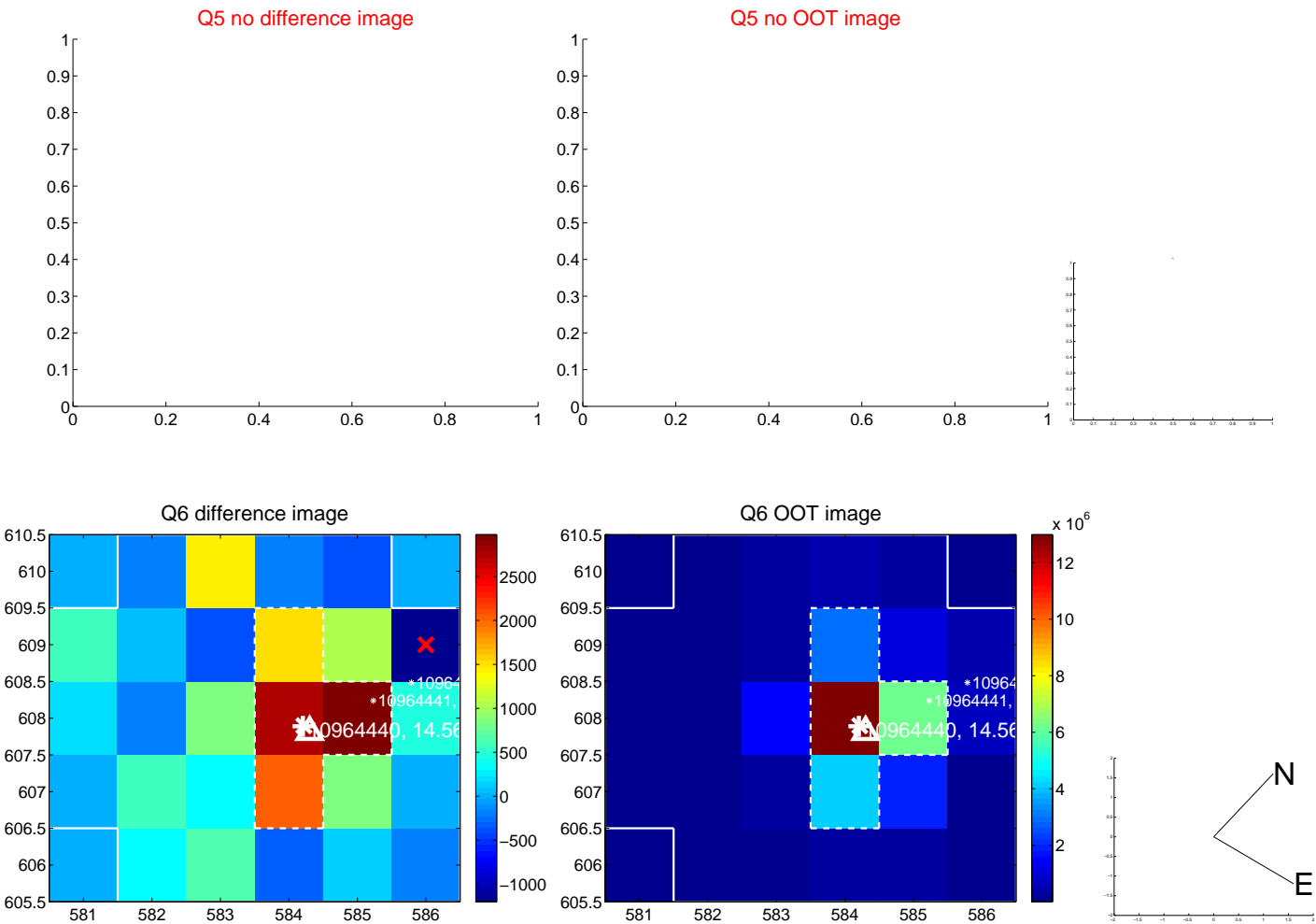


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

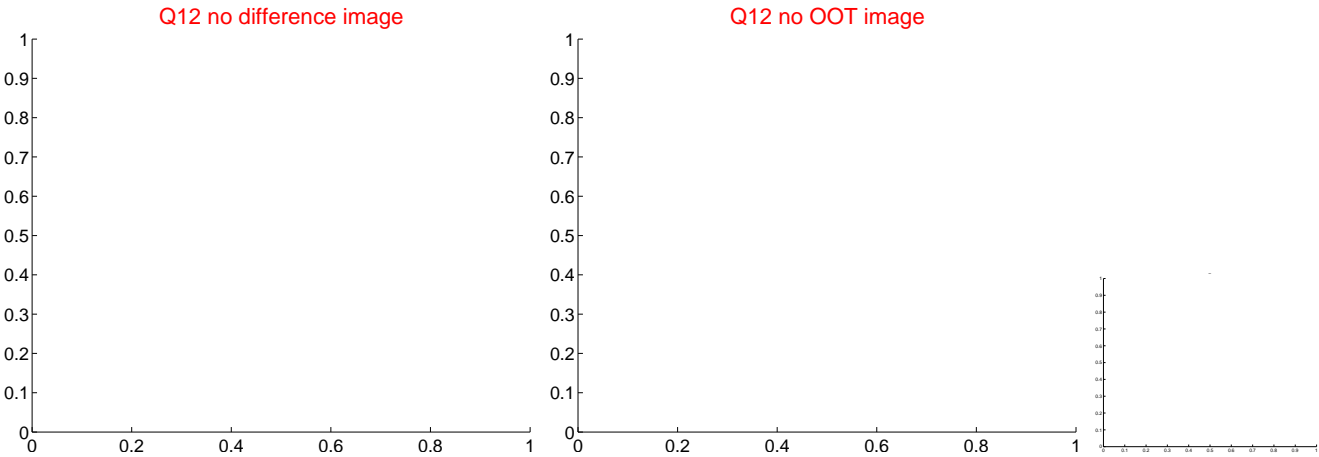
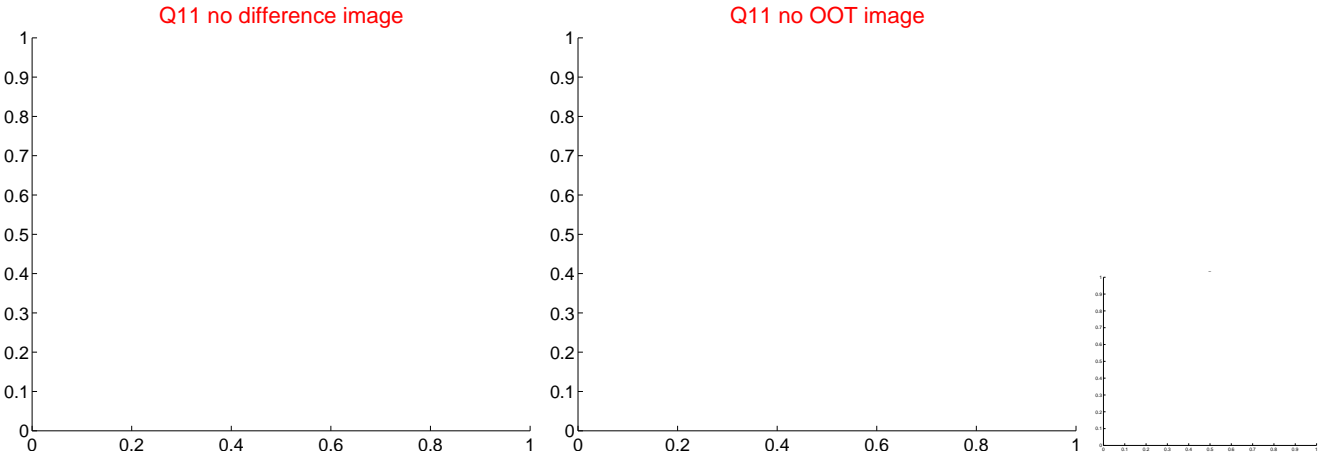
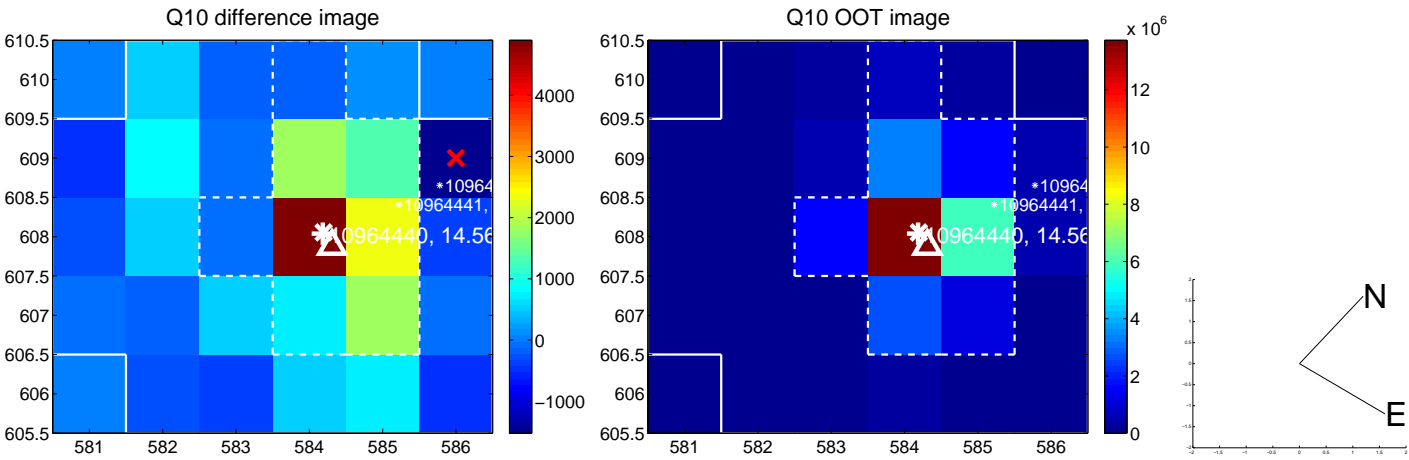
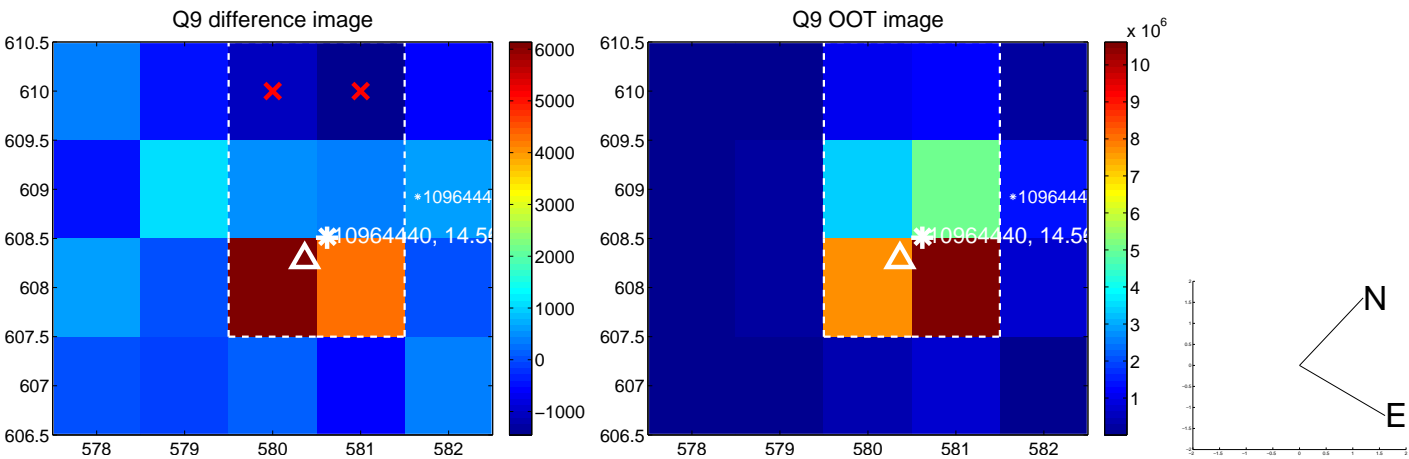
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



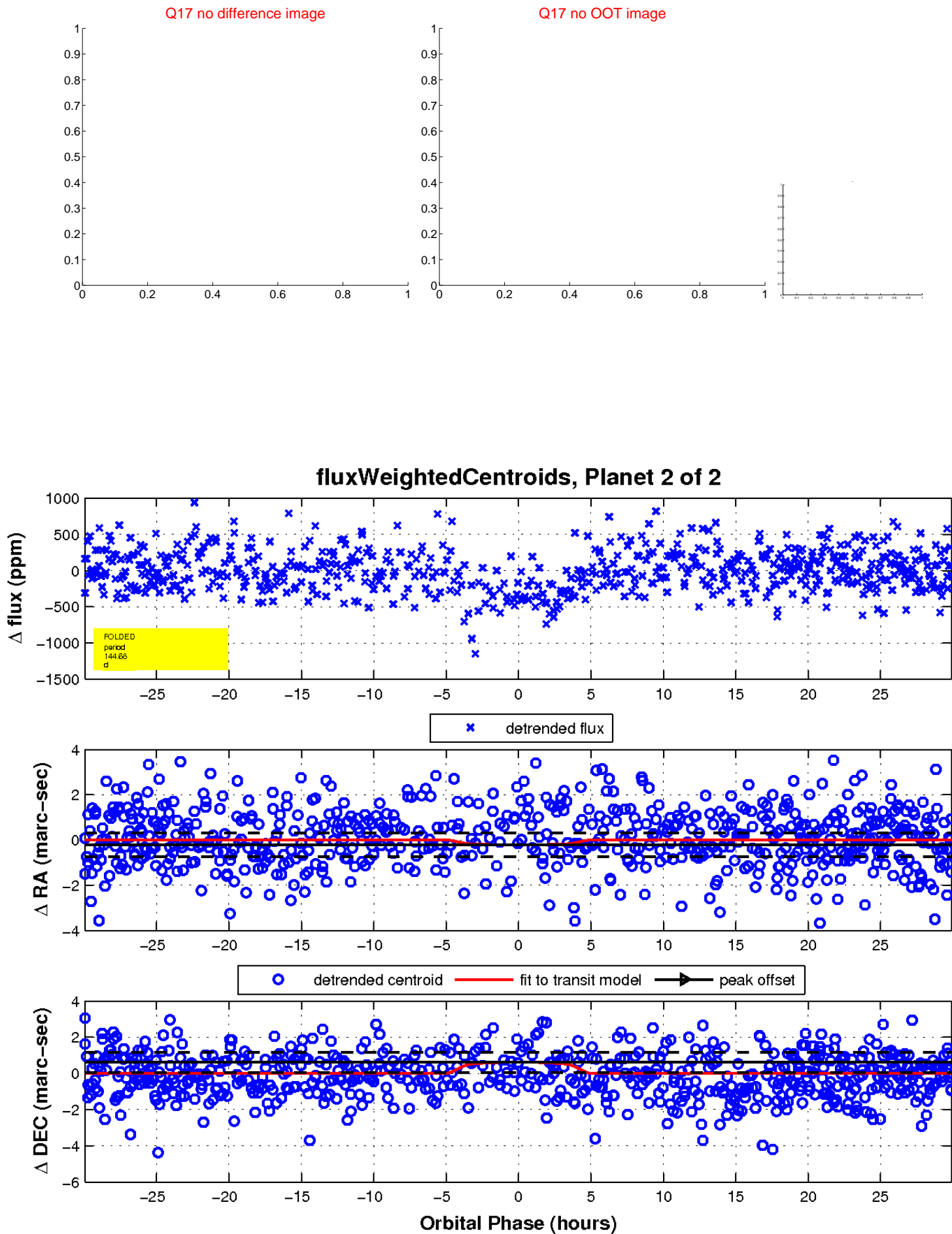
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image

