

KIC 012109845

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})
012109845-01	OBS	3765.01	0.865954	132.058911	258017.0	1.926	2205.8	1296.2	0.47	4561	25.63	432.44
012109845-02	OBS	No	0.865379	131.851619	96700.3	1.500	664.5	-1.0	0.47	4561	14.76	432.82

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012109845-01	OBS	FP	0.00	0	1	0	0	SWEET_EB—MOD_SEC_DV—MOD_SEC_ALT
012109845-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—CENT_NOFITS

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.

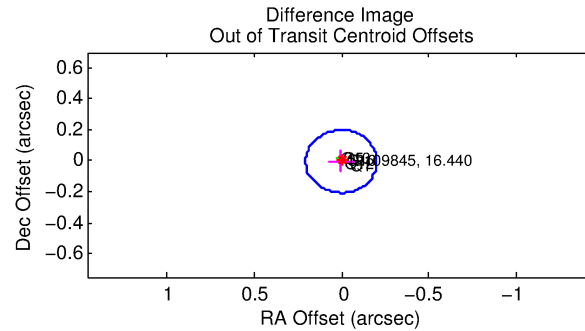
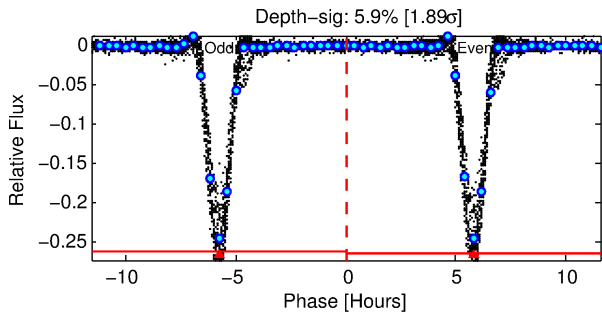
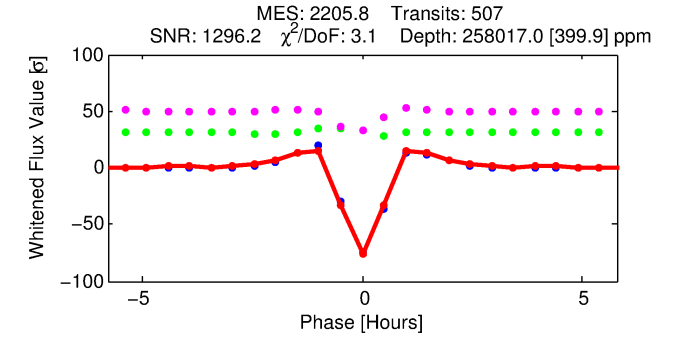
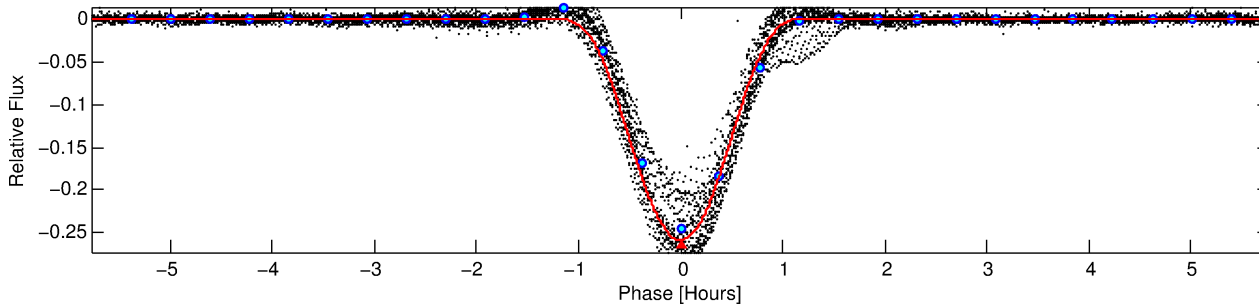
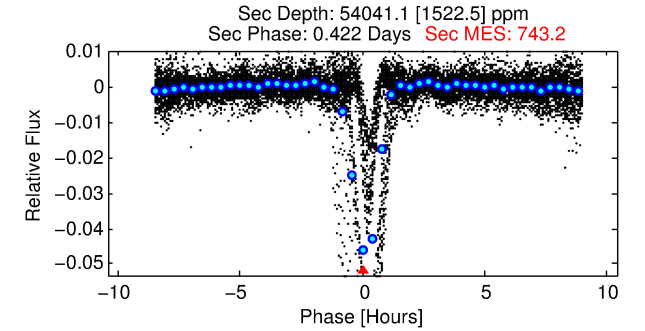
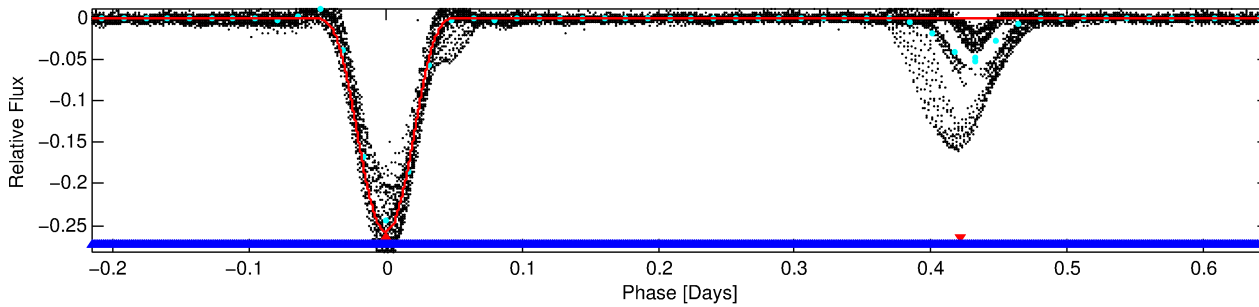
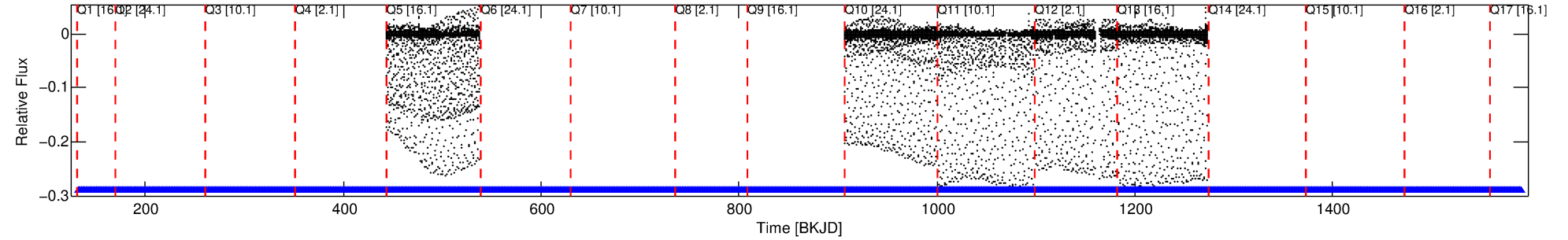
Ephemeris Match Information For 012109845-01

No Significant Match Found

DV One-Page Summary

KIC: 12109845 Candidate: 1 of 2 Period: 0.866 d
KOI: K03765.01 Corr: 0.975

Kp: 16.44 R*: 0.47 Rs Teff: 4561.0 K Logg: 4.79 Fe/H: -1.840



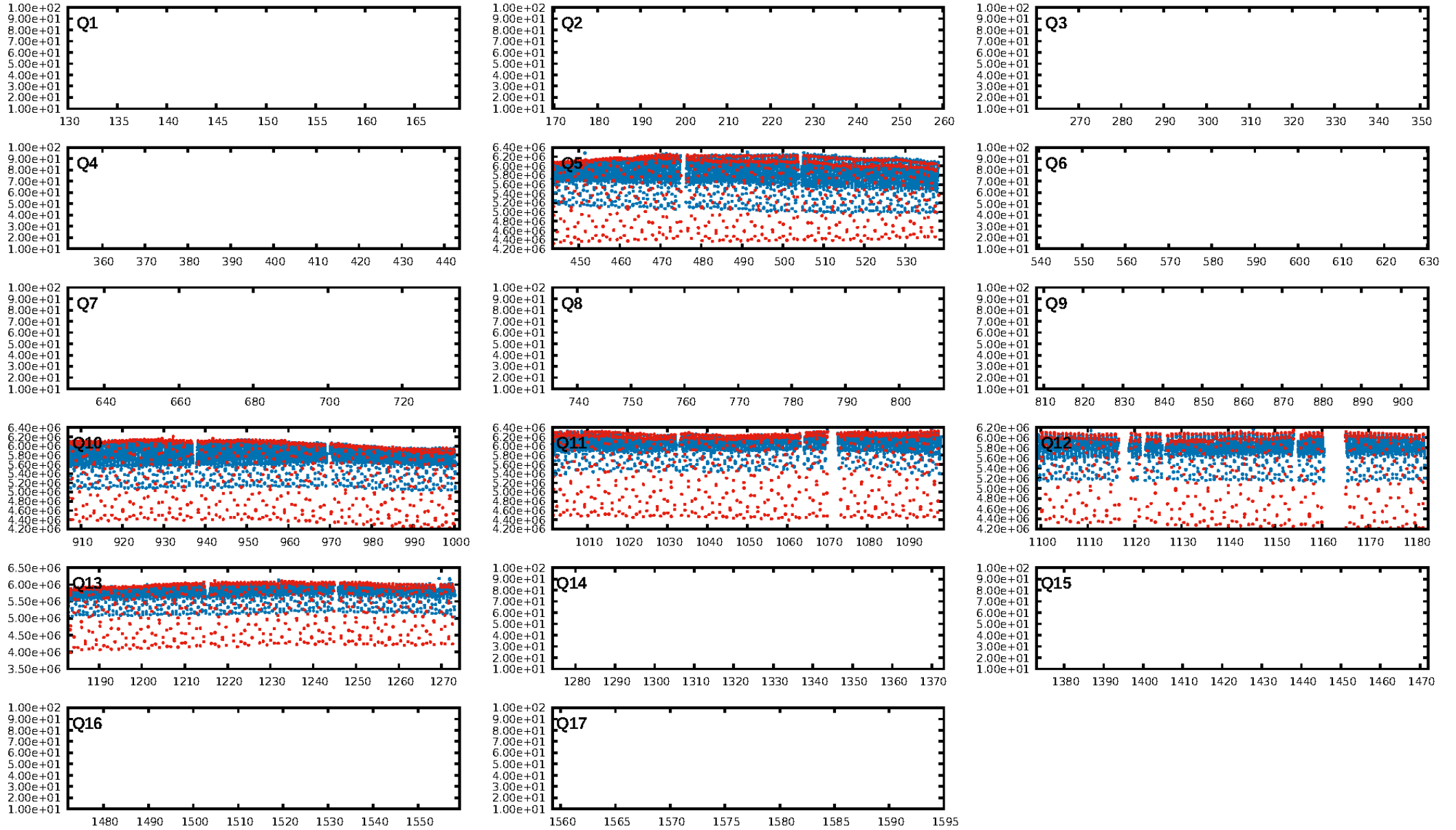
DV Fit Results:

Period = 0.86595 [0.00000] d
Epoch = 132.0589 [0.0000] BKJD
Rp/R* = 0.5007 [0.0016]
a/R* = 4.96 [0.01]
b = 0.50 [0.01]
Seff = 432.44 [83.86]
Teq = 1163 [56] K
Rp = 25.63 [2.19] Re
a = 0.0140 [0.0010] AU
Ag = 8.93 [0.87] [9.11σ]
Teffp = 3108 [134] K [13.37σ]

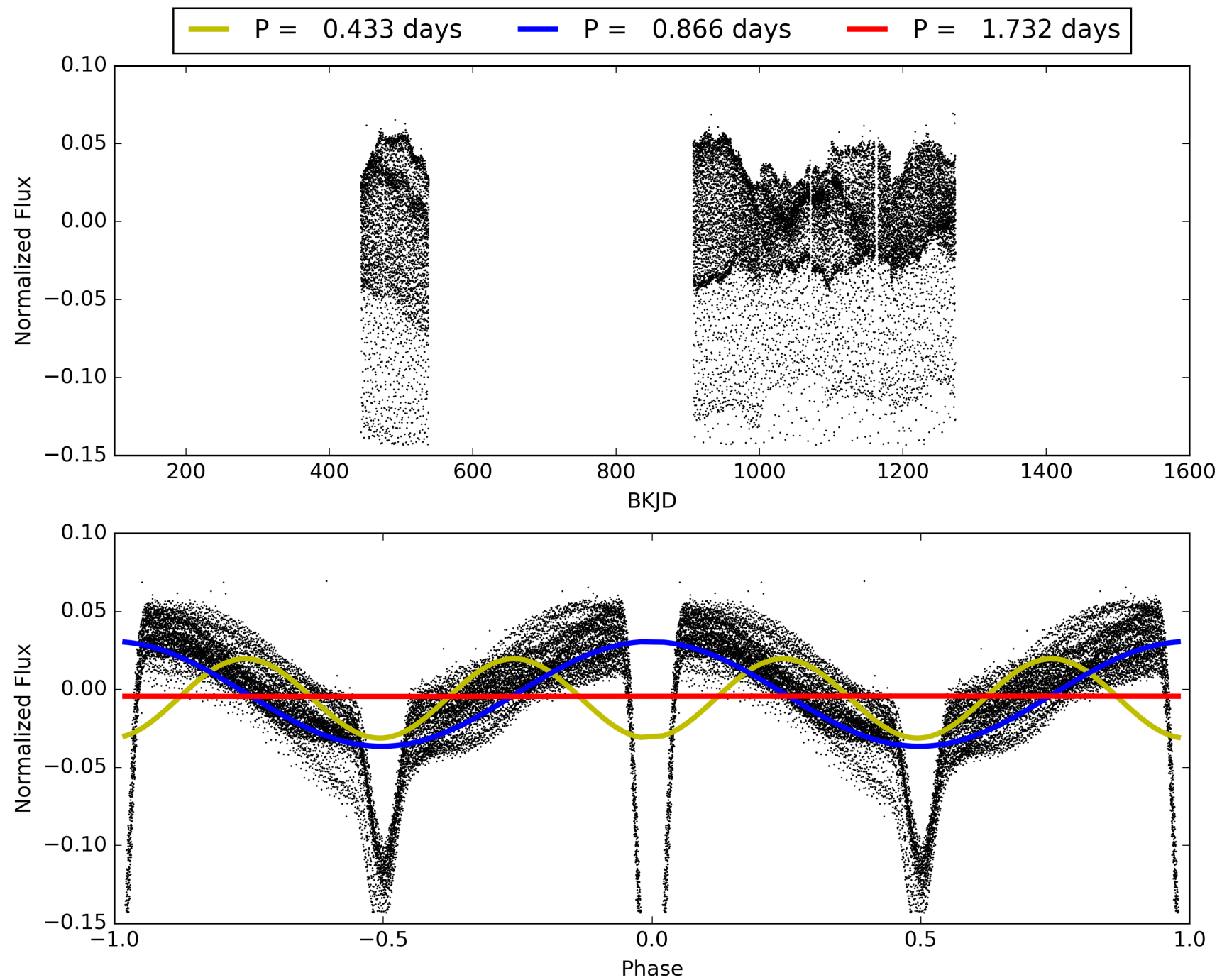
DV Diagnostic Results:

ShortPeriod-sig: 0.5% [0.01σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [507/507]
GhostDiagnostic-chr: 1.109
Centroid-sig: 0.0%
Centroid-so: 0.148 arcsec [44.55σ]
OotOffset-rm: 0.004 arcsec [0.06σ]
OotOffset-st: 1/1/1/2 [5]
KicOffset-rm: 0.048 arcsec [0.71σ]
KicOffset-st: 1/1/1/2 [5]
DiffImageQuality-fgm: 1.00 [5/5]
DiffImageOverlap-fno: 0.20 [1/5]

TCE 012109845-01, PDC Light Curves

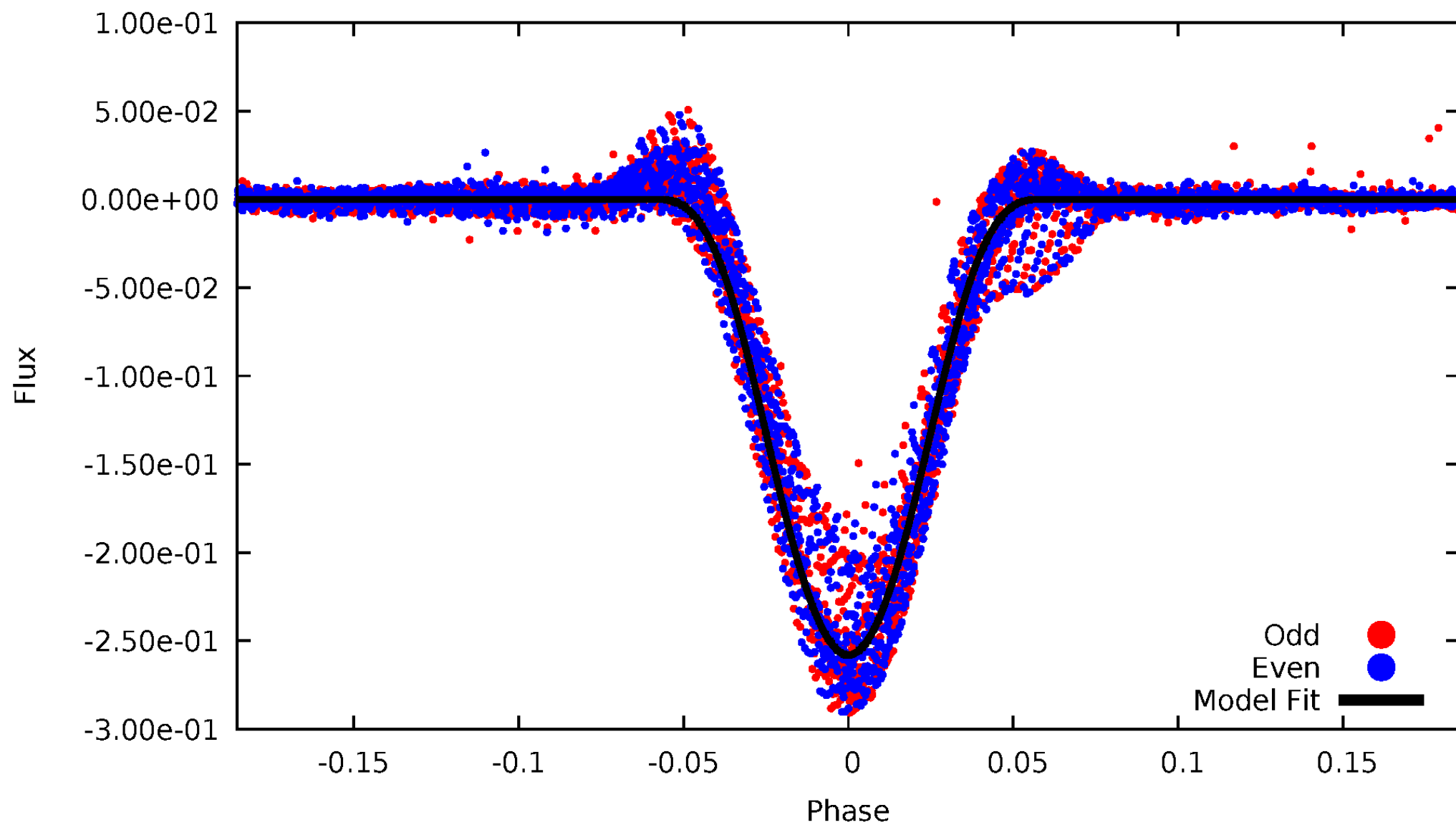


TCE 012109845-01



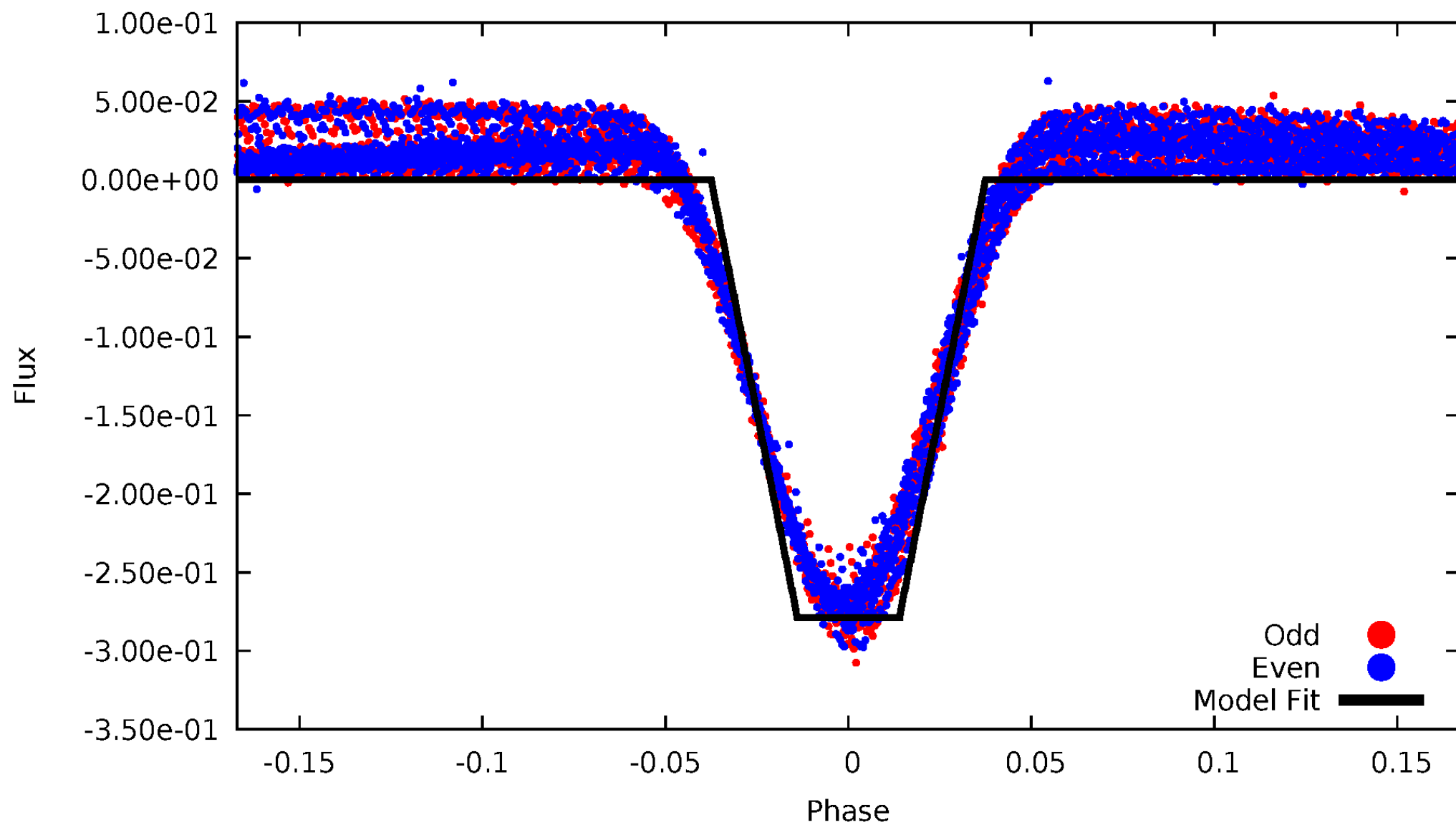
DV Odd/Even

TCE 012109845-01



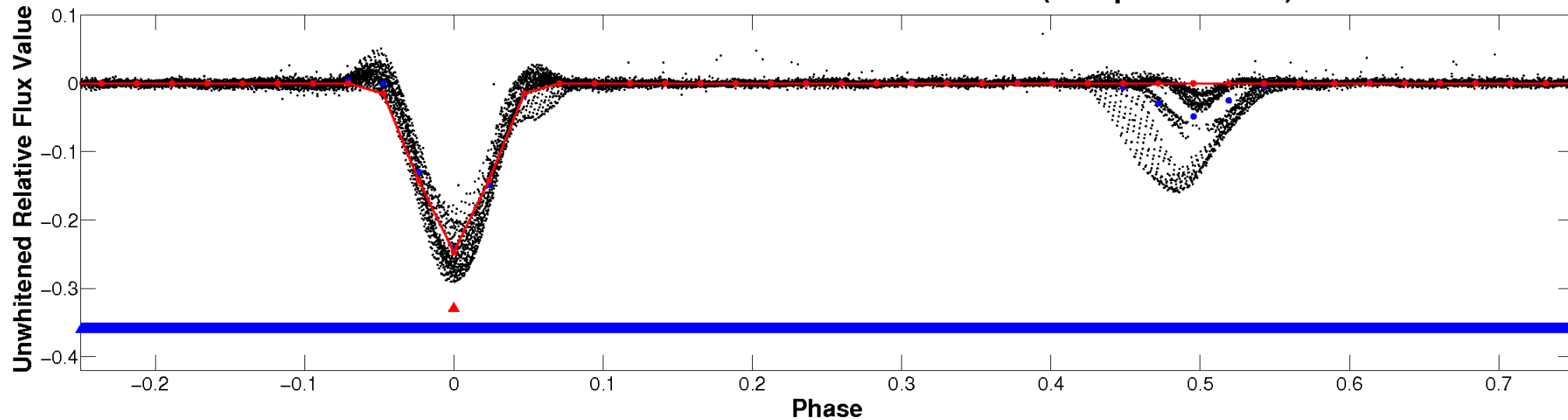
ALT Odd/Even

TCE 012109845-01

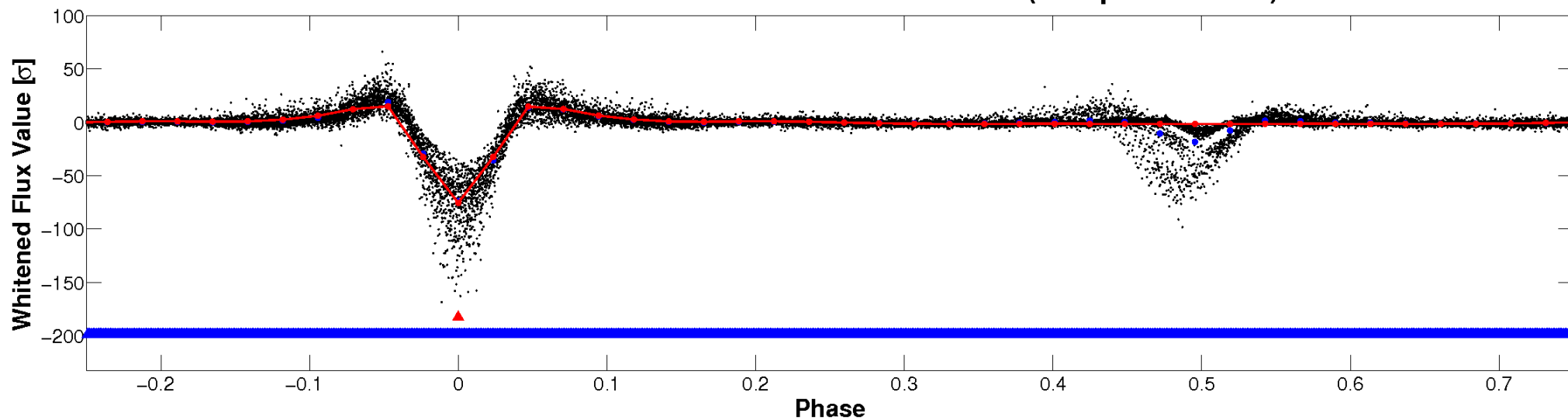


Non-Whitened Vs. Whitened Light Curve

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

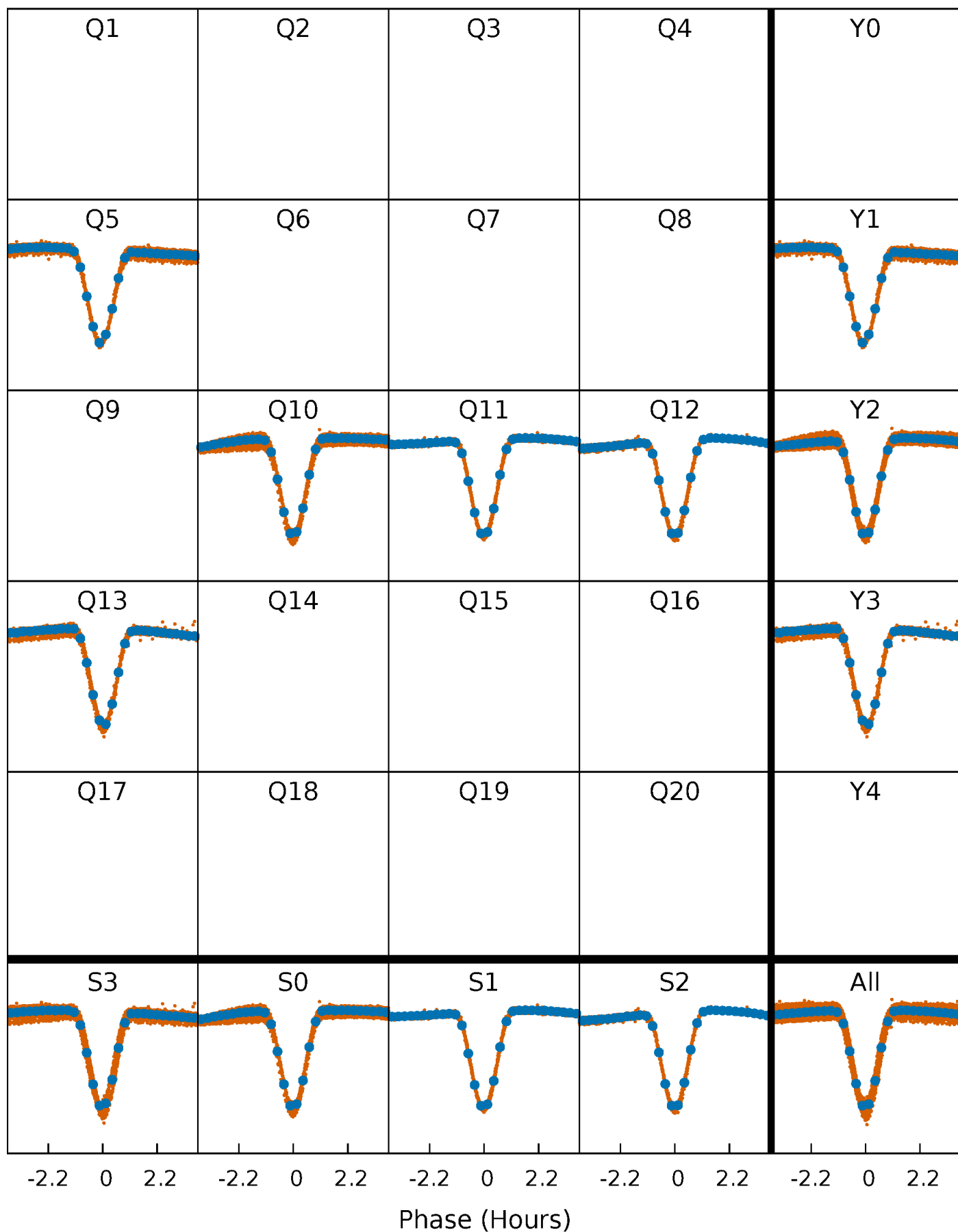


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



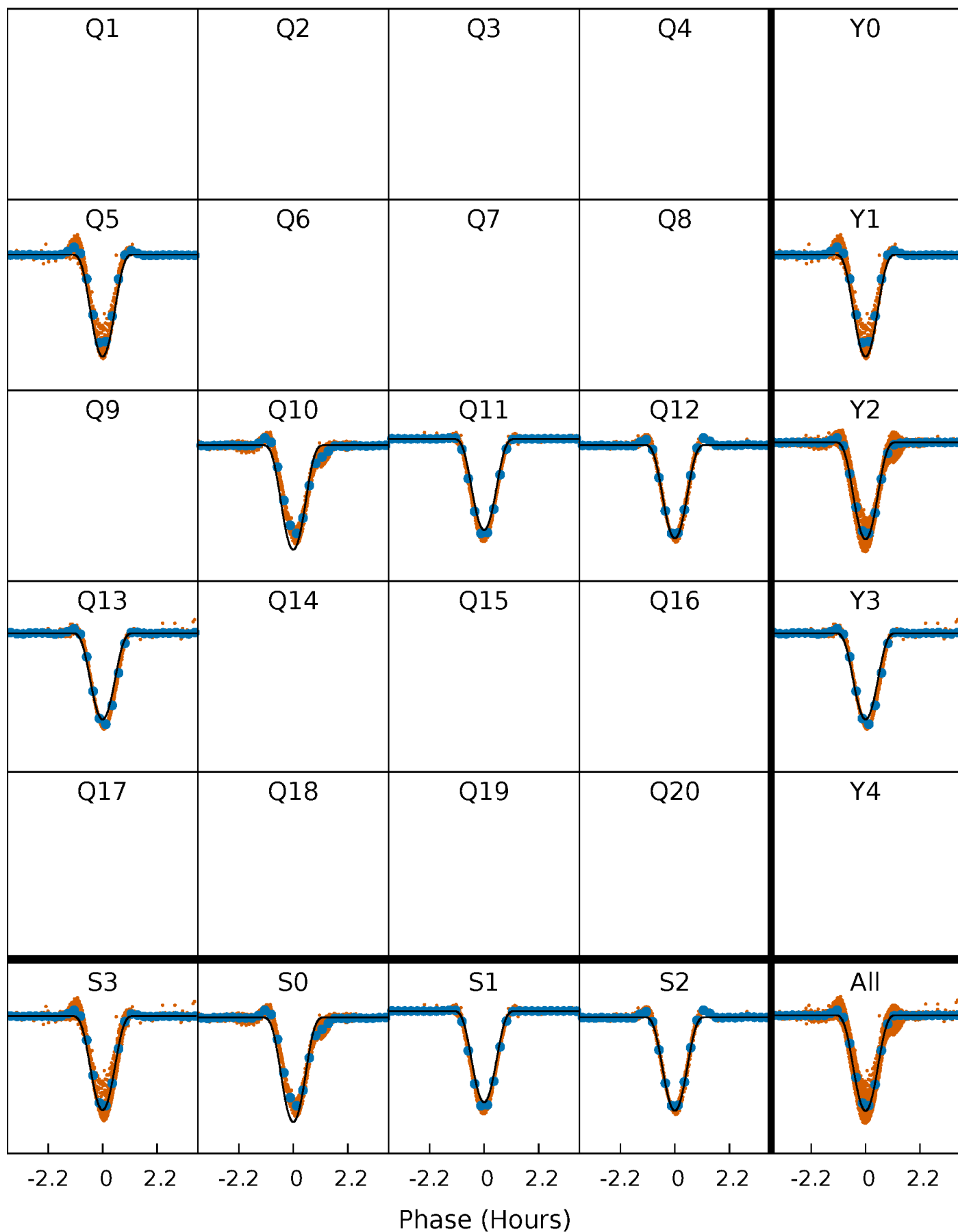
PDC Quarter-Phased Transit Curves

TCE 012109845-01 P= 0.865954 Days $T_0=132.058911$ (BKJD)



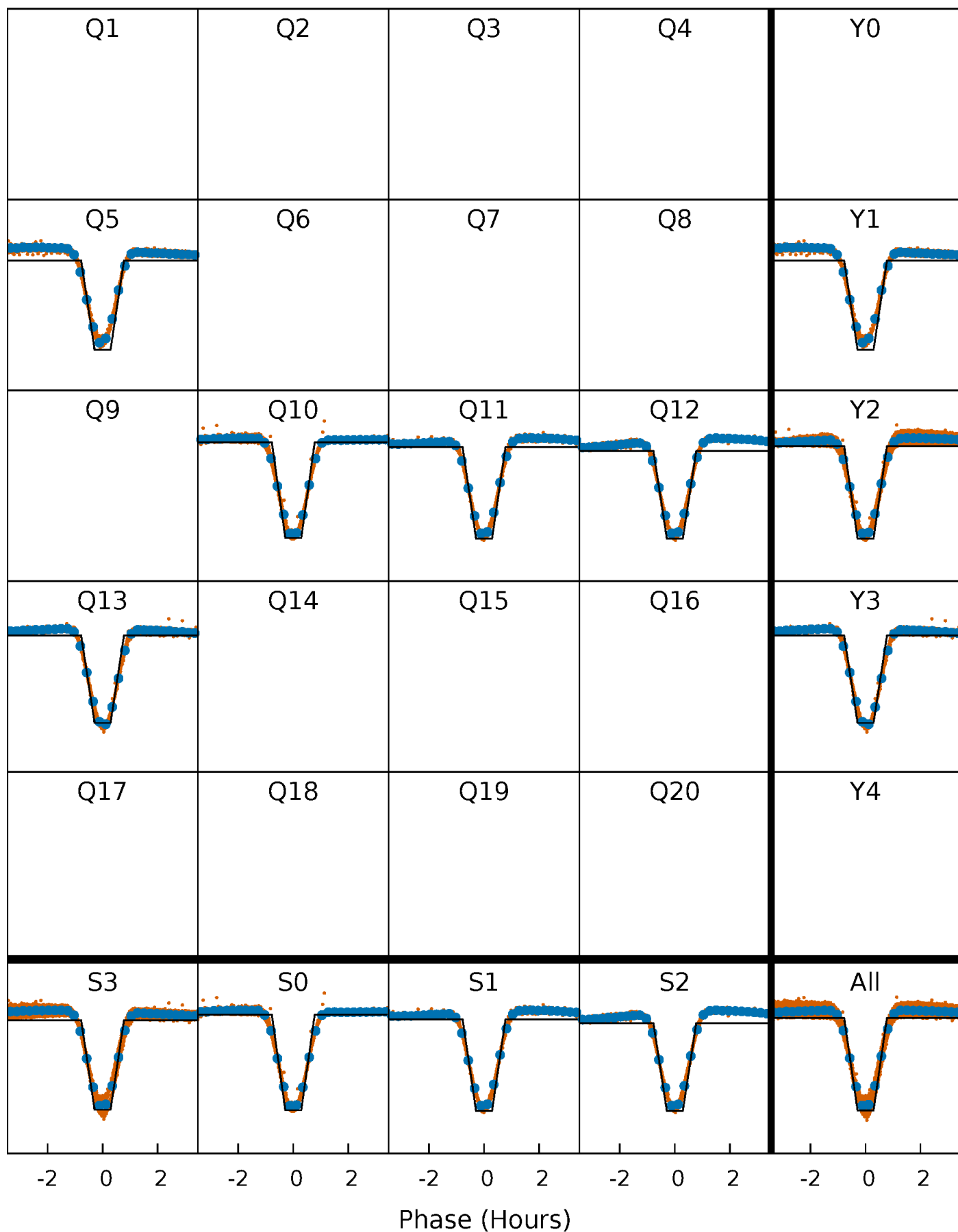
DV Quarter-Phased Transit Curves

TCE 012109845-01 $P = 0.865954$ Days $T_0 = 132.058911$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

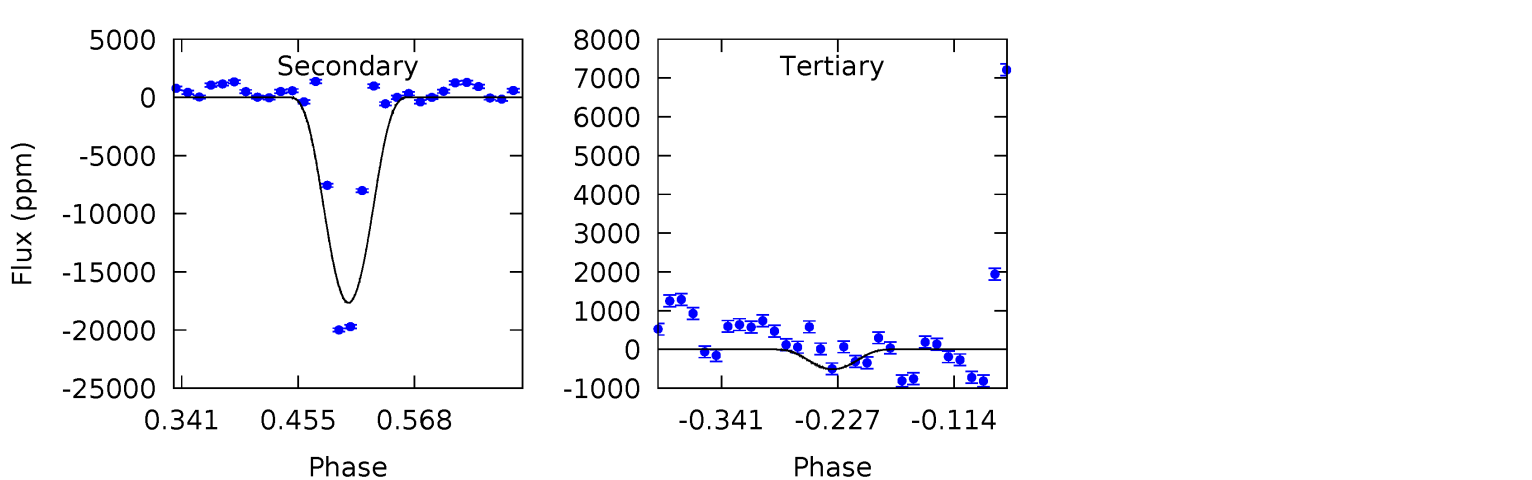
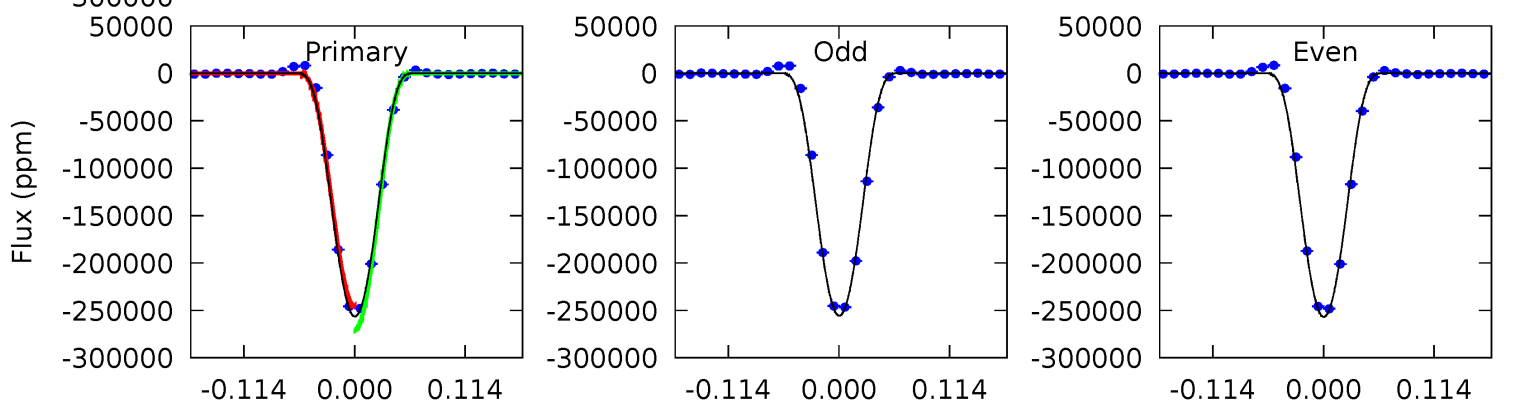
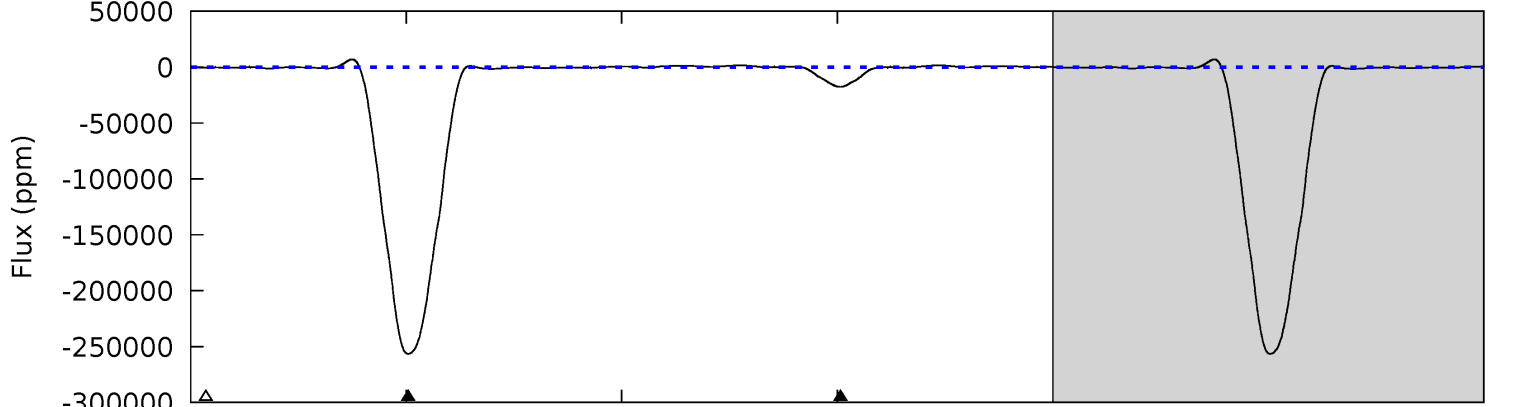
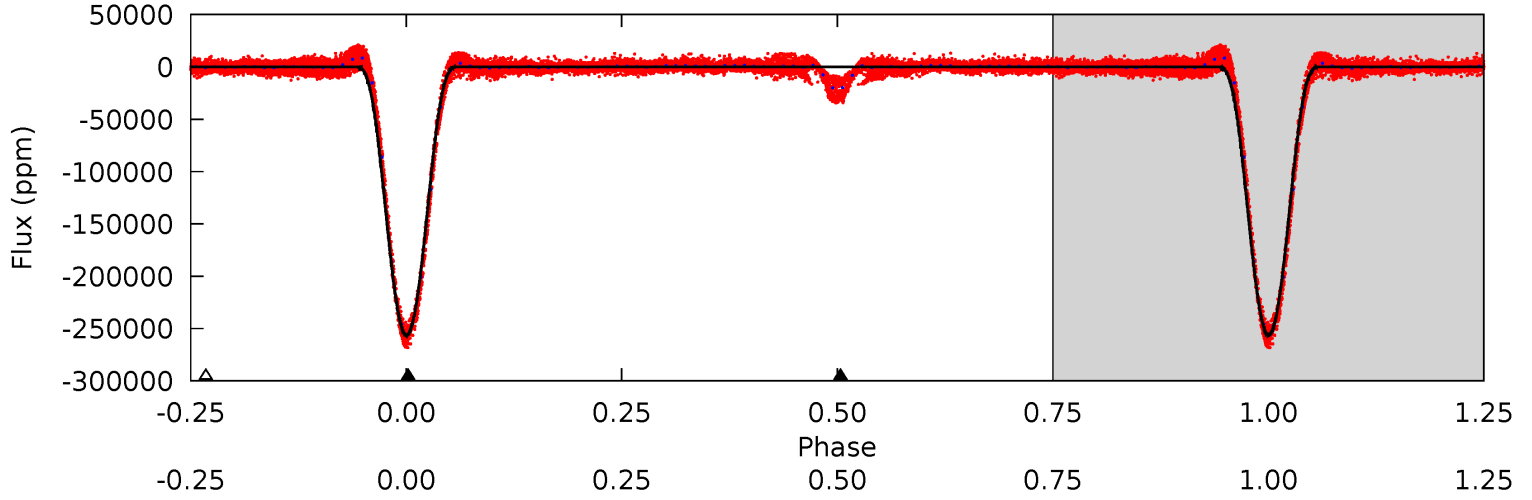
TCE 012109845-01 P= 0.865957 Days $T_0=132.056088$ (BKJD)



DV Model-Shift Uniqueness Test

012109845-01, P = 0.865954 Days, E = 132.058911 Days

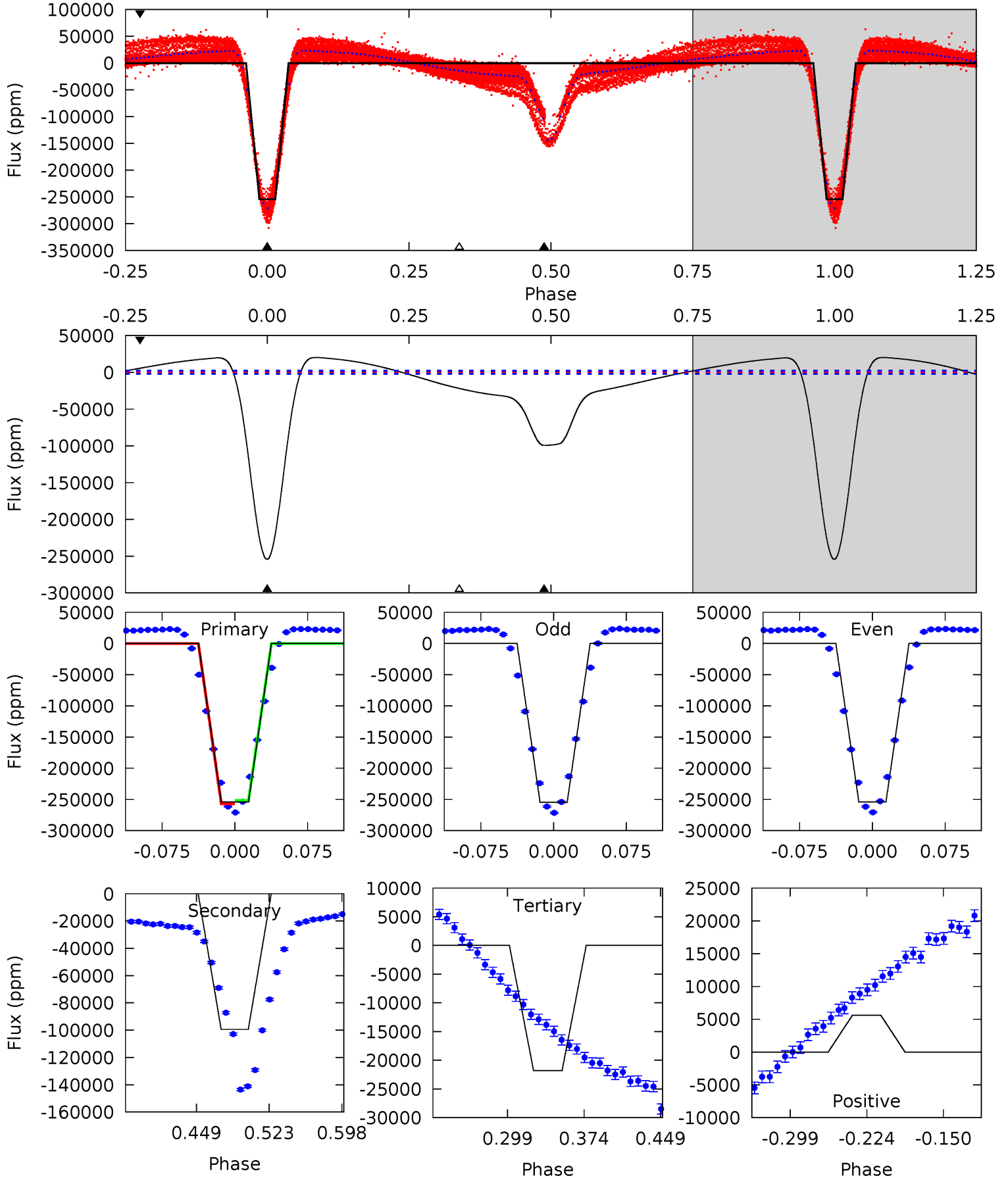
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3142	216.3	6.26	0	4.54	1.58	7.79	3136	3142	210.0	216.3	7.06	0.99	0.03	0



Alt Model-Shift Uniqueness Test

012109845-01, P = 0.865957 Days, E = 132.056088 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
560.1	219.0	48.0	12.3	4.63	1.78	36.1	512.1	547.8	171.0	206.7	0.54	1.00	0.07	6.00



Stellar Parameters For KIC 012109845

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4561^{+145}_{-194}	$4.788^{+0.048}_{-0.028}$	$-1.840^{+0.250}_{-0.100}$	$0.469^{+0.030}_{-0.040}$	$0.492^{+0.037}_{-0.034}$	$6.723^{+1.563}_{-0.715}$
	+3%/-4%	+1%/-1%	+14%/-5%	+6%/-9%	+8%/-7%	+23%/-11%
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 012109845-01 / KOI 3765.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-17652 ± 82	$25.67^{+0.92}_{-1.20}$	1615^{+59}_{-70}	2913^{+64}_{-87}	$2.996^{+0.216}_{-0.166}$
Alt.	-99426 ± 454	$27.08^{+1.03}_{-1.37}$	1615^{+64}_{-72}	3833^{+111}_{-137}	17^{+1}_{-1}

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 $A_{obs} \gg 1.0$

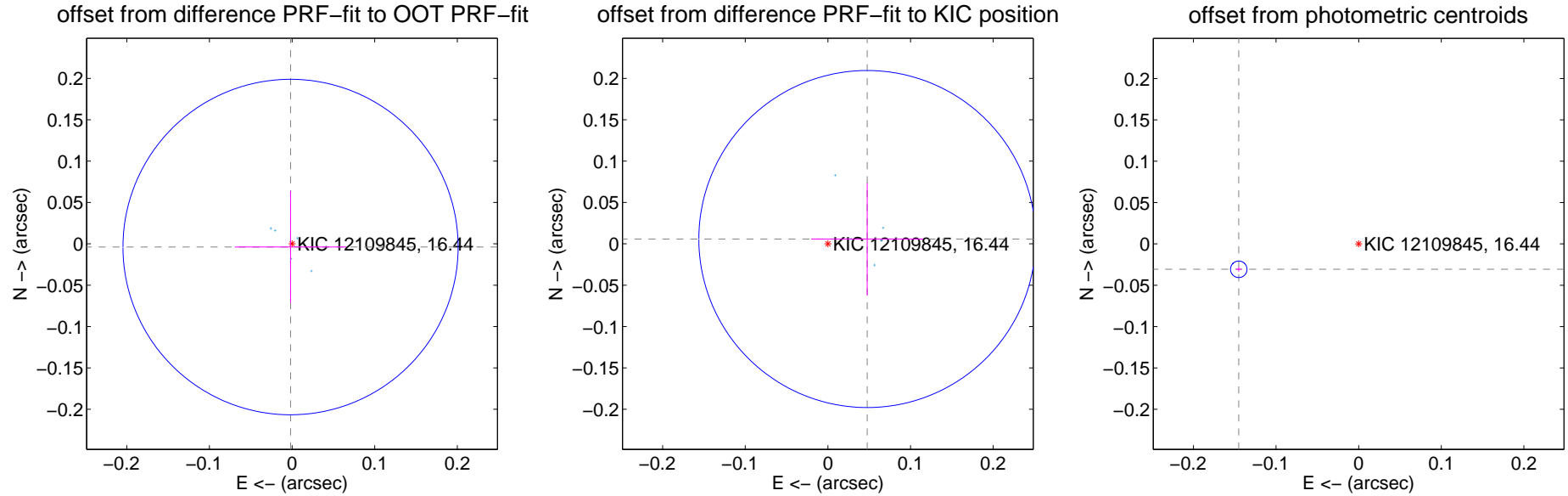
DV Centroid Data

Supplemental centroid analysis for 012109845-01. Kepler magnitude: 16.44. Transit SNR 1296.18

There are 5 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.004 ± 0.068	0.06	0.002 ± 0.067	-0.004 ± 0.068
PRF-fit source offset from KIC position	0.048 ± 0.068	0.71	-0.048 ± 0.068	0.006 ± 0.068
photometric centroid source offset	0.15 ± 0.00	44.55	0.15 ± 0.00	-0.03 ± 0.00

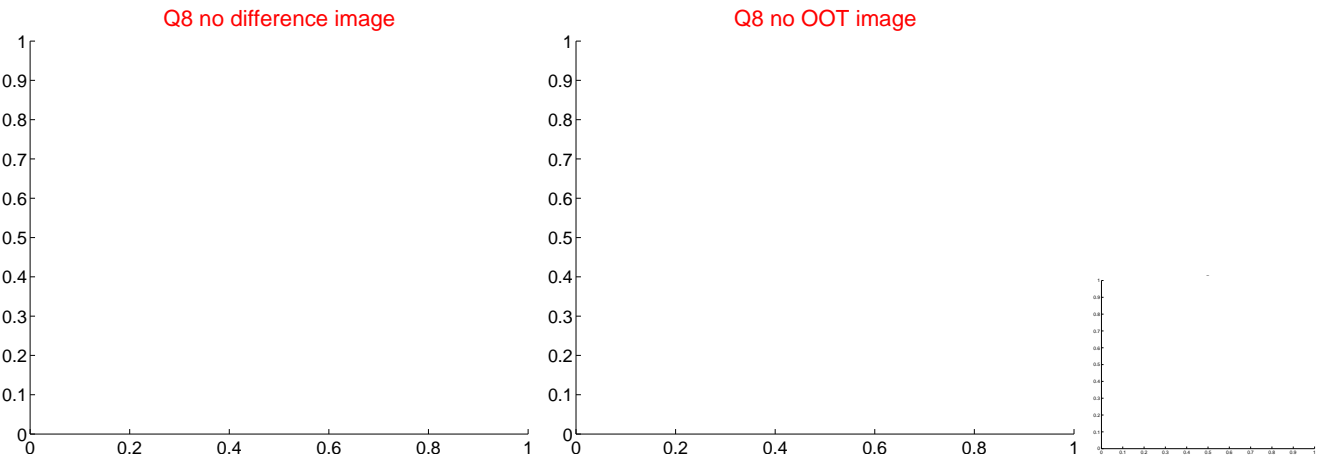
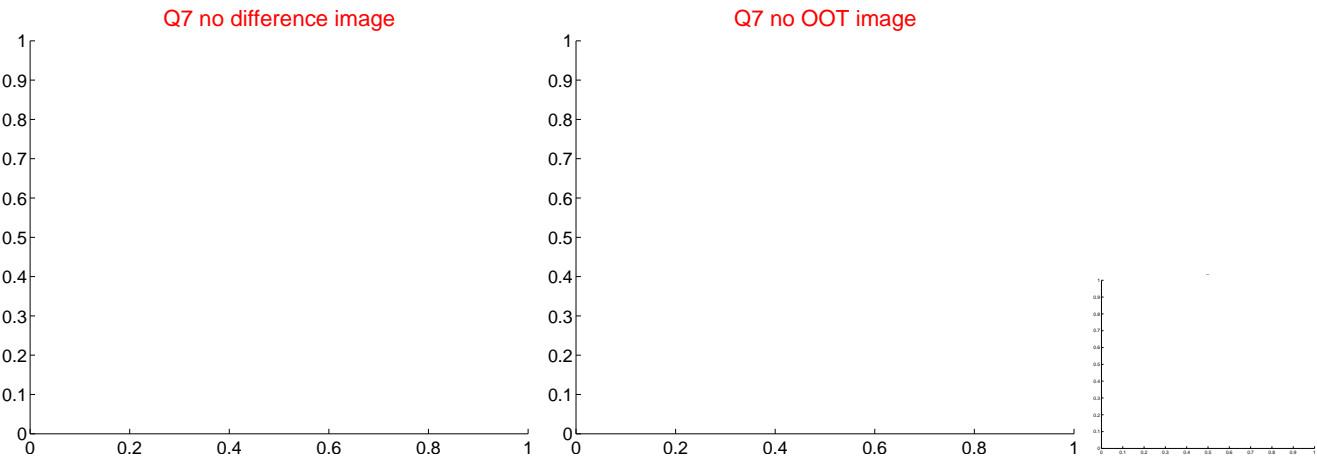
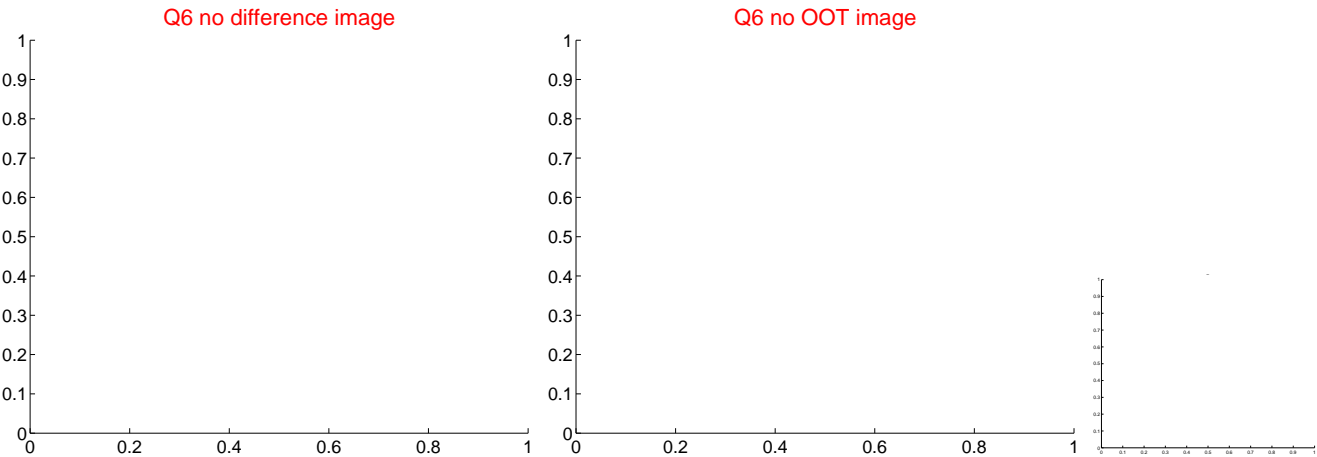
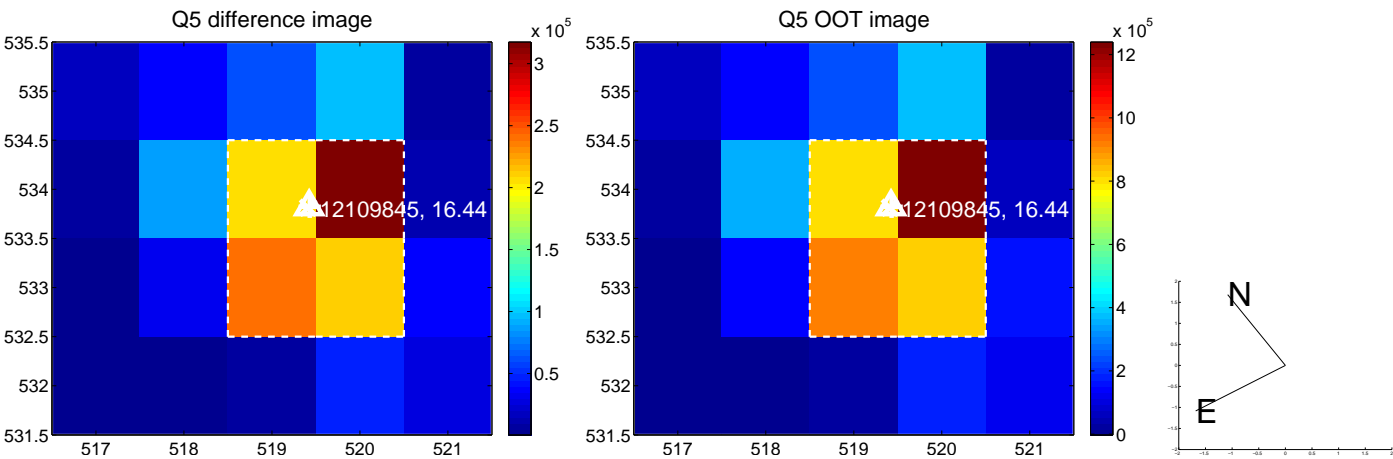


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

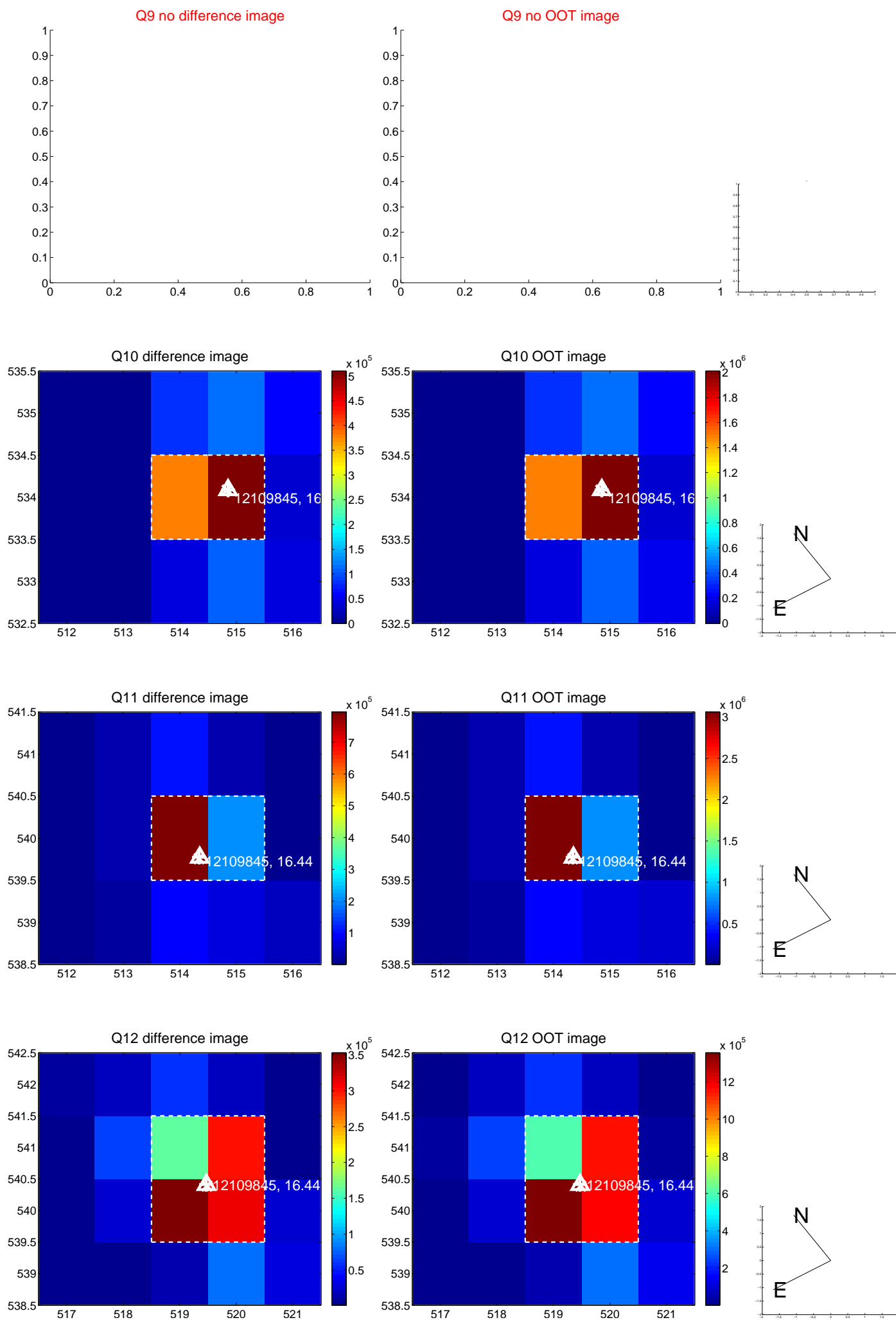
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



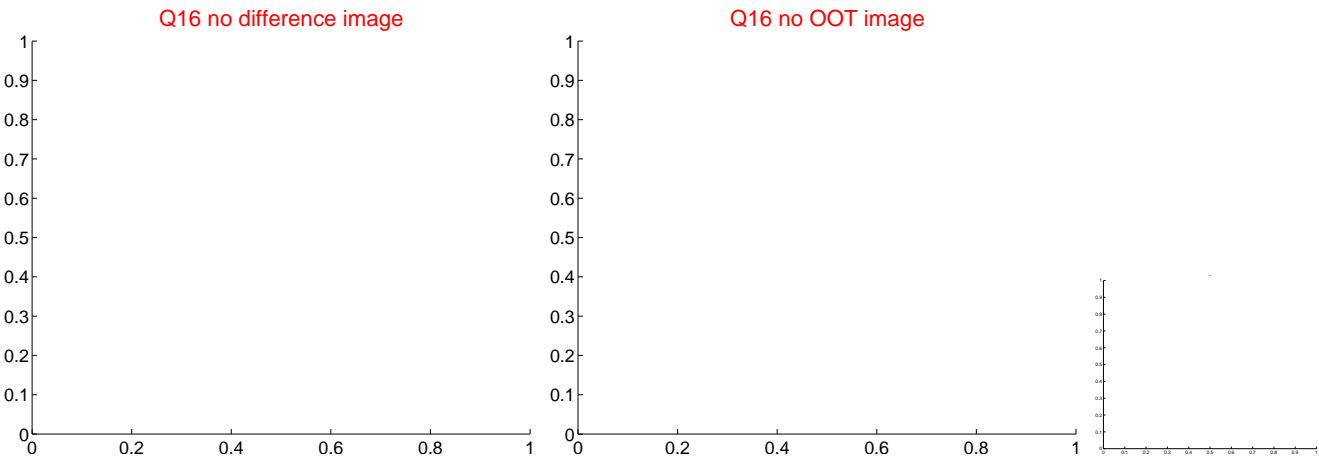
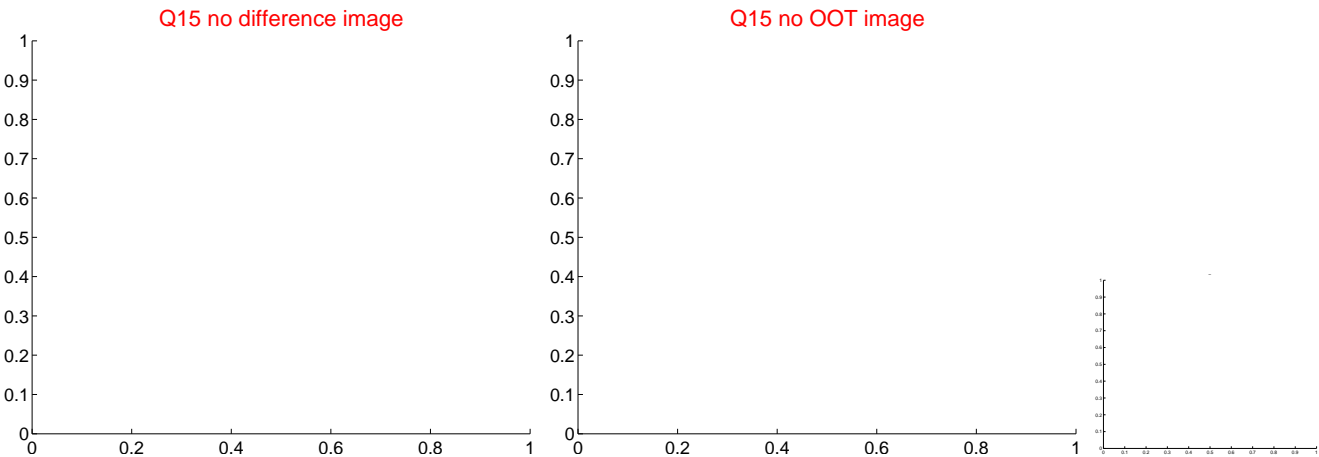
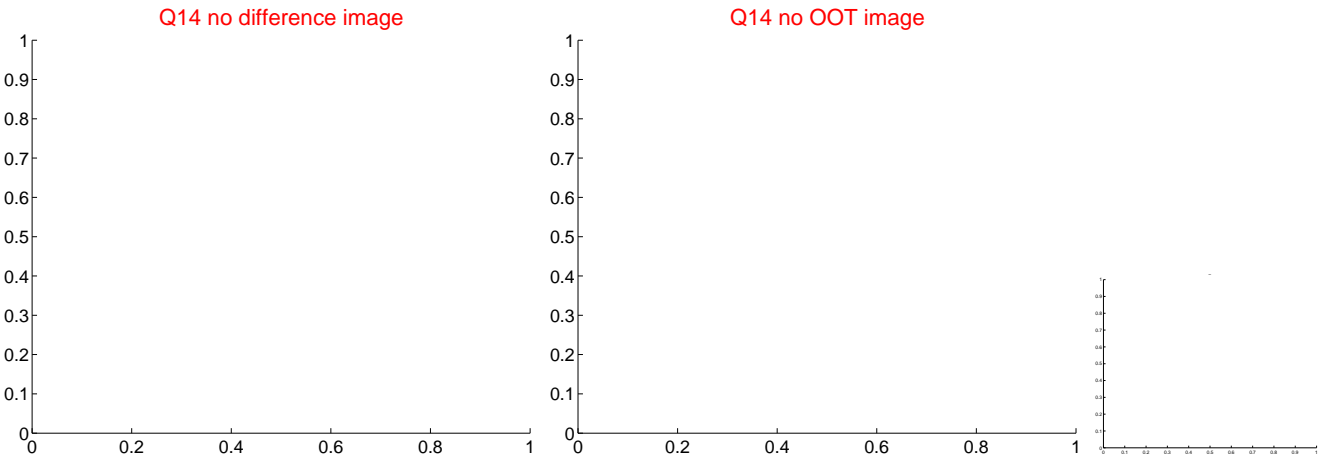
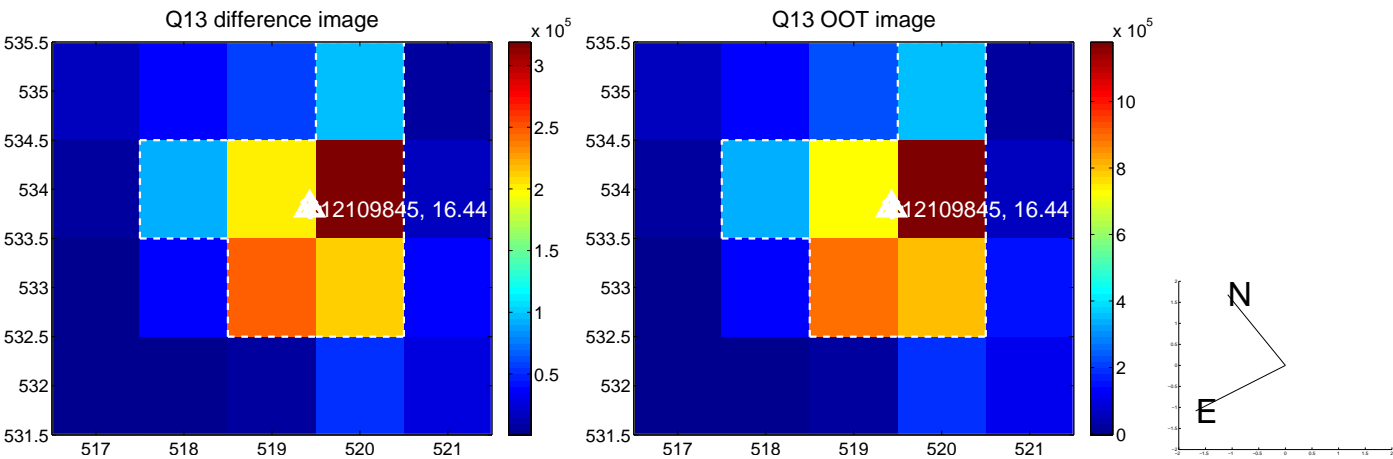
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



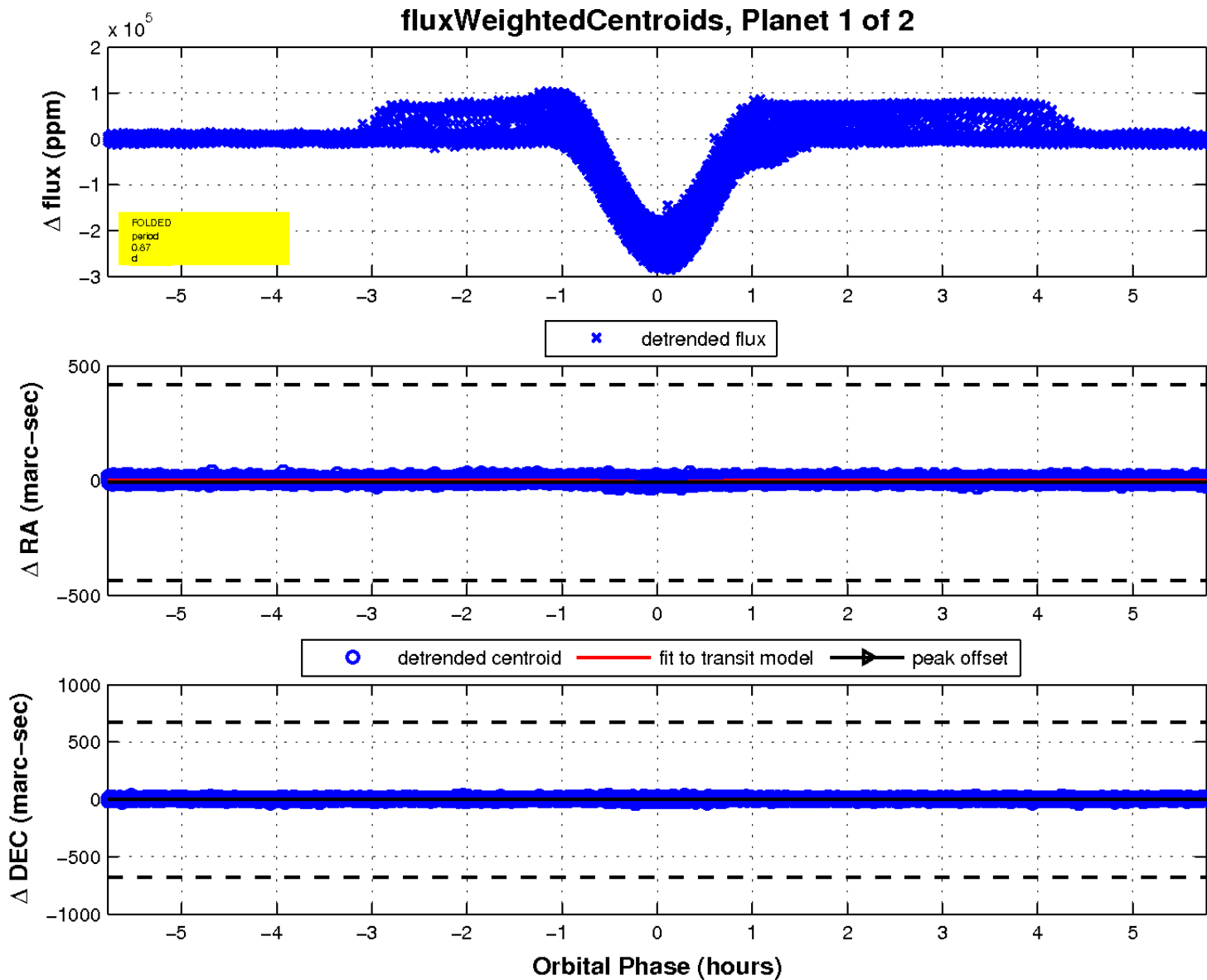
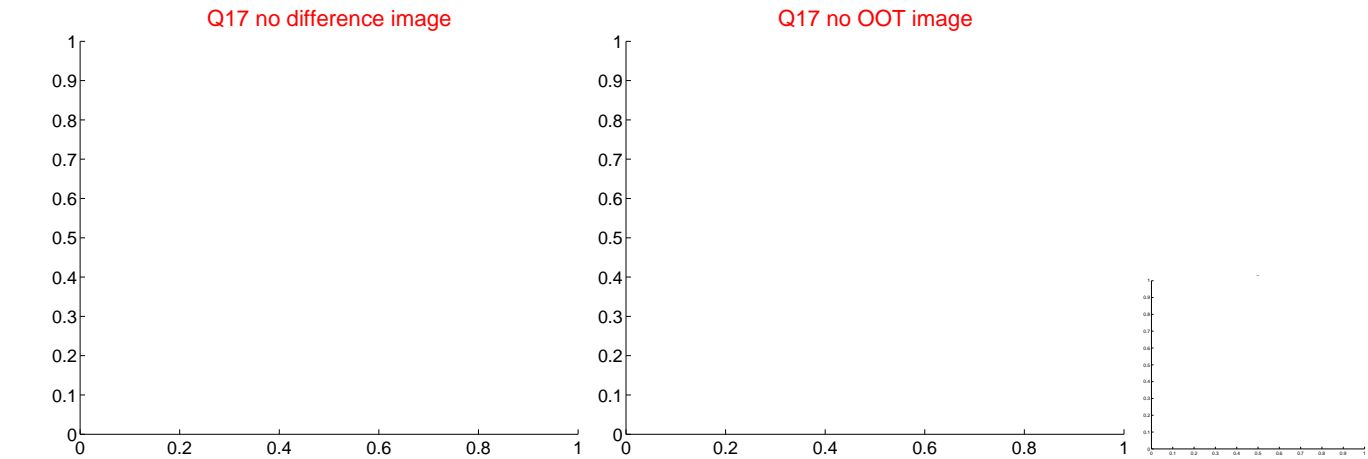
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



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

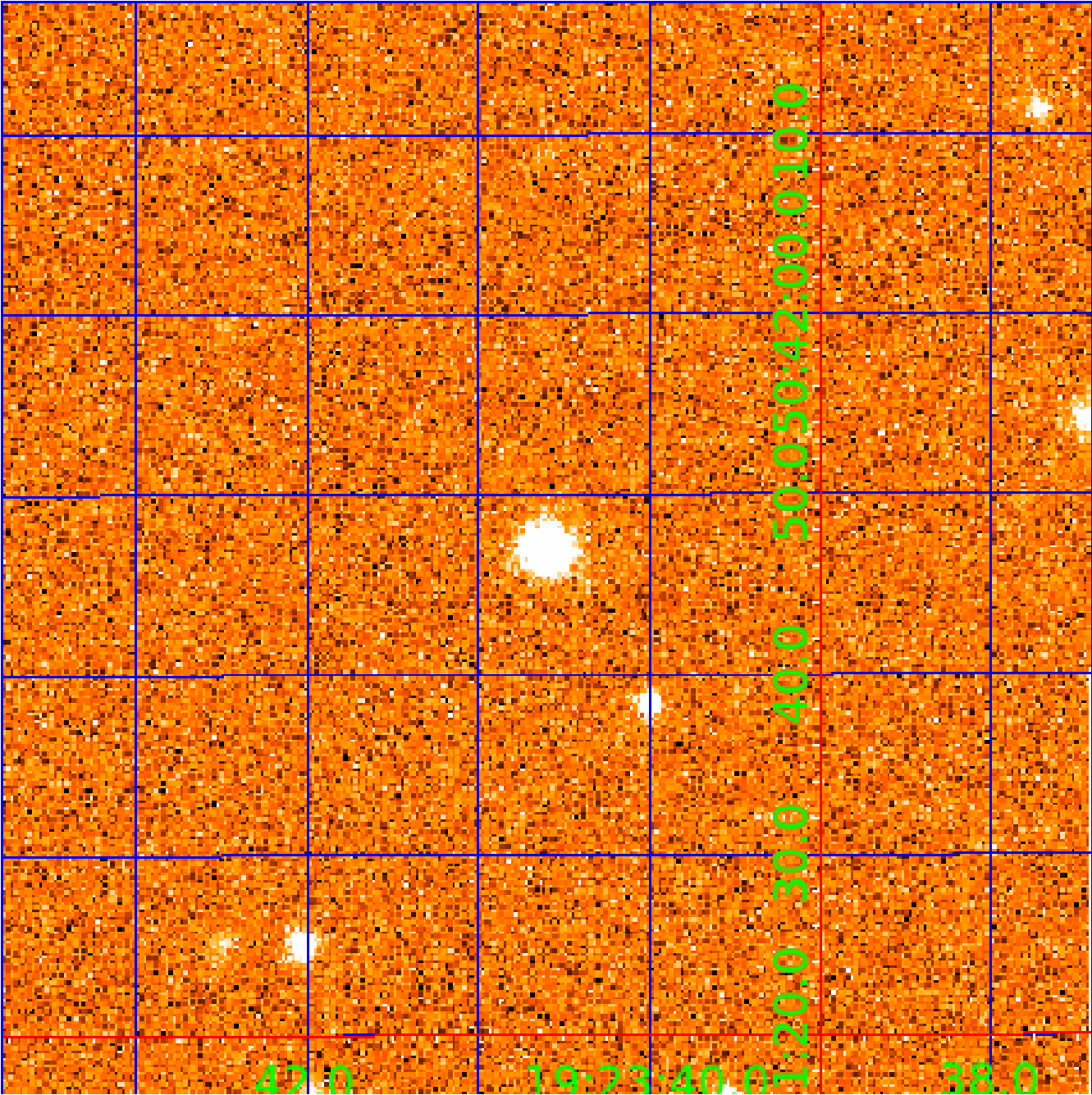


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 012109845

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})
012109845-01	OBS	3765.01	0.865954	132.058911	258017.0	1.926	2205.8	1296.2	0.47	4561	25.63	432.44
012109845-02	OBS	No	0.865379	131.851619	96700.3	1.500	664.5	-1.0	0.47	4561	14.76	432.82

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012109845-01	OBS	FP	0.00	0	1	0	0	SWEET_EB—MOD_SEC_DV—MOD_SEC_ALT
012109845-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—CENT_NOFITS

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.

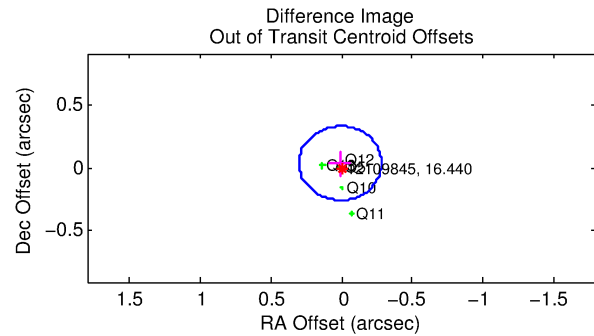
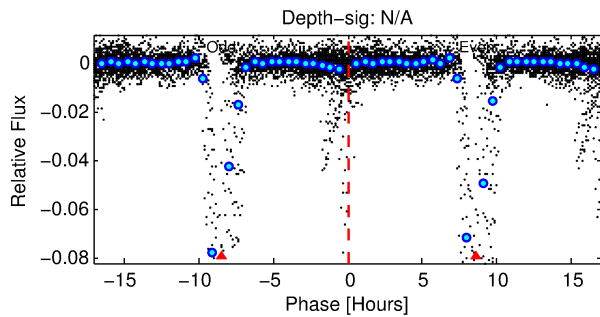
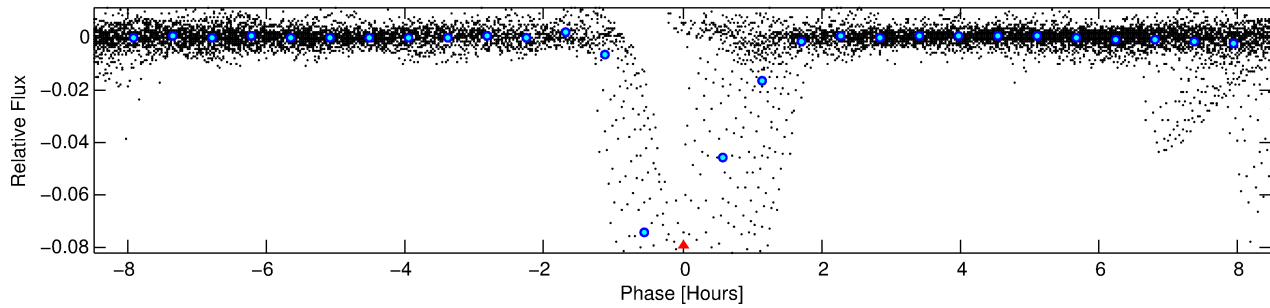
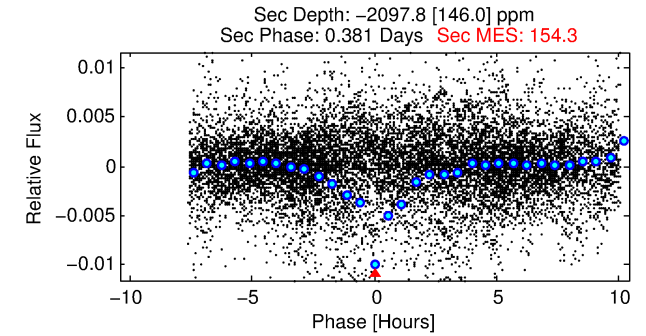
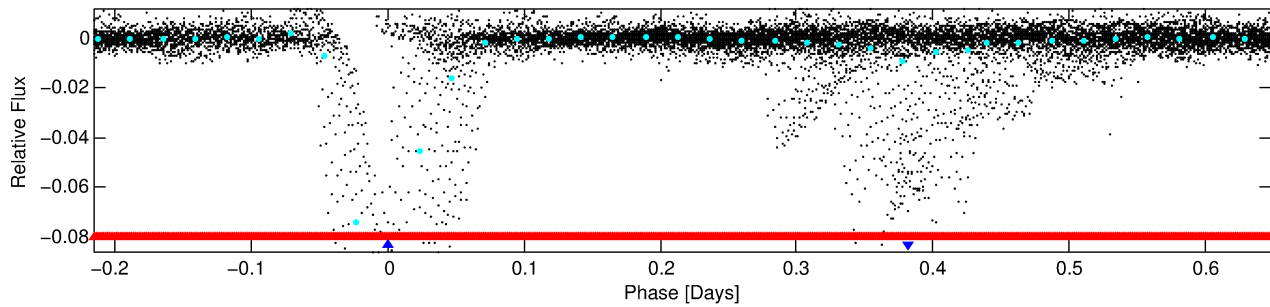
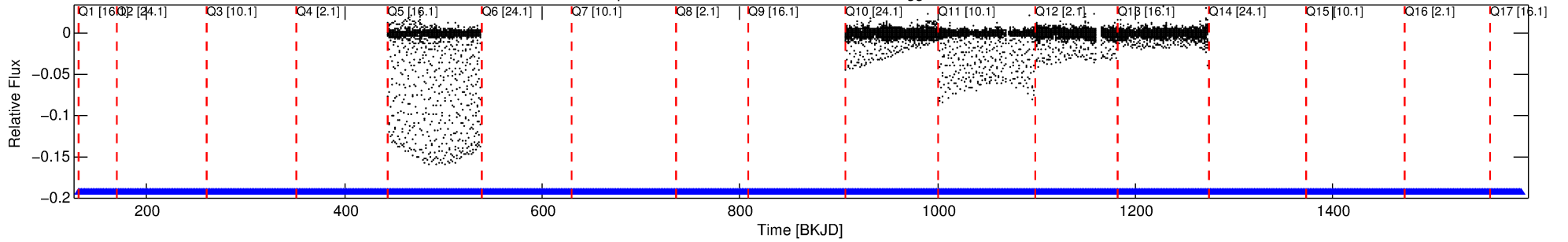
Ephemeris Match Information For 012109845-02

No Significant Match Found

DV One-Page Summary

KIC: 12109845 Candidate: 2 of 2 Period: 0.865 d
KOI: K03765 Corr: No Ephemeris Match

Kp: 16.44 R*: 0.47 Rs Teff: 4561.0 K Logg: 4.79 Fe/H: -1.840



TPS TCE Results:

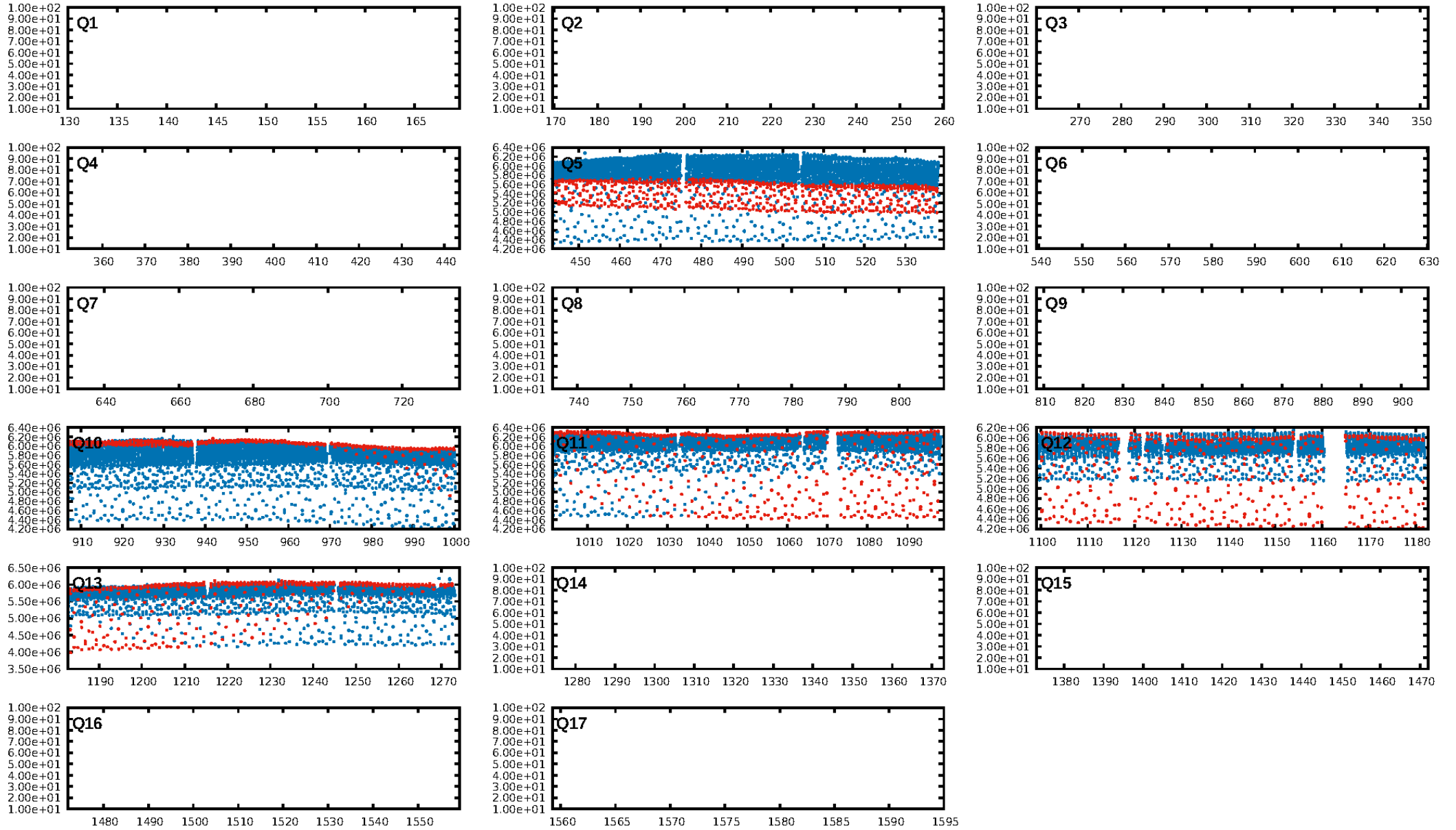
Period = 0.86538 d
Epoch = 131.8516 BKJD

DV fit results are unavailable

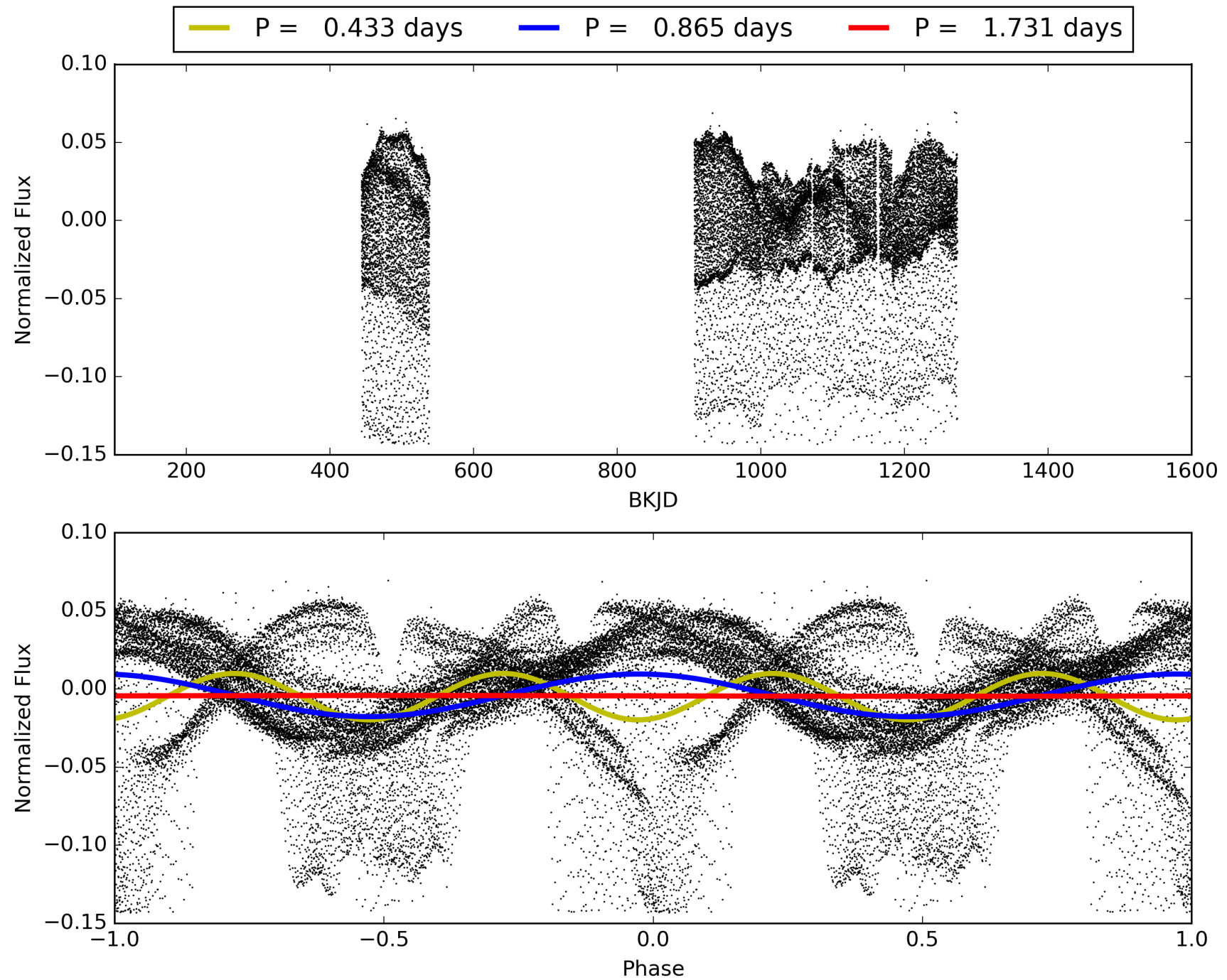
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.5% [0.01σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [274/274]
GhostDiagnostic-chr: 0.5251
Centroid-sig: 6.3%
Centroid-so: 0.118 arcsec [14.45σ]
OotOffset-rm: 0.037 arcsec [0.38σ]
KicOffset-rm: 0.120 arcsec [1.42σ]
OotOffset-st: 1/1/1/2 [5]
KicOffset-st: 1/1/1/2 [5]
DiffImageQuality-fgm: 0.60 [3/5]
DiffImageOverlap-fno: 0.20 [1/5]

TCE 012109845-02, PDC Light Curves

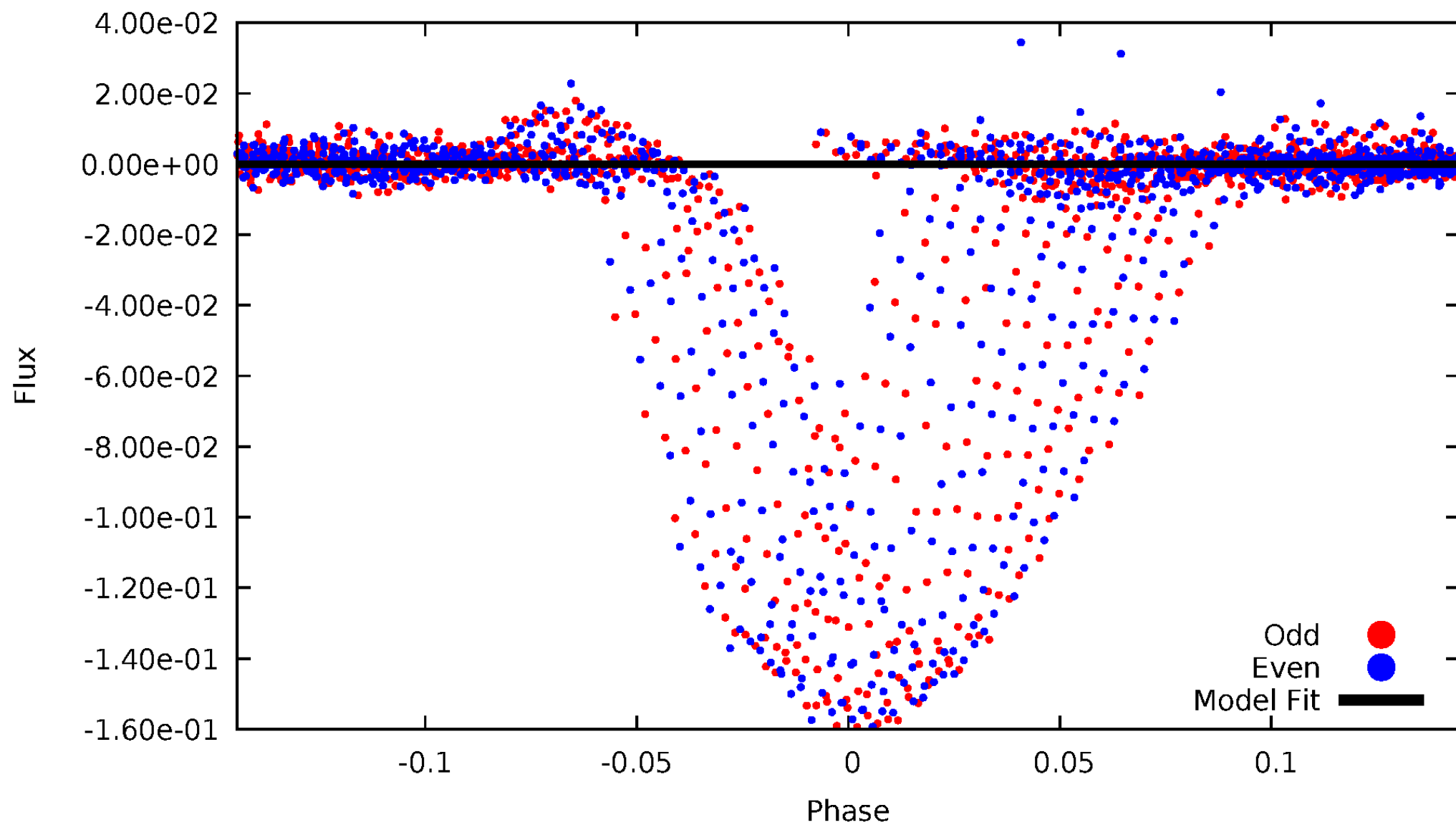


TCE 012109845-02



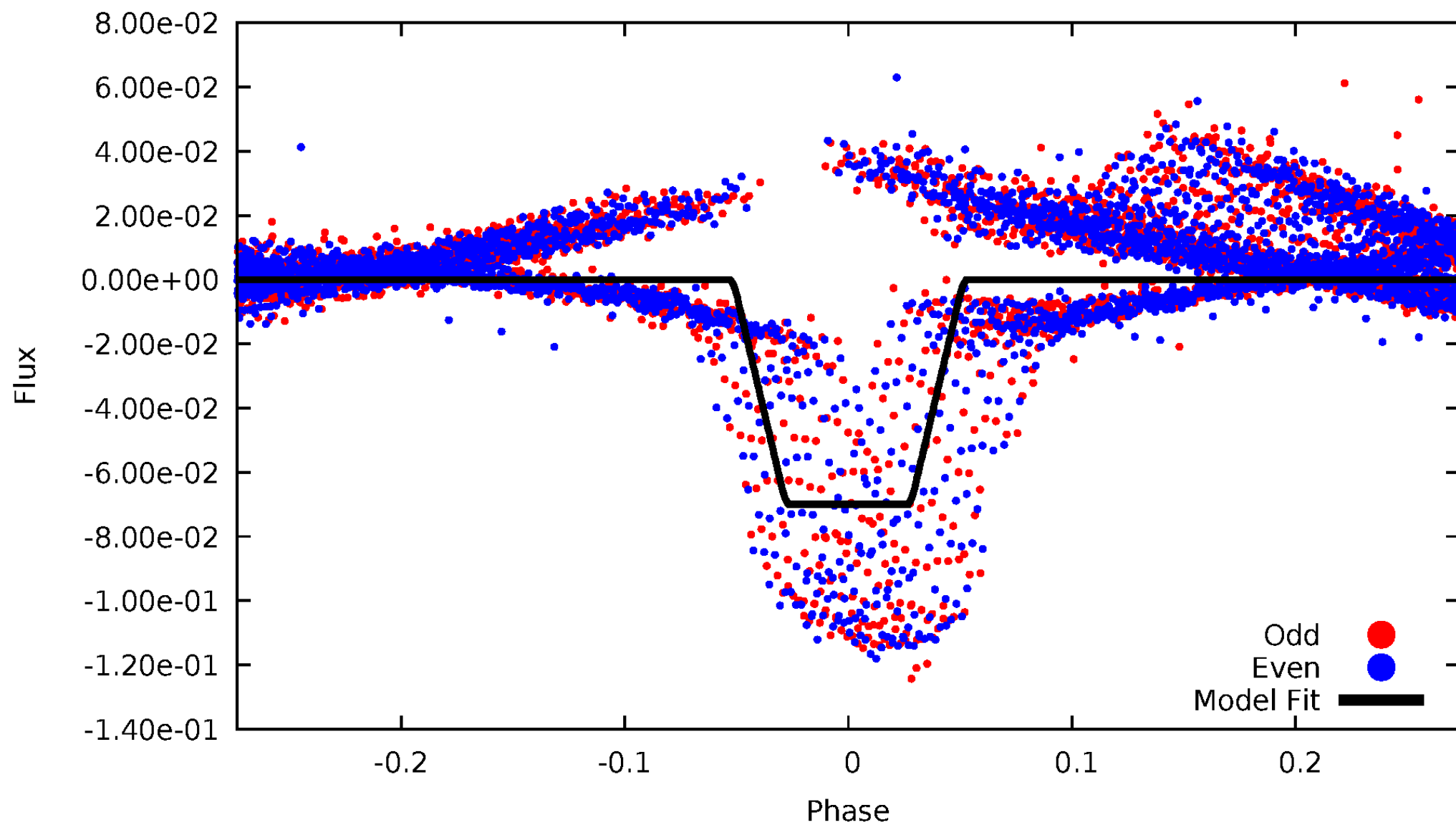
DV Odd/Even

TCE 012109845-02



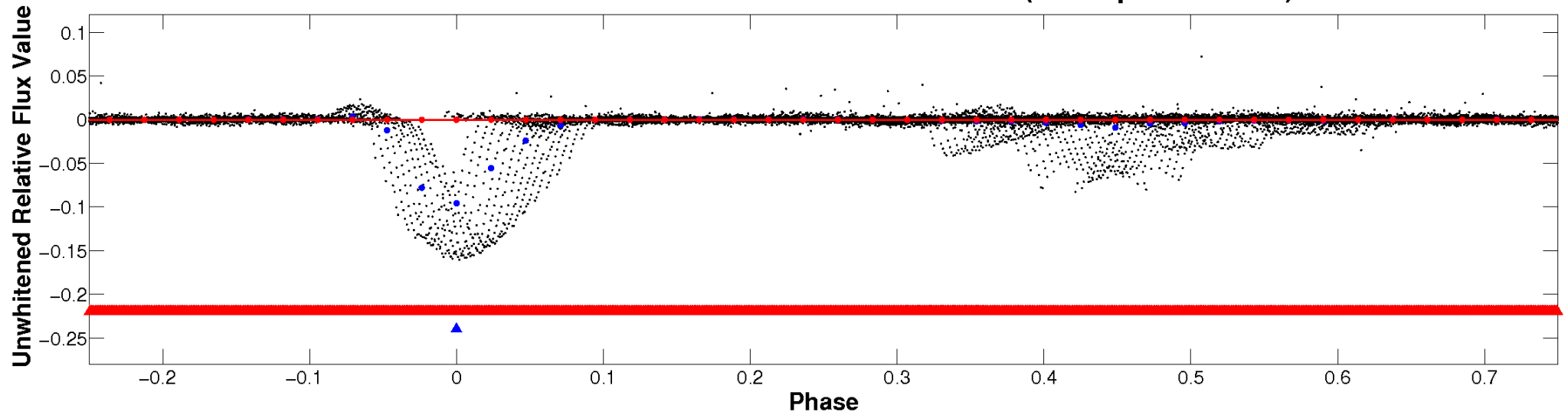
ALT Odd/Even

TCE 012109845-02

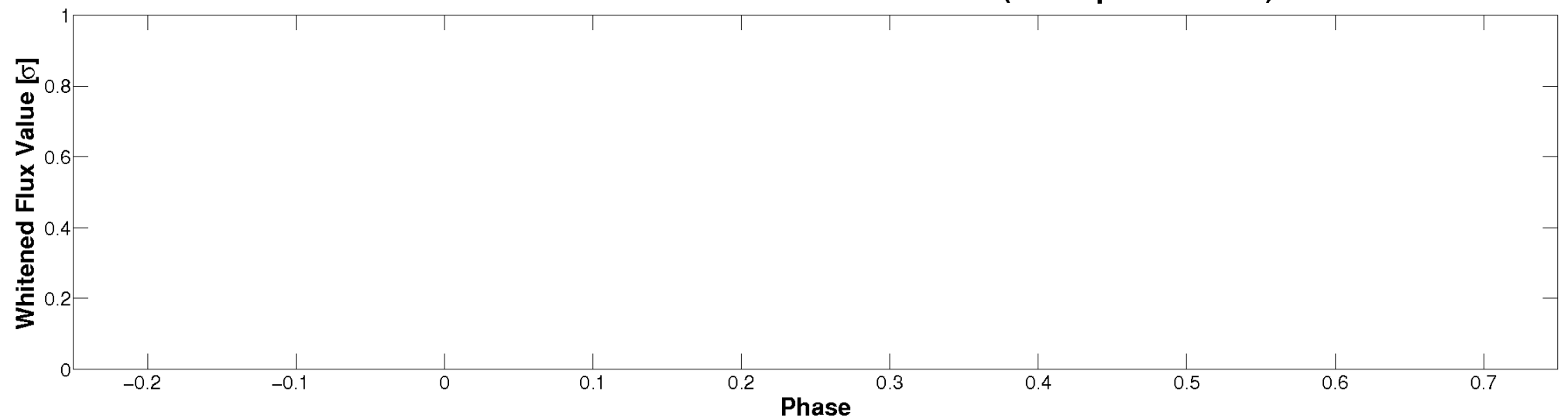


Non-Whitened Vs. Whitened Light Curve

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

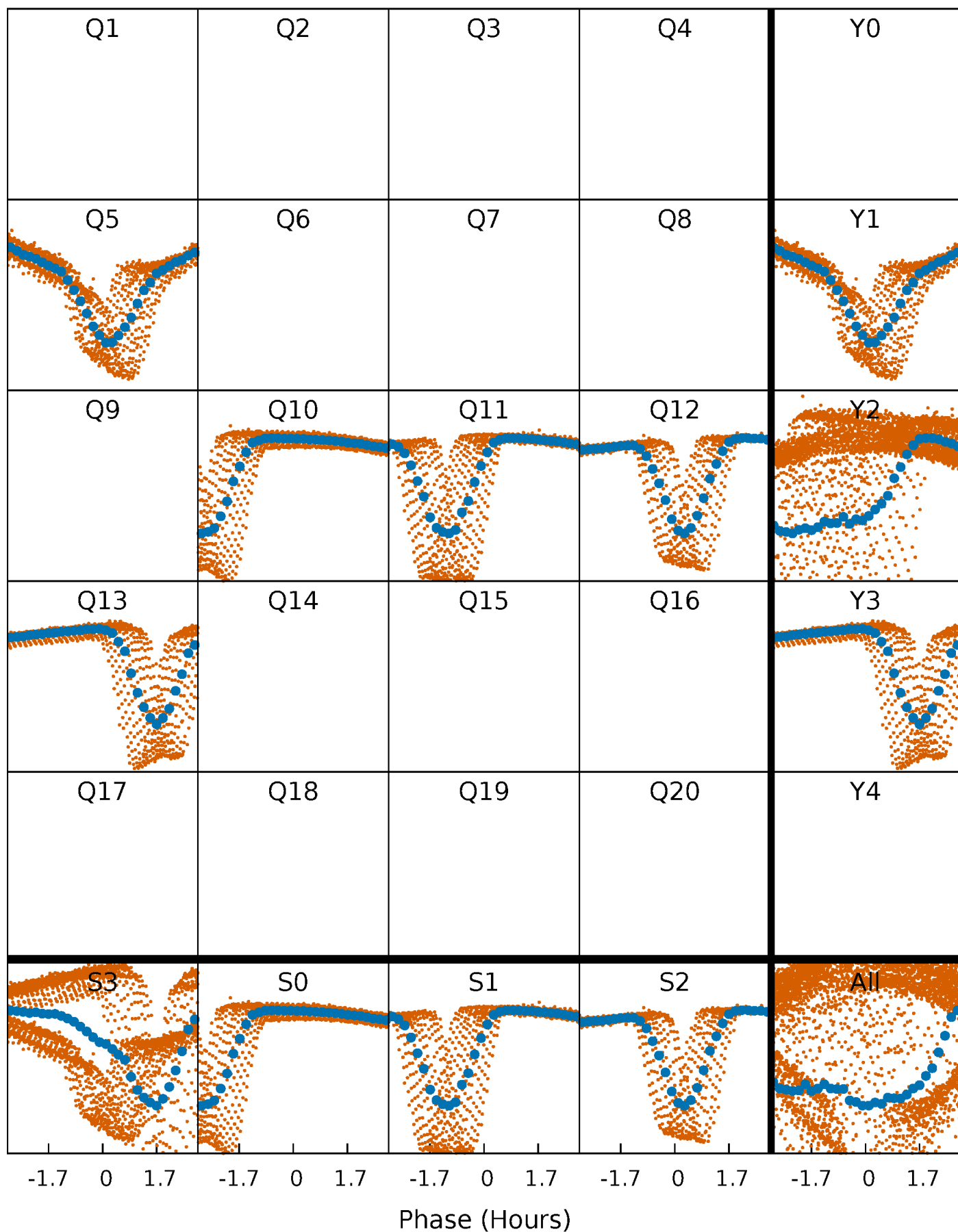


Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)



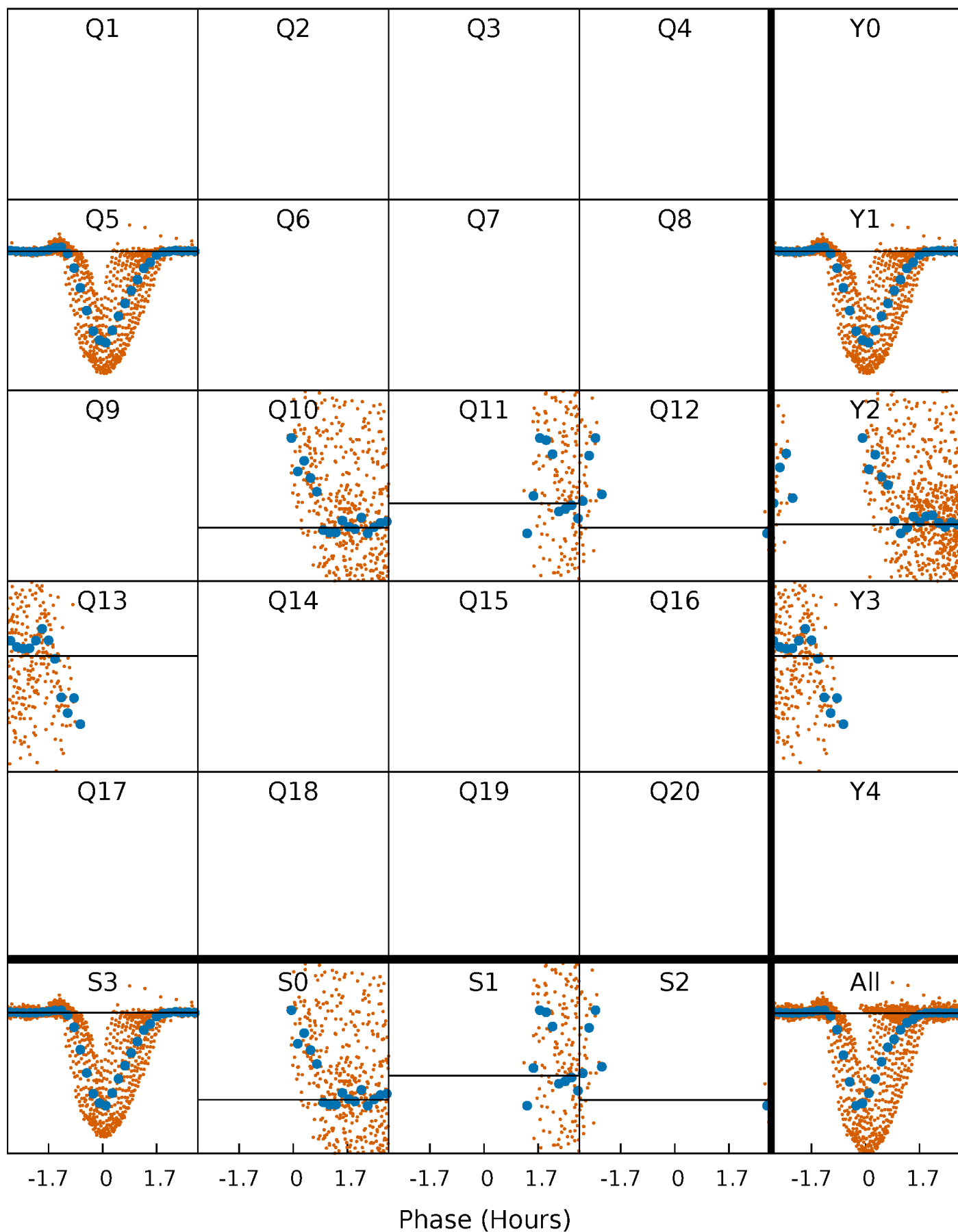
PDC Quarter-Phased Transit Curves

TCE 012109845-02 P= 0.865379 Days $T_0=131.851619$ (BKJD)



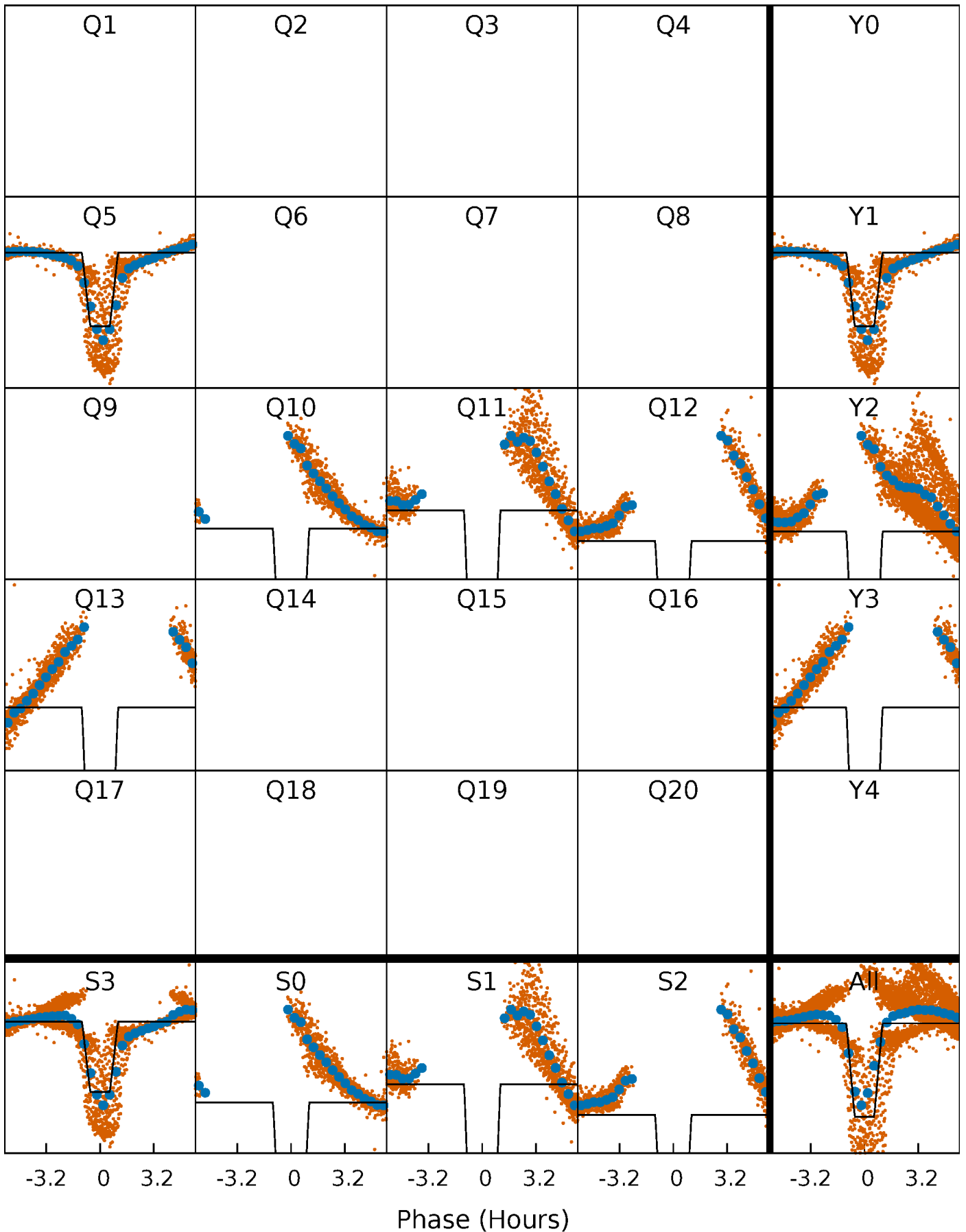
DV Quarter-Phased Transit Curves

TCE 012109845-02 $P = 0.865379$ Days $T_0 = 131.851619$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

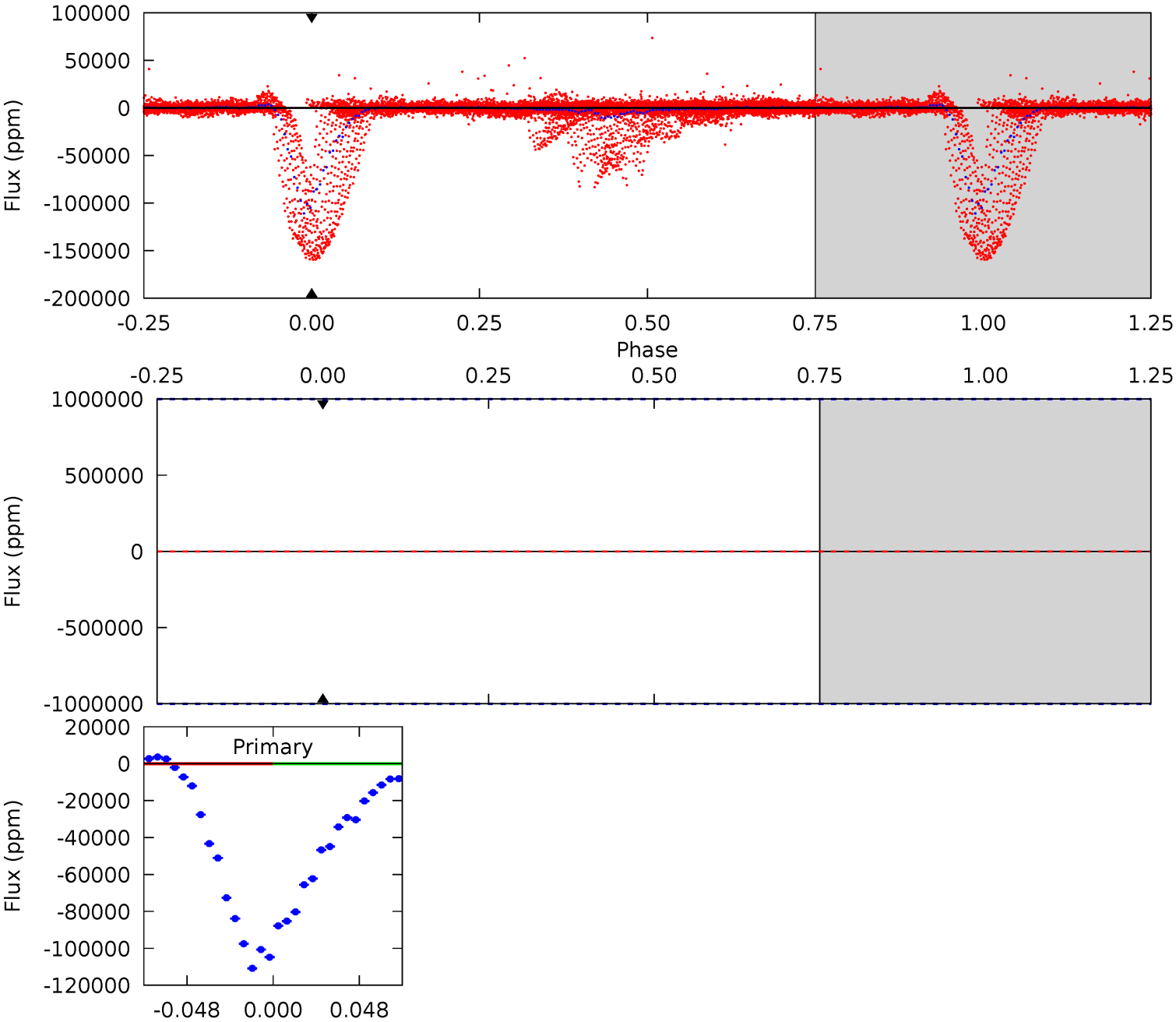
TCE 012109845-02 $P = 0.865379$ Days $T_0 = 131.853888$ (BKJD)



DV Model-Shift Uniqueness Test

012109845-02, P = 0.865379 Days, E = 131.851619 Days

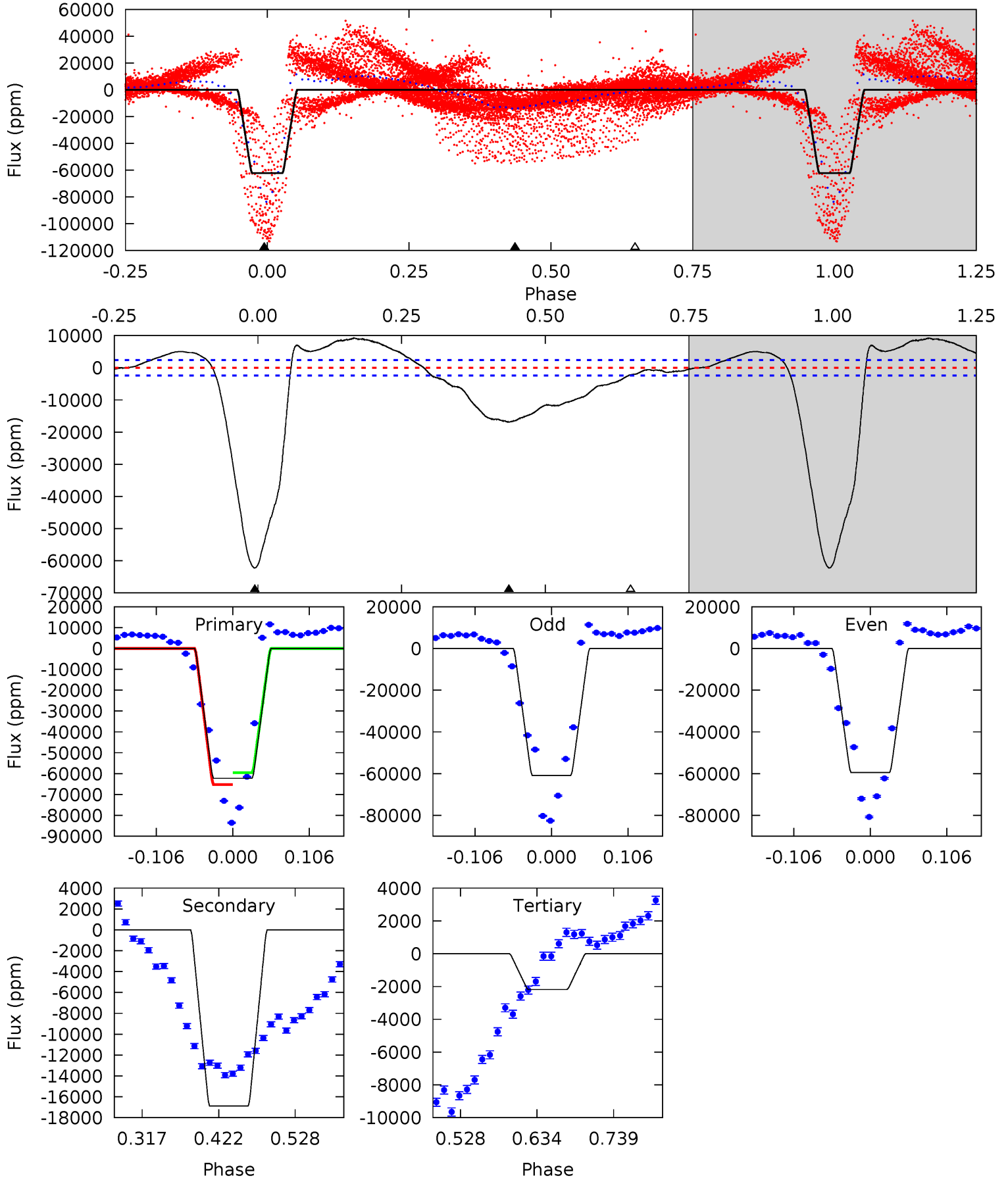
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

012109845-02, P = 0.865379 Days, E = 131.853888 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
117.1	31.8	4.11	0	4.55	1.62	9.19	113.0	117.1	27.7	31.8	1.24	0.59	0.13	0



Stellar Parameters For KIC 012109845

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4561^{+145}_{-194}	$4.788^{+0.048}_{-0.028}$	$-1.840^{+0.250}_{-0.100}$	$0.469^{+0.030}_{-0.040}$	$0.492^{+0.037}_{-0.034}$	$6.723^{+1.563}_{-0.715}$
	+3%/-4%	+1%/-1%	+14%/-5%	+6%/-9%	+8%/-7%	+23%/-11%
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 012109845-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	0 ± 1000000	$14.57^{+5.46}_{-5.46}$	1619^{+60}_{-73}	2526^{+2361}_{-7296}	$1.194^{+62.675}_{-54.229}$
Alt.	-16883 ± 531	$13.65^{+4.71}_{-5.19}$	1618^{+59}_{-69}	3526^{+611}_{-346}	10^{+15}_{-5}

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

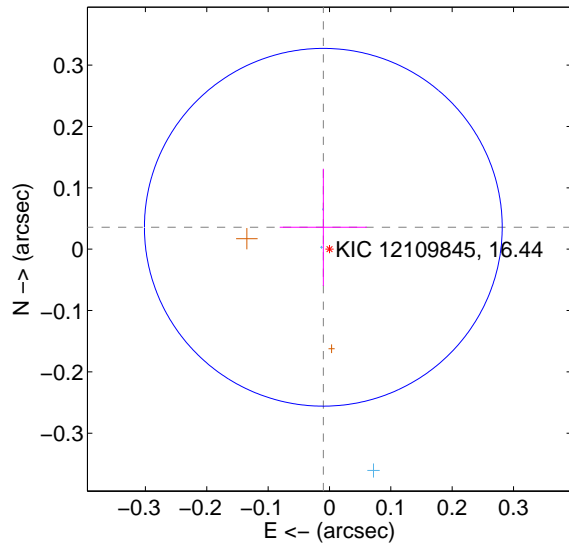
Supplemental centroid analysis for 012109845-02. Kepler magnitude: 16.44. Transit SNR -1.00

There are 3 quarters with good PRF difference image offsets

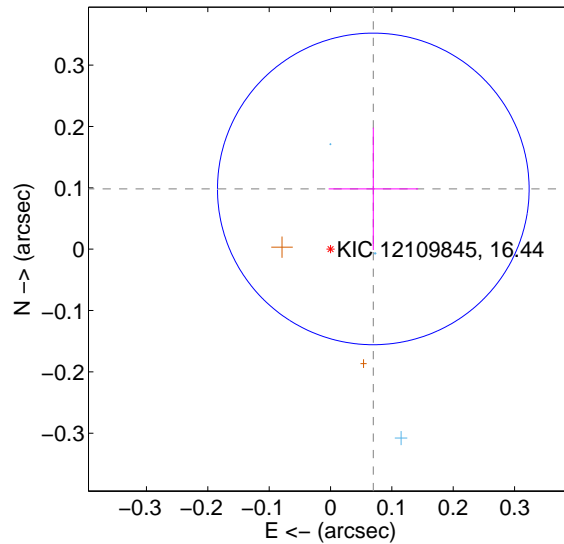
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.037 ± 0.097	0.38	0.010 ± 0.071	0.036 ± 0.095
PRF-fit source offset from KIC position	0.120 ± 0.085	1.42	-0.070 ± 0.073	0.098 ± 0.100
photometric centroid source offset	0.12 ± 0.01	14.45	0.11 ± 0.01	-0.05 ± 0.01

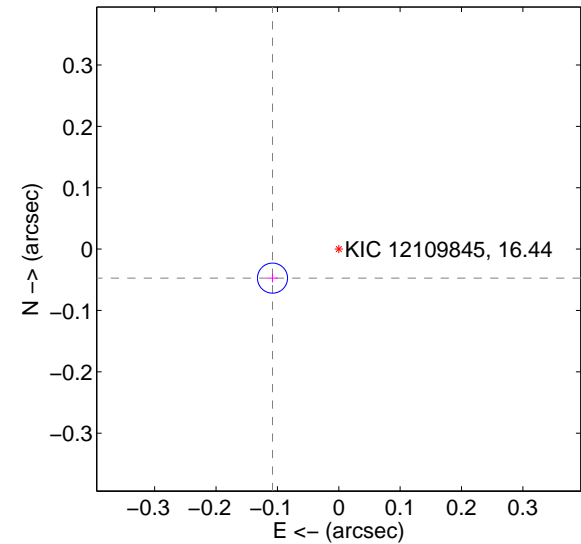
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

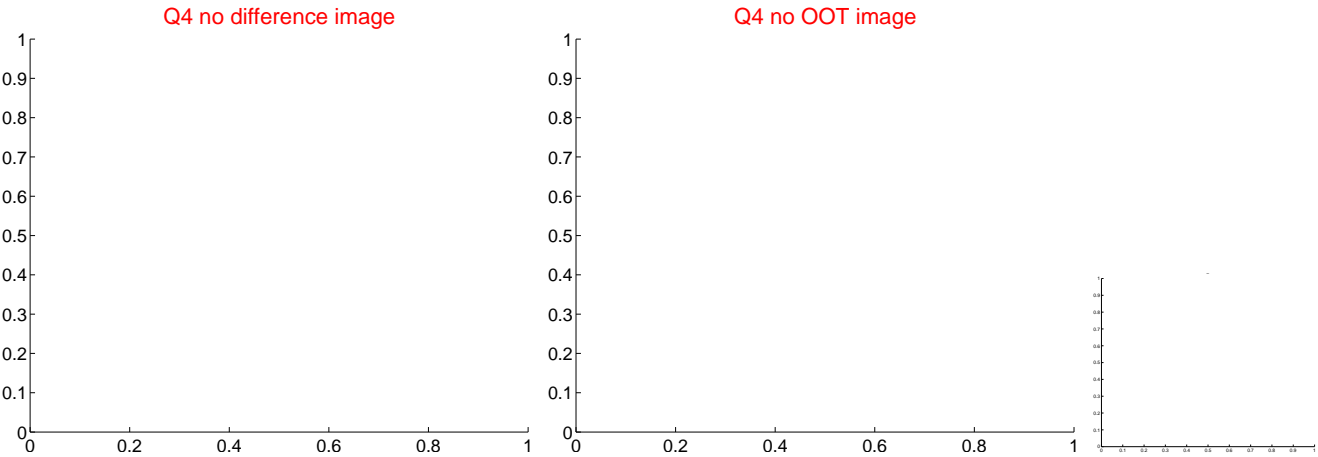
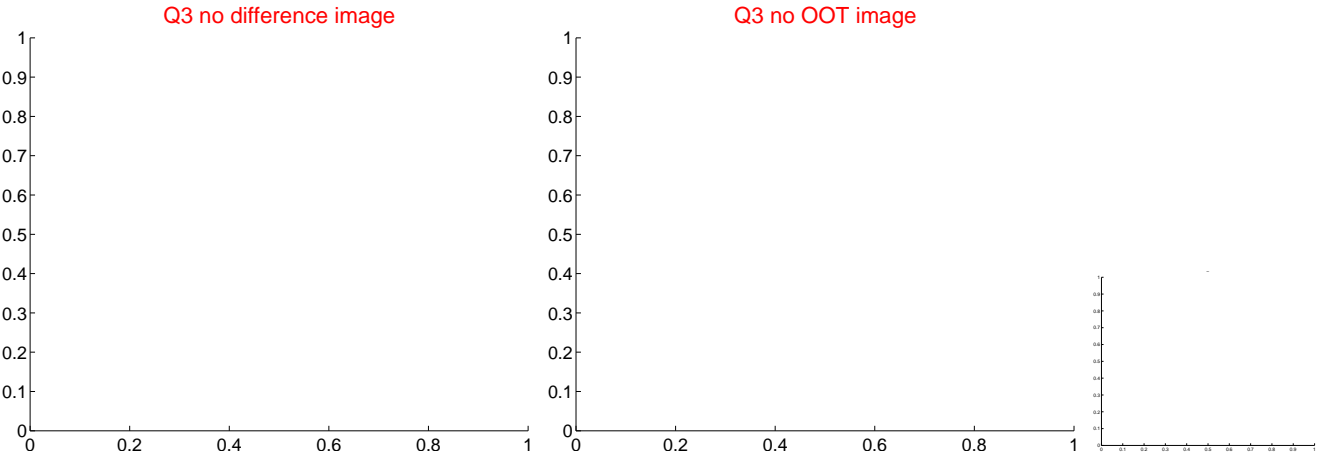
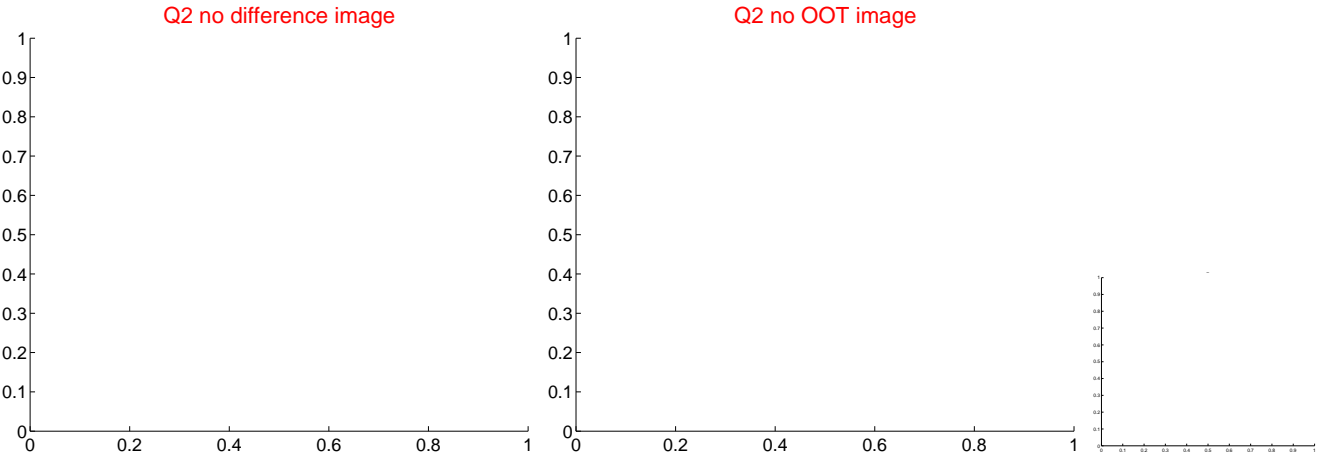
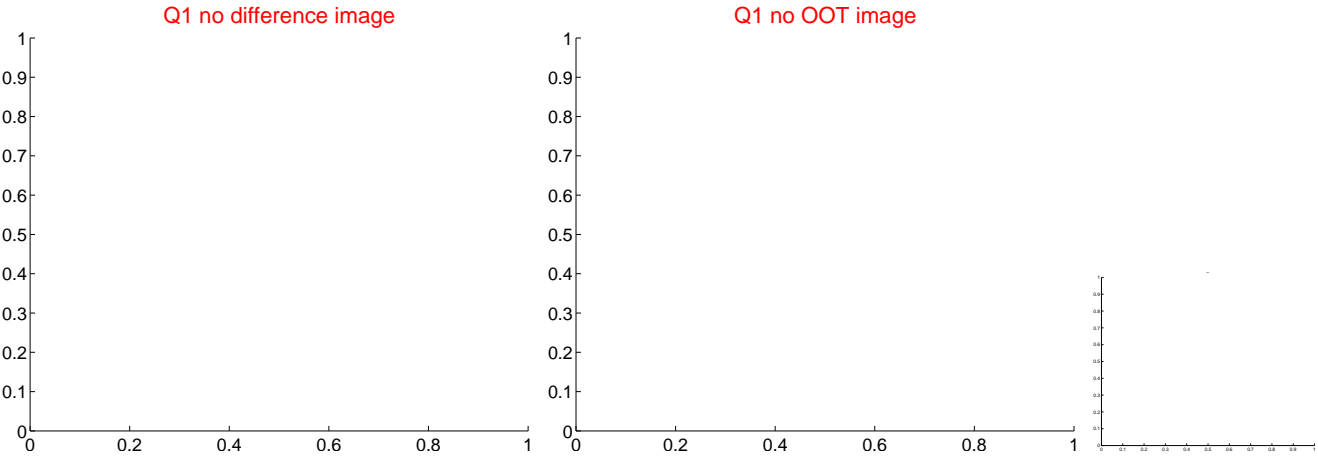


offset from photometric centroids

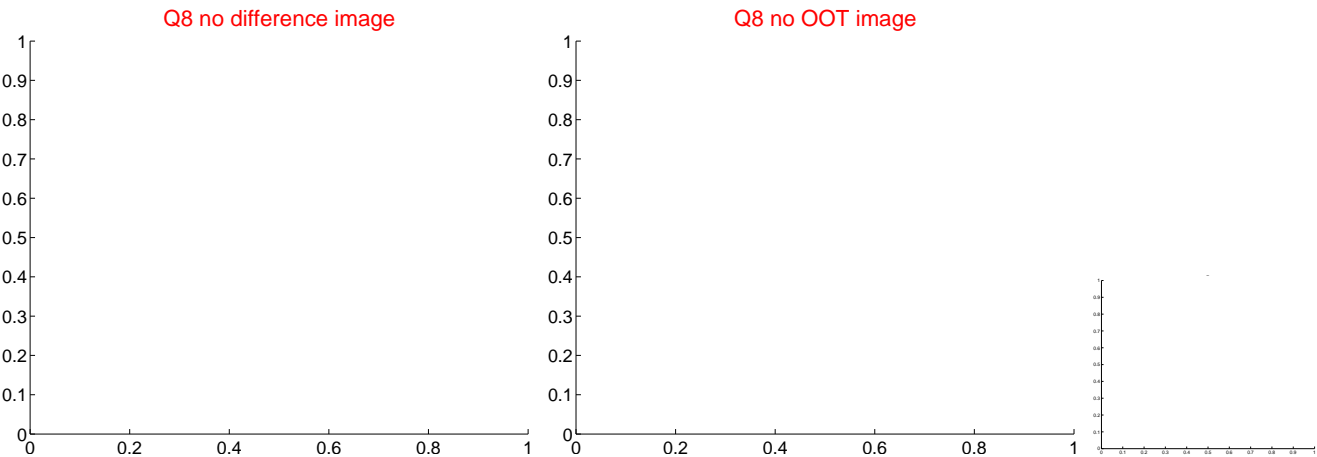
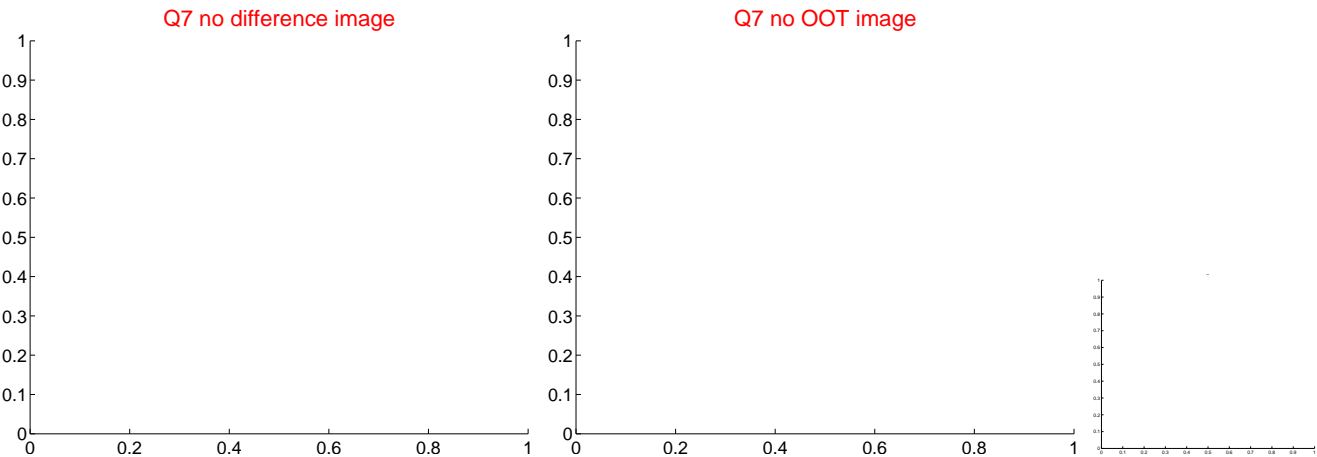
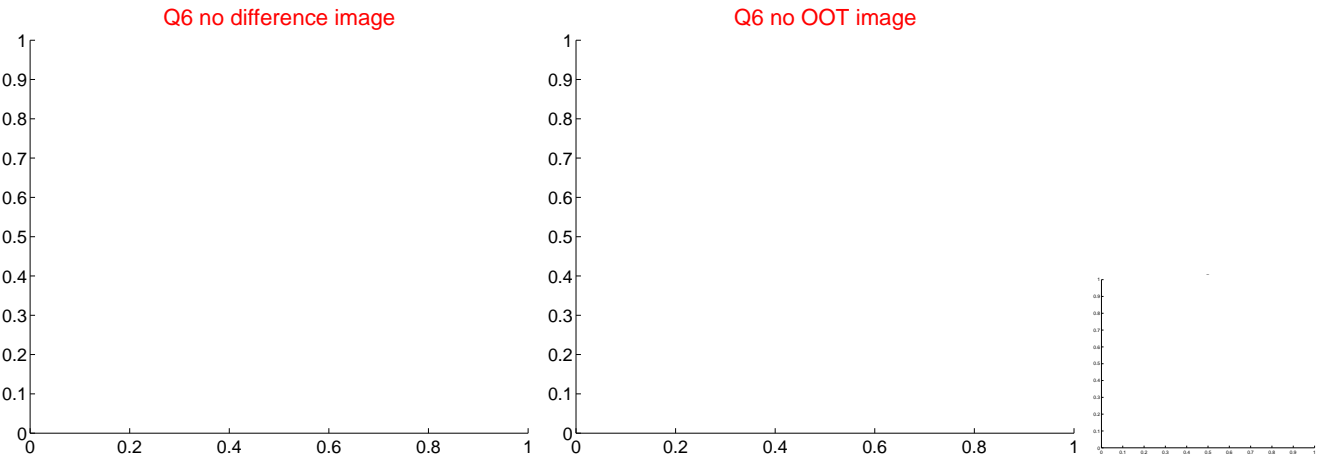
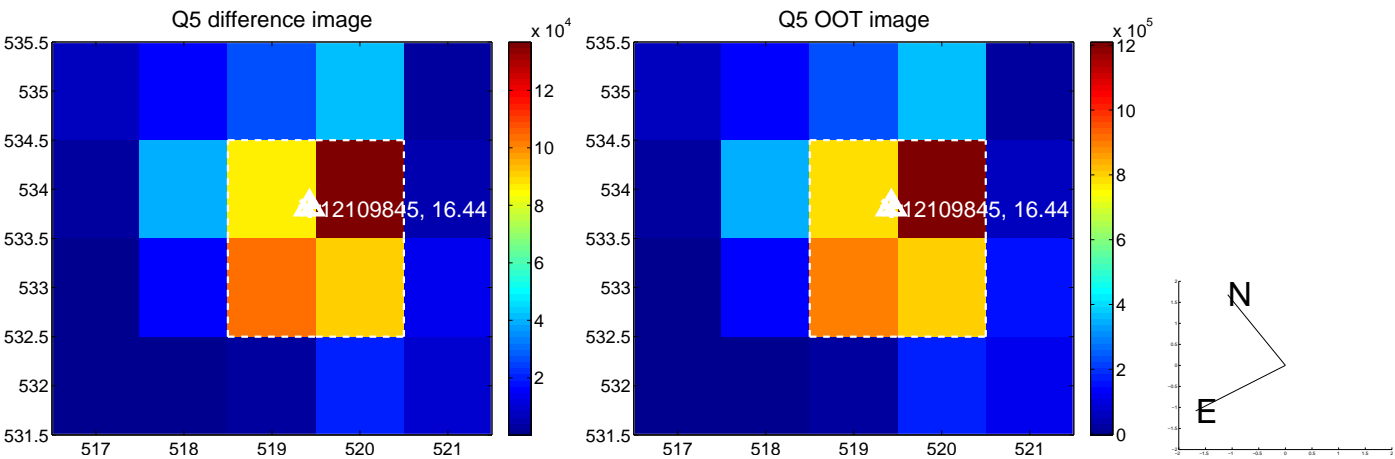


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

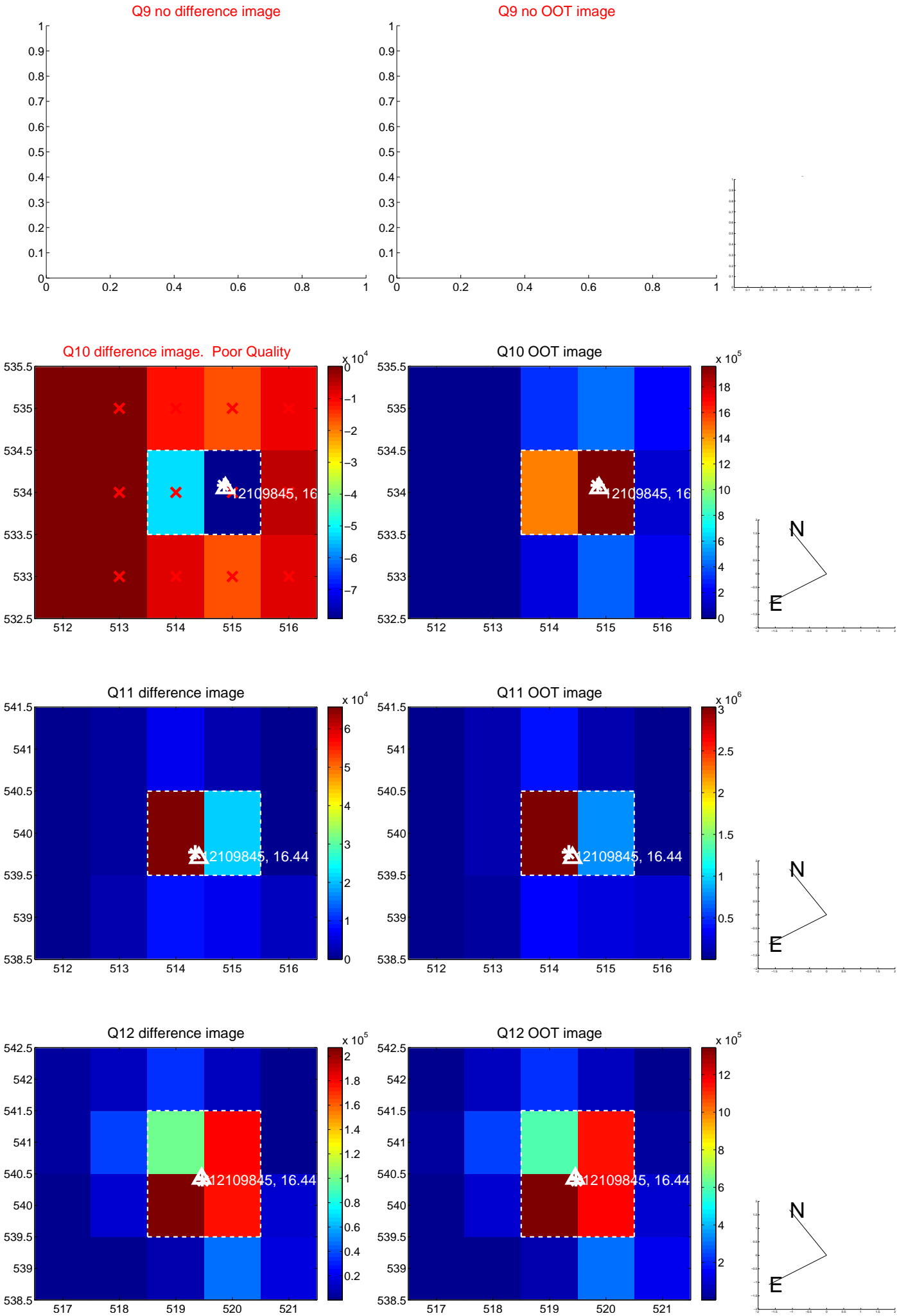
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



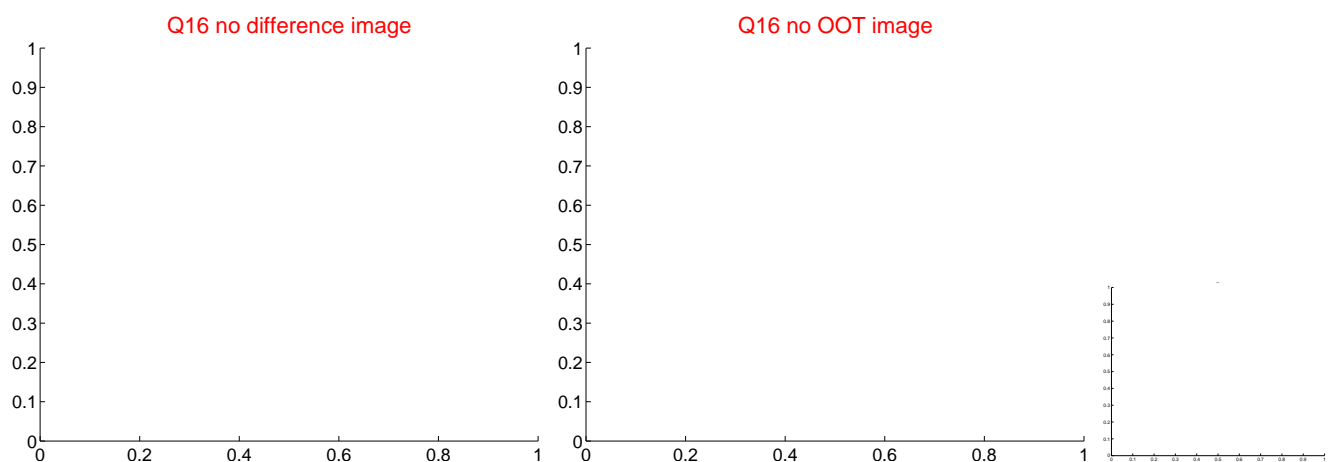
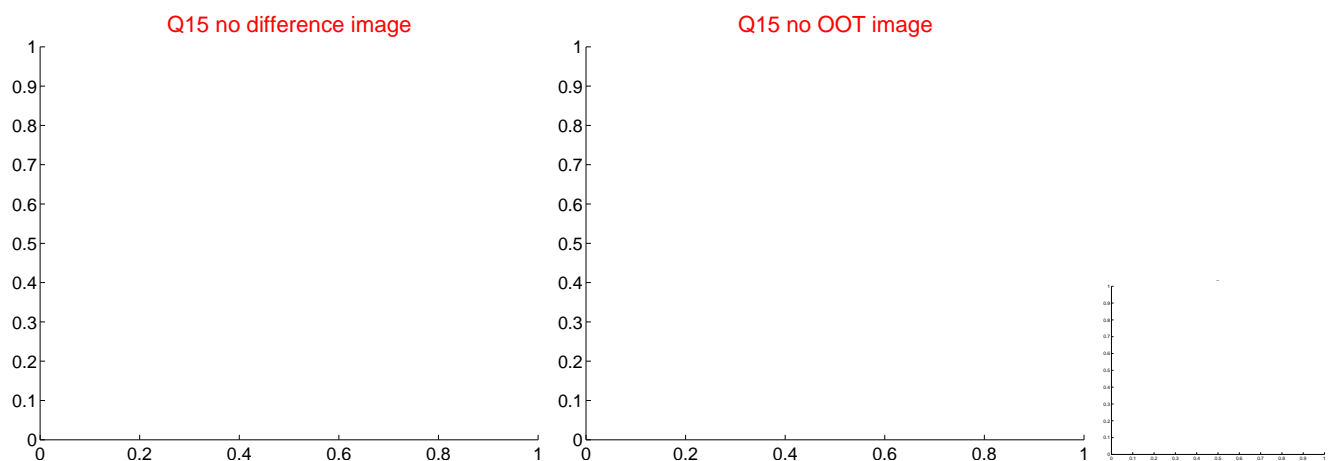
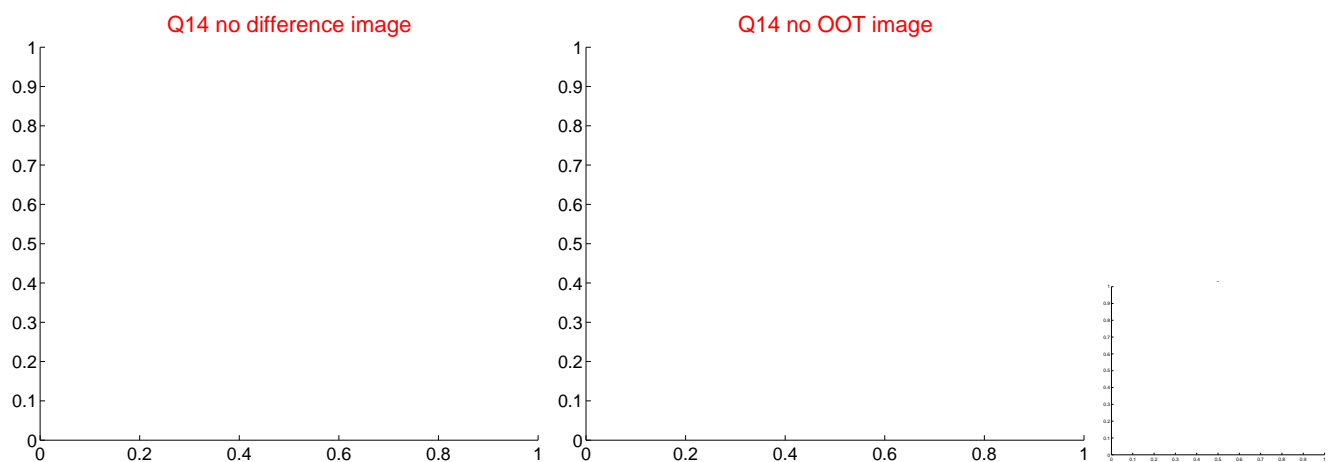
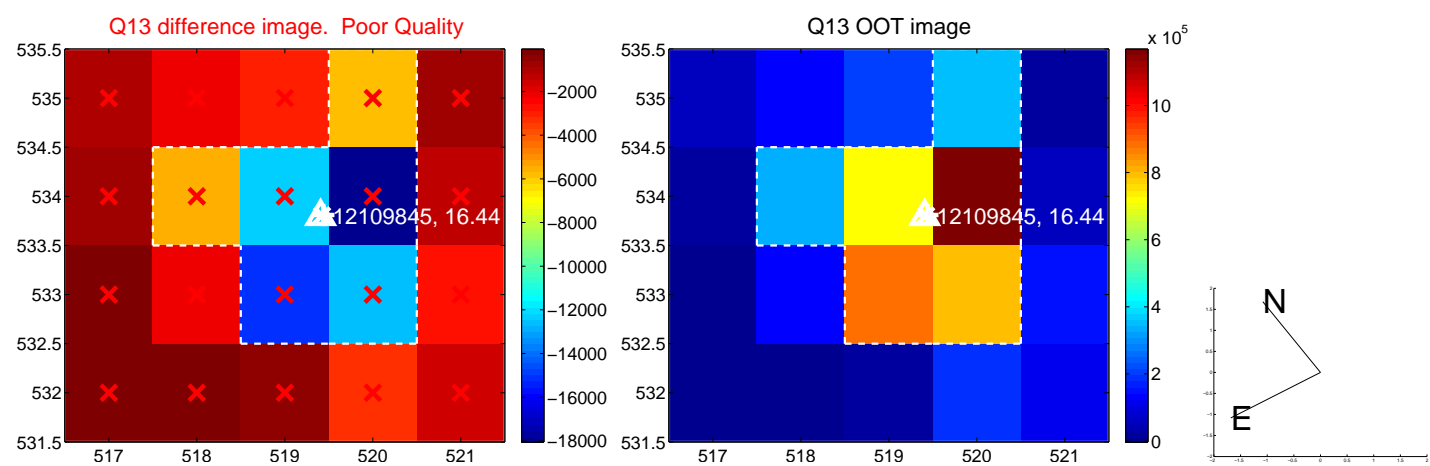
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



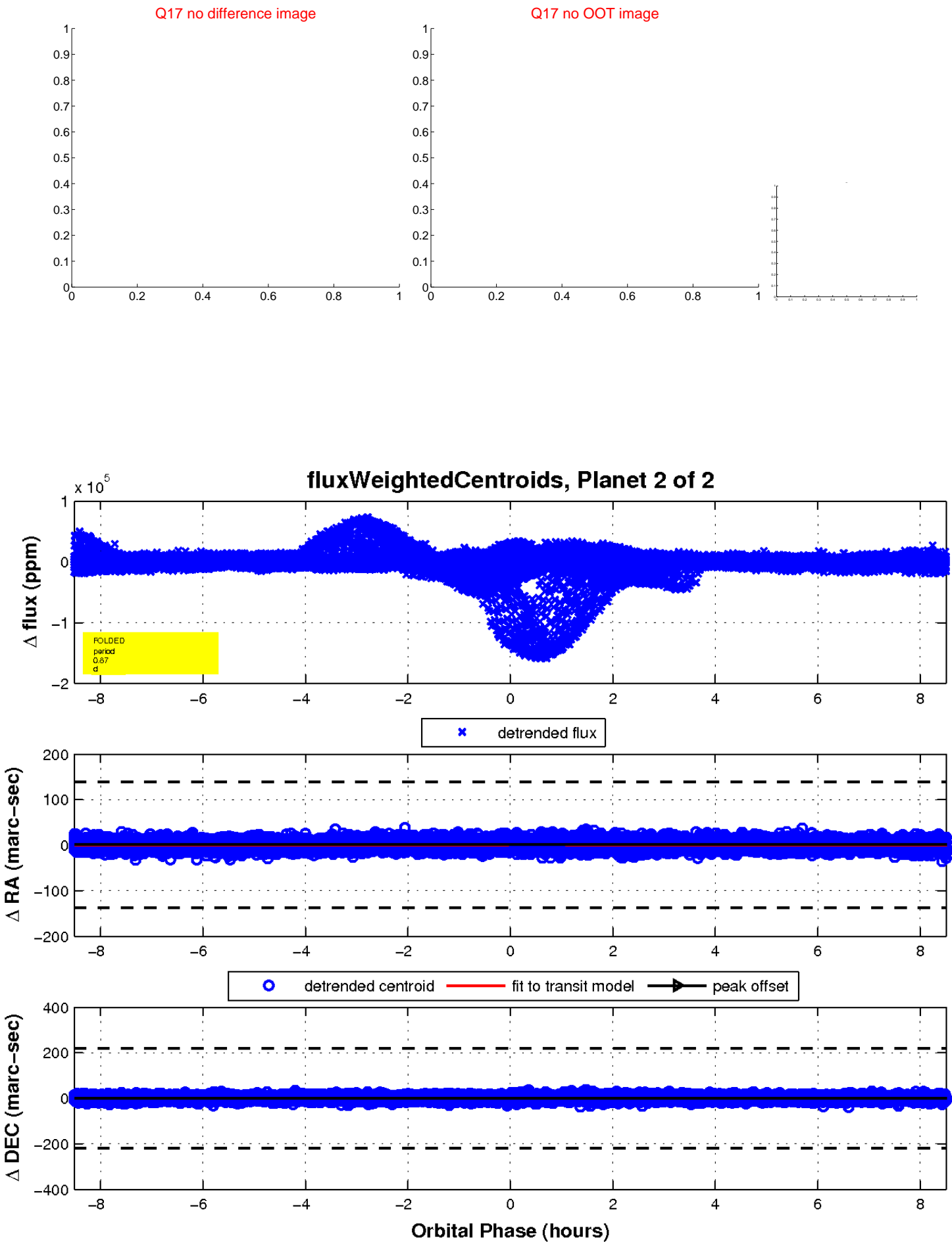
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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



UKIRT Image

Declination

