

KIC 010004510

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})
010004510-01	OBS	No	1.366716	132.113649	173.0	4.213	9.6	10.4	0.73	4633	1.17	447.83
010004510-02	OBS	No	211.065453	340.271162	656.0	39.855	13.7	0.9	0.73	4633	2.55	0.54

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010004510-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT
010004510-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

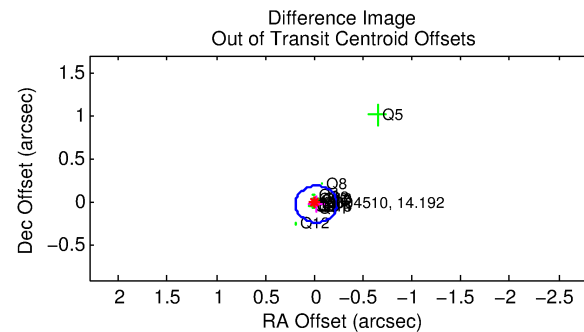
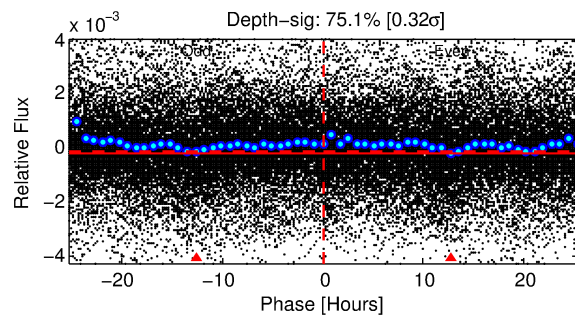
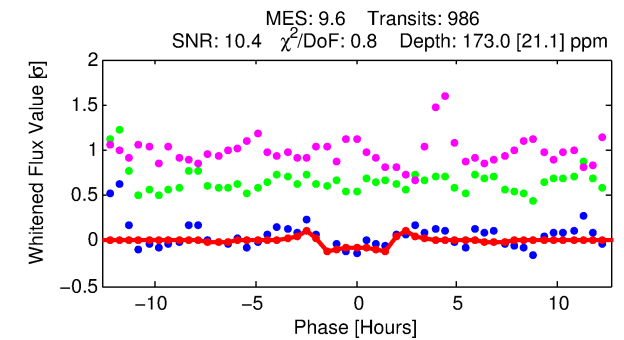
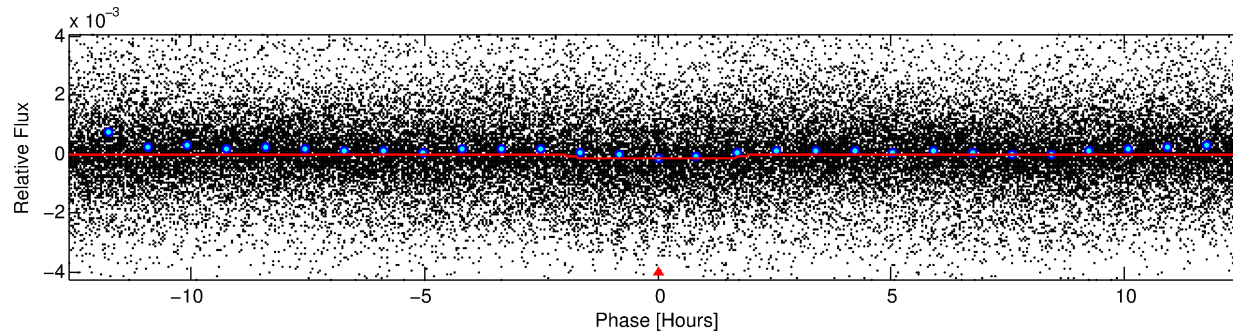
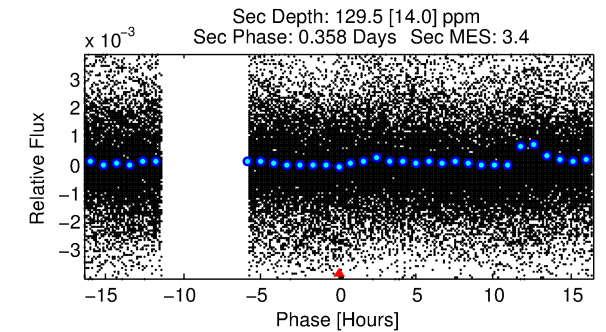
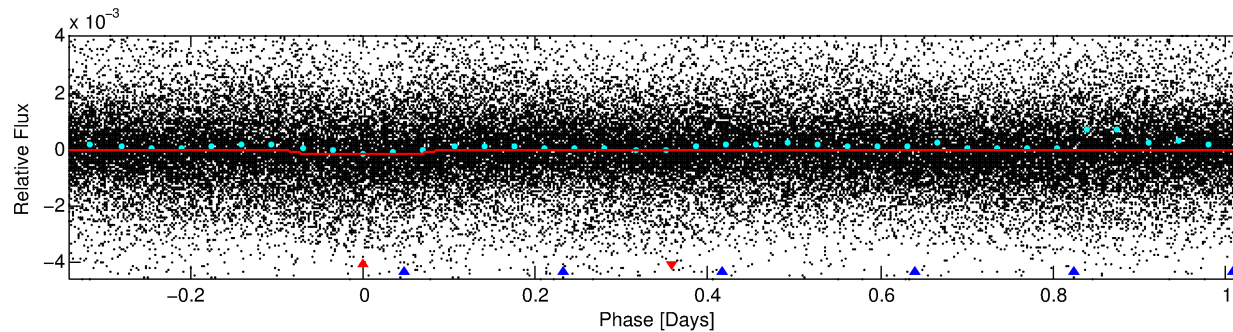
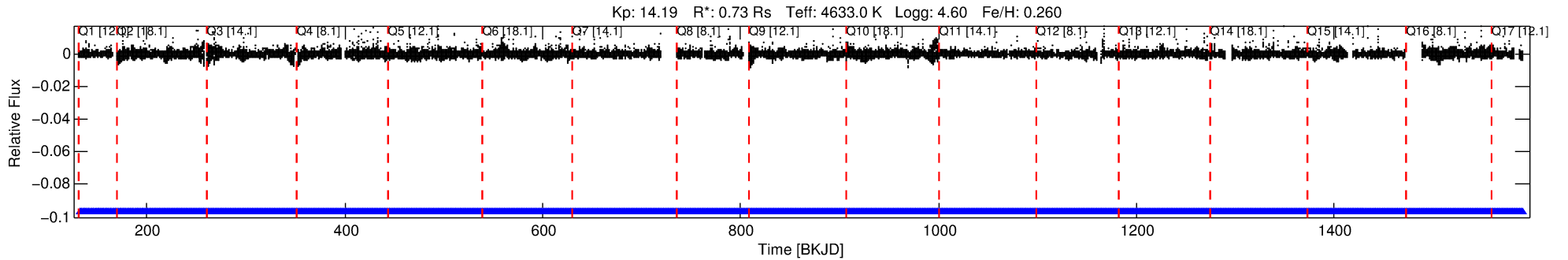
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010004510-01

No Significant Match Found

DV One-Page Summary

KIC: 10004510 Candidate: 1 of 2 Period: 1.367 d



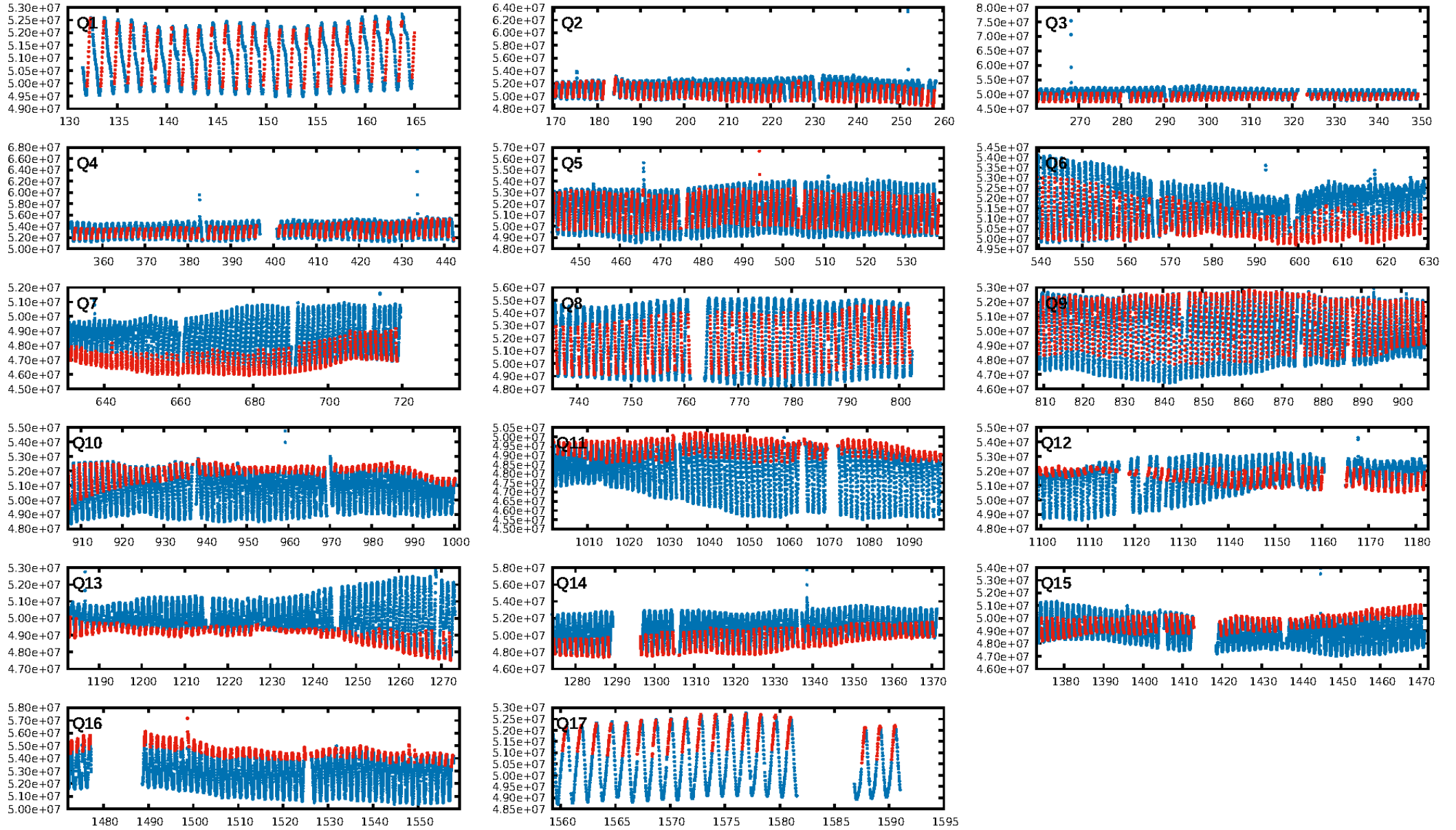
DV Fit Results:

Period = 1.36672 [0.00001] d
Epoch = 132.1136 [0.0016] BKJD
Rp/R* = 0.0147 [0.0026]
a/R* = 1.53 [0.53]
b = 0.89 [0.15]
Seff = 447.83 [71.70]
Teq = 1173 [47] K
Rp = 1.17 [0.23] Re
a = 0.0222 [0.0012] AU
Ag = 25.59 [9.80] [2.51σ]
Teffp = 4079 [409] K [7.06σ]

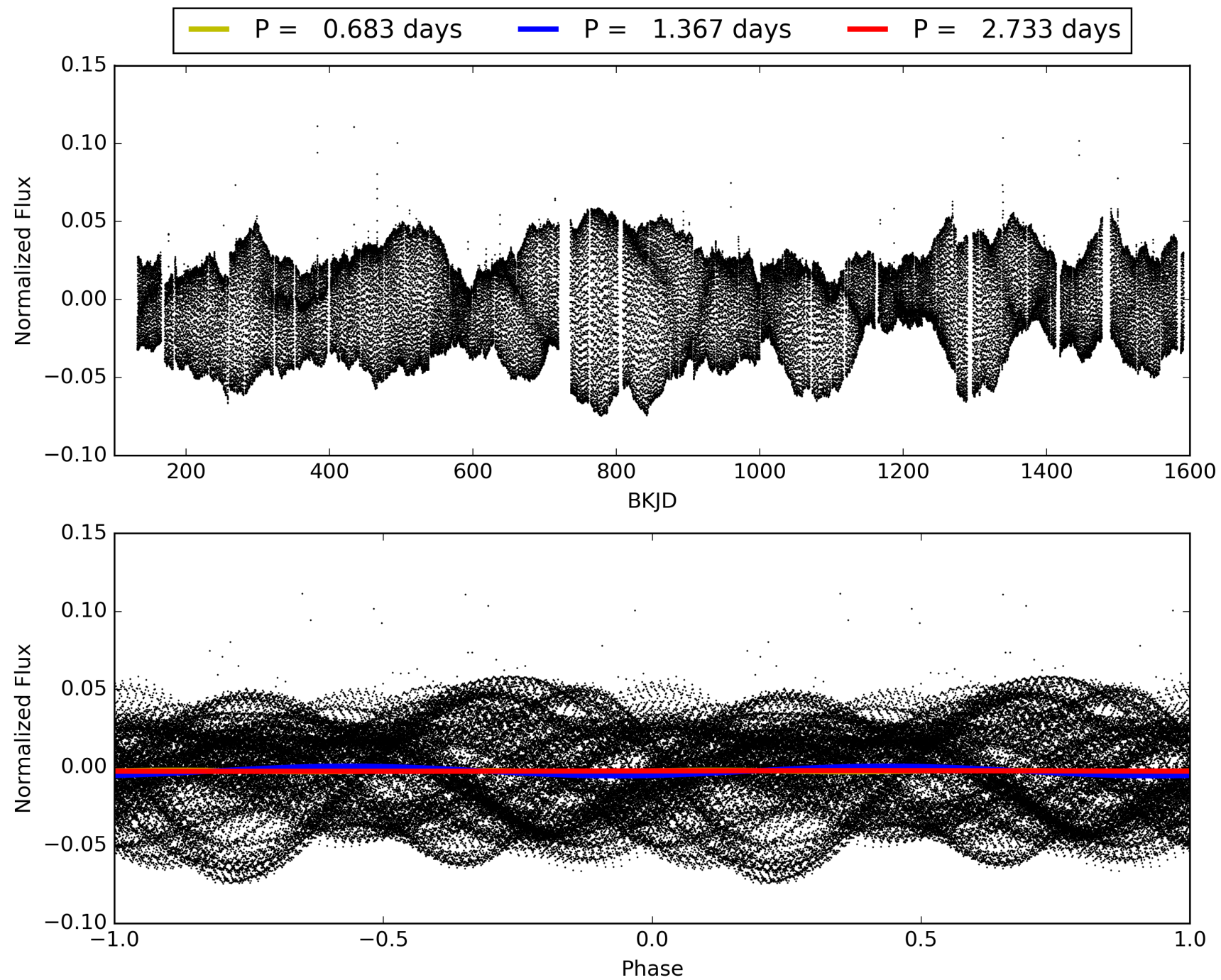
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [125.58σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.96e-17
RollingBand-fgt: 1.00 [942/942]
GhostDiagnostic-chr: 0.4043
Centroid-sig: 5.7%
Centroid-so: 0.402 arcsec [1.83σ]
OotOffset-rm: 0.028 arcsec [0.40σ]
KicOffset-rm: 0.290 arcsec [2.94σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.53 [9/17]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 010004510-01, PDC Light Curves

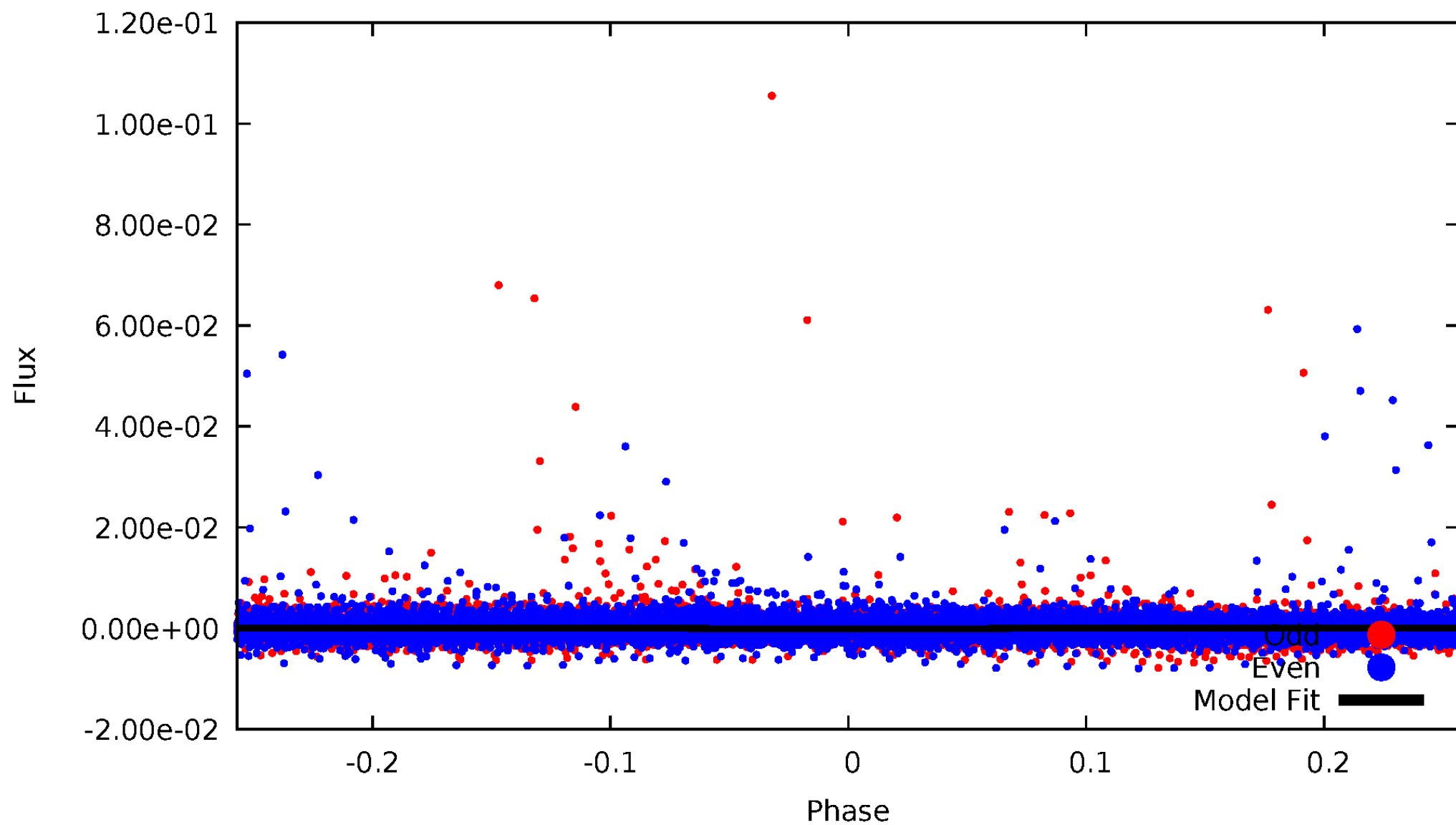


TCE 010004510-01



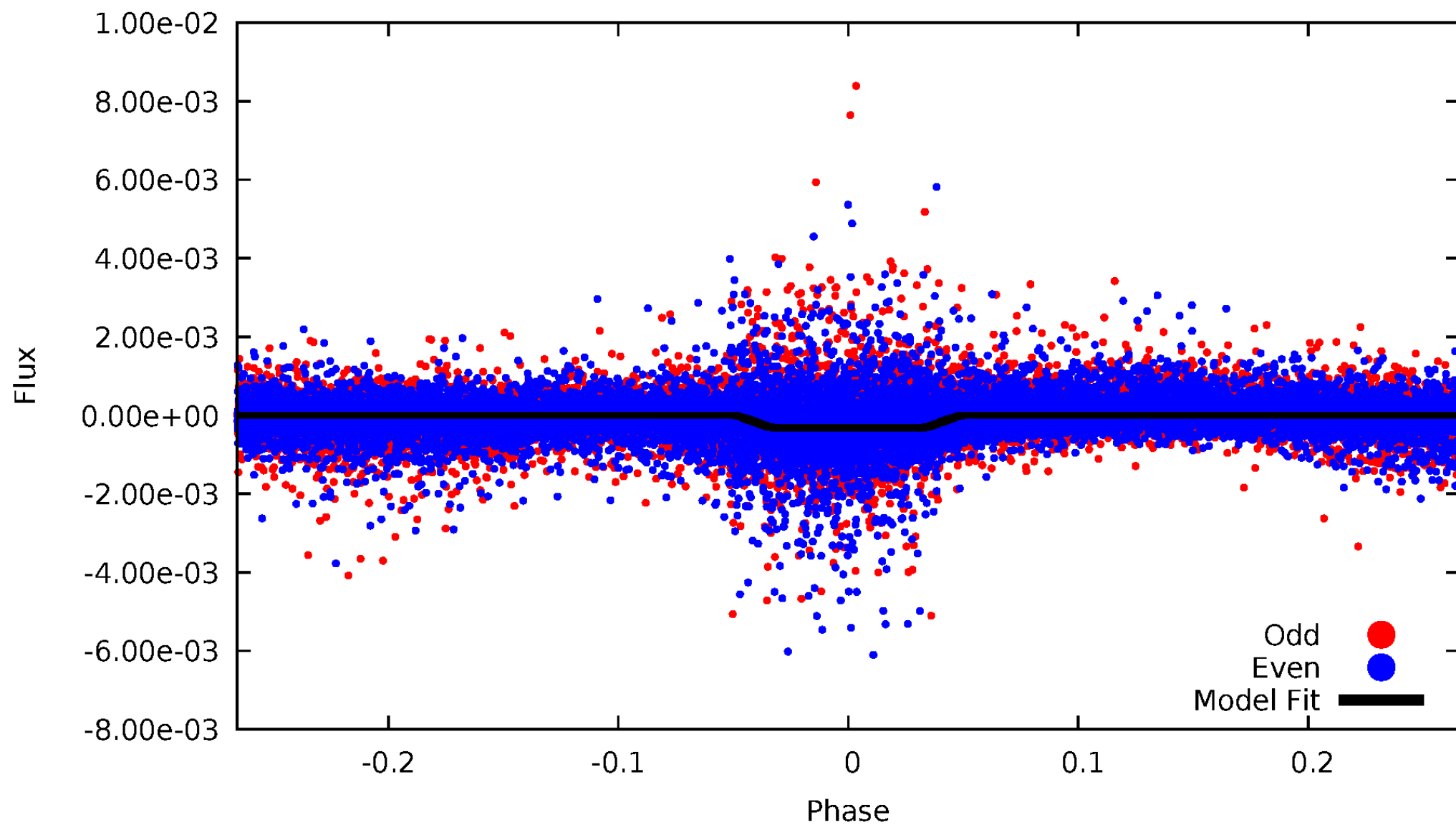
DV Odd/Even

TCE 010004510-01

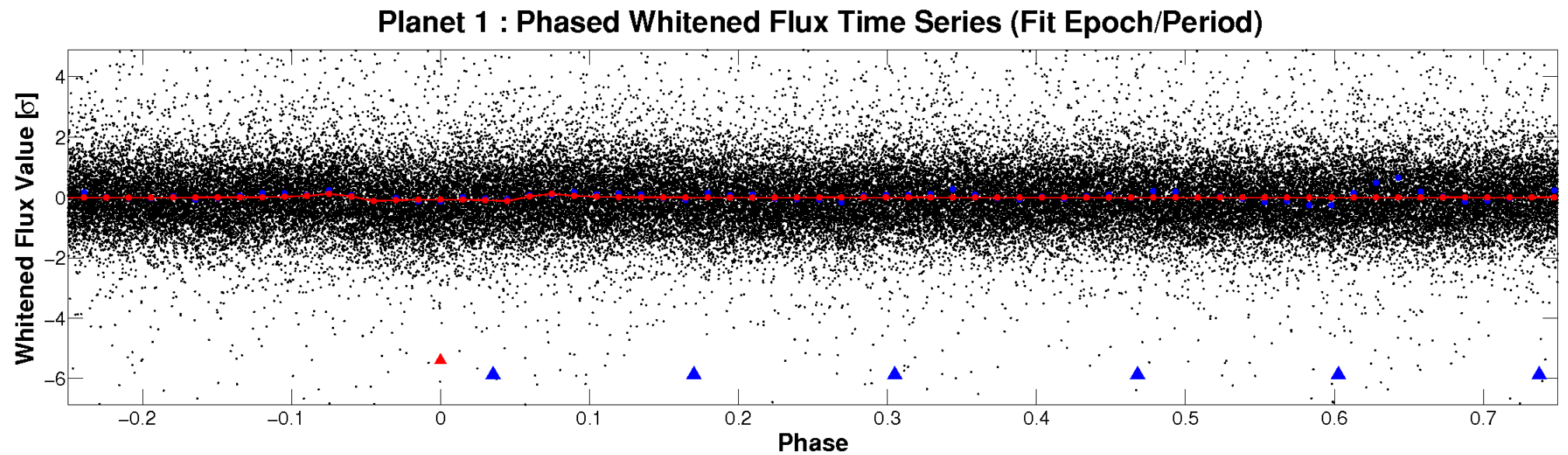
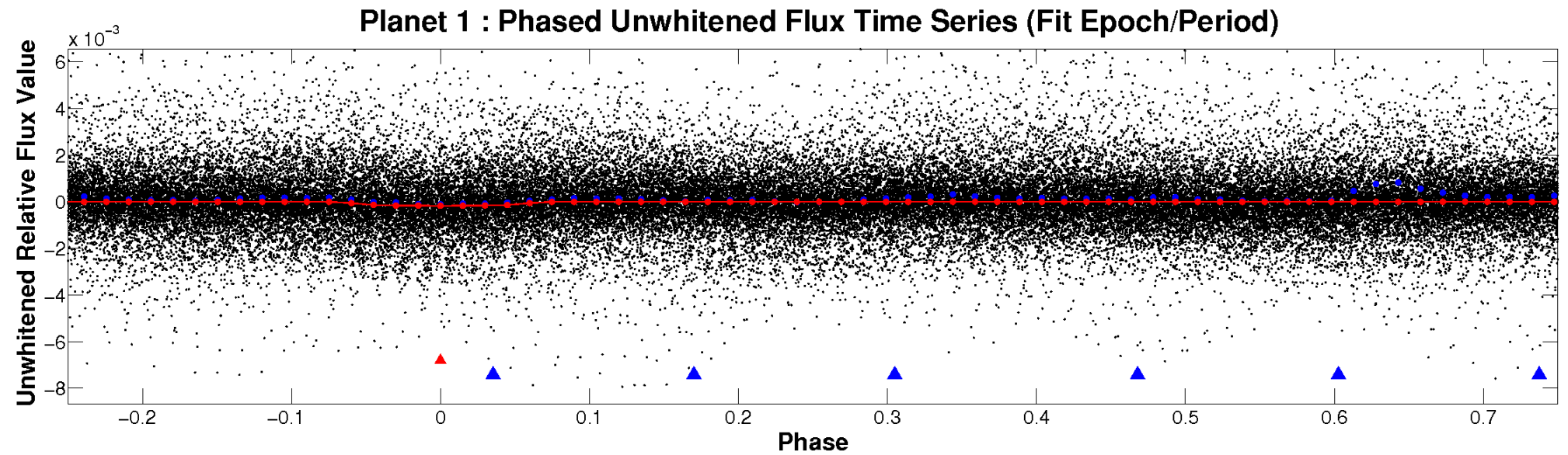


ALT Odd/Even

TCE 010004510-01

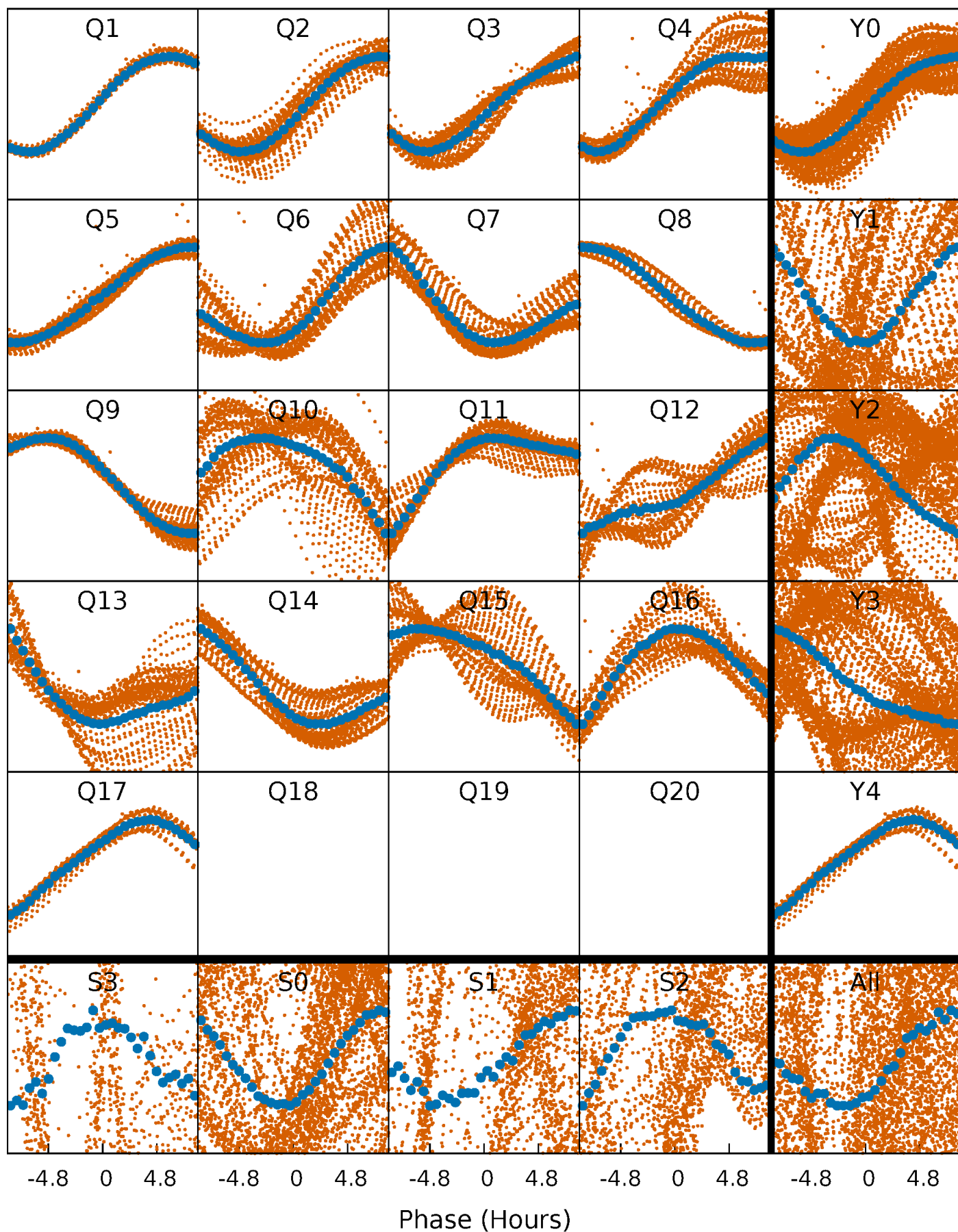


Non-Whitened Vs. Whitened Light Curve



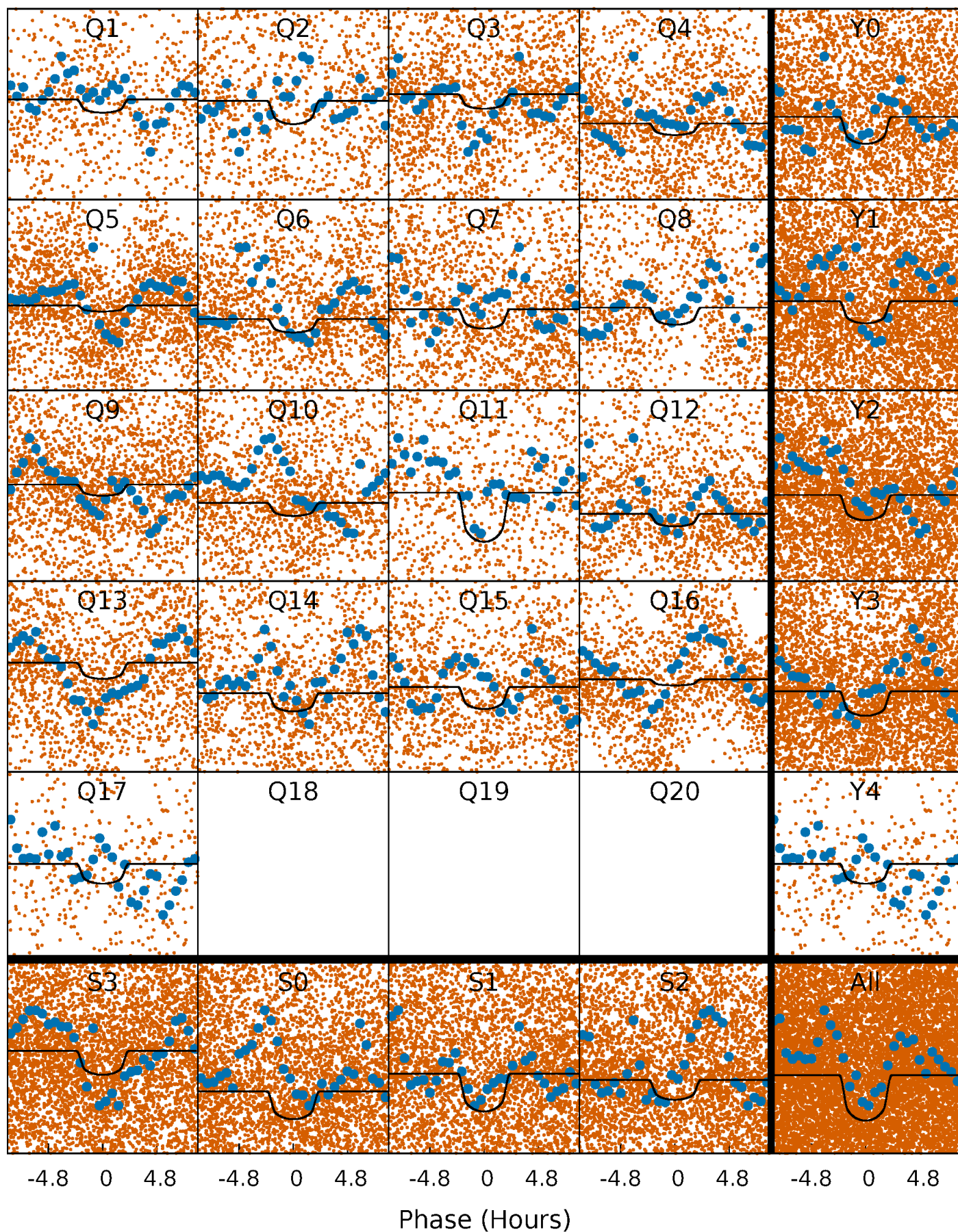
PDC Quarter-Phased Transit Curves

TCE 010004510-01 P= 1.366716 Days $T_0=132.113649$ (BKJD)



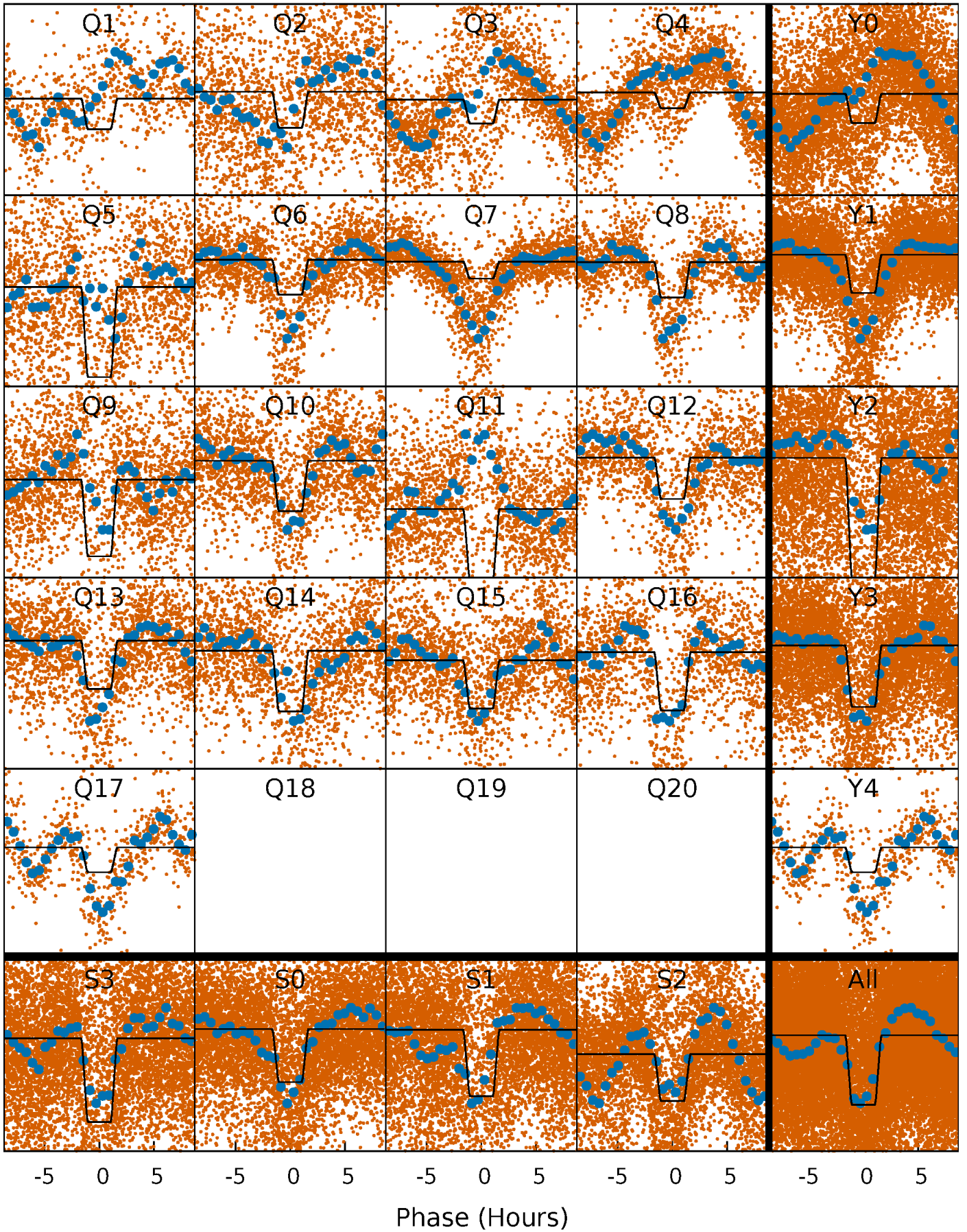
DV Quarter-Phased Transit Curves

TCE 010004510-01 P= 1.366716 Days $T_0=132.113649$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

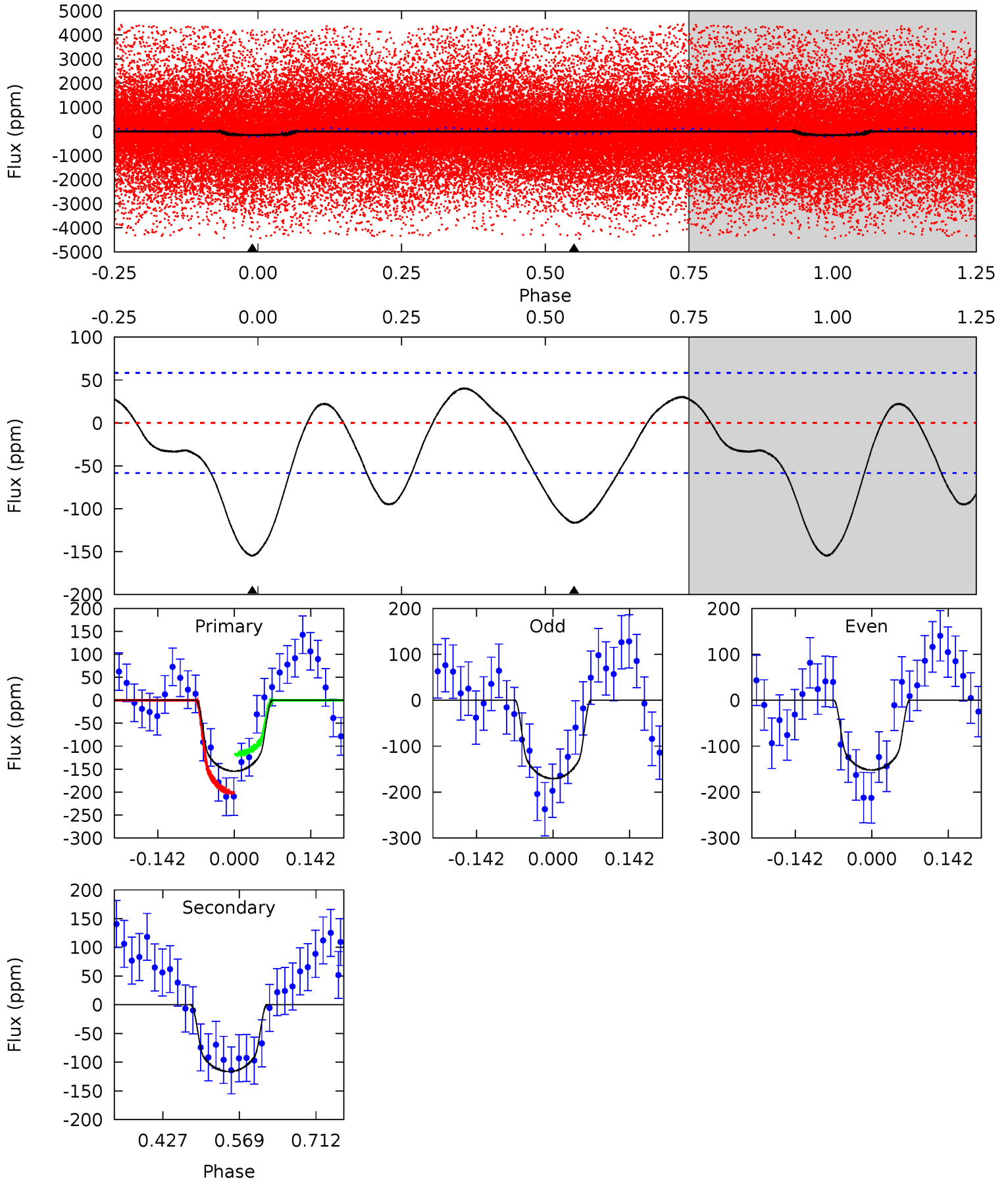
TCE 010004510-01 P= 1.366666 Days $T_0=132.113059$ (BKJD)



DV Model-Shift Uniqueness Test

010004510-01, P = 1.366716 Days, E = 130.746933 Days

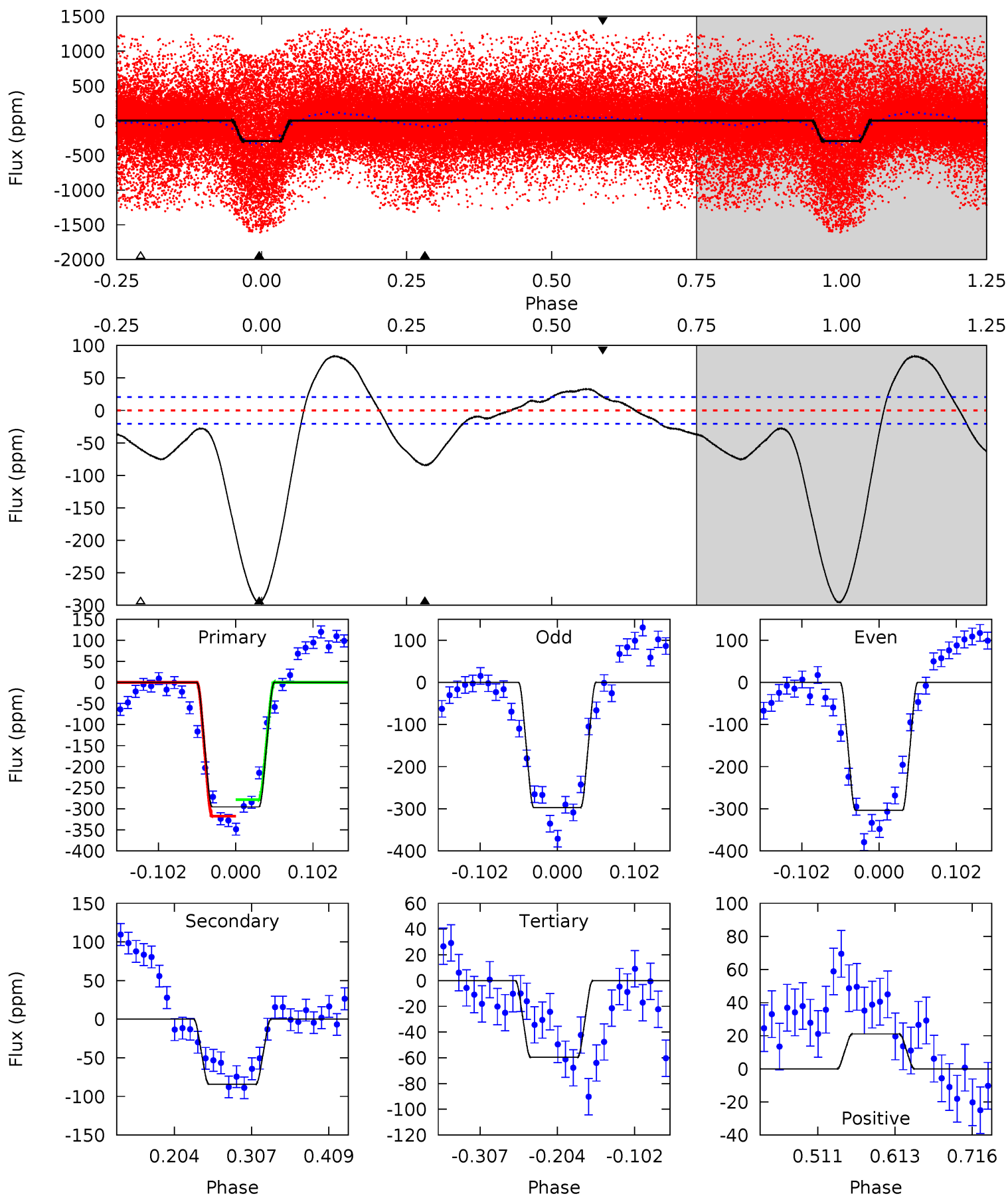
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.9	8.95	0	0	4.49	1.47	3.21	11.9	11.9	8.95	8.95	0.73	0.46	0.21	3.24



Alt Model-Shift Uniqueness Test

010004510-01, P = 1.366666 Days, E = 130.746393 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
65.5	18.7	13.2	4.67	4.56	1.63	9.34	52.3	60.9	5.47	14.0	0.70	0.96	0.22	4.28



Stellar Parameters For KIC 010004510

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4633^{+163}_{-163}	$4.603^{+0.028}_{-0.039}$	$0.260^{+0.150}_{-0.300}$	$0.732^{+0.042}_{-0.052}$	$0.784^{+0.035}_{-0.069}$	$2.816^{+0.417}_{-0.397}$
	+4%/-4%	+1%/-1%	+58%/-115%	+6%/-7%	+4%/-9%	+15%/-14%
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 010004510-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-116 ± 13	$1.17^{+0.21}_{-0.22}$	1648^{+60}_{-62}	4133^{+361}_{-294}	23^{+13}_{-7}
Alt.	-84 ± 5	$1.43^{+0.22}_{-0.22}$	1640^{+66}_{-59}	3621^{+247}_{-176}	11^{+5}_{-3}

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

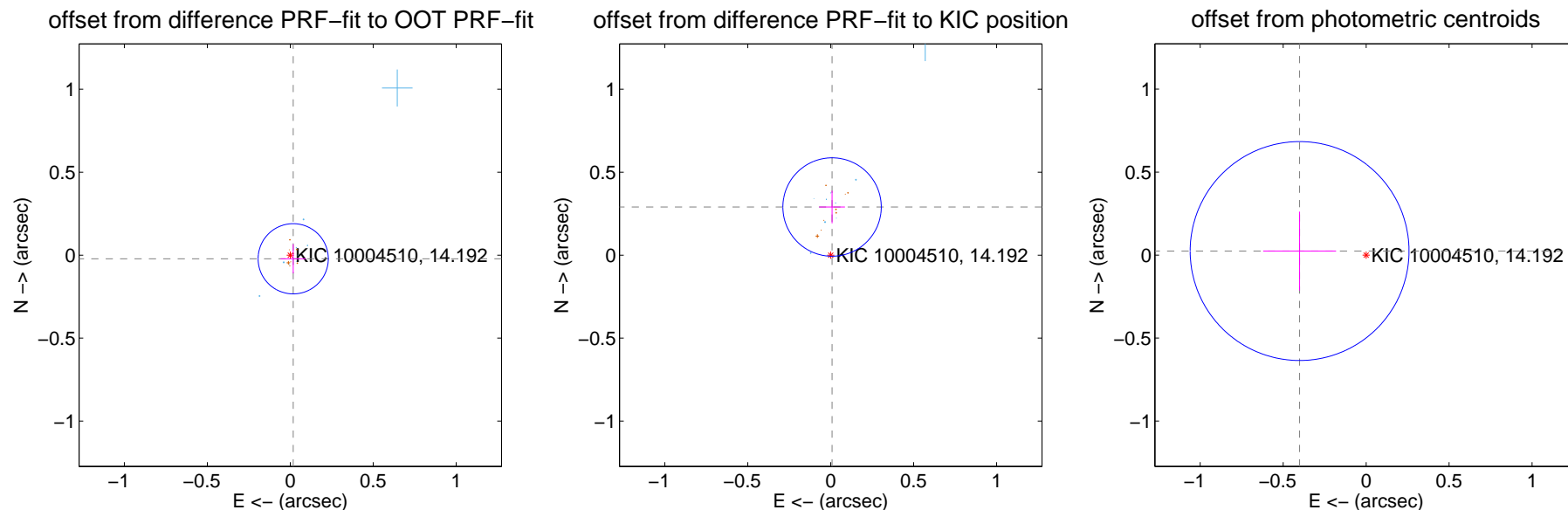
DV Centroid Data

Supplemental centroid analysis for 010004510-01. Kepler magnitude: 14.19. Transit SNR 10.36

There are 9 quarters with good PRF difference image offsets

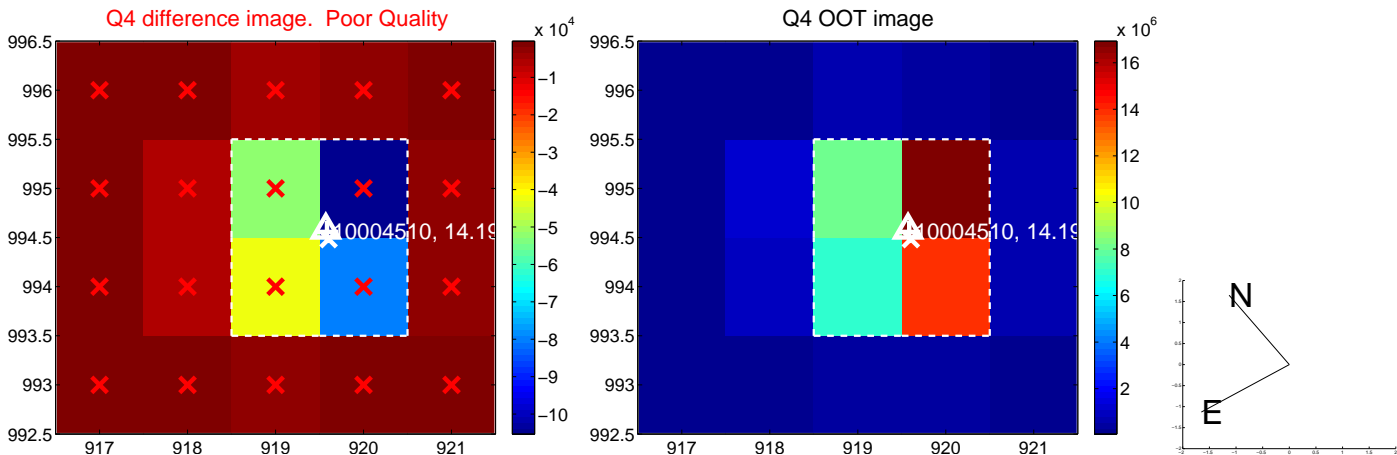
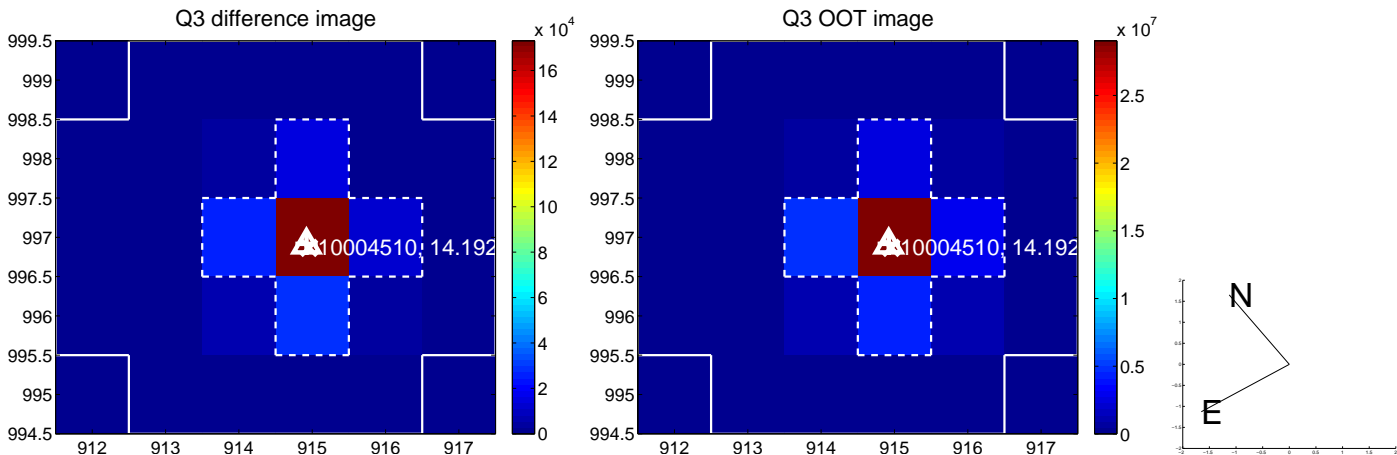
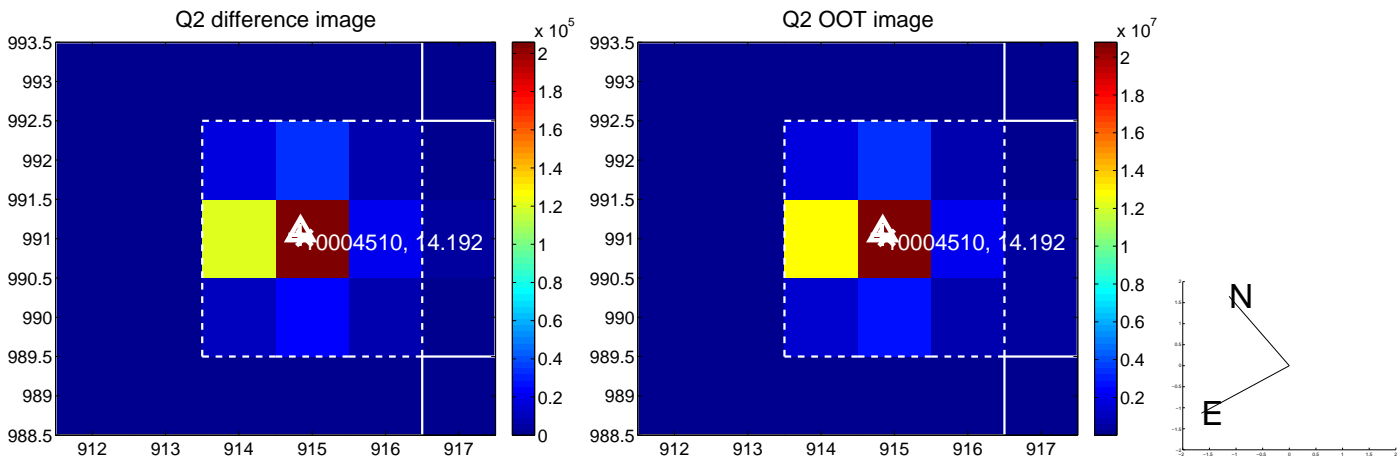
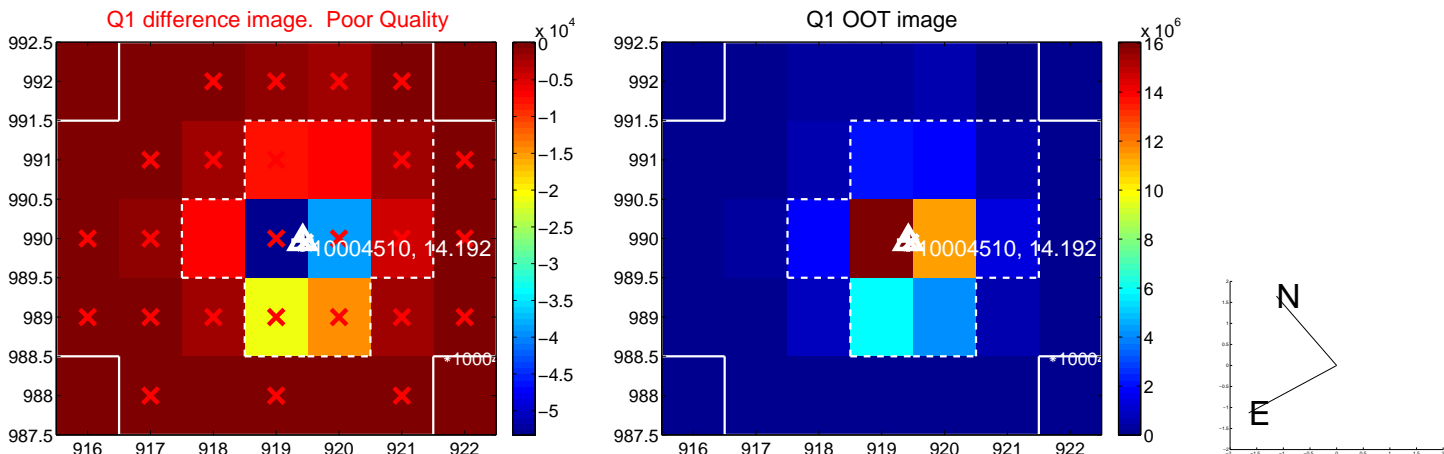
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.028 ± 0.071	0.40	-0.018 ± 0.076	-0.022 ± 0.088
PRF-fit source offset from KIC position	0.290 ± 0.099	2.94	-0.008 ± 0.078	0.290 ± 0.098
photometric centroid source offset	0.40 ± 0.22	1.83	0.40 ± 0.22	0.02 ± 0.24

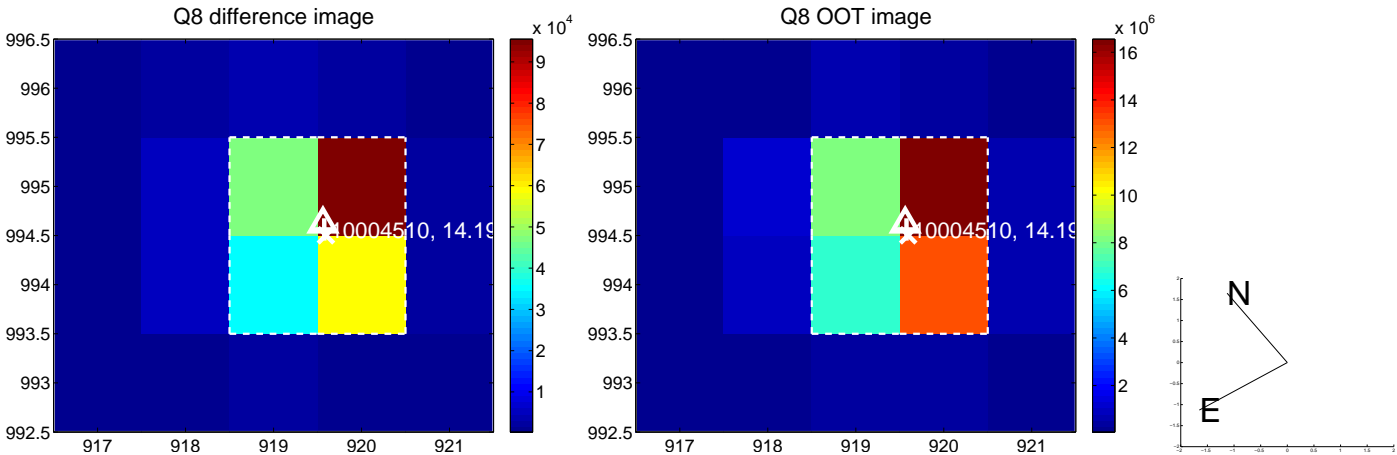
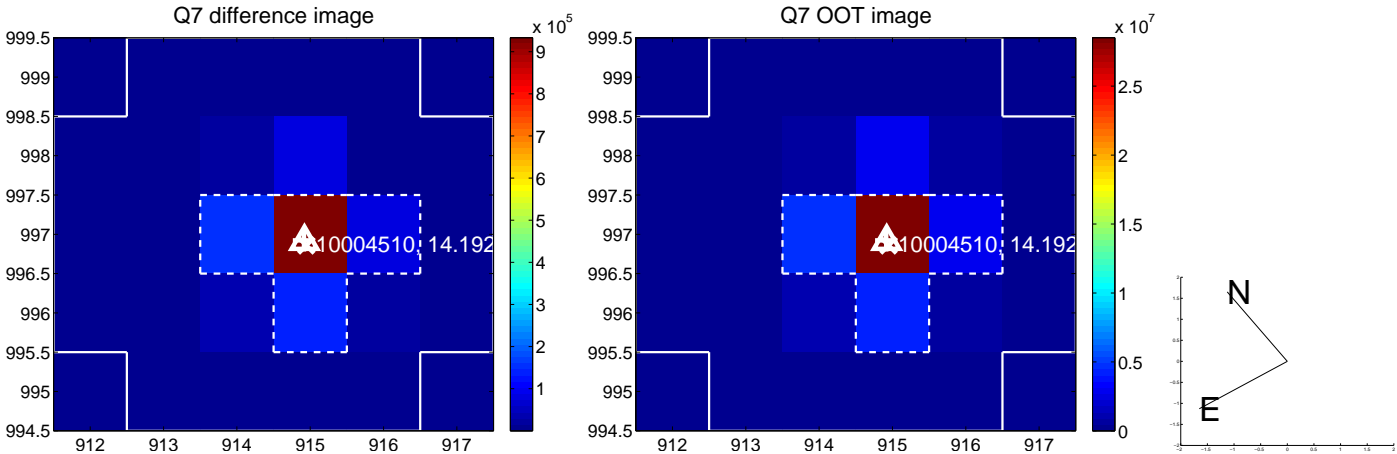
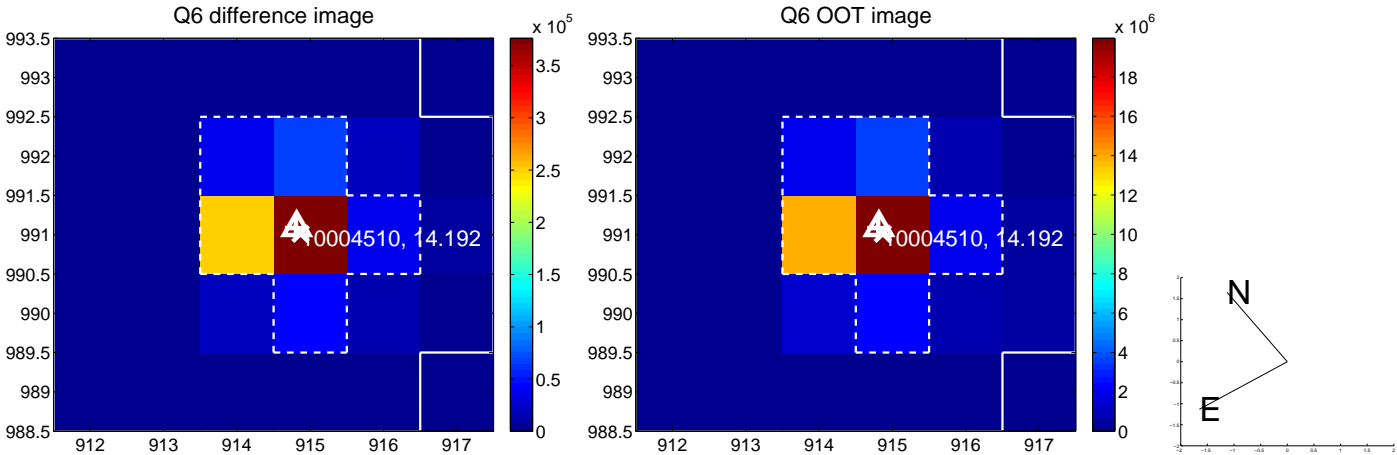
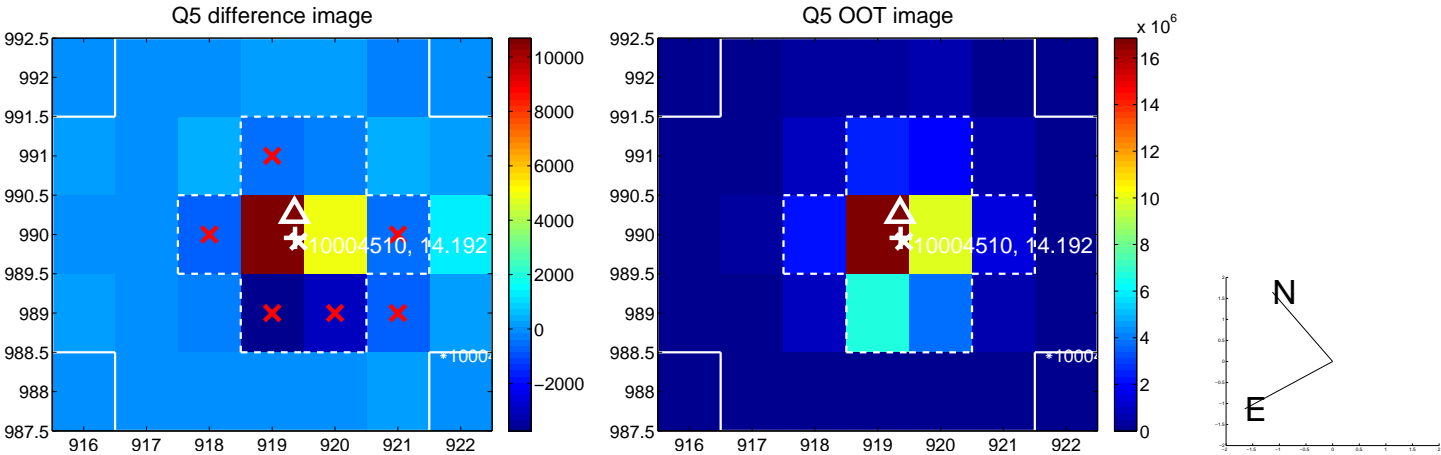


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

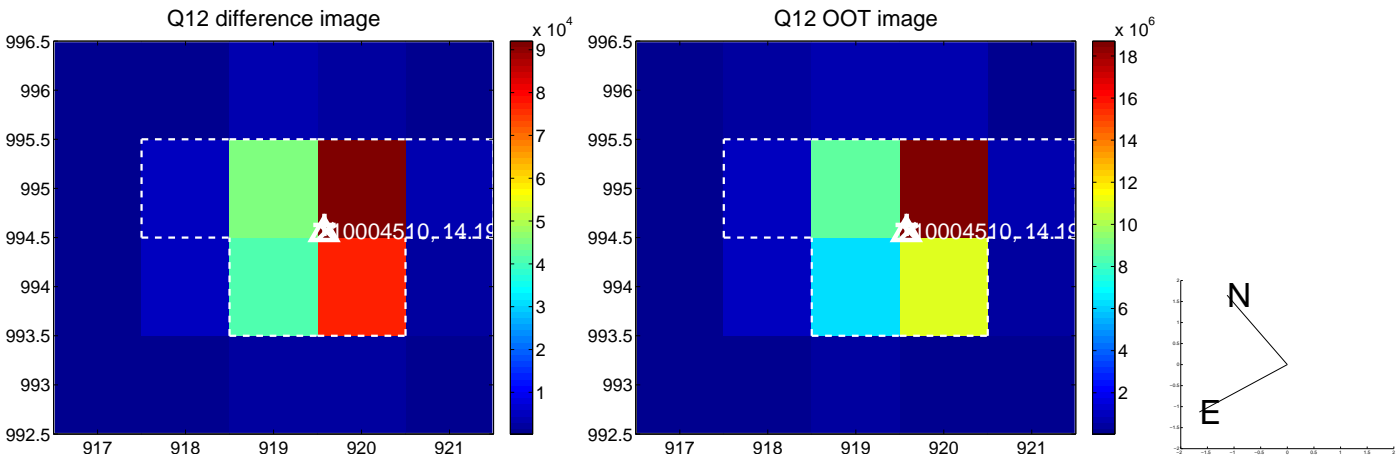
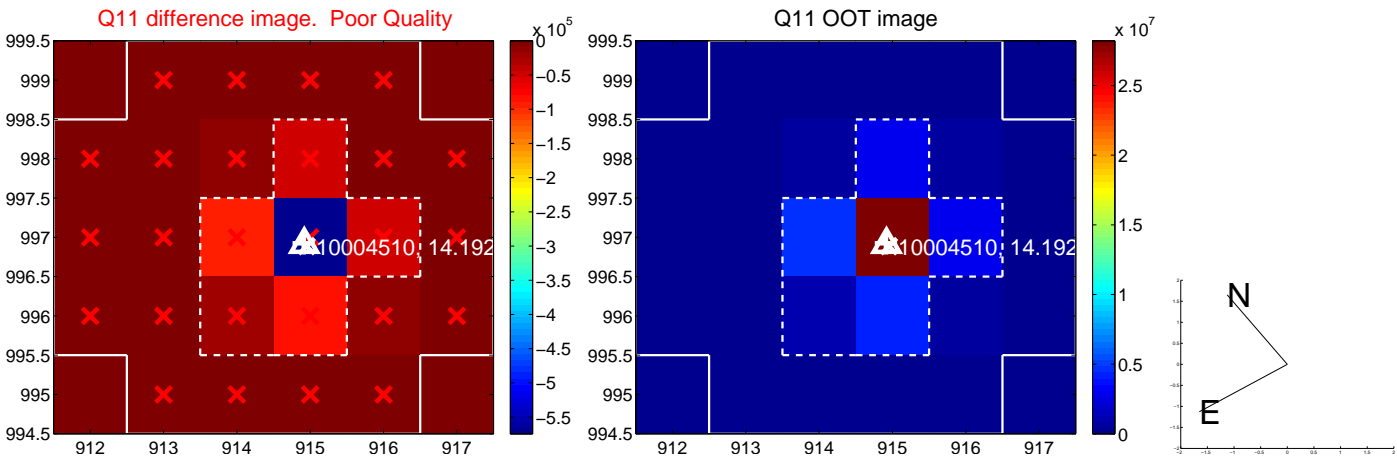
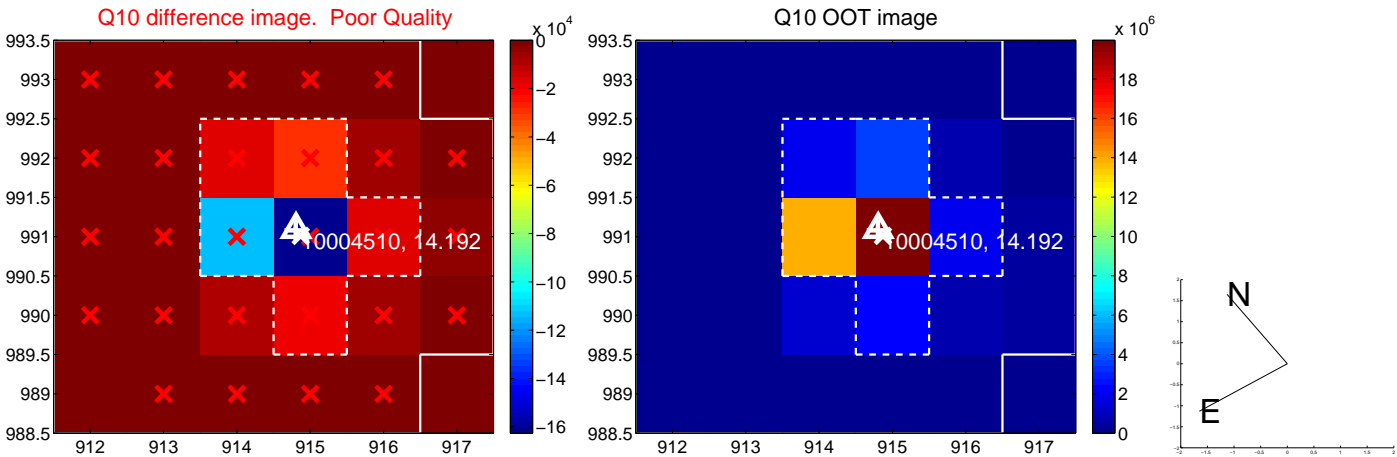
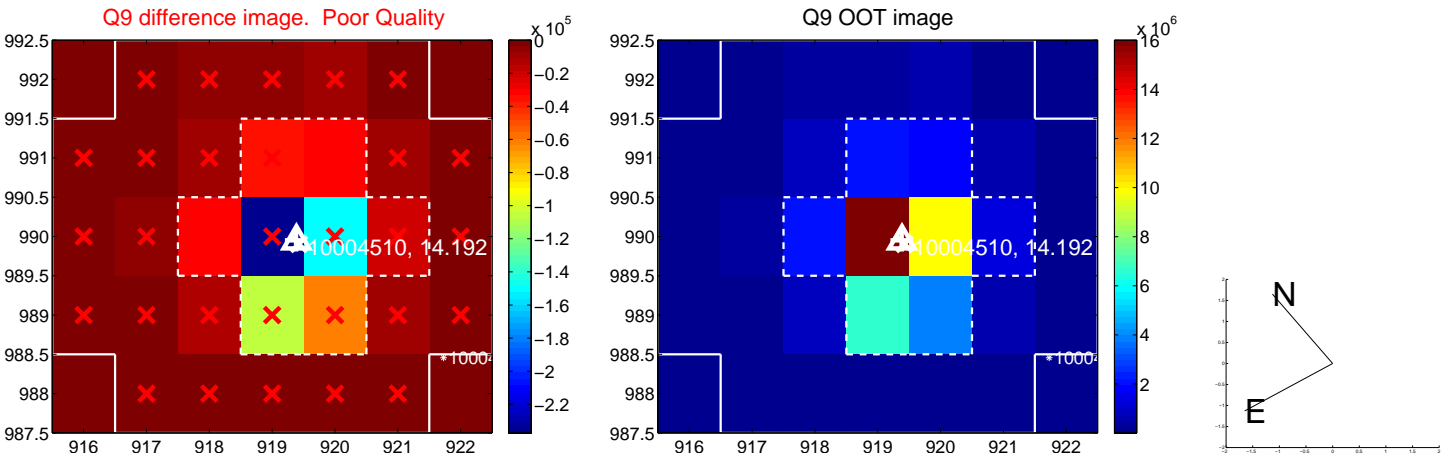
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



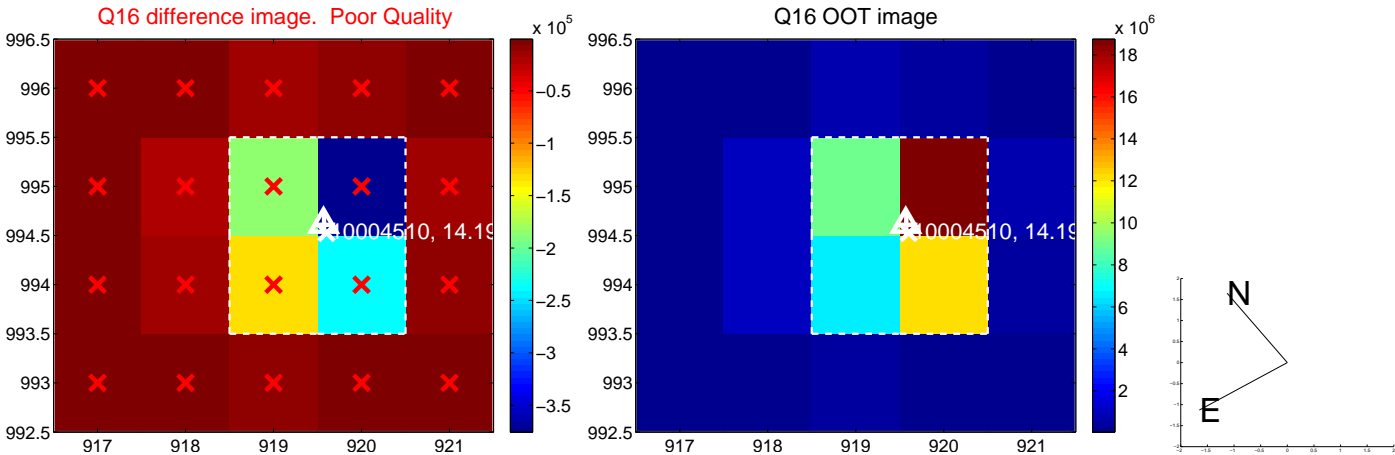
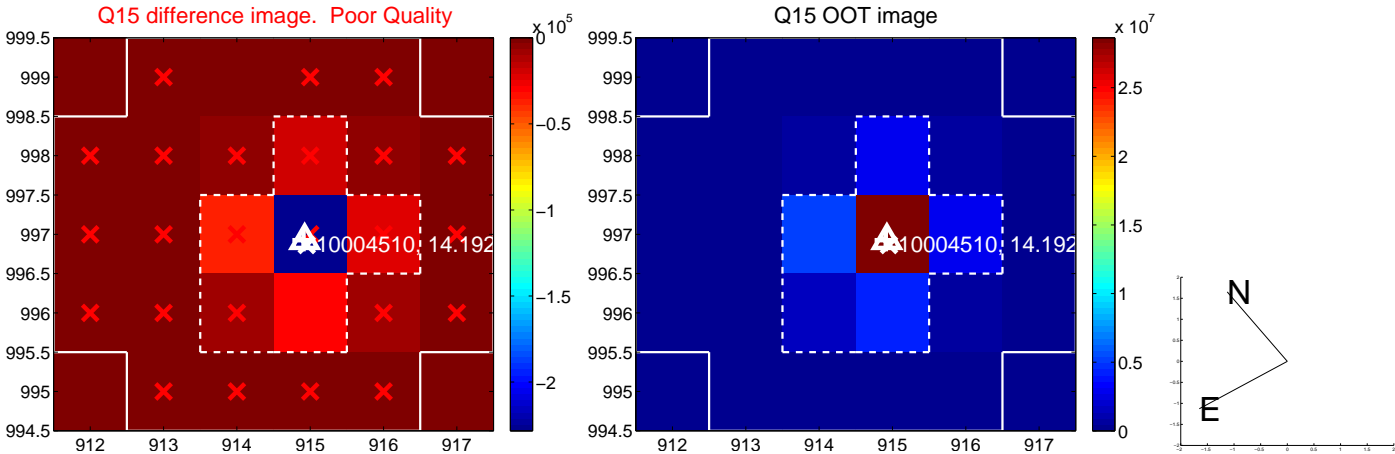
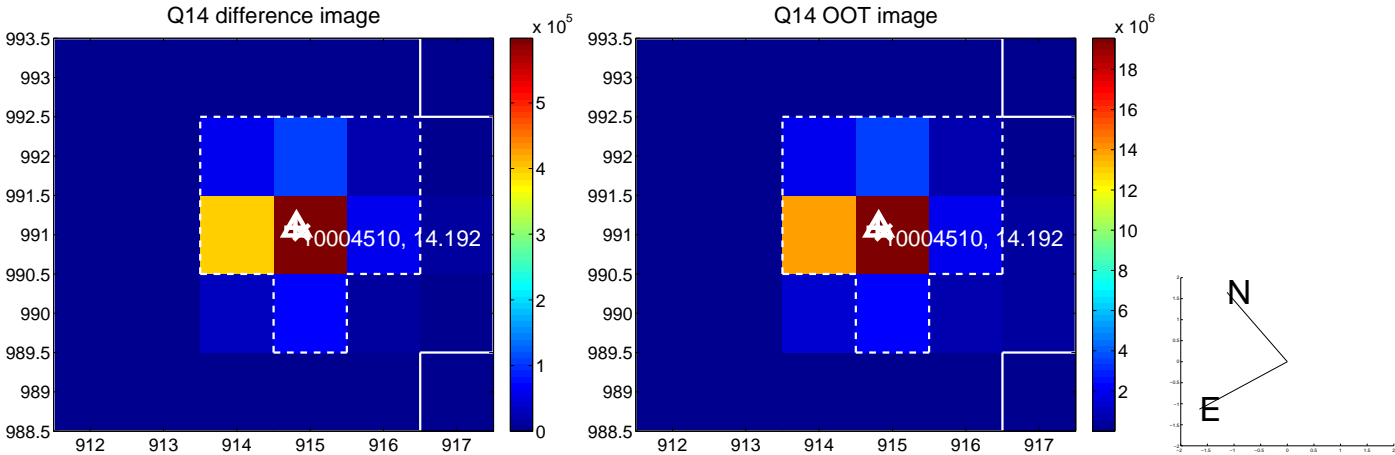
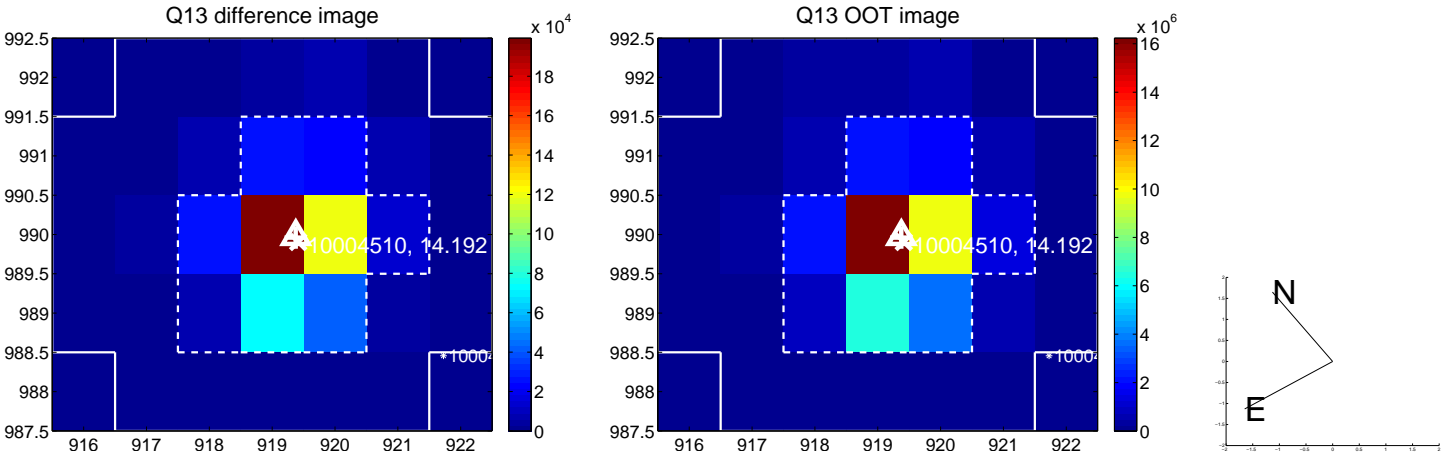
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



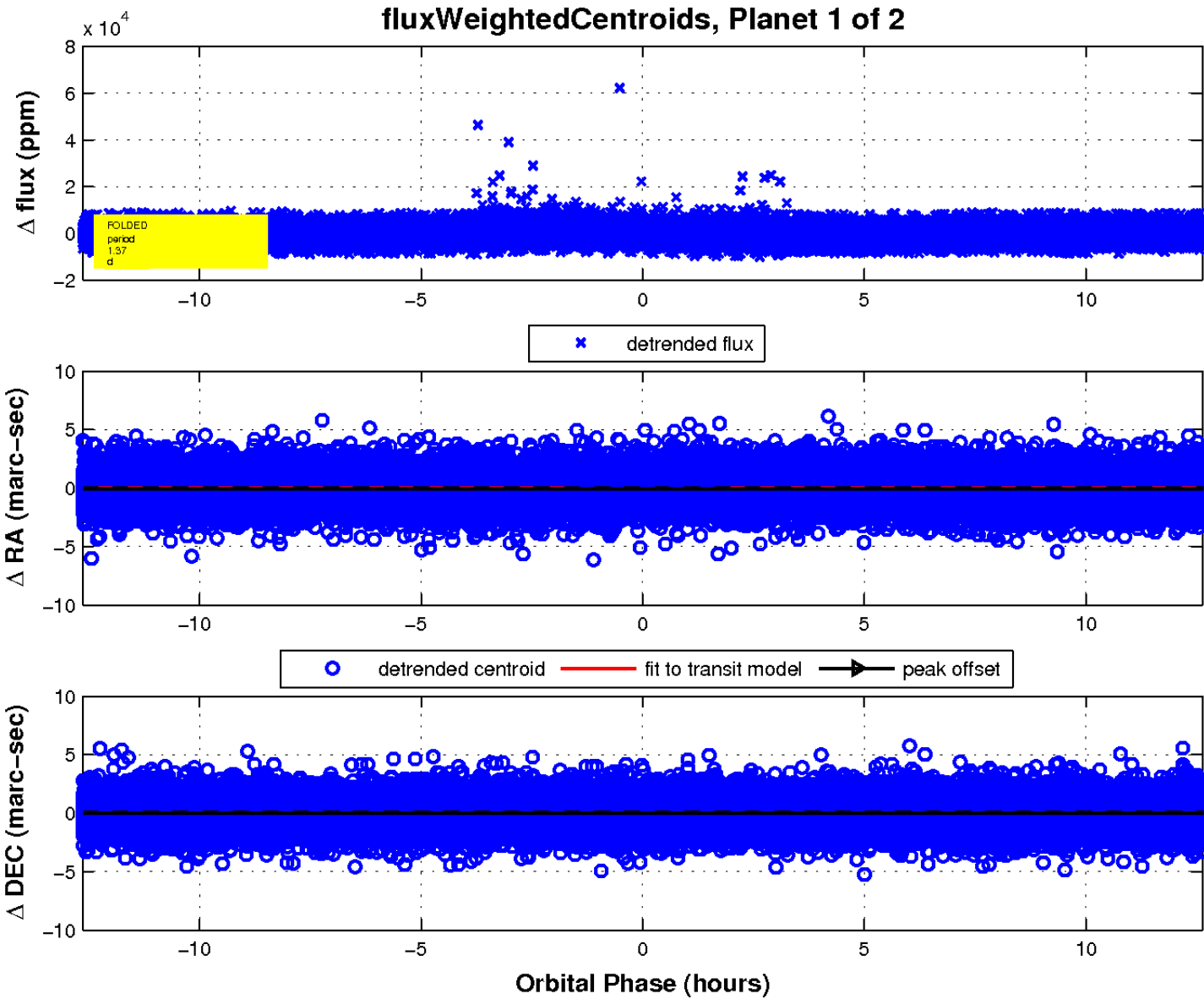
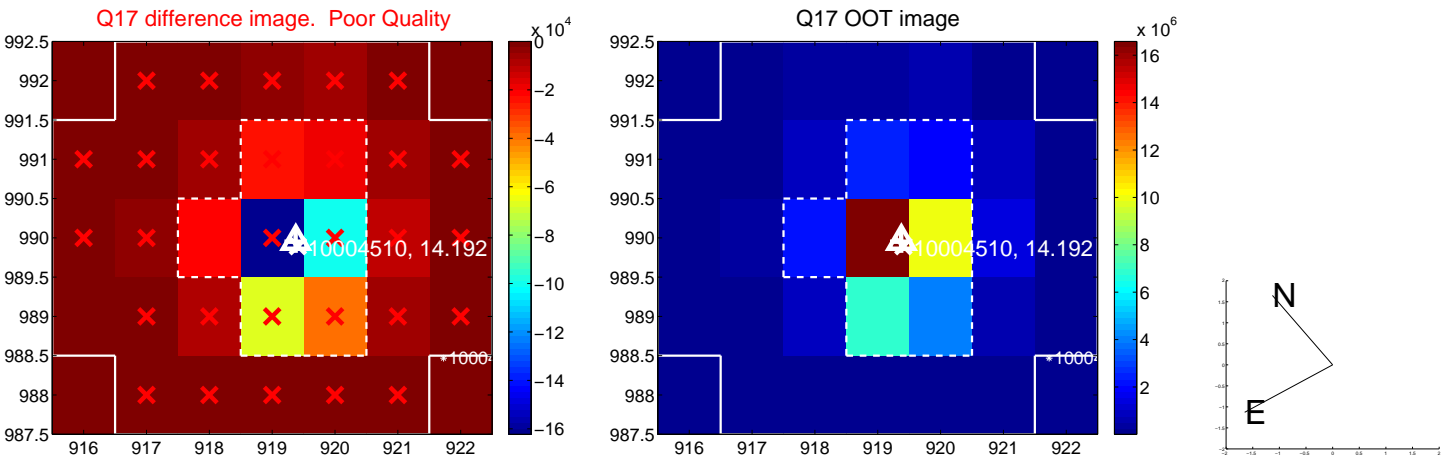
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



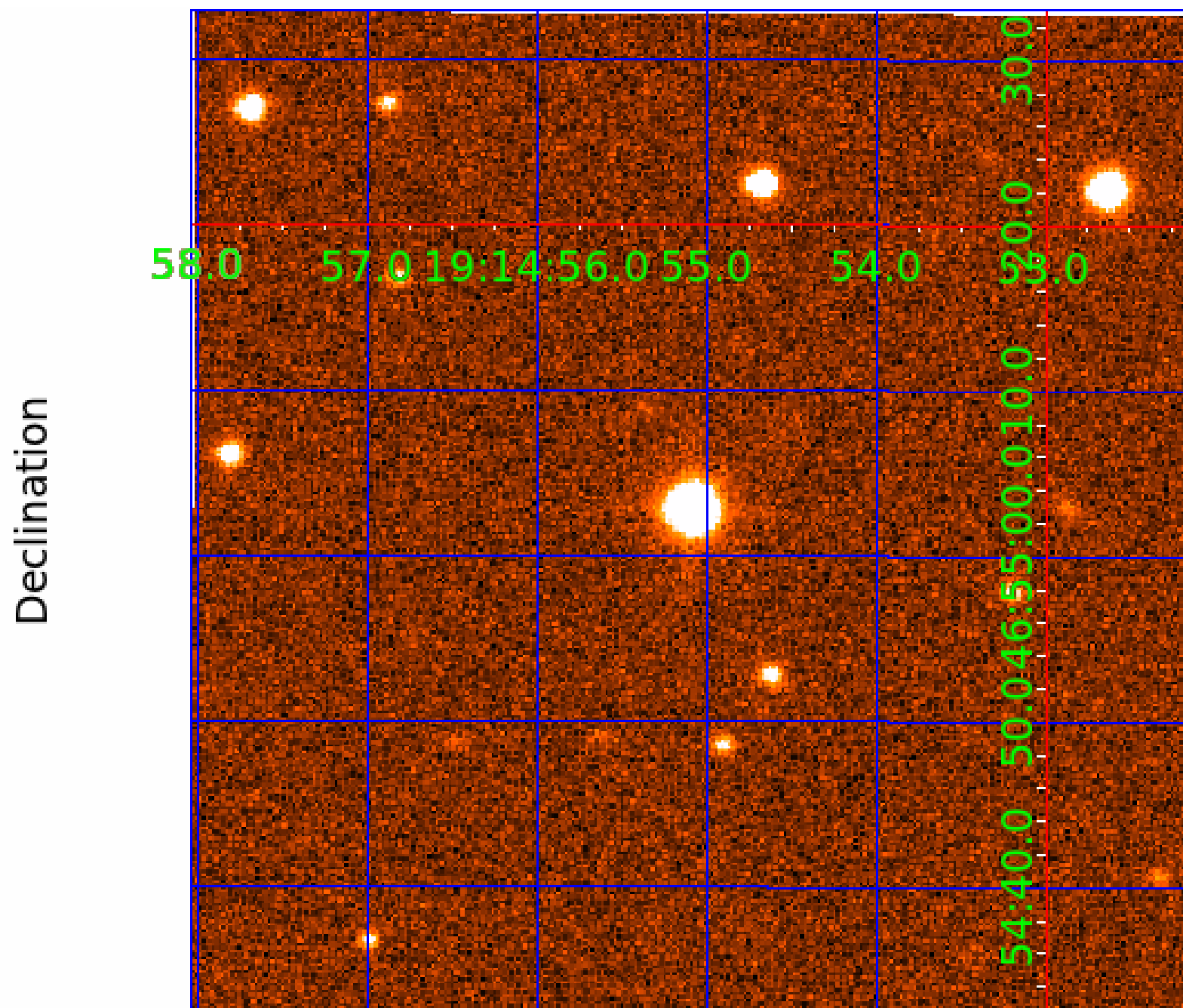
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 010004510

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})
010004510-01	OBS	No	1.366716	132.113649	173.0	4.213	9.6	10.4	0.73	4633	1.17	447.83
010004510-02	OBS	No	211.065453	340.271162	656.0	39.855	13.7	0.9	0.73	4633	2.55	0.54

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010004510-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT
010004510-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

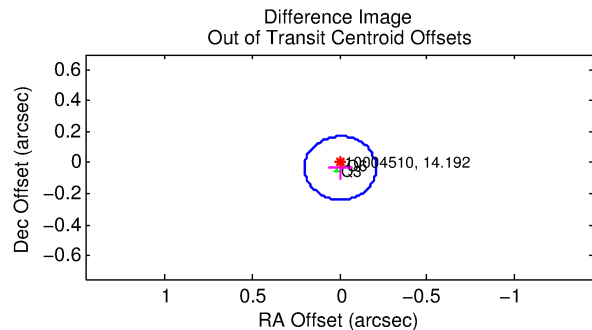
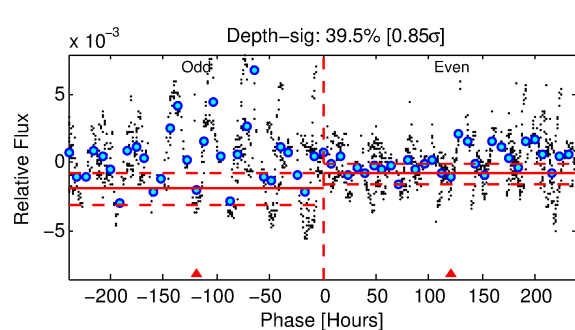
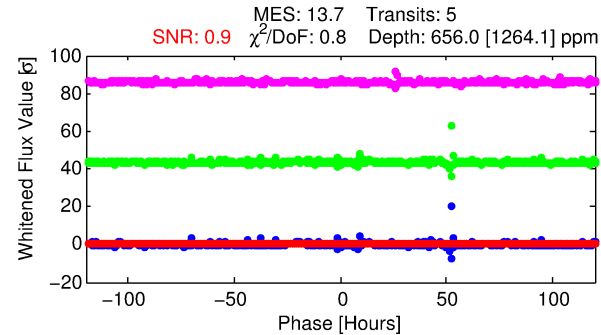
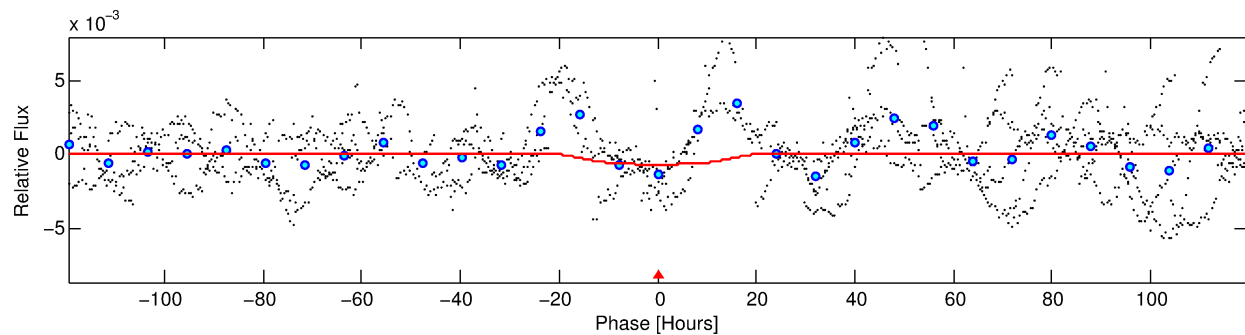
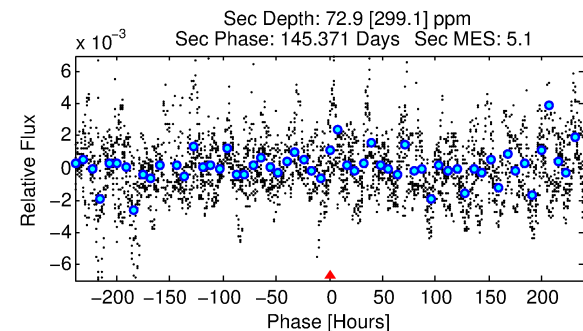
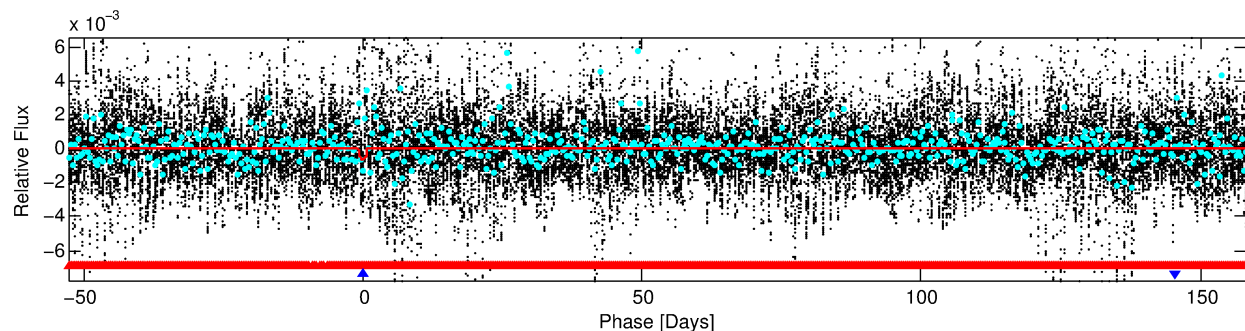
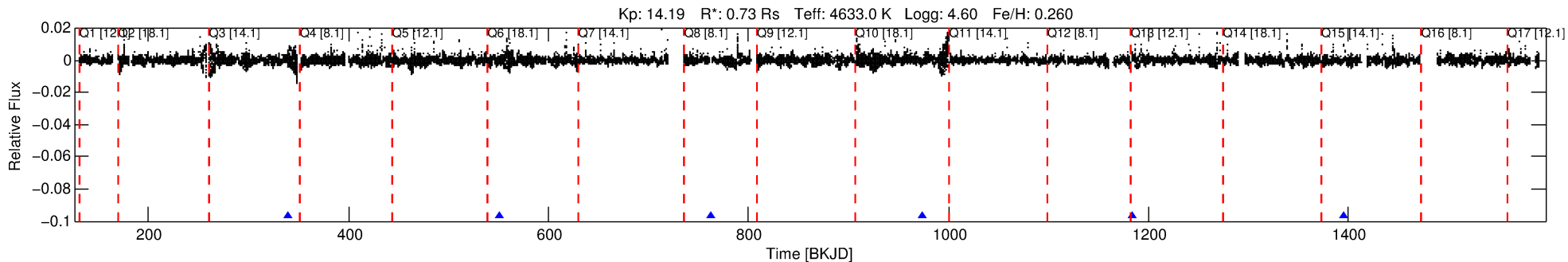
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010004510-02

No Significant Match Found

DV One-Page Summary

KIC: 10004510 Candidate: 2 of 2 Period: 211.065 d



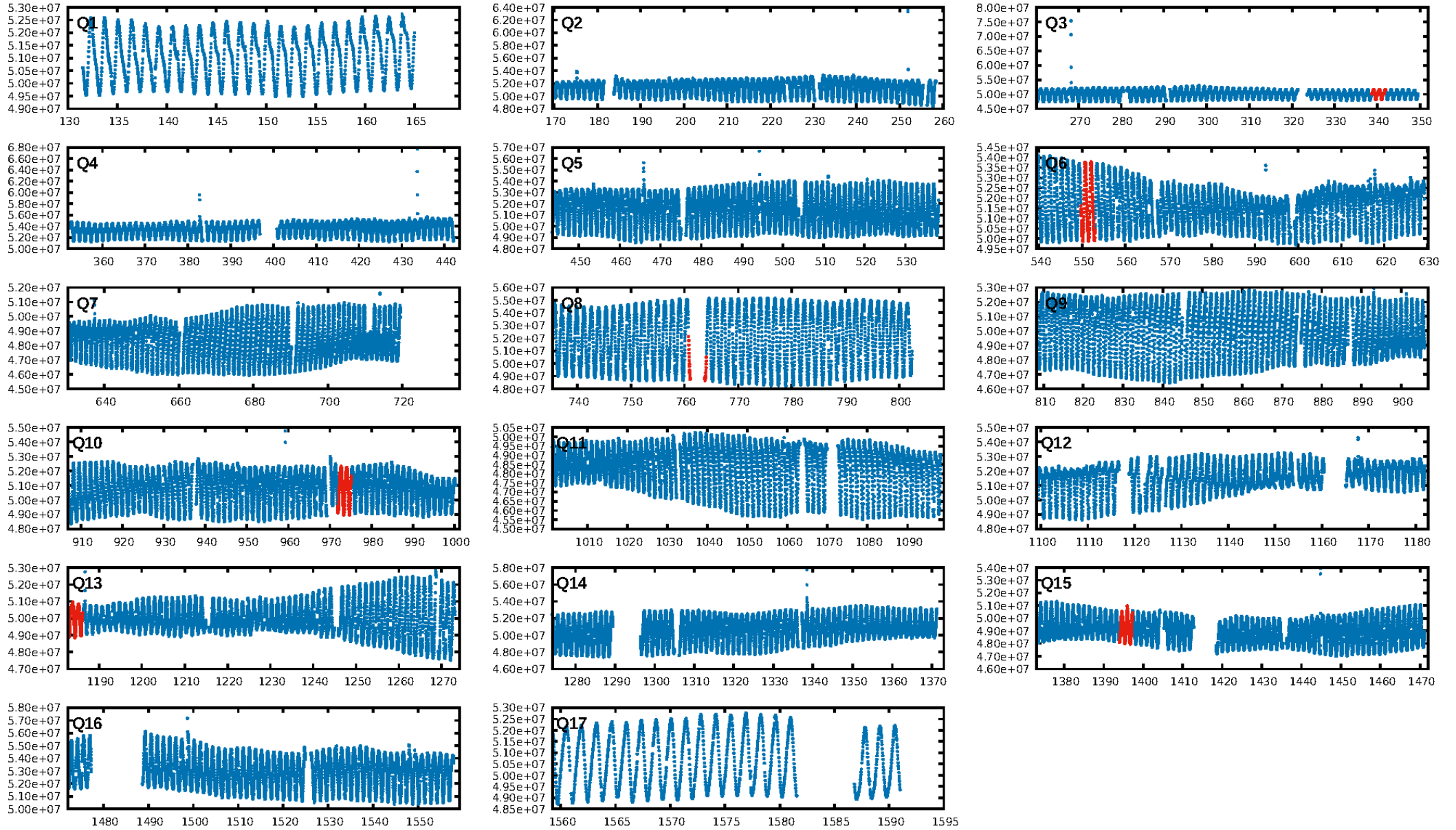
DV Fit Results:

Period = 211.06545 [2.31027] d
Epoch = 340.2712 [8.3617] BKJD
Rp/R* = 0.0320 [0.1062]
a/R* = 15.79 [377.56]
b = 0.96 [1.15]
Seff = 0.54 [0.09]
Teq = 219 [9] K
Rp = 2.55 [8.49] Re
a = 0.6397 [0.0361] AU
Ag = 2515.63 [19655.15] [0.13σ]
Teffp = 2394 [4676] K [0.47σ]

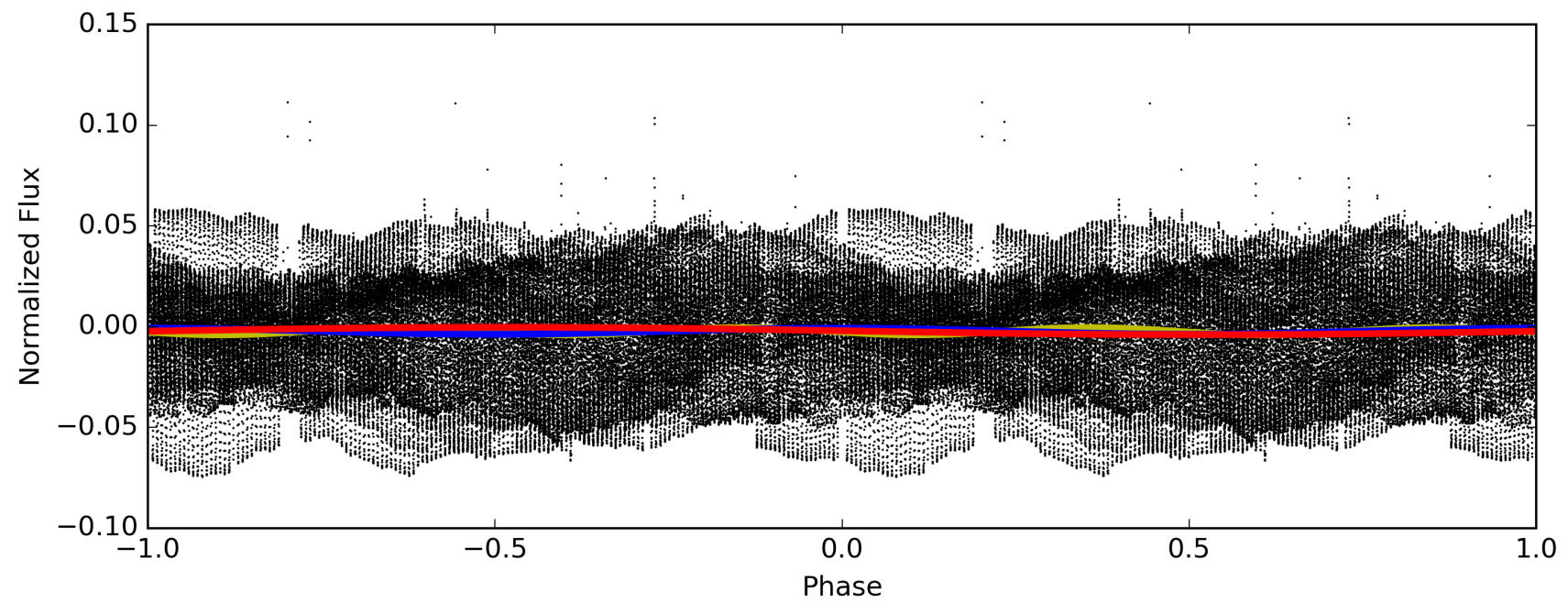
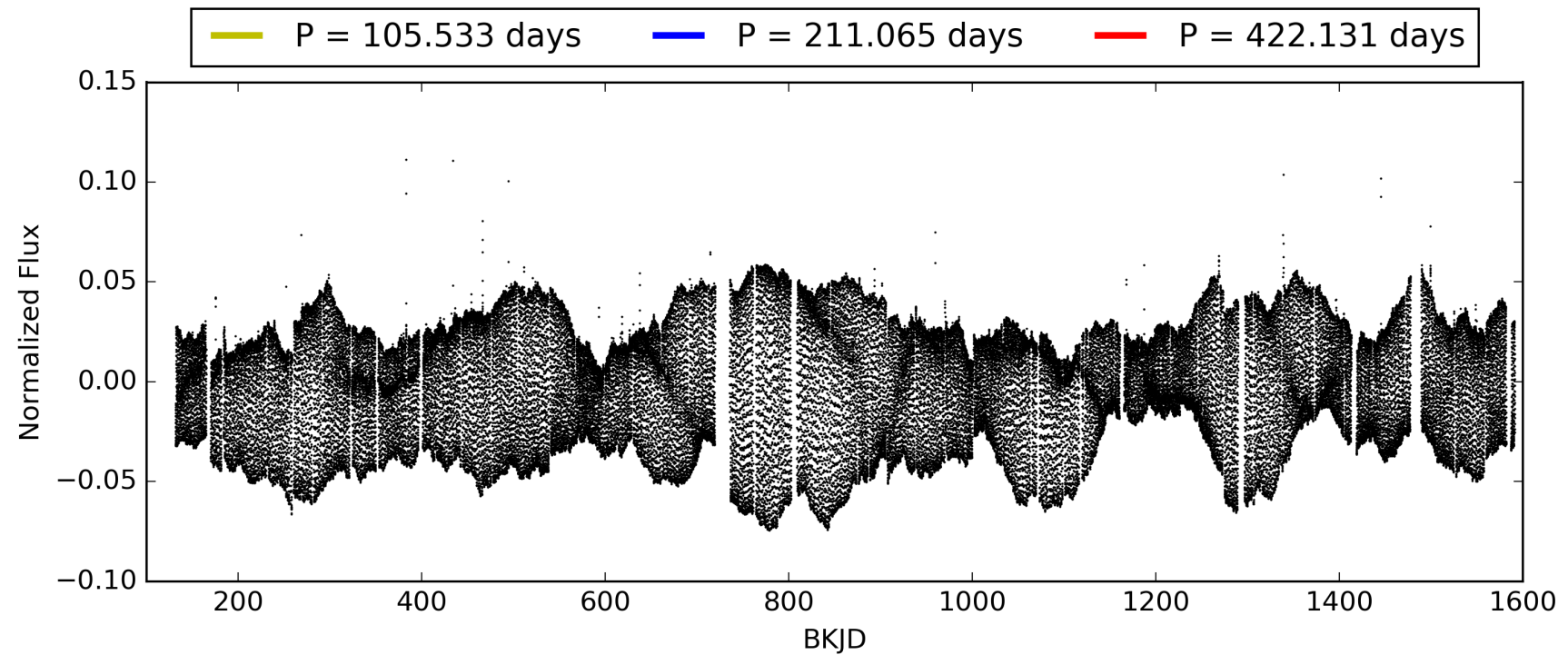
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [125.58σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 23.8%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 7.71e-14
RollingBand-fgt: 1.00 [5/5]
GhostDiagnostic-chr: -3.702
Centroid-sig: 4.6%
Centroid-so: 0.646 arcsec [1.94σ]
OotOffset-rm: 0.035 arcsec [0.51σ]
KicOffset-rm: 0.318 arcsec [2.91σ]
OotOffset-st: 1/1/0/0 [2]
KicOffset-st: 1/1/0/0 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 0.00 [0/2]

TCE 010004510-02, PDC Light Curves

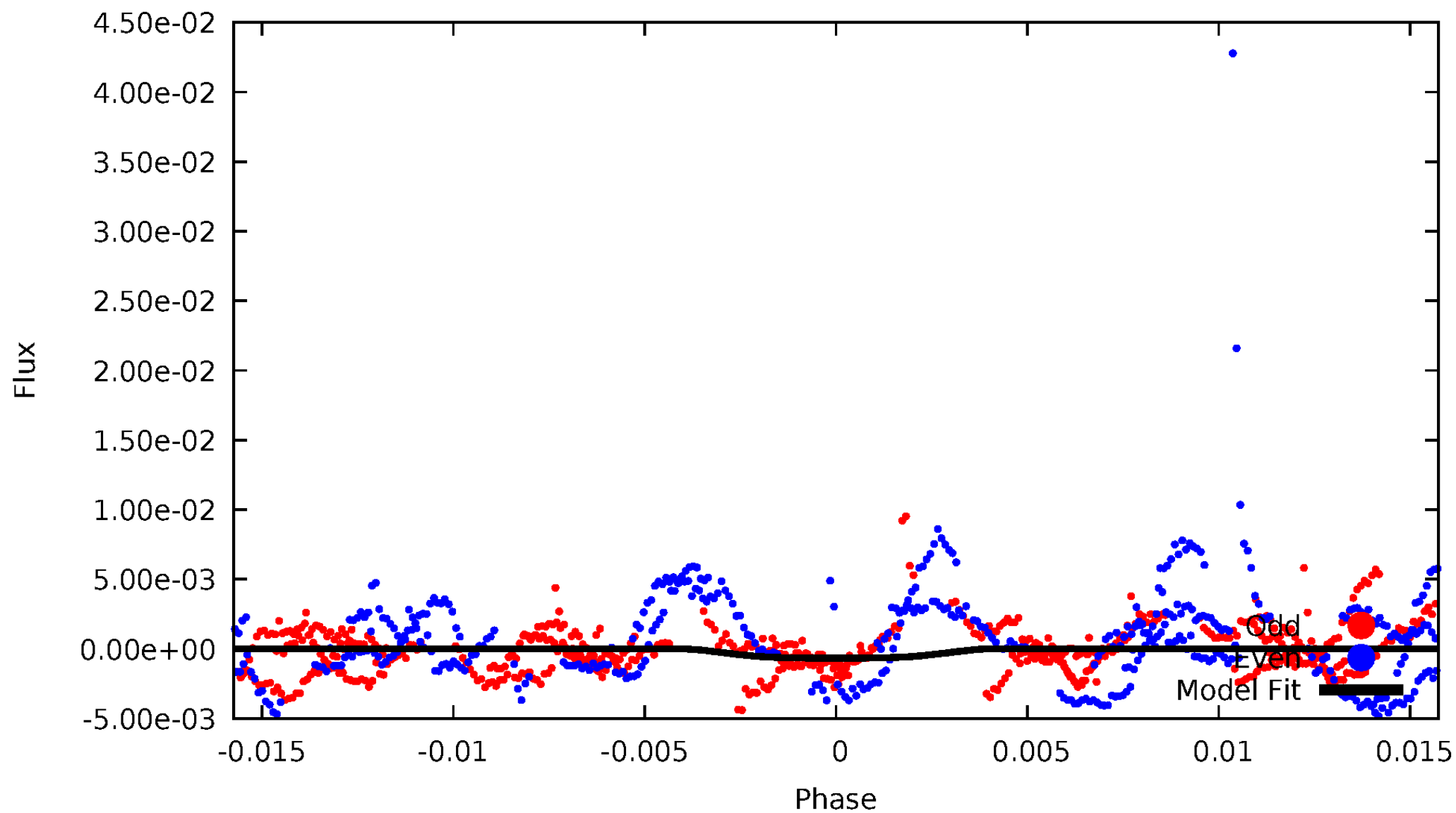


TCE 010004510-02



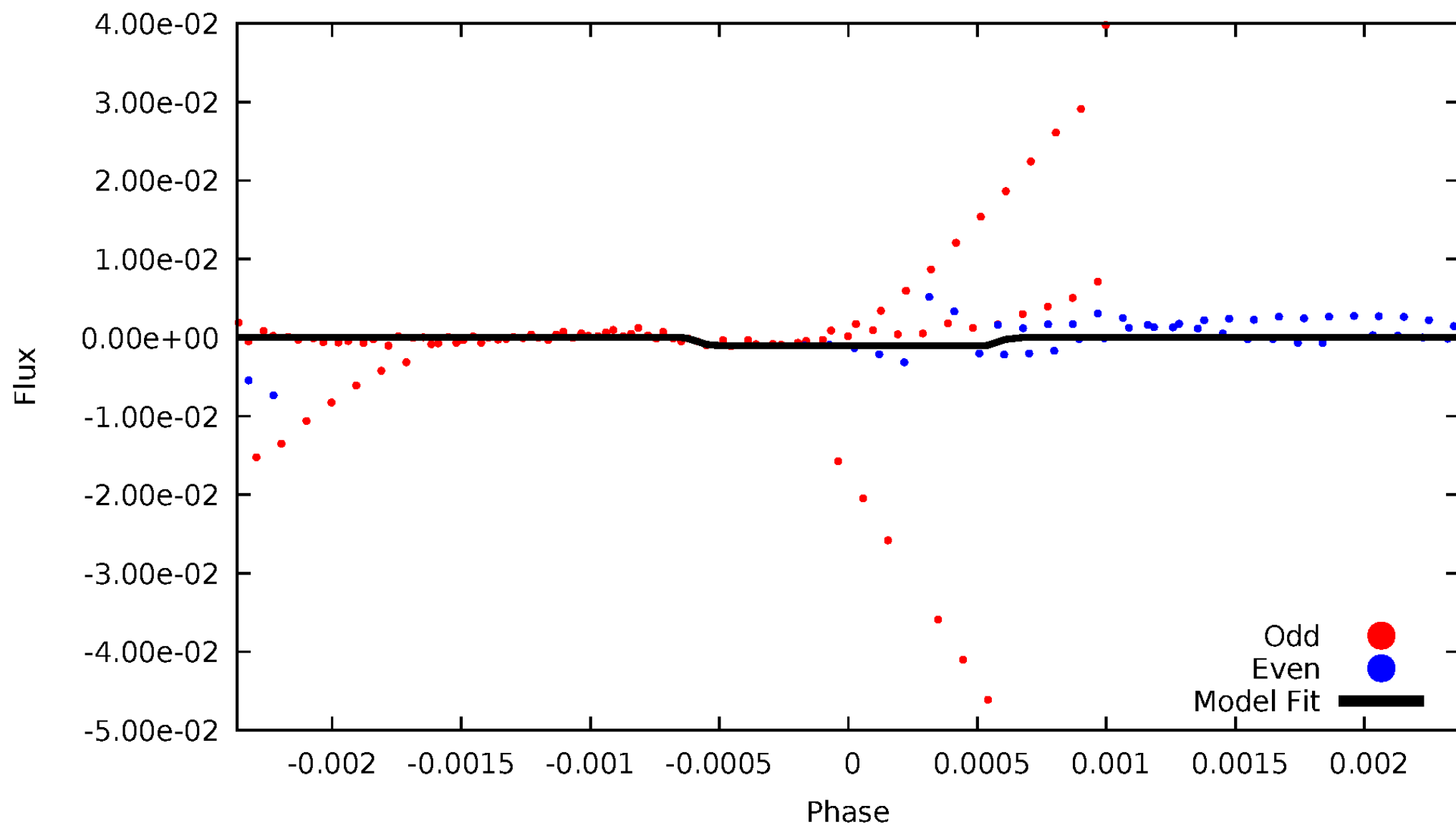
DV Odd/Even

TCE 010004510-02



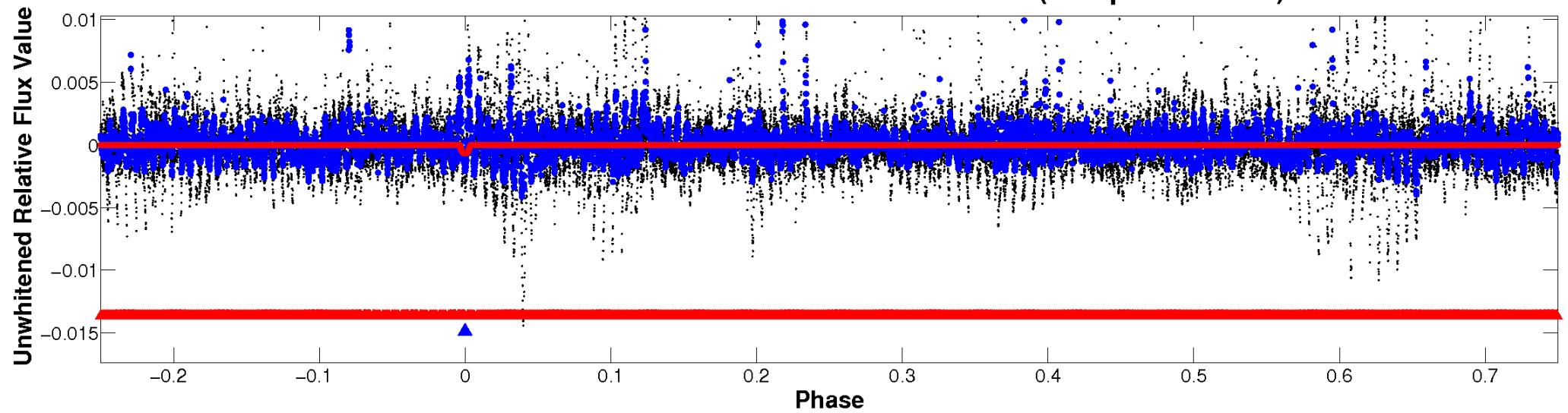
ALT Odd/Even

TCE 010004510-02

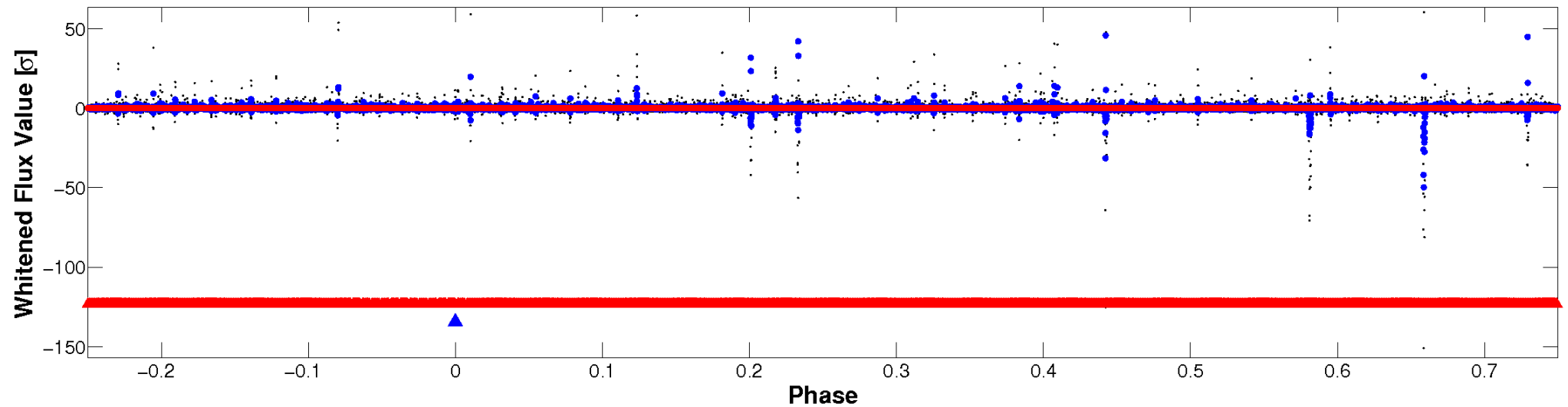


Non-Whitened Vs. Whitened Light Curve

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



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



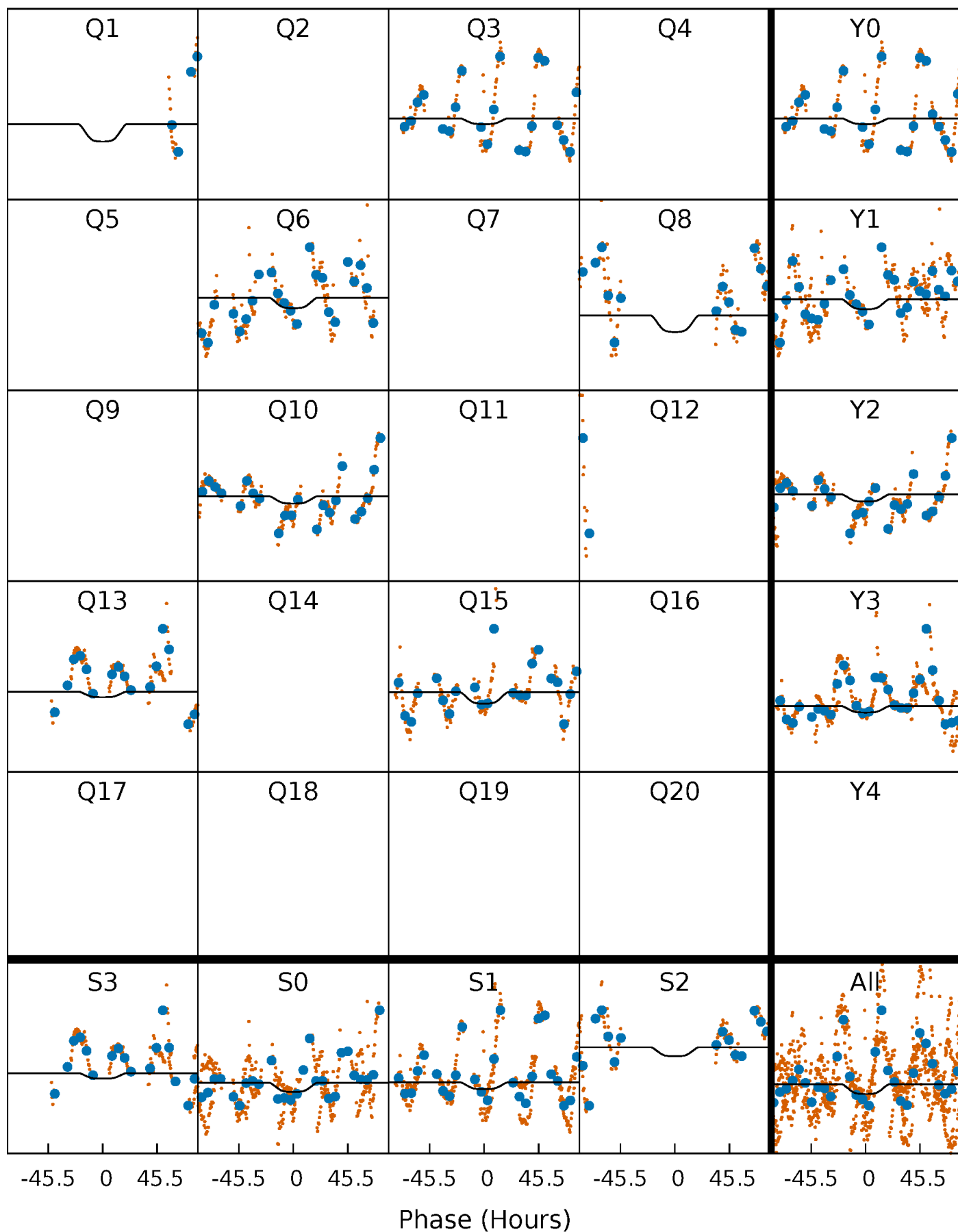
PDC Quarter-Phased Transit Curves

TCE 010004510-02 P=211.065453 Days $T_0=340.271162$ (BKJD)



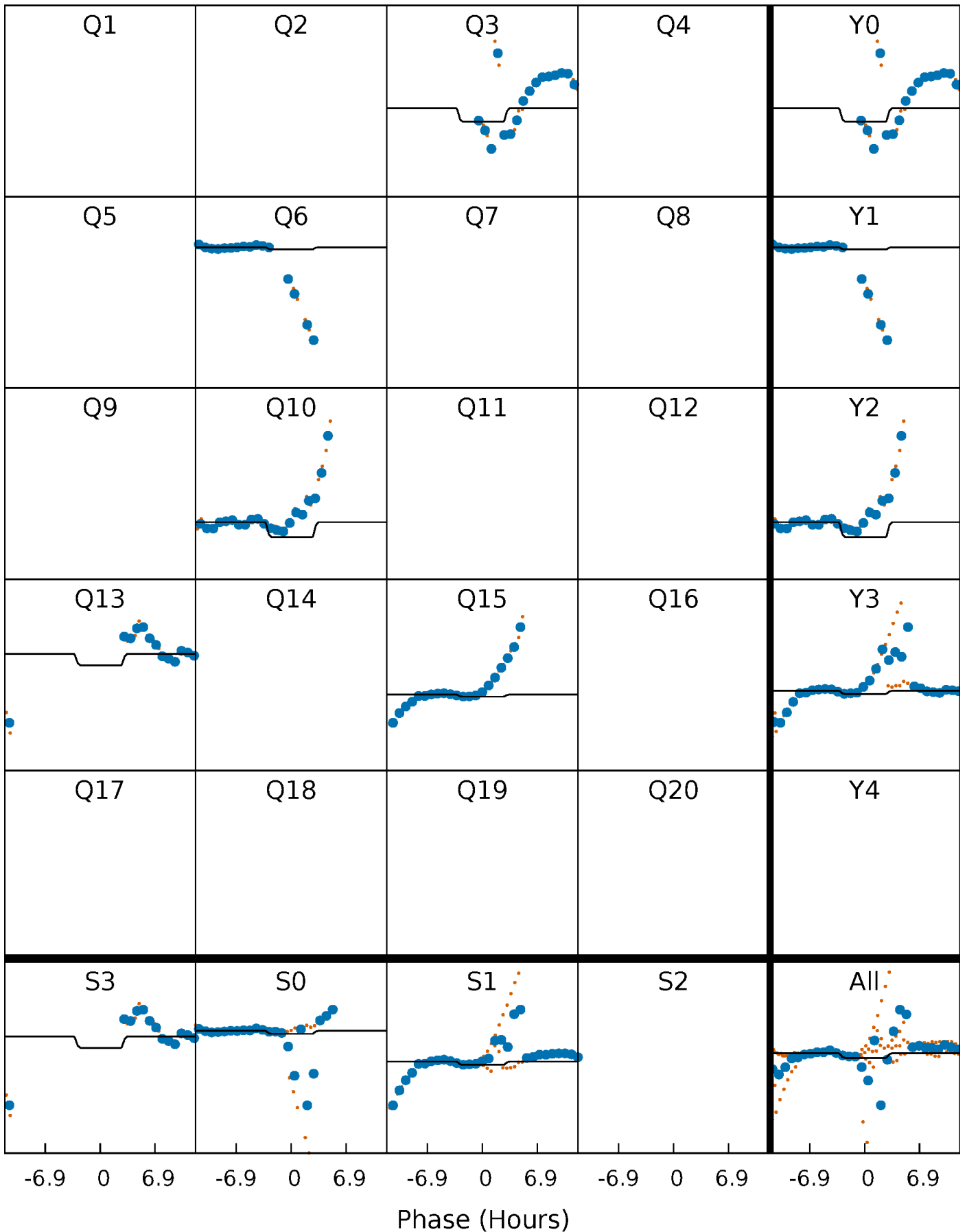
DV Quarter-Phased Transit Curves

TCE 010004510-02 P=211.065453 Days $T_0=340.271162$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

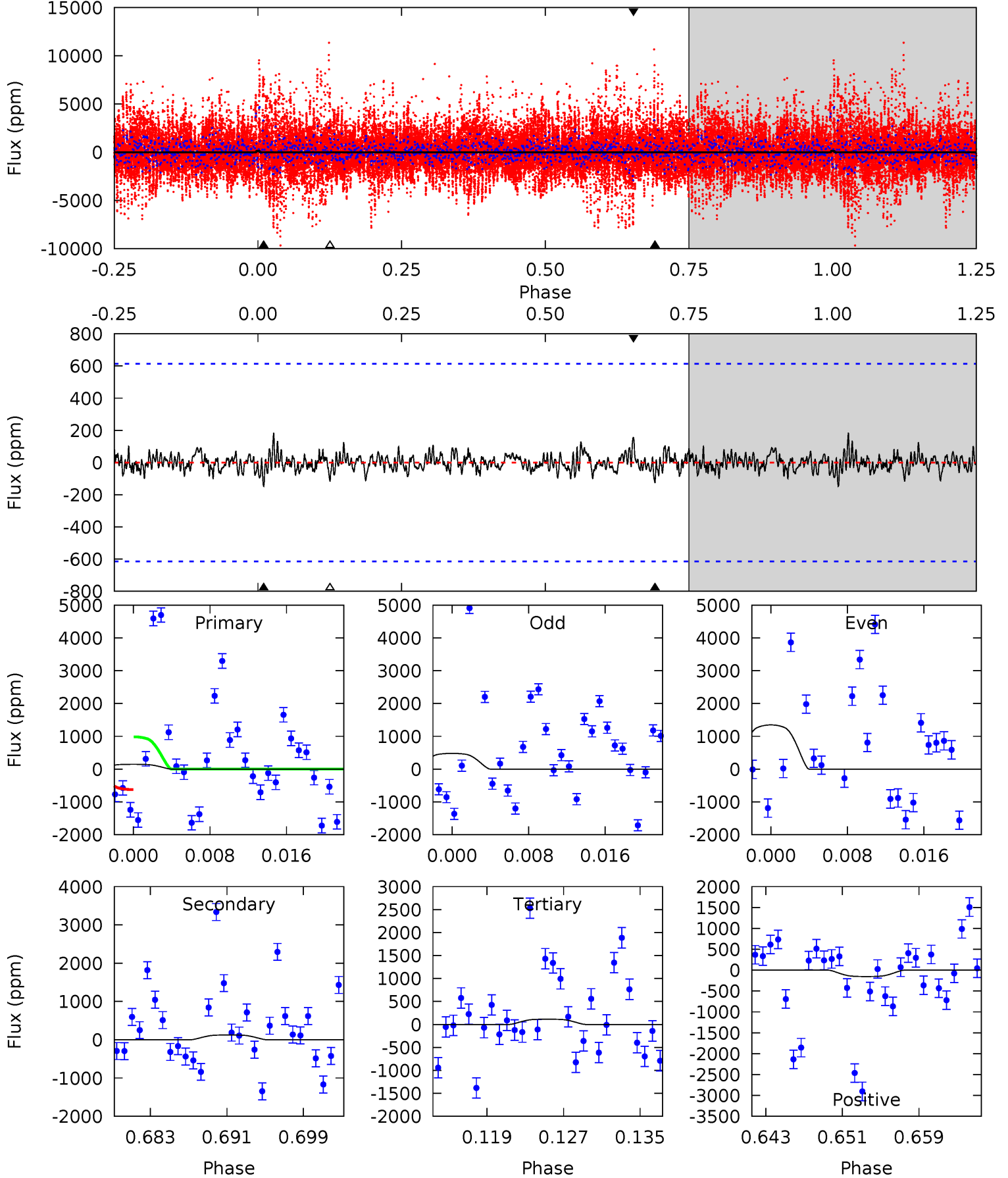
TCE 010004510-02 P=211.116027 Days $T_0=340.173495$ (BKJD)



DV Model-Shift Uniqueness Test

010004510-02, P = 211.065453 Days, E = 129.205709 Days

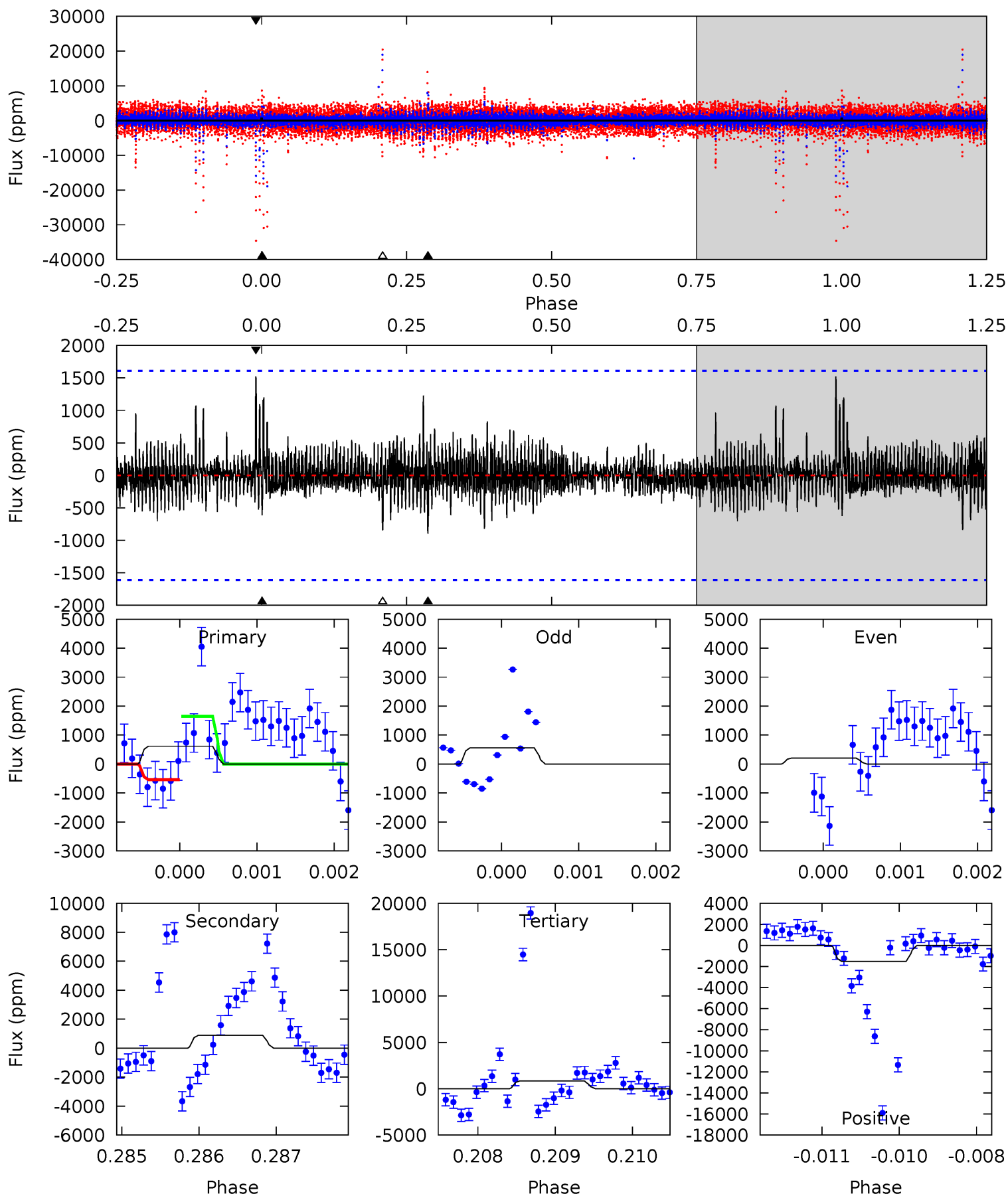
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.21	1.04	0.95	1.27	5.07	2.65	0.36	0.26	-0.06	0.09	-0.24	3.29	0.69	0.56	1.51



Alt Model-Shift Uniqueness Test

010004510-02, P = 211.116027 Days, E = 129.057468 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.07	2.98	2.82	5.11	5.42	3.24	0.76	-0.75	-3.04	0.16	-2.13	0.38	427.5	0.63	1.95



Stellar Parameters For KIC 010004510

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4633^{+163}_{-163}	$4.603^{+0.028}_{-0.039}$	$0.260^{+0.150}_{-0.300}$	$0.732^{+0.042}_{-0.052}$	$0.784^{+0.035}_{-0.069}$	$2.816^{+0.417}_{-0.397}$
	+4%/-4%	+1%/-1%	+58%/-115%	+6%/-7%	+4%/-9%	+15%/-14%
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 010004510-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-126 ± 121	$6.67^{+7.05}_{-4.63}$	307^{+11}_{-12}	2405^{+984}_{-676}	464^{+5444}_{-444}
Alt.	-887 ± 297	$6.78^{+6.67}_{-4.84}$	306^{+12}_{-12}	3205^{+1868}_{-583}	4092^{+51856}_{-3167}

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 $A_{obs} \gg 1.0$

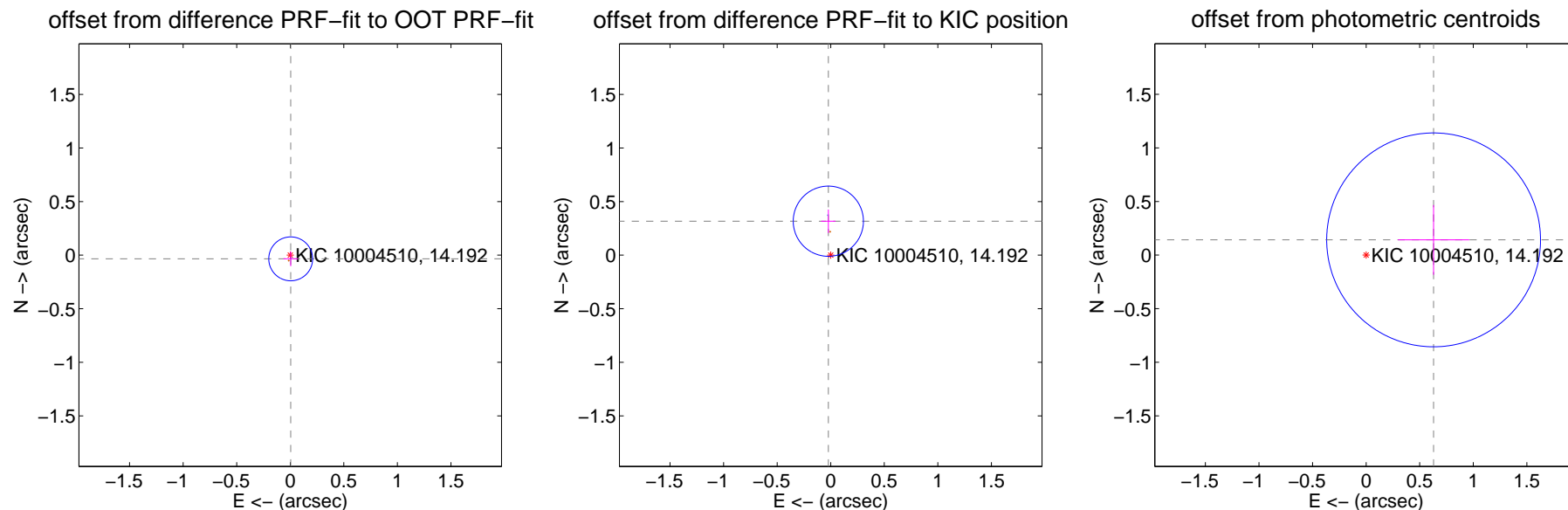
DV Centroid Data

Supplemental centroid analysis for 010004510-02. Kepler magnitude: 14.19. Transit SNR 0.85

There are 1 quarters with good PRF difference image offsets

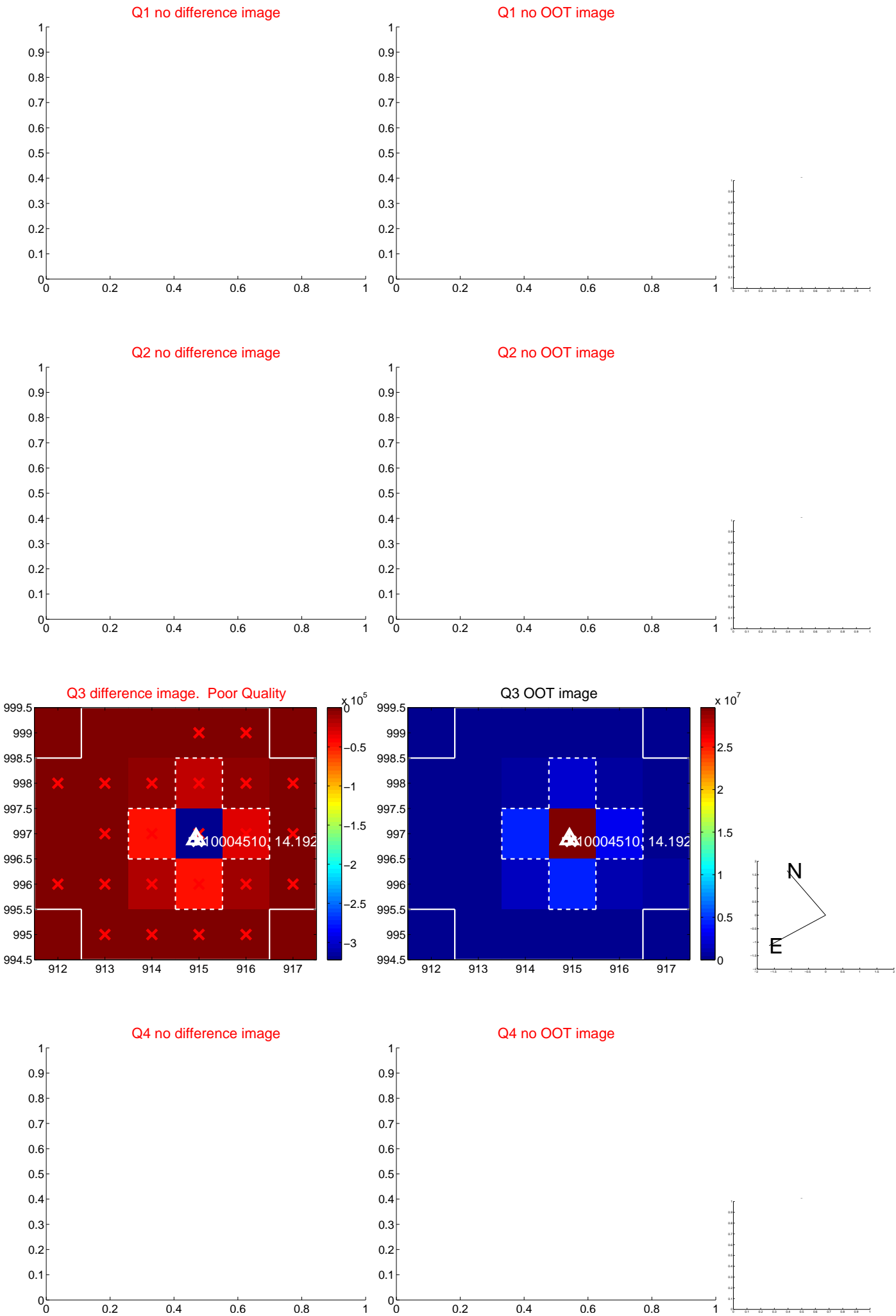
The direct PRF centroid is offset from the target star catalog position by about 0.40 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.035 ± 0.068	0.51	-0.004 ± 0.068	-0.034 ± 0.068
PRF-fit source offset from KIC position	0.318 ± 0.109	2.91	0.022 ± 0.068	0.317 ± 0.109
photometric centroid source offset	0.65 ± 0.33	1.94	-0.63 ± 0.33	0.14 ± 0.33



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.

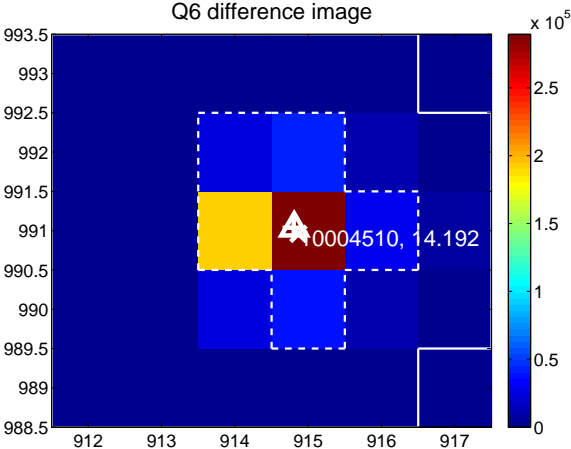
Q5 no difference image



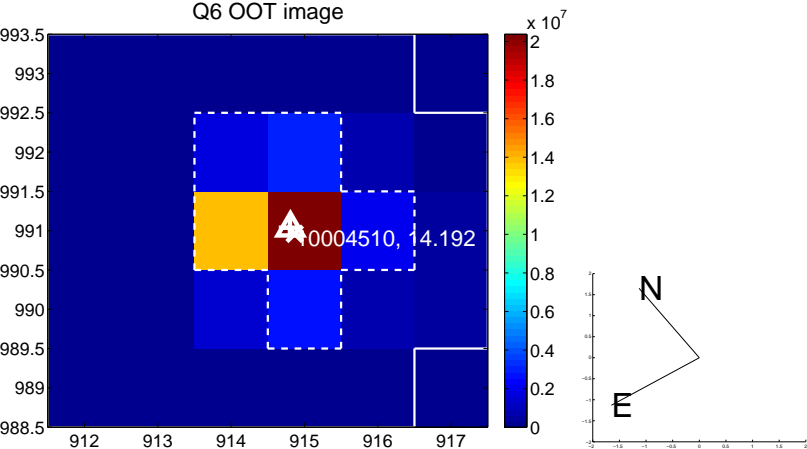
Q5 no OOT image



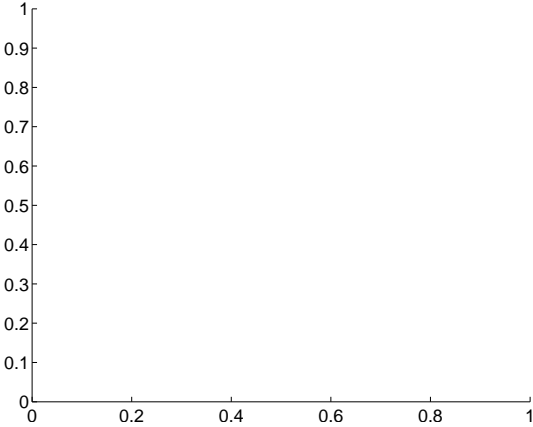
Q6 difference image



Q6 OOT image



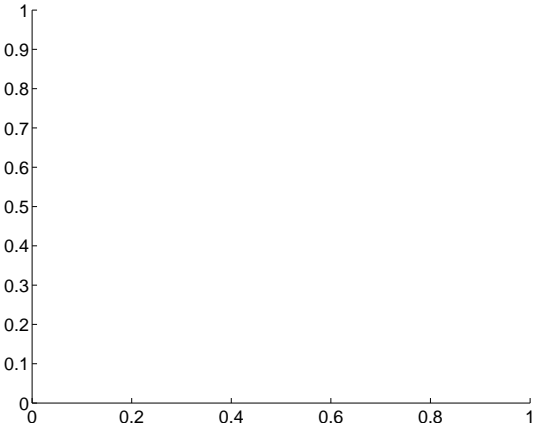
Q7 no difference image



Q7 no OOT image



Q8 no difference image



Q8 no OOT image



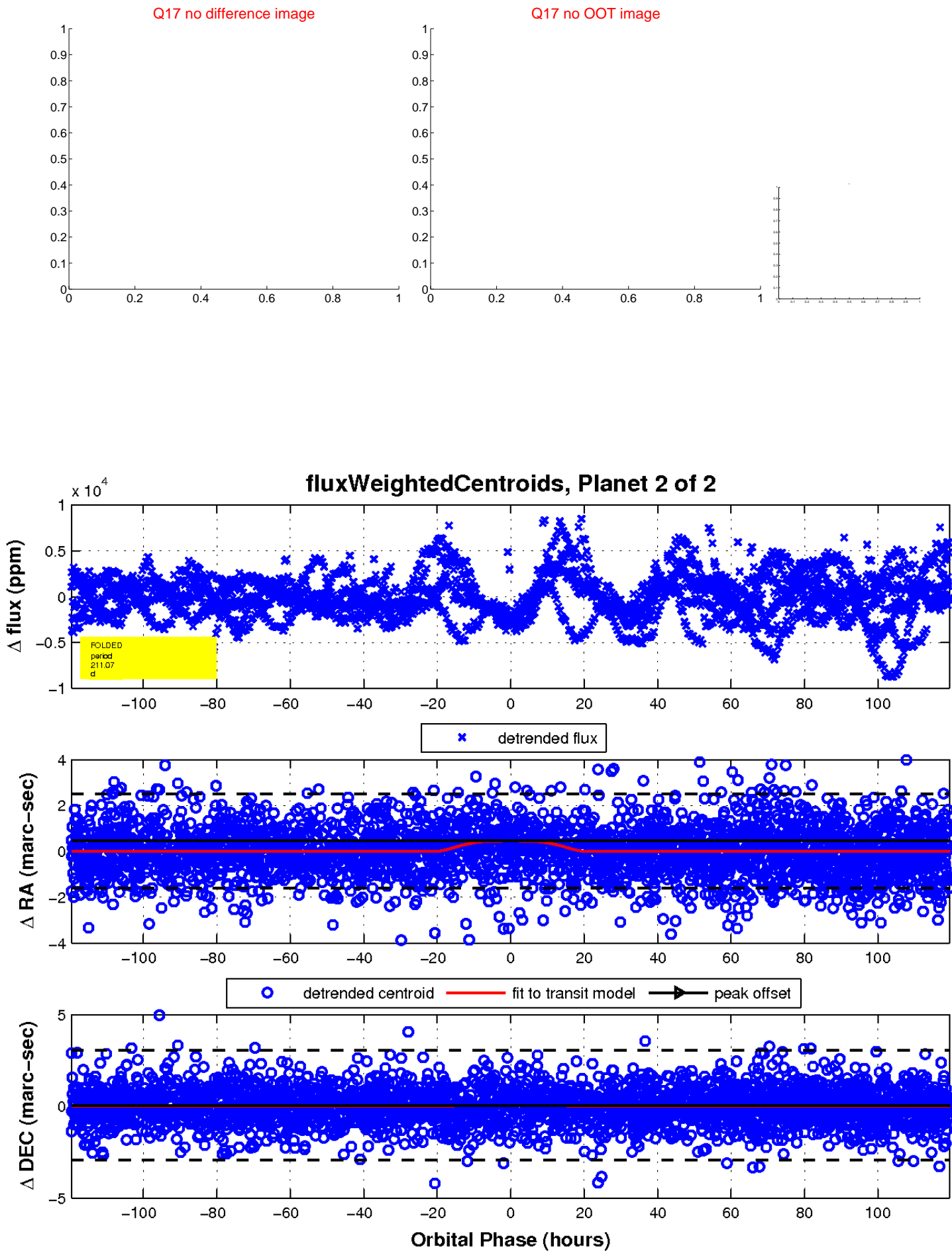
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

