

KIC 009886224

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})
009886224-01	OBS	3614.01	2.992668	131.891248	113500.7	2.564	2288.1	1683.0	1.84	4927	60.94	1123.45
009886224-02	OBS	No	1.496320	131.901312	7441.9	2.484	162.0	156.5	1.84	4927	17.70	2830.95

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009886224-01	OBS	FP	0.01	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
009886224-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

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

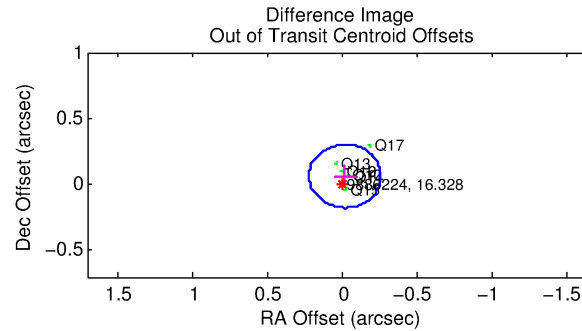
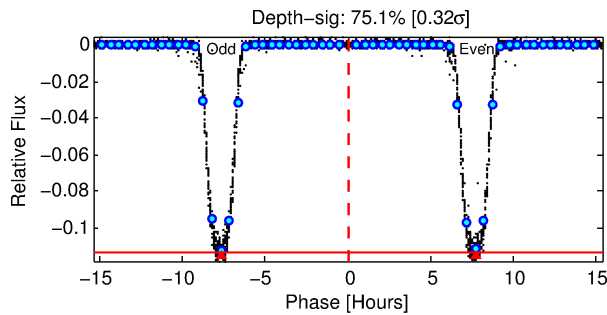
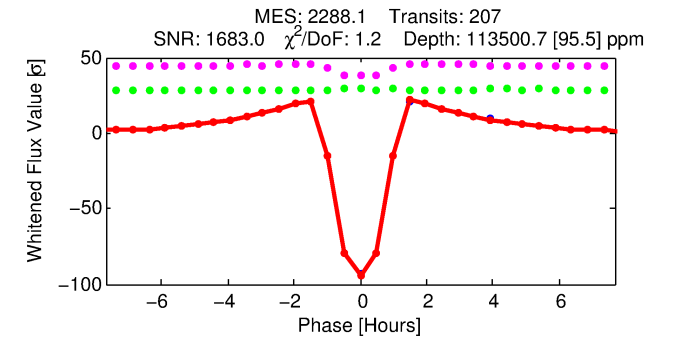
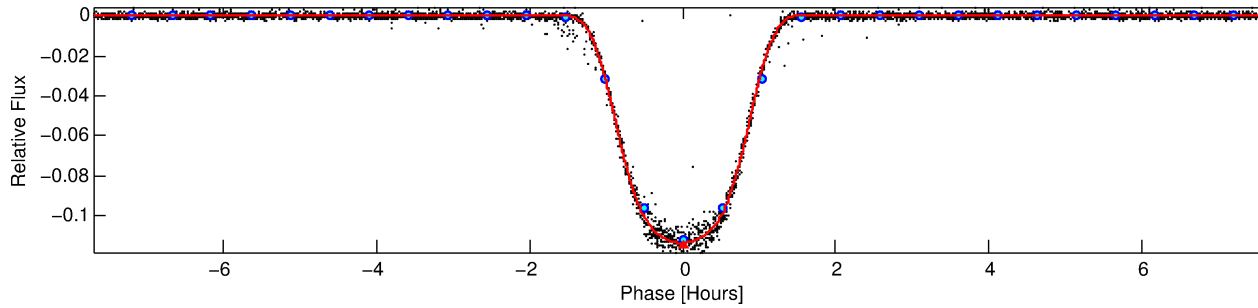
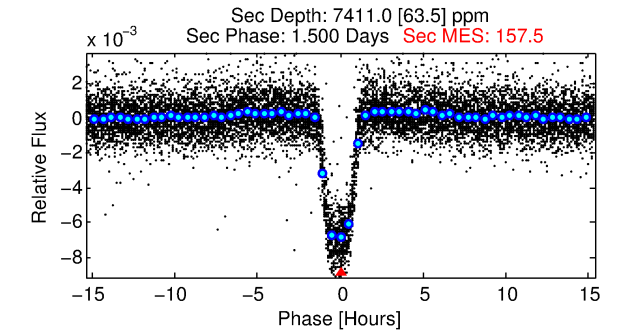
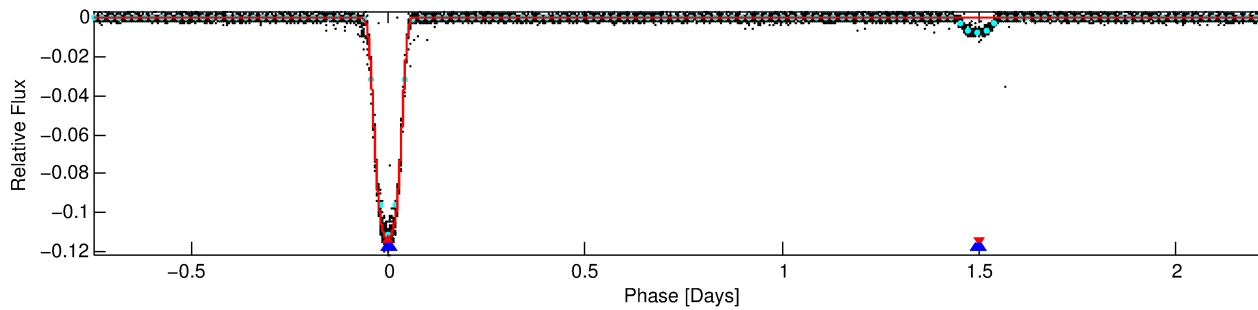
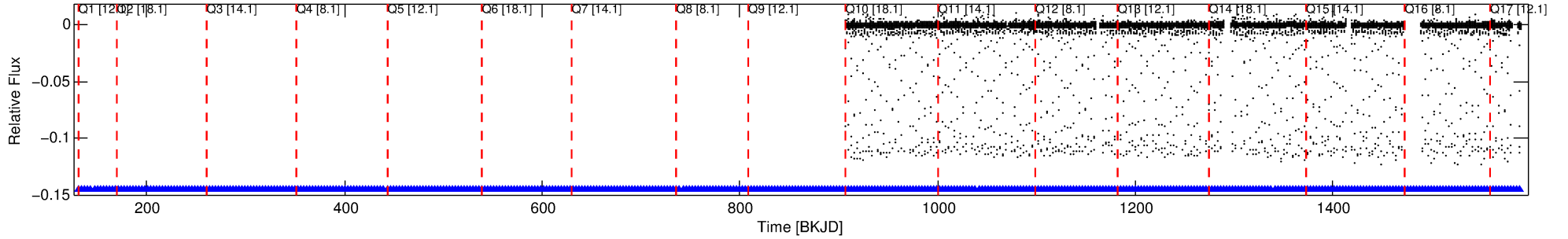
Ephemeris Match Information For 009886224-01

No Significant Match Found

DV One-Page Summary

KIC: 9886224 Candidate: 1 of 2 Period: 2.993 d
KOI: K03614.01 Corr: 0.992

Kp: 16.33 R*: 1.84 Rs Teff: 4927.0 K Logg: 3.88 Fe/H: 0.160



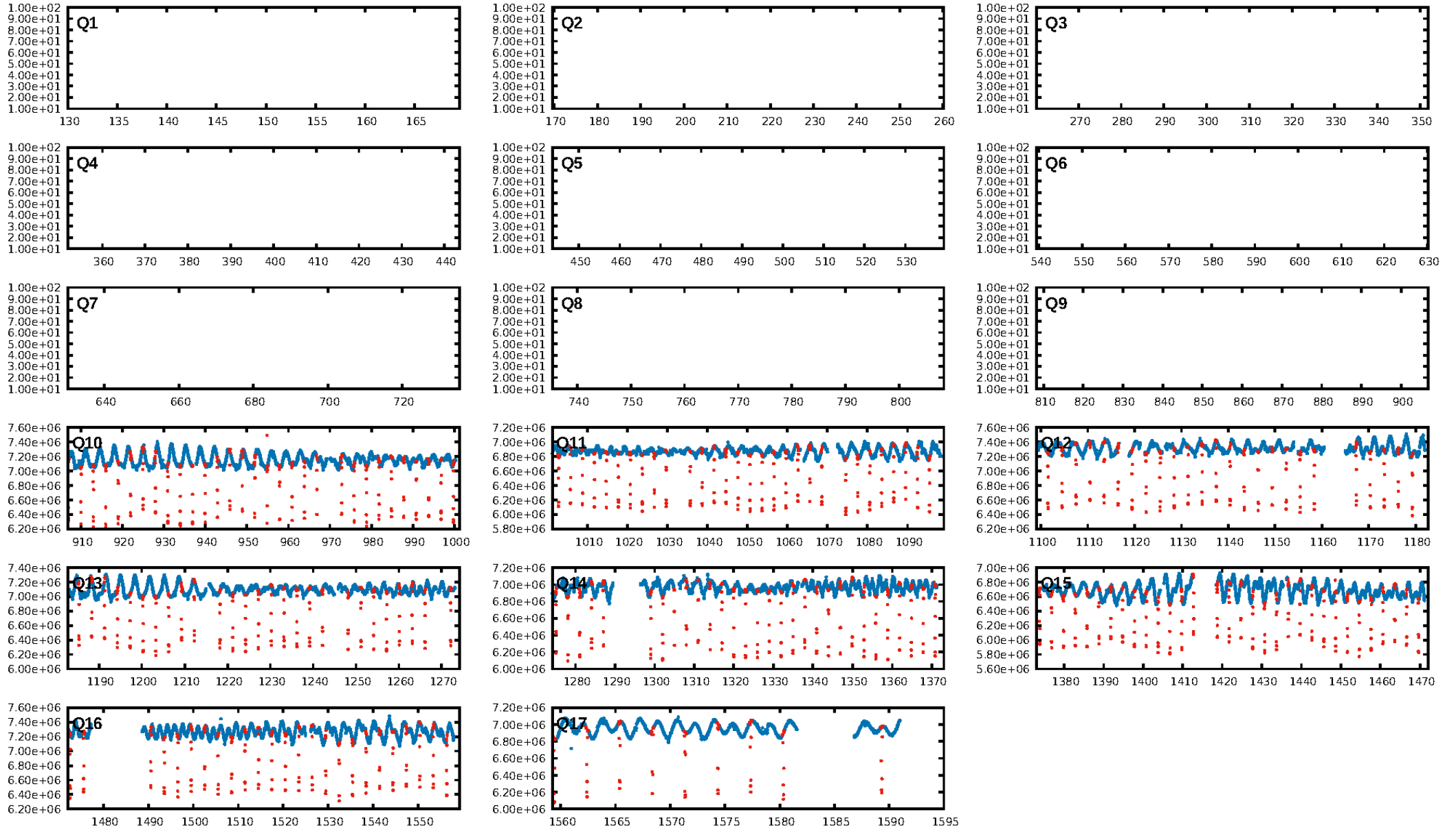
DV Fit Results:

Period = 2.99267 [0.00000] d
Epoch = 131.8912 [0.0000] BKJD
Rp/R* = 0.3040 [0.0003]
a/R* = 11.42 [0.03]
b = 0.26 [0.01]
Seff = 1123.45 [1344.80]
Teq = 1476 [442] K
Rp = 60.94 [36.59] Re
a = 0.0398 [0.0274] AU
Ag = 1.74 [2.07] [0.36σ]
Teffp = 2622 [101] K [2.53σ]

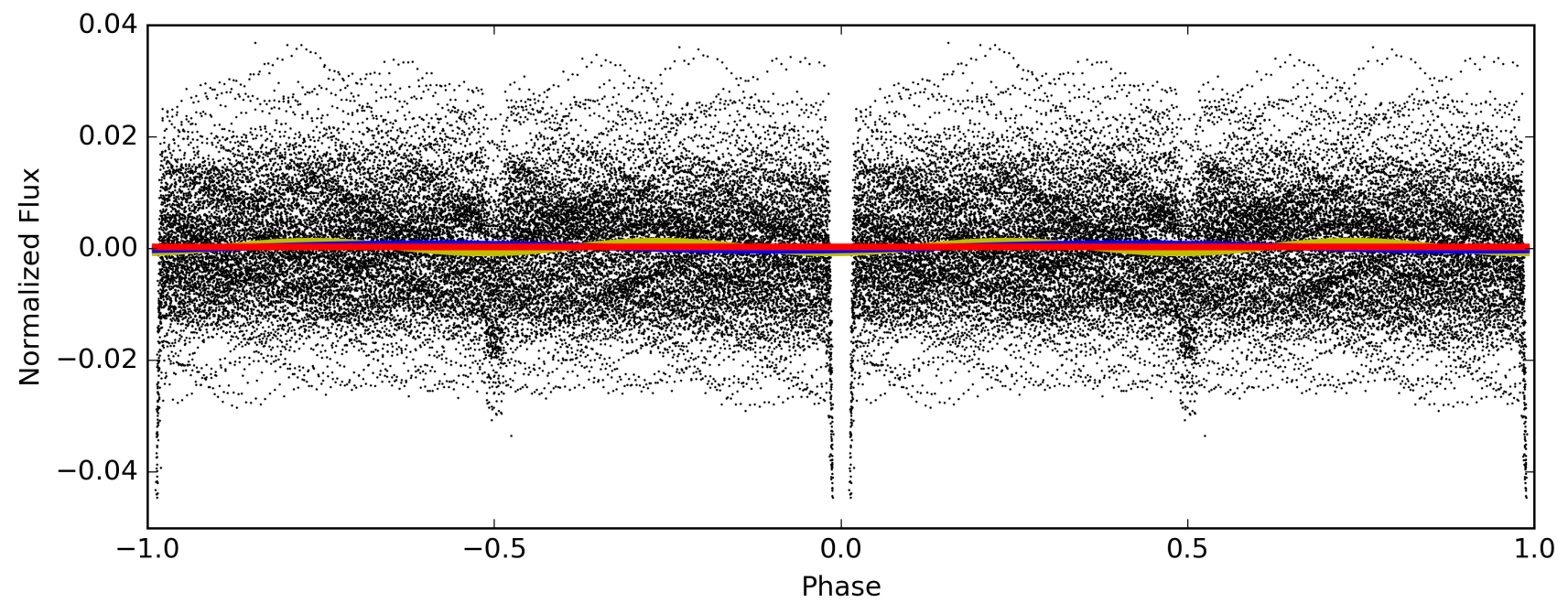
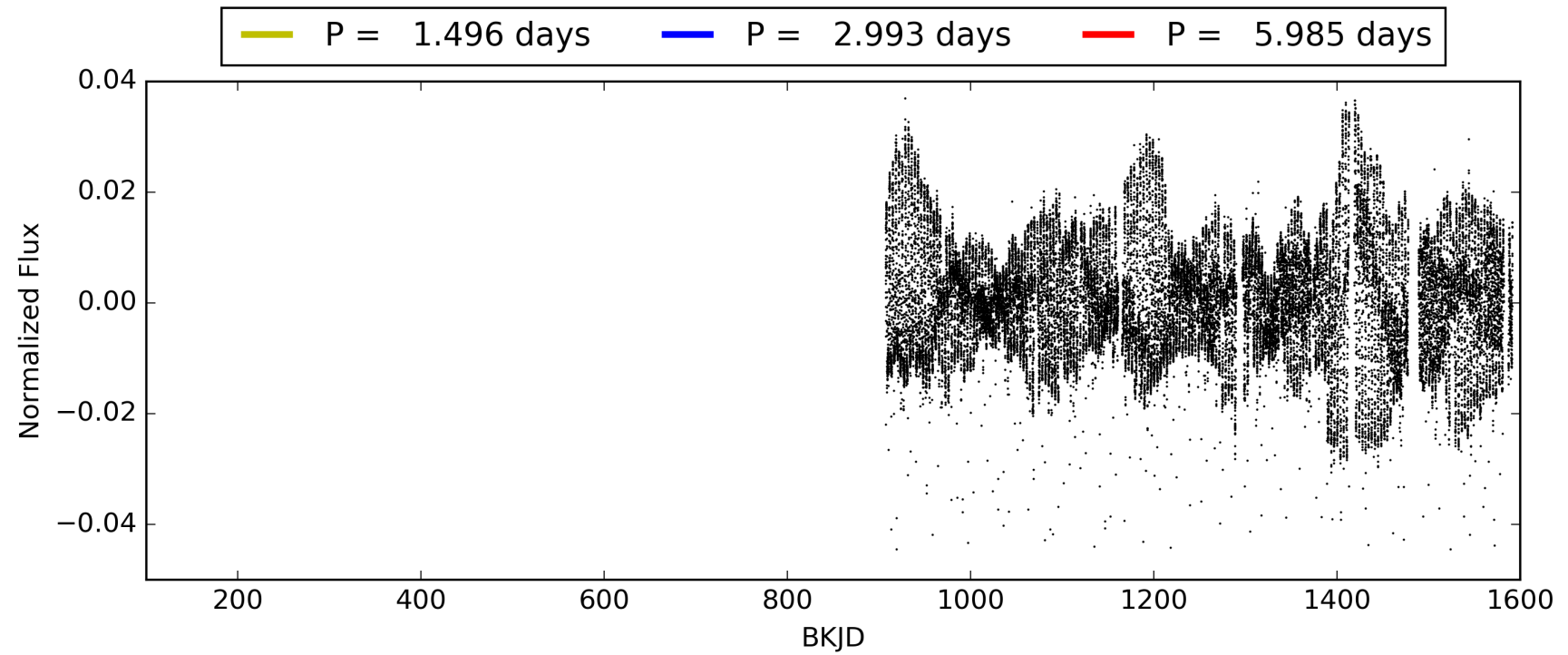
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [10.06σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [198/198]
GhostDiagnostic-chr: 2.485
Centroid-sig: N/A
Centroid-so: 0.193 arcsec [32.56σ]
OotOffset-rm: 0.067 arcsec [0.84σ]
KicOffset-rm: 0.050 arcsec [0.73σ]
OotOffset-st: 2/2/2/2 [8]
KicOffset-st: 2/2/2/2 [8]
DiffImageQuality-fgm: 1.00 [8/8]
DiffImageOverlap-fno: 0.00 [0/8]

TCE 009886224-01, PDC Light Curves

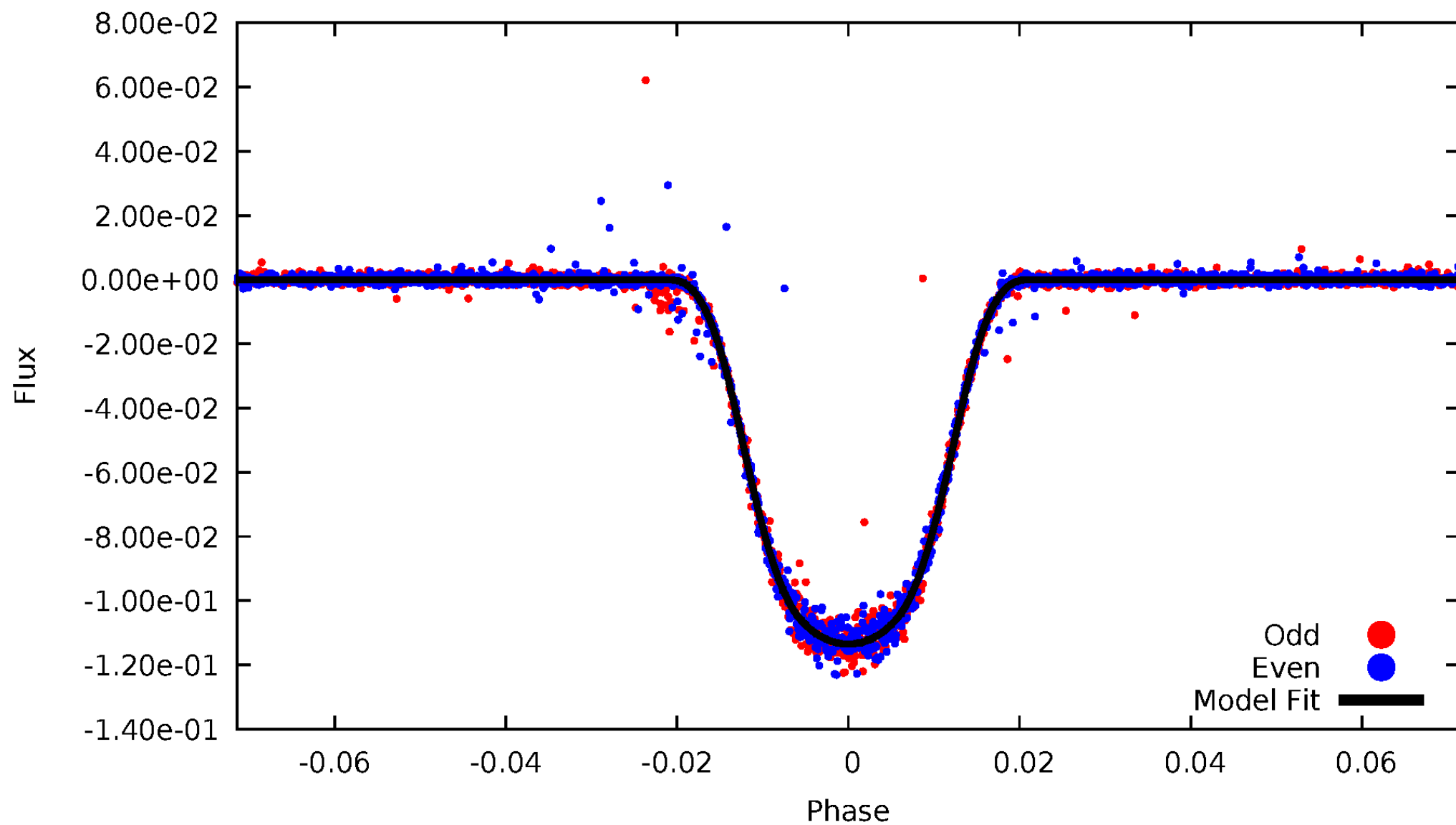


TCE 009886224-01



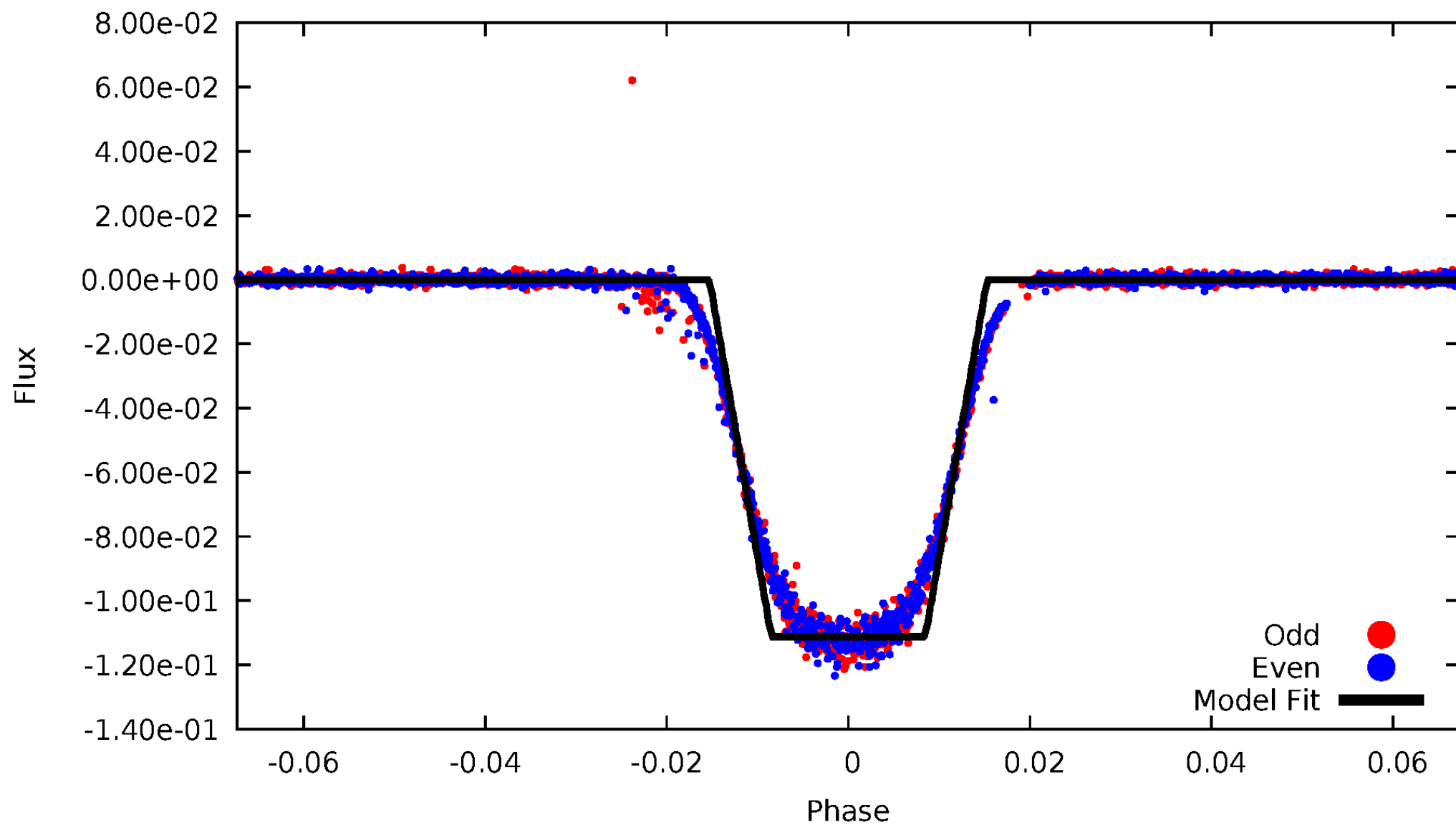
DV Odd/Even

TCE 009886224-01



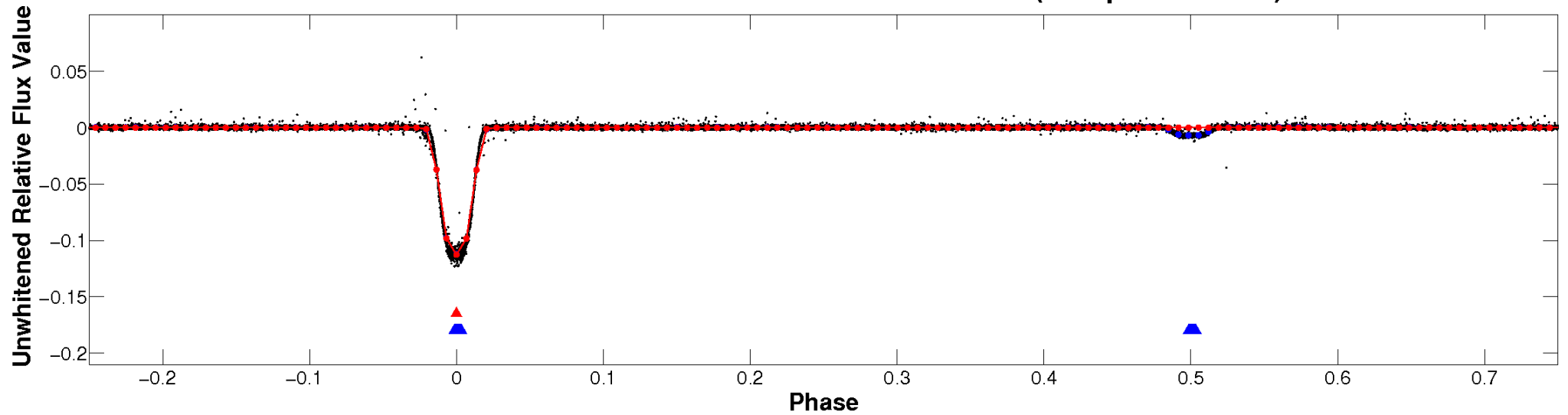
ALT Odd/Even

TCE 009886224-01

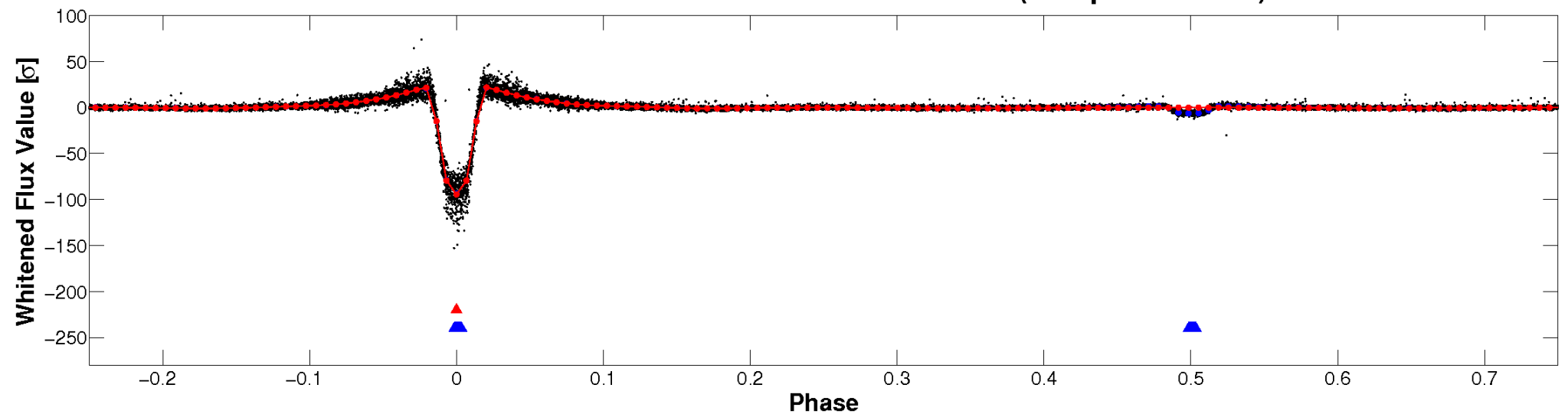


Non-Whitened Vs. Whitened Light Curve

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

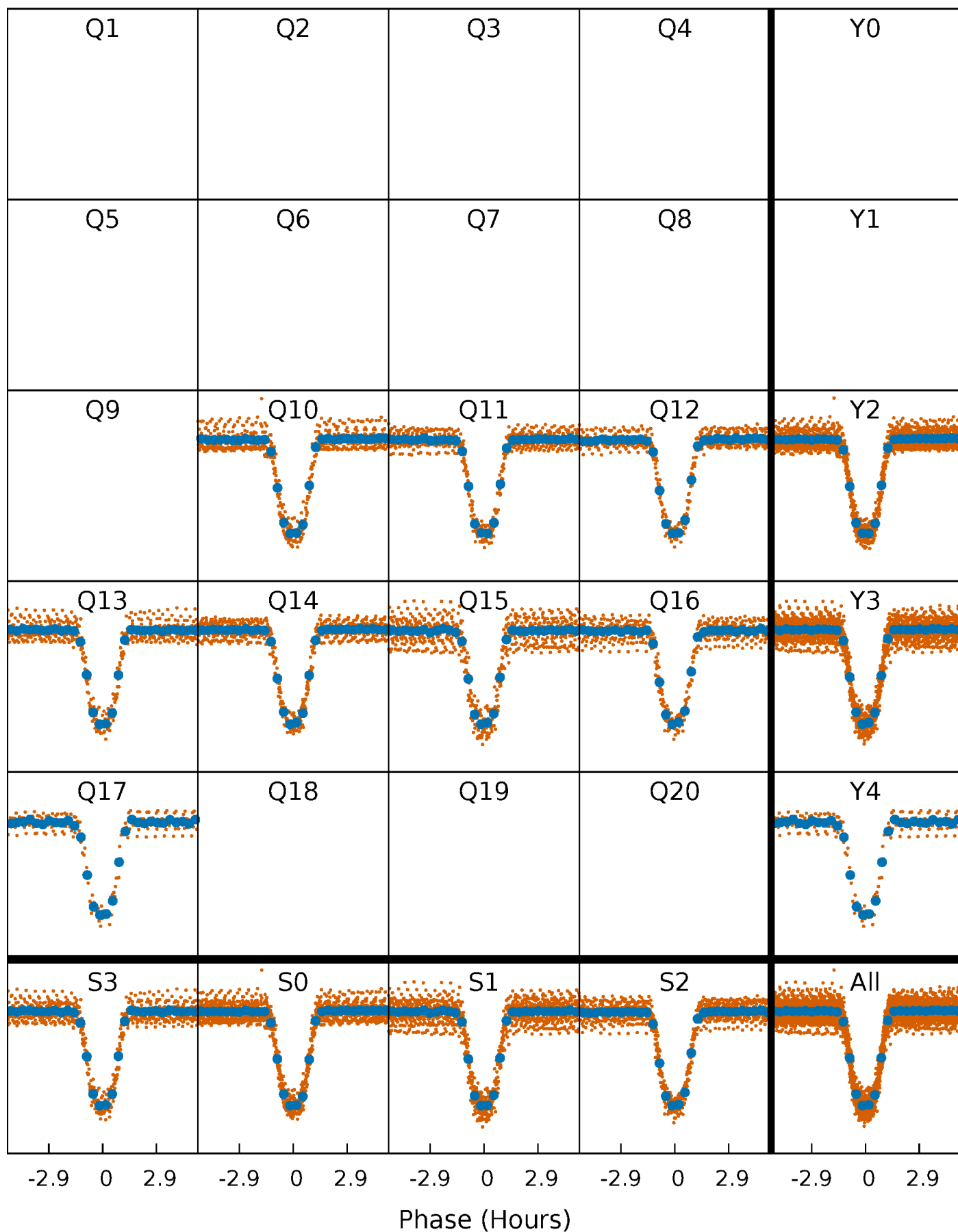


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



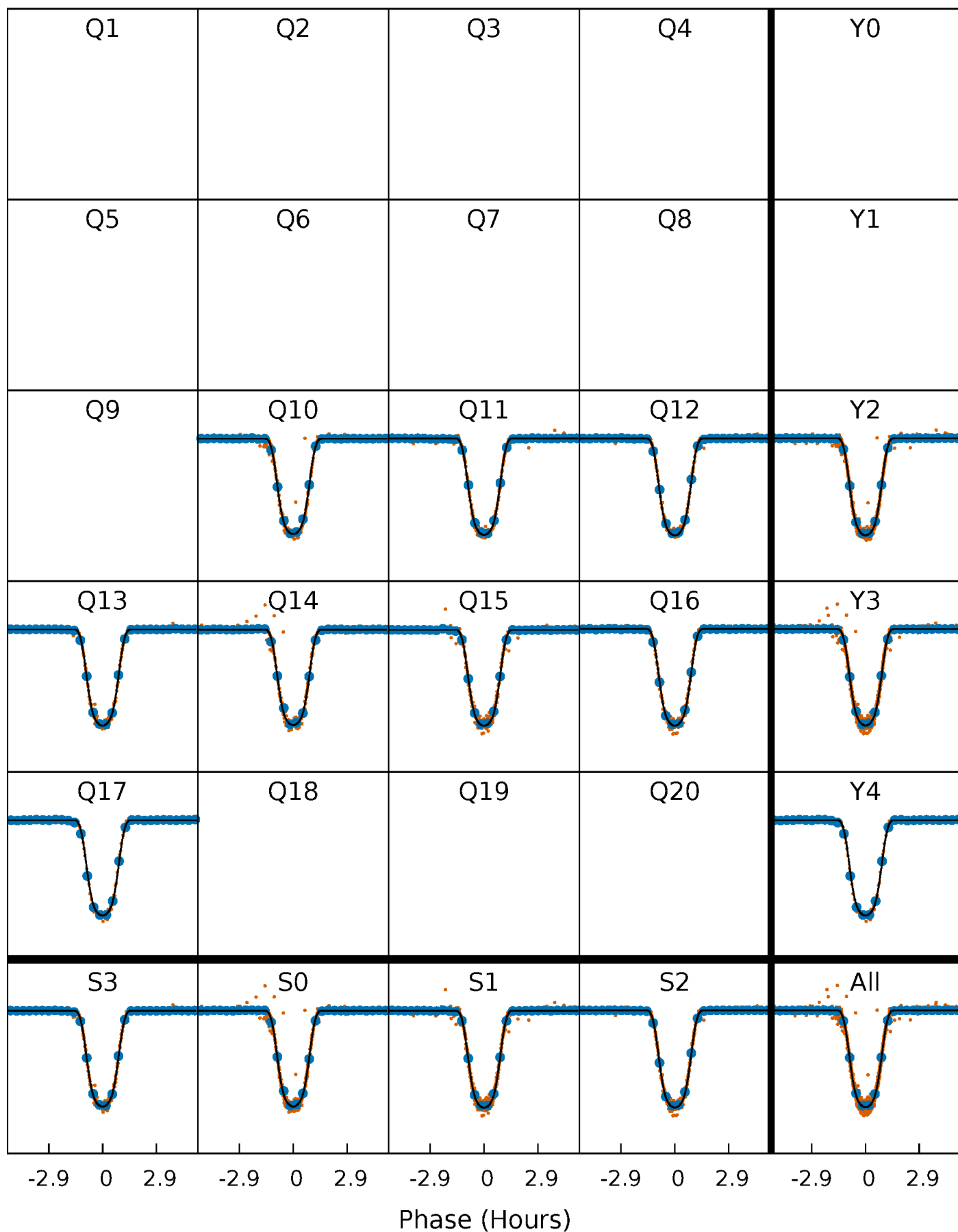
PDC Quarter-Phased Transit Curves

TCE 009886224-01 P= 2.992668 Days $T_0=131.891248$ (BKJD)



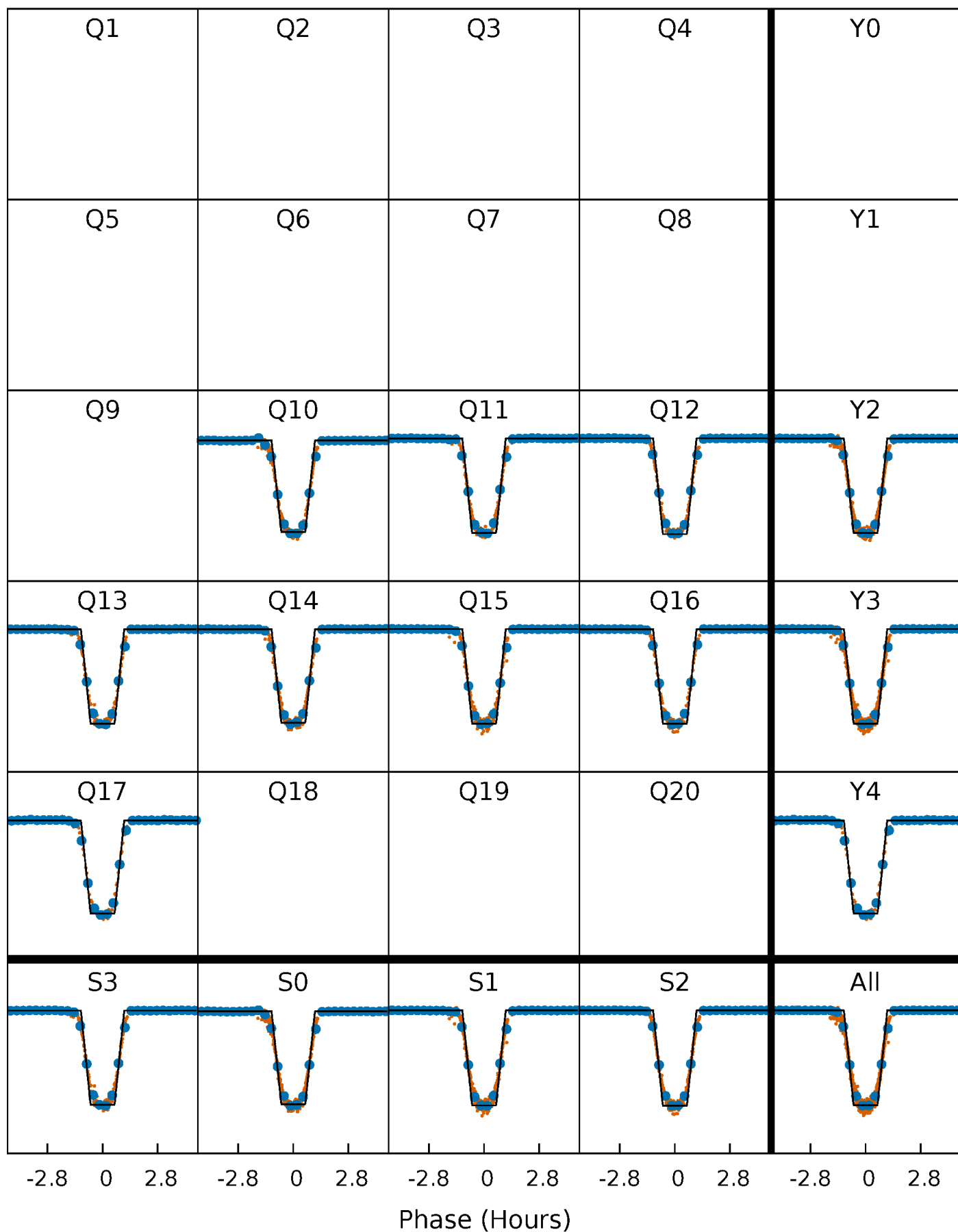
DV Quarter-Phased Transit Curves

TCE 009886224-01 P= 2.992668 Days $T_0=131.891248$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

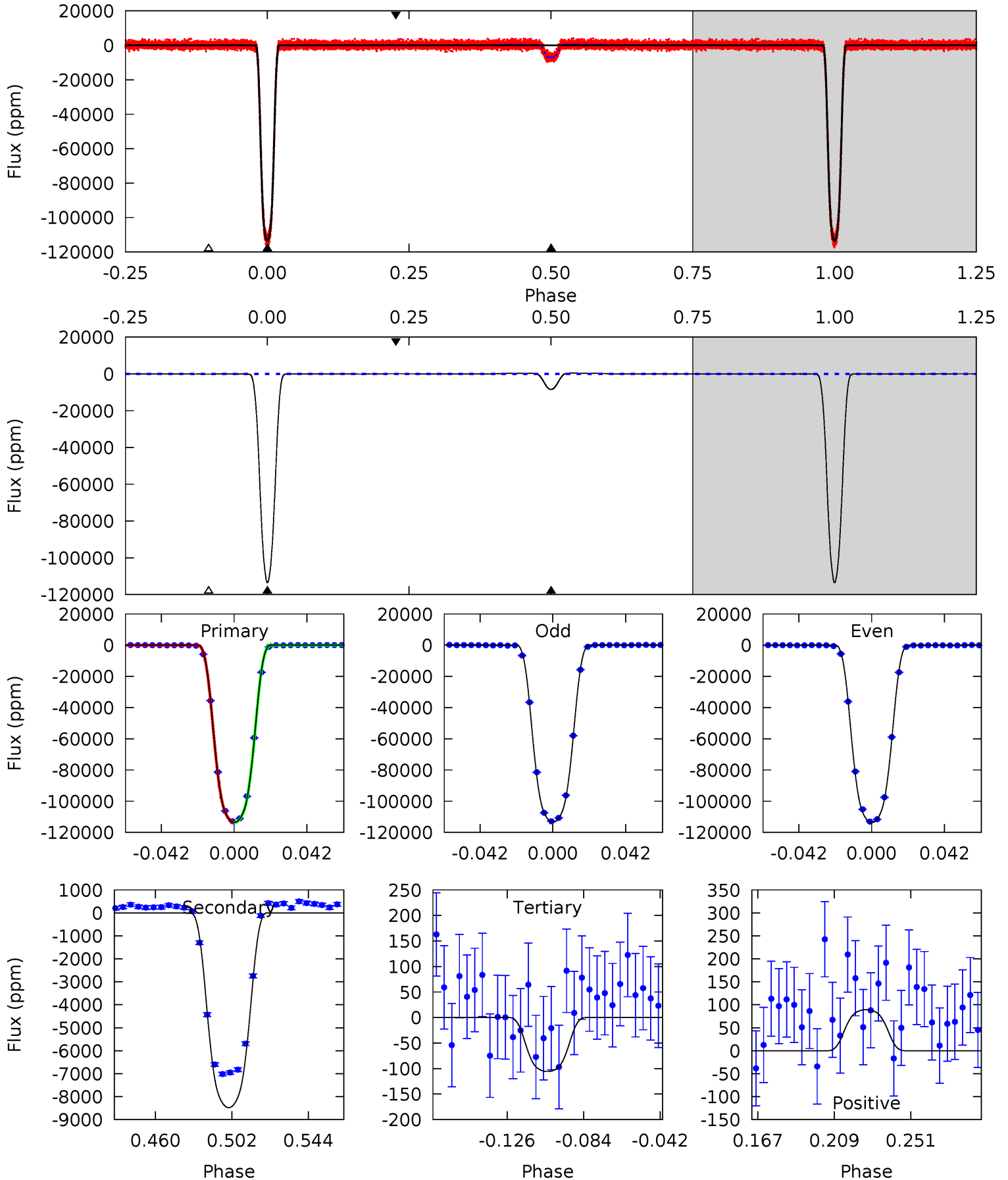
TCE 009886224-01 P= 2.992664 Days $T_0=131.892759$ (BKJD)



DV Model-Shift Uniqueness Test

009886224-01, P = 2.992668 Days, E = 131.891248 Days

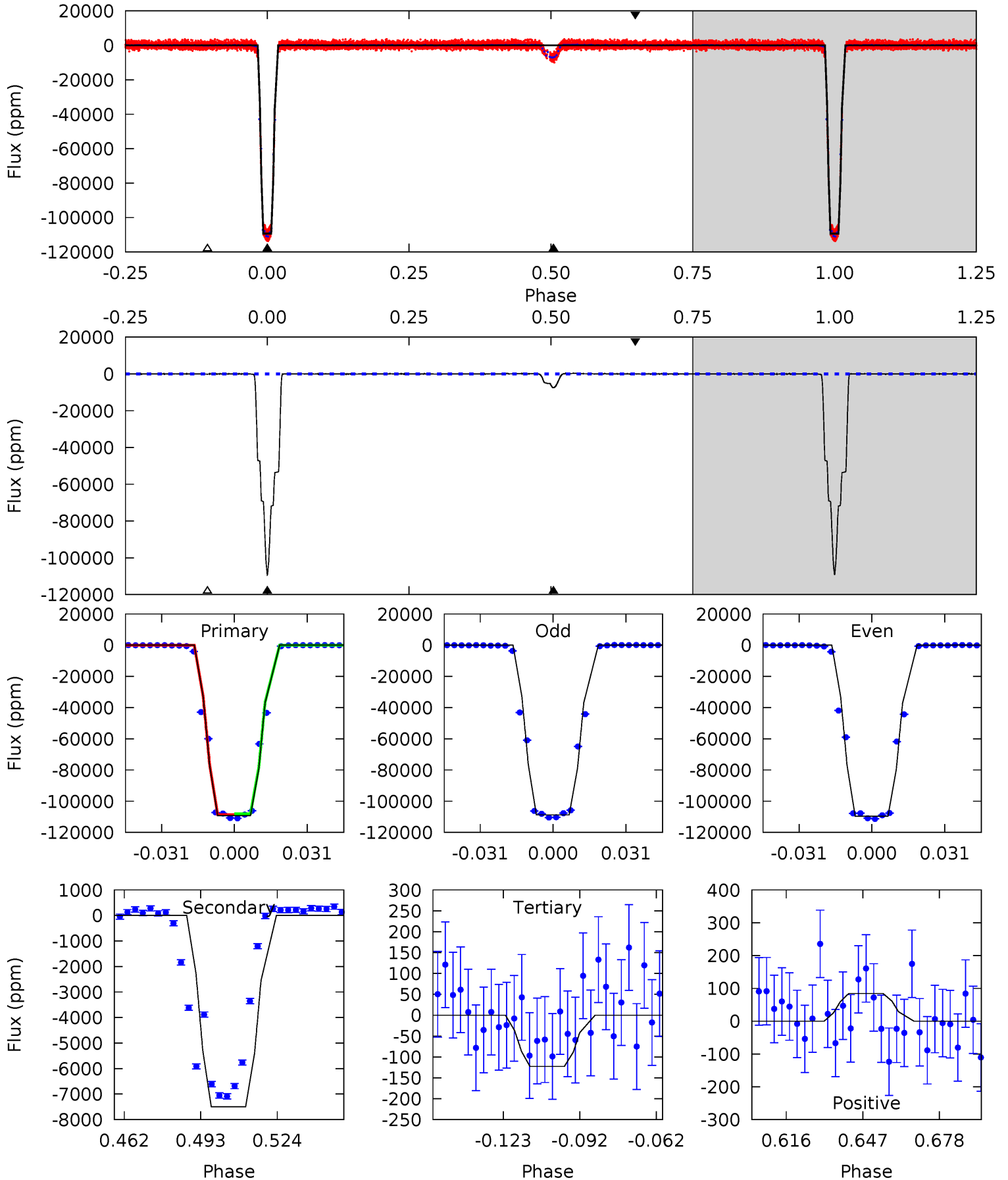
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3860	288.1	3.59	3.03	4.74	2.04	3.81	3856	3857	284.5	285.0	4.21	0.99	0.00	0



Alt Model-Shift Uniqueness Test

009886224-01, P = 2.992664 Days, E = 131.892759 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2266	155.3	2.54	1.74	4.81	2.16	1.29	2263	2264	152.8	153.6	9.37	1.00	0.00	5.26



Stellar Parameters For KIC 009886224

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4927^{+190}_{-155}	$3.883^{+0.728}_{-0.312}$	$0.160^{+0.250}_{-0.250}$	$1.837^{+1.103}_{-1.103}$	$0.940^{+0.219}_{-0.164}$	$0.214^{+2.416}_{-0.169}$
	+4%/-3%	+19%/-8%	+156%/-156%	+60%/-60%	+23%/-17%	+1131%/-79%
Source	KIC0	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 009886224-01 / KOI 3614.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-8477 ± 29	$58.92^{+19.30}_{-18.26}$	2031^{+320}_{-345}	3173^{+87}_{-100}	$2.151^{+2.327}_{-0.904}$
Alt.	-7495 ± 48	$64.29^{+21.03}_{-18.78}$	2021^{+313}_{-320}	3001^{+93}_{-96}	$1.597^{+1.584}_{-0.654}$

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

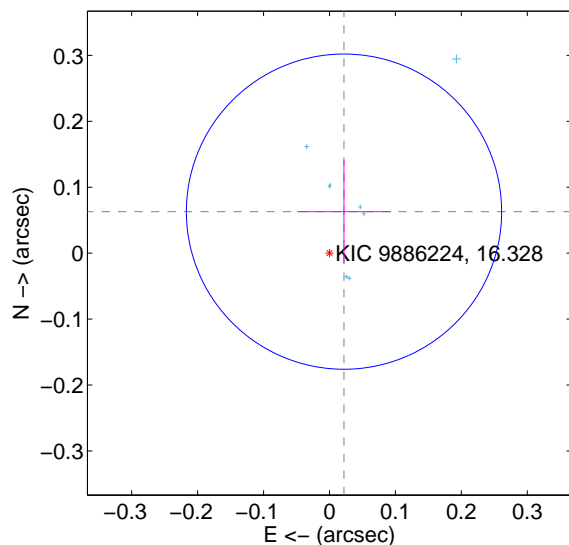
Supplemental centroid analysis for 009886224-01. Kepler magnitude: 16.33. Transit SNR 1682.98

There are 8 quarters with good PRF difference image offsets

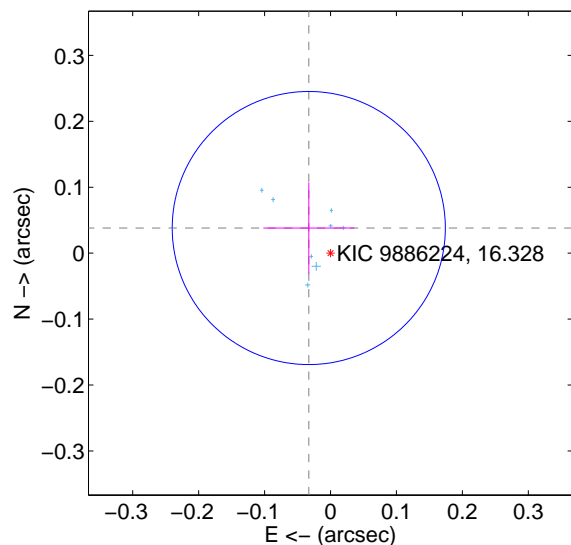
The direct PRF centroid is offset from the target star catalog position by about 0.38 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.067 ± 0.080	0.84	-0.022 ± 0.071	0.063 ± 0.078
PRF-fit source offset from KIC position	0.050 ± 0.069	0.73	0.033 ± 0.069	0.038 ± 0.069
photometric centroid source offset	0.19 ± 0.01	32.56	0.19 ± 0.01	-0.03 ± 0.00

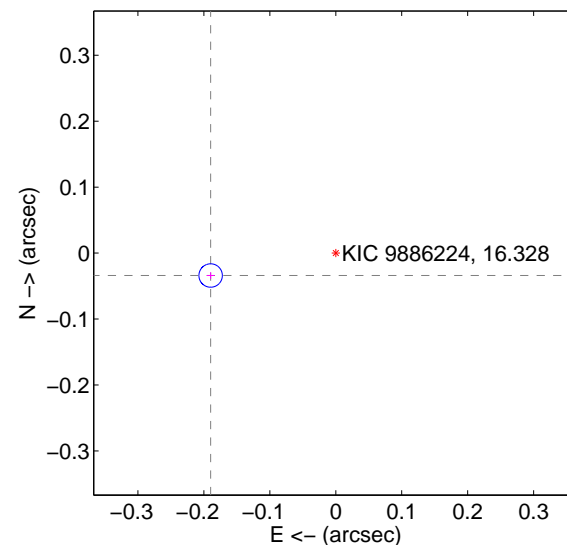
offset from difference PRF-fit to OOT PRF-fit



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.

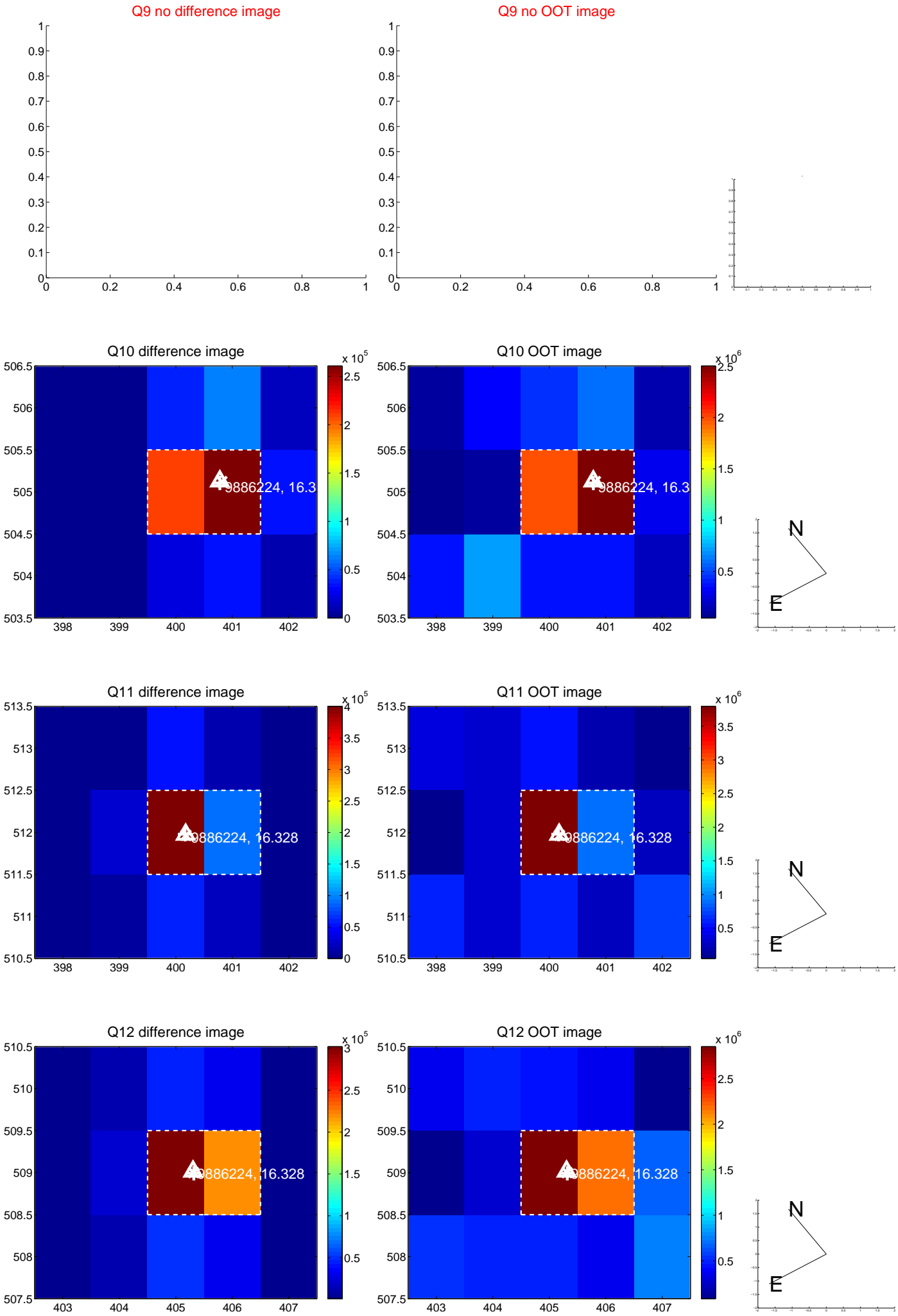
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



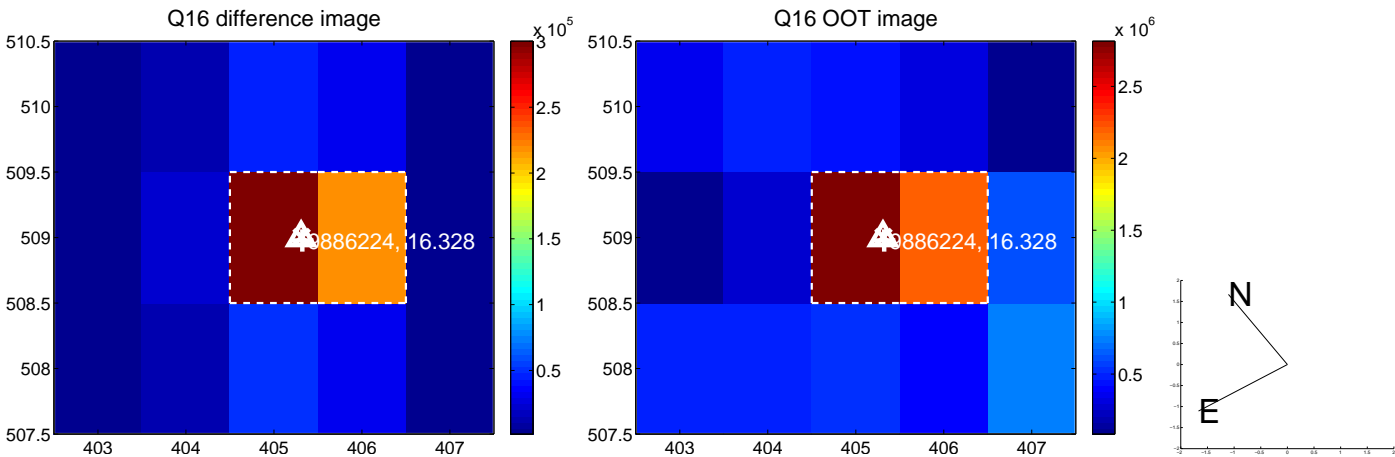
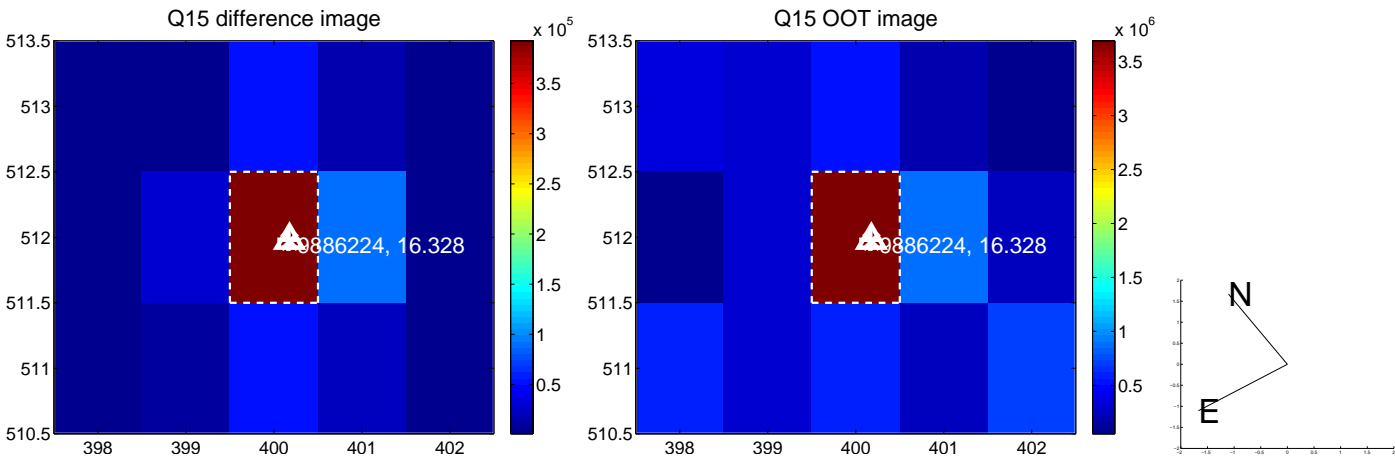
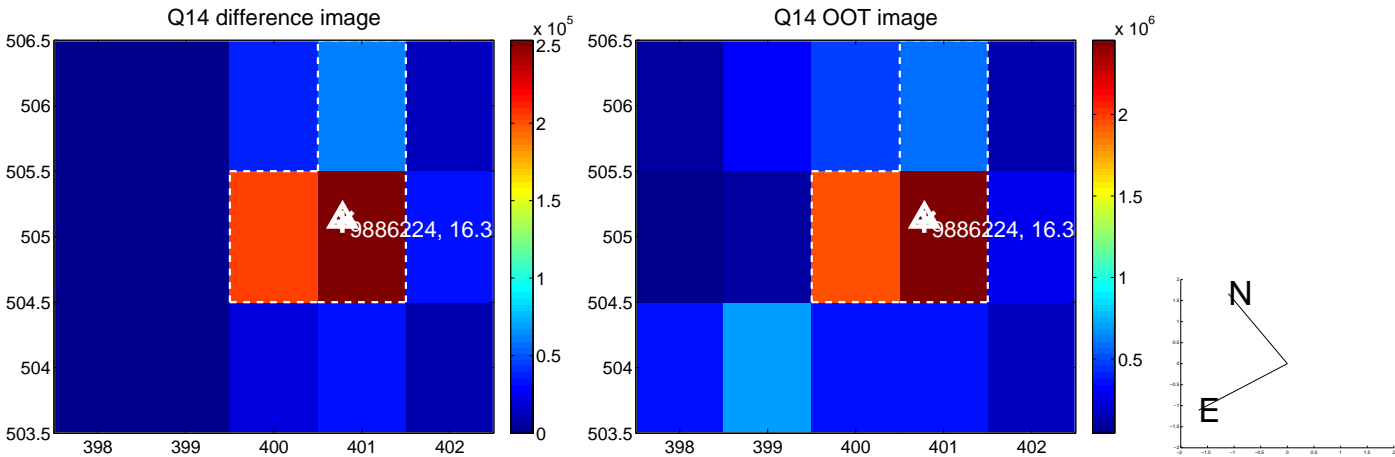
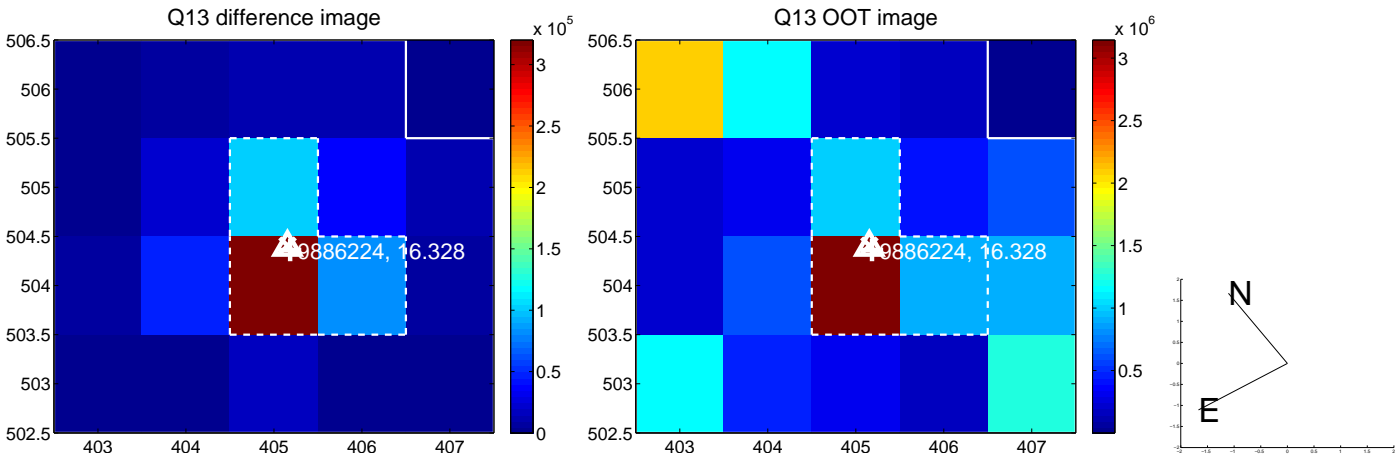
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



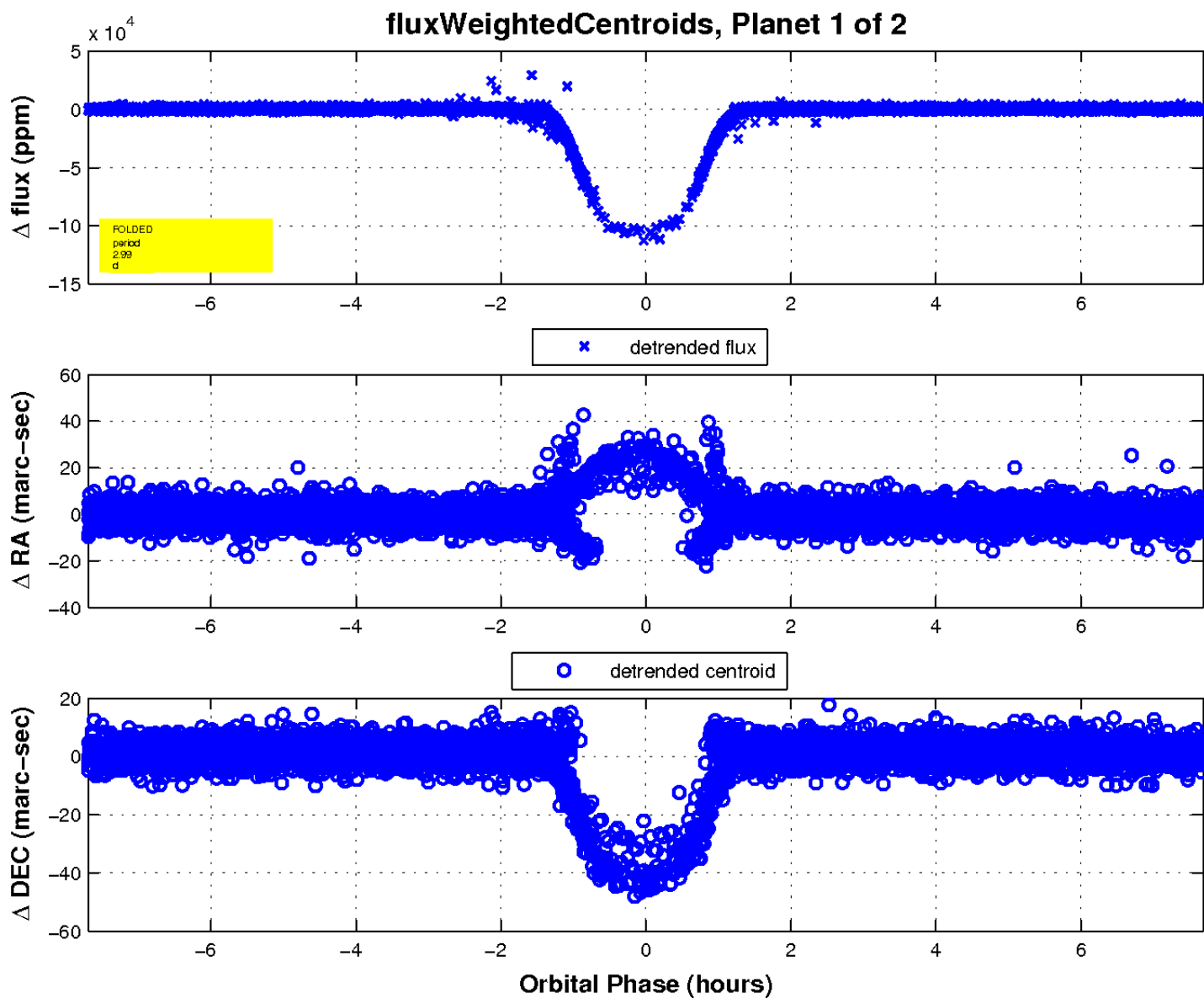
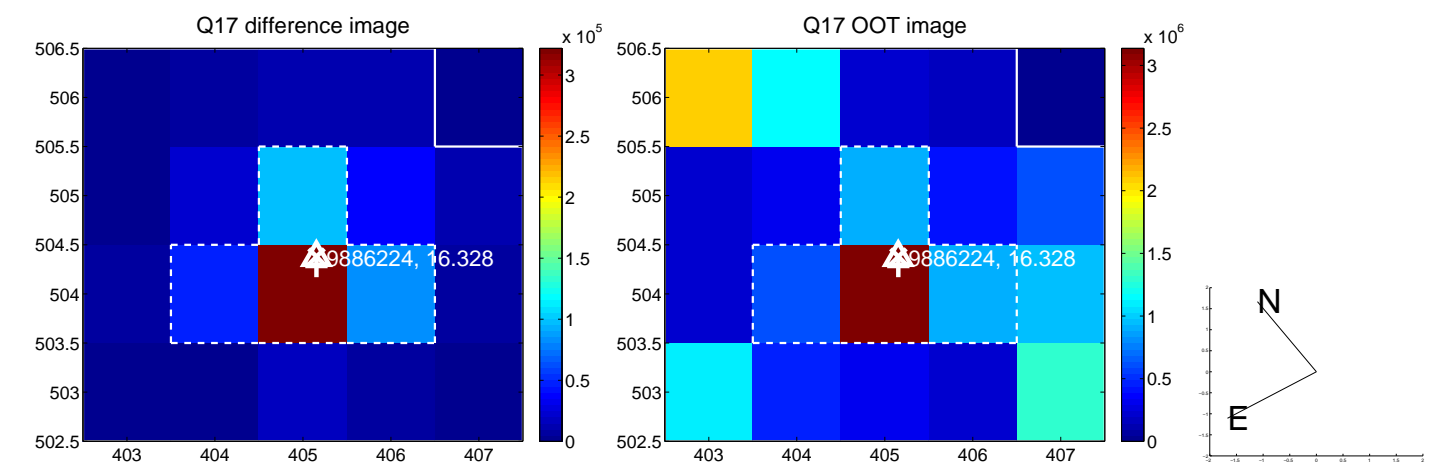
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

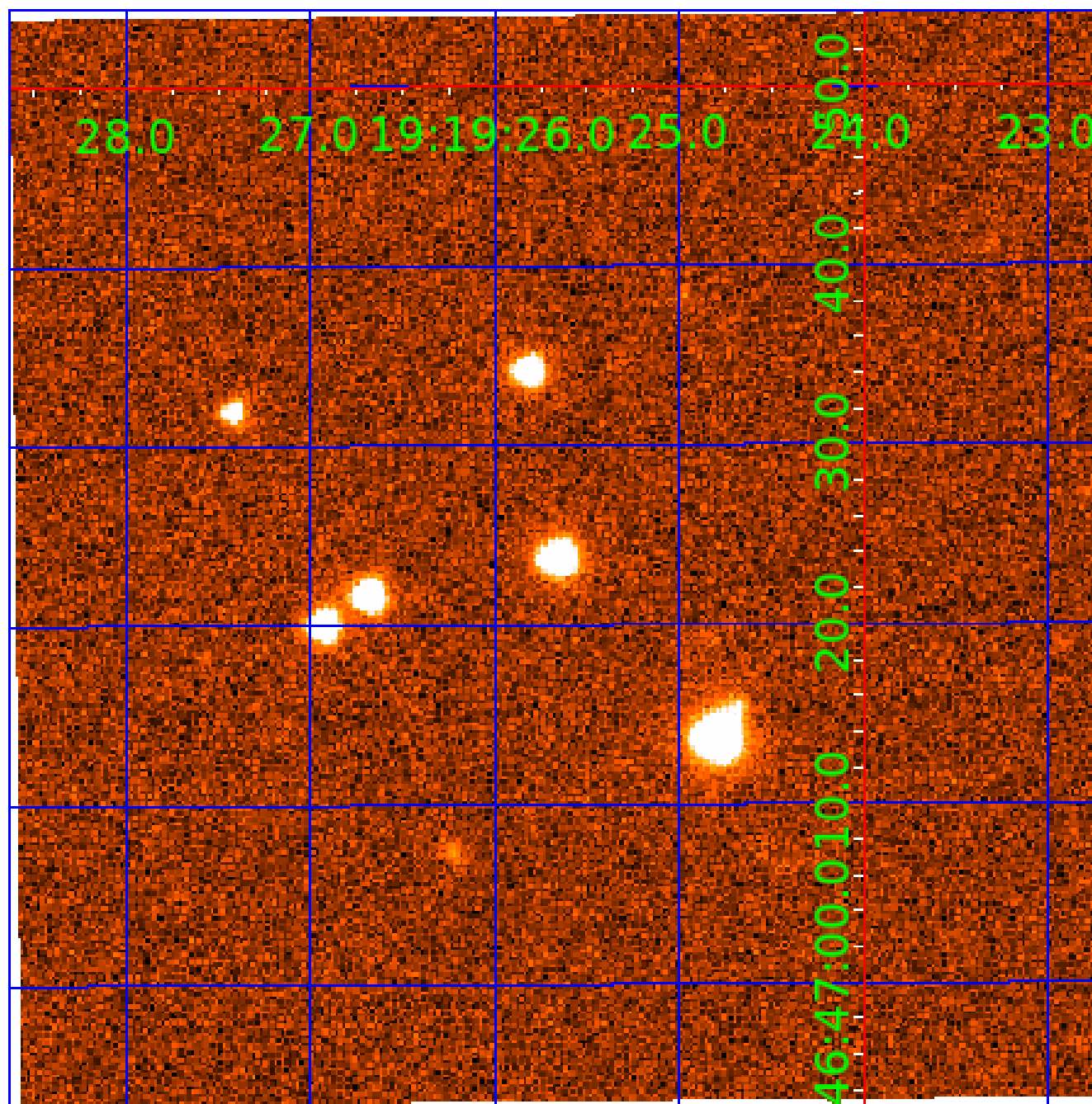


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009886224

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})
009886224-01	OBS	3614.01	2.992668	131.891248	113500.7	2.564	2288.1	1683.0	1.84	4927	60.94	1123.45
009886224-02	OBS	No	1.496320	131.901312	7441.9	2.484	162.0	156.5	1.84	4927	17.70	2830.95

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009886224-01	OBS	FP	0.01	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
009886224-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

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

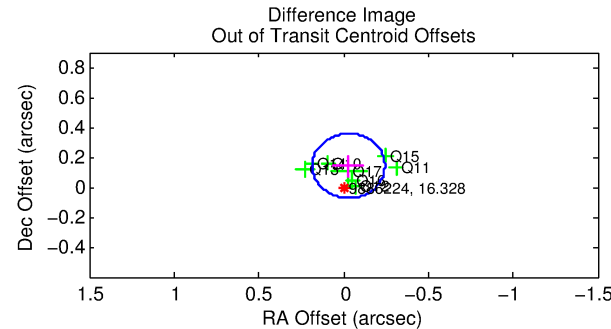
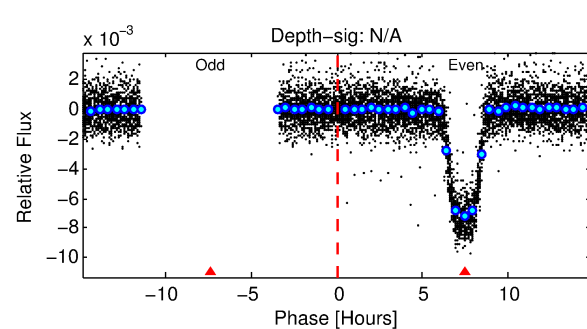
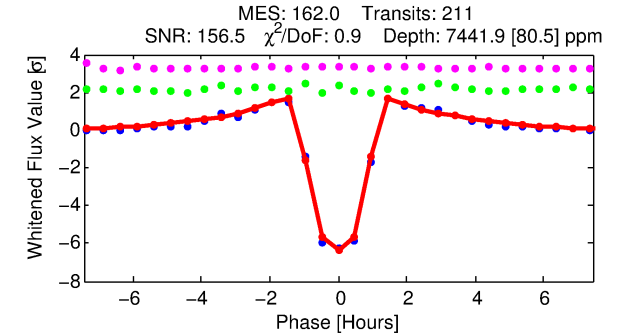
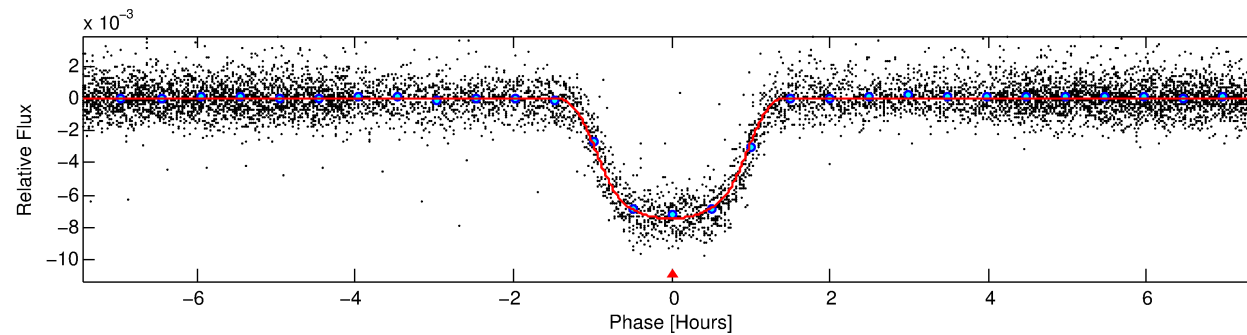
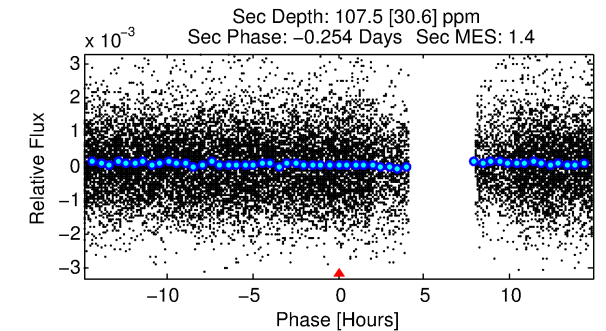
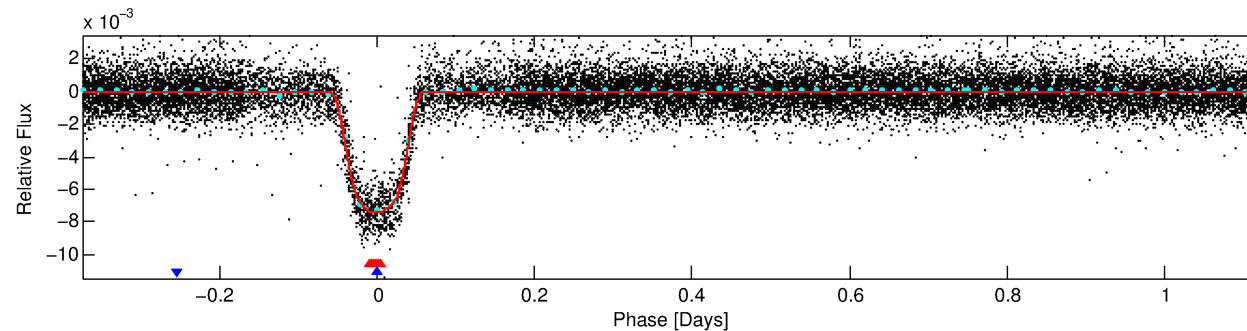
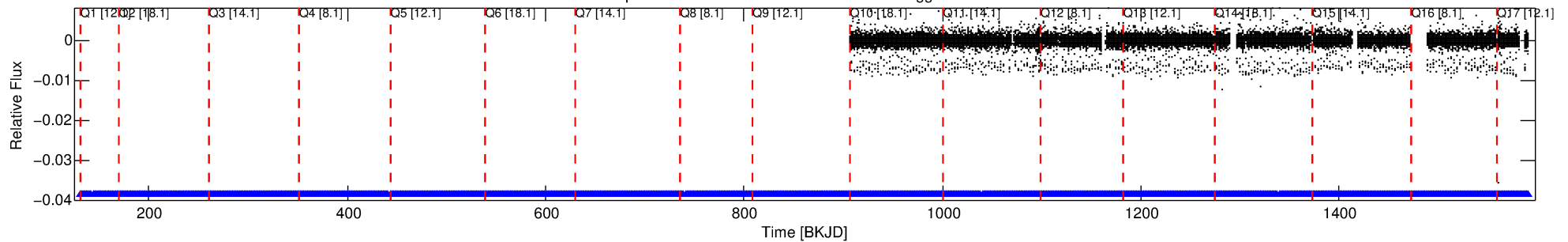
Ephemeris Match Information For 009886224-02

No Significant Match Found

DV One-Page Summary

KIC: 9886224 Candidate: 2 of 2 Period: 1.496 d
KOI: K03614 Corr: No Ephemeris Match

Kp: 16.33 R*: 1.84 Rs Teff: 4927.0 K Logg: 3.88 Fe/H: 0.160



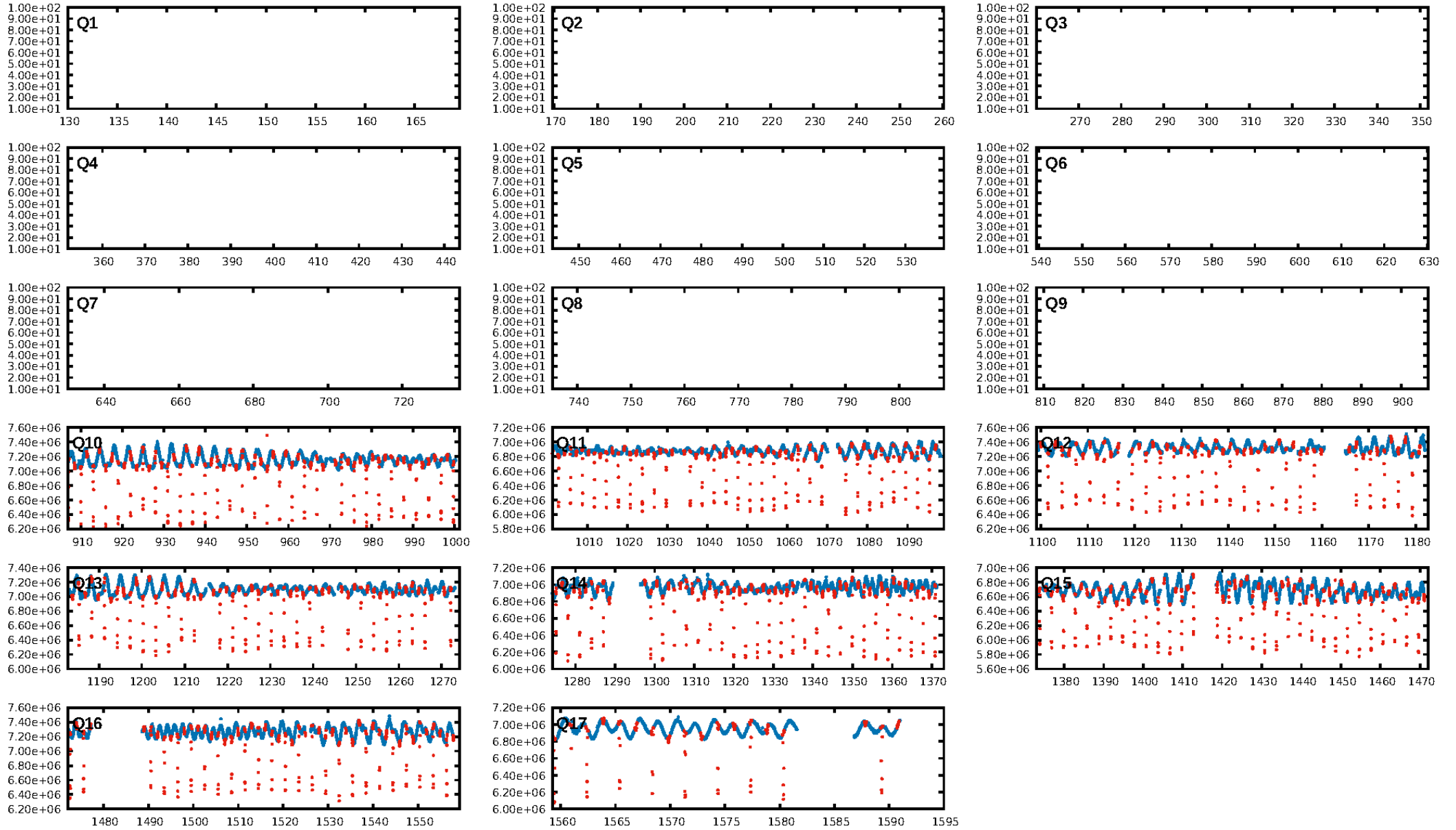
DV Fit Results:

Period = 1.49632 [0.00000] d
Epoch = 131.9013 [0.0002] BKJD
Rp/R* = 0.0883 [0.0014]
a/R* = 3.59 [0.15]
b = 0.78 [0.02]
Seff = 2830.95 [3388.73]
Teq = 1860 [557] K
Rp = 17.70 [10.63] Re
a = 0.0251 [0.0172] AU
Ag = 0.12 [0.15] [-6.07σ]
Teffp = 1689 [137] K [-0.30σ]

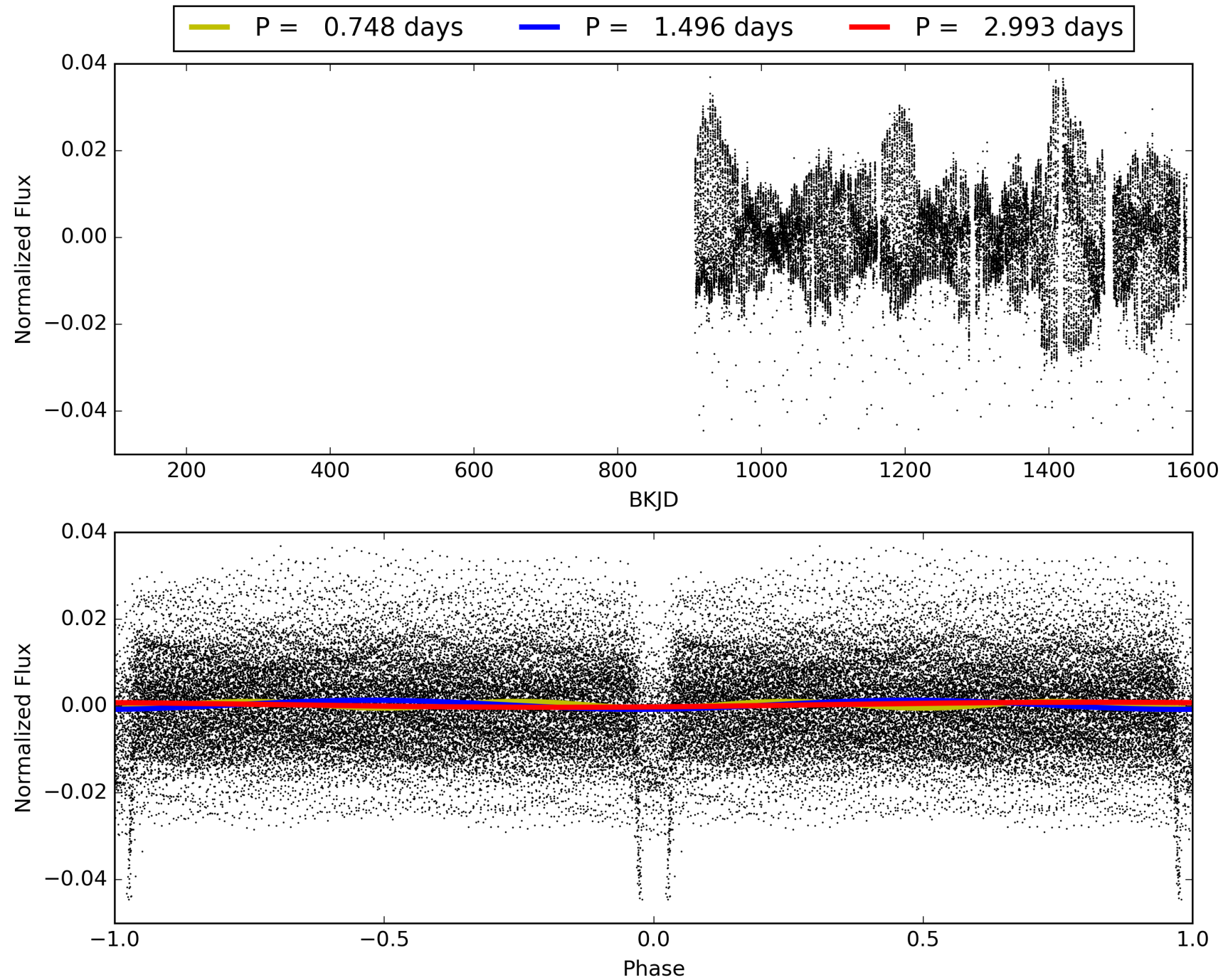
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [10.06σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [202/202]
GhostDiagnostic-chr: 1.627
Centroid-sig: N/A
Centroid-so: 0.279 arcsec [4.74σ]
OotOffset-rm: 0.144 arcsec [2.01σ]
KicOffset-rm: 0.109 arcsec [1.19σ]
OotOffset-st: 2/2/2/2 [8]
KicOffset-st: 2/2/2/2 [8]
DiffImageQuality-fgm: 1.00 [8/8]
DiffImageOverlap-fno: 1.00 [8/8]

TCE 009886224-02, PDC Light Curves

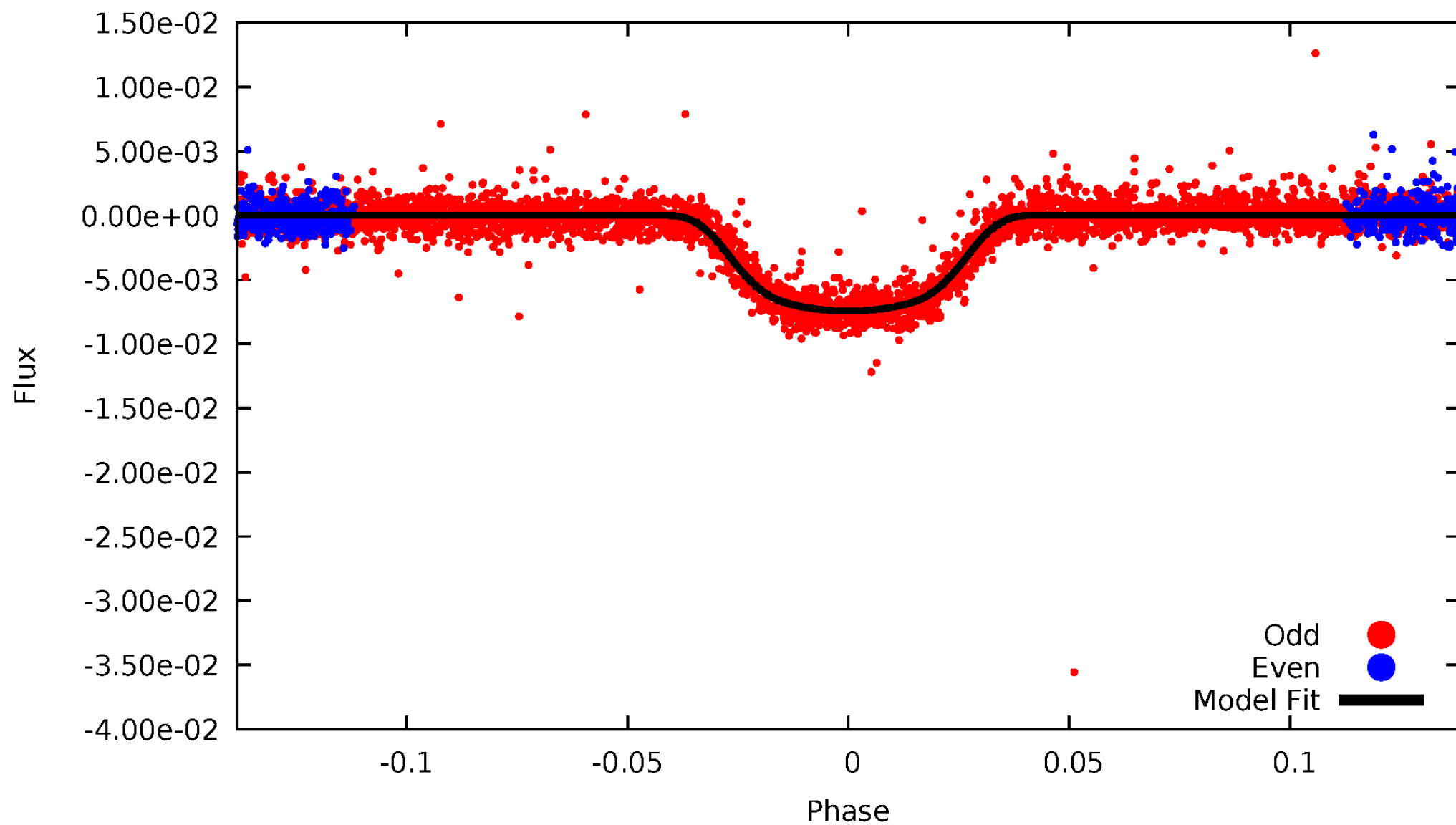


TCE 009886224-02



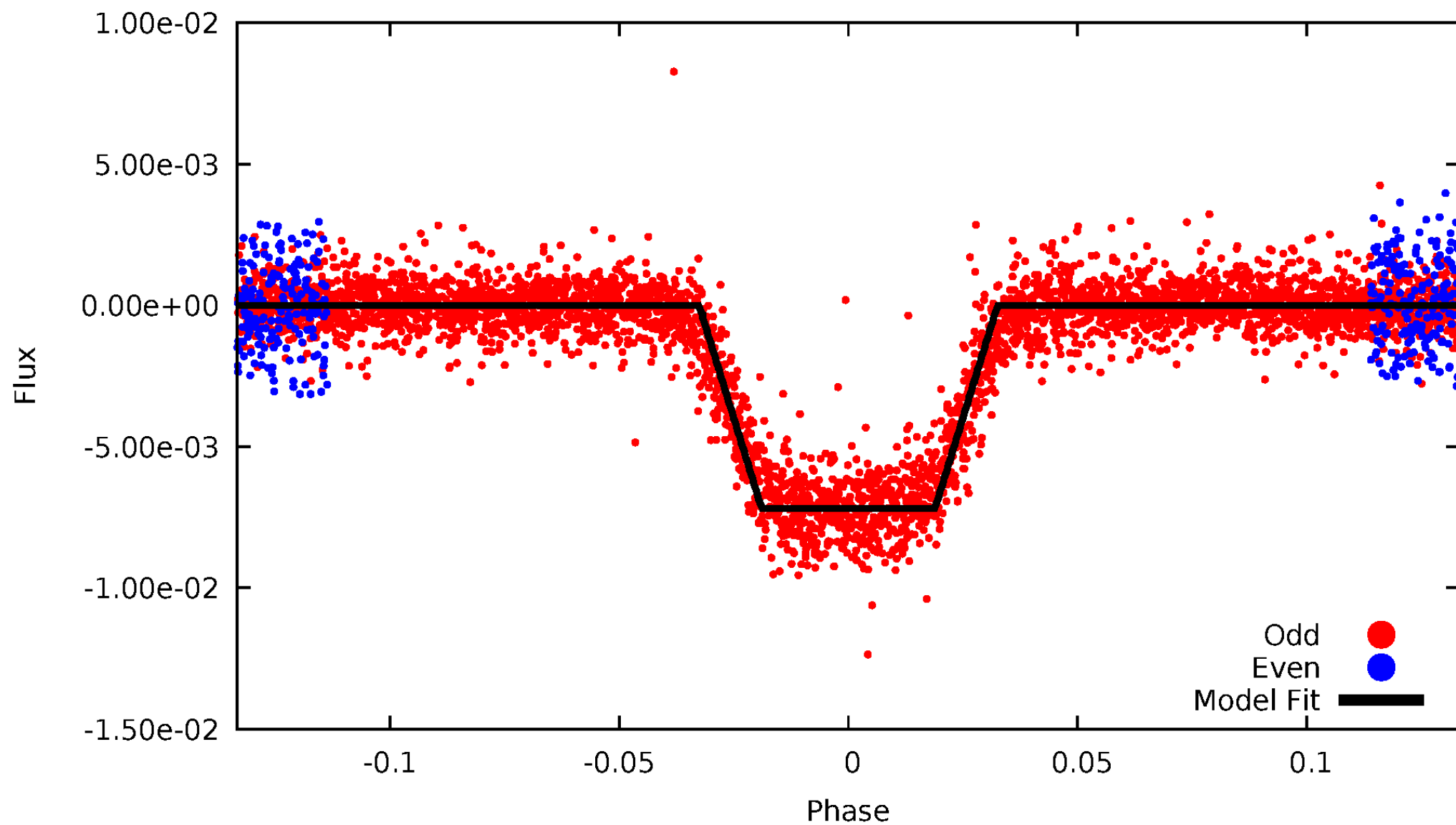
DV Odd/Even

TCE 009886224-02



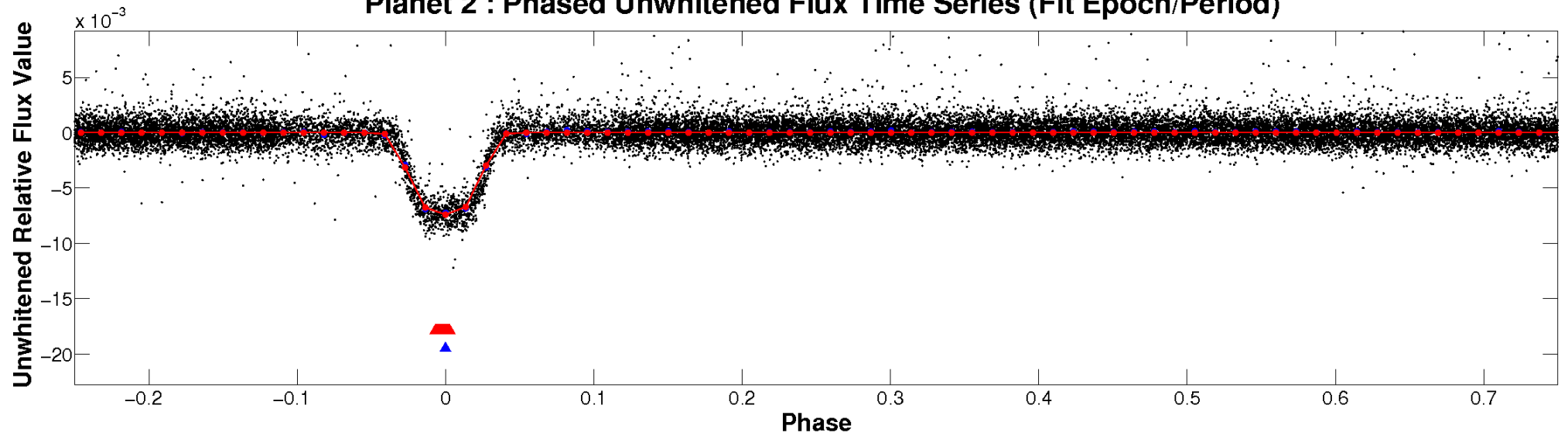
ALT Odd/Even

TCE 009886224-02

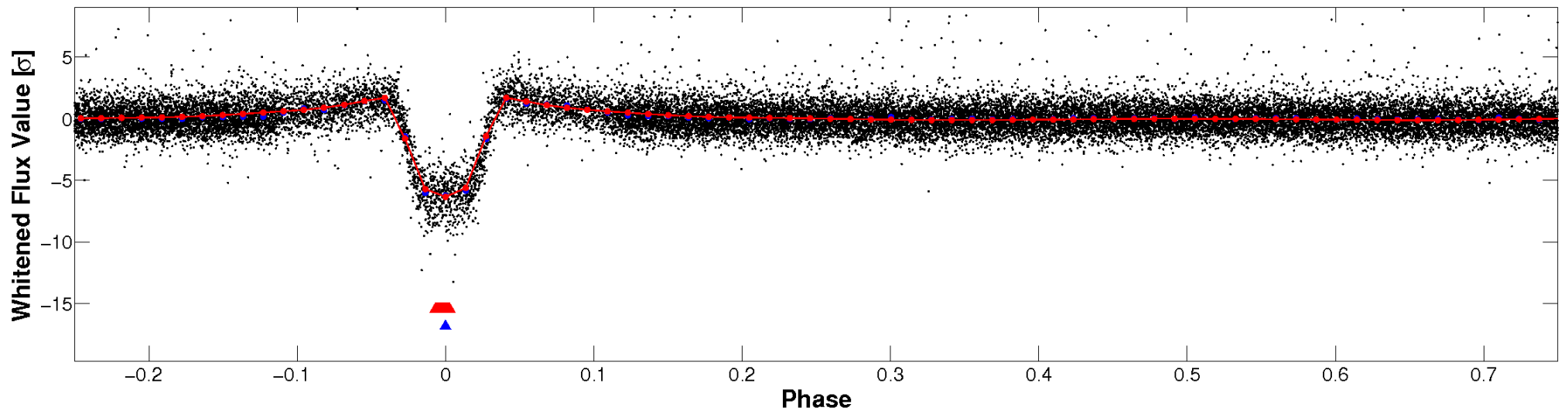


Non-Whitened Vs. Whitened Light Curve

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

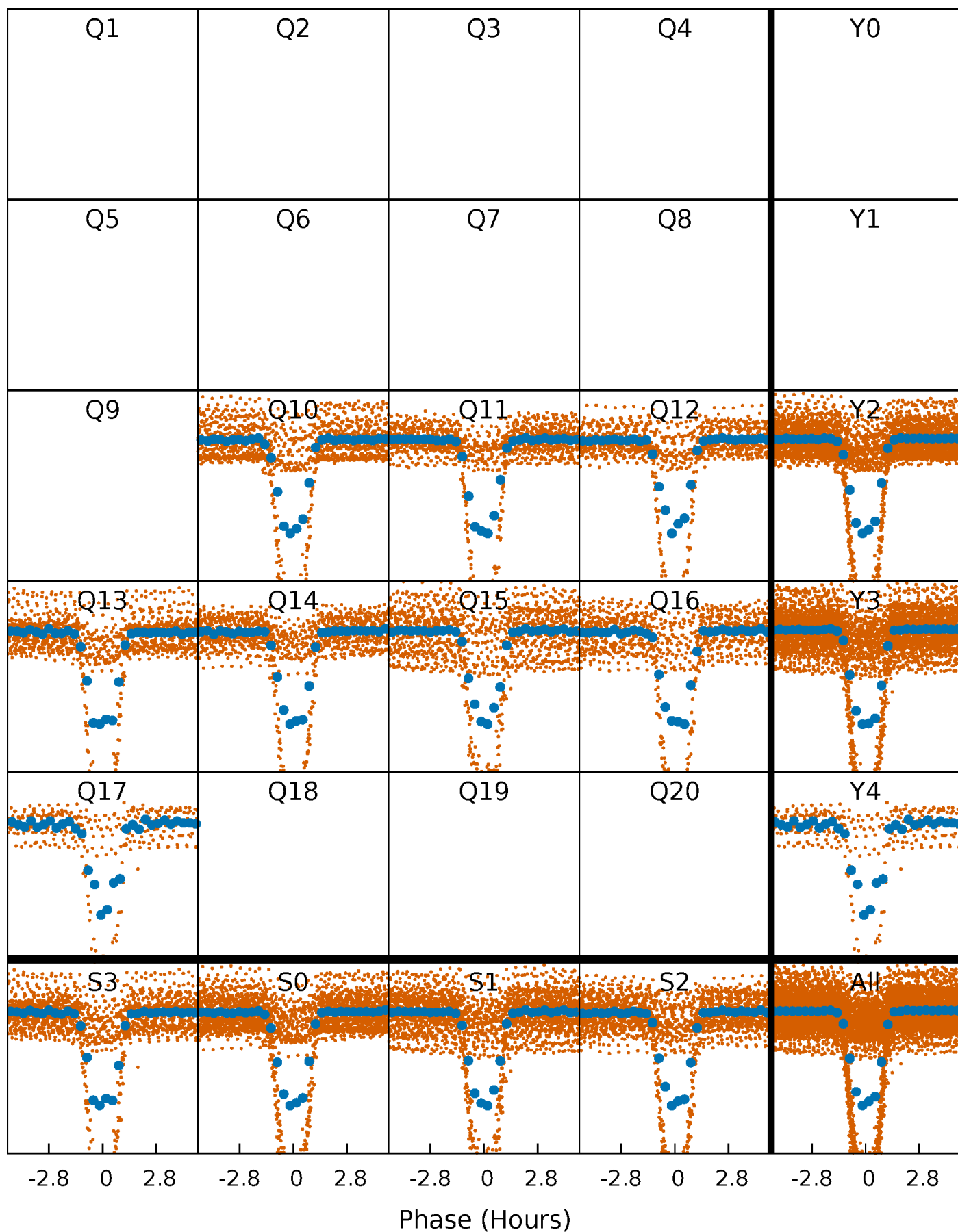


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



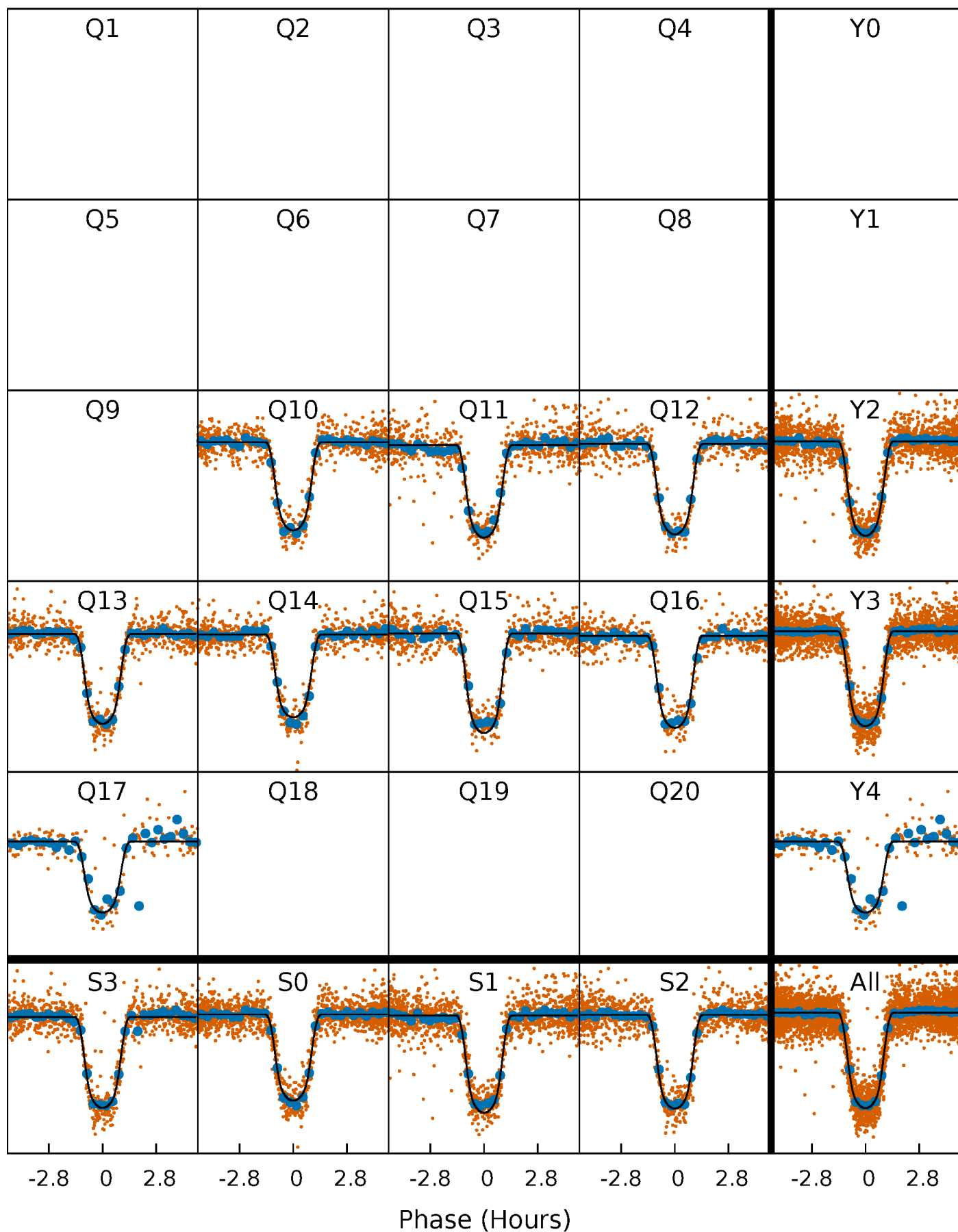
PDC Quarter-Phased Transit Curves

TCE 009886224-02 P= 1.496320 Days $T_0=131.901312$ (BKJD)



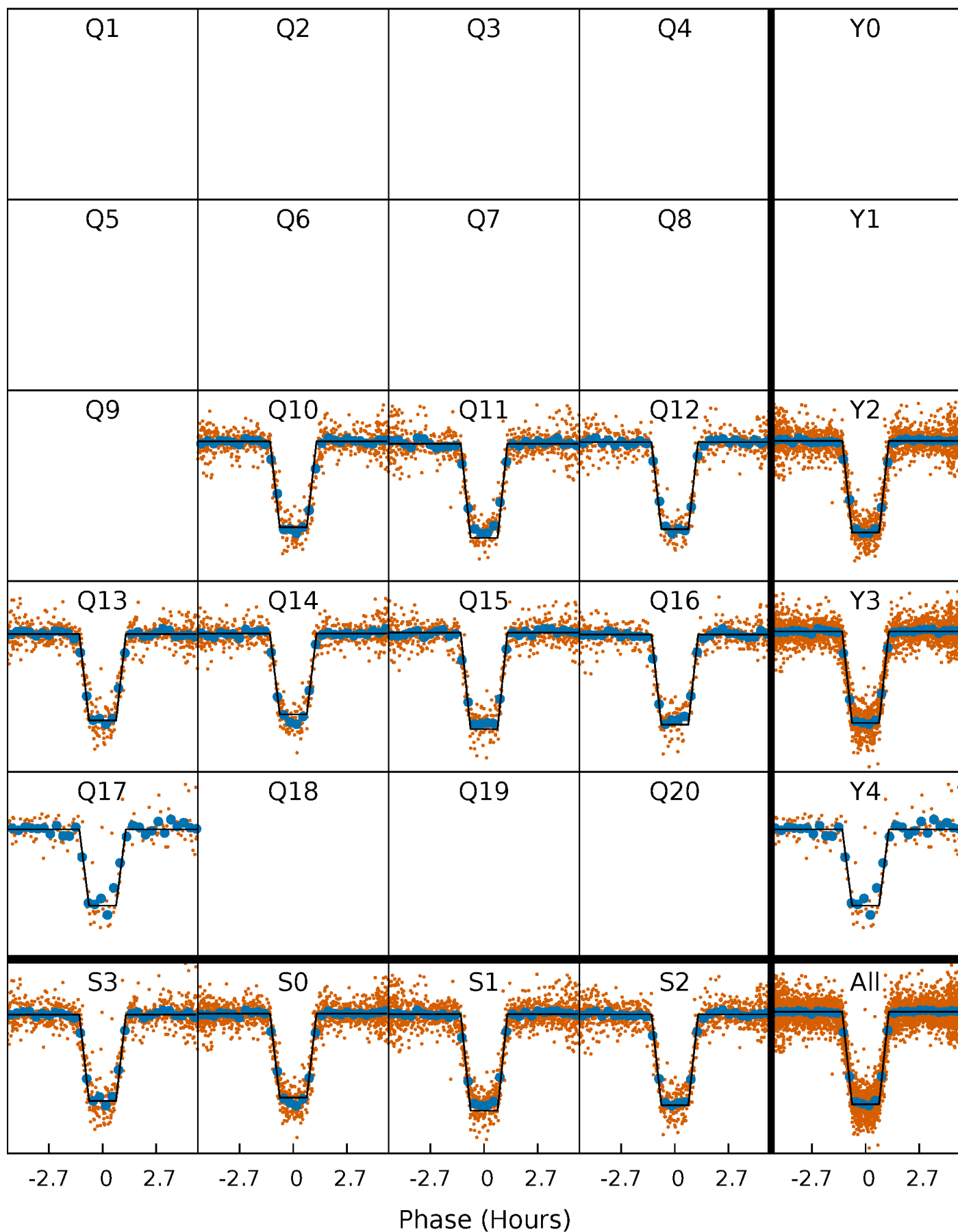
DV Quarter-Phased Transit Curves

TCE 009886224-02 P= 1.496320 Days $T_0=131.901312$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

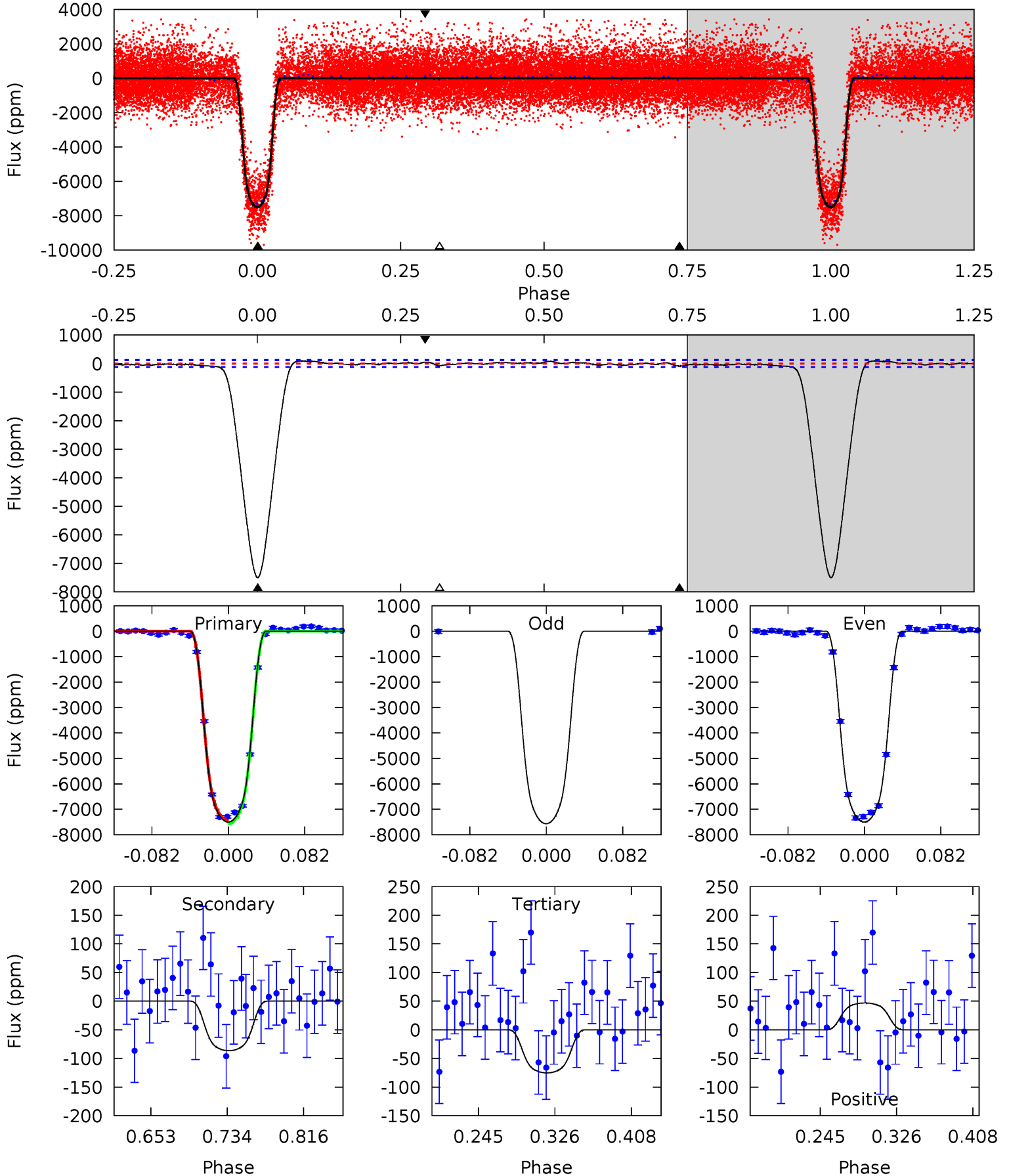
TCE 009886224-02 P= 1.496340 Days $T_0=131.887389$ (BKJD)



DV Model-Shift Uniqueness Test

009886224-02, P = 1.496320 Days, E = 131.901312 Days

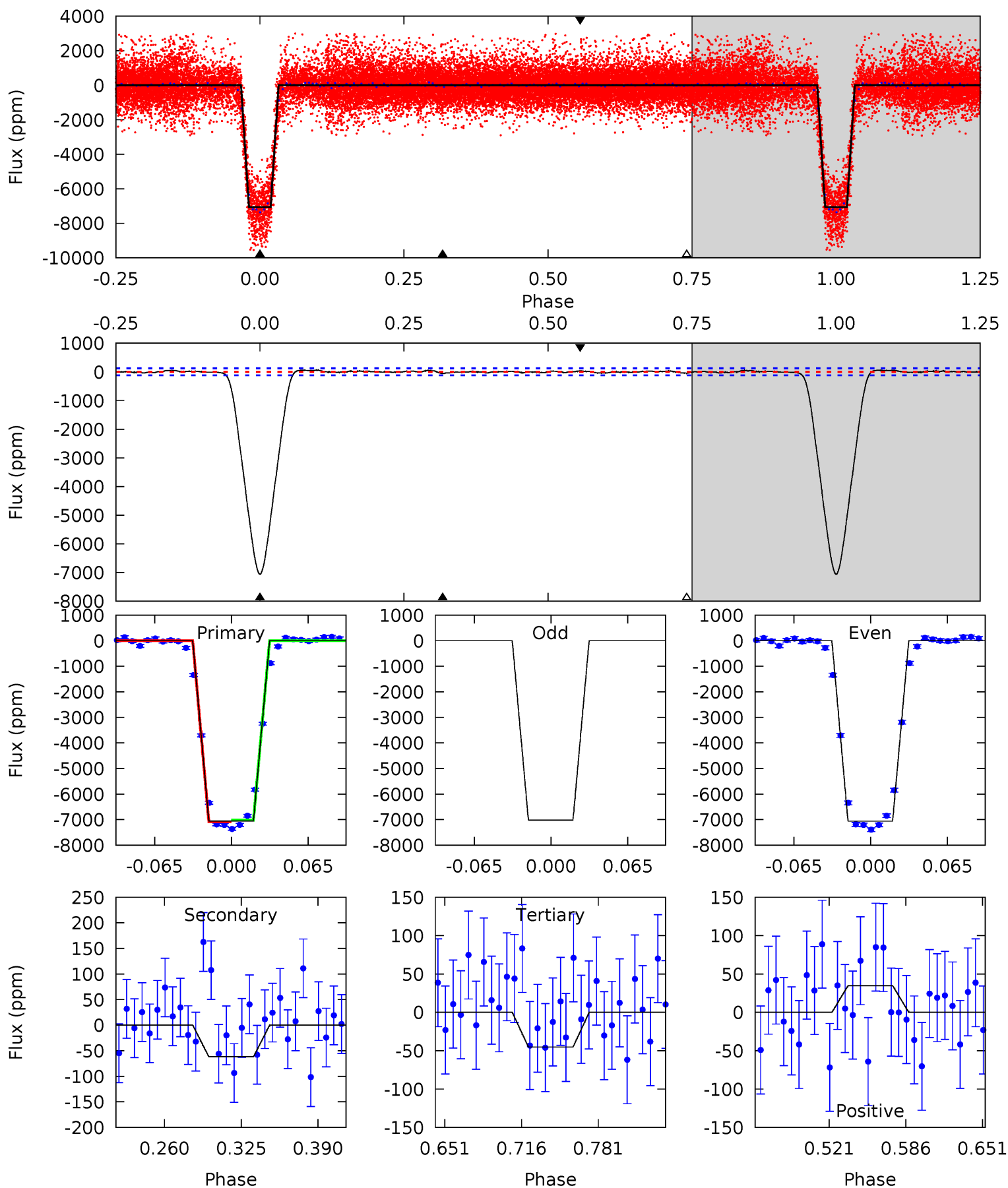
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
287.3	3.32	2.88	1.79	4.61	1.74	1.29	284.5	285.5	0.43	1.52	1.38	0.99	0.01	2.37



Alt Model-Shift Uniqueness Test

009886224-02, P = 1.496340 Days, E = 131.887389 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
271.8	2.38	1.74	1.34	4.65	1.84	0.82	270.0	270.4	0.64	1.04	0.95	1.00	0.01	1.30



Stellar Parameters For KIC 009886224

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4927^{+190}_{-155}	$3.883^{+0.728}_{-0.312}$	$0.160^{+0.250}_{-0.250}$	$1.837^{+1.103}_{-1.103}$	$0.940^{+0.219}_{-0.164}$	$0.214^{+2.416}_{-0.169}$
	+4%/-3%	+19%/-8%	+156%/-156%	+60%/-60%	+23%/-17%	+1131%/-79%
Source	KIC0	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 009886224-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-87 ± 26	$17.22^{+5.74}_{-6.02}$	2556^{+408}_{-495}	-2649^{+537}_{-292}	$0.099^{+0.137}_{-0.047}$
Alt.	-62 ± 26	$16.56^{+5.38}_{-5.41}$	2553^{+378}_{-442}	-2681^{+399}_{-276}	$0.080^{+0.103}_{-0.045}$

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 $A_{obs} \gg 1.0$

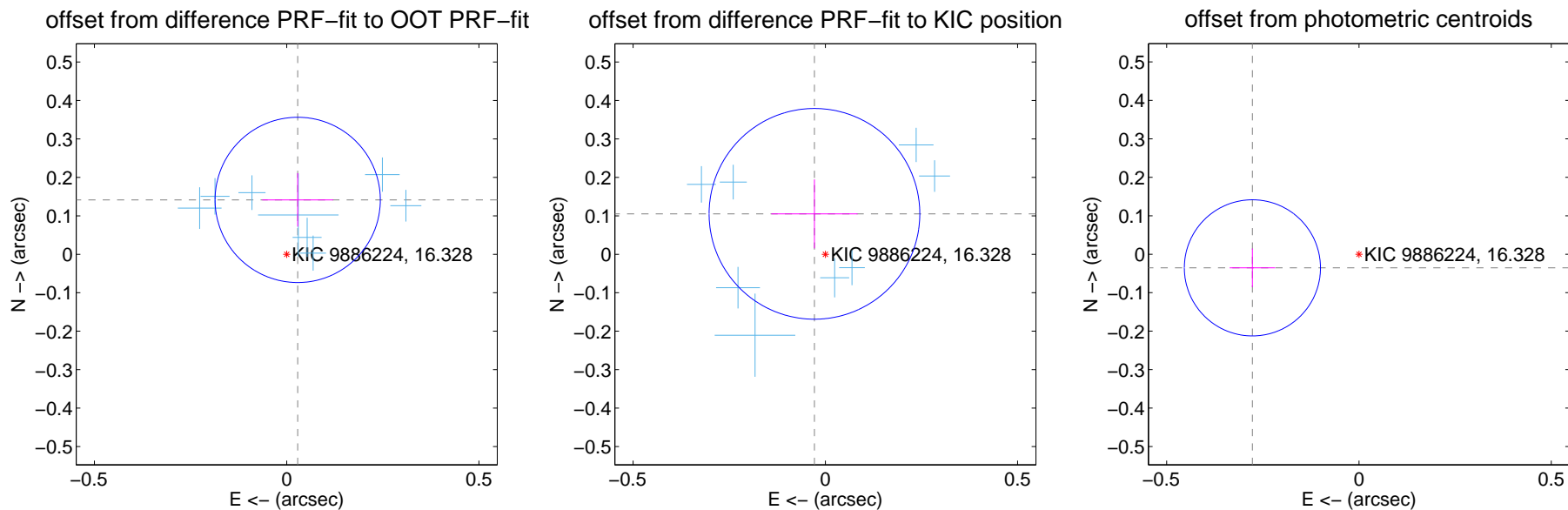
DV Centroid Data

Supplemental centroid analysis for 009886224-02. Kepler magnitude: 16.33. Transit SNR 156.49

There are 8 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.38 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.144 ± 0.072	2.01	-0.029 ± 0.092	0.141 ± 0.070
PRF-fit source offset from KIC position	0.109 ± 0.091	1.19	0.028 ± 0.112	0.105 ± 0.090
photometric centroid source offset	0.28 ± 0.06	4.74	0.28 ± 0.06	-0.04 ± 0.05



Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

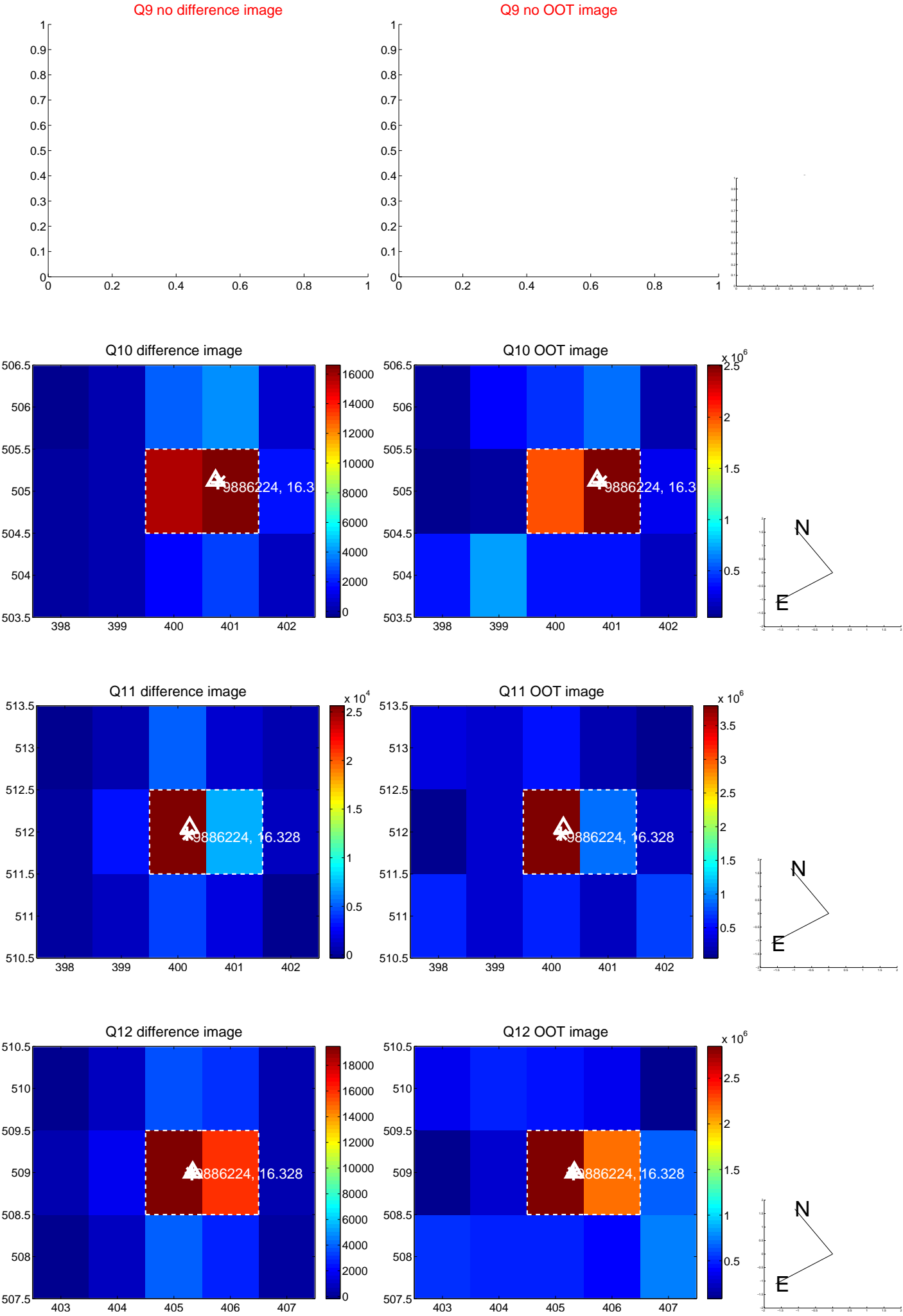
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



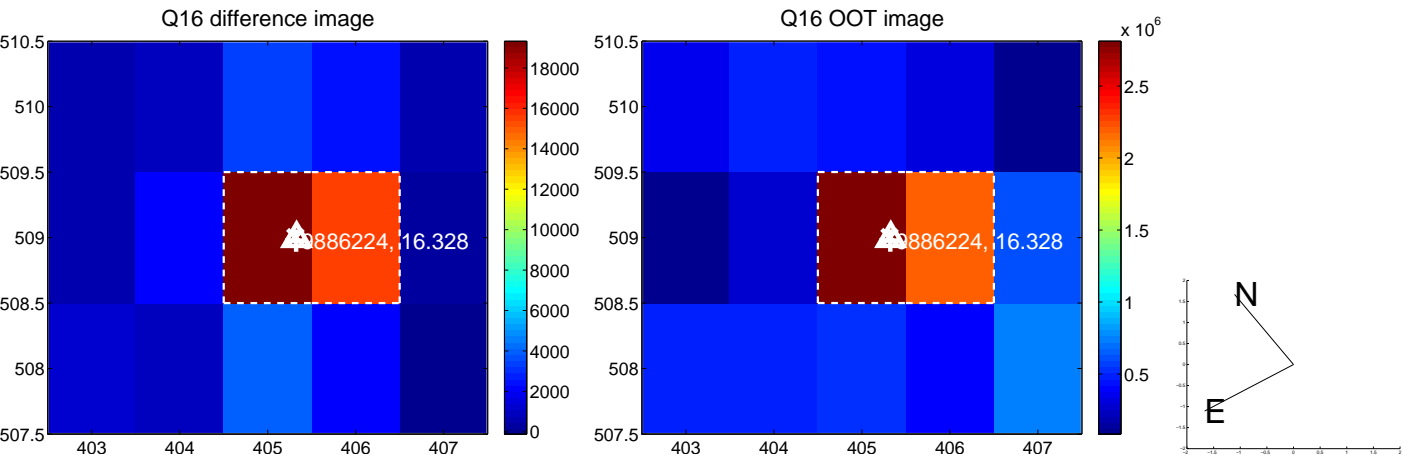
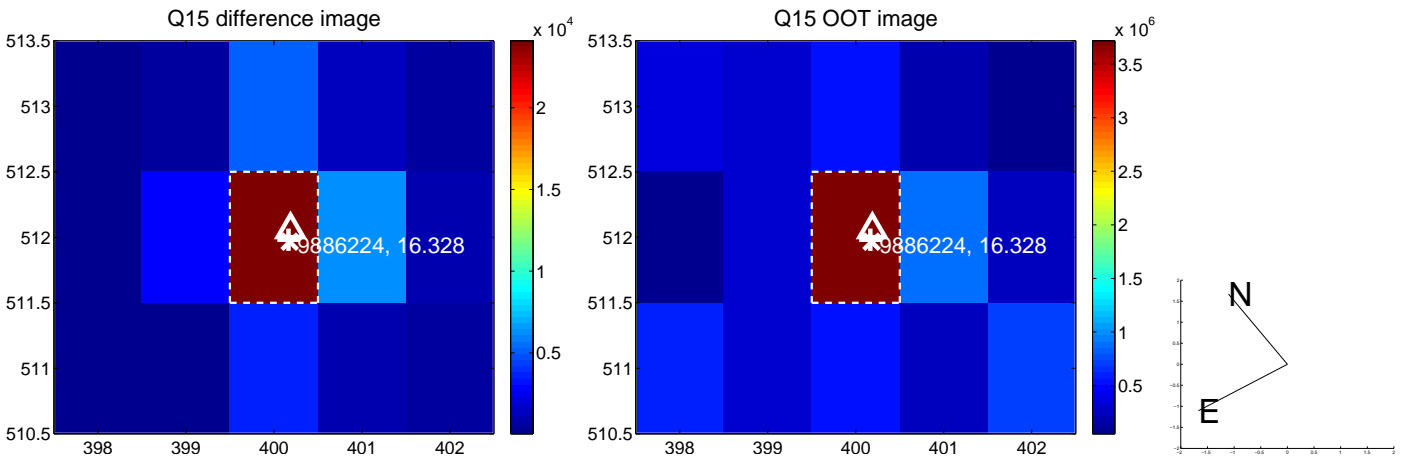
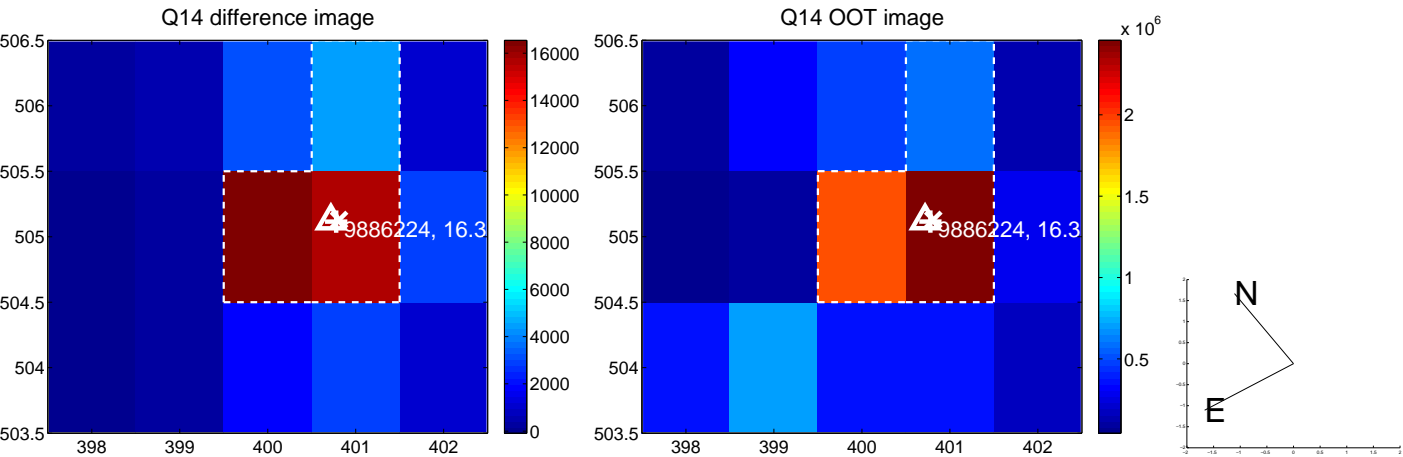
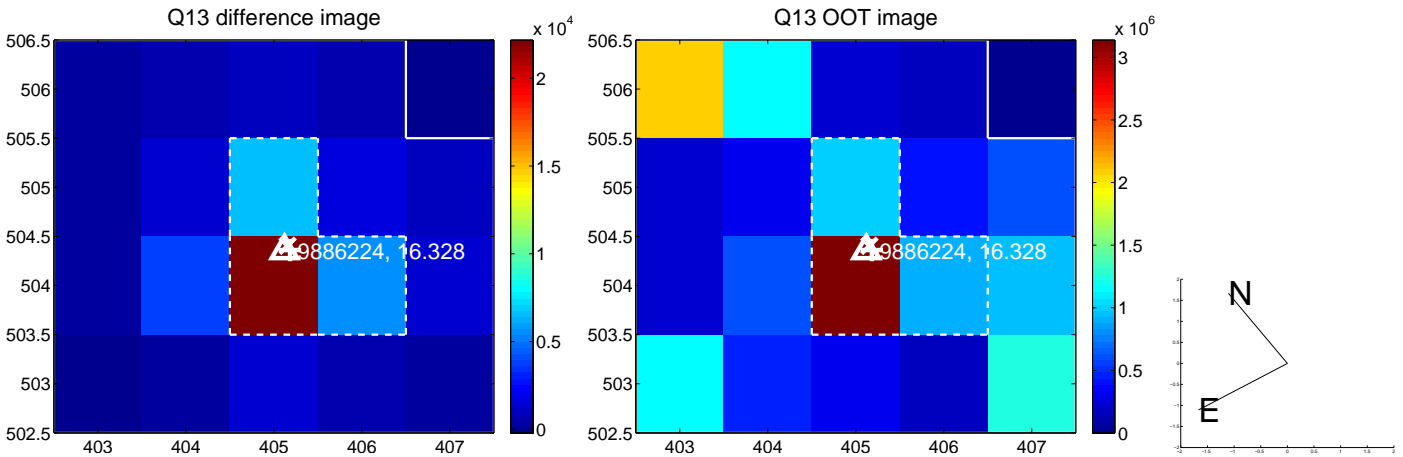
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



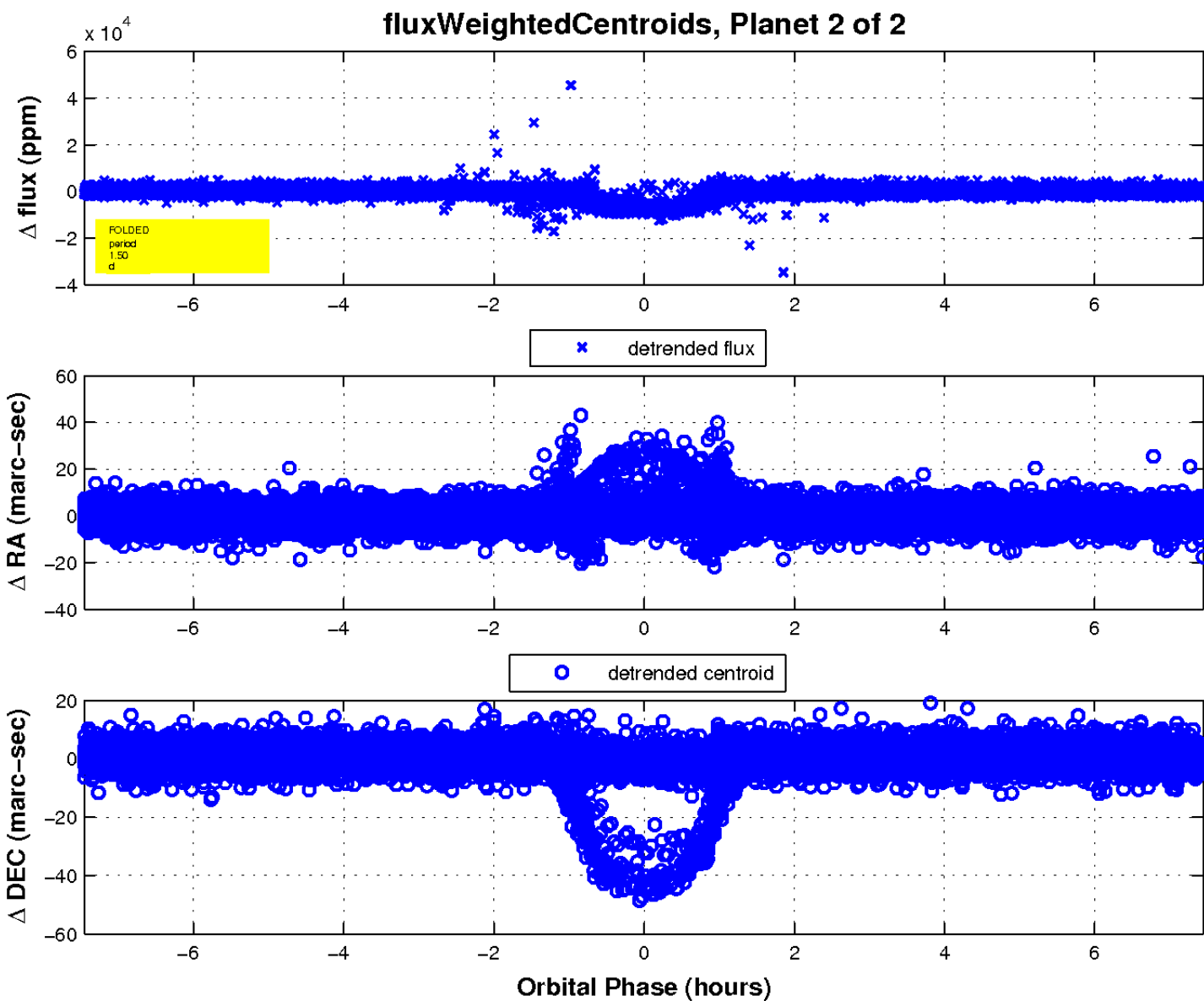
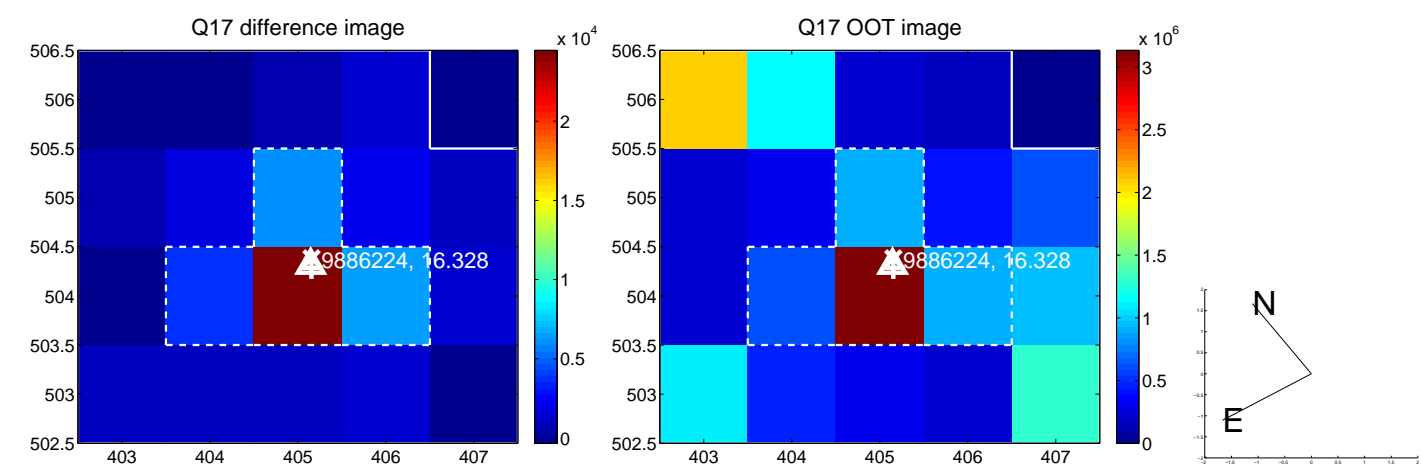
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image

Declination

