

KIC 009164836

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})
009164836-01	OBS	0213.01	48.118811	170.839672	69478.1	5.281	2789.2	2362.1	0.87	6003	34.79	13.62
009164836-02	OBS	No	48.118831	158.320889	8598.7	4.748	330.6	322.9	0.87	6003	13.26	13.62

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009164836-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
009164836-02	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.

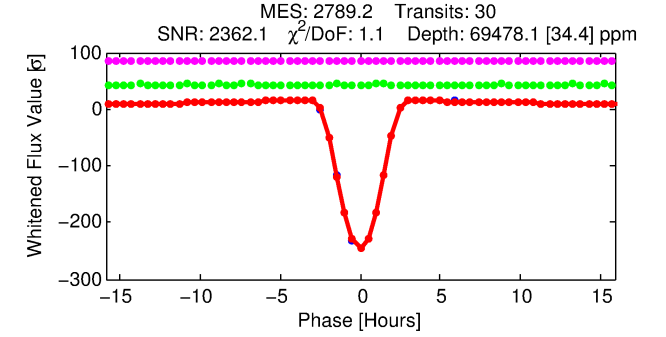
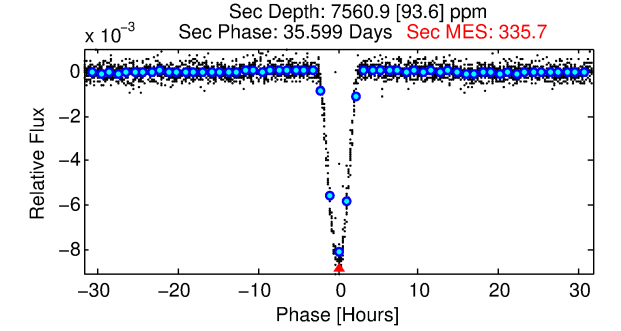
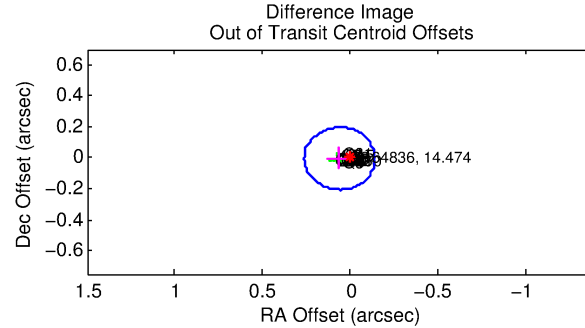
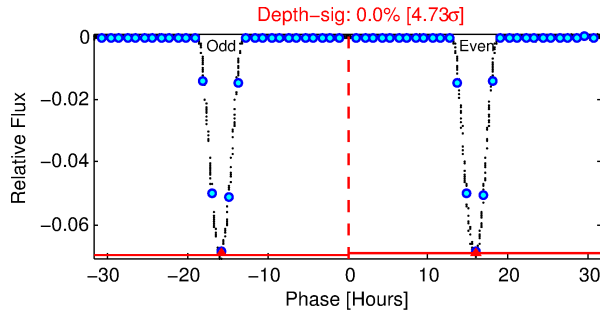
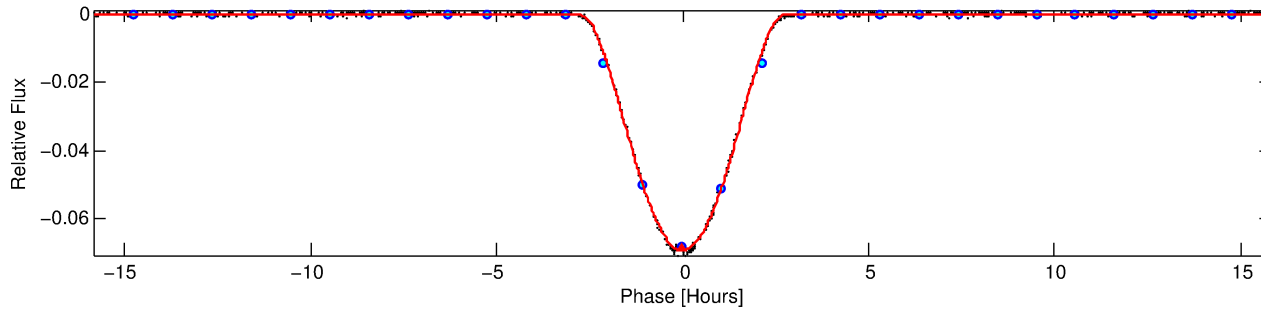
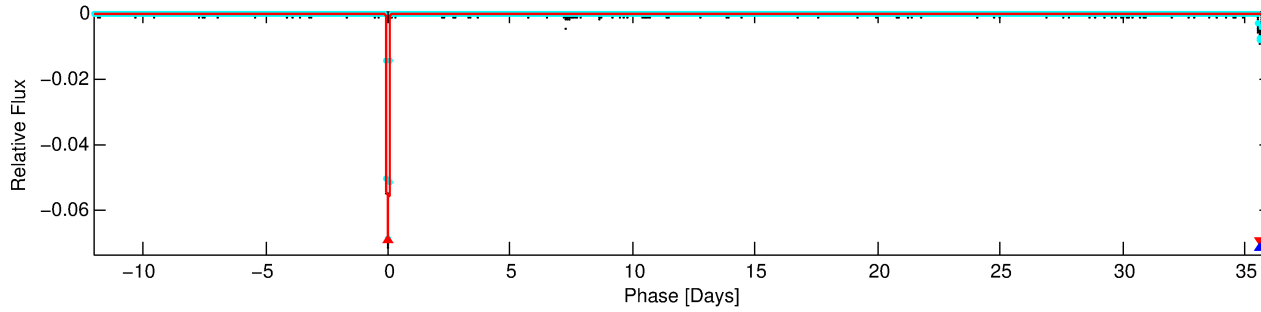
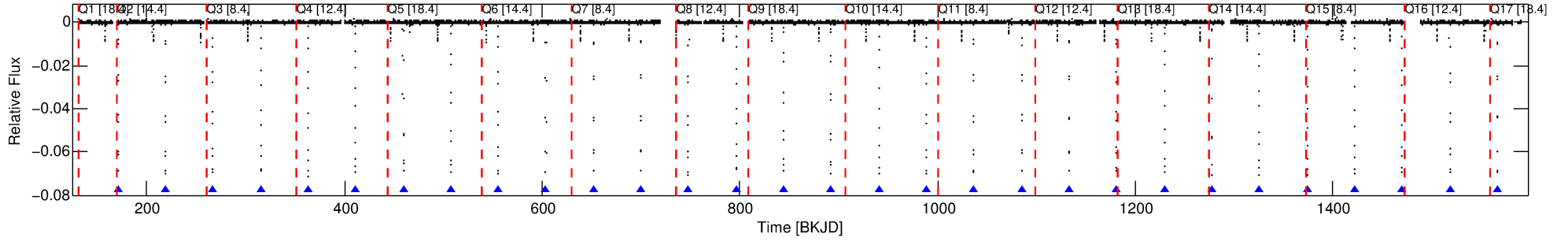
Ephemeris Match Information For 009164836-01

No Significant Match Found

DV One-Page Summary

KIC: 9164836 Candidate: 1 of 2 Period: 48.119 d
KOI: K00213.01 Corr: 0.999

Kp: 14.47 R*: 0.87 Rs Teff: 6003.0 K Logg: 4.54 Fe/H: -0.340



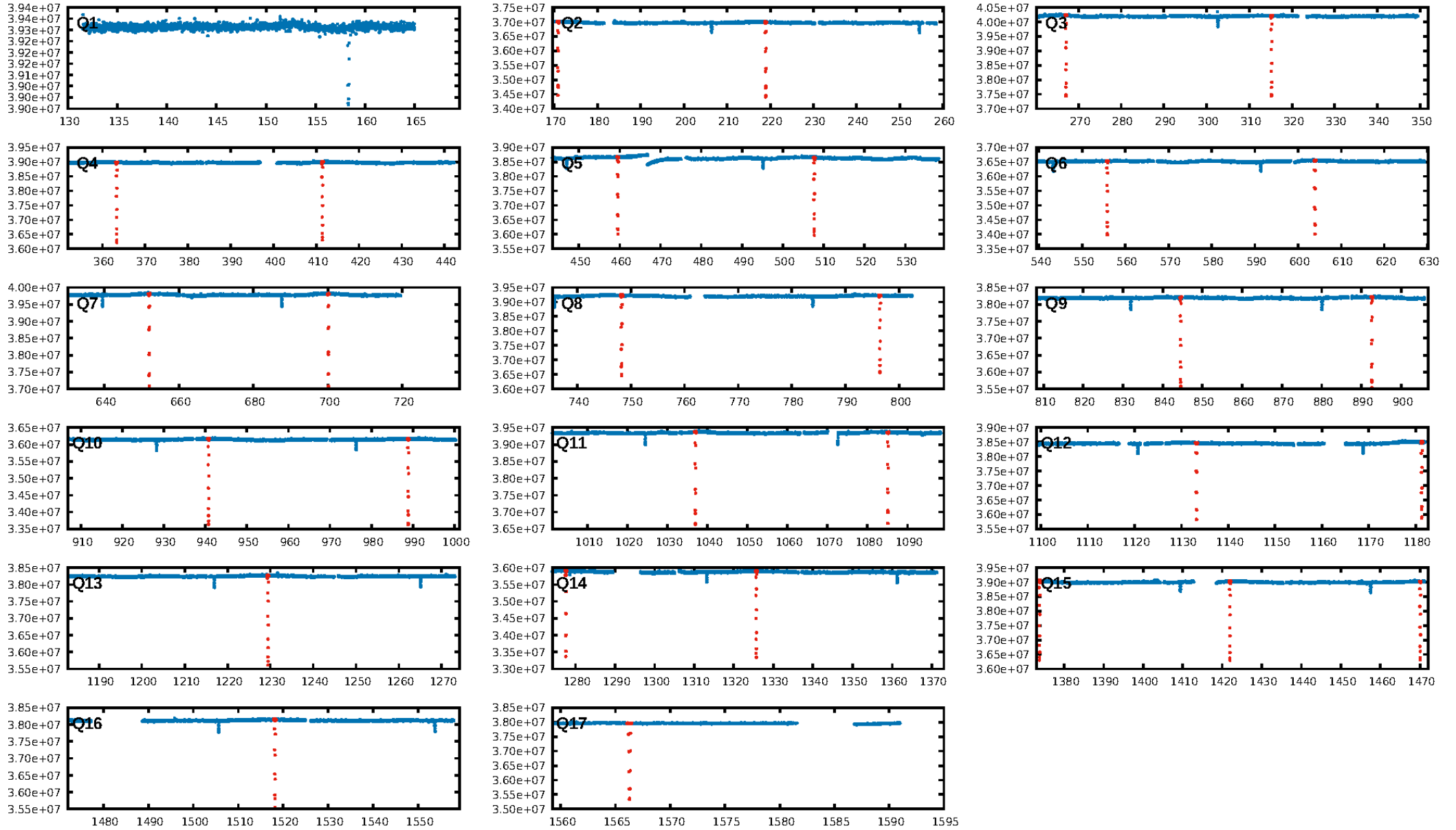
DV Fit Results:

Period = 48.11881 [0.00000] d
Epoch = 170.8397 [0.0001] BKJD
Rp/R* = 0.3656 [0.0123]
a/R* = 69.25 [0.06]
b = 0.94 [0.02]
Seff = 13.62 [5.51]
Teff = 490 [50] K
Rp = 34.79 [10.80] Re
a = 0.2548 [0.0669] AU
Ag = 223.14 [87.52] [2.54σ]
Teffp = 2927 [101] K [21.67σ]

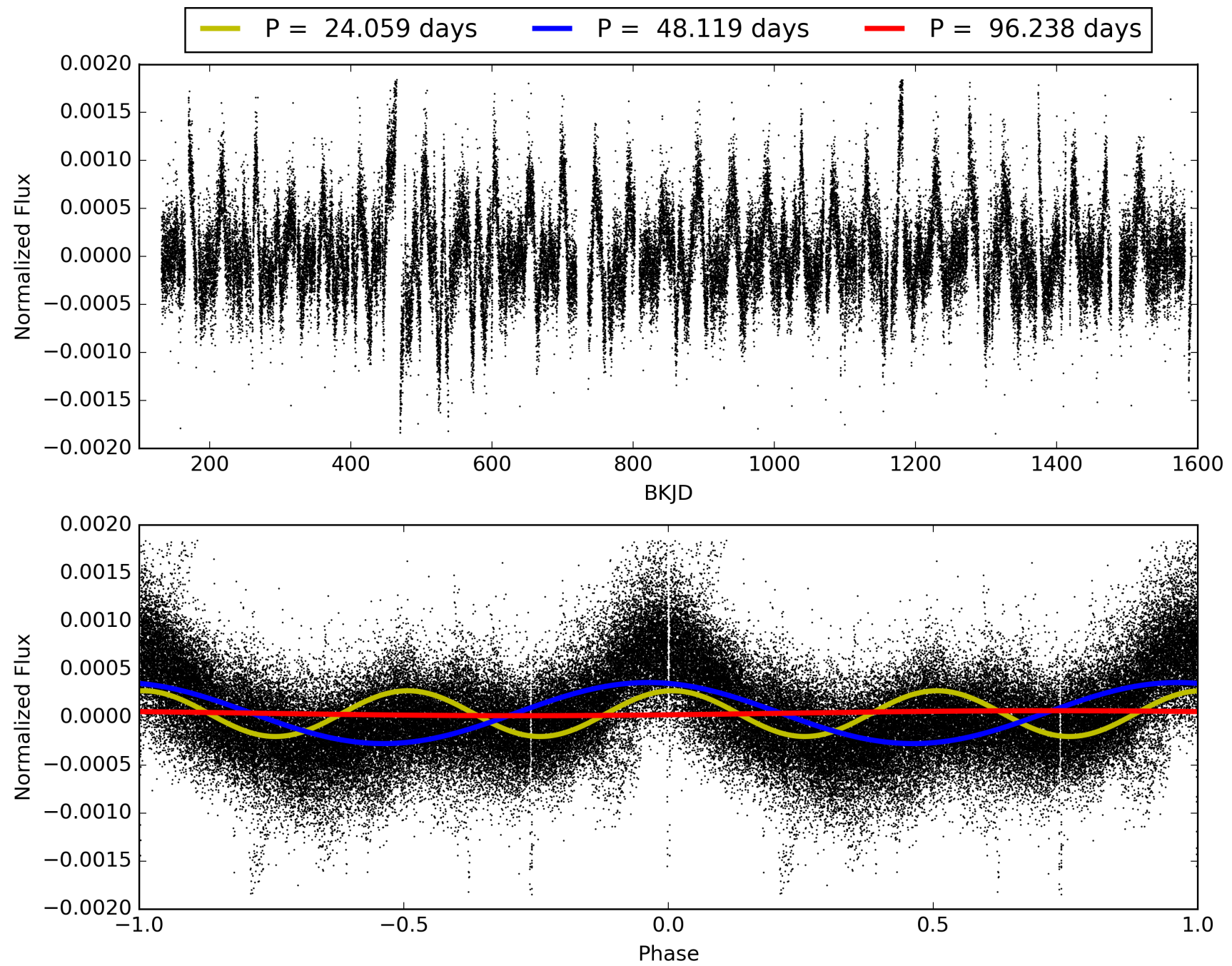
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 0.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [29/29]
GhostDiagnostic-chr: 6.622
Centroid-sig: 0.0%
Centroid-so: 0.204 arcsec [42.17σ]
OotOffset-rm: 0.062 arcsec [0.92σ]
KicOffset-rm: 0.247 arcsec [3.62σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 1.00 [16/16]
DiffImageOverlap-fno: 1.00 [16/16]

TCE 009164836-01, PDC Light Curves

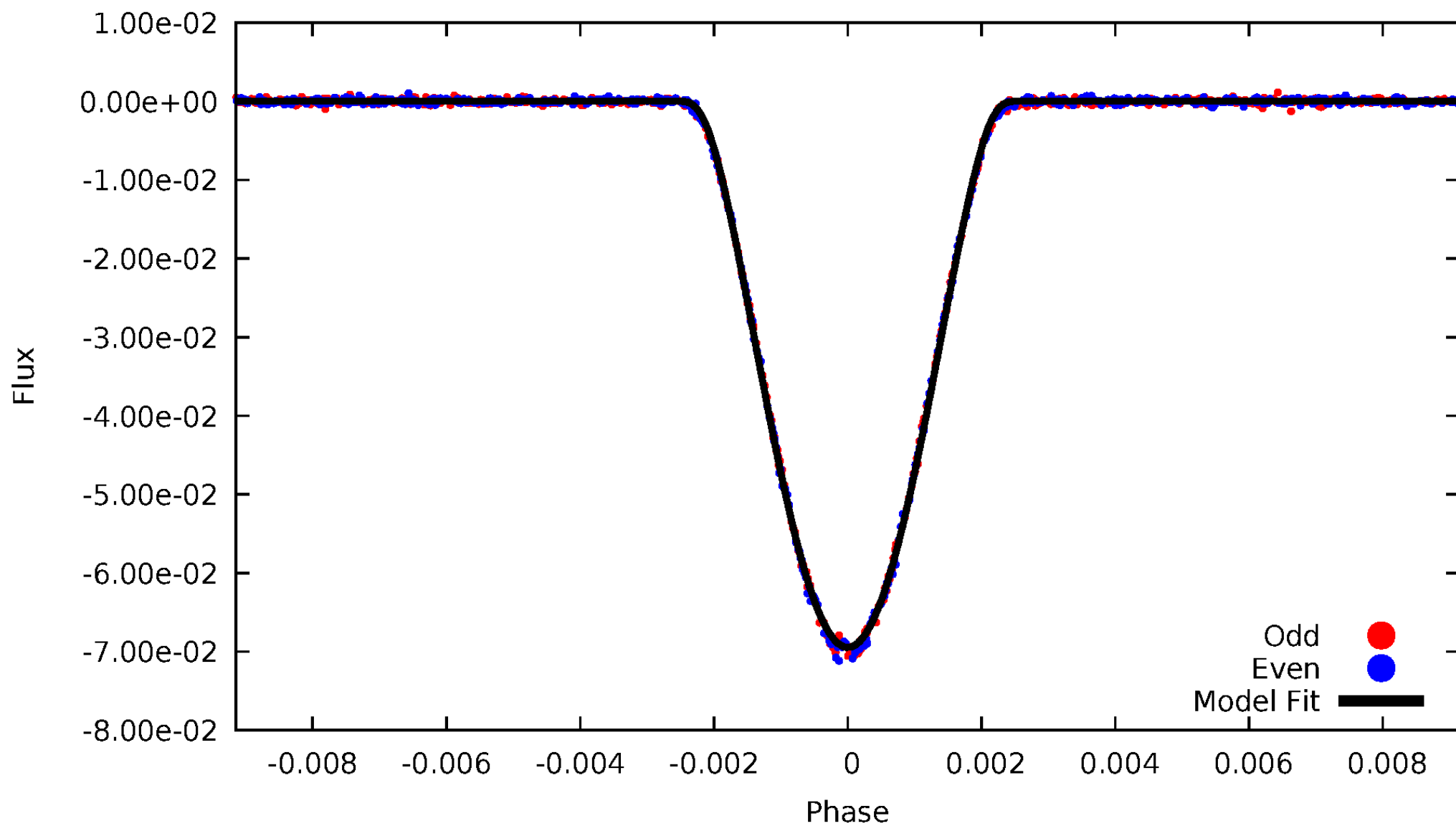


TCE 009164836-01



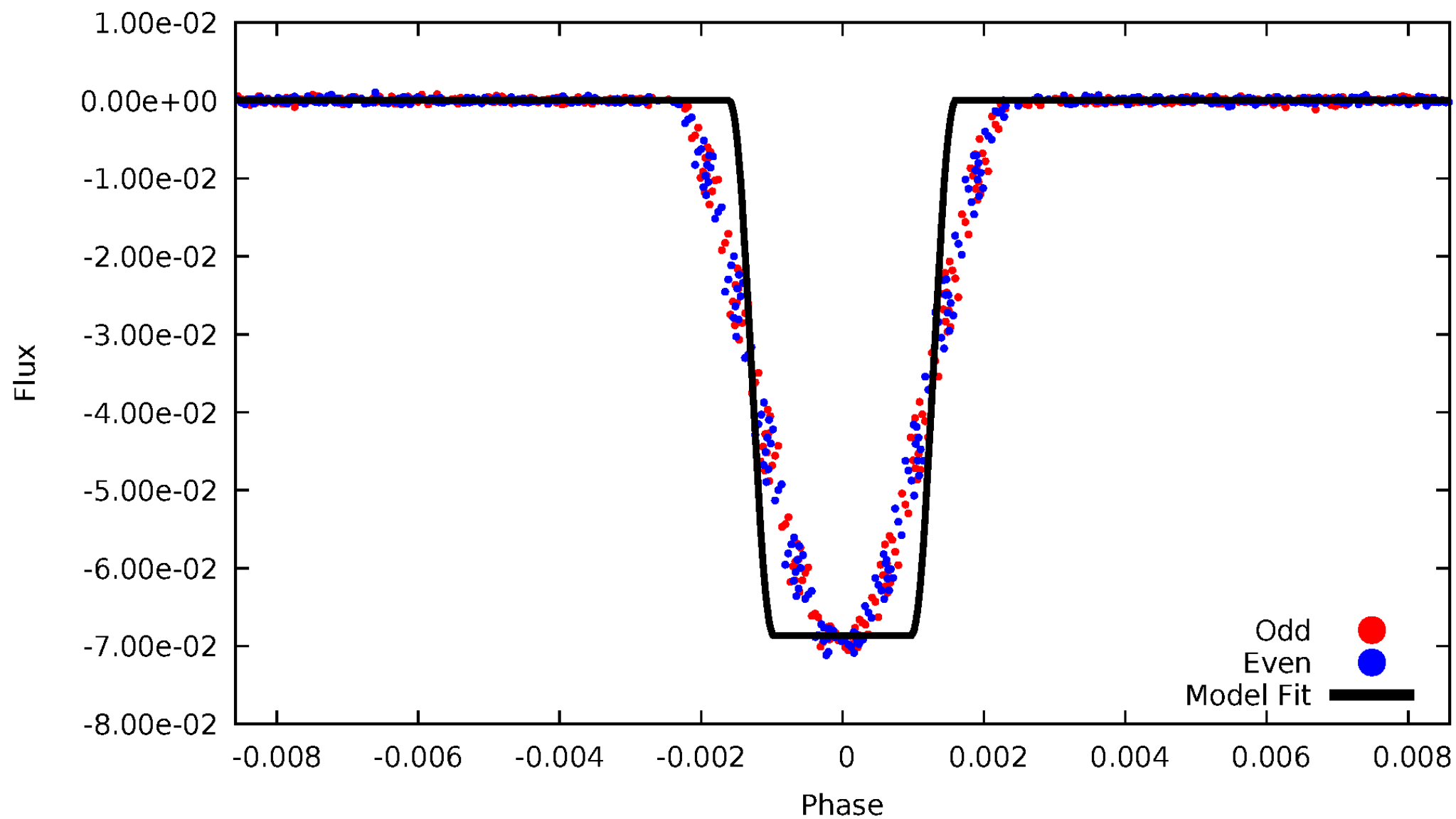
DV Odd/Even

TCE 009164836-01



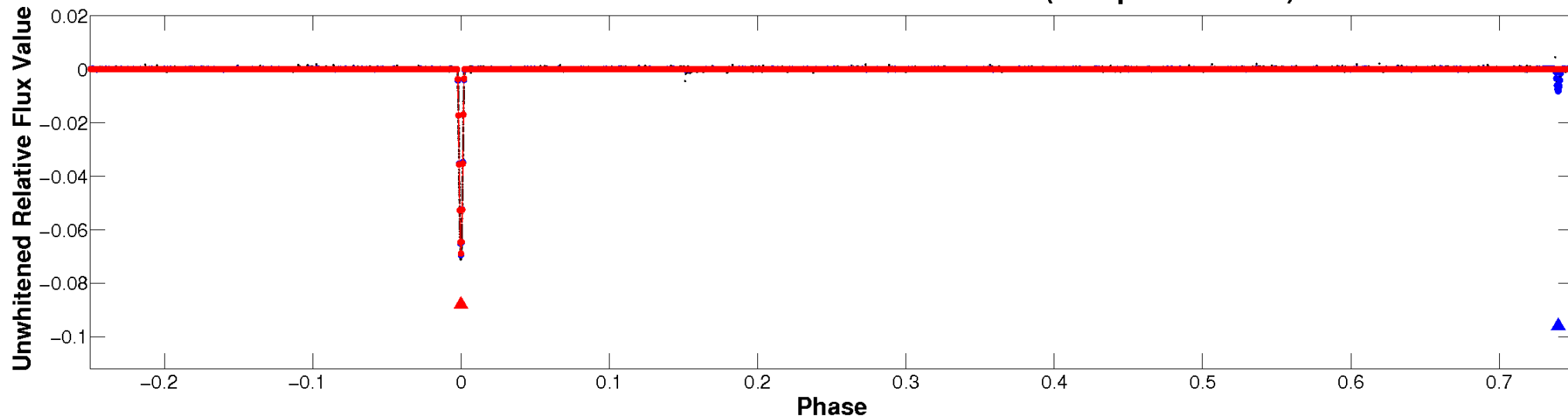
ALT Odd/Even

TCE 009164836-01

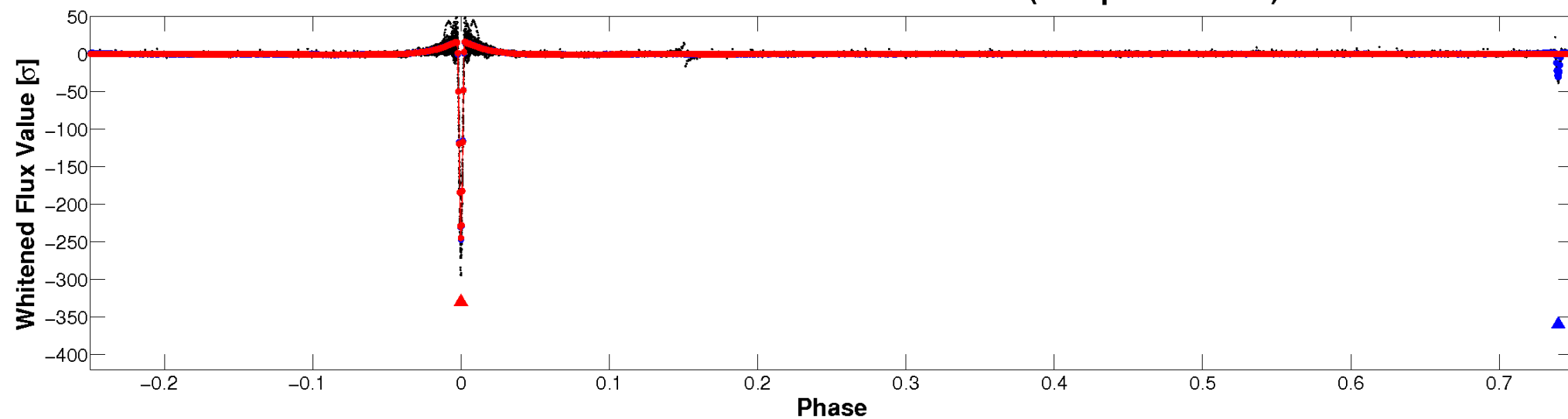


Non-Whitened Vs. Whitened Light Curve

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

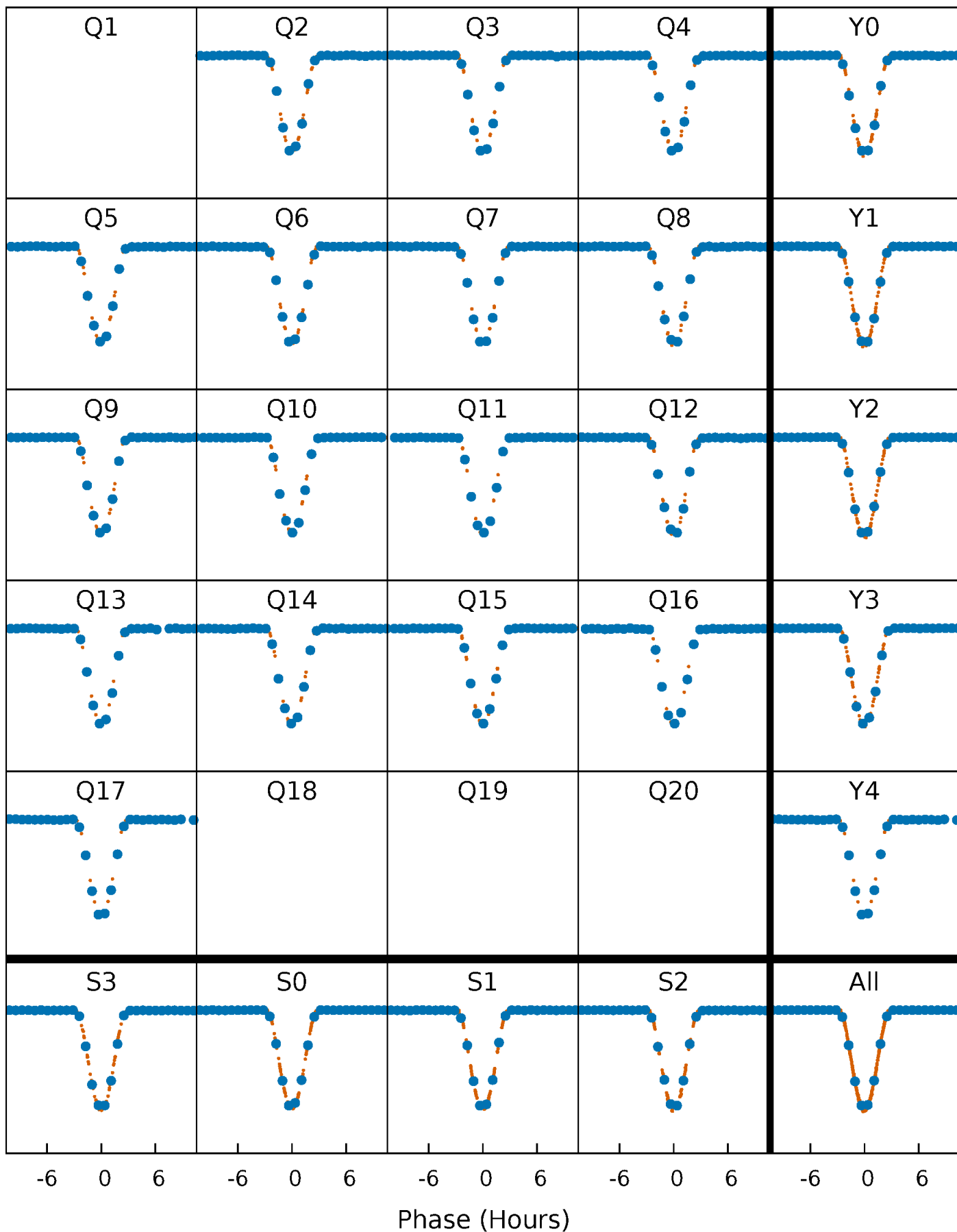


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



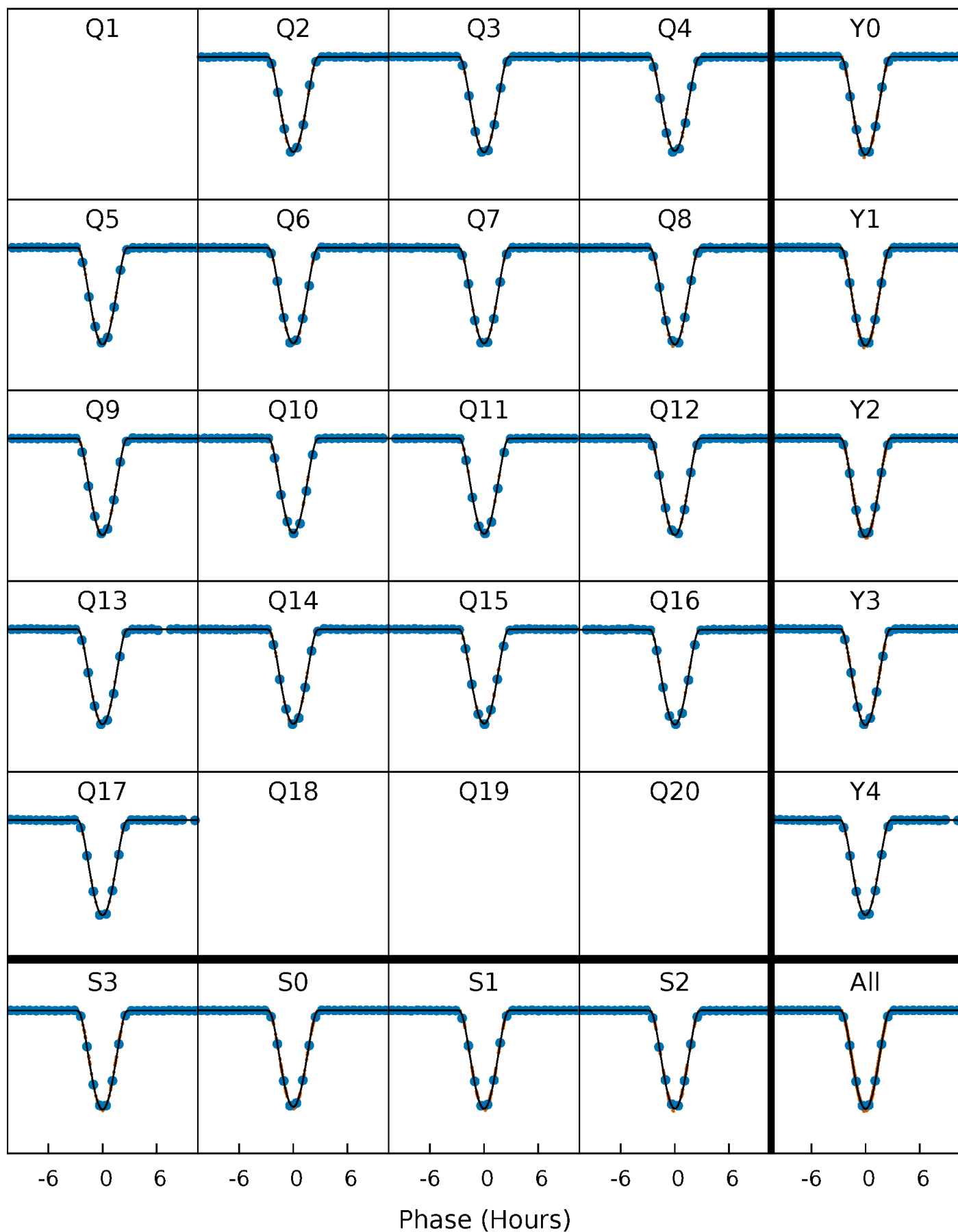
PDC Quarter-Phased Transit Curves

TCE 009164836-01 P= 48.118811 Days $T_0=170.839672$ (BKJD)



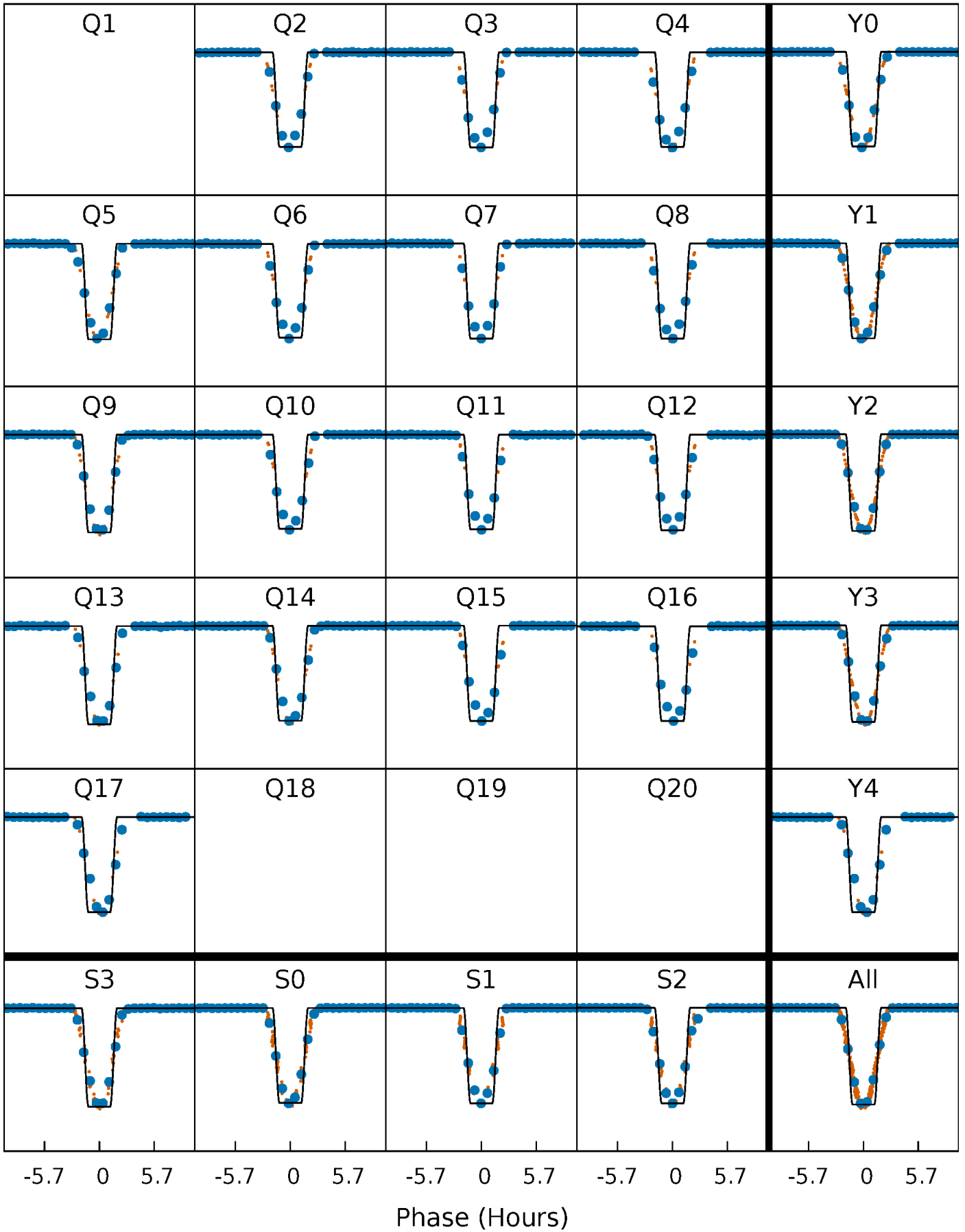
DV Quarter-Phased Transit Curves

TCE 009164836-01 P= 48.118811 Days $T_0=170.839672$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

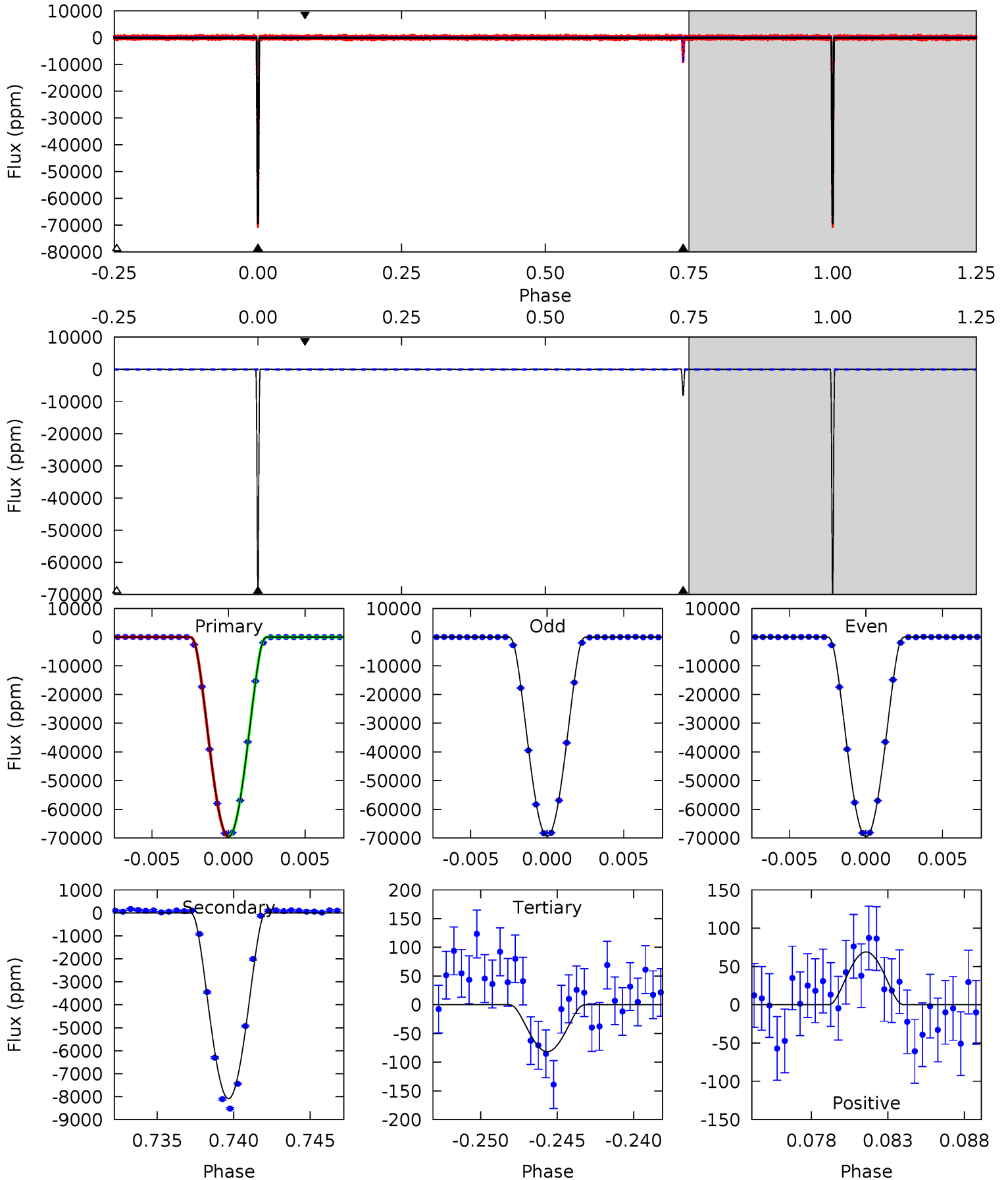
TCE 009164836-01 P= 48.118355 Days $T_0=170.846236$ (BKJD)



DV Model-Shift Uniqueness Test

009164836-01, P = 48.118811 Days, E = 122.720861 Days

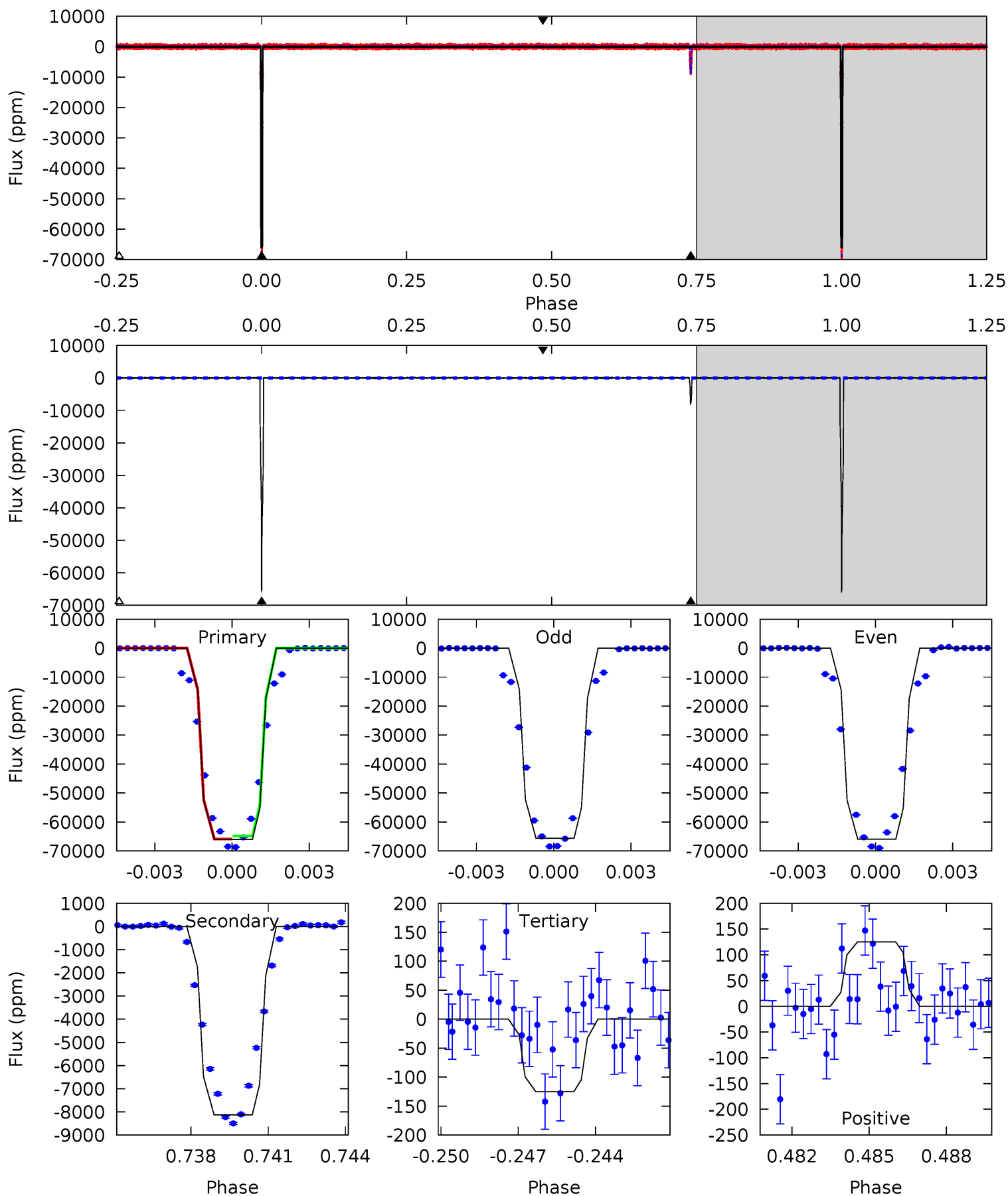
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5107	593.9	5.99	5.07	5.16	2.81	1.90	5101	5102	587.9	588.8	6.15	1.00	0.00	0.45



Alt Model-Shift Uniqueness Test

009164836-01, P = 48.118355 Days, E = 122.727881 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2026	249.5	3.84	3.84	5.24	2.95	2.83	2022	2022	245.7	245.7	5.41	1.00	0.00	9.51



Stellar Parameters For KIC 009164836

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6003^{+162}_{-180}	$4.536^{+0.050}_{-0.213}$	$-0.340^{+0.300}_{-0.300}$	$0.872^{+0.269}_{-0.090}$	$0.952^{+0.117}_{-0.117}$	$2.023^{+0.418}_{-1.078}$
	+3%/-3%	+1%/-5%	+88%/-88%	+31%/-10%	+12%/-12%	+21%/-53%
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 009164836-01 / KOI 0213.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-8086 ± 14	$36.09^{+5.71}_{-3.08}$	701^{+50}_{-35}	3477^{+71}_{-78}	220^{+39}_{-53}
Alt.	-8131 ± 33	$25.72^{+4.63}_{-2.56}$	700^{+53}_{-34}	3885^{+101}_{-99}	433^{+84}_{-114}

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

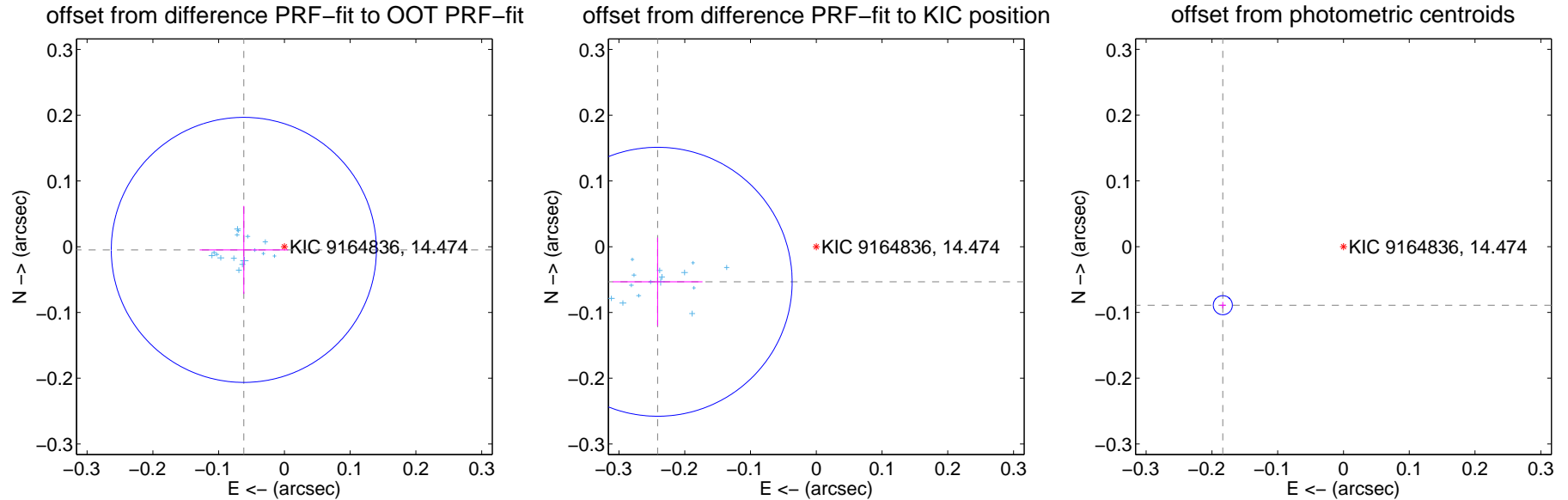
DV Centroid Data

Supplemental centroid analysis for 009164836-01. Kepler magnitude: 14.47. Transit SNR 2362.13

There are 16 quarters with good PRF difference image offsets

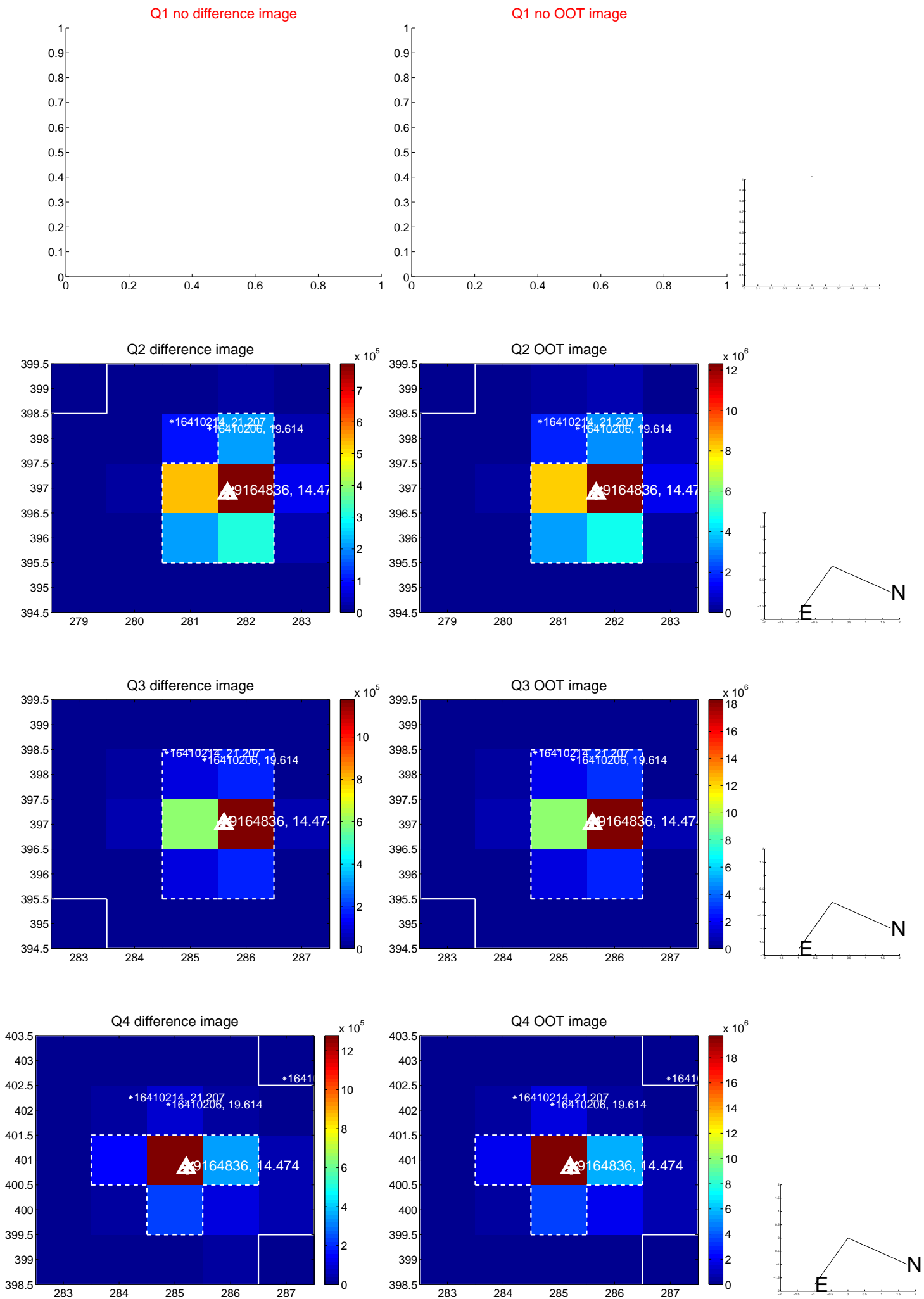
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.062 ± 0.067	0.92	0.062 ± 0.067	-0.005 ± 0.067
PRF-fit source offset from KIC position	0.247 ± 0.068	3.62	0.241 ± 0.068	-0.053 ± 0.067
photometric centroid source offset	0.20 ± 0.00	42.17	0.18 ± 0.00	-0.09 ± 0.00

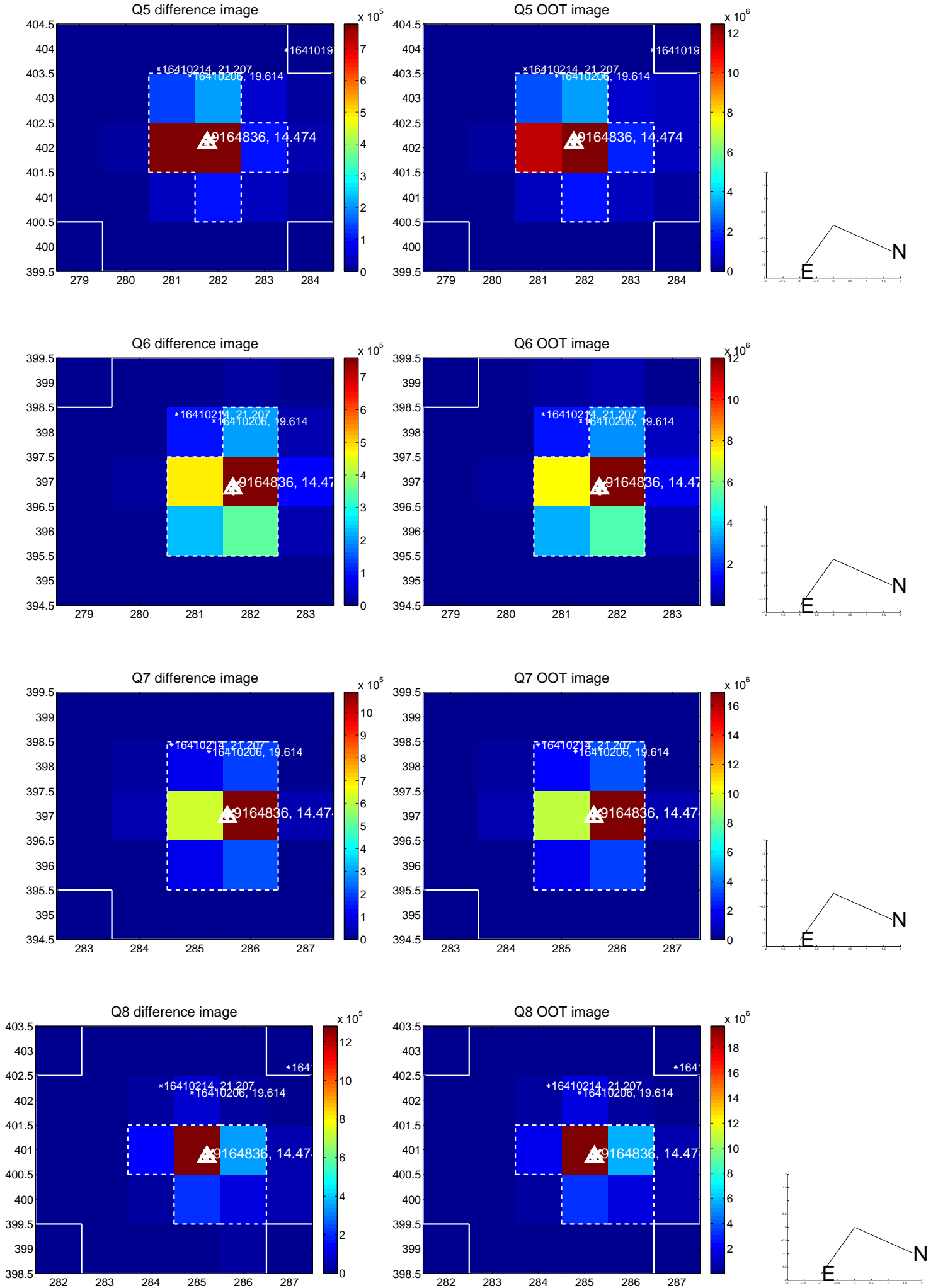


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

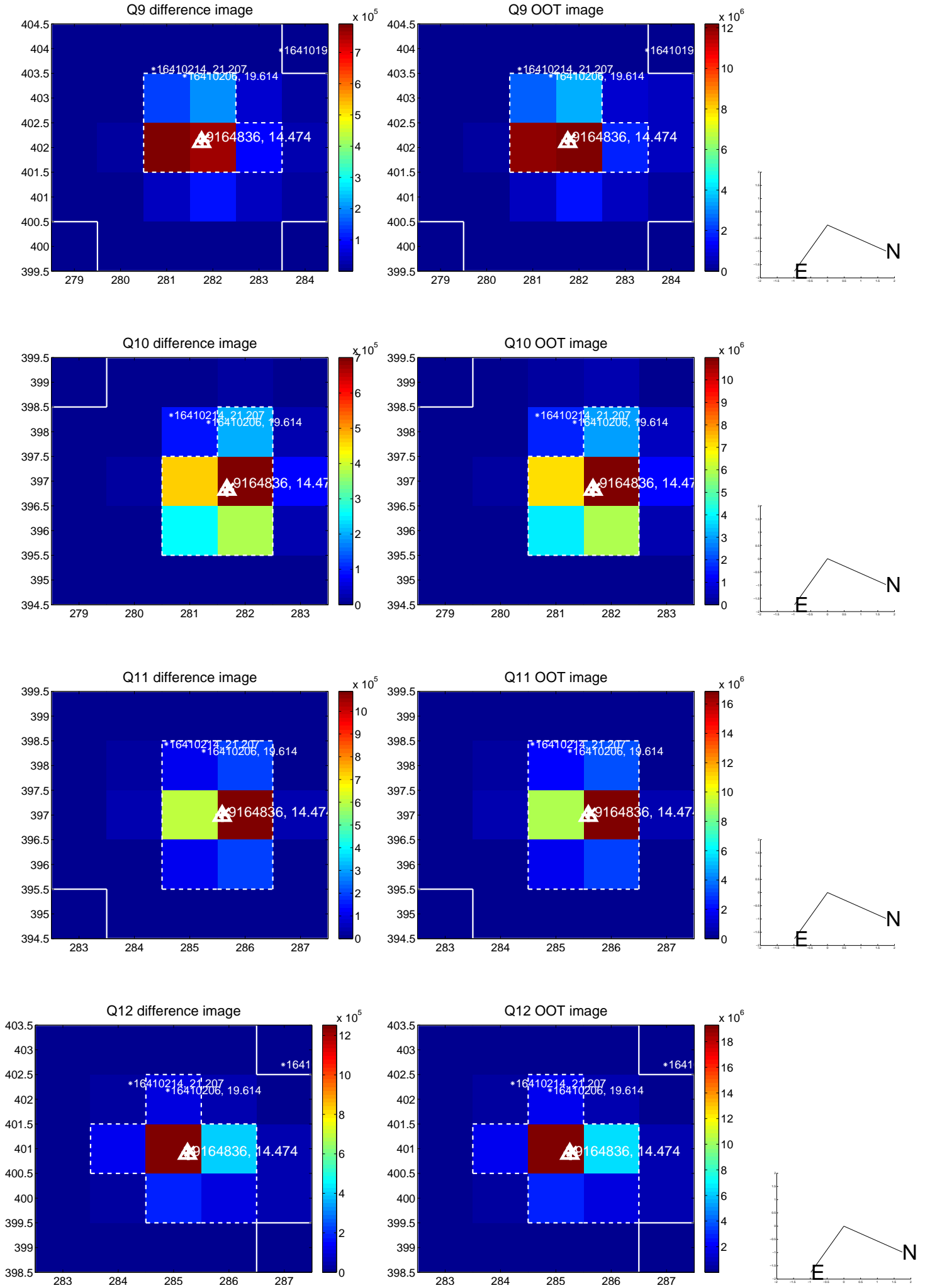
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



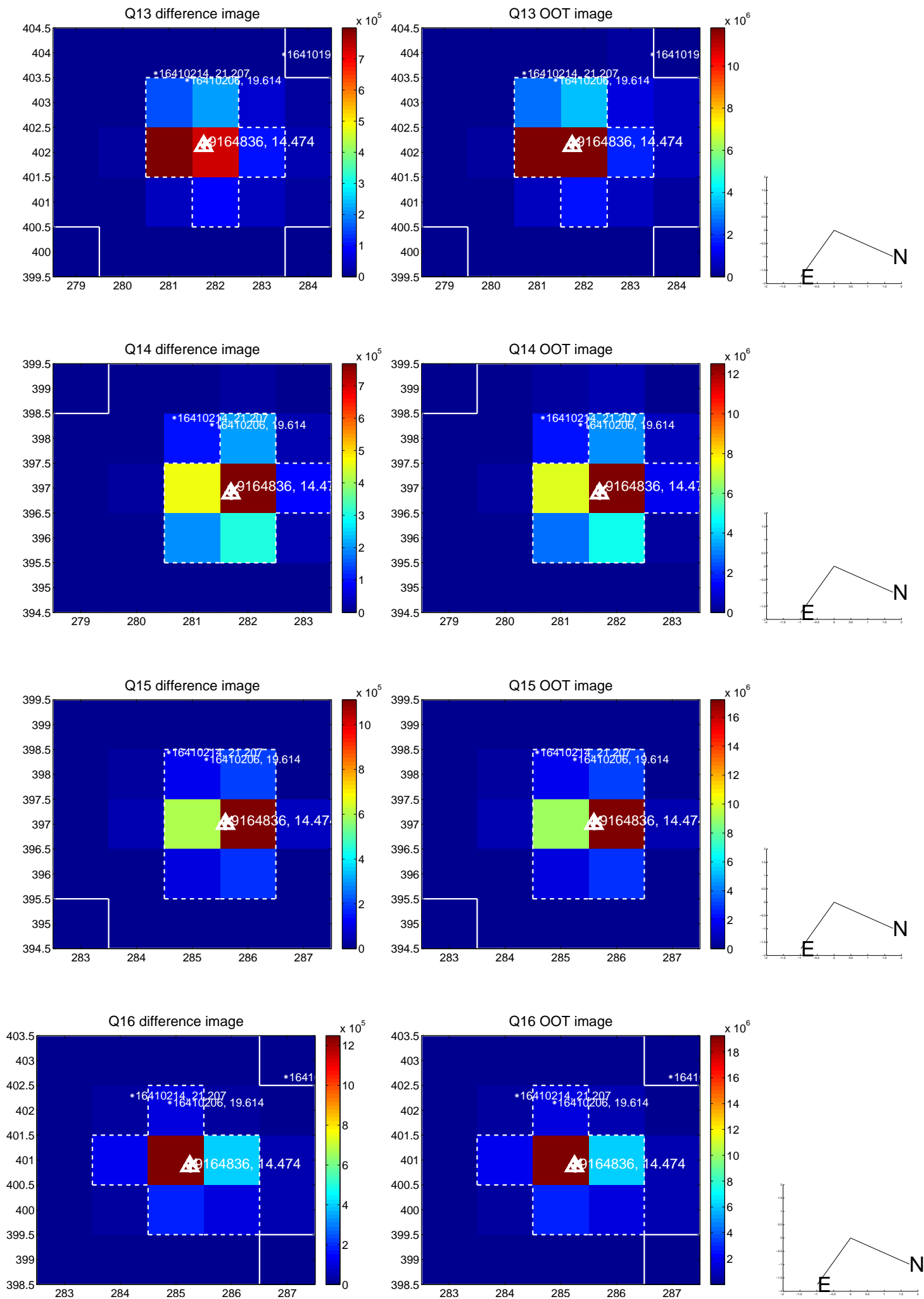
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



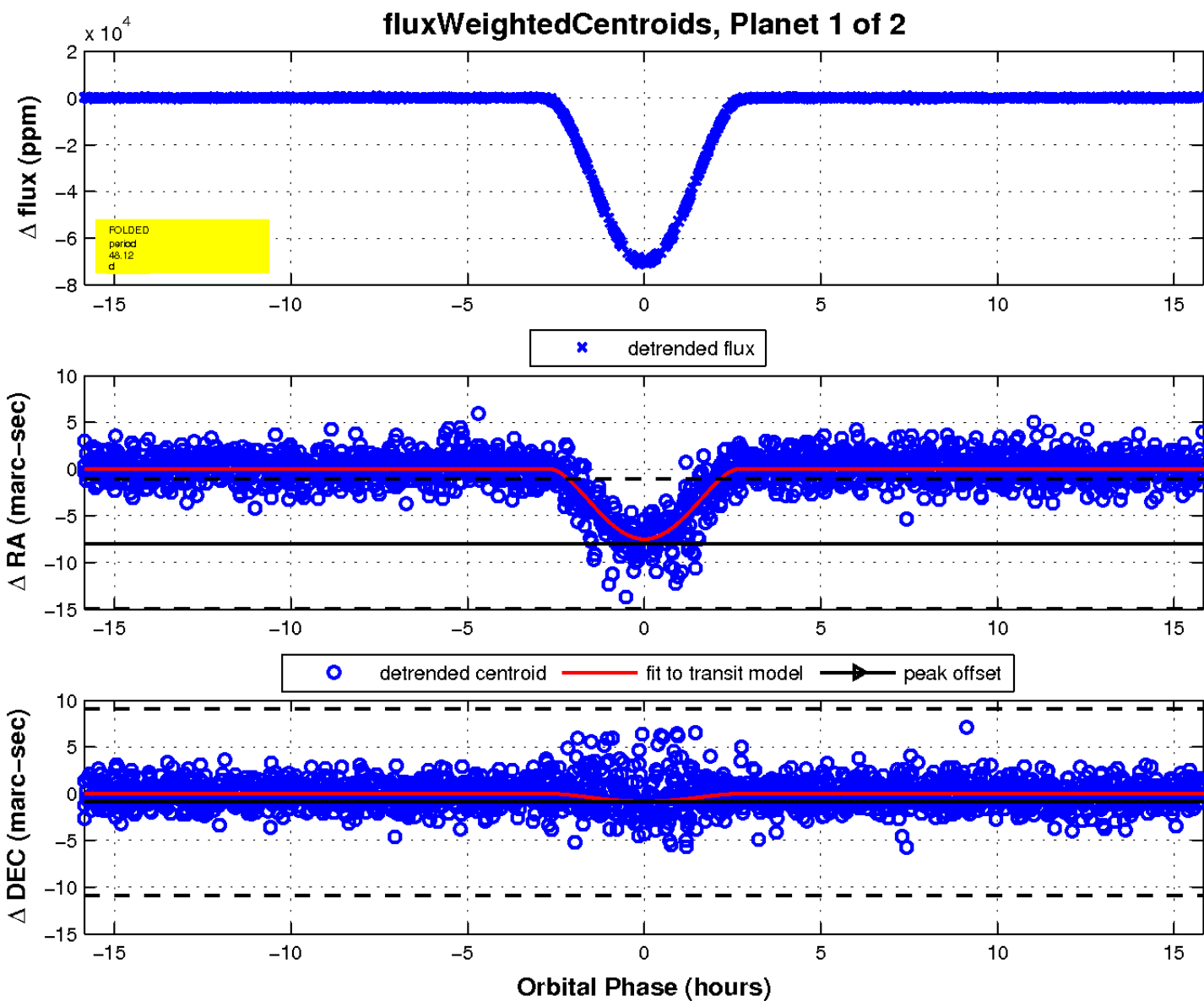
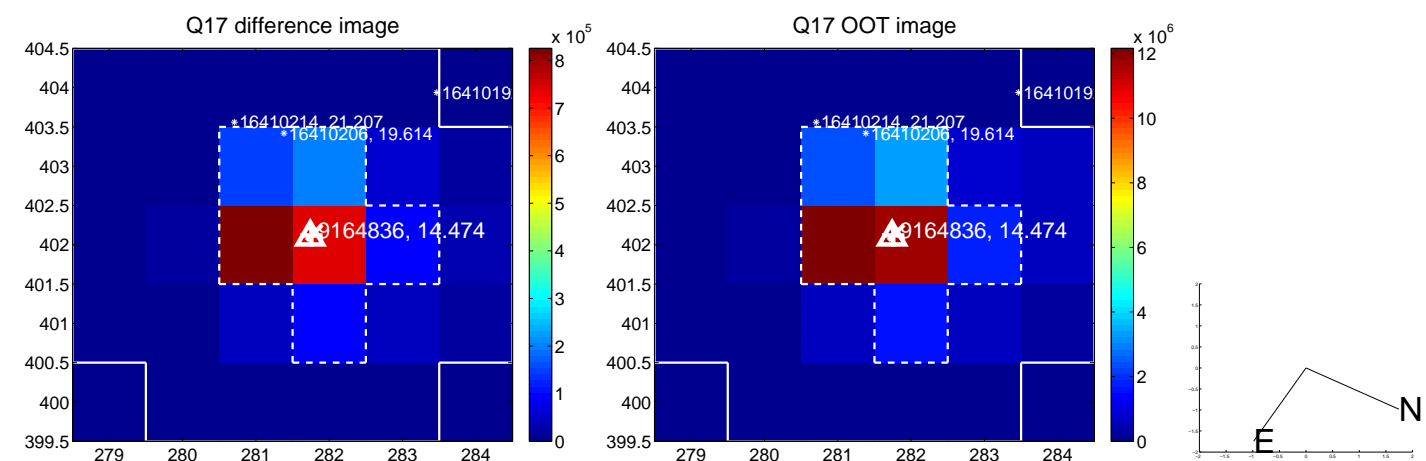
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

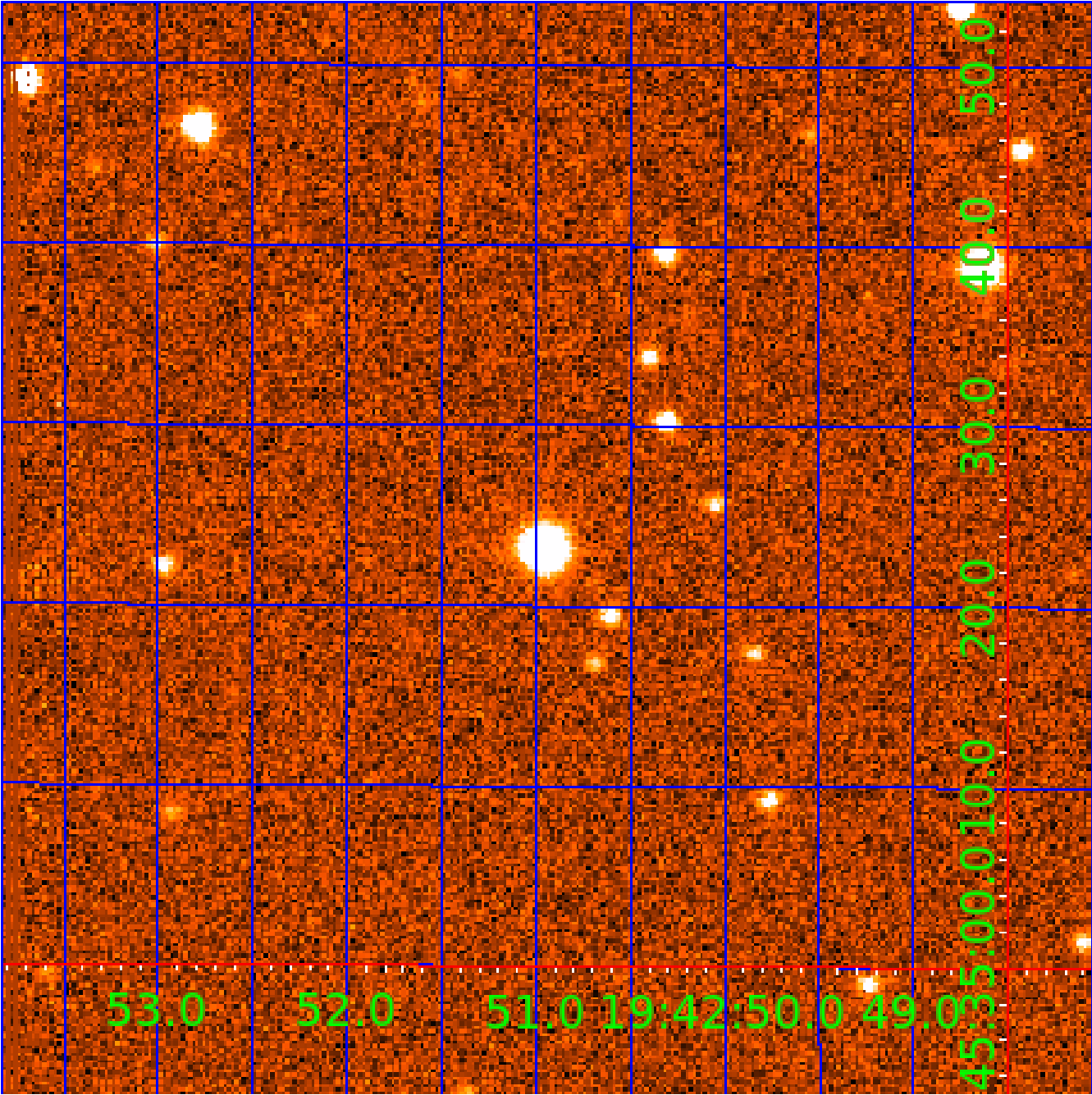


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009164836

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})
009164836-01	OBS	0213.01	48.118811	170.839672	69478.1	5.281	2789.2	2362.1	0.87	6003	34.79	13.62
009164836-02	OBS	No	48.118831	158.320889	8598.7	4.748	330.6	322.9	0.87	6003	13.26	13.62

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009164836-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
009164836-02	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.

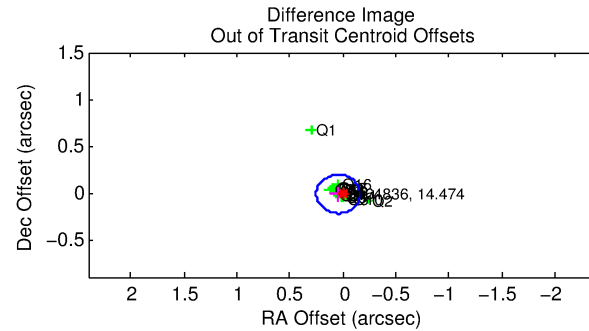
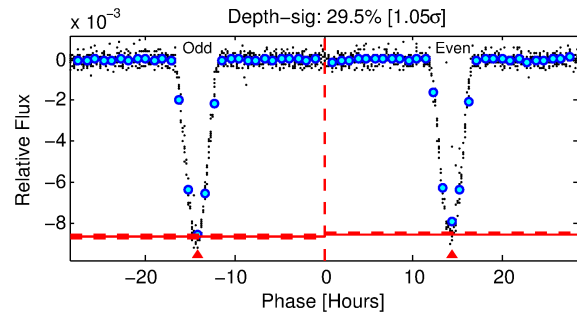
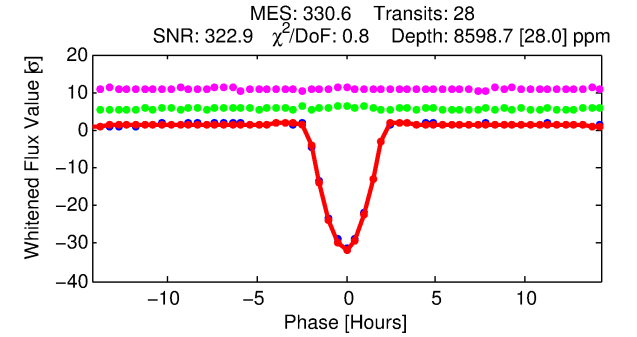
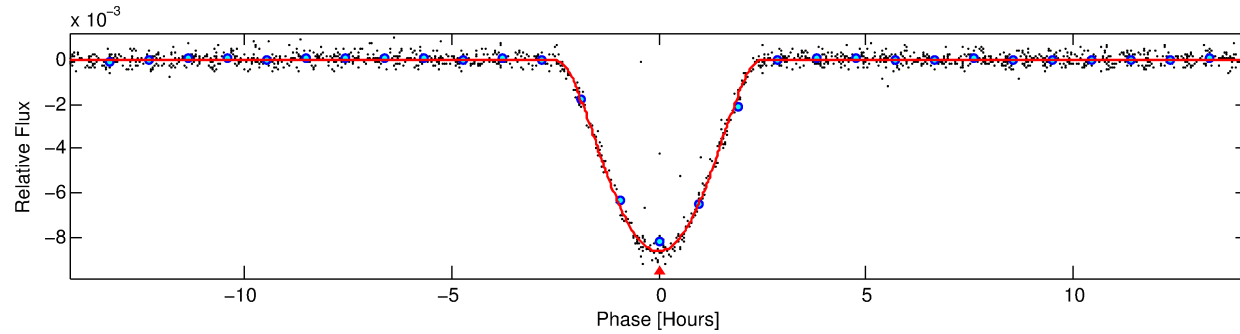
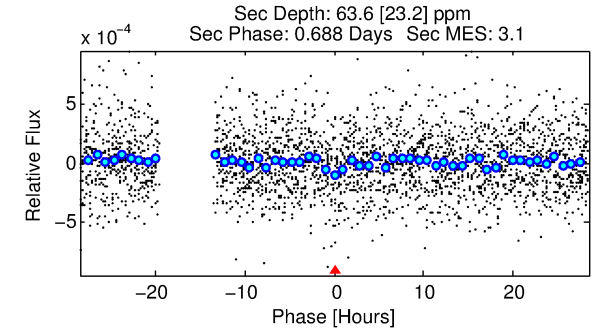
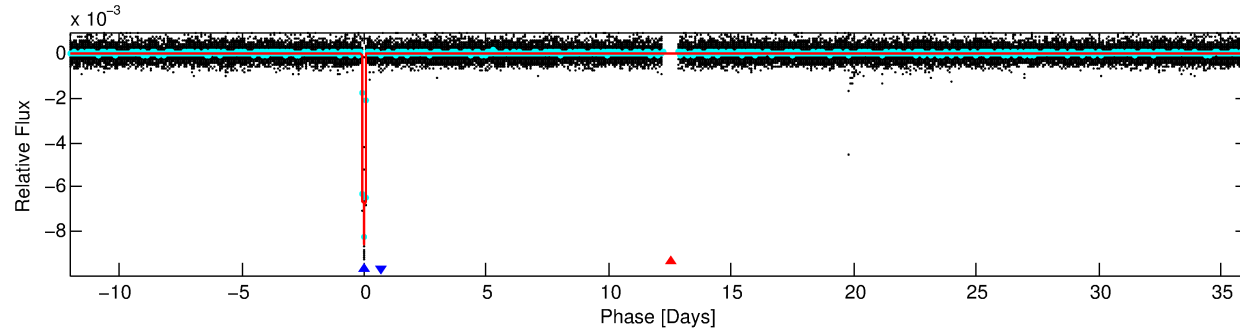
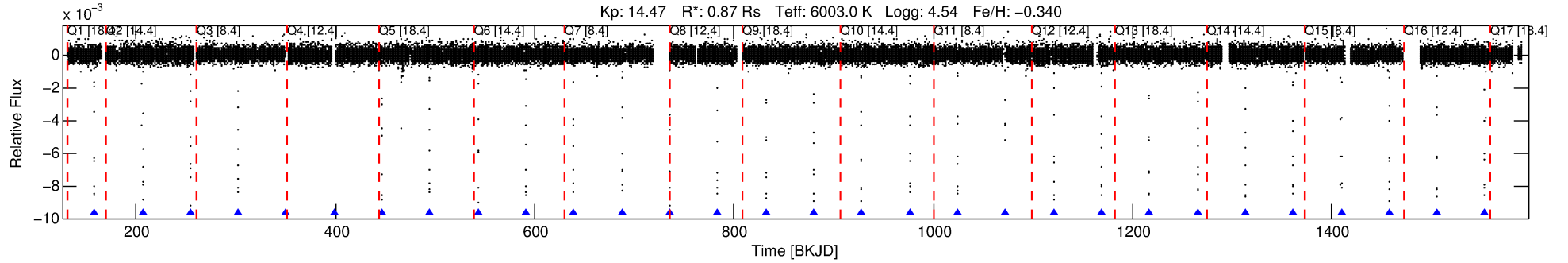
Ephemeris Match Information For 009164836-02

No Significant Match Found

DV One-Page Summary

KIC: 9164836 Candidate: 2 of 2 Period: 48.119 d

KOI: K00213 Corr: No Ephemeris Match



DV Fit Results:

Period = 48.11883 [0.00002] d
Epoch = 158.3209 [0.0004] BKJD
Rp/R* = 0.1393 [0.0152]
a/R* = 44.92 [0.96]
b = 0.98 [0.02]
Seff = 13.62 [5.51]
Teq = 490 [50] K
Rp = 13.26 [4.34] Re
a = 0.2548 [0.0669] AU
Ag = 12.94 [7.43] [1.61 σ]
Teffp = 1436 [159] K [5.70 σ]

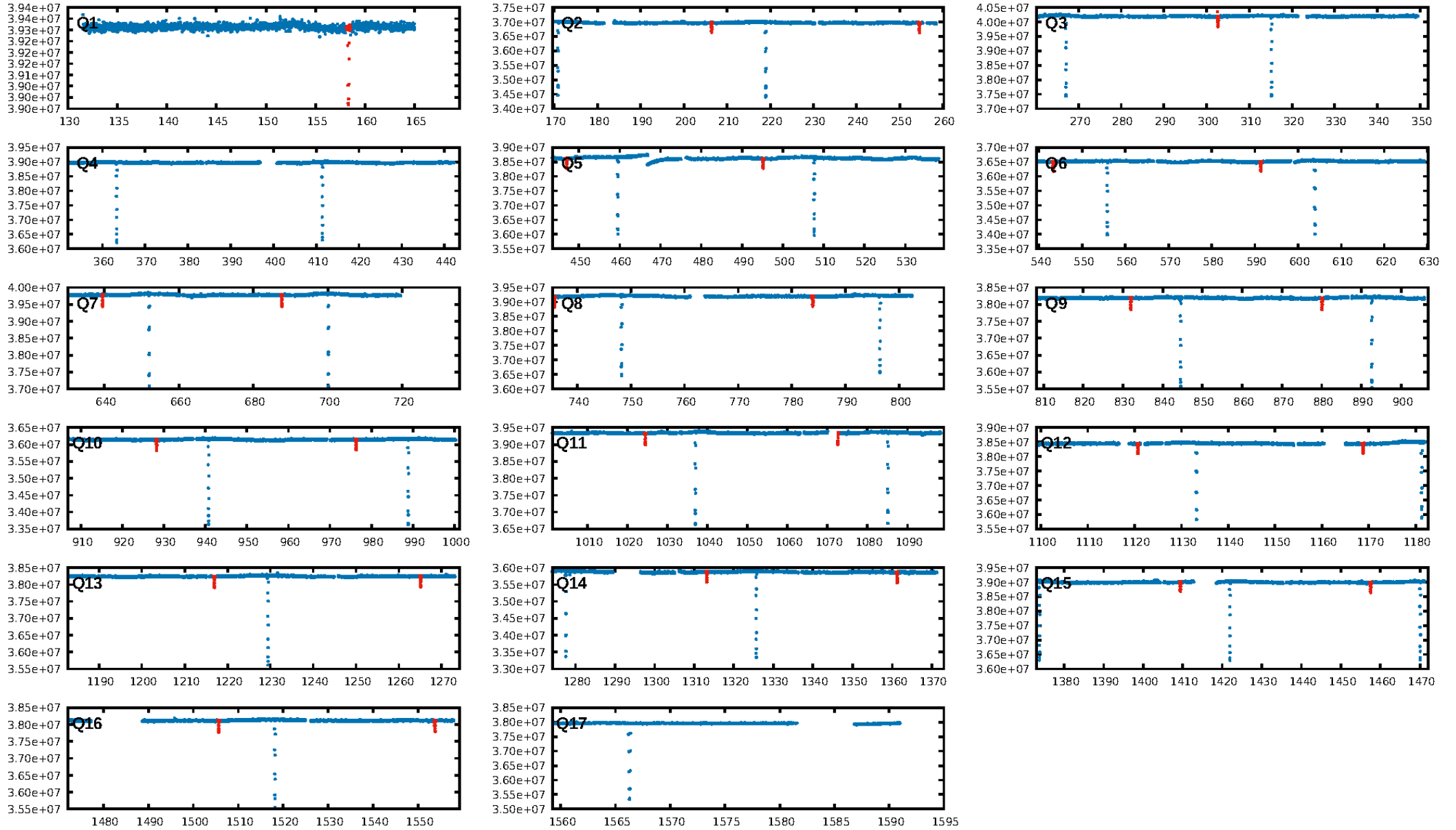
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 41.9%
ModelChiSquareGoF-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [27/27]
GhostDiagnostic-chr: 7.246
Centroid-sig: 0.3%
Centroid-so: 0.216 arcsec [5.23 σ]
OotOffset-rm: 0.047 arcsec [0.68 σ]
KicOffset-rm: 0.243 arcsec [3.42 σ]
OotOffset-st: 4/4/3/4 [15]
KicOffset-st: 4/4/3/4 [15]
DiffImageQuality-fgm: 1.00 [15/15]
DiffImageOverlap-fno: 1.00 [15/15]

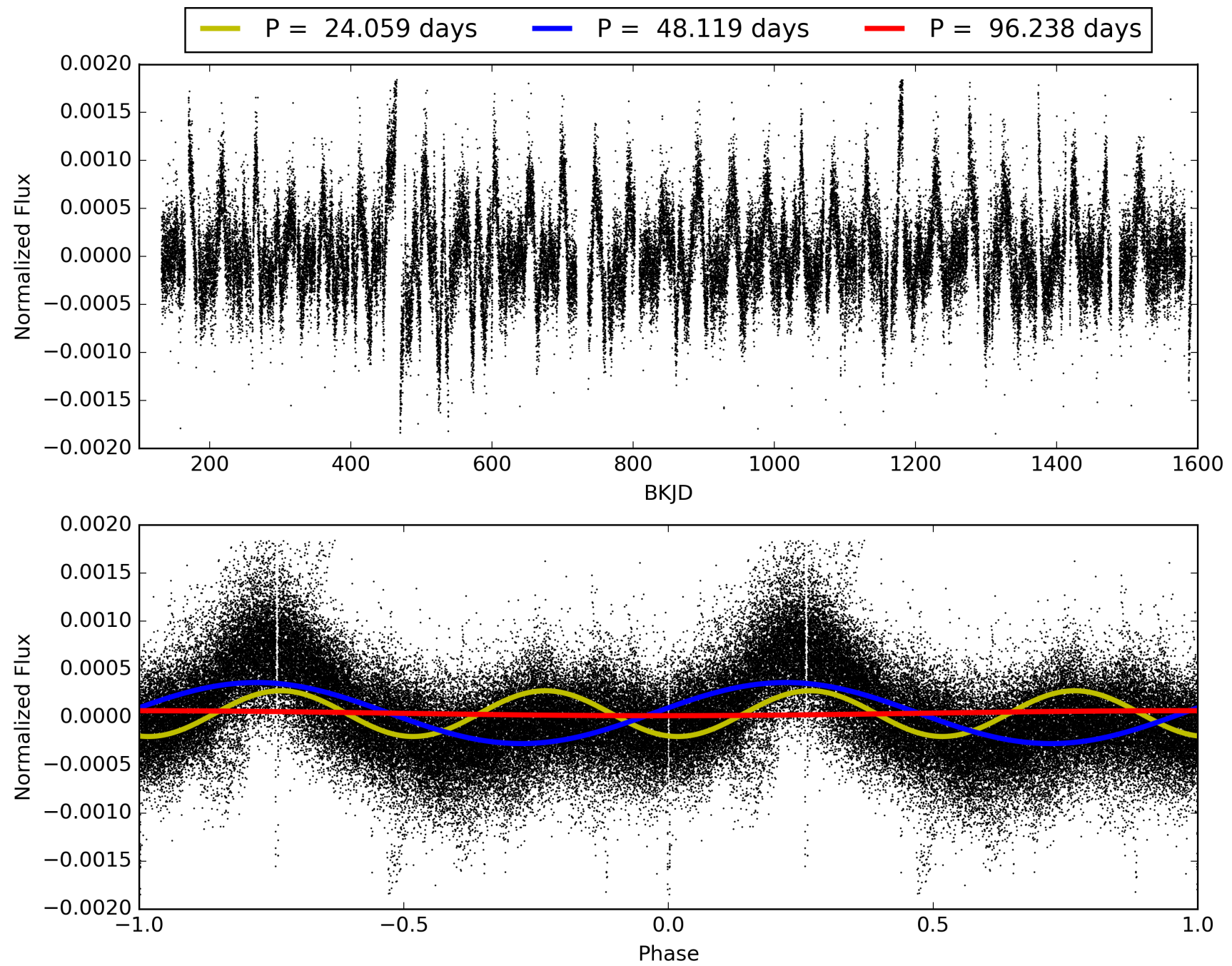
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:18:43 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009164836-02, PDC Light Curves

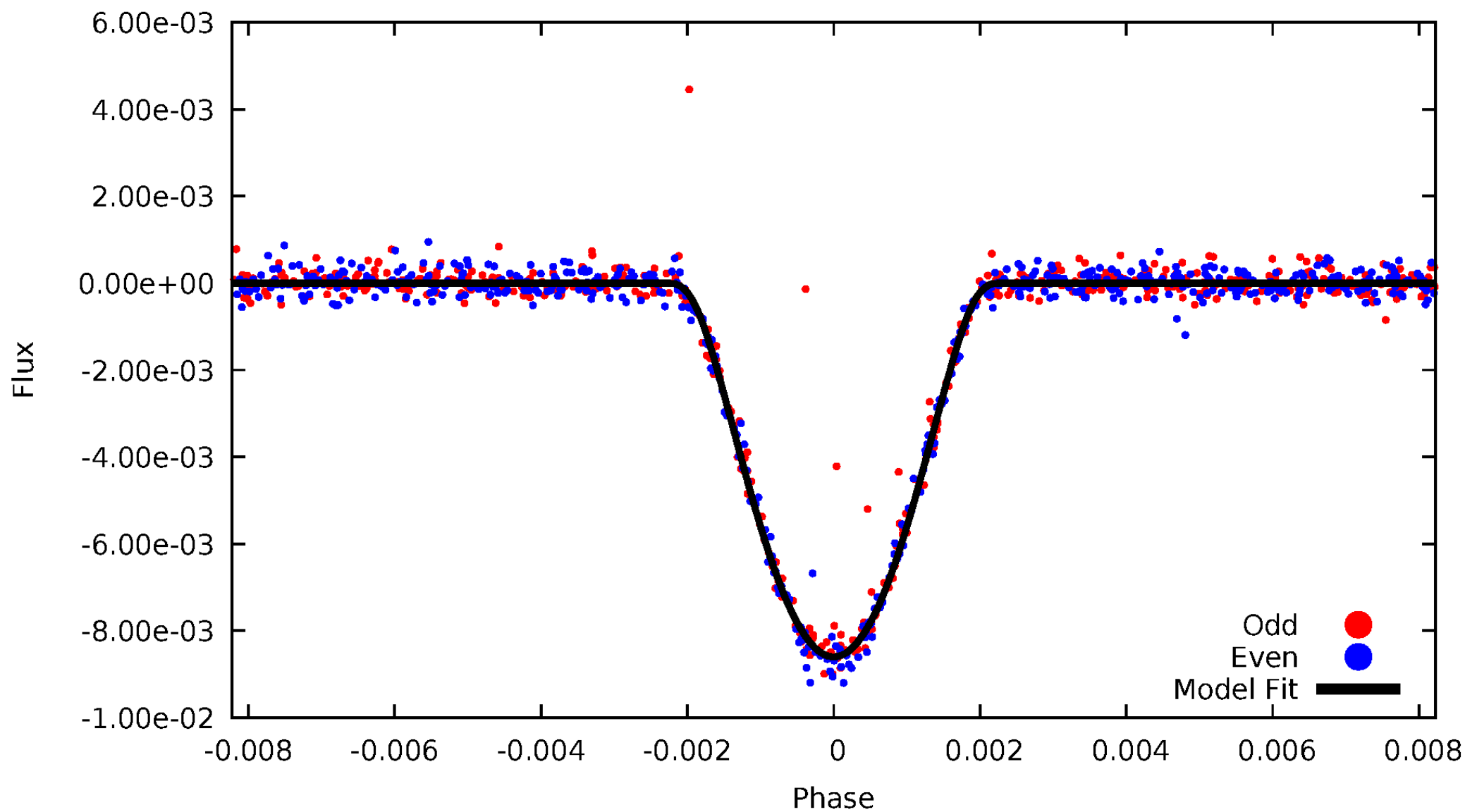


TCE 009164836-02



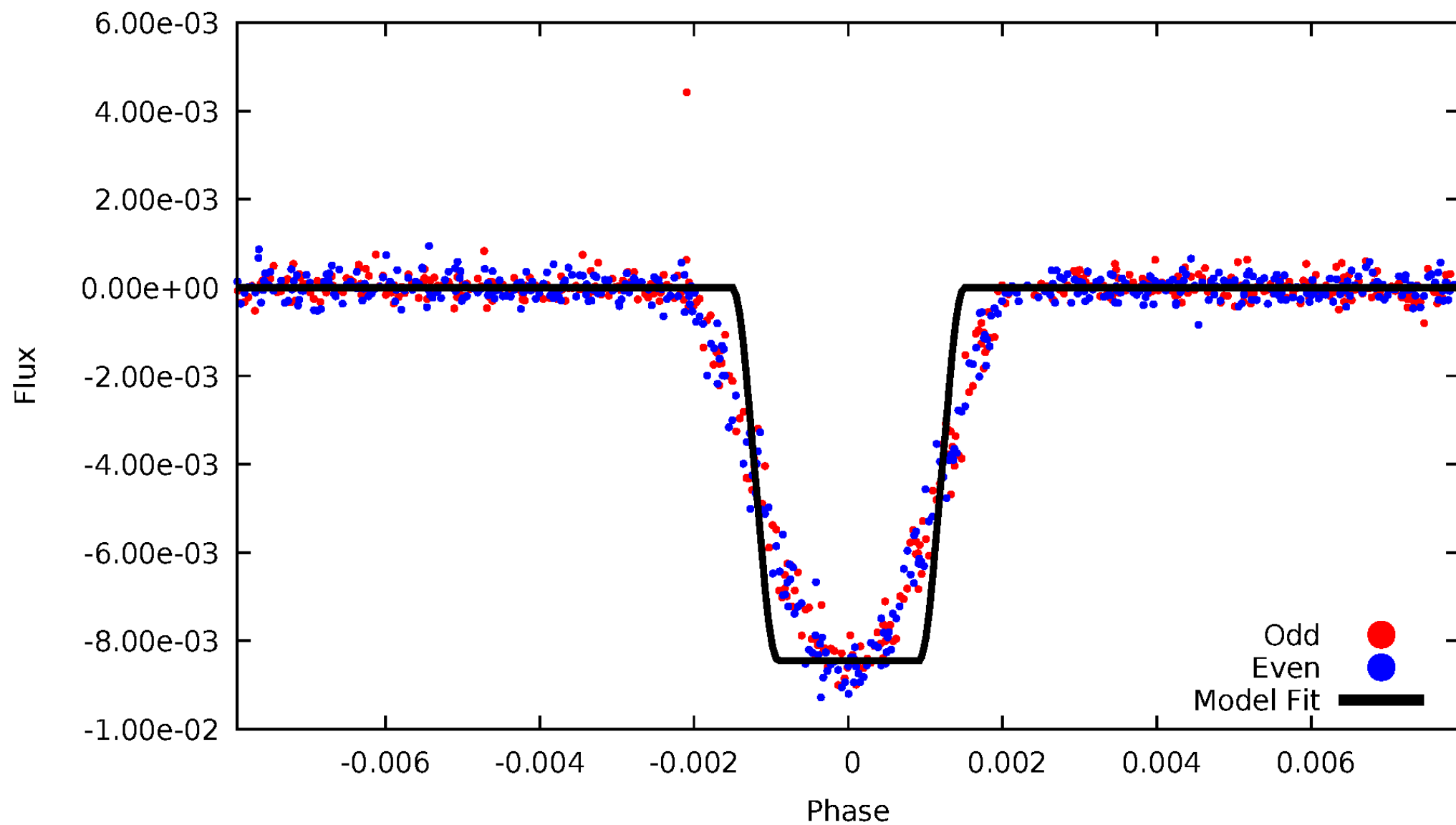
DV Odd/Even

TCE 009164836-02



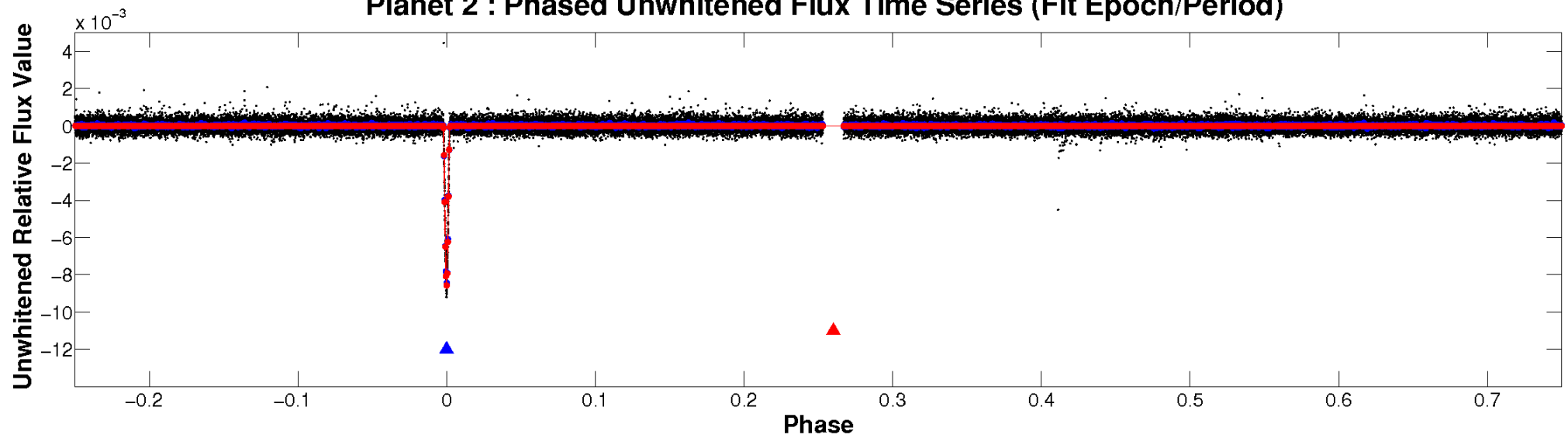
ALT Odd/Even

TCE 009164836-02

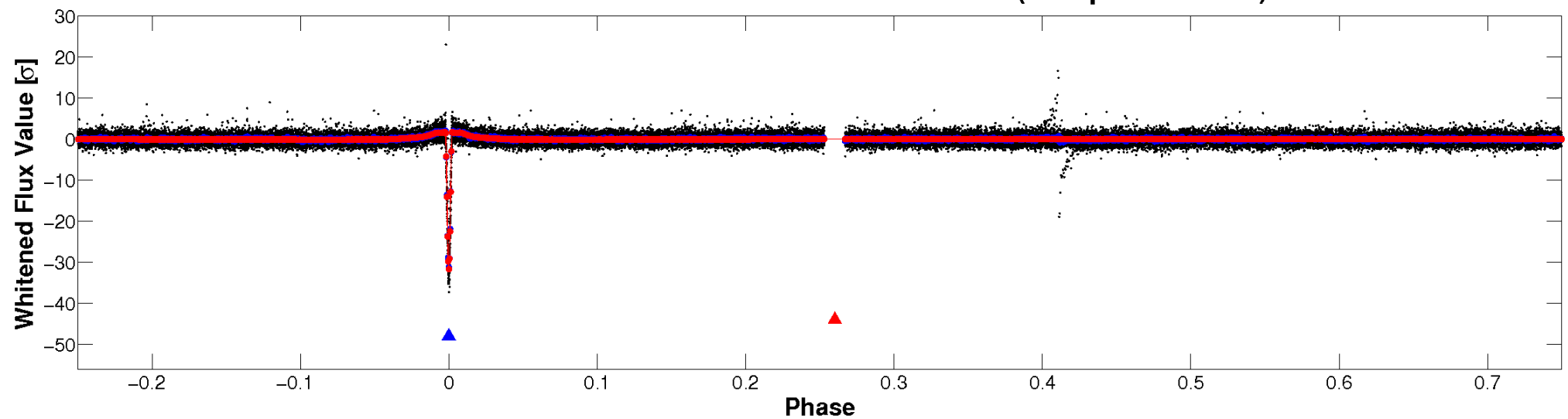


Non-Whitened Vs. Whitened Light Curve

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

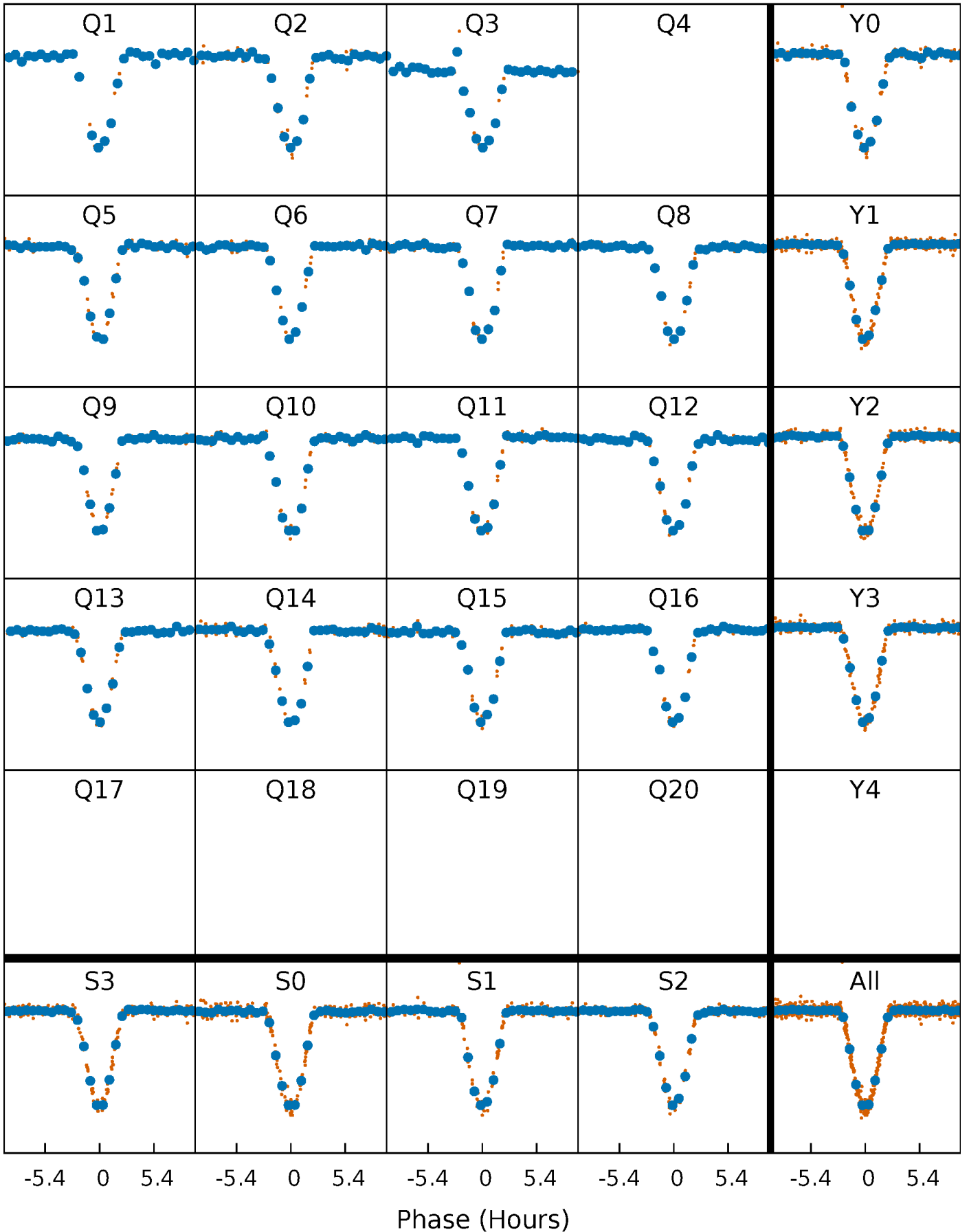


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



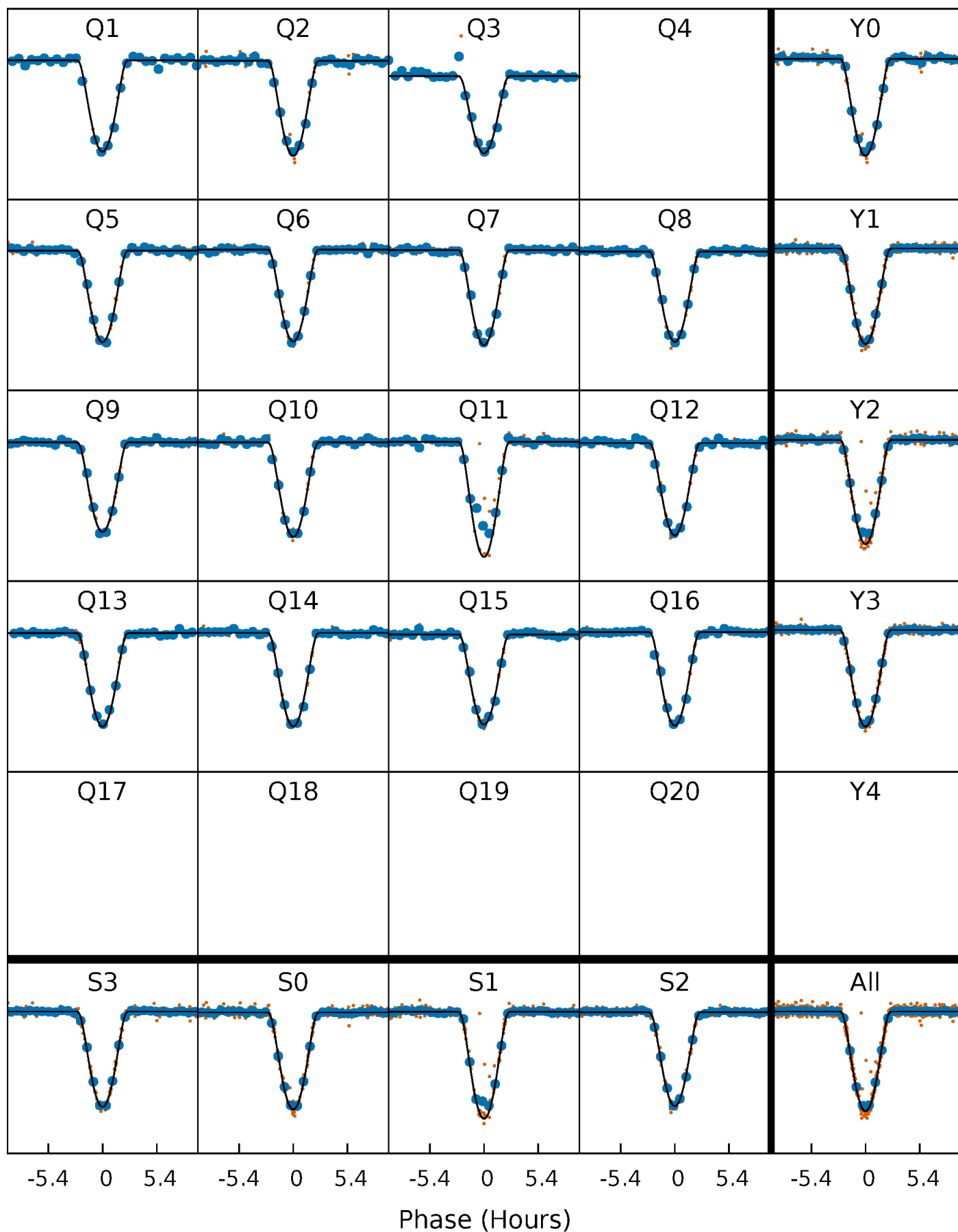
PDC Quarter-Phased Transit Curves

TCE 009164836-02 P= 48.118831 Days $T_0=158.320889$ (BKJD)



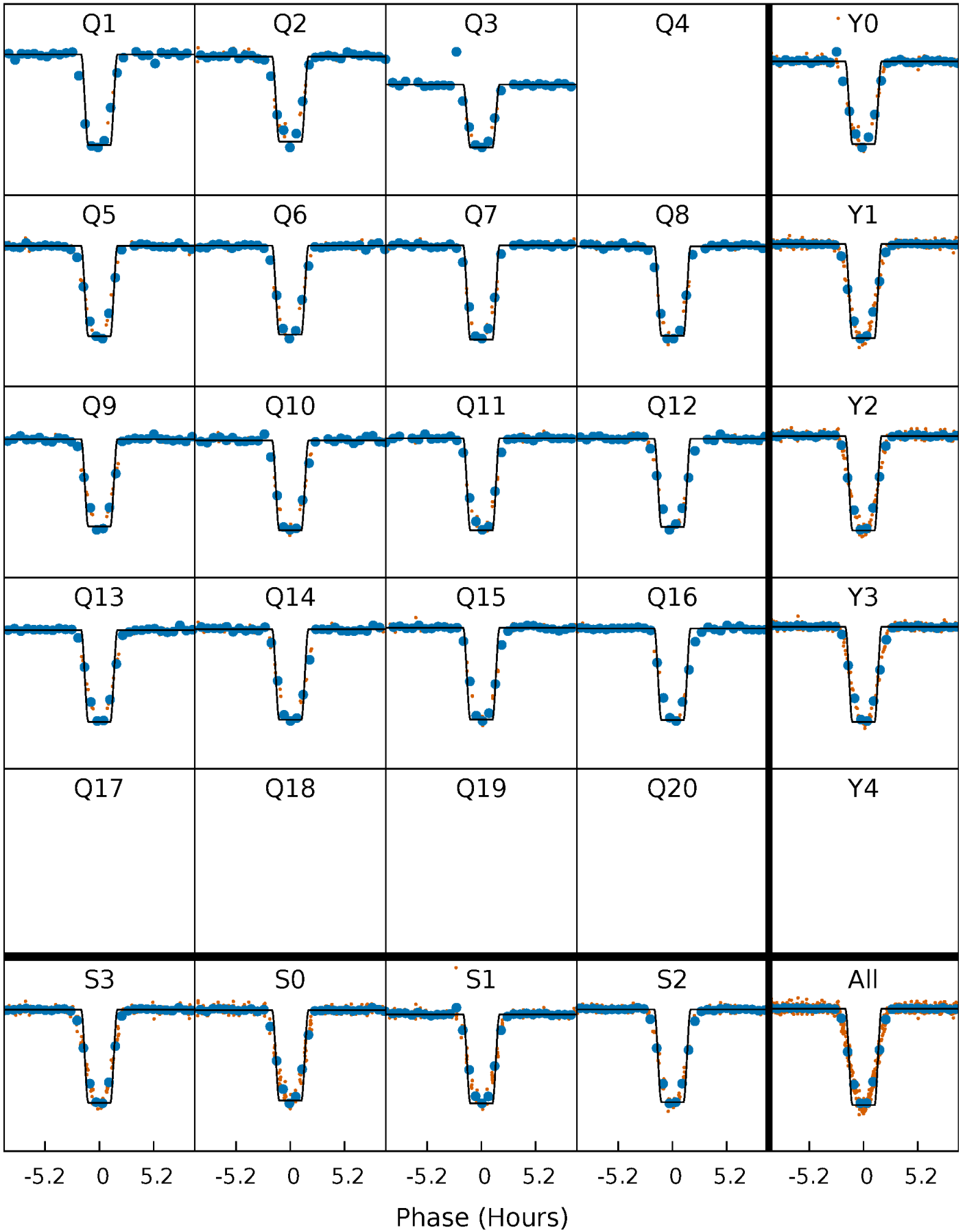
DV Quarter-Phased Transit Curves

TCE 009164836-02 P= 48.118831 Days $T_0=158.320889$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

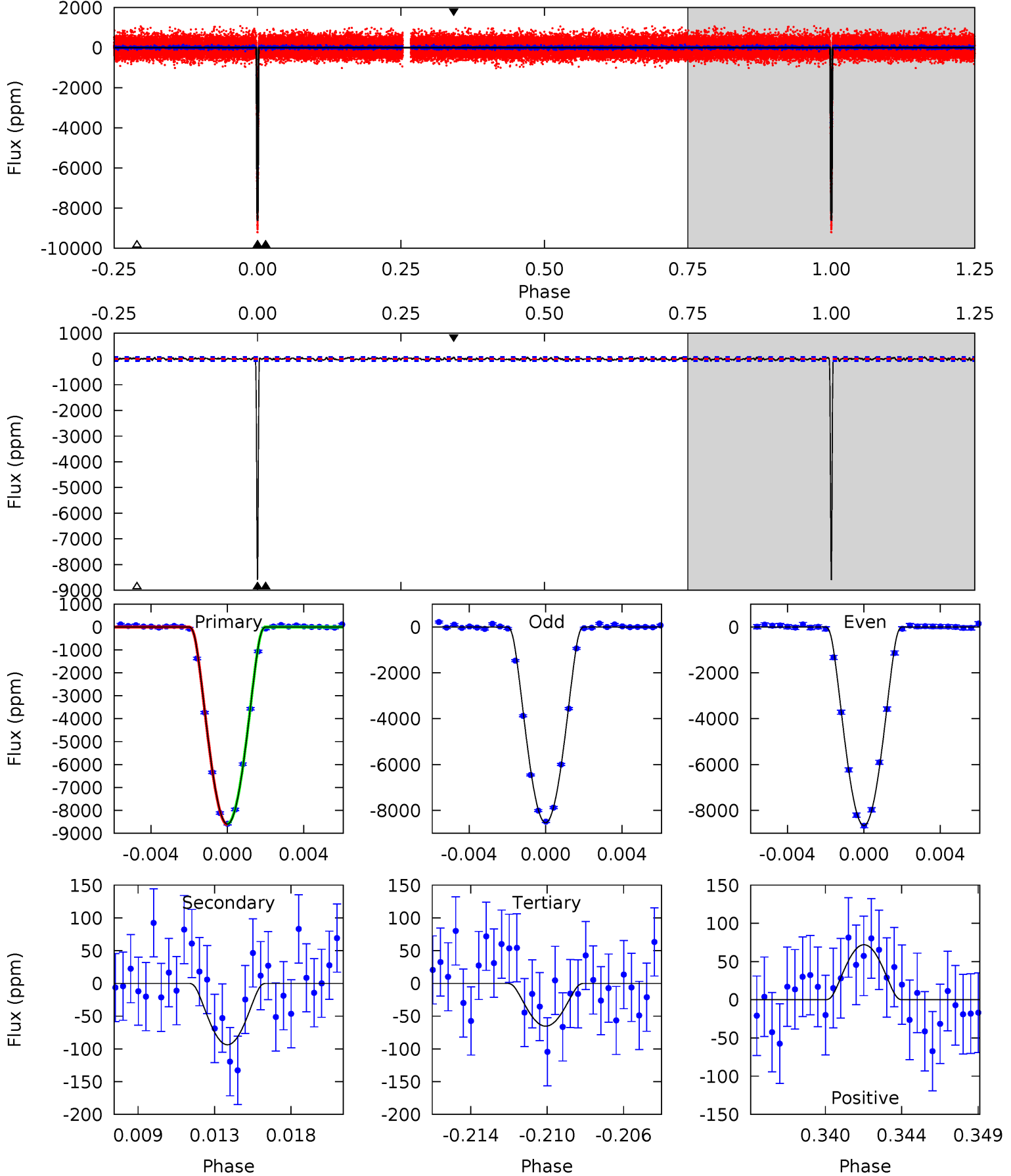
TCE 009164836-02 P= 48.118355 Days $T_0=158.328155$ (BKJD)



DV Model-Shift Uniqueness Test

009164836-02, P = 48.118831 Days, E = 110.202058 Days

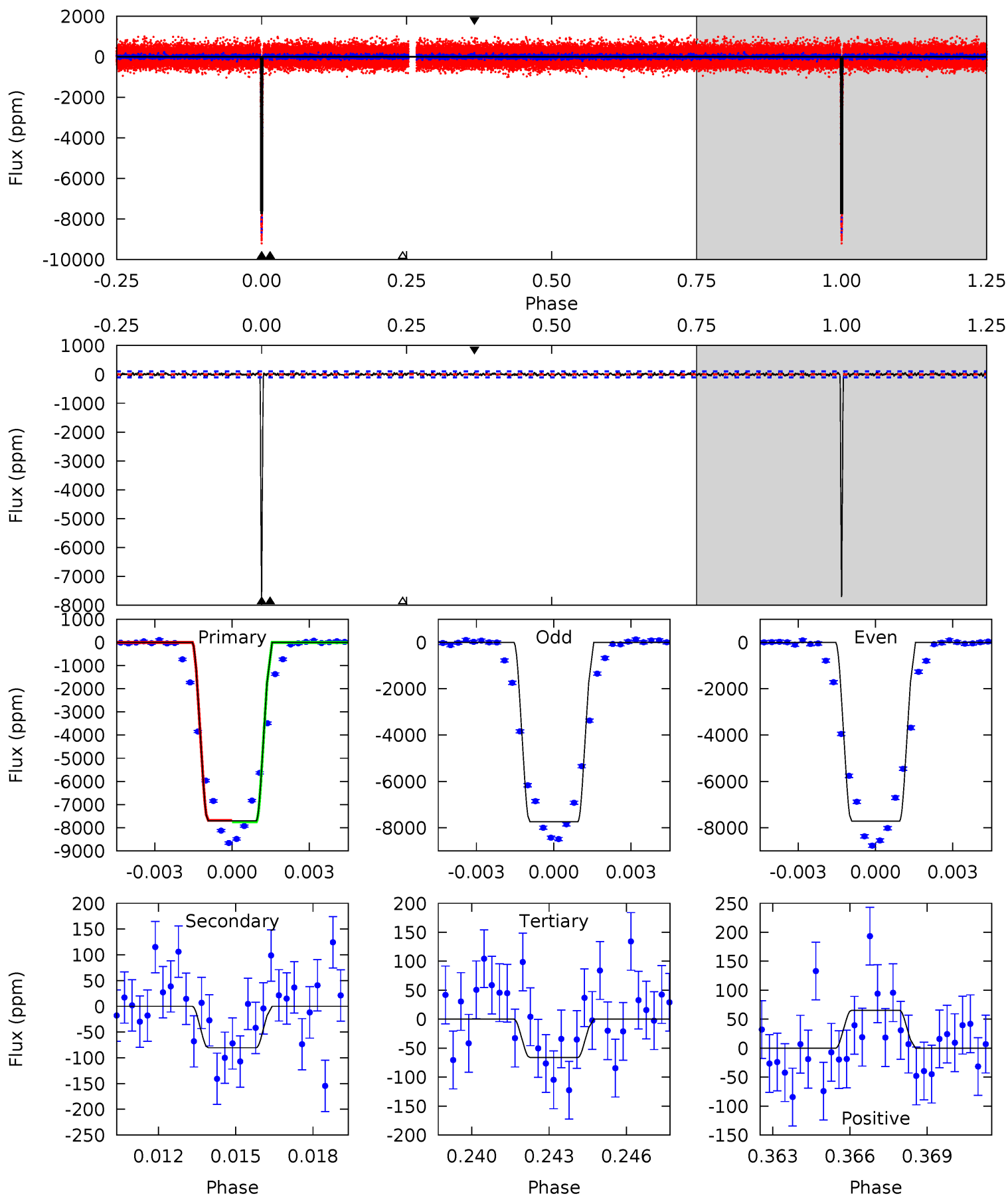
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
580.3	6.32	4.41	4.86	5.18	2.84	1.65	575.9	575.4	1.91	1.46	4.12	0.98	0.01	1.32



Alt Model-Shift Uniqueness Test

009164836-02, P = 48.118355 Days, E = 110.209800 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
387.6	4.04	3.32	3.29	5.26	2.98	1.08	384.2	384.3	0.72	0.76	0.84	1.00	0.01	1.68



Stellar Parameters For KIC 009164836

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6003^{+162}_{-180}	$4.536^{+0.050}_{-0.213}$	$-0.340^{+0.300}_{-0.300}$	$0.872^{+0.269}_{-0.090}$	$0.952^{+0.117}_{-0.117}$	$2.023^{+0.418}_{-1.078}$
	+3%/-3%	+1%/-5%	+88%/-88%	+31%/-10%	+12%/-12%	+21%/-53%
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 009164836-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-94 ± 15	$13.88^{+2.65}_{-1.99}$	704^{+53}_{-35}	2448^{+92}_{-79}	17^{+6}_{-6}
Alt.	-80 ± 20	$9.18^{+2.04}_{-1.78}$	699^{+46}_{-32}	2662^{+169}_{-154}	33^{+20}_{-13}

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

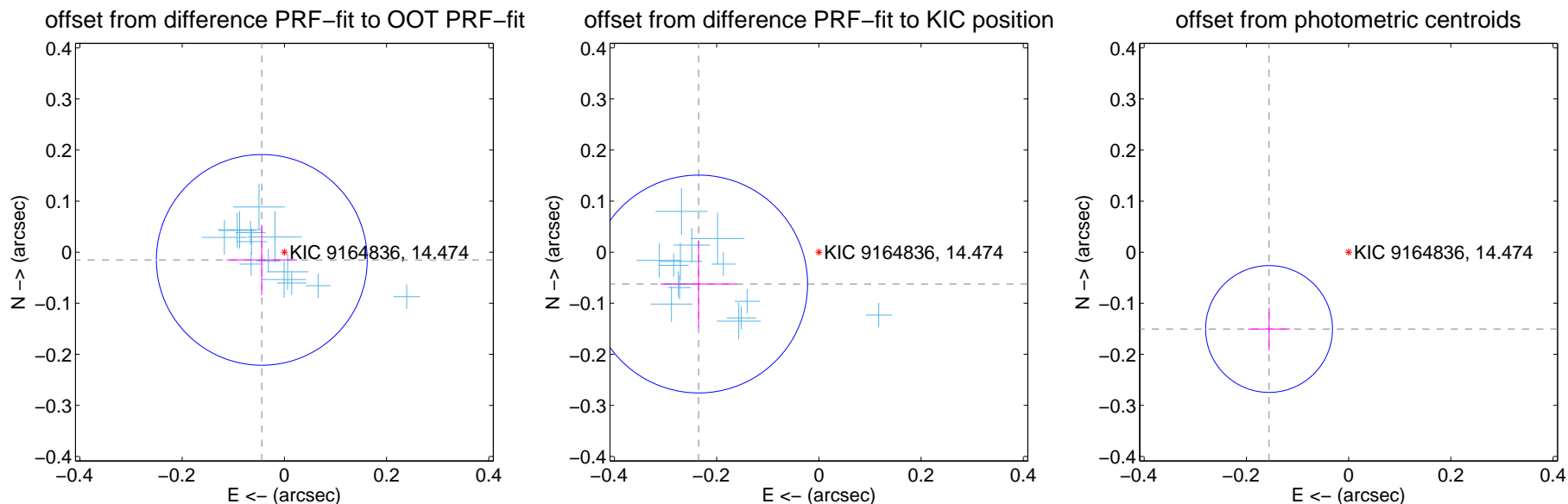
DV Centroid Data

Supplemental centroid analysis for 009164836-02. Kepler magnitude: 14.47. Transit SNR 322.88

There are 15 quarters with good PRF difference image offsets

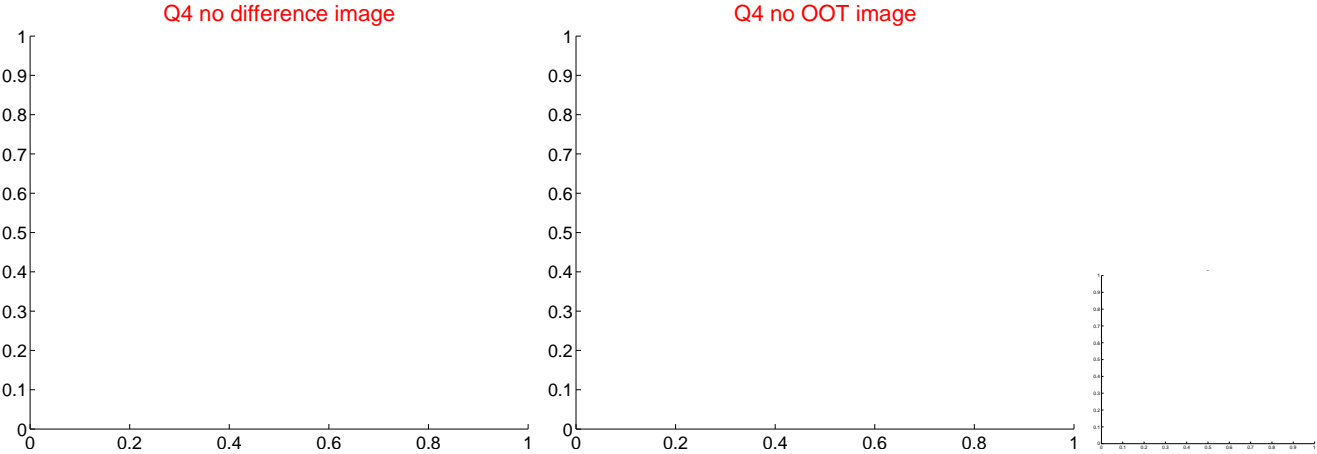
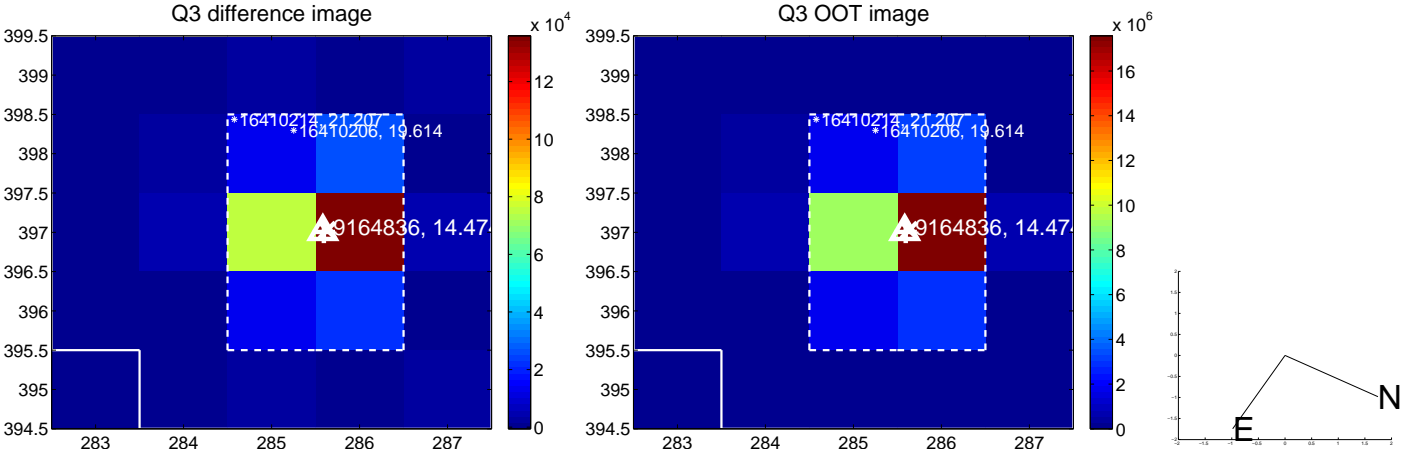
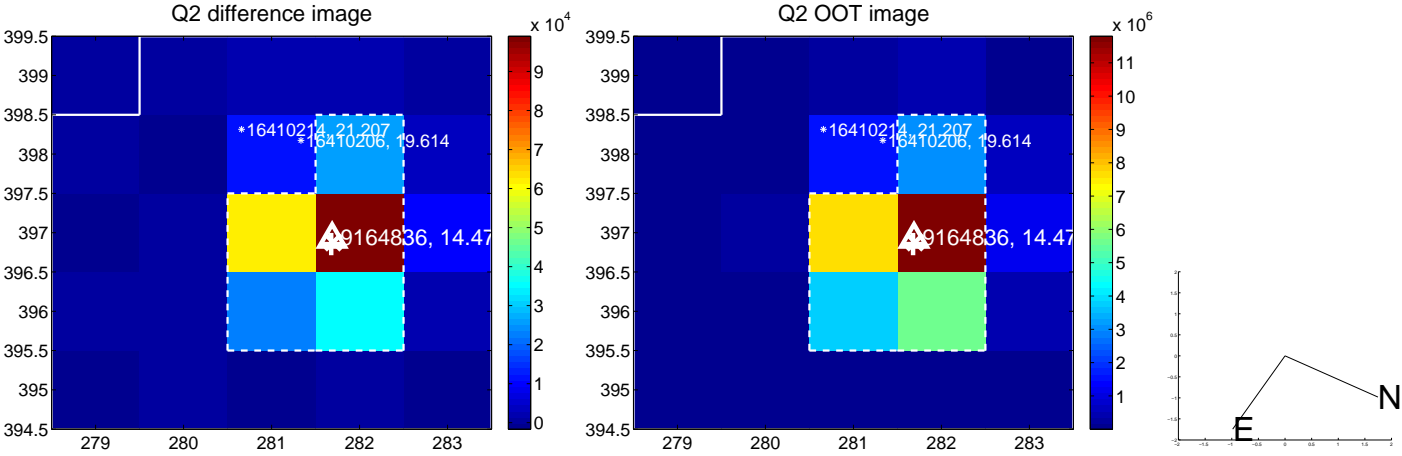
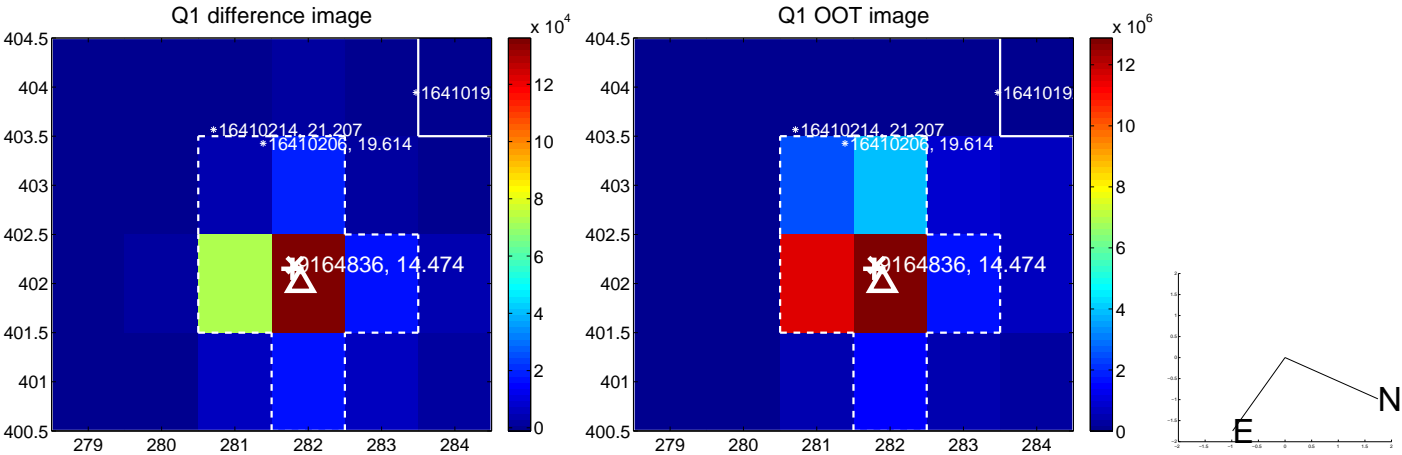
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.047 ± 0.069	0.68	0.044 ± 0.069	-0.015 ± 0.069
PRF-fit source offset from KIC position	0.243 ± 0.071	3.42	0.235 ± 0.074	-0.062 ± 0.085
photometric centroid source offset	0.22 ± 0.04	5.23	0.16 ± 0.04	-0.15 ± 0.04

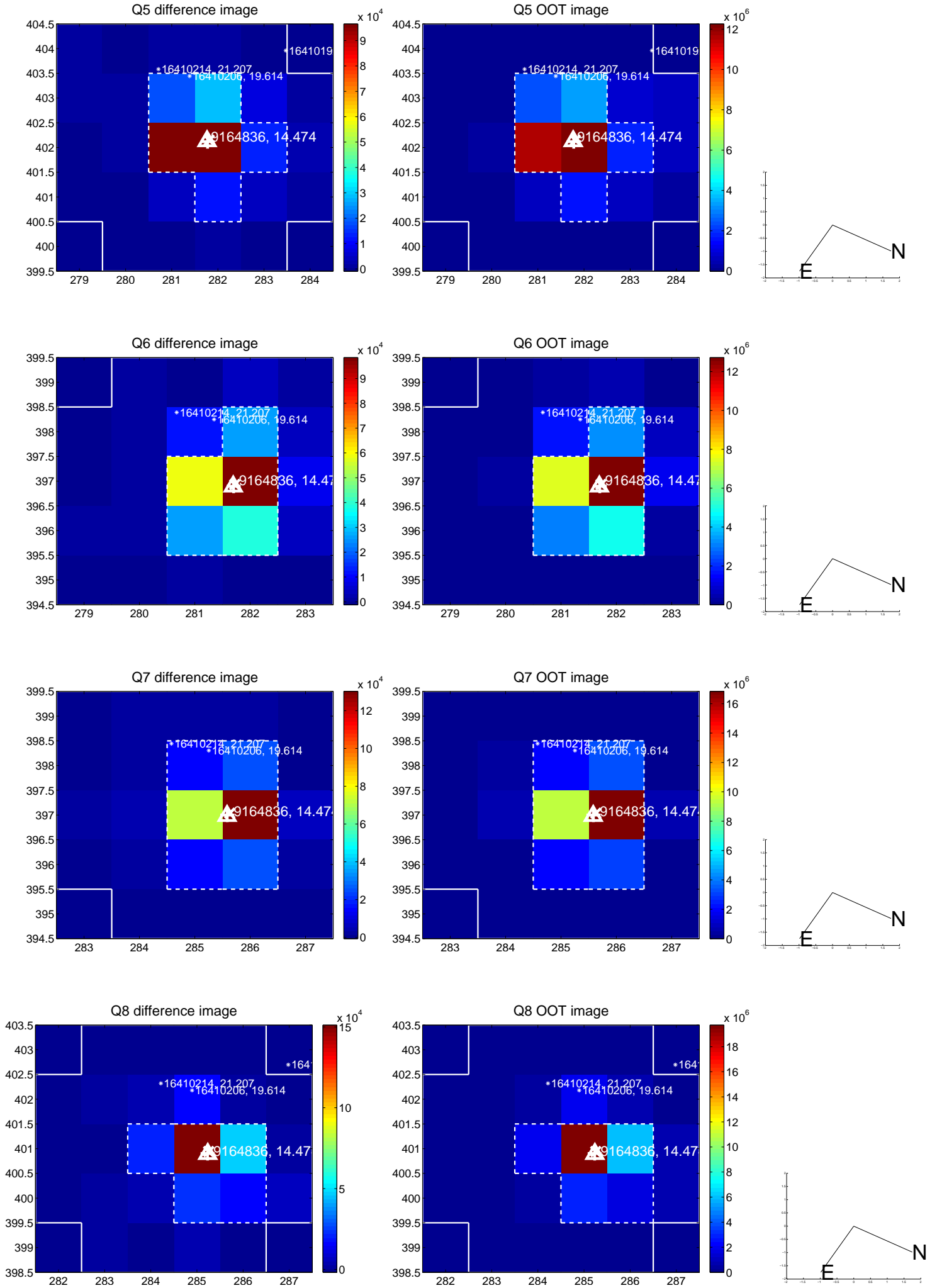


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

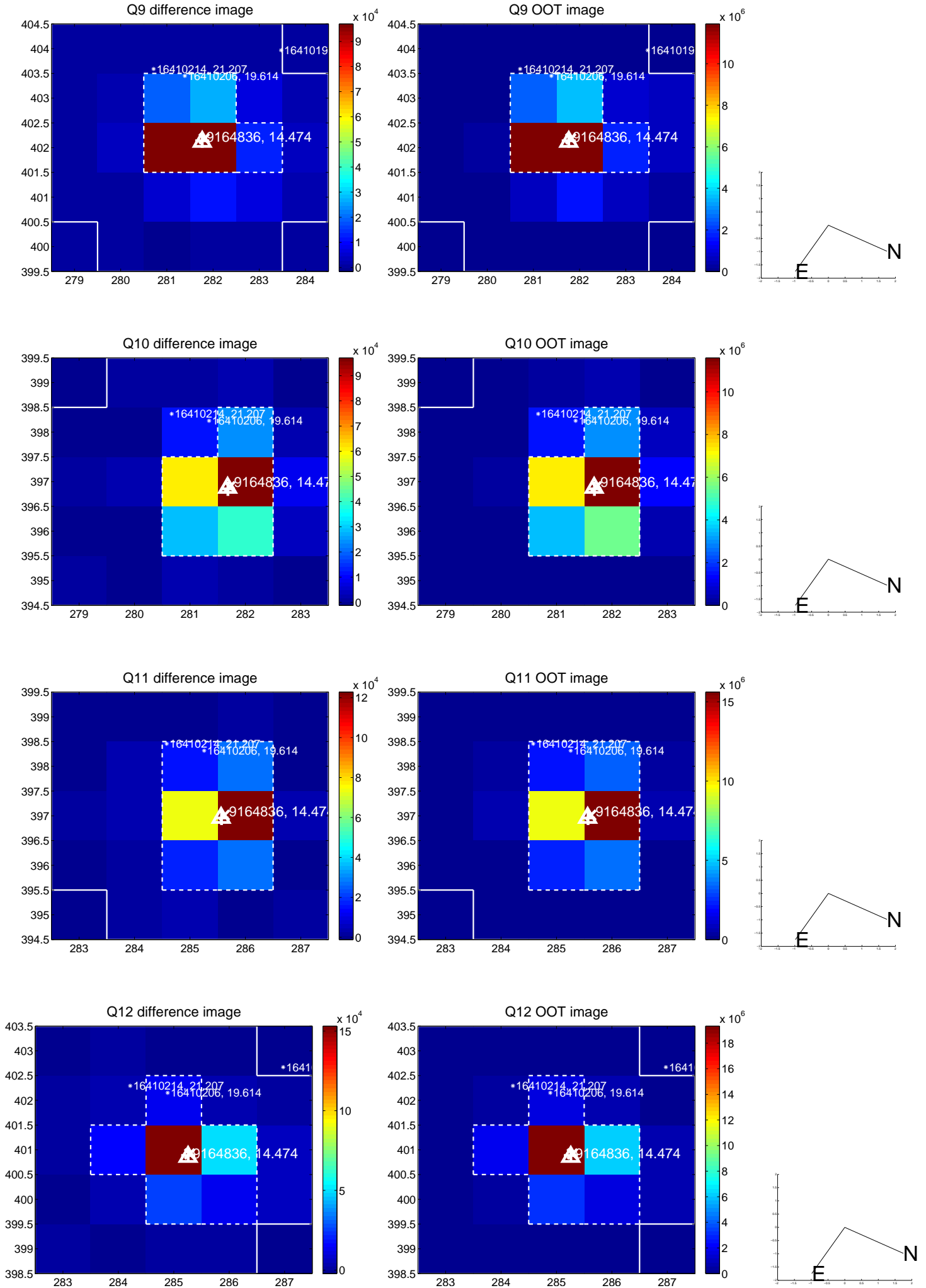
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



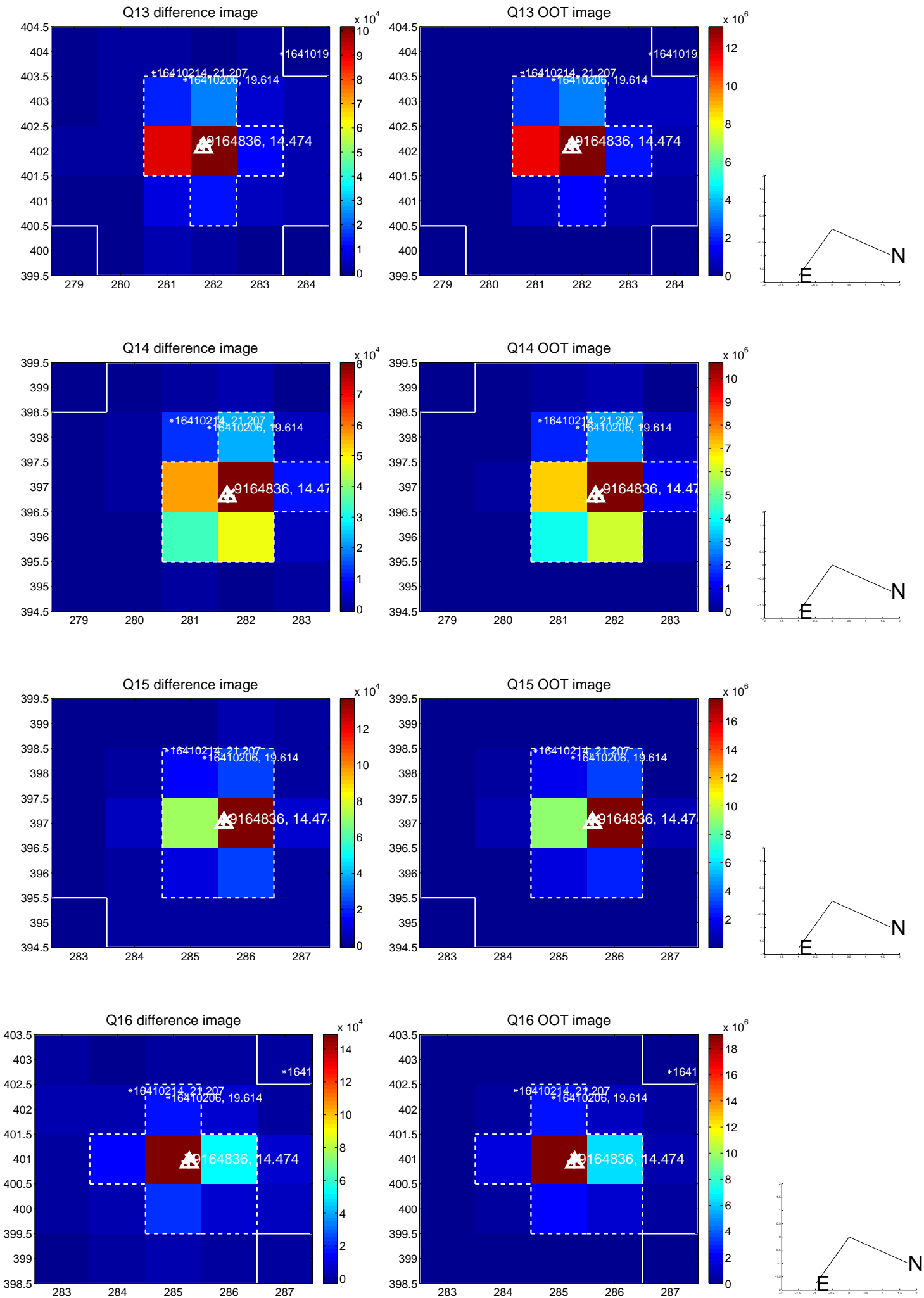
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



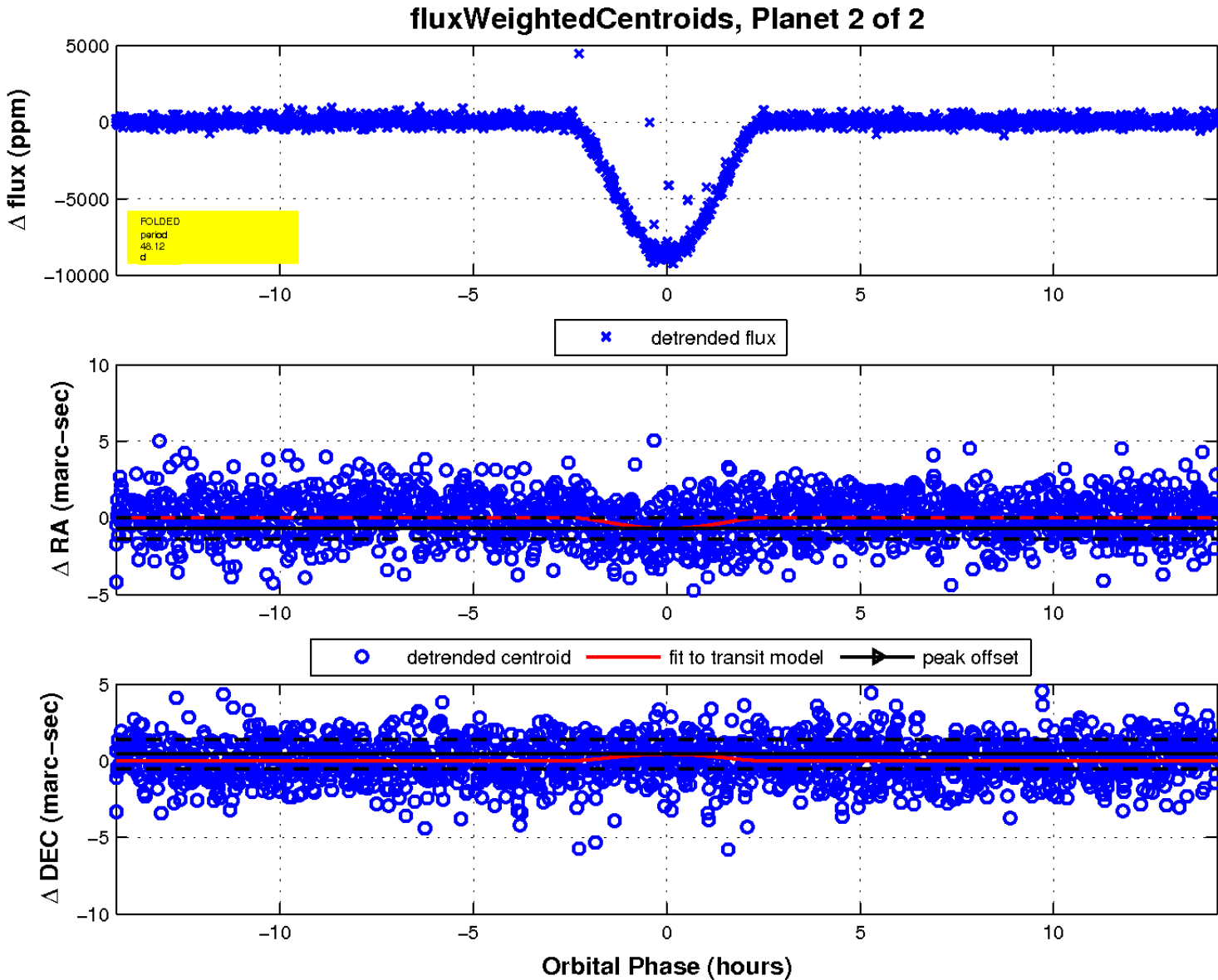
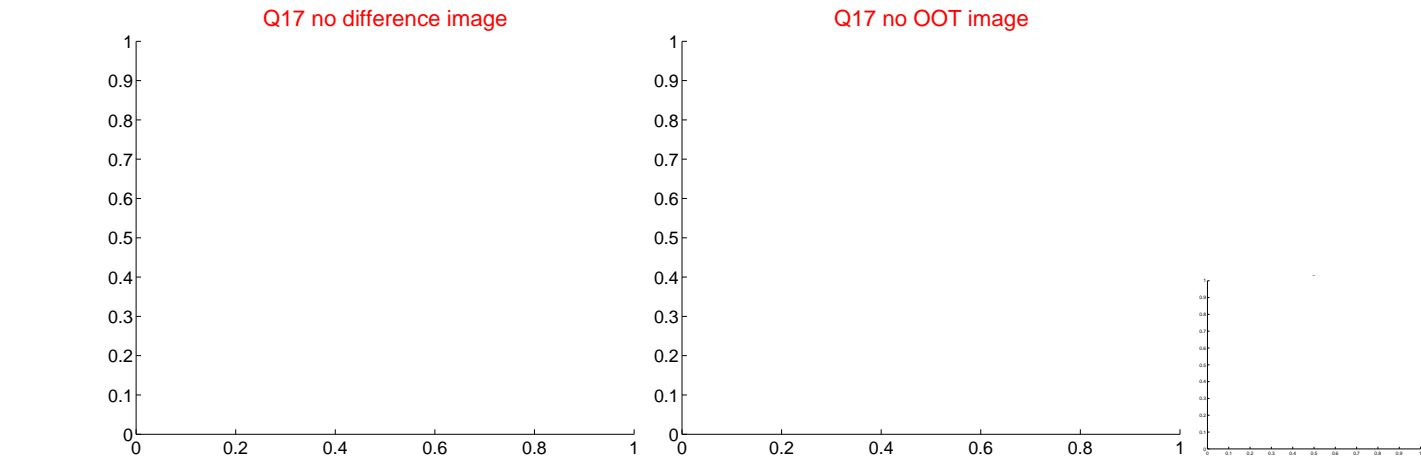
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

