

KIC 009368524

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})
009368524-01	OBS	No	0.664695	131.747053	155.9	2.071	11.9	8.0	2.34	6065	3.43	27124.35
009368524-02	OBS	No	0.916989	132.011405	195.9	3.442	8.6	8.3	2.34	6065	3.83	17661.90

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009368524-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009368524-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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.

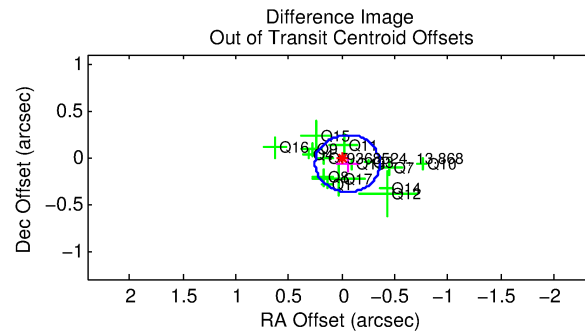
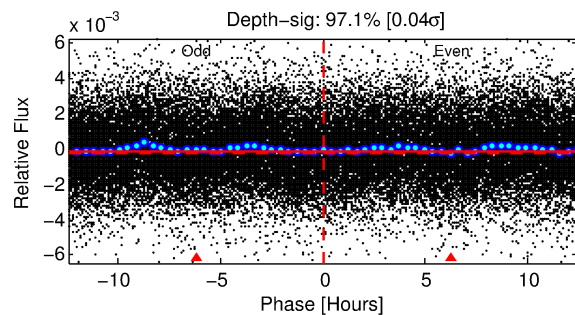
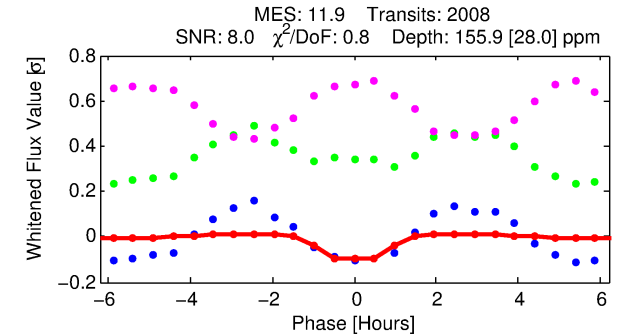
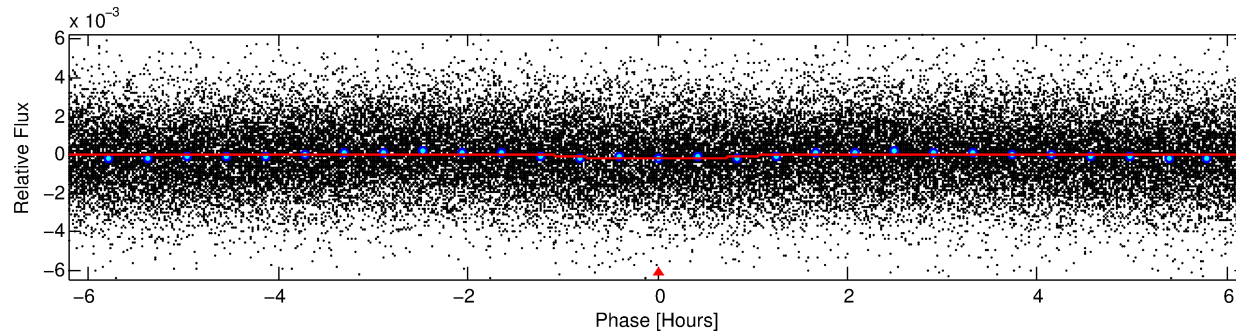
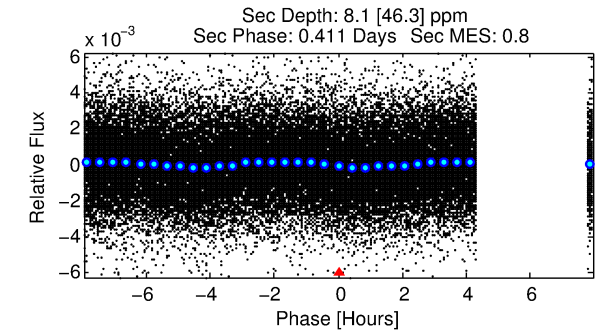
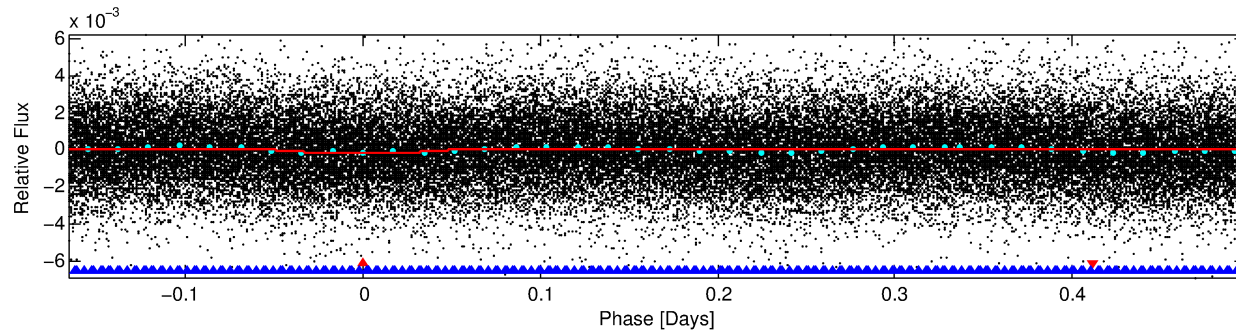
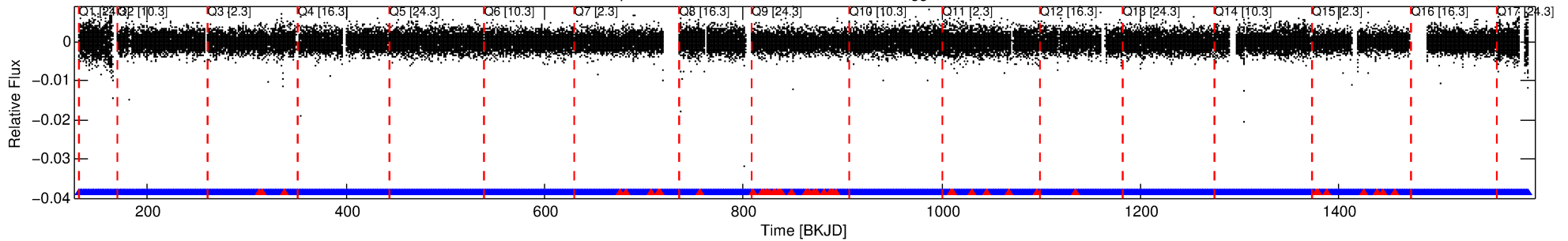
Ephemeris Match Information For 009368524-01

No Significant Match Found

DV One-Page Summary

KIC: 9368524 Candidate: 1 of 2 Period: 0.665 d
KOI: K05661 Corr: No Ephemeris Match

Kp: 13.87 R*: 2.34 Rs Teff: 6065.0 K Logg: 3.76 Fe/H: -0.460



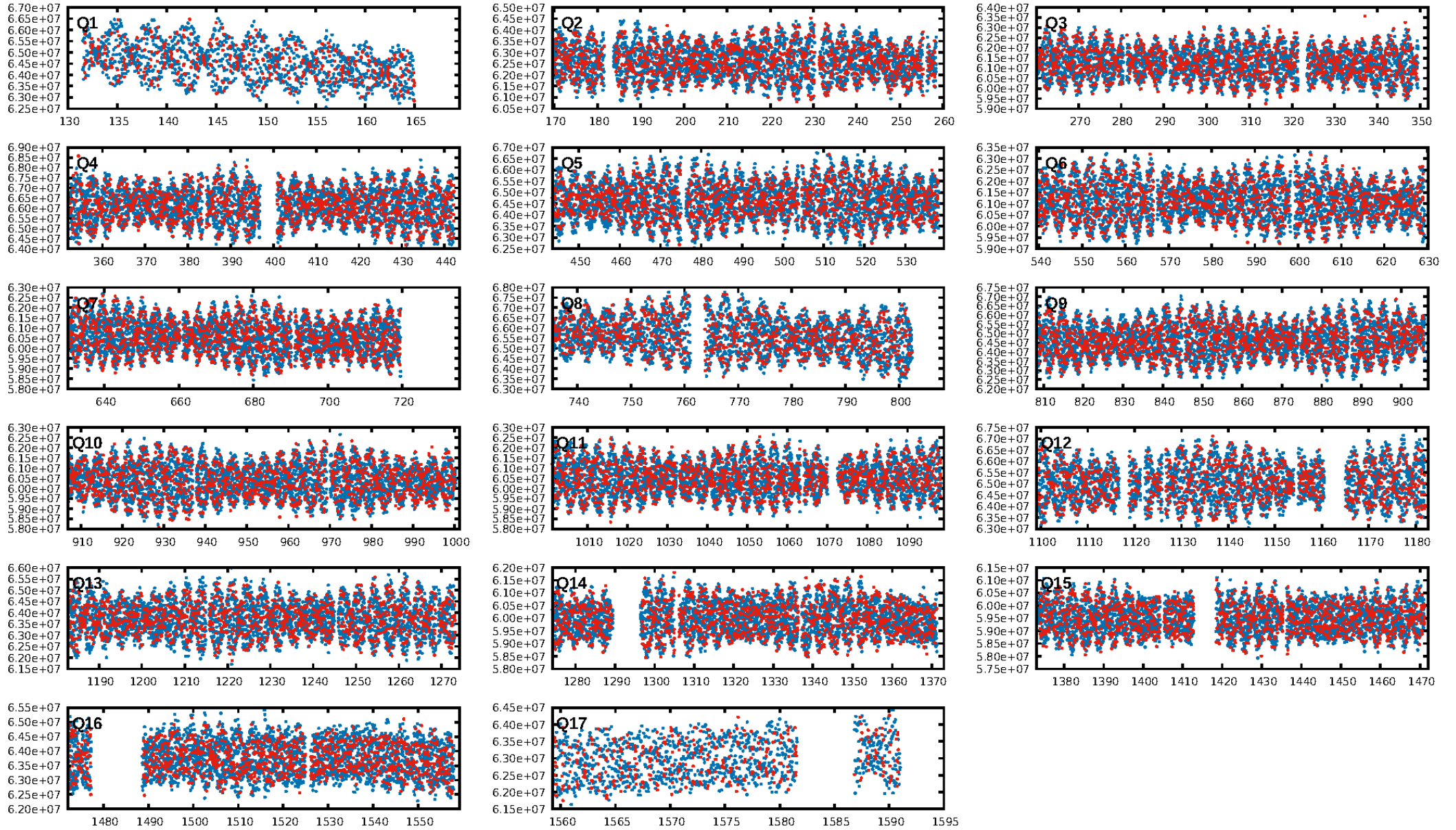
DV Fit Results:

Period = 0.66470 [0.00001] d
Epoch = 131.7471 [0.0036] BKJD
Rp/R* = 0.0134 [0.0119]
a/R* = 1.49 [3.93]
b = 0.90 [1.06]
Seff = 27124.35 [28975.64]
Teff = 3272 [874] K
Rp = 3.43 [3.60] Re
a = 0.0157 [0.0097] AU
Ag = 0.09 [0.56] [-1.61σ]
Teffp = 2790 [4188] K [-0.11σ]

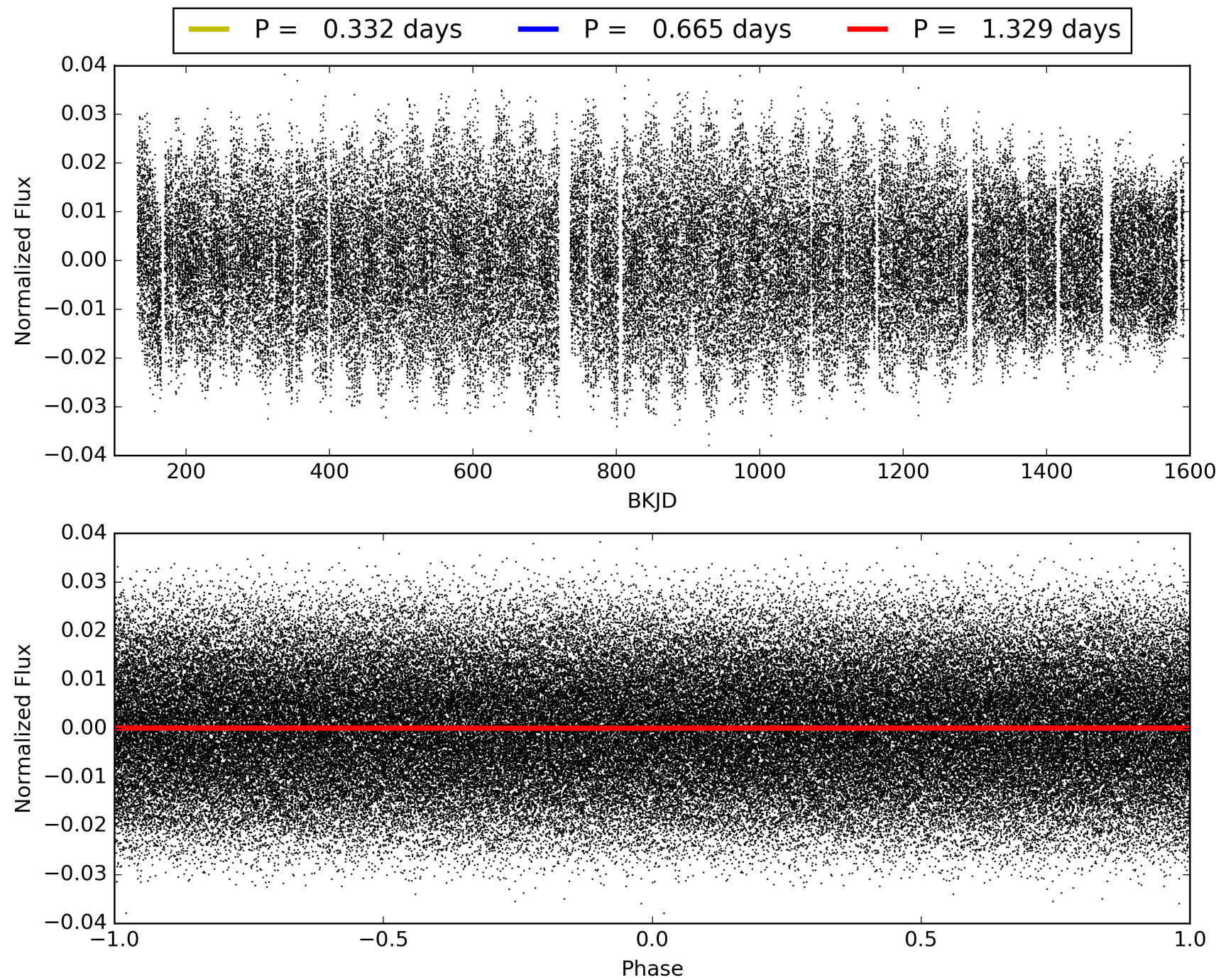
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 86.8% [1.51σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 3.19e-24
RollingBand-fgt: 0.98 [1874/1917]
GhostDiagnostic-chr: 1.503
Centroid-sig: 0.0%
Centroid-so: 1.150 arcsec [3.66σ]
OotOffset-rm: 0.086 arcsec [0.85σ]
KicOffset-rm: 0.082 arcsec [0.88σ]
OotOffset-st: 2/4/4/5 [15]
KicOffset-st: 2/4/4/5 [15]
DiffImageQuality-fgm: 0.67 [10/15]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 009368524-01, PDC Light Curves

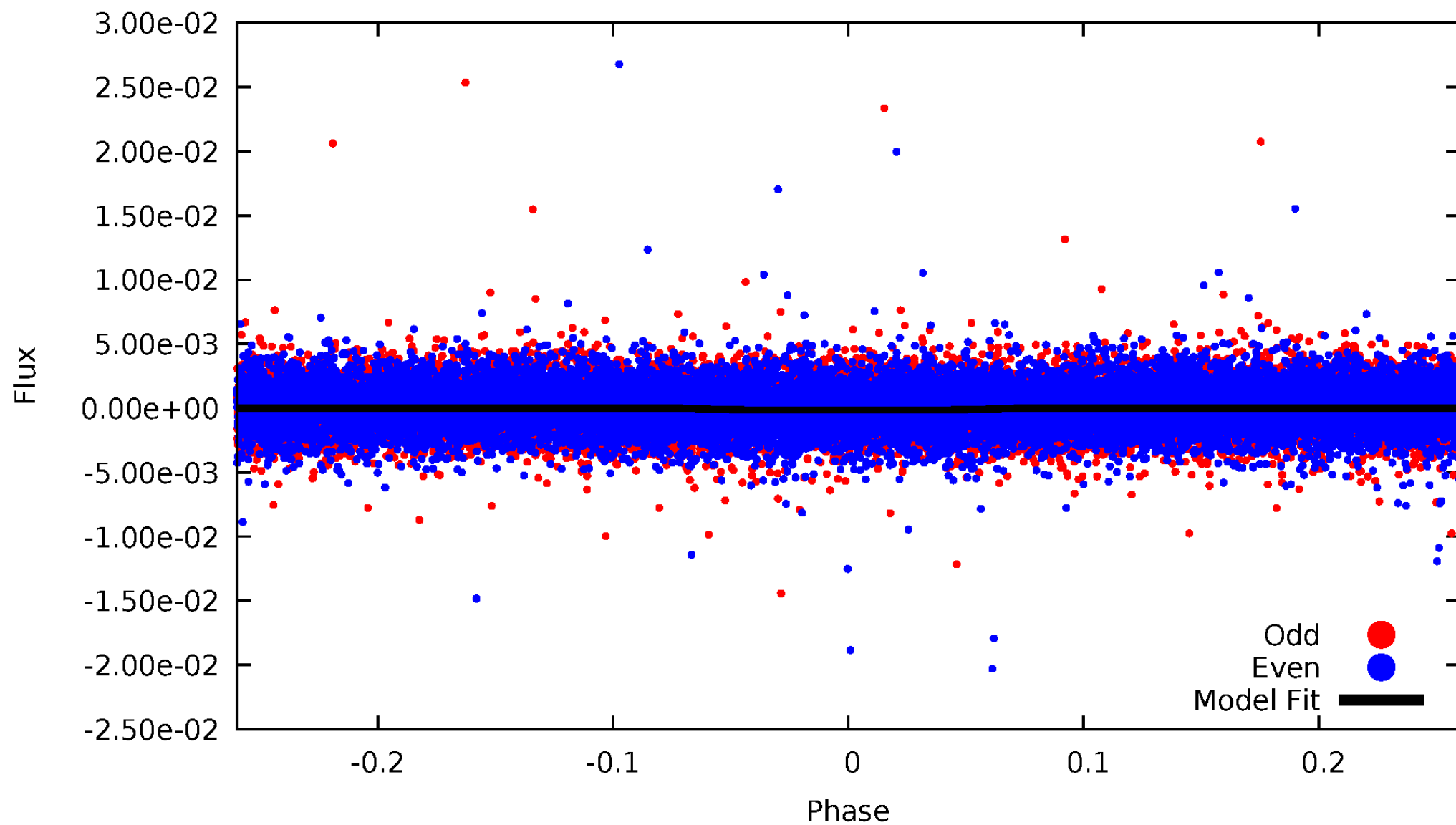


TCE 009368524-01



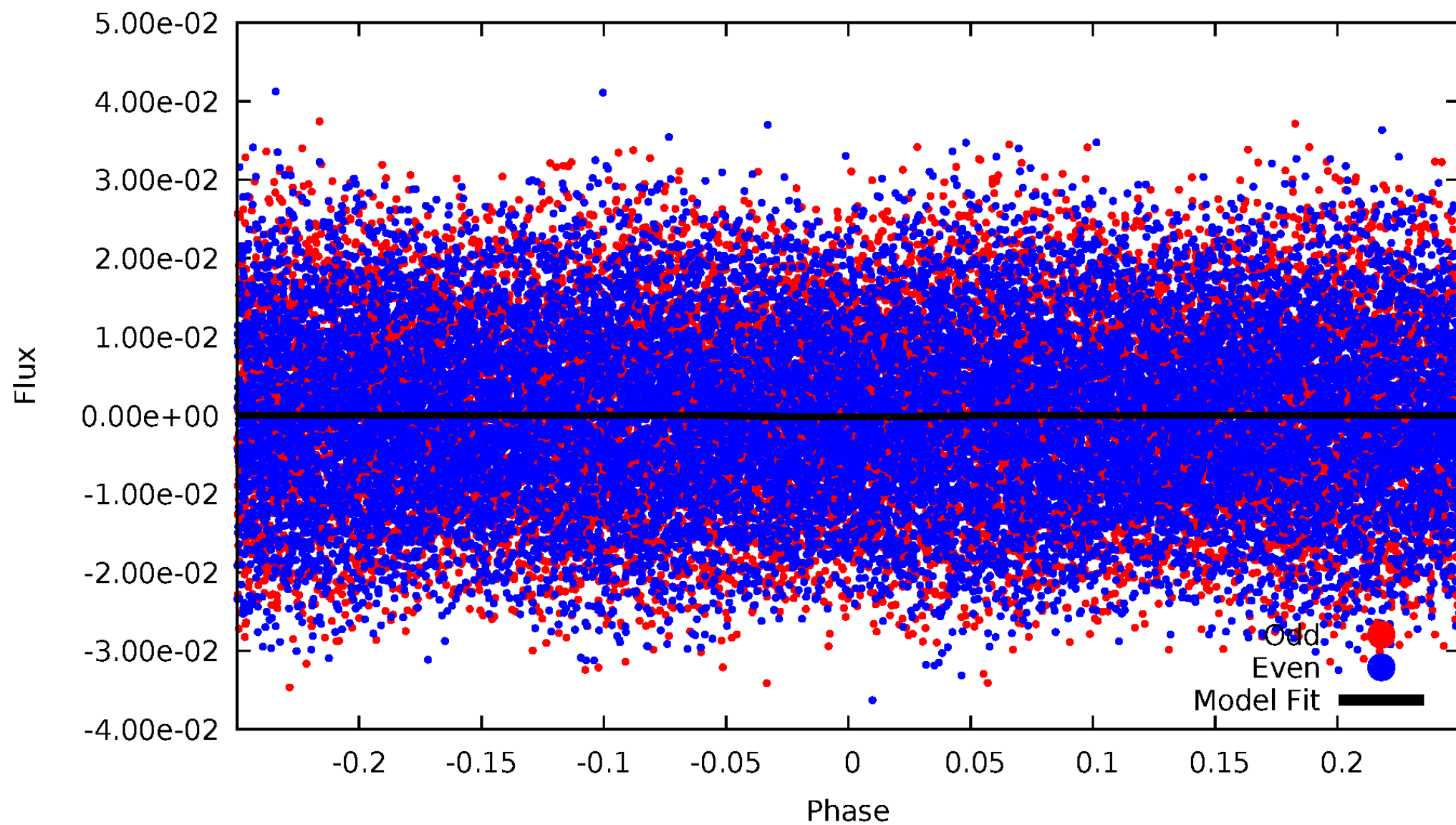
DV Odd/Even

TCE 009368524-01



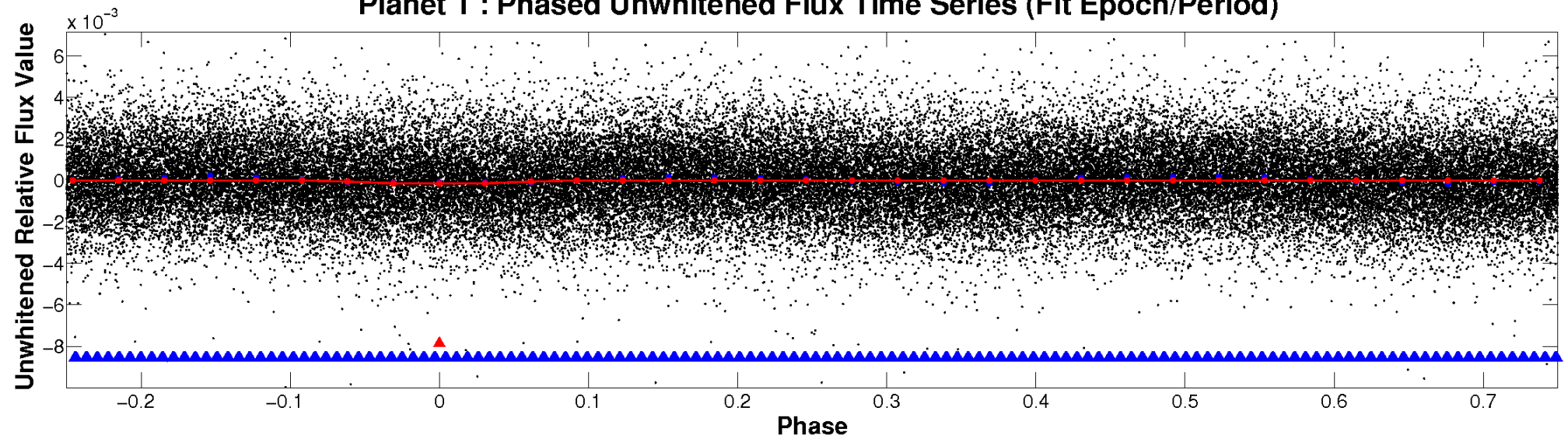
ALT Odd/Even

TCE 009368524-01

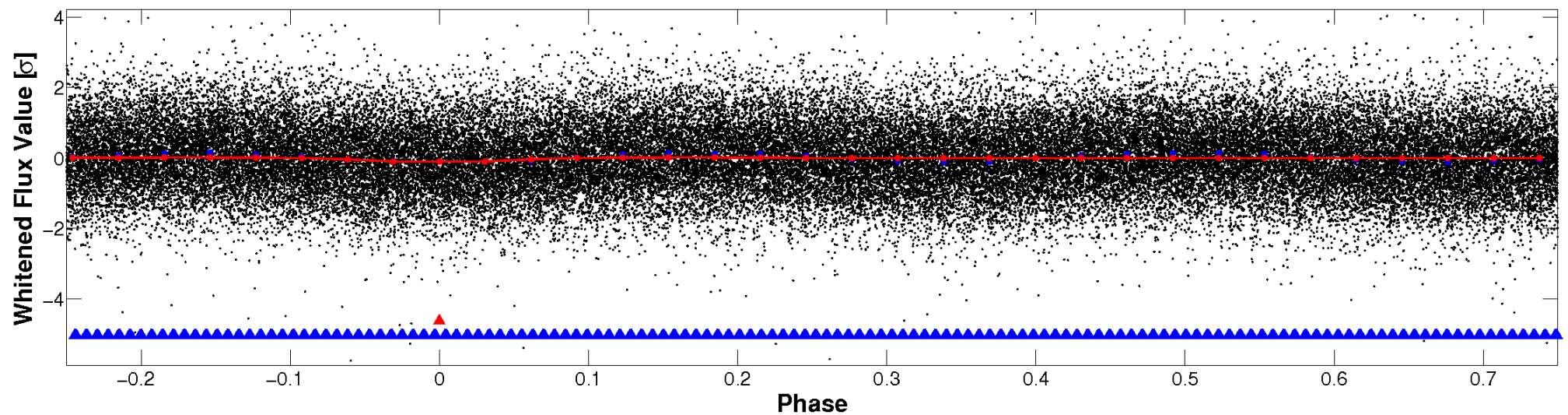


Non-Whitened Vs. Whitened Light Curve

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

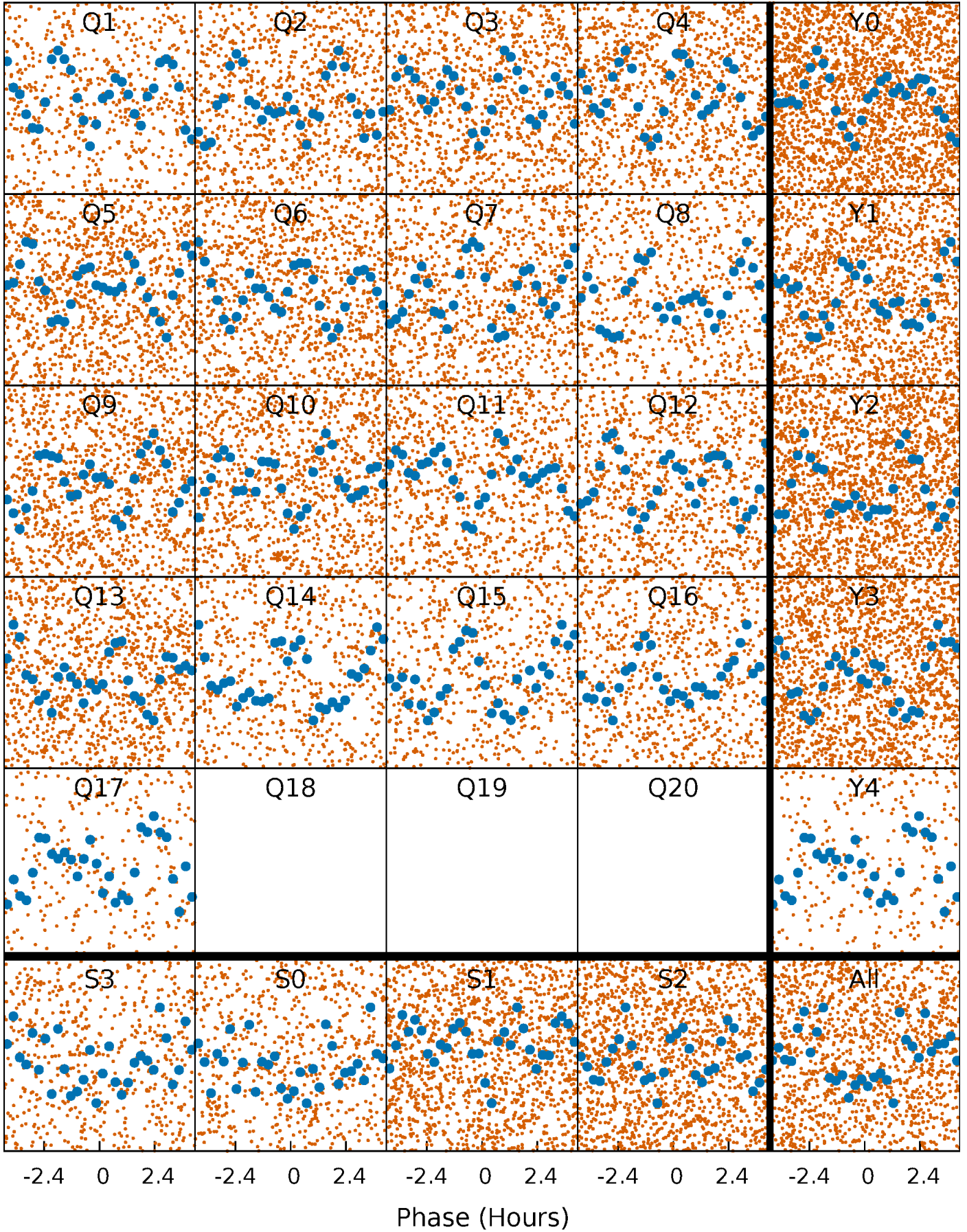


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



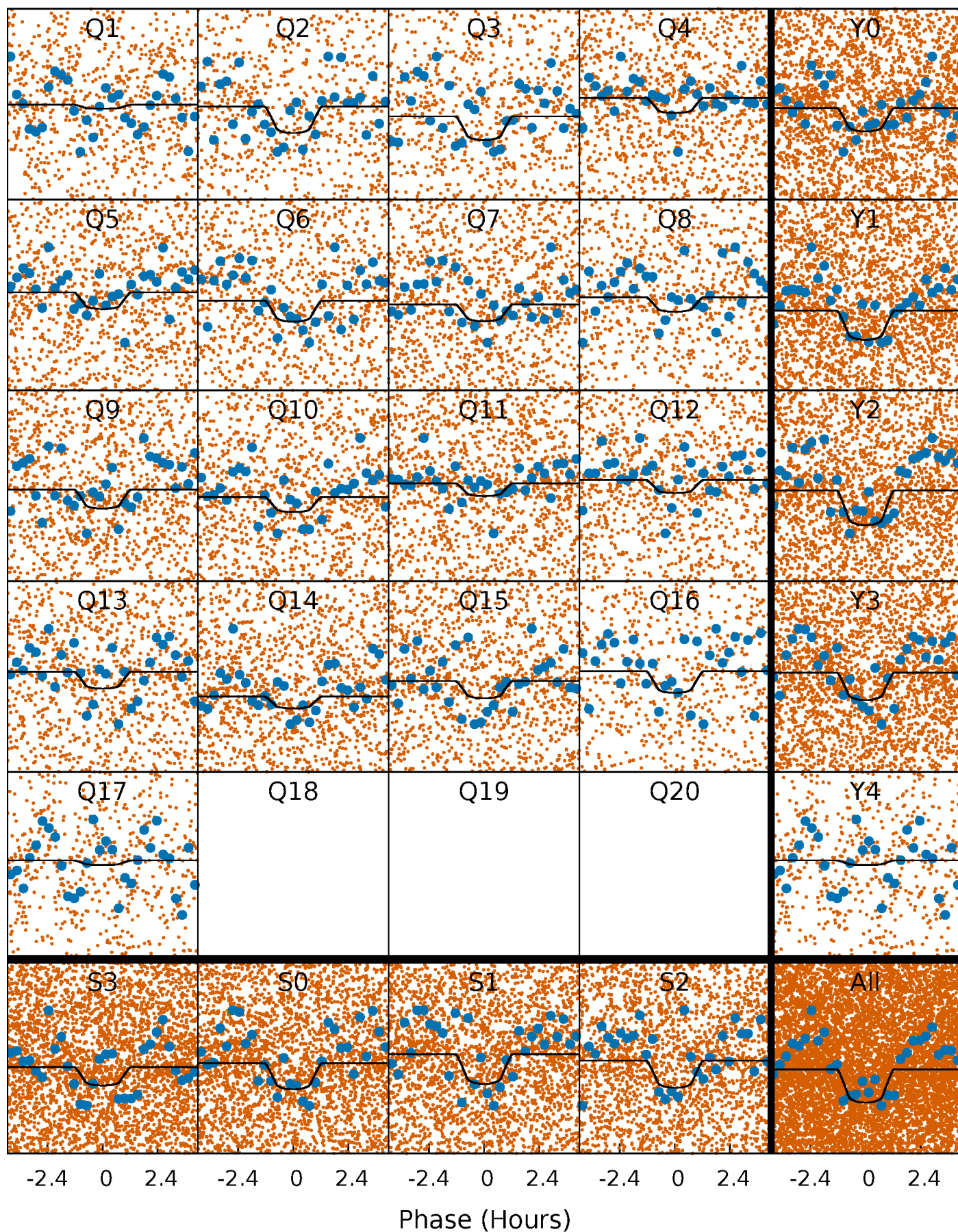
PDC Quarter-Phased Transit Curves

TCE 009368524-01 P= 0.664695 Days $T_0=131.747053$ (BKJD)



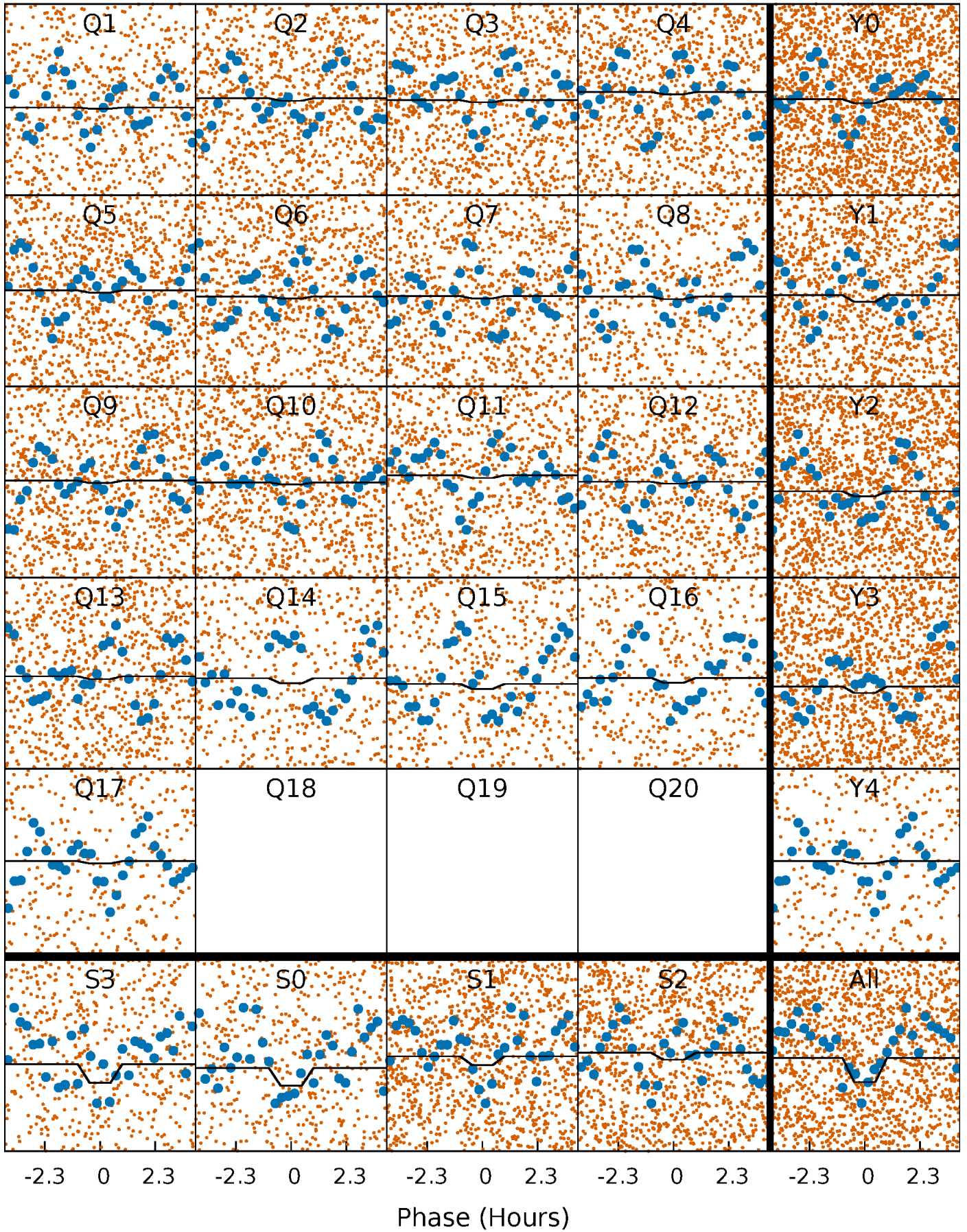
DV Quarter-Phased Transit Curves

TCE 009368524-01 P= 0.664695 Days $T_0=131.747053$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

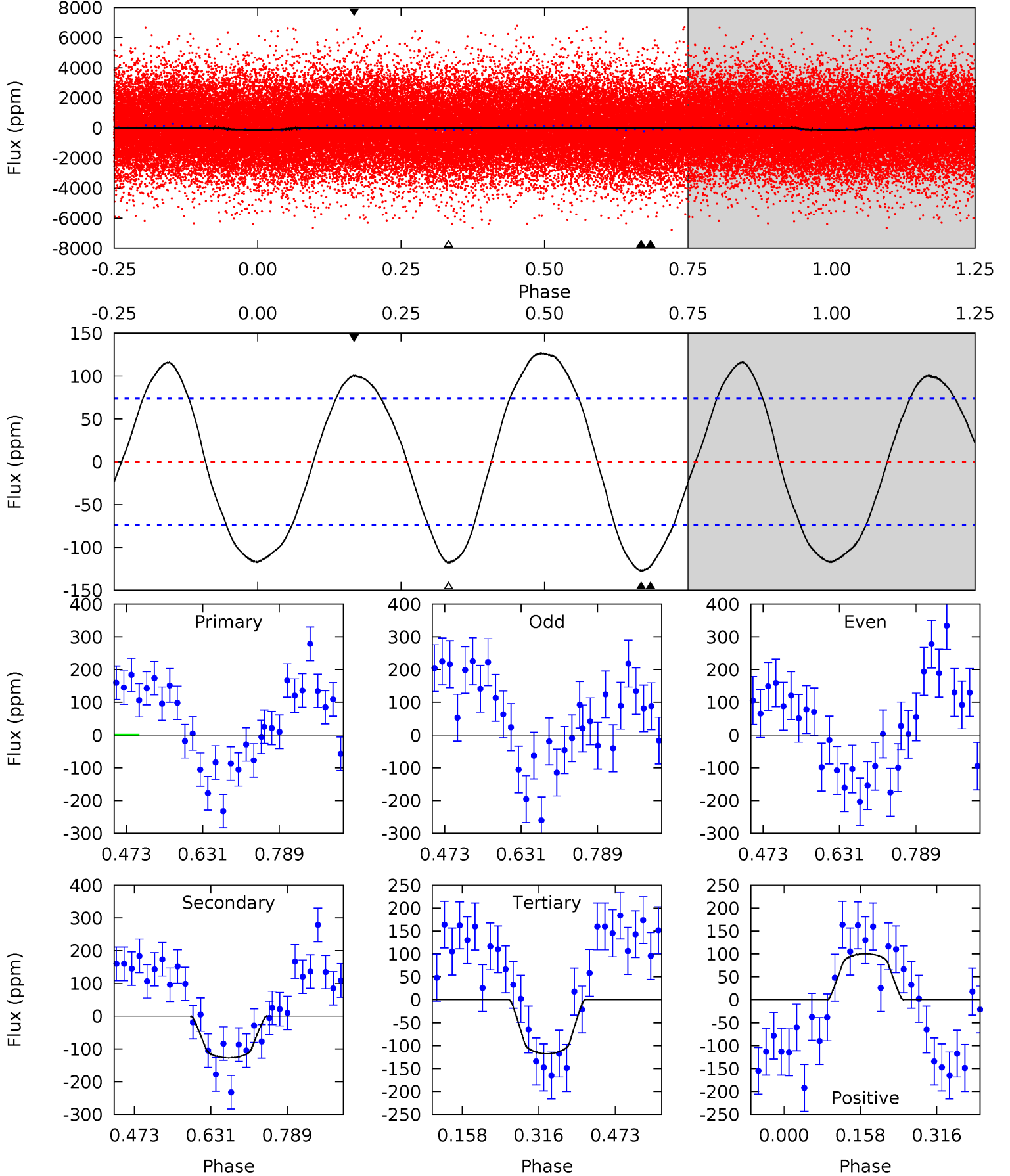
TCE 009368524-01 P= 0.664701 Days $T_0=131.747063$ (BKJD)



DV Model-Shift Uniqueness Test

009368524-01, P = 0.664695 Days, E = 131.082358 Days

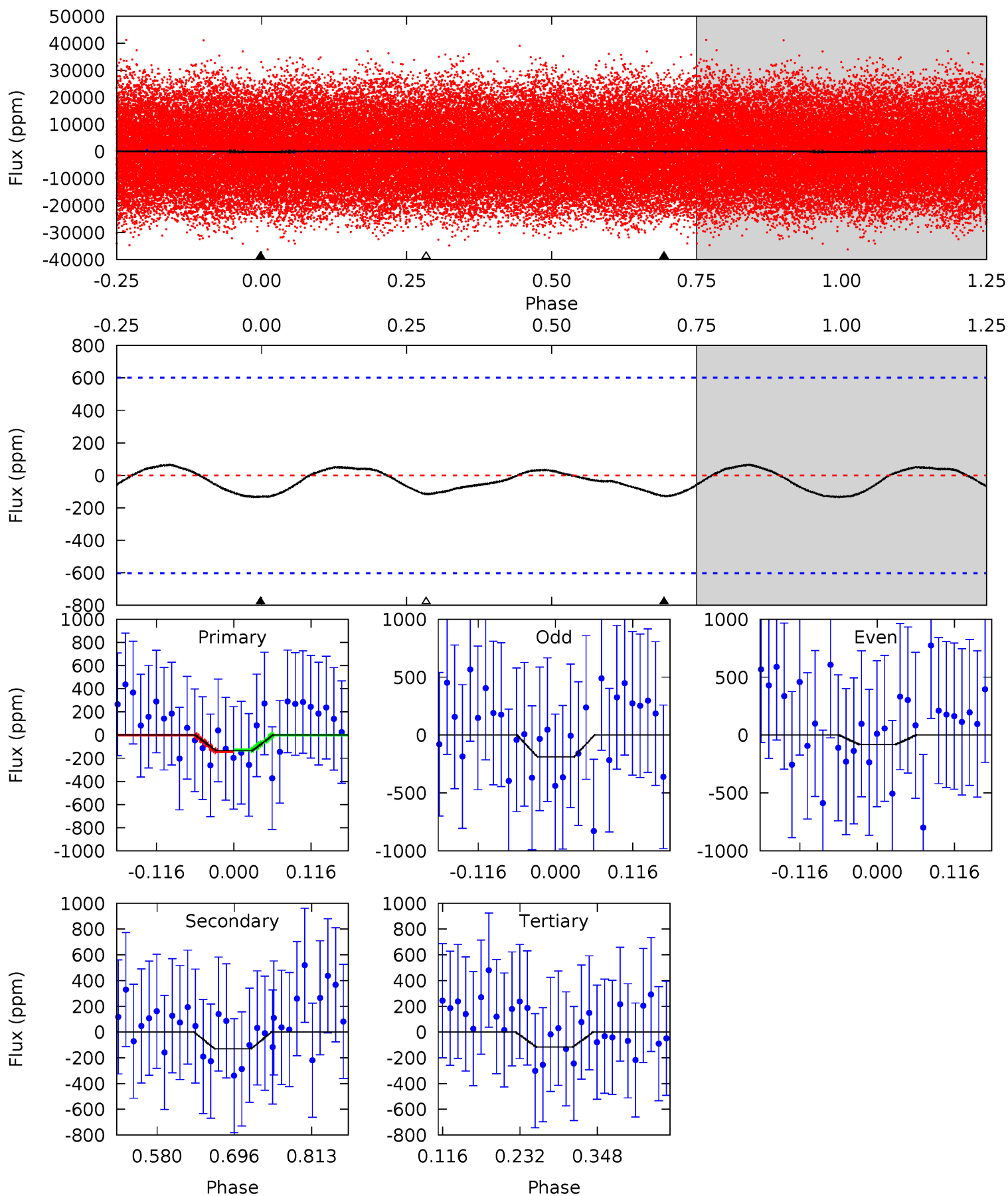
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.39	7.71	7.13	6.09	4.47	1.41	5.02	0.26	1.30	0.58	1.62	3.04	0.83	0.50	0.64



Alt Model-Shift Uniqueness Test

009368524-01, P = 0.664701 Days, E = 131.082362 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.01	0.97	0.87	0	4.53	1.57	0.40	0.14	1.01	0.10	0.97	0.40	0.71	0.33	0.05



Stellar Parameters For KIC 009368524

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6065^{+218}_{-200}	$3.763^{+0.646}_{-0.152}$	$-0.460^{+0.300}_{-0.250}$	$2.344^{+0.558}_{-1.302}$	$1.162^{+0.167}_{-0.286}$	$0.127^{+1.150}_{-0.051}$
	+4%/-3%	+17%/-4%	+65%/-54%	+24%/-56%	+14%/-25%	+906%/-40%
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 009368524-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-127 ± 16	$3.40^{+3.07}_{-2.18}$	4454^{+414}_{-689}	5004^{+3677}_{-1650}	$1.451^{+9.360}_{-1.032}$
Alt.	-129 ± 133	$3.10^{+3.31}_{-1.89}$	4422^{+412}_{-739}	4755^{+3741}_{-8576}	$1.229^{+8.842}_{-1.187}$

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 $A_{obs} \gg 1.0$

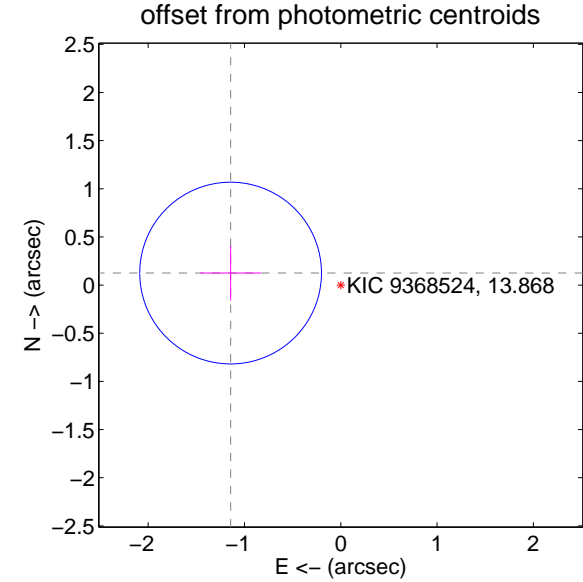
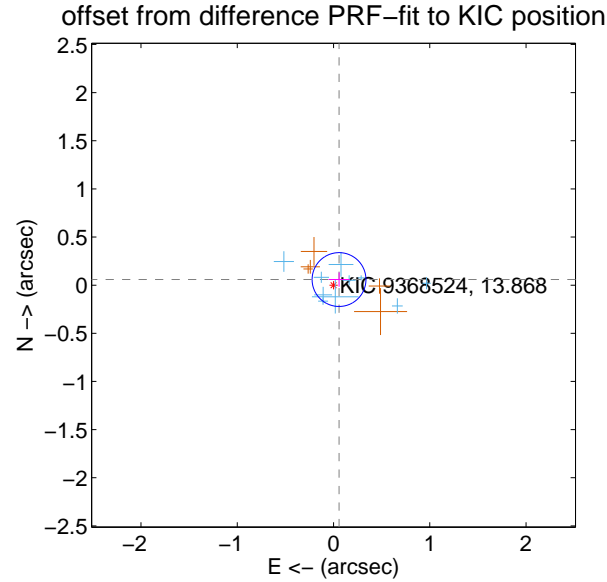
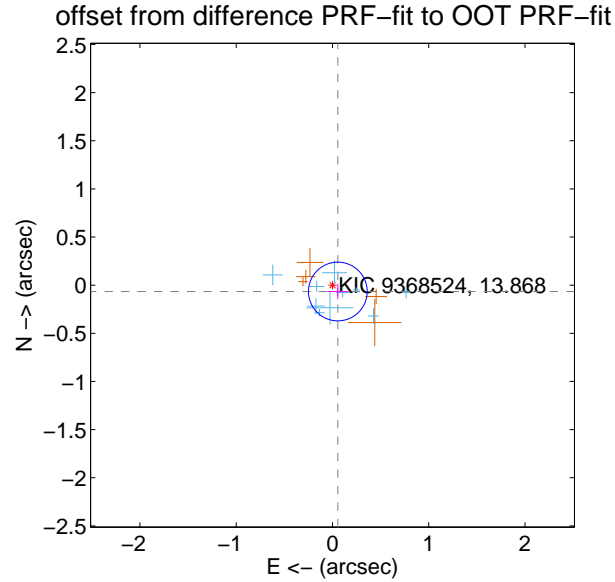
DV Centroid Data

Supplemental centroid analysis for 009368524-01. Kepler magnitude: 13.87. Transit SNR 8.01

There are 10 quarters with good PRF difference image offsets

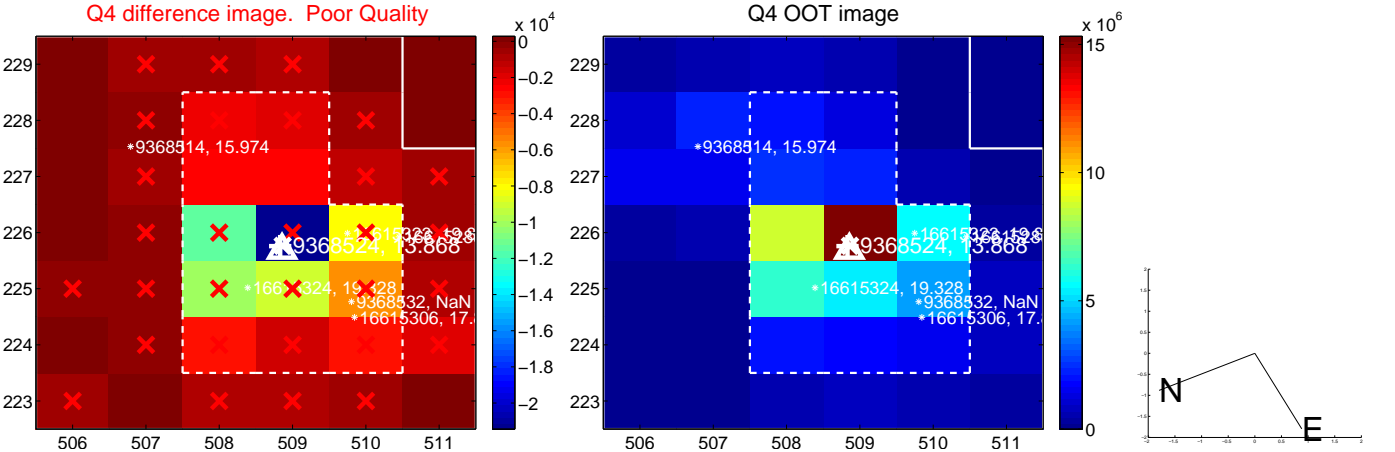
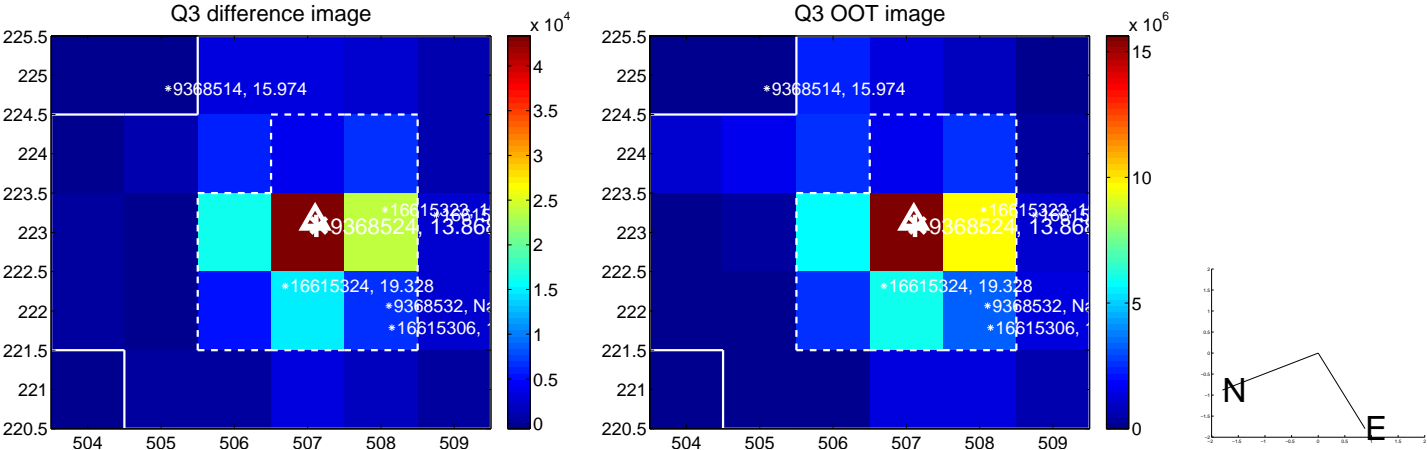
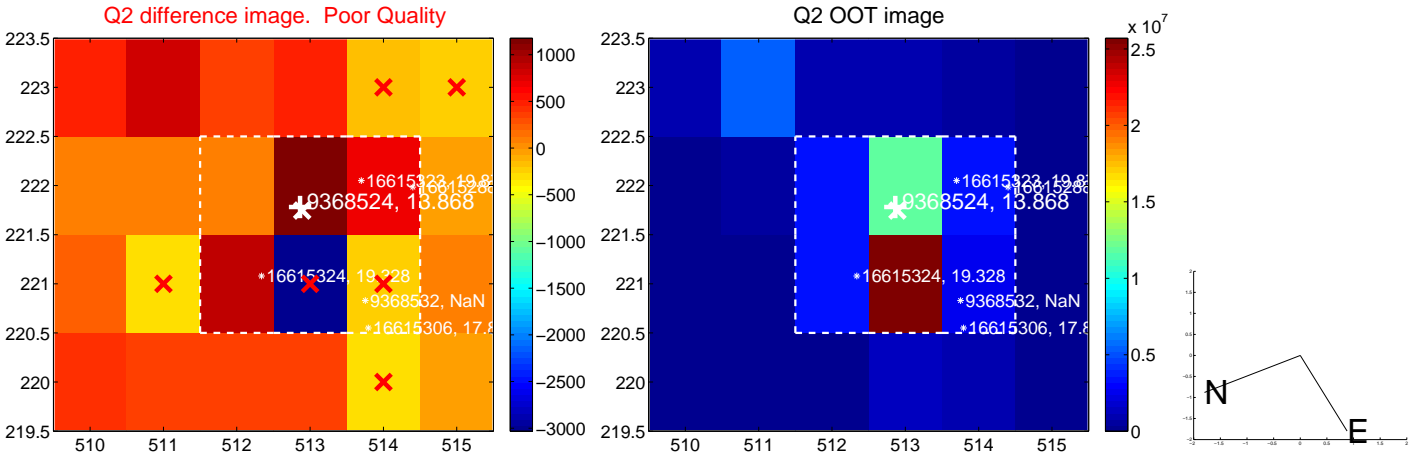
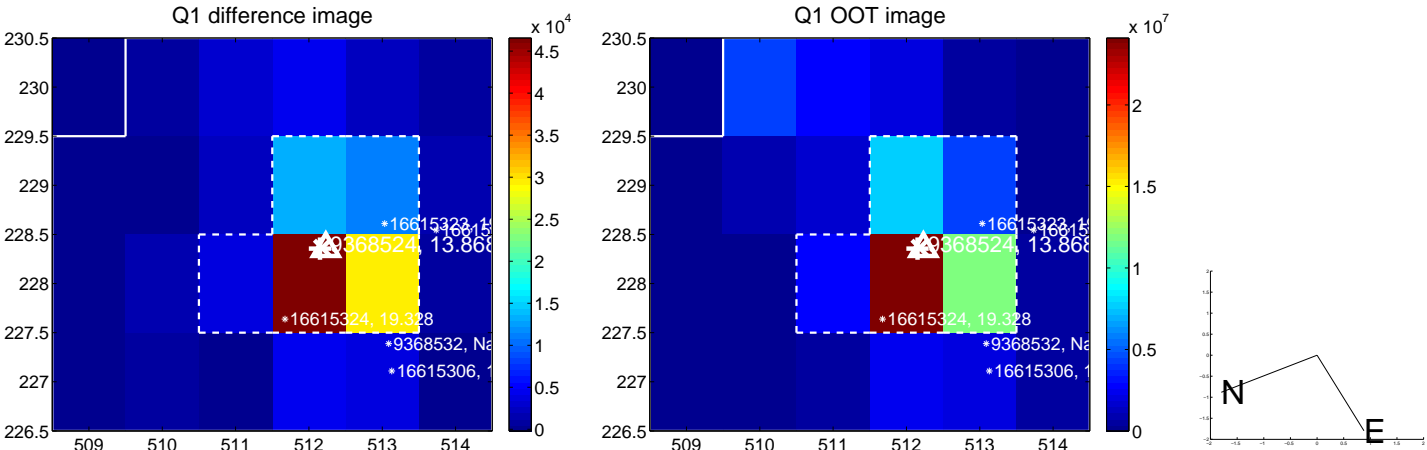
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.086 ± 0.102	0.85	-0.056 ± 0.107	-0.066 ± 0.079
PRF-fit source offset from KIC position	0.082 ± 0.093	0.88	-0.057 ± 0.110	0.058 ± 0.074
photometric centroid source offset	1.15 ± 0.31	3.66	1.14 ± 0.31	0.12 ± 0.28

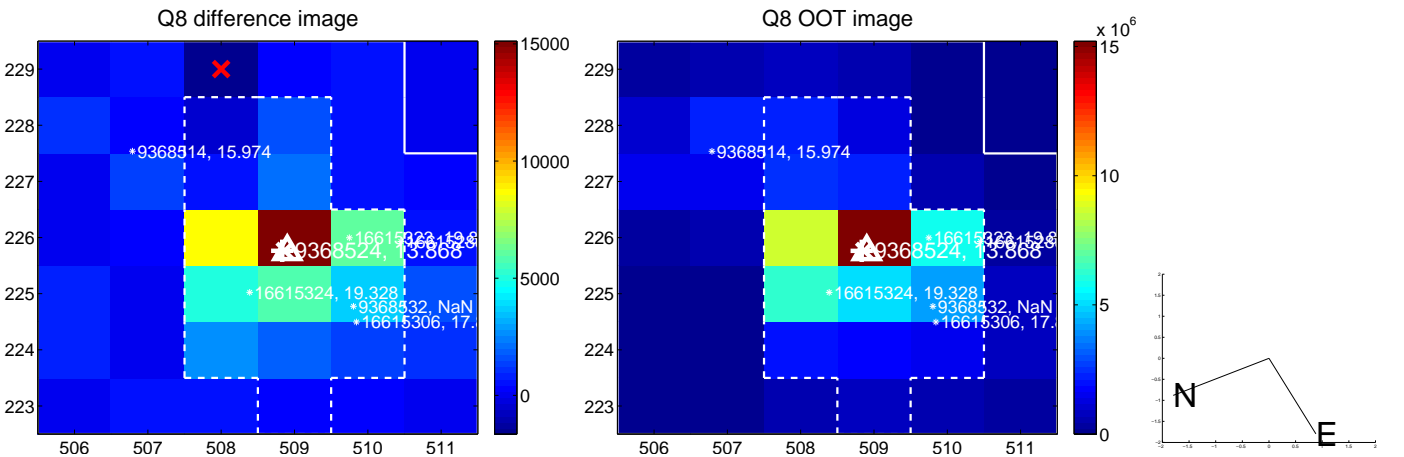
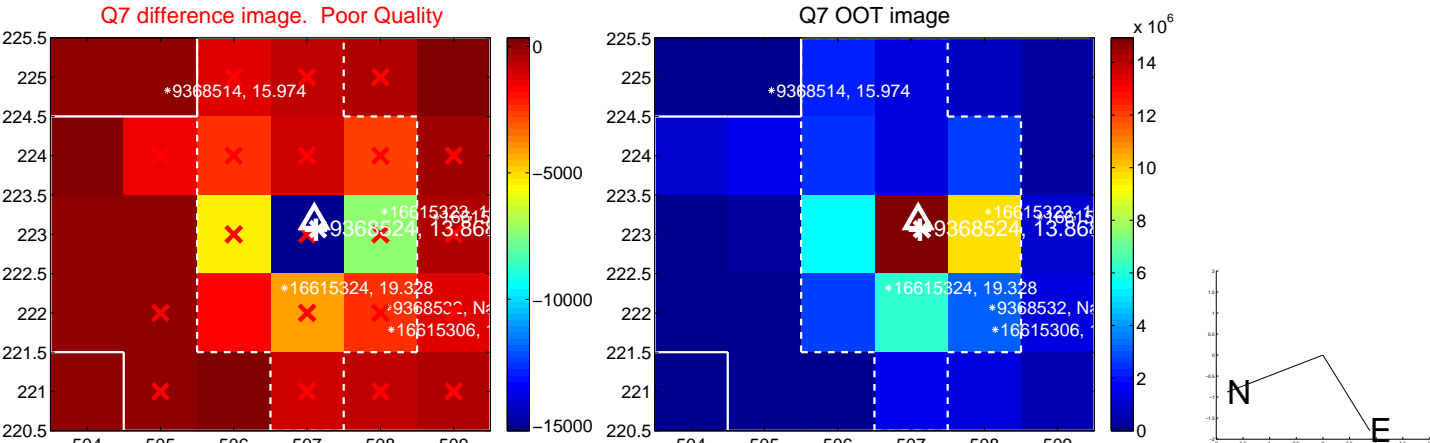
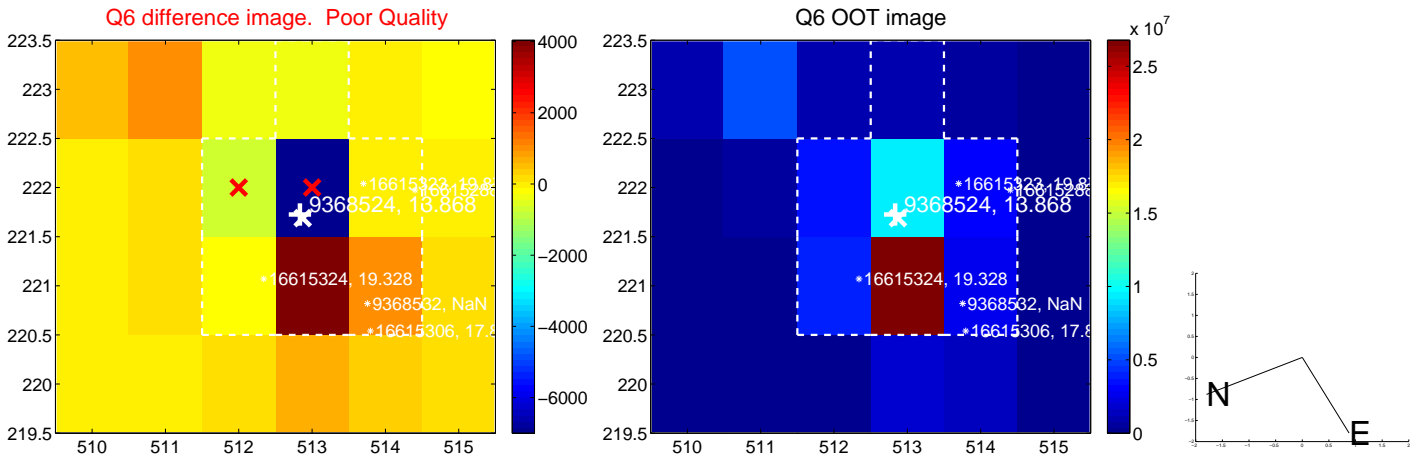
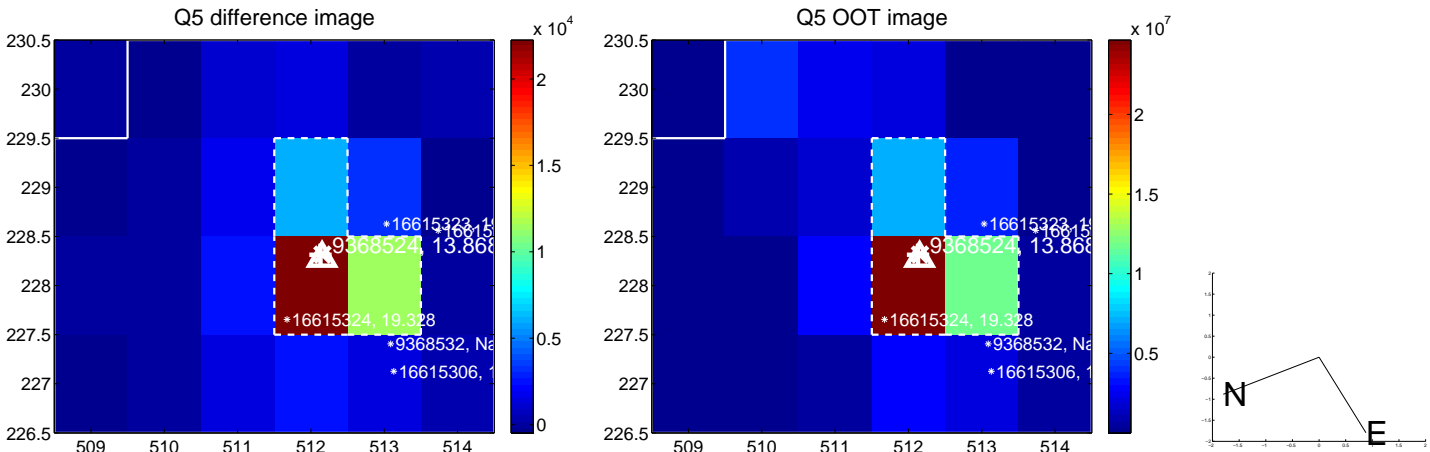


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

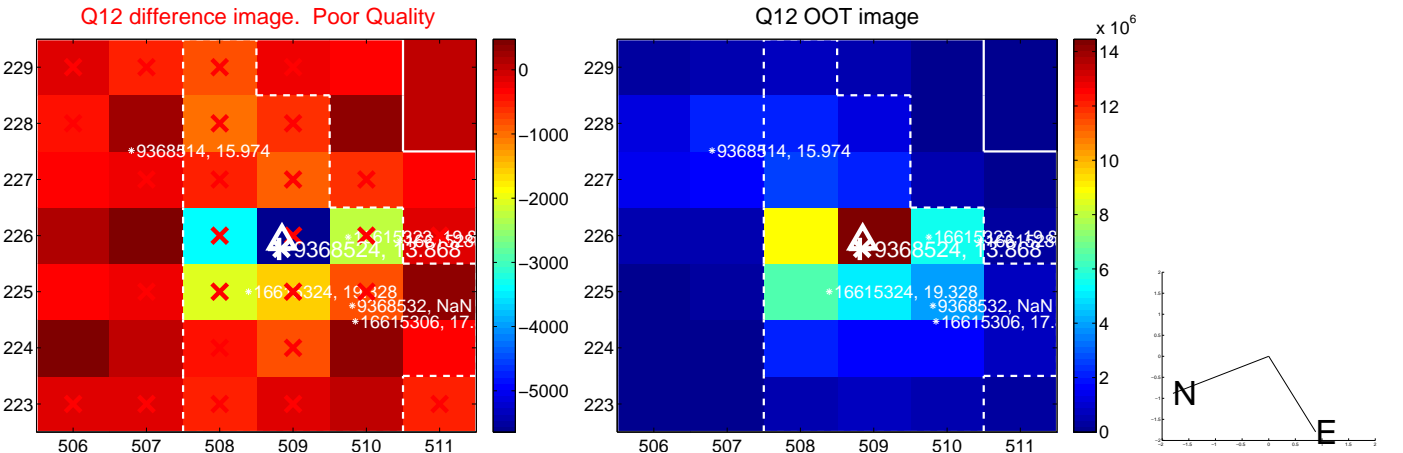
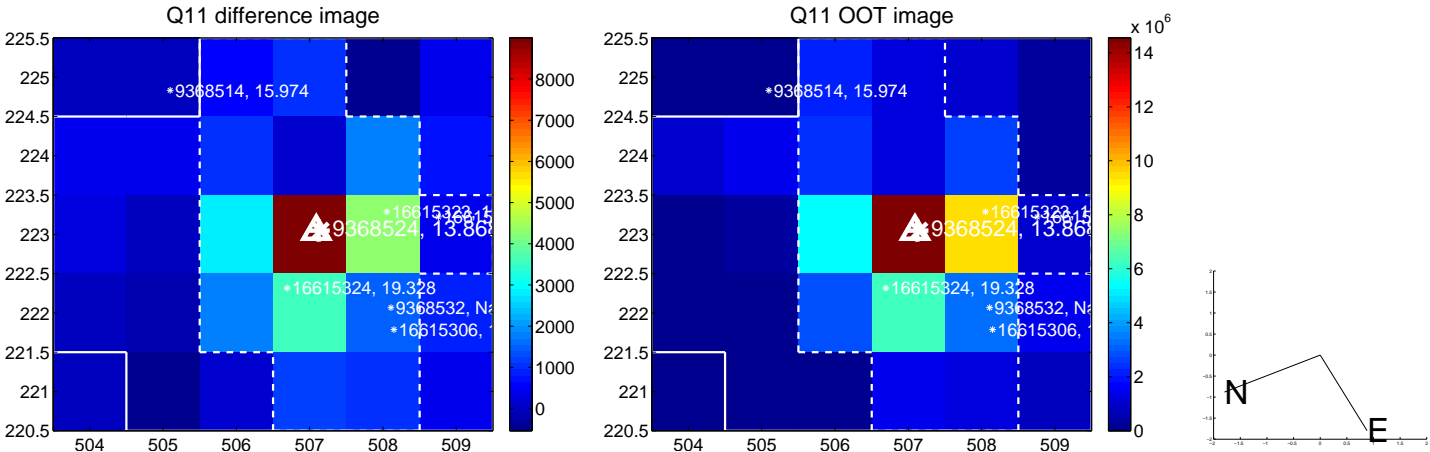
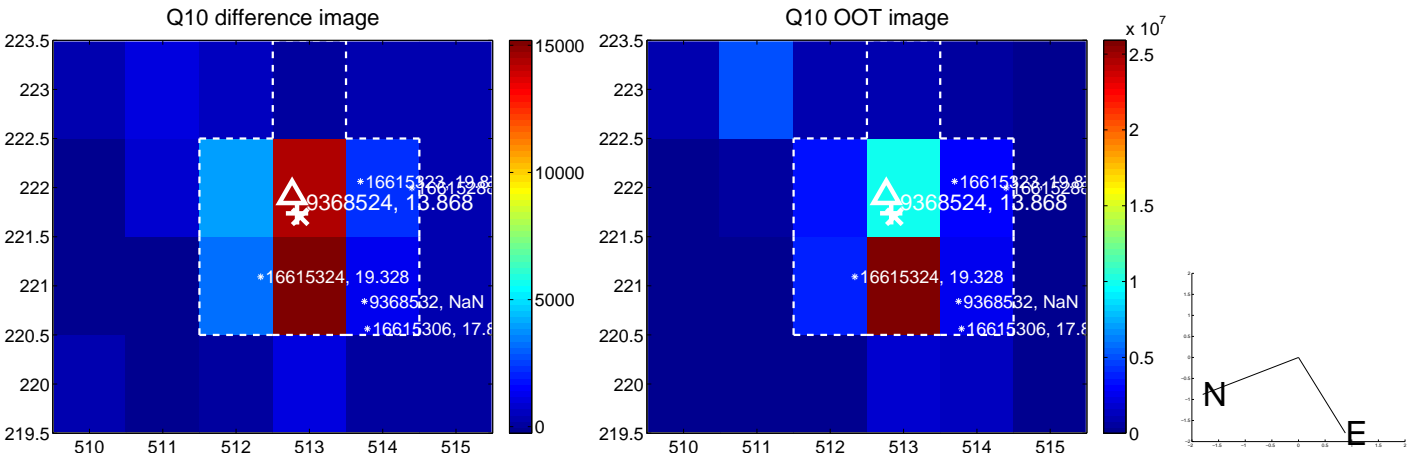
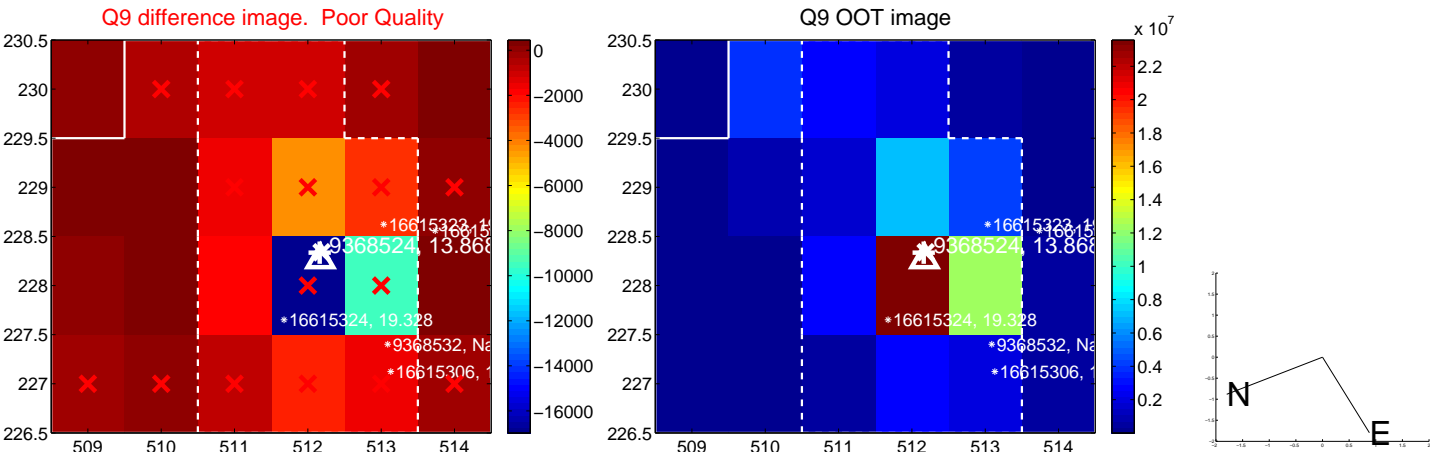
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



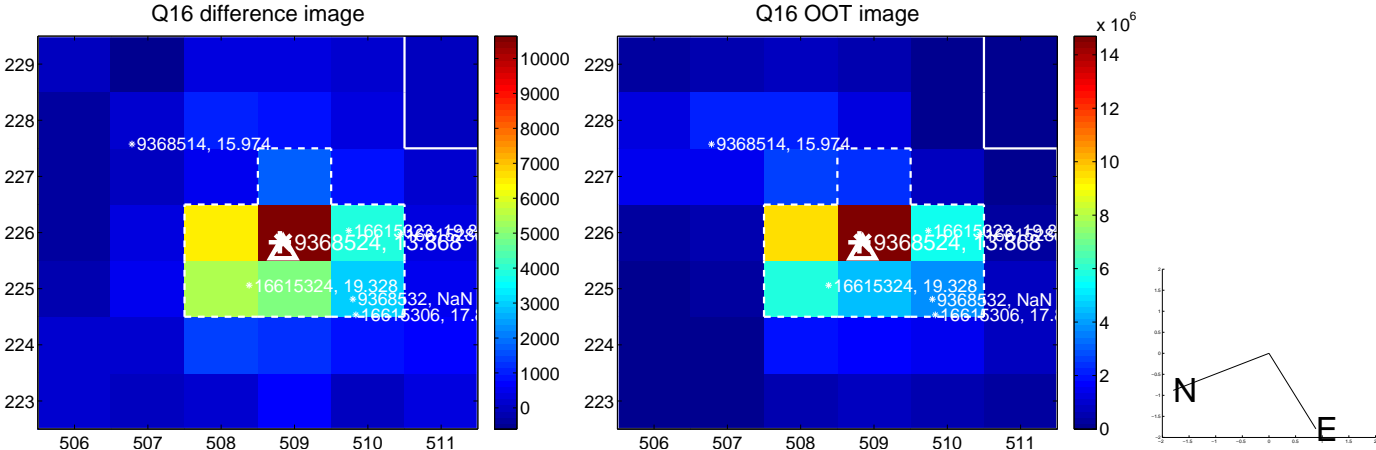
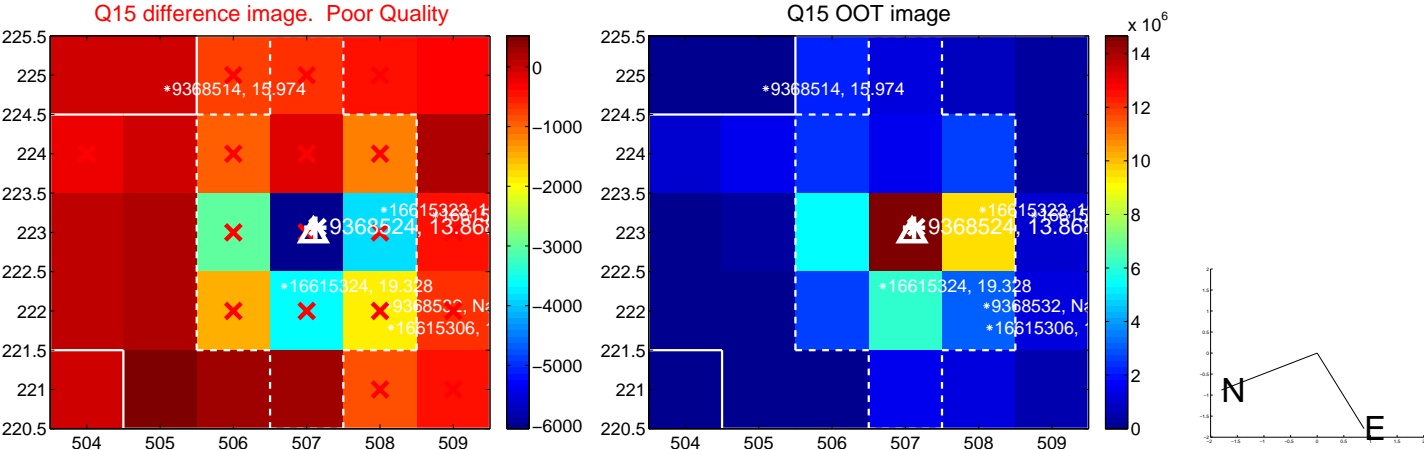
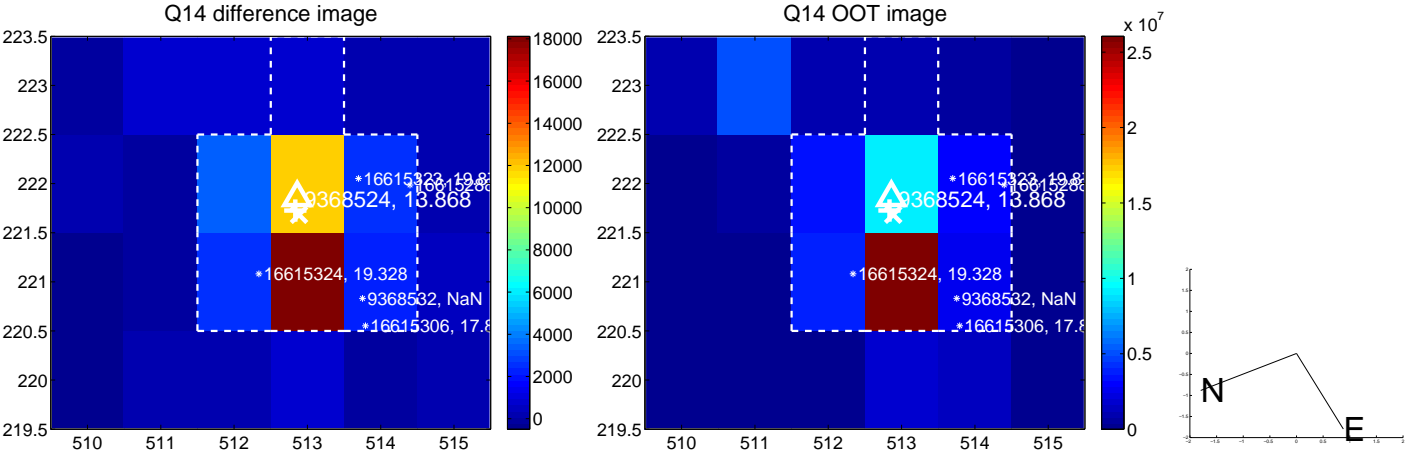
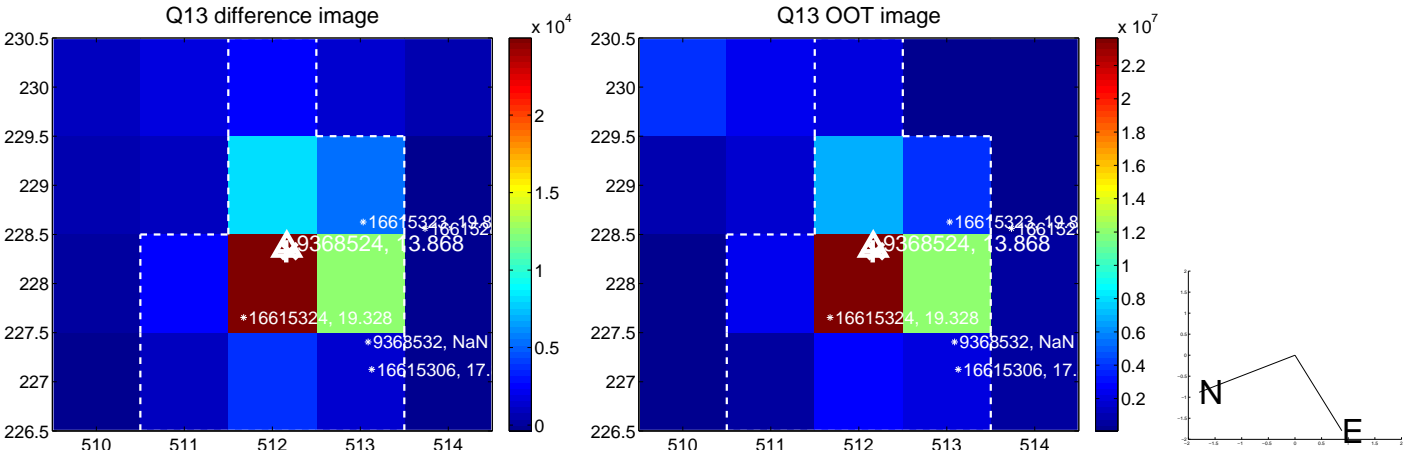
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



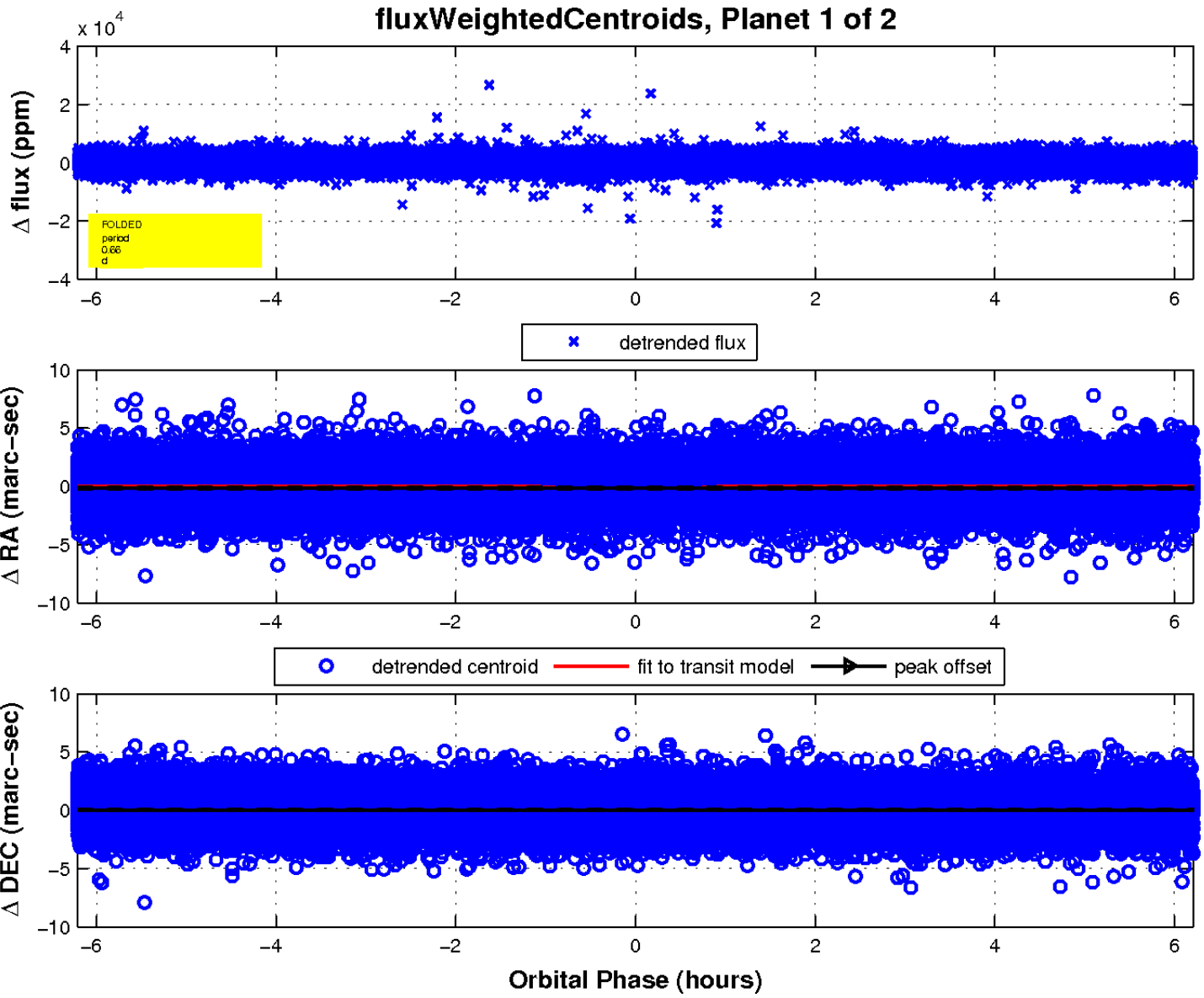
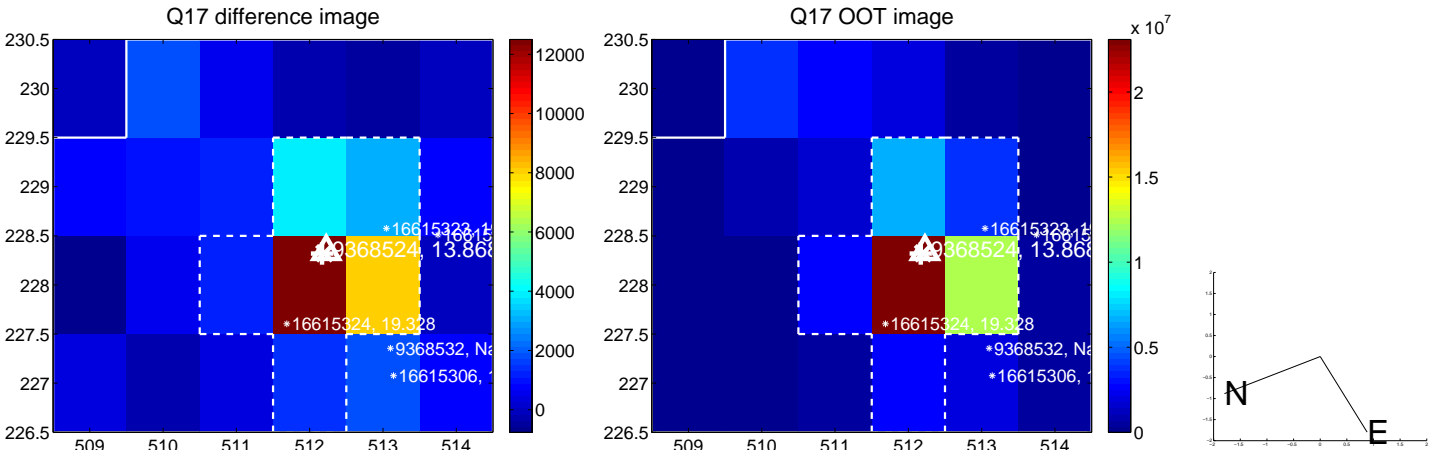
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

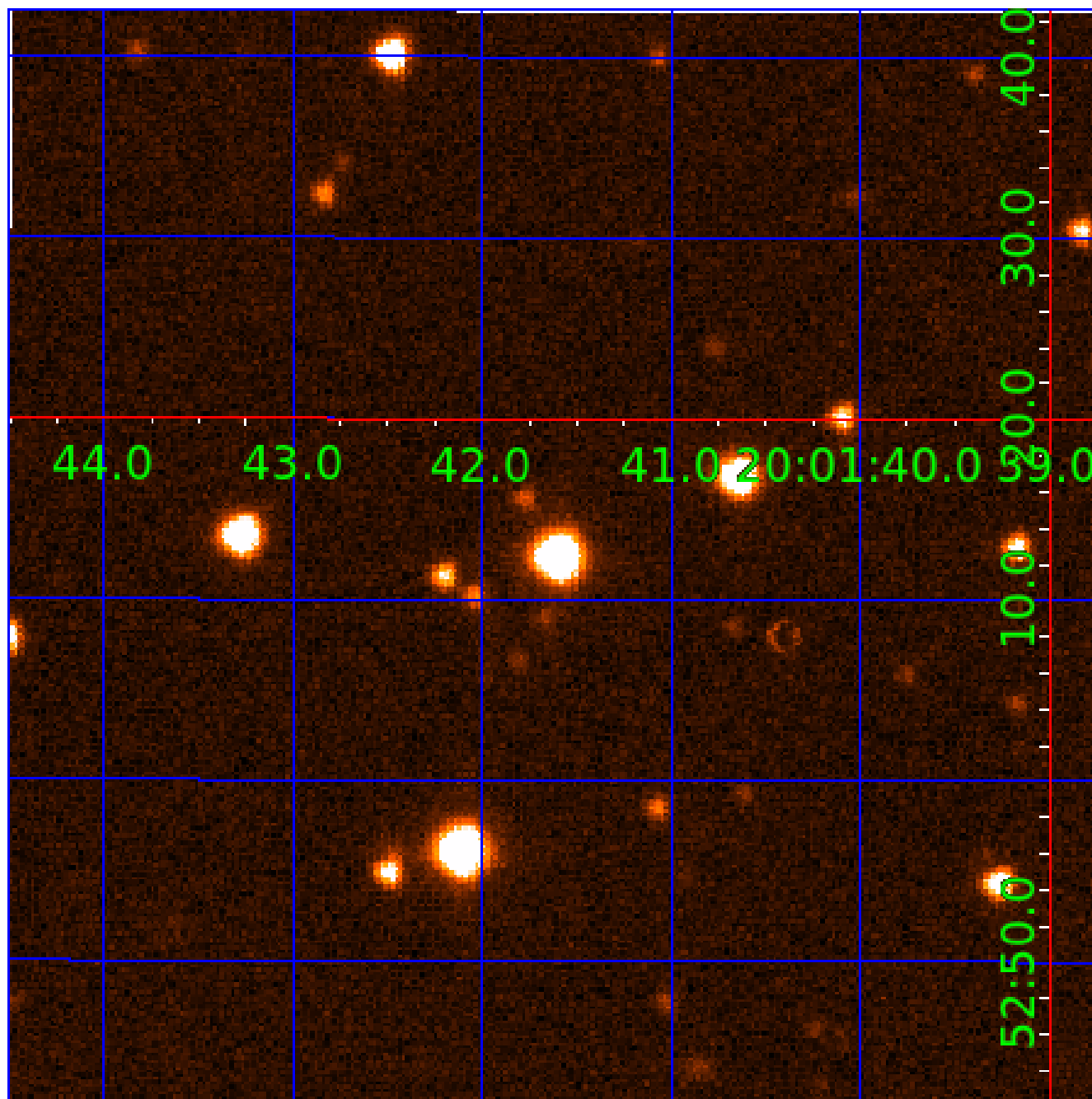


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009368524

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})
009368524-01	OBS	No	0.664695	131.747053	155.9	2.071	11.9	8.0	2.34	6065	3.43	27124.35
009368524-02	OBS	No	0.916989	132.011405	195.9	3.442	8.6	8.3	2.34	6065	3.83	17661.90

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009368524-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009368524-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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.

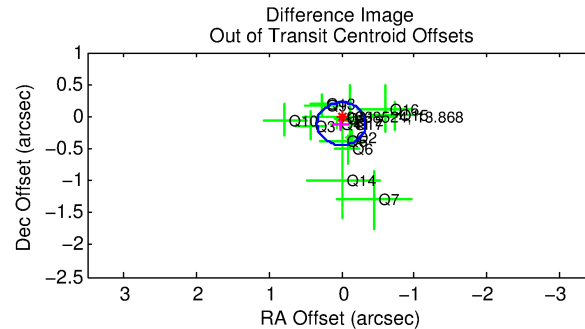
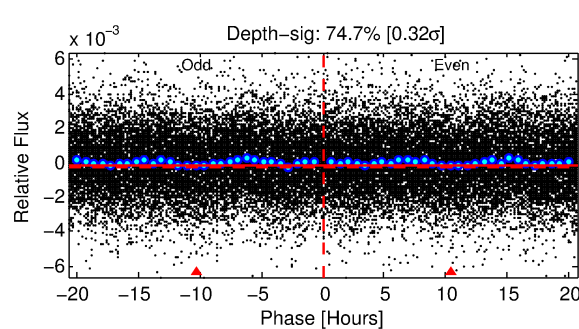
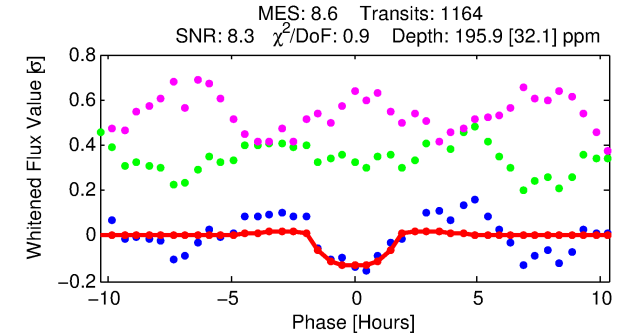
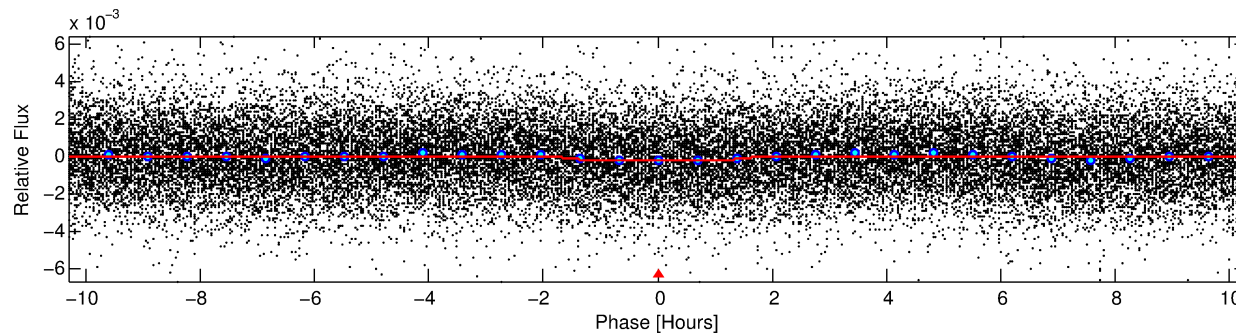
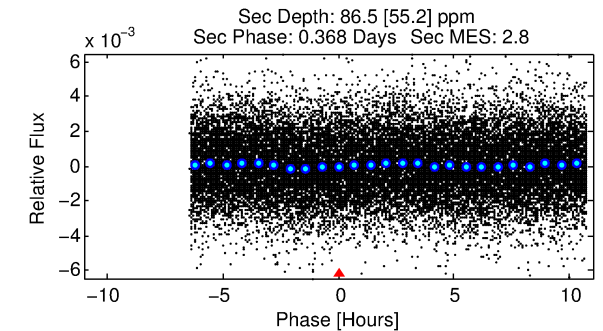
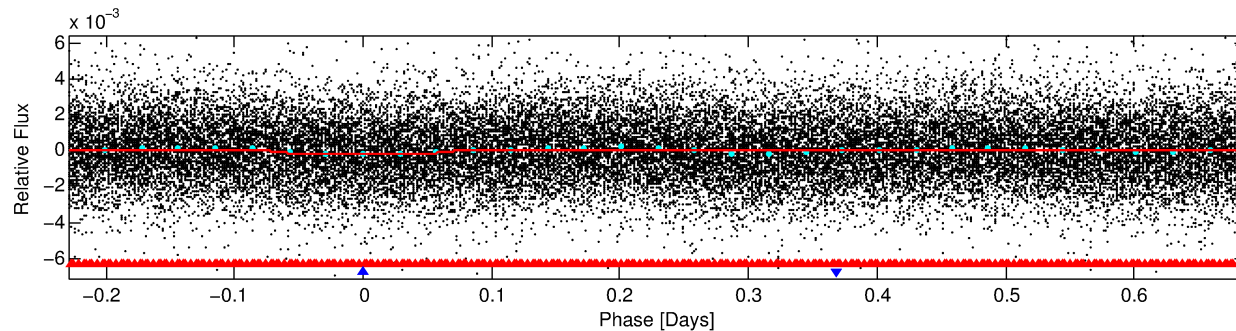
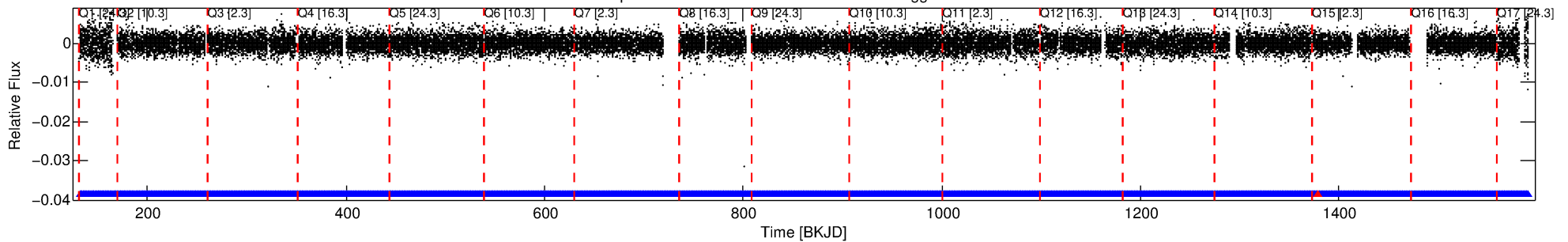
Ephemeris Match Information For 009368524-02

No Significant Match Found

DV One-Page Summary

KIC: 9368524 Candidate: 2 of 2 Period: 0.917 d
KOI: K05661 Corr: No Ephemeris Match

Kp: 13.87 R*: 2.34 Rs Teff: 6065.0 K Logg: 3.76 Fe/H: -0.460



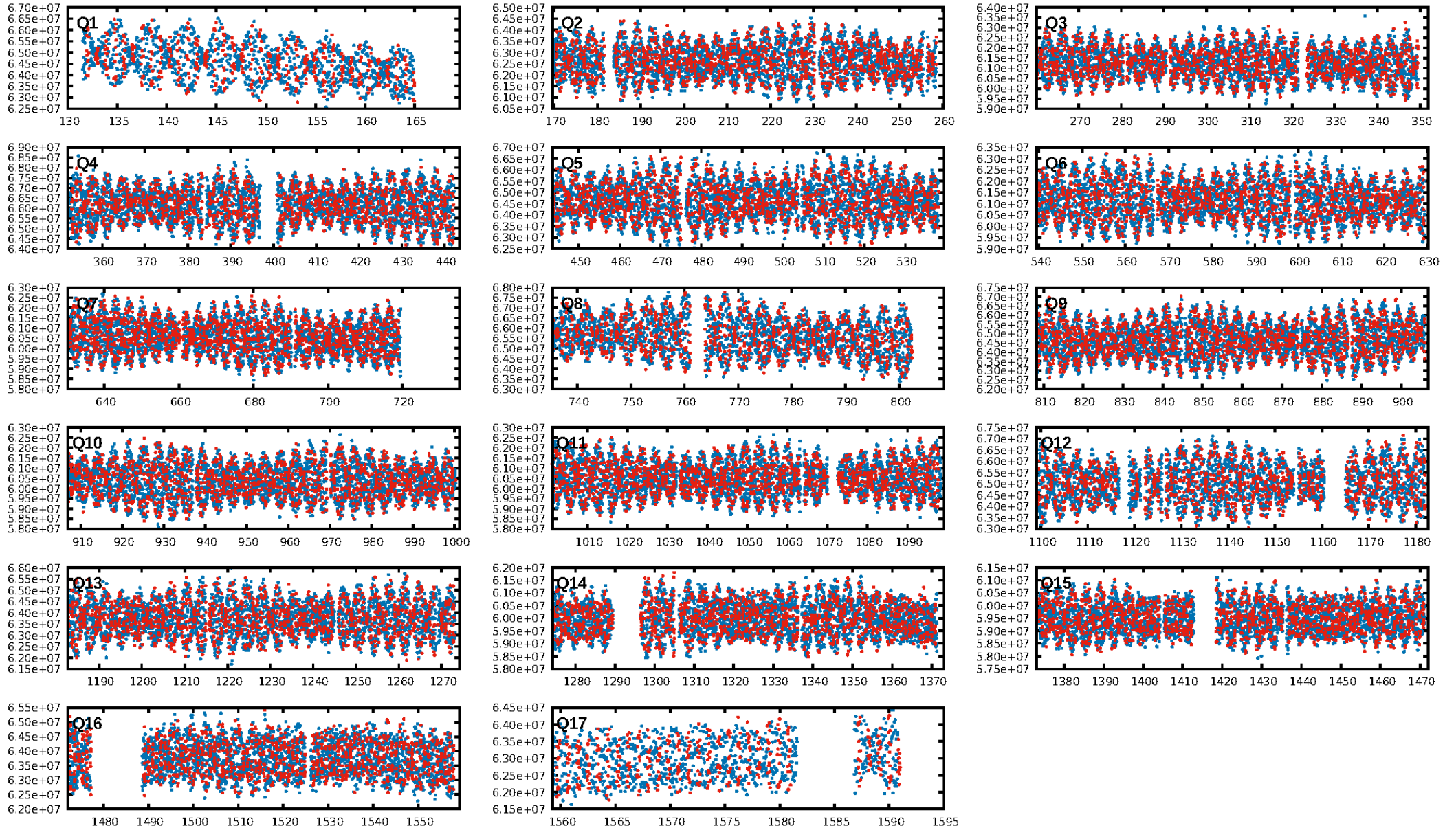
DV Fit Results:

Period = 0.91699 [0.00001] d
Epoch = 132.0114 [0.0052] BKJD
Rp/R* = 0.0150 [0.0088]
a/R* = 1.35 [1.94]
b = 0.89 [0.72]
Seff = 17661.90 [18867.35]
Teq = 2940 [785] K
Rp = 3.83 [3.10] Re
a = 0.0194 [0.0120] AU
Ag = 1.22 [2.08] [0.11σ]
Teffp = 4778 [1604] K [1.03σ]

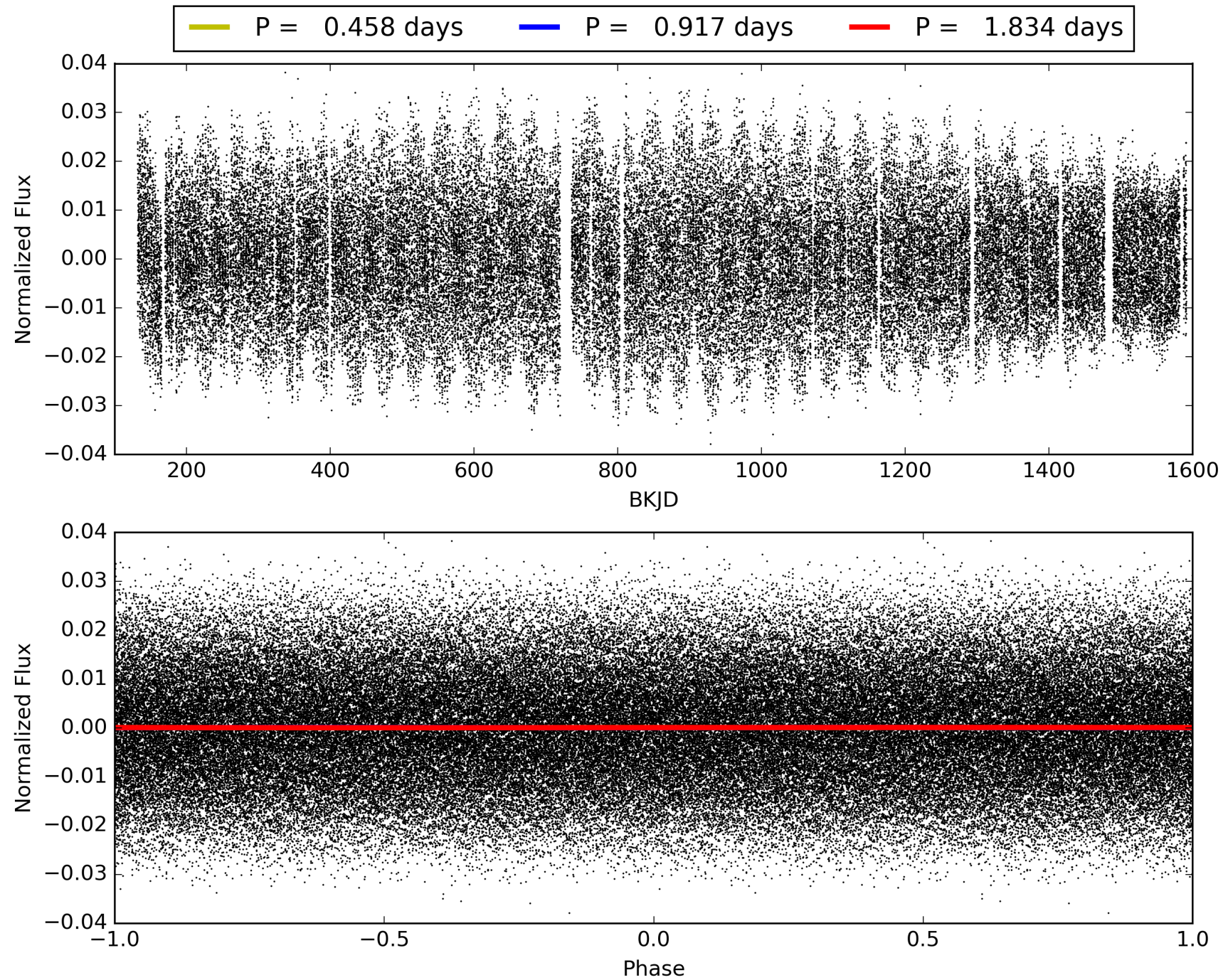
DV Diagnostic Results:

ShortPeriod-sig: 86.8% [1.51σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 9.70e-12
RollingBand-fgt: 1.00 [1110/1111]
GhostDiagnostic-chr: 1.717
Centroid-sig: 3.3%
Centroid-so: 0.261 arcsec [1.13σ]
OotOffset-rm: 0.113 arcsec [1.02σ]
KicOffset-rm: 0.073 arcsec [0.70σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.82 [14/17]
DiffImageOverlap-fno: 0.00 [0/17]

TCE 009368524-02, PDC Light Curves

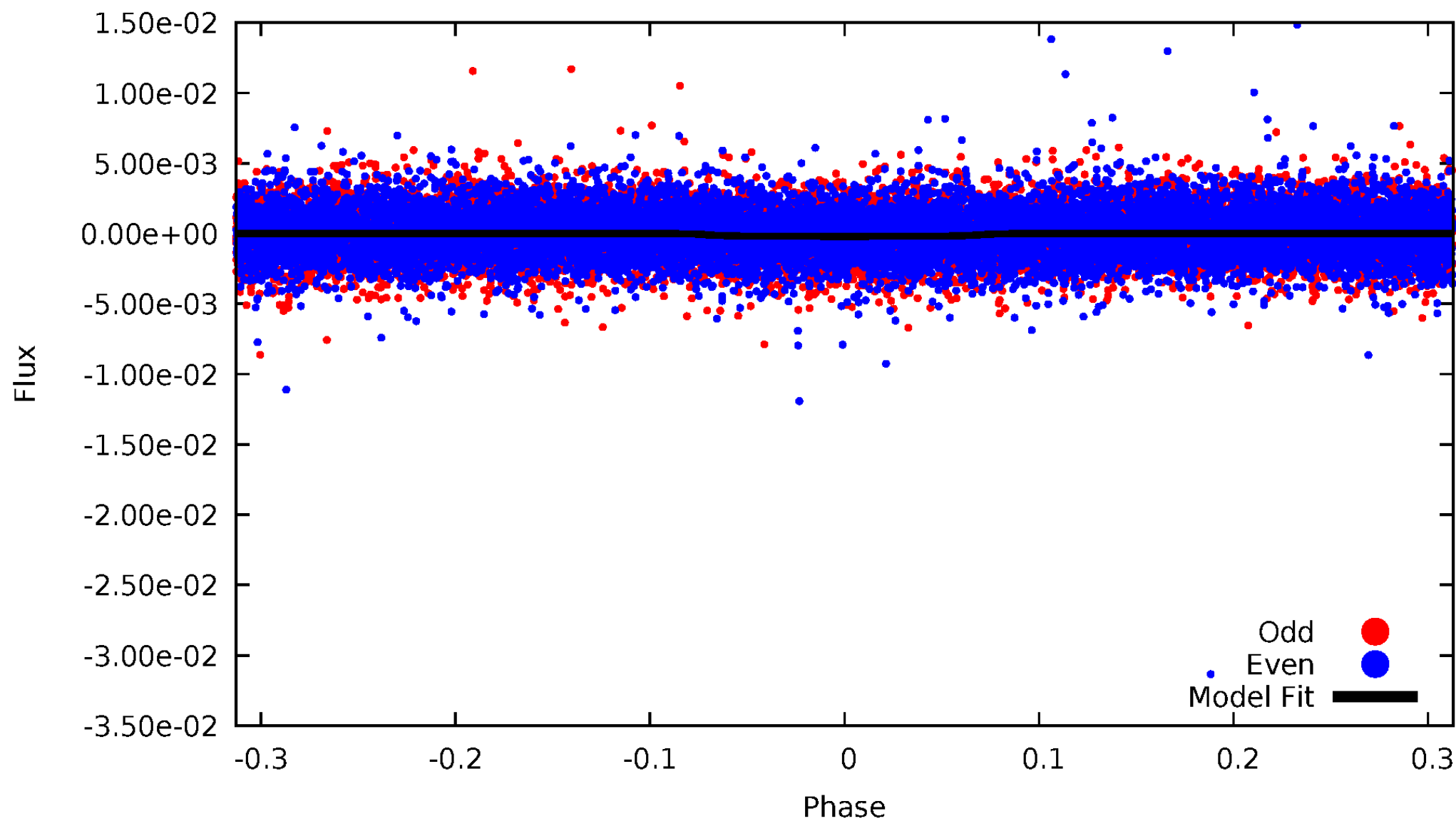


TCE 009368524-02



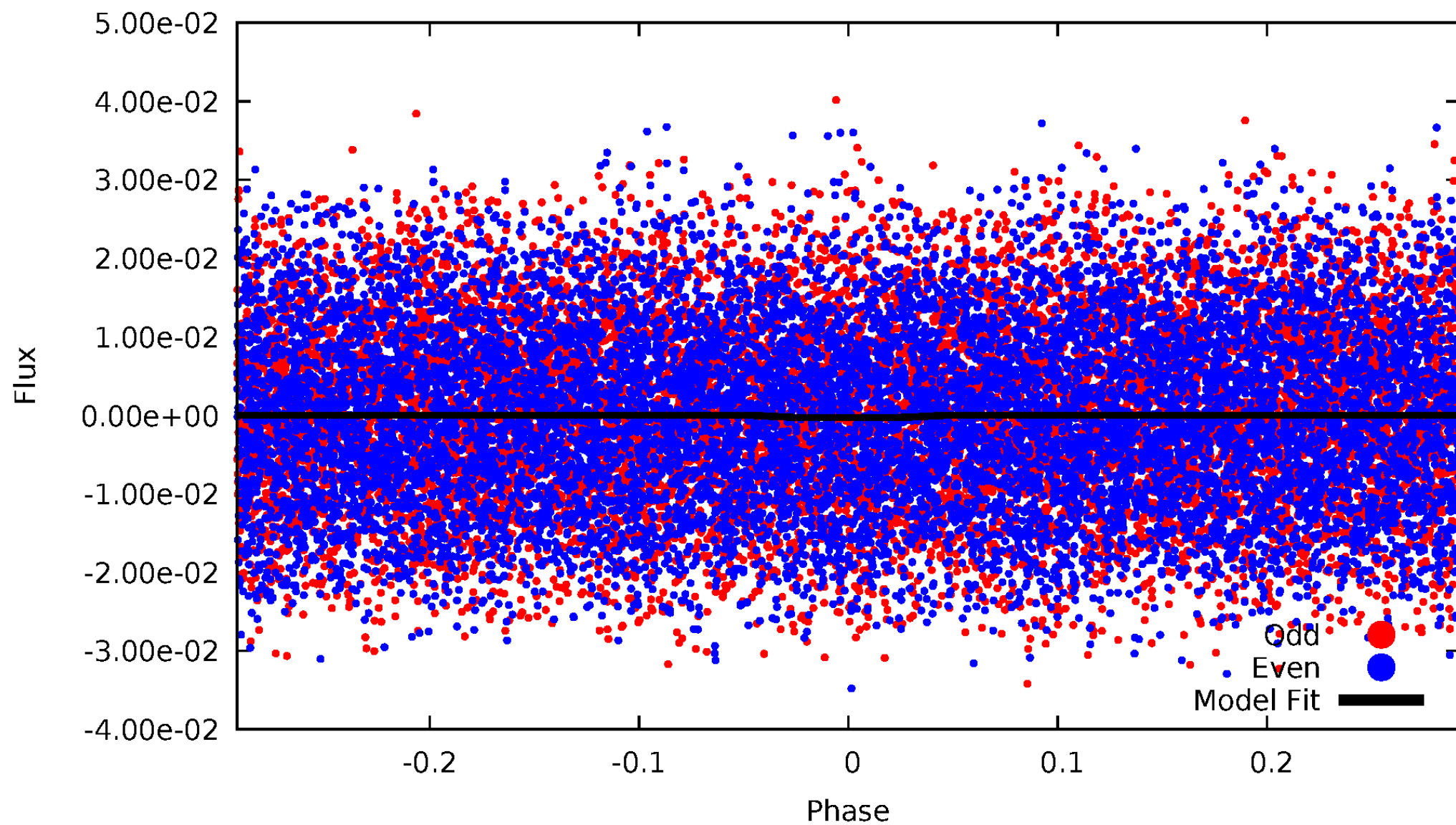
DV Odd/Even

TCE 009368524-02



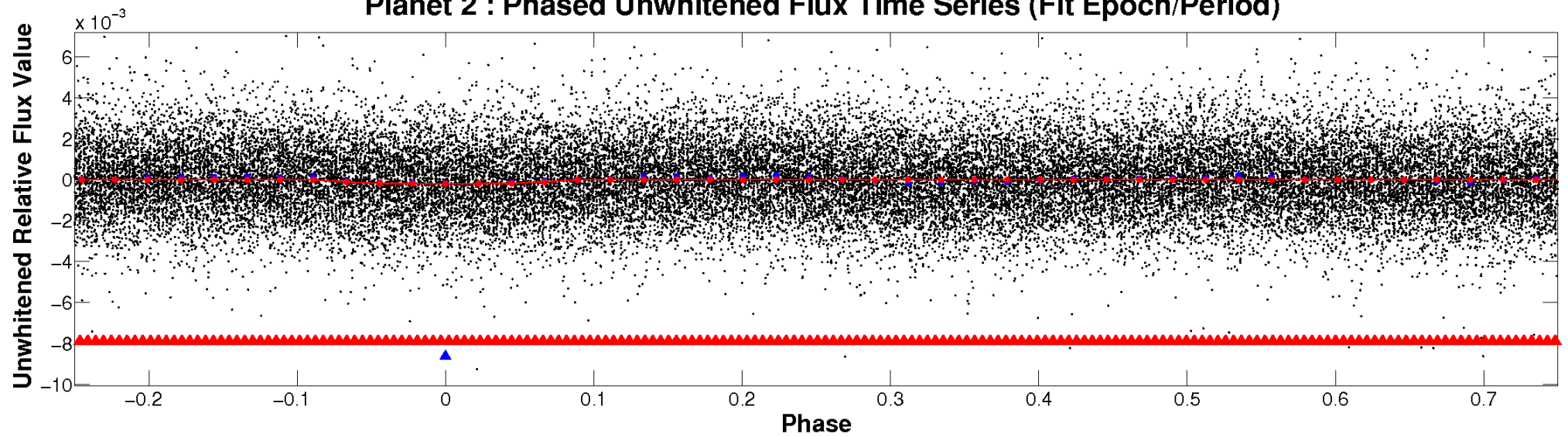
ALT Odd/Even

TCE 009368524-02

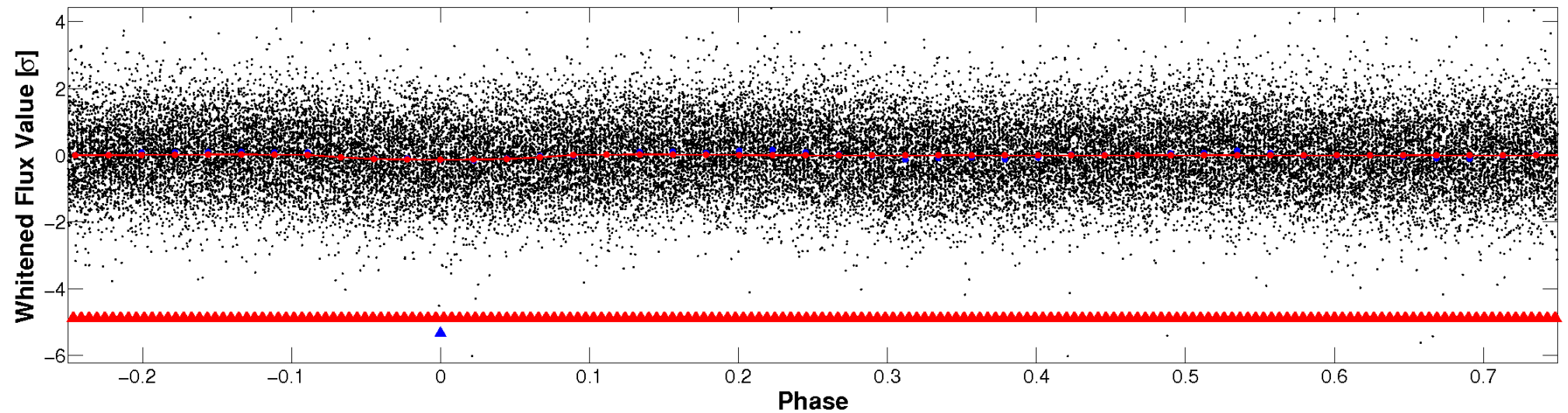


Non-Whitened Vs. Whitened Light Curve

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

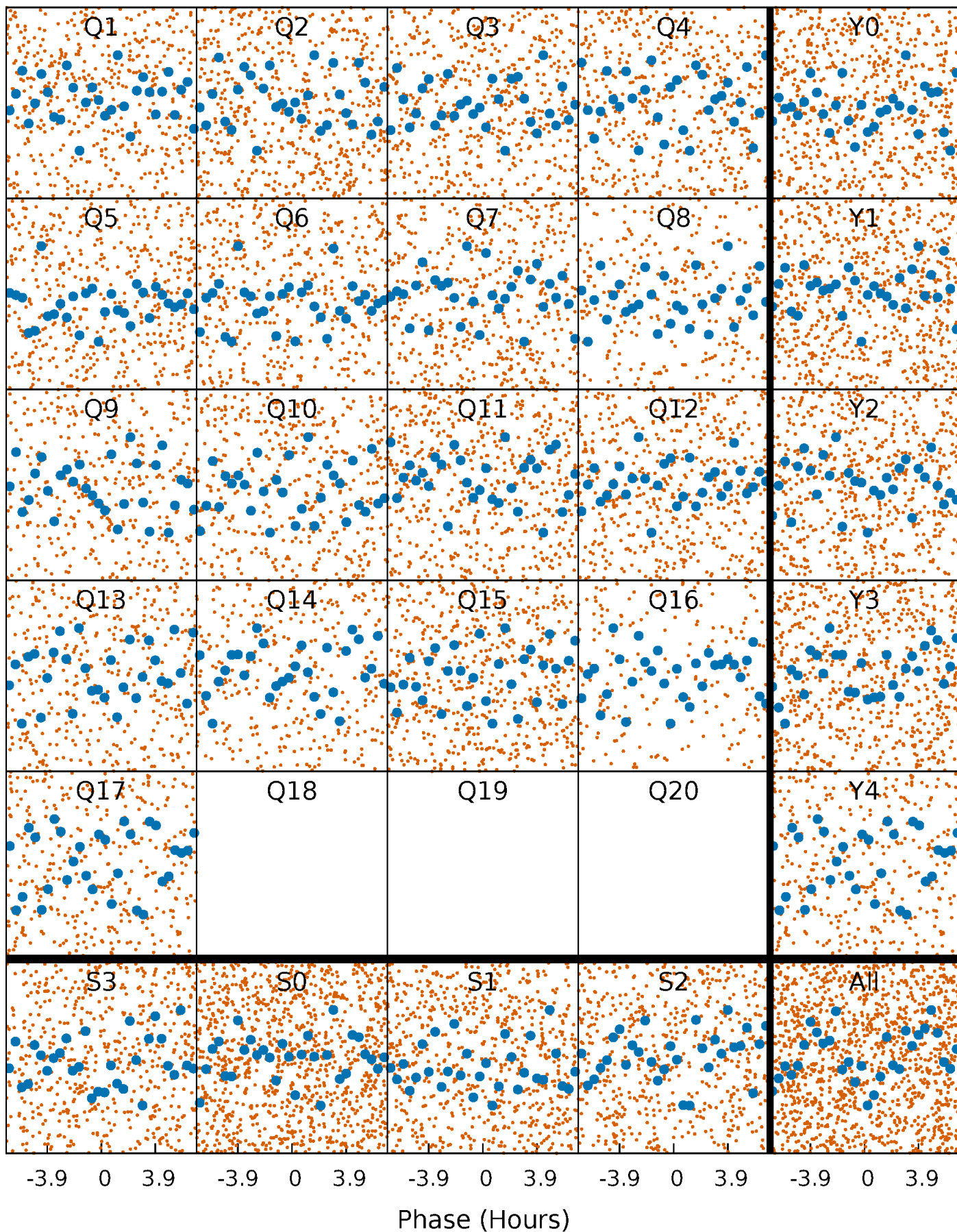


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



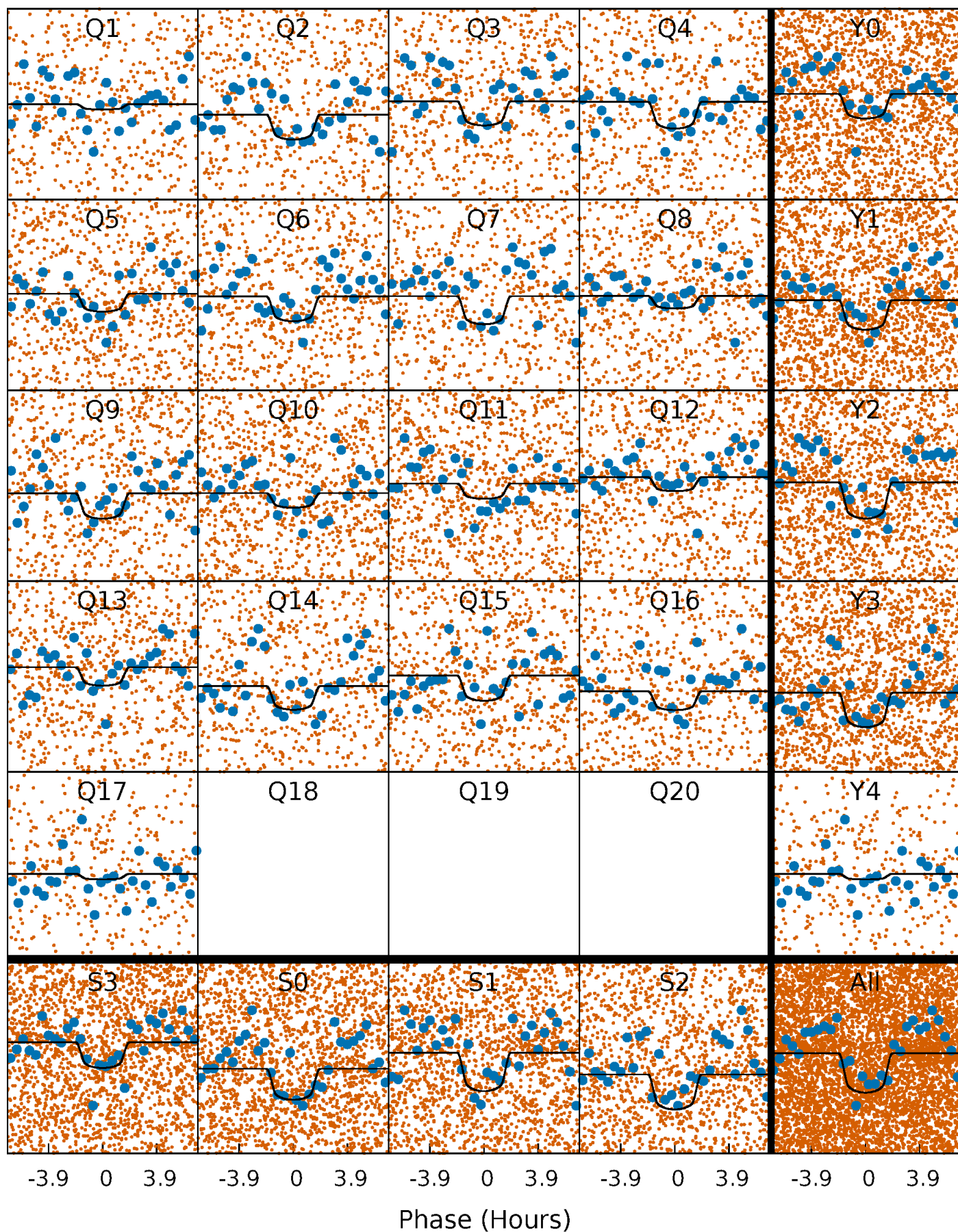
PDC Quarter-Phased Transit Curves

TCE 009368524-02 P= 0.916989 Days $T_0=132.011405$ (BKJD)



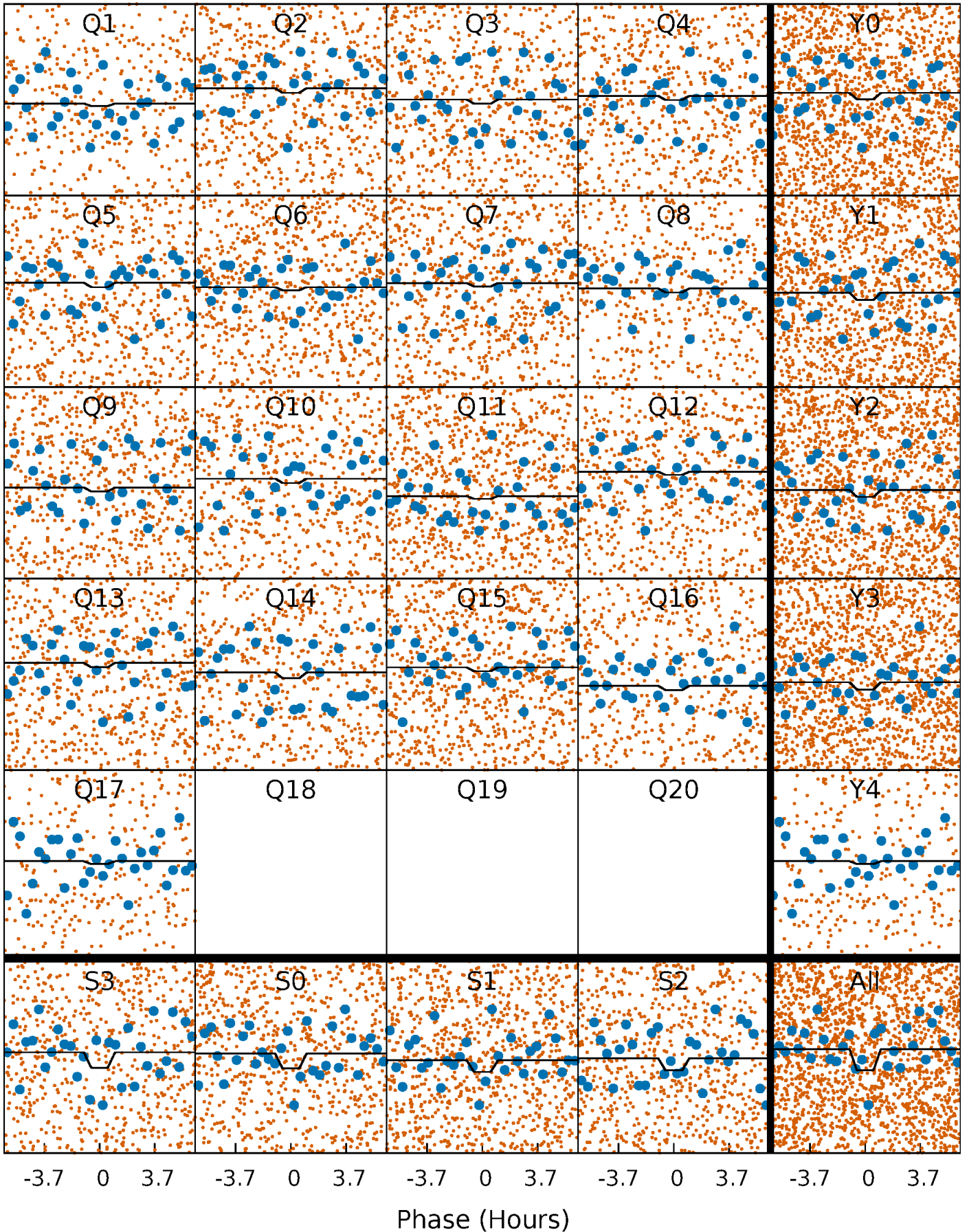
DV Quarter-Phased Transit Curves

TCE 009368524-02 P= 0.916989 Days $T_0=132.011405$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

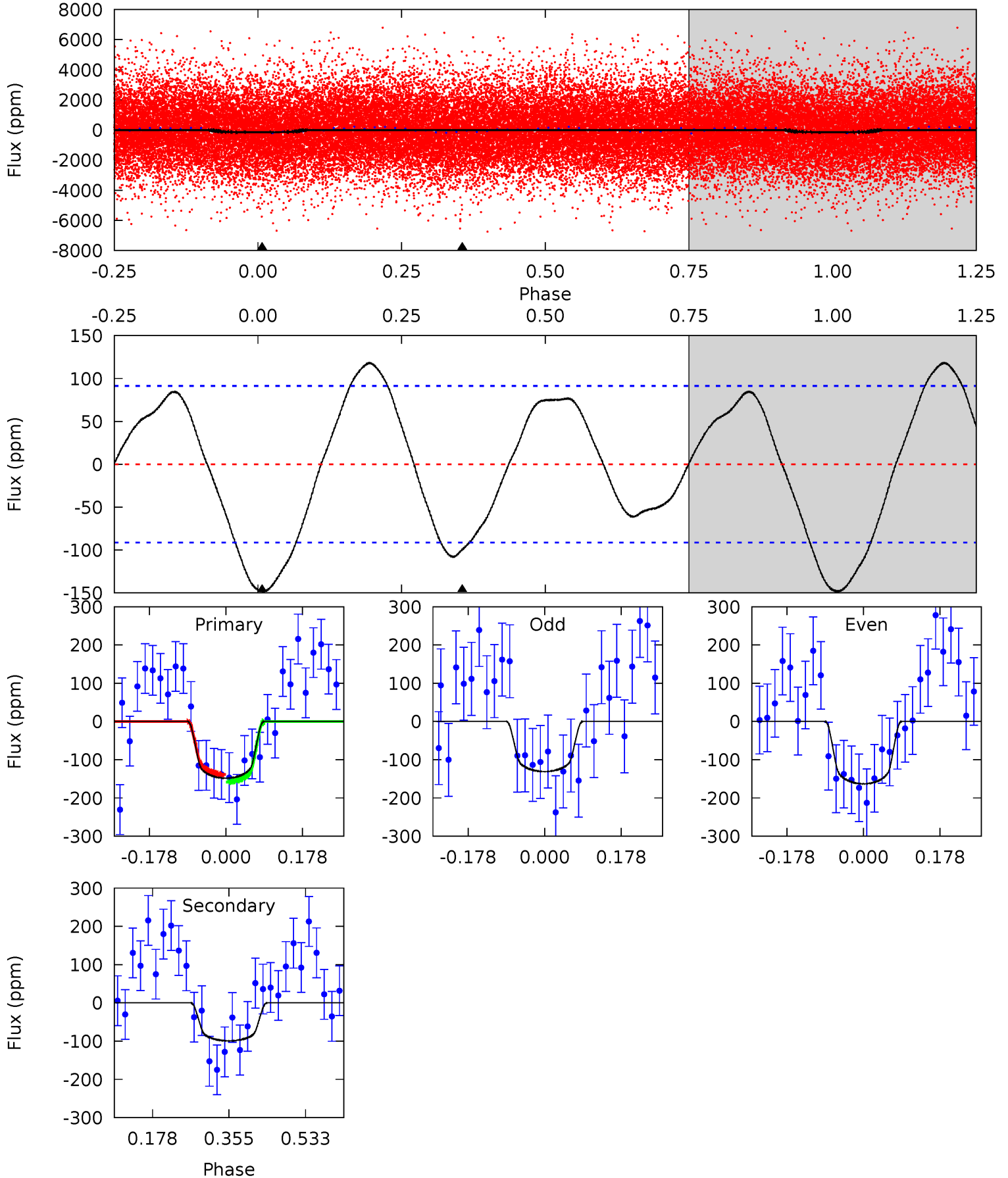
TCE 009368524-02 P= 0.917011 Days $T_0=132.000271$ (BKJD)



DV Model-Shift Uniqueness Test

009368524-02, P = 0.916989 Days, E = 131.094416 Days

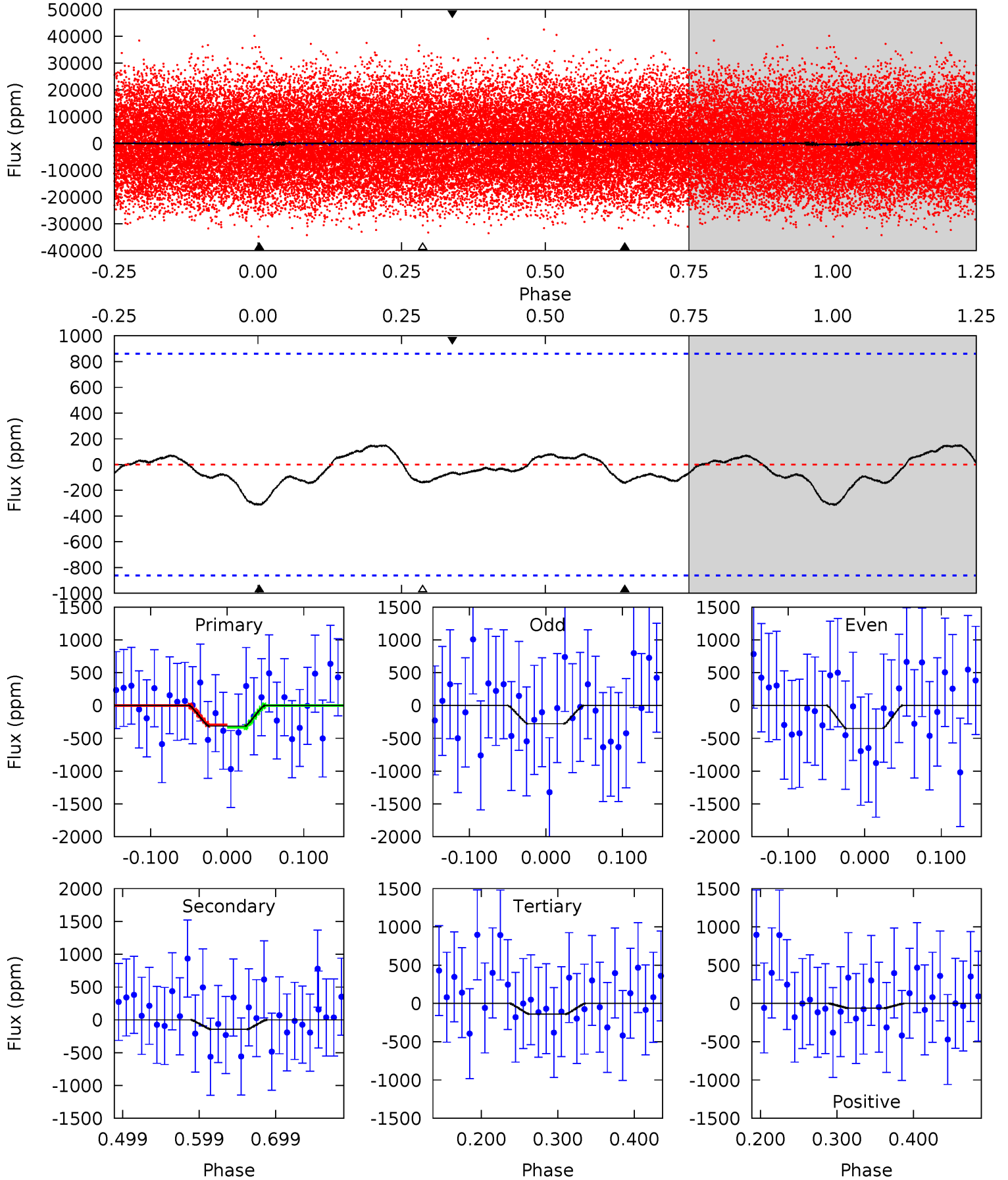
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.23	4.83	0	0	4.44	1.35	2.28	7.23	7.23	4.83	4.83	0.79	1.01	0.44	0.49



Alt Model-Shift Uniqueness Test

009368524-02, P = 0.917011 Days, E = 131.083260 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.66	0.76	0.74	-0.32	4.57	1.65	0.39	0.92	1.98	0.02	1.08	0.20	0.97	0.32	0.10



Stellar Parameters For KIC 009368524

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6065^{+218}_{-200}	$3.763^{+0.646}_{-0.152}$	$-0.460^{+0.300}_{-0.250}$	$2.344^{+0.558}_{-1.302}$	$1.162^{+0.167}_{-0.286}$	$0.127^{+1.150}_{-0.051}$
	+4%/-3%	+17%/-4%	+65%/-54%	+24%/-56%	+14%/-25%	+906%/-40%
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 009368524-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-99 ± 21	$3.47^{+2.62}_{-1.99}$	3982^{+386}_{-594}	4687^{+2486}_{-1060}	$1.733^{+7.172}_{-1.186}$
Alt.	-143 ± 189	$3.62^{+2.74}_{-1.88}$	4004^{+387}_{-634}	4940^{+2497}_{-9278}	$1.840^{+9.007}_{-2.407}$

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 $A_{obs} \gg 1.0$

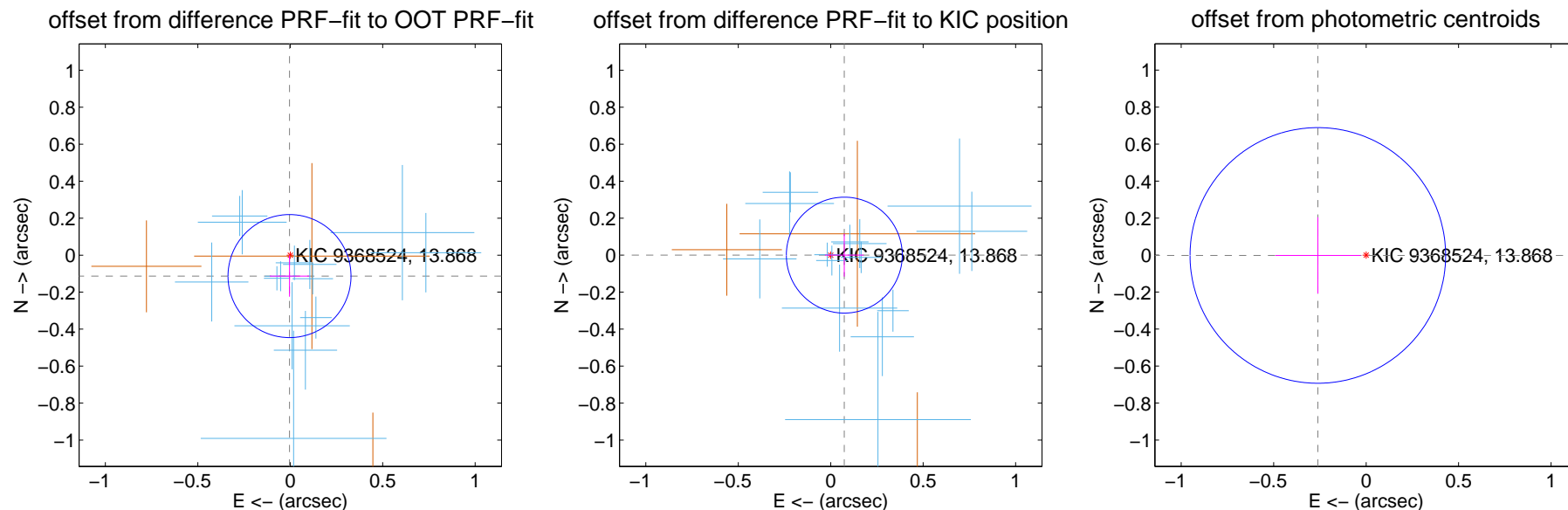
DV Centroid Data

Supplemental centroid analysis for 009368524-02. Kepler magnitude: 13.87. Transit SNR 8.27

There are 14 quarters with good PRF difference image offsets

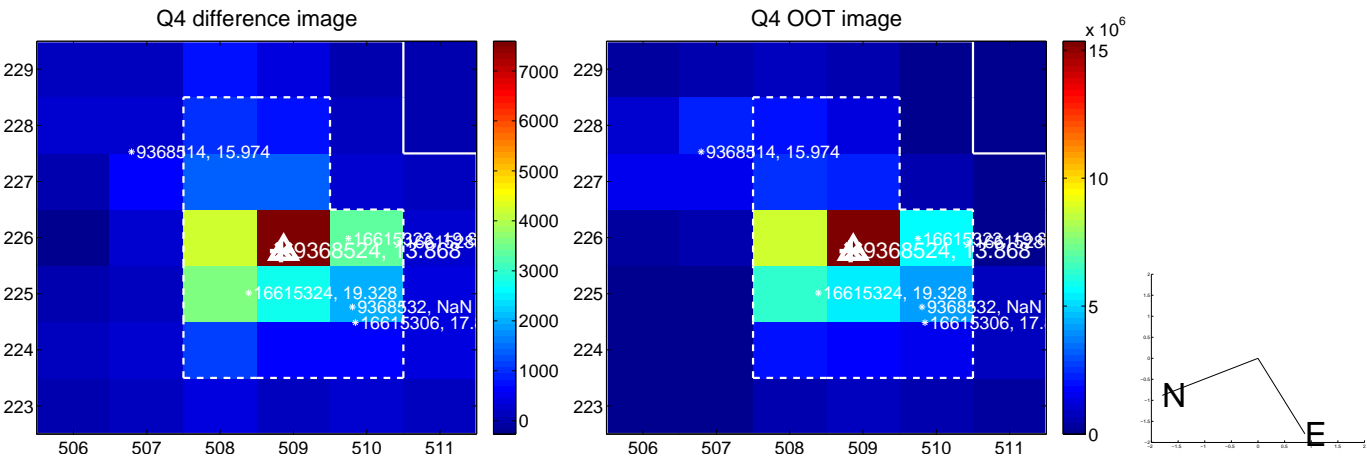
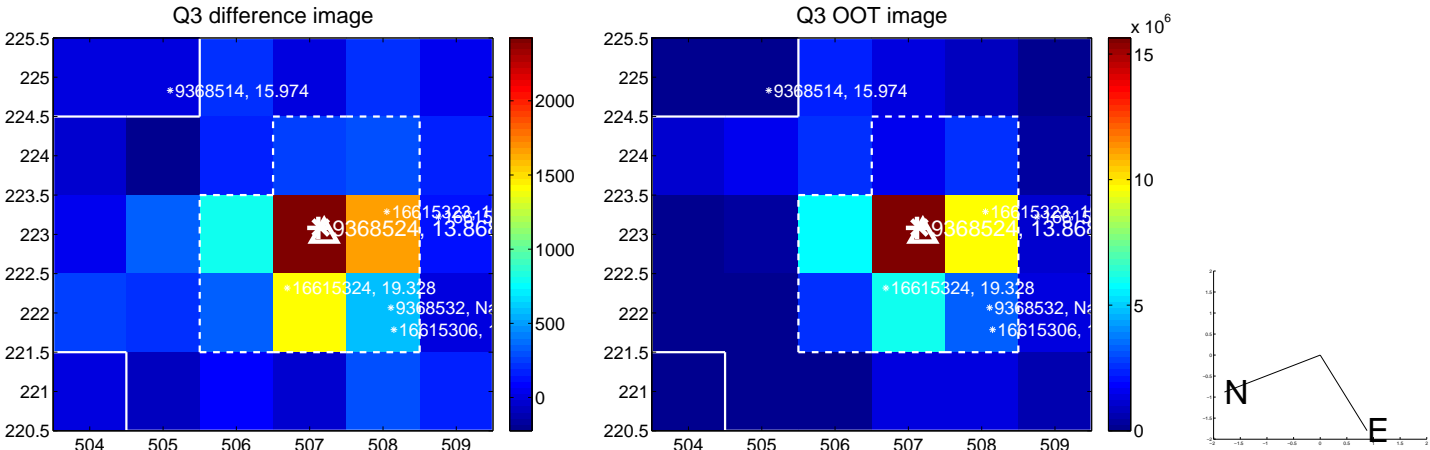
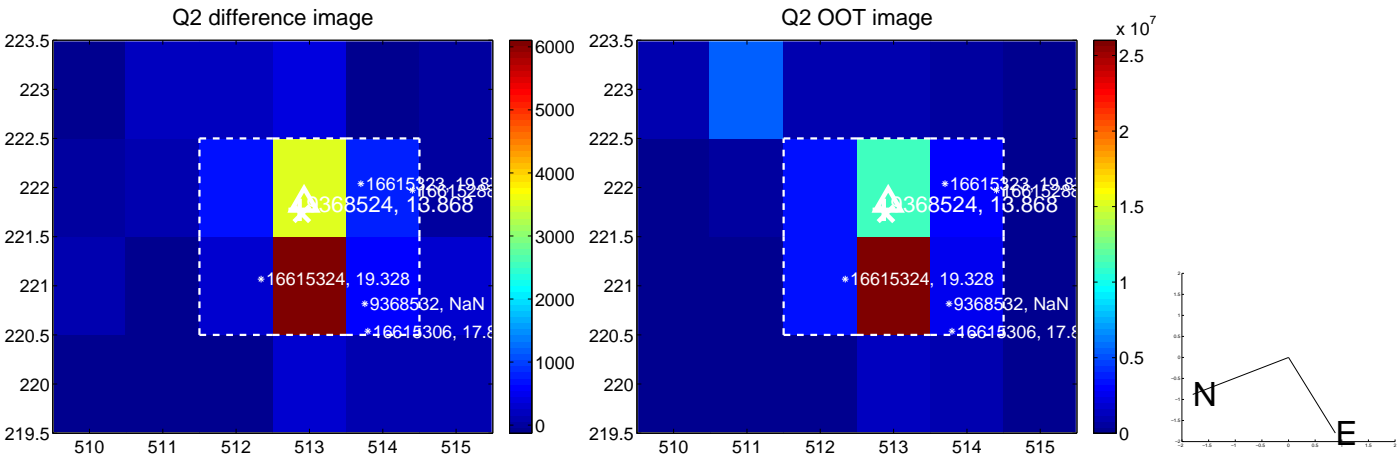
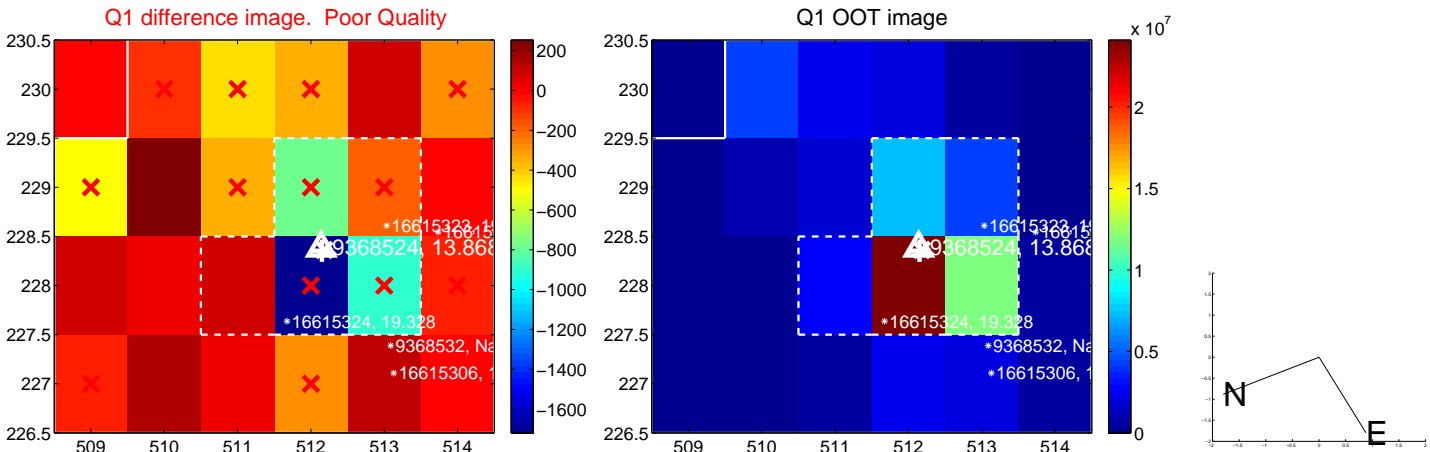
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.113 ± 0.111	1.02	0.004 ± 0.106	-0.113 ± 0.111
PRF-fit source offset from KIC position	0.073 ± 0.104	0.70	-0.073 ± 0.104	0.000 ± 0.116
photometric centroid source offset	0.26 ± 0.23	1.13	0.26 ± 0.23	-0.00 ± 0.21

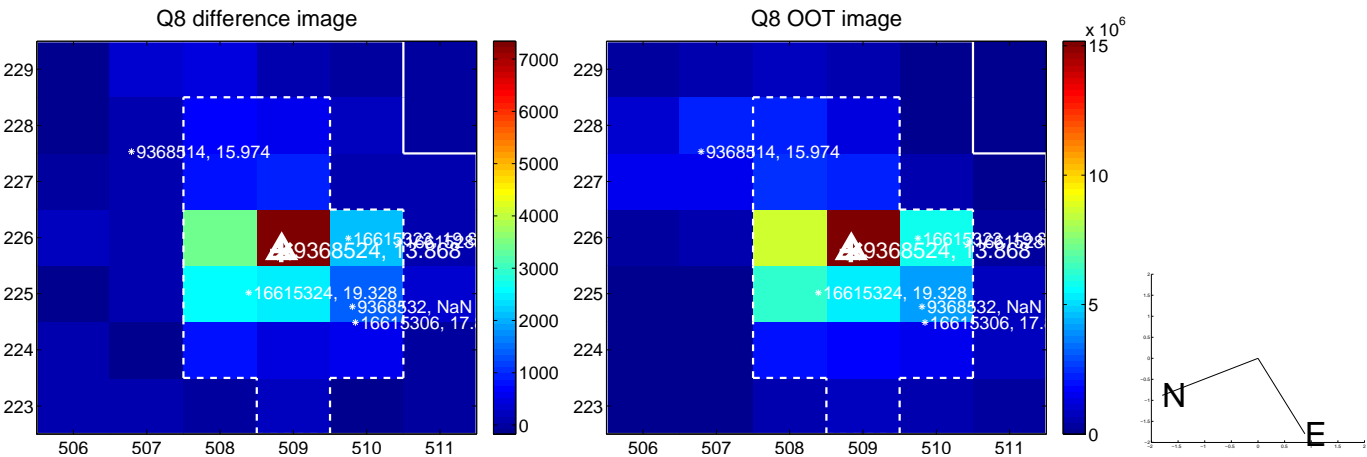
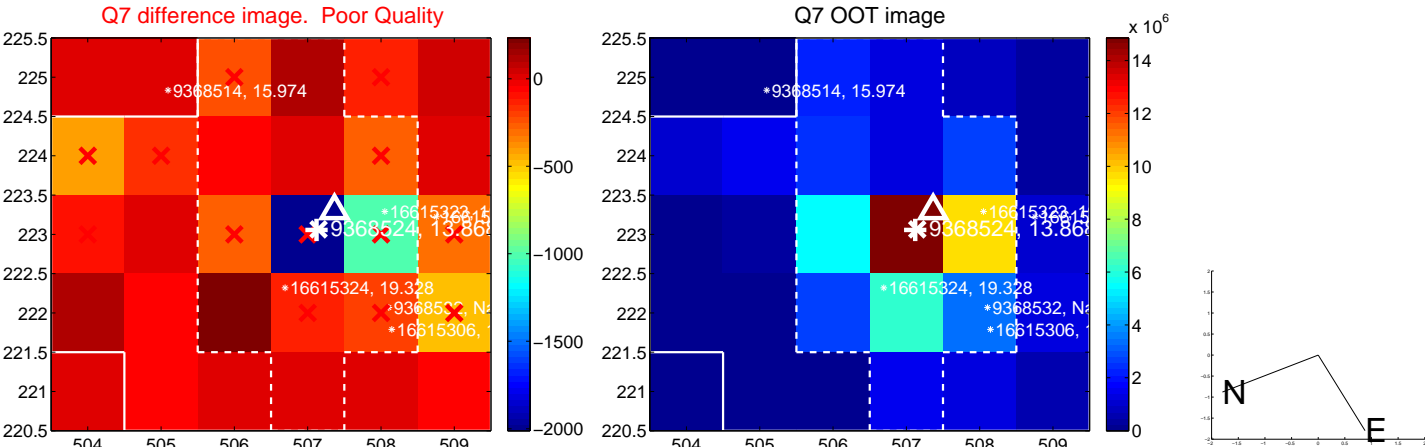
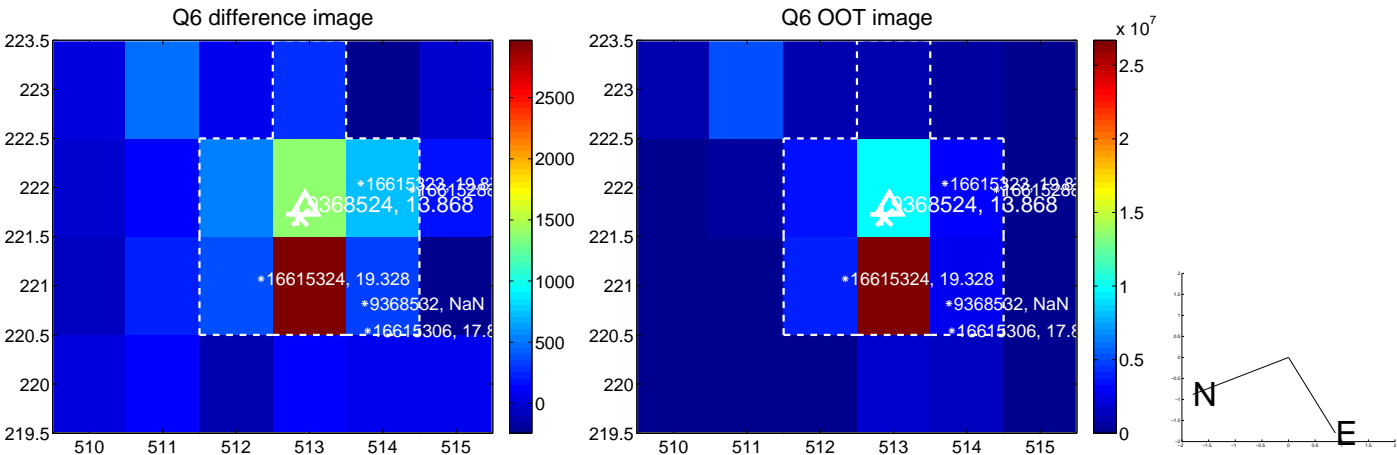
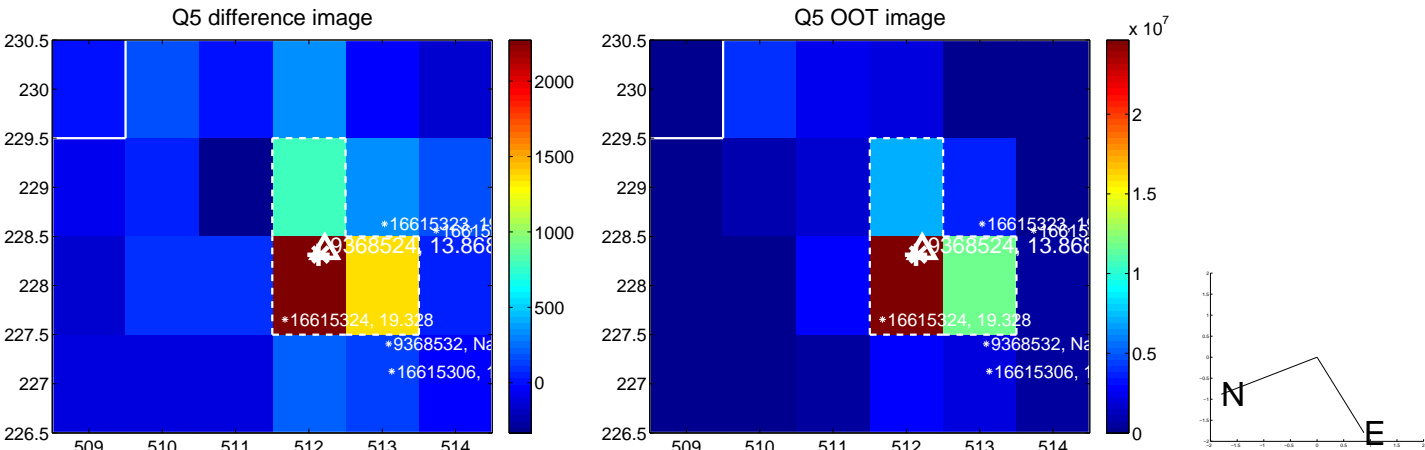


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

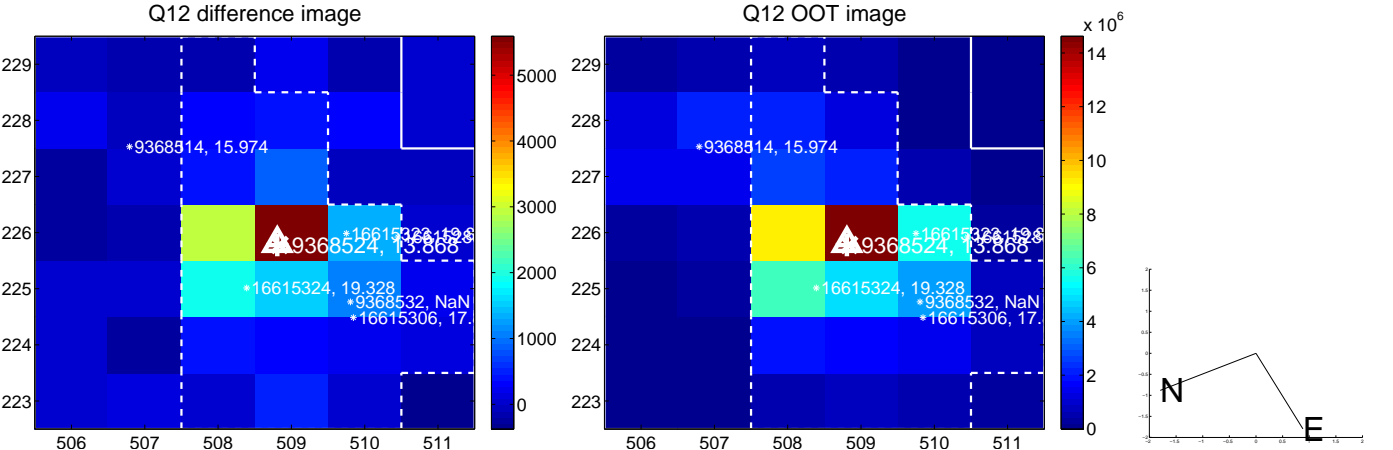
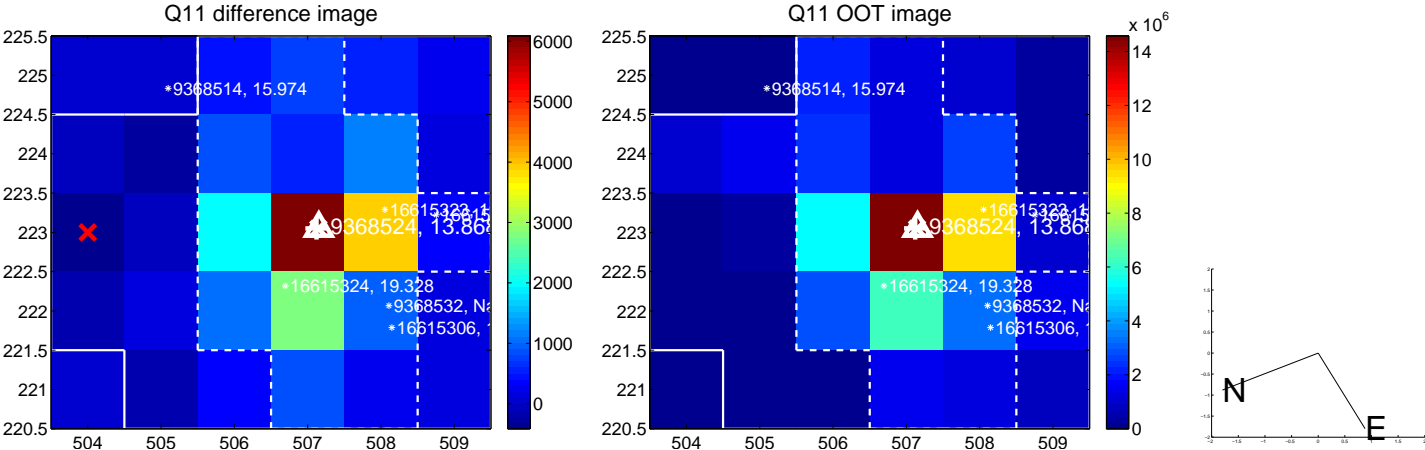
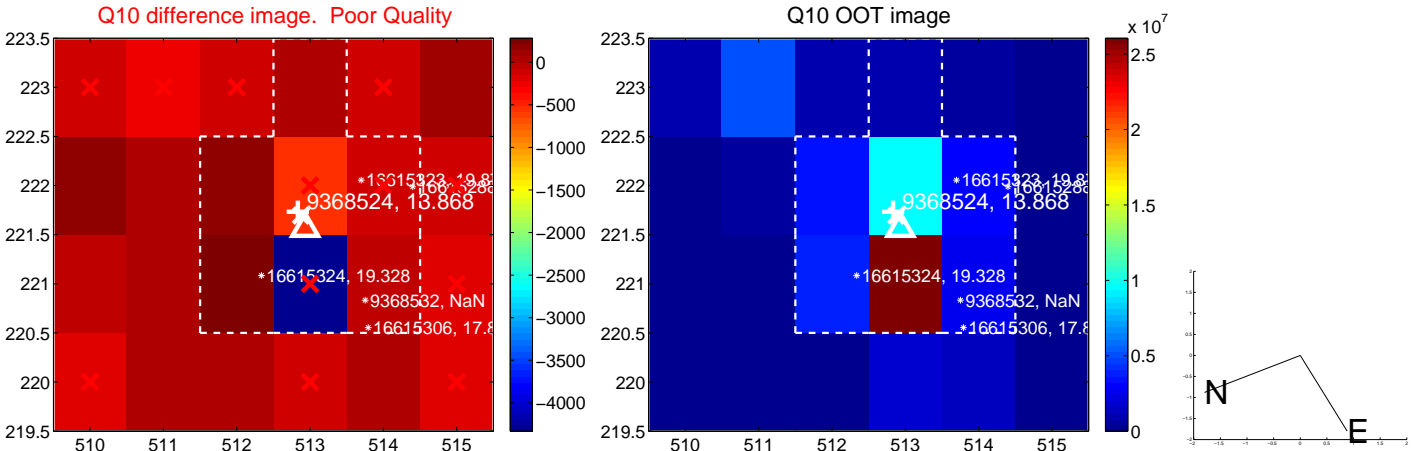
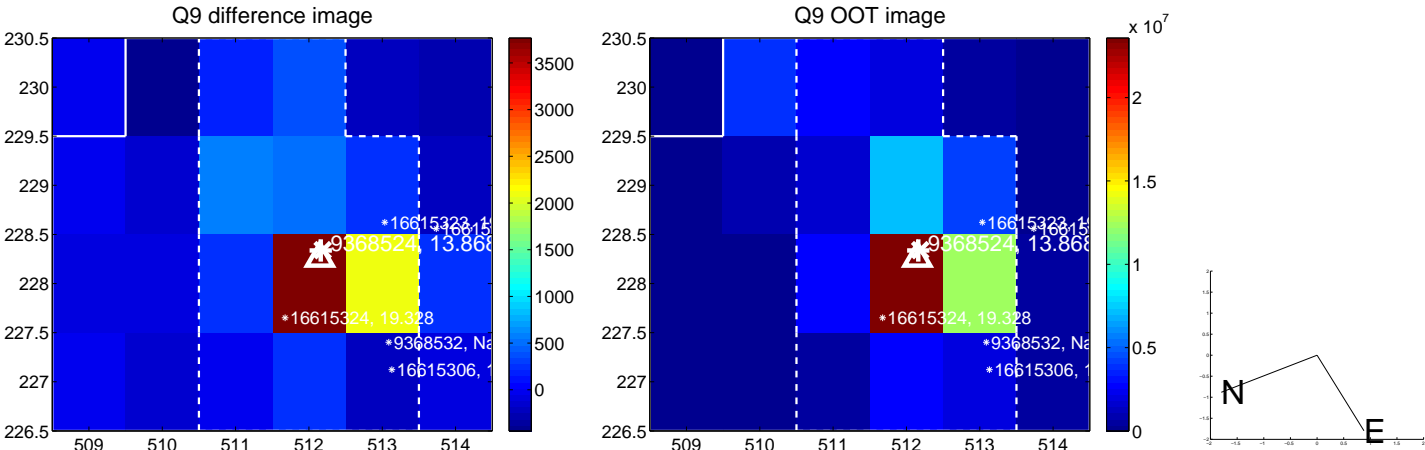
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



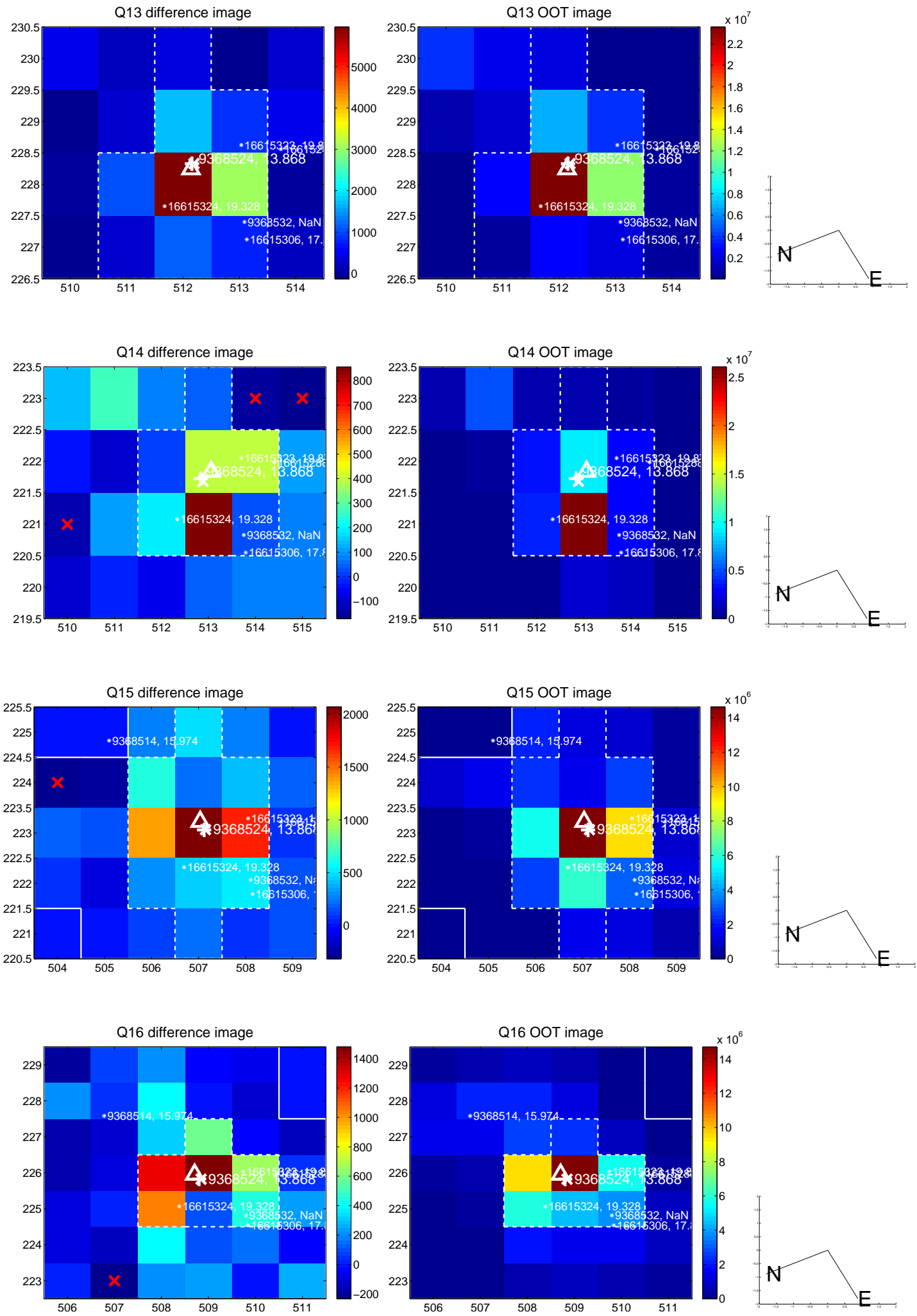
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



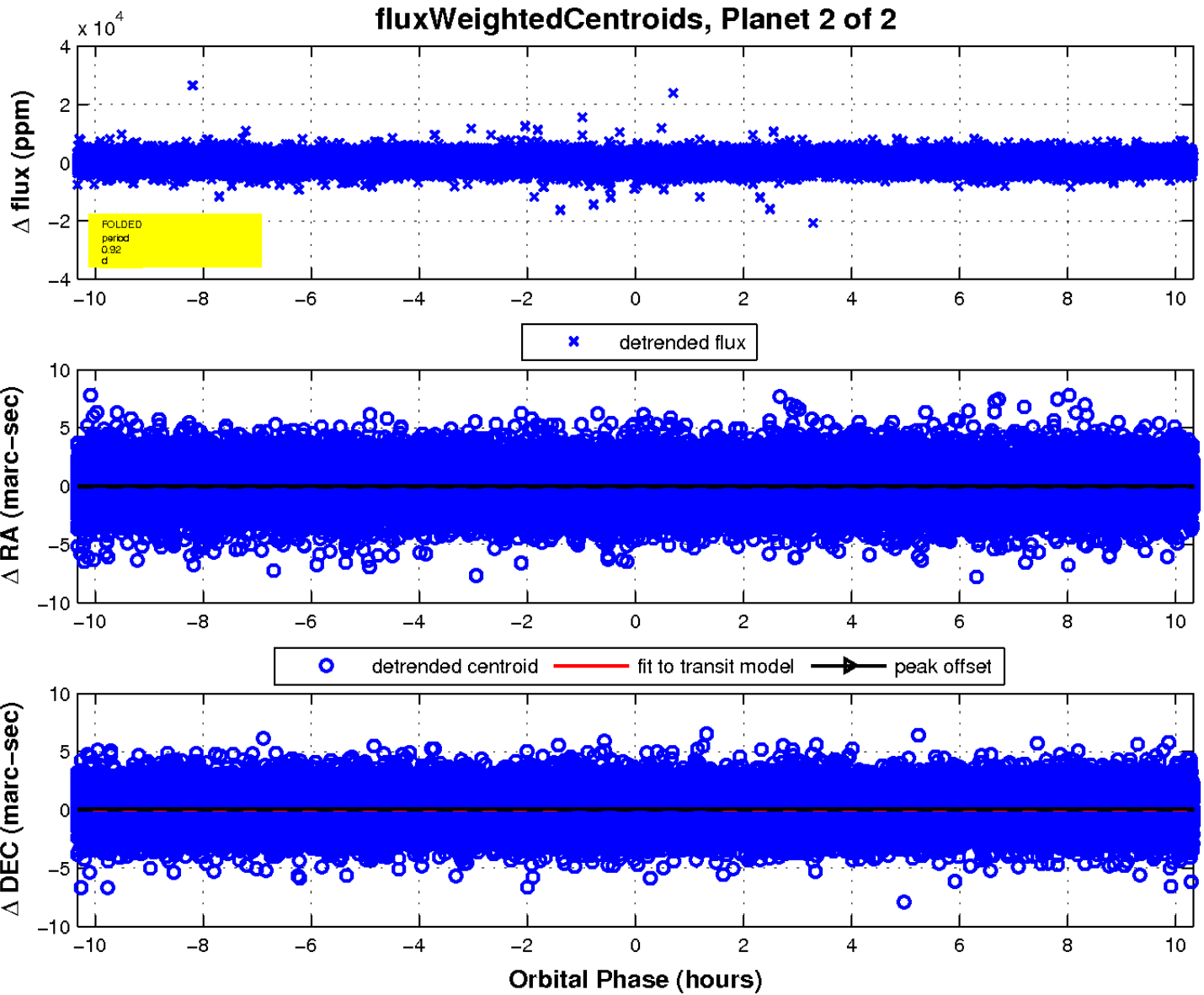
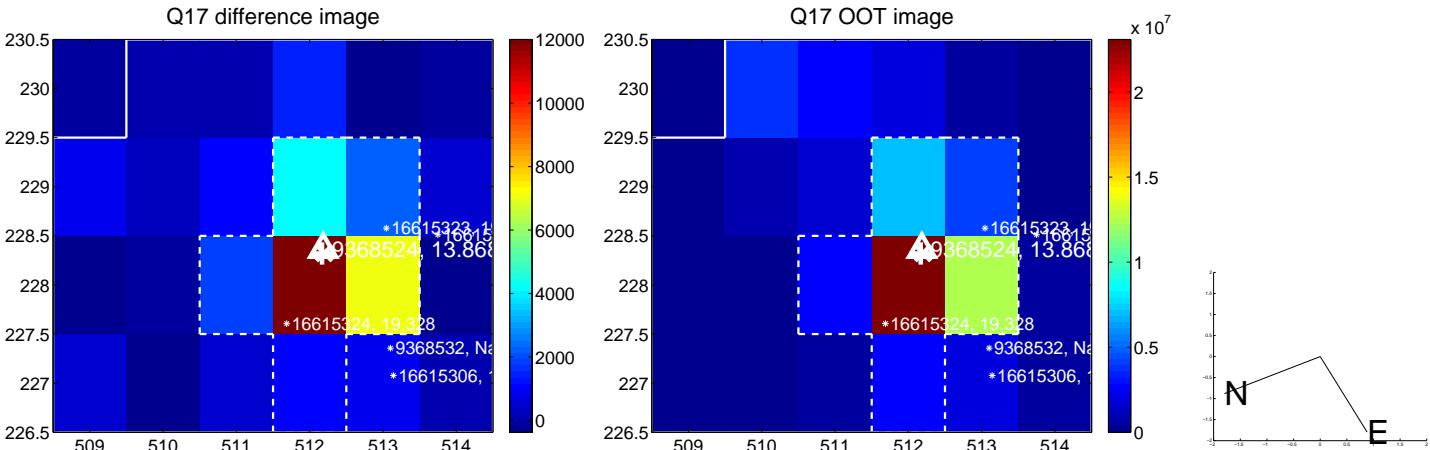
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

