

KIC 003531231

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})
003531231-01	OBS	7657.01	62.059782	134.517344	405.2	26.877	9.8	13.8	0.78	5526	1.96	6.09
003531231-02	OBS	No	62.064146	170.030766	377.6	19.851	10.1	10.1	0.78	5526	1.84	6.08

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003531231-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET
003531231-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET

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

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

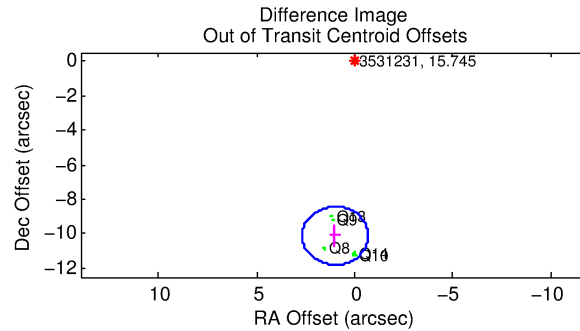
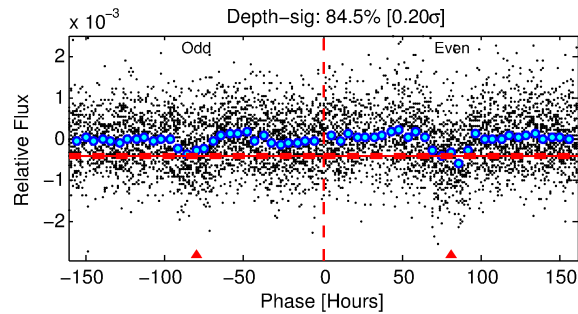
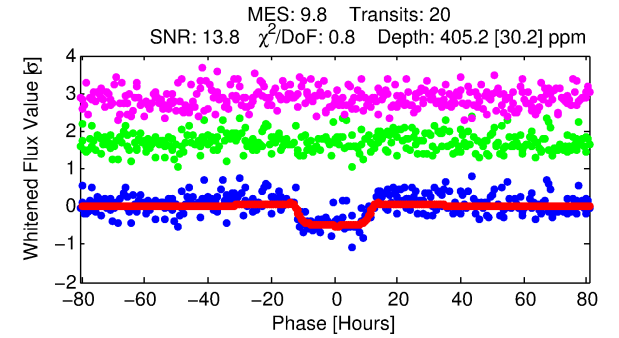
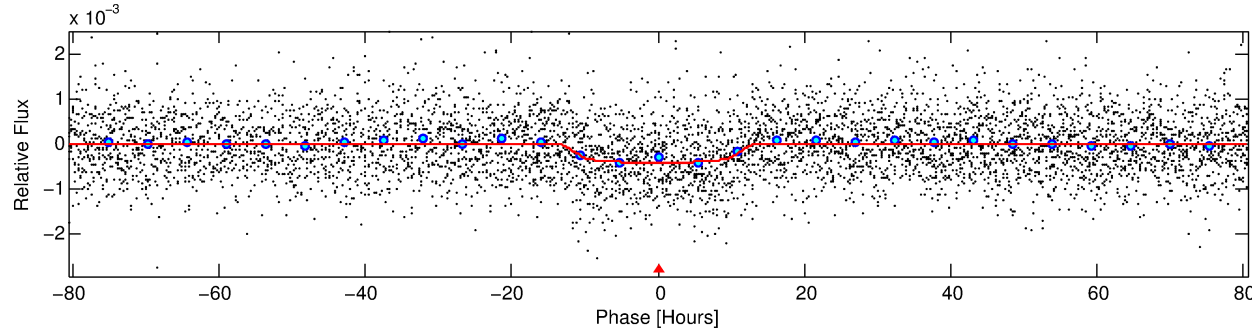
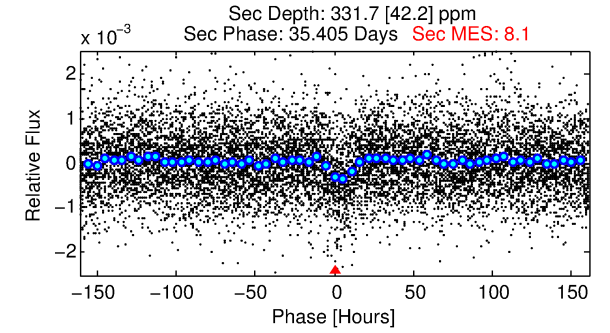
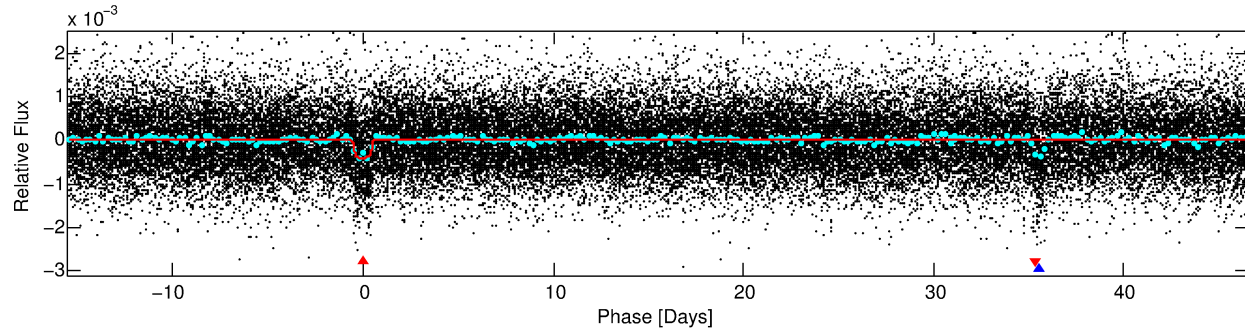
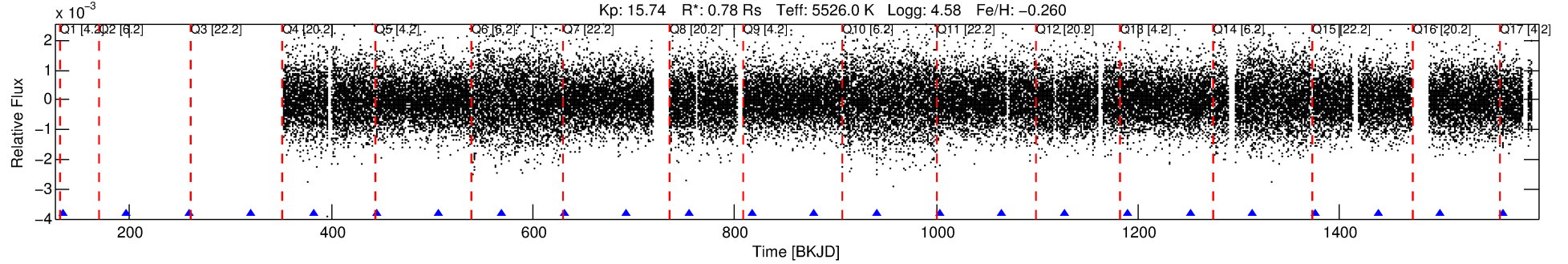
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 003531231-01

No Significant Match Found

DV One-Page Summary

KIC: 3531231 Candidate: 1 of 2 Period: 62.060 d



DV Fit Results:

Period = 62.05978 [0.00319] d
Epoch = 134.5173 [0.0461] BKJD
Rp/R* = 0.0229 [0.0016]
a/R* = 7.50 [1.85]
b = 0.93 [0.04]
Seff = 6.09 [1.87]
Teq = 401 [31] K
Rp = 1.96 [0.48] Re
a = 0.2905 [0.0558] AU
Ag = 4021.45 [1326.58] [3.03σ]
Teff = 4931 [292] K [15.42σ]

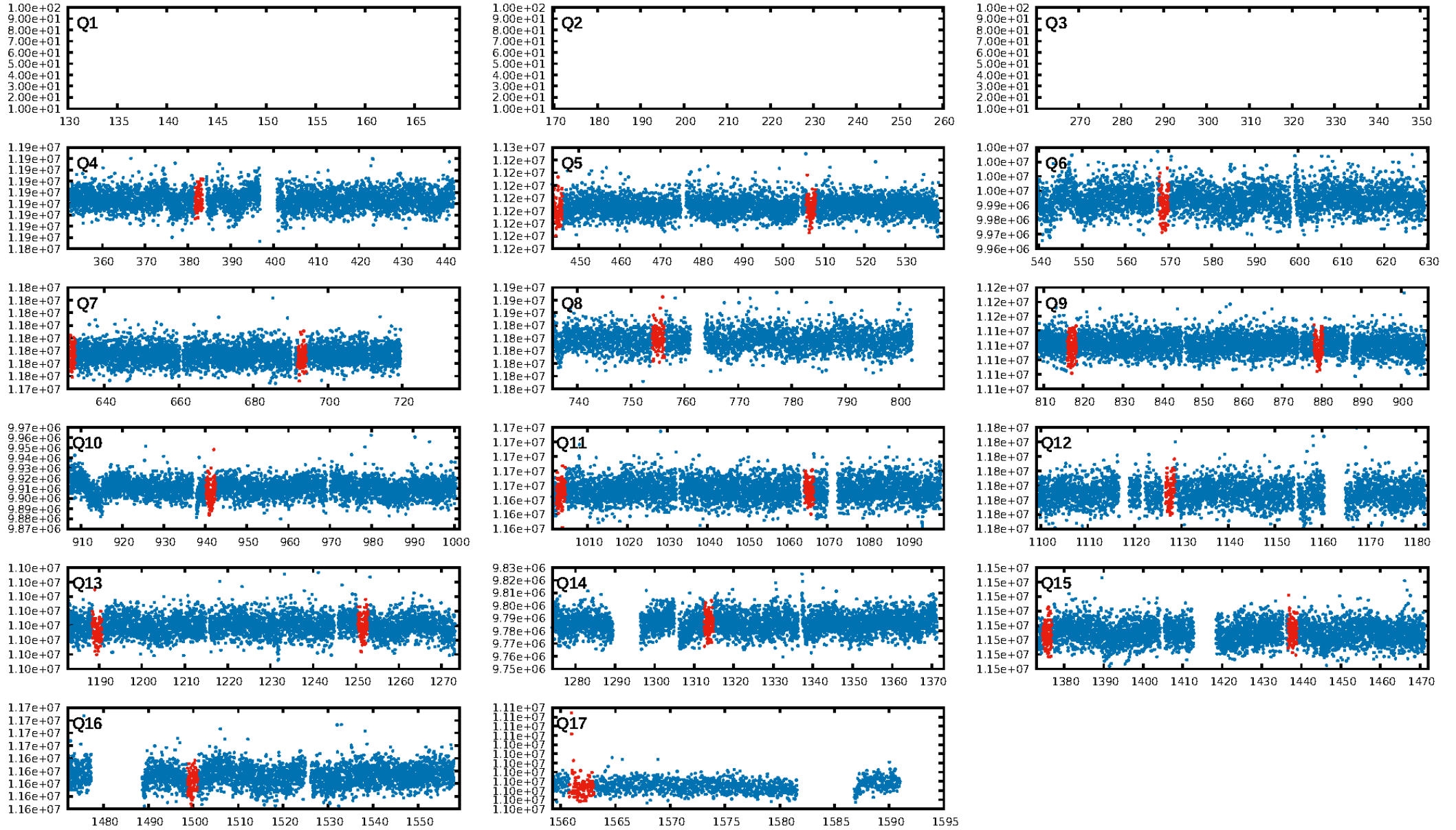
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.3% [0.00σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGoF-sig: 100.0%
Bootstrap-pfa: 9.05e-19
RollingBand-fgt: 1.00 [19/19]
GhostDiagnostic-chr: -0.3266
Centroid-sig: 0.0%
Centroid-so: 41.969 arcsec [30.66σ]
OotOffset-rm: 10.166 arcsec [18.16σ]
KicOffset-rm: 10.323 arcsec [17.15σ]
OotOffset-st: 2/0/1/2 [5]
KicOffset-st: 2/0/1/2 [5]
DiffImageQuality-fgm: 1.00 [5/5]
DiffImageOverlap-fno: 1.00 [5/5]

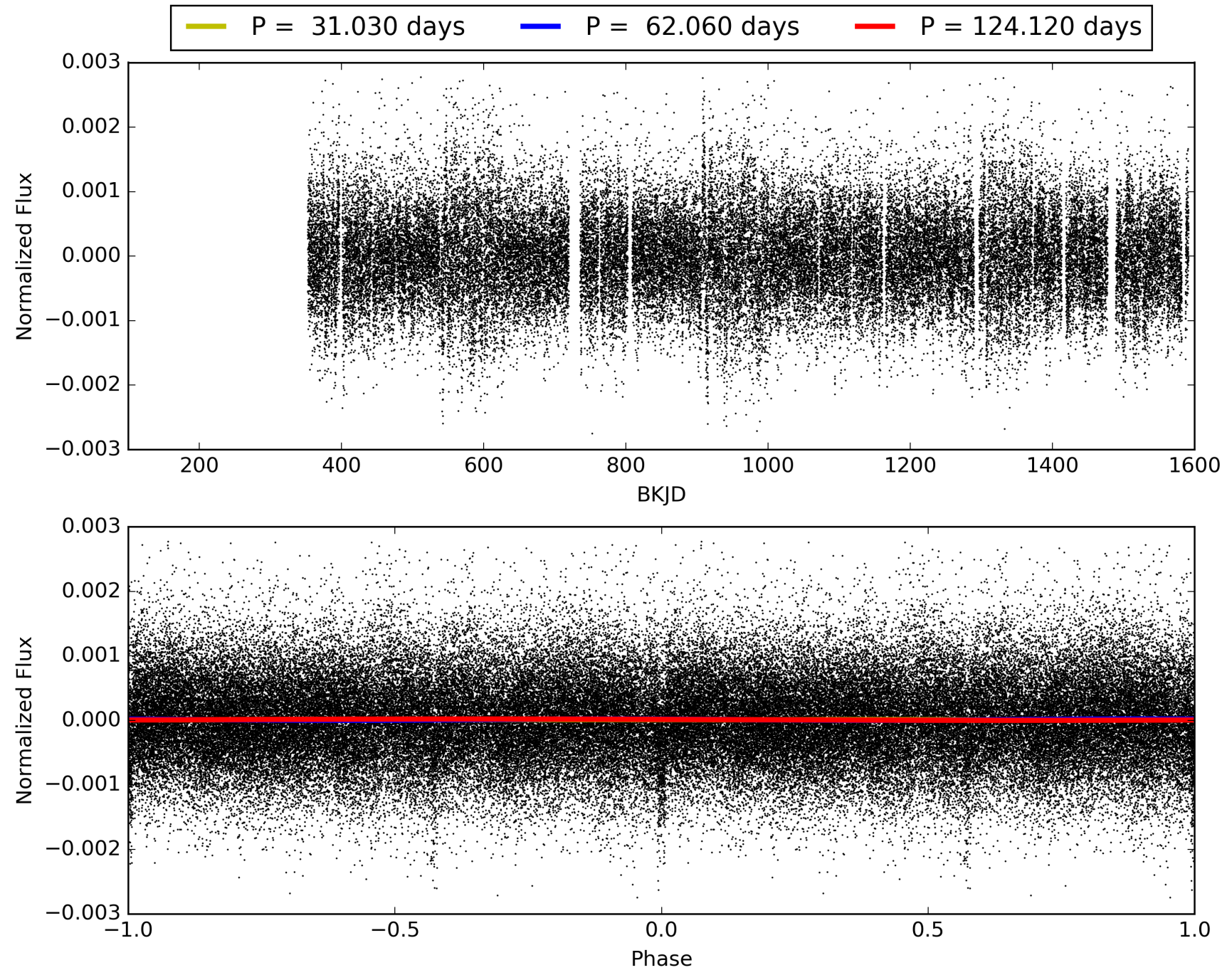
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:02:58 Z

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

TCE 003531231-01, PDC Light Curves

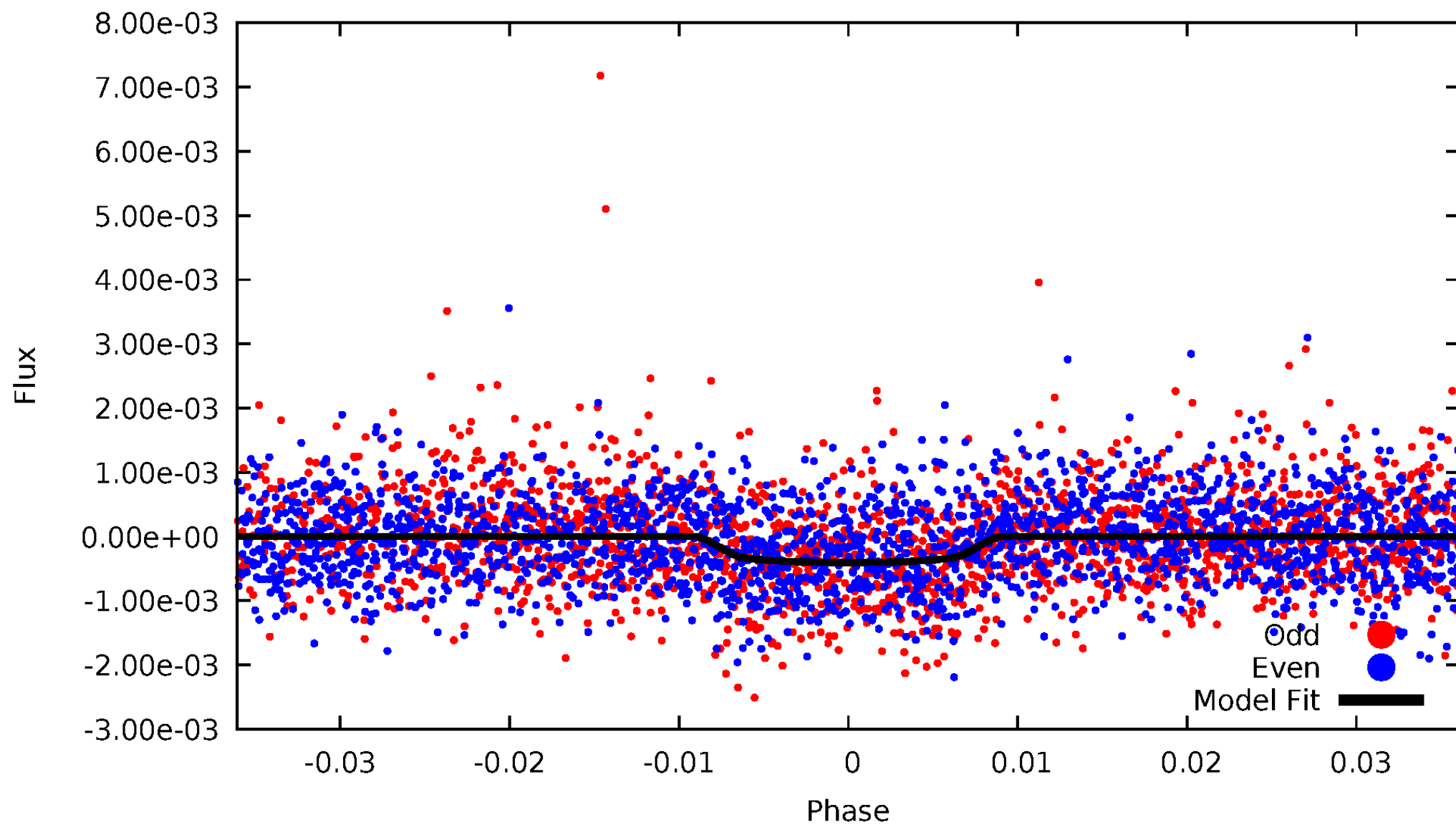


TCE 003531231-01



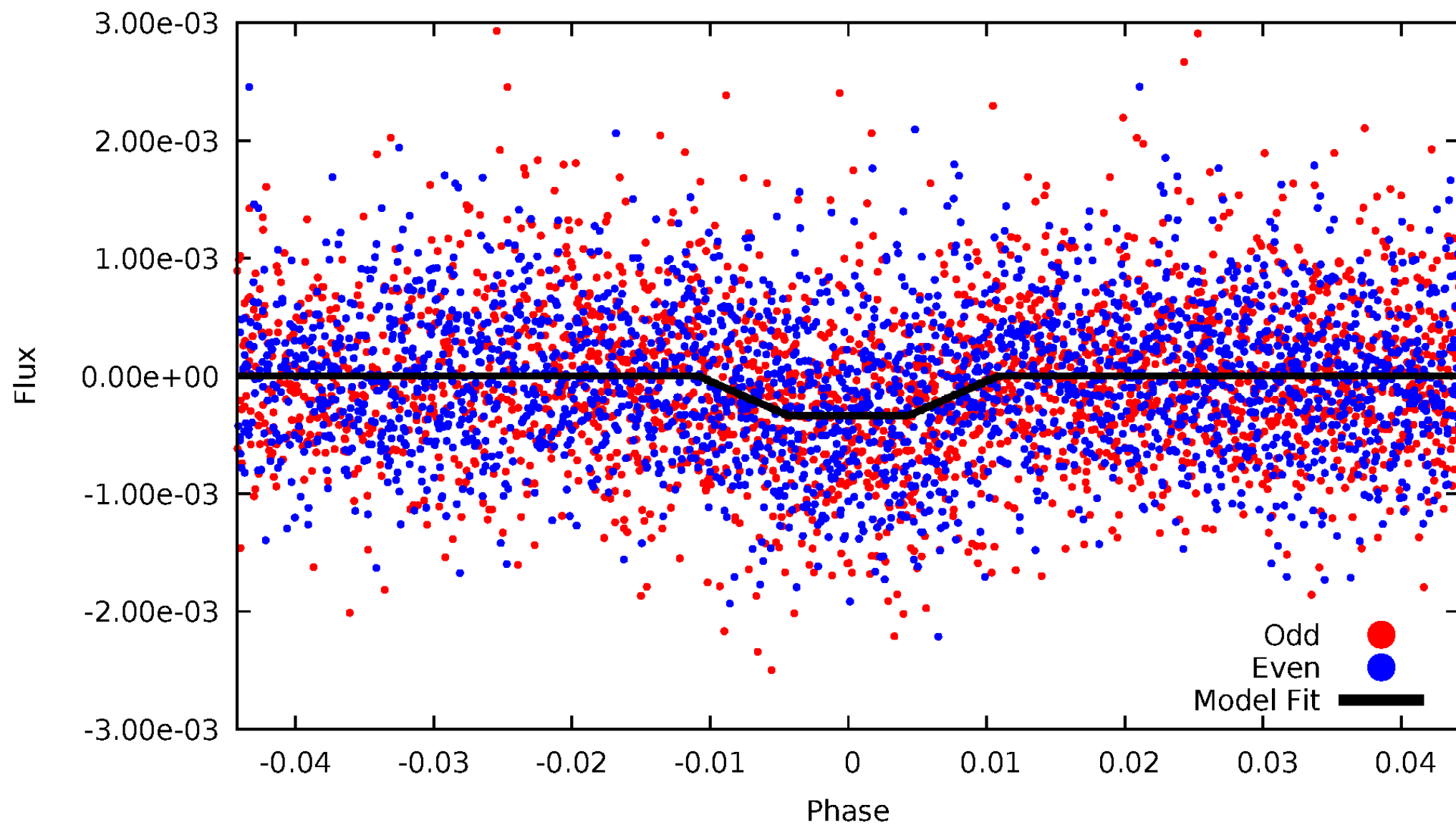
DV Odd/Even

TCE 003531231-01



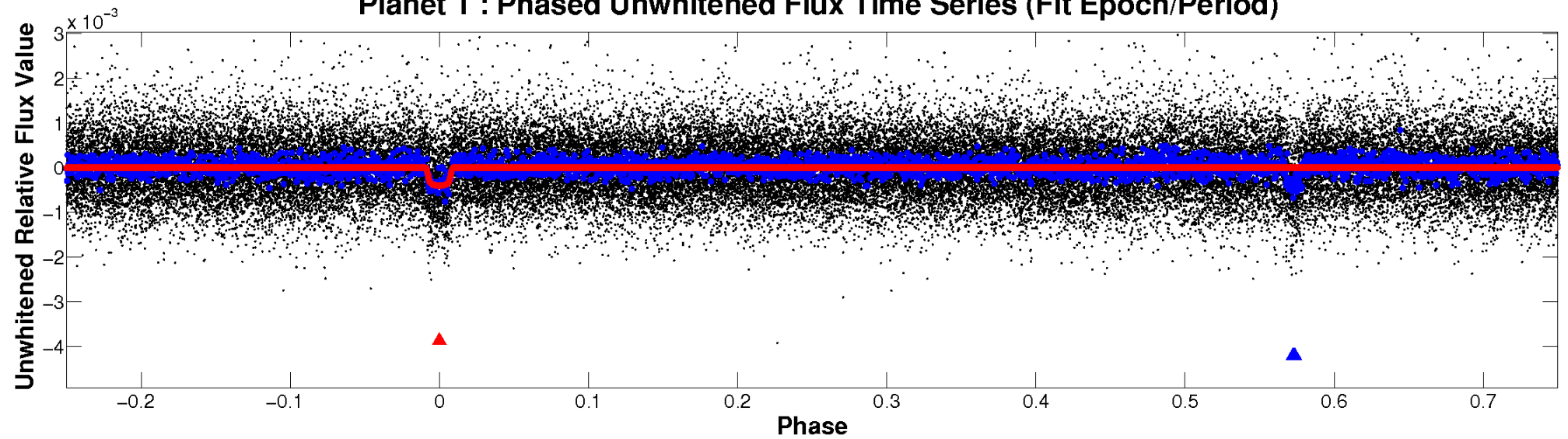
ALT Odd/Even

TCE 003531231-01

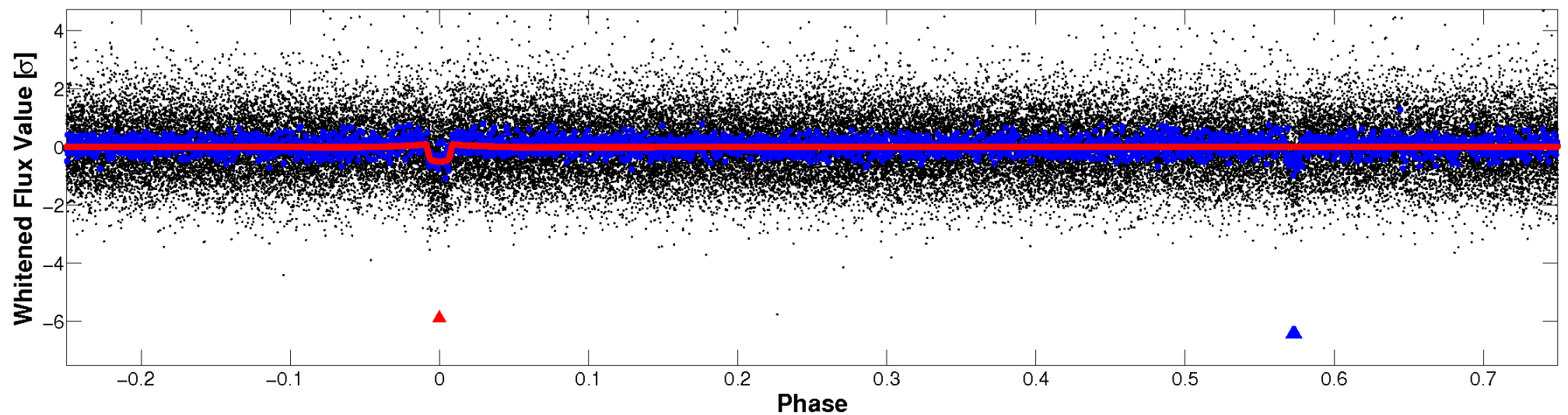


Non-Whitened Vs. Whitened Light Curve

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

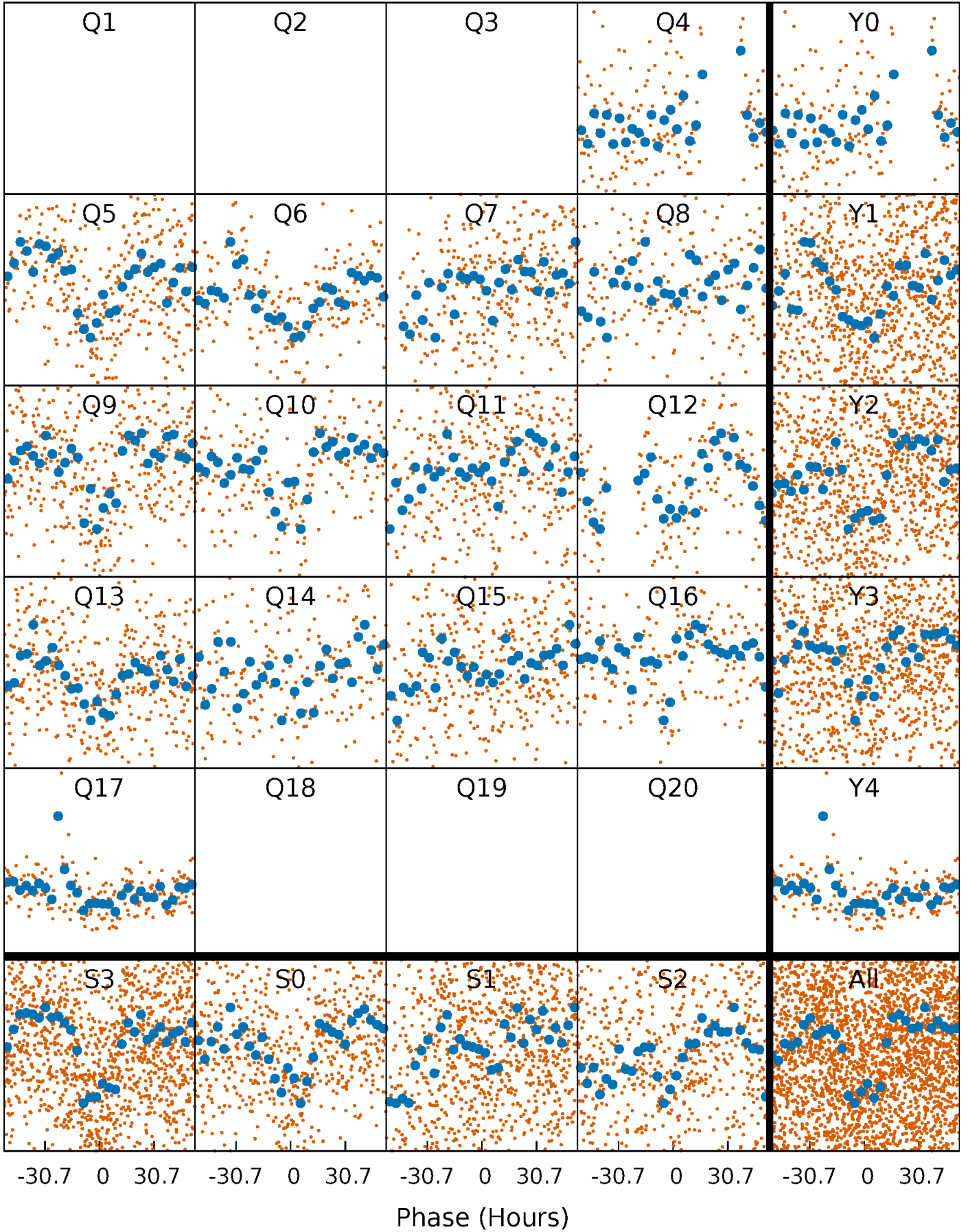


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



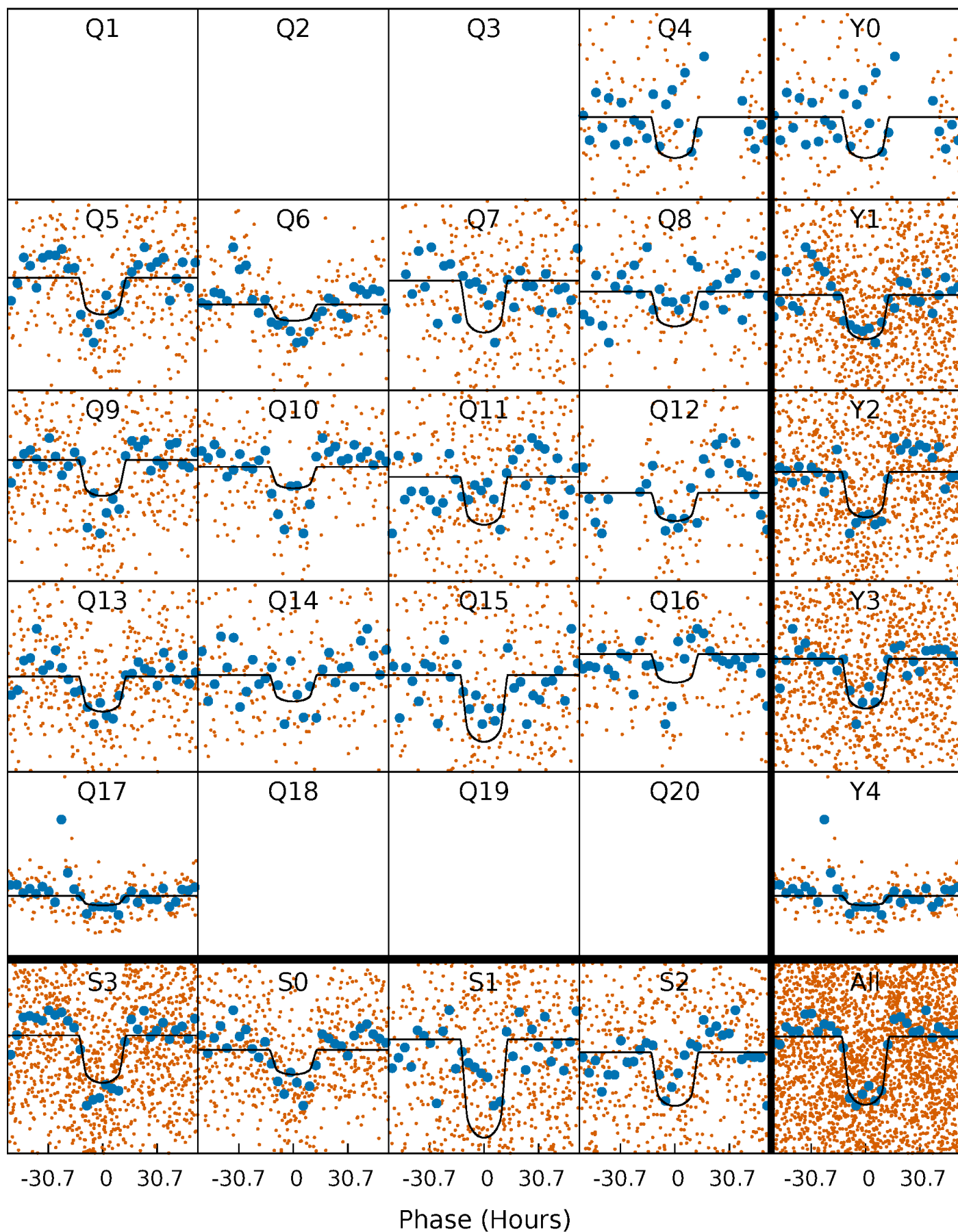
PDC Quarter-Phased Transit Curves

TCE 003531231-01 P= 62.059782 Days $T_0=134.517344$ (BKJD)



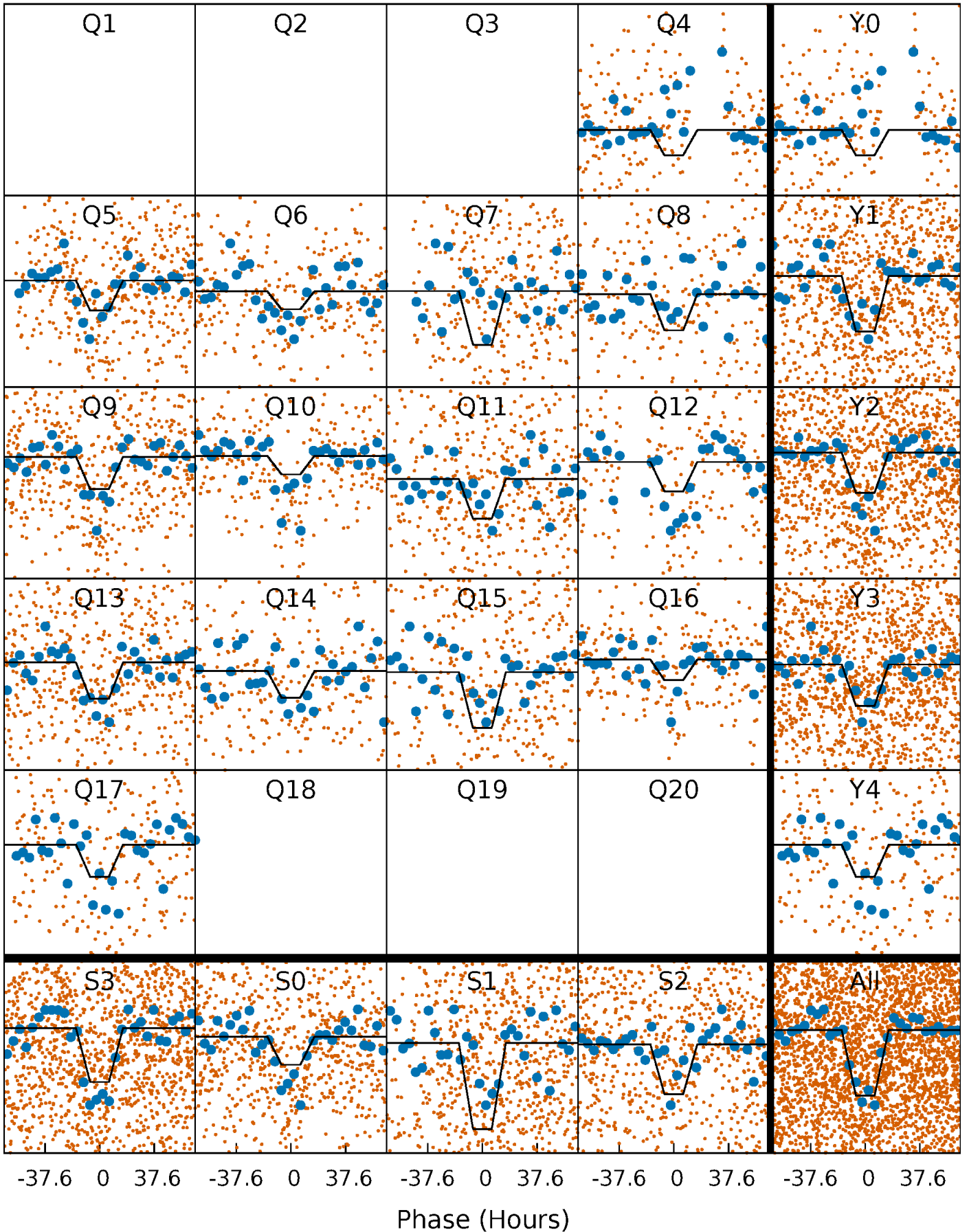
DV Quarter-Phased Transit Curves

TCE 003531231-01 P= 62.059782 Days $T_0=134.517344$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

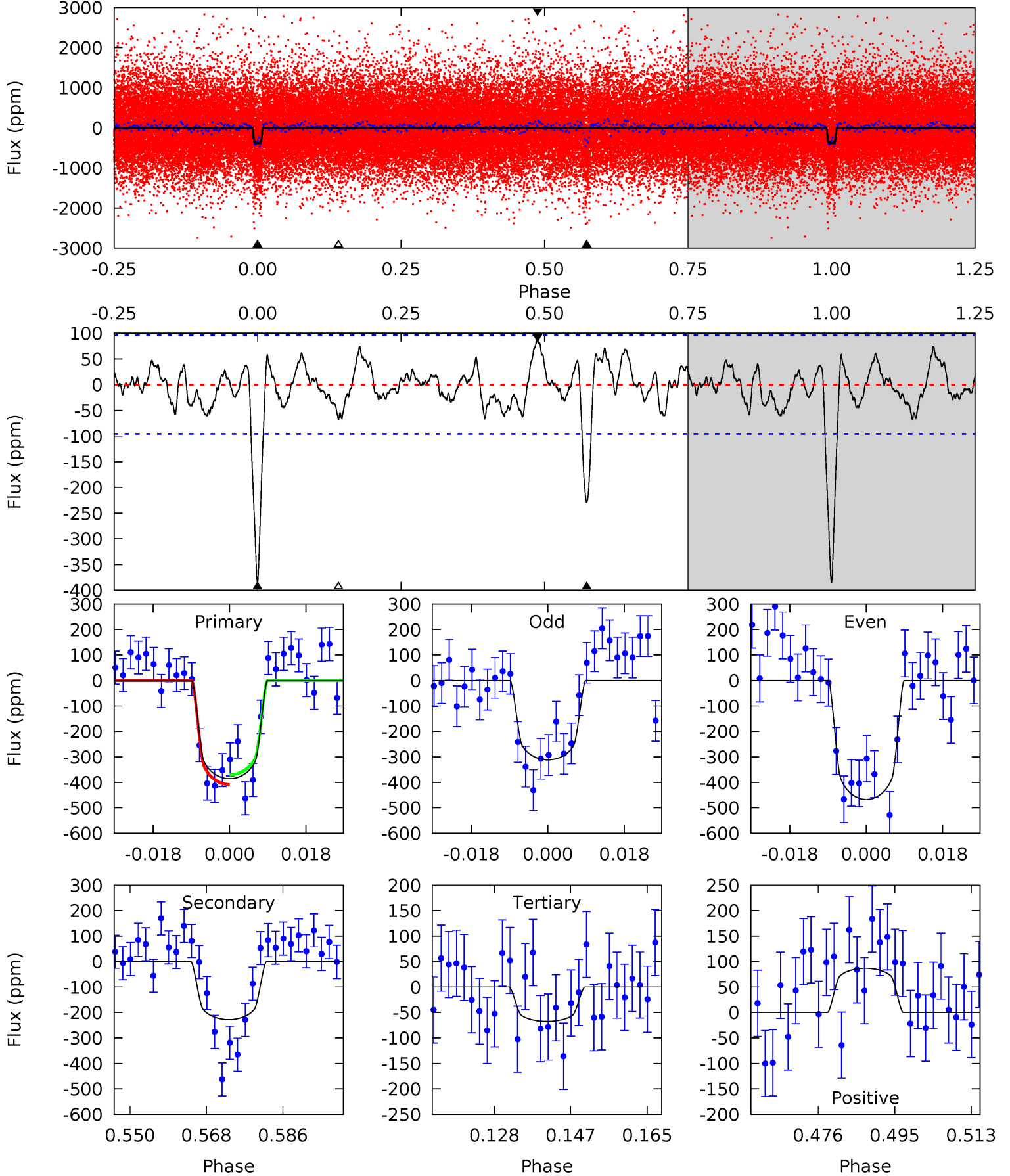
TCE 003531231-01 P= 62.042030 Days $T_0=134.749545$ (BKJD)



DV Model-Shift Uniqueness Test

003531231-01, P = 62.059782 Days, E = 134.517344 Days

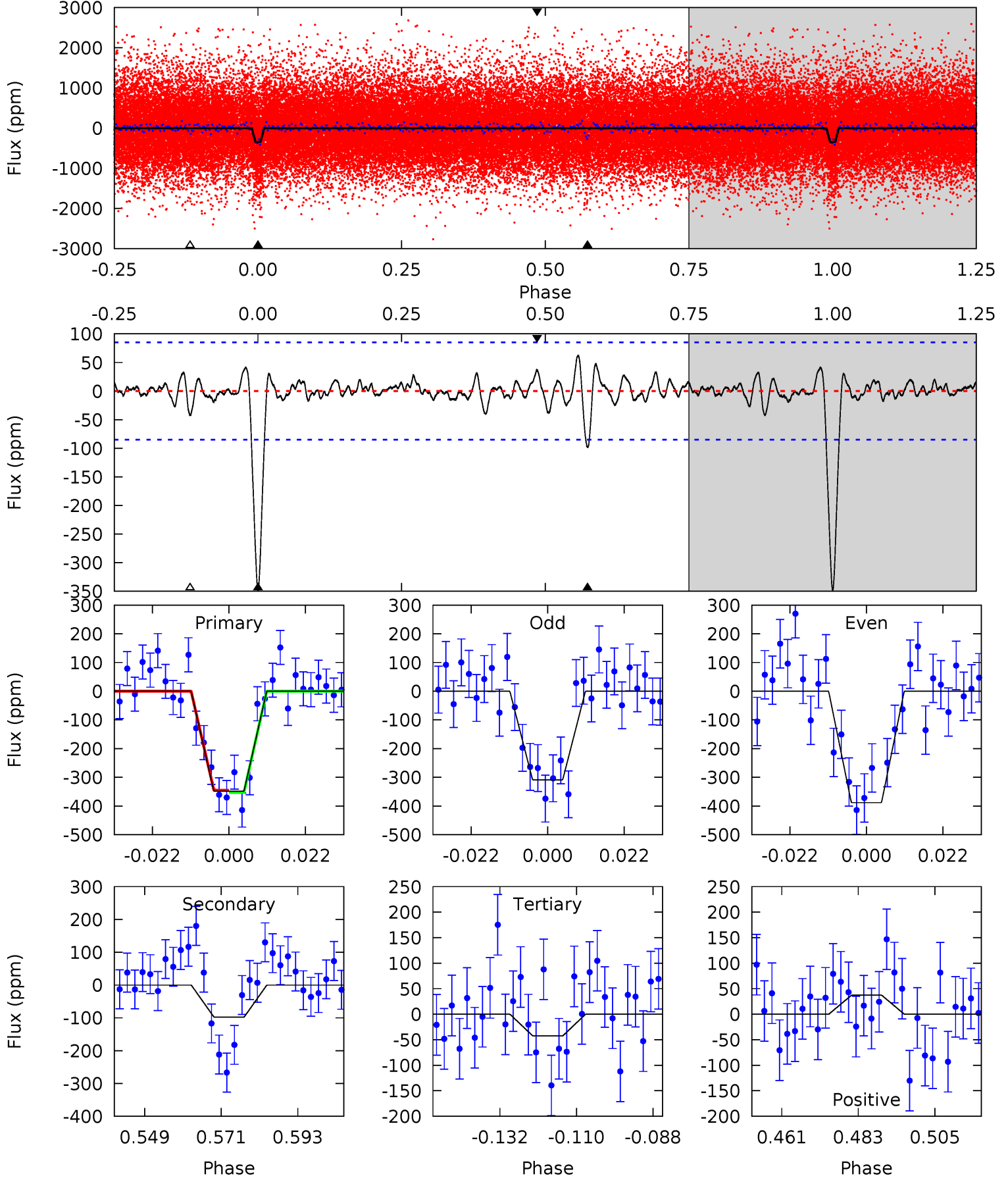
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.8	11.7	3.45	4.45	4.91	2.36	1.61	16.3	15.3	8.23	7.23	4.00	1.03	0.18	0.98



Alt Model-Shift Uniqueness Test

003531231-01, P = 62.042030 Days, E = 134.749545 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.9	5.60	2.42	2.13	4.87	2.29	0.76	17.5	17.8	3.17	3.46	2.29	1.12	0.15	0.23



Stellar Parameters For KIC 003531231

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5526^{+200}_{-183}	$4.578^{+0.045}_{-0.144}$	$-0.260^{+0.300}_{-0.300}$	$0.784^{+0.185}_{-0.062}$	$0.850^{+0.091}_{-0.091}$	$2.486^{+0.493}_{-1.046}$
	+4%/-3%	+1%/-3%	+115%/-115%	+24%/-8%	+11%/-11%	+20%/-42%
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 003531231-01 / KOI 7657.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-228 ± 20	$2.02^{+0.25}_{-0.20}$	569^{+34}_{-26}	4627^{+203}_{-192}	2560^{+617}_{-528}
Alt.	-98 ± 17	$1.61^{+0.24}_{-0.17}$	568^{+33}_{-25}	4269^{+247}_{-234}	1667^{+606}_{-444}

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 $A_{obs} \gg 1.0$

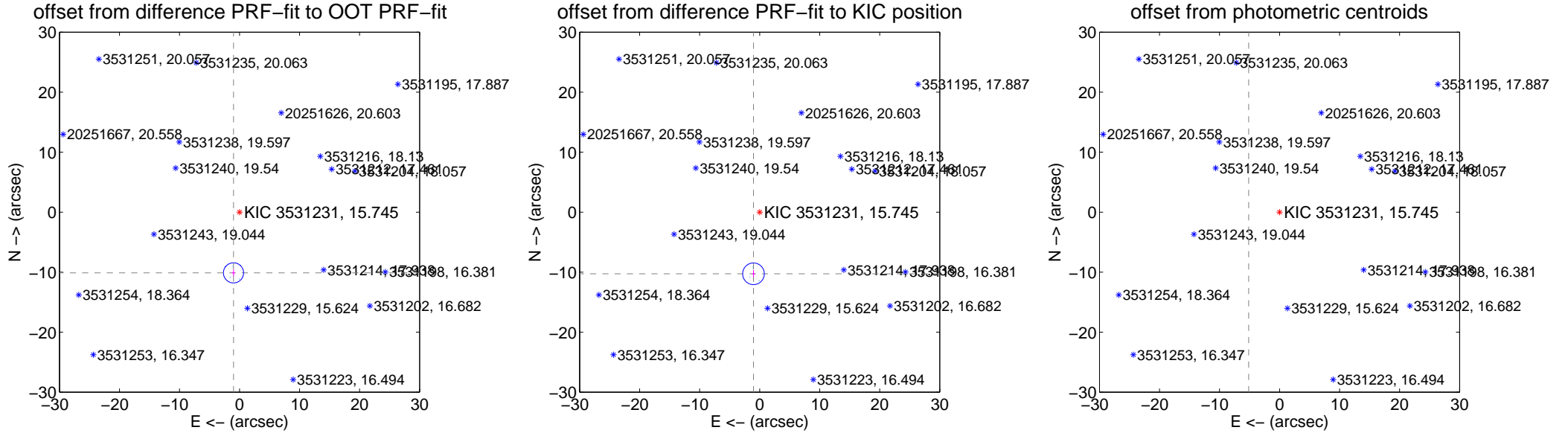
DV Centroid Data

Supplemental centroid analysis for 003531231-01. Kepler magnitude: 15.74. Transit SNR 13.82

There are 5 quarters with good PRF difference image offsets

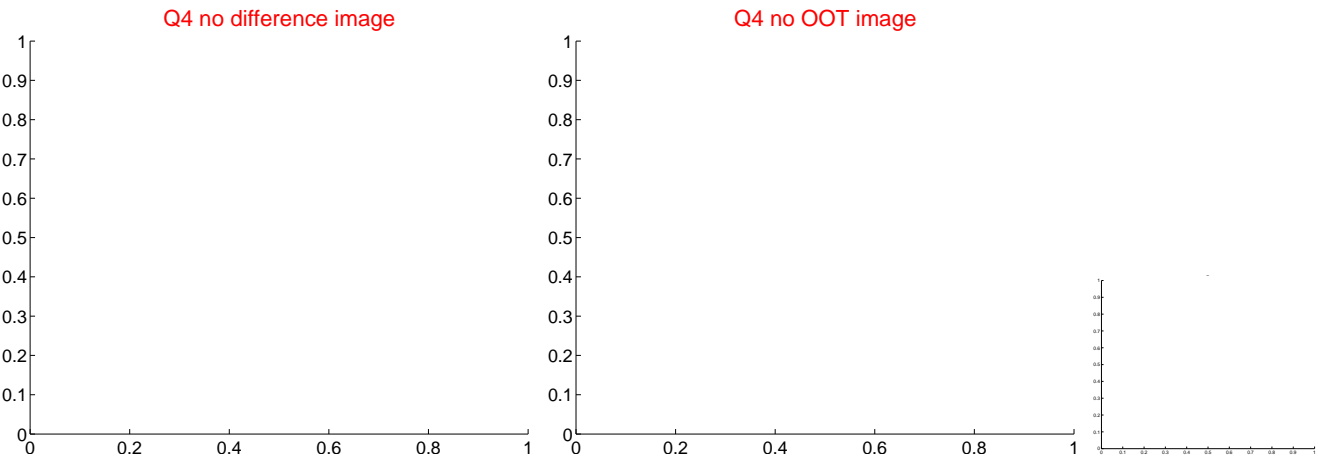
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	10.166 \pm 0.560	18.16	1.004 \pm 0.279	-10.116 \pm 0.562
PRF-fit source offset from KIC position	10.323 \pm 0.602	17.15	1.033 \pm 0.258	-10.271 \pm 0.604
photometric centroid source offset	41.97 \pm 1.37	30.66	5.15 \pm 0.90	-41.65 \pm 1.37

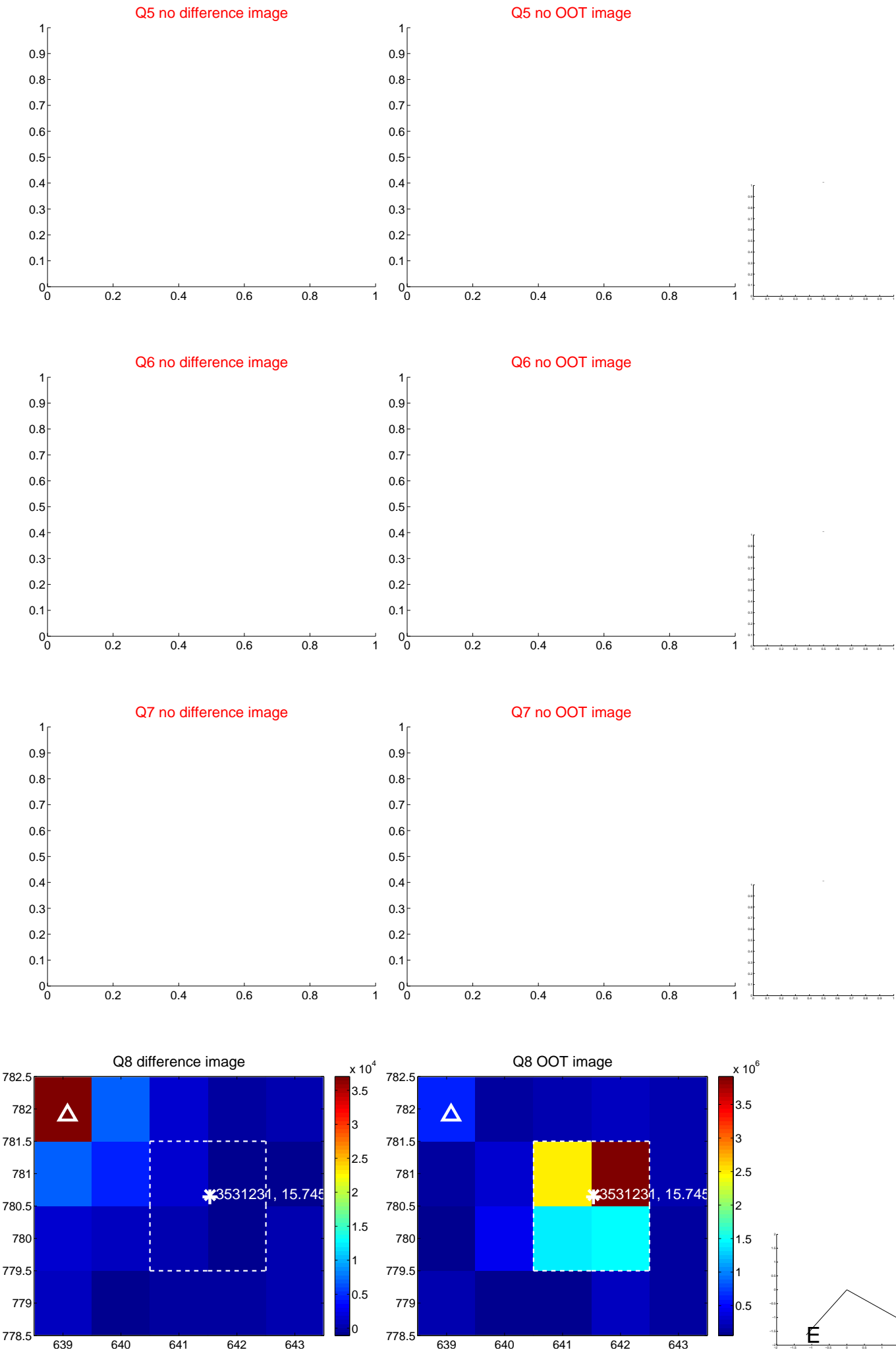


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

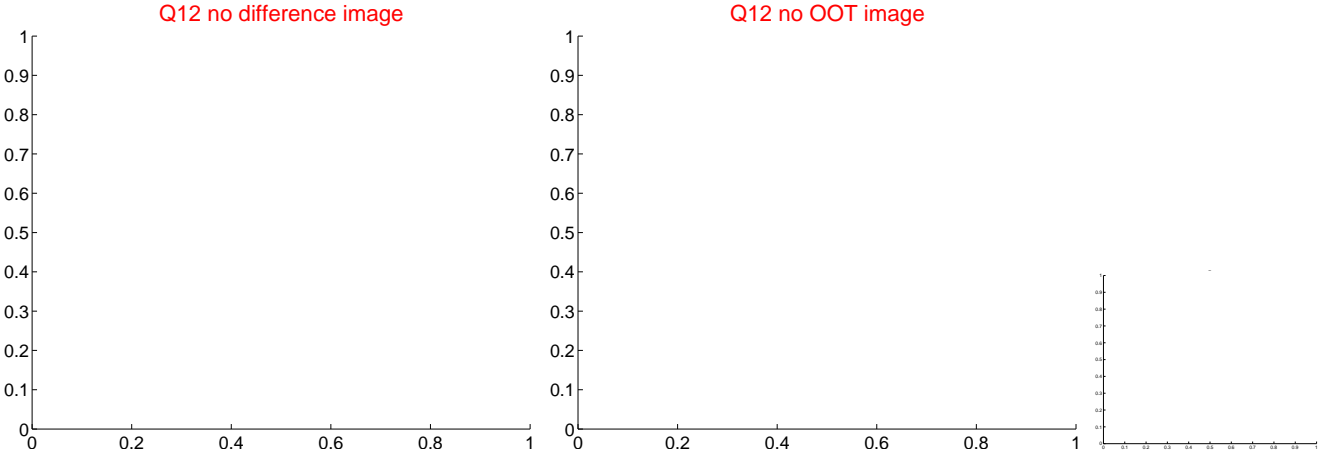
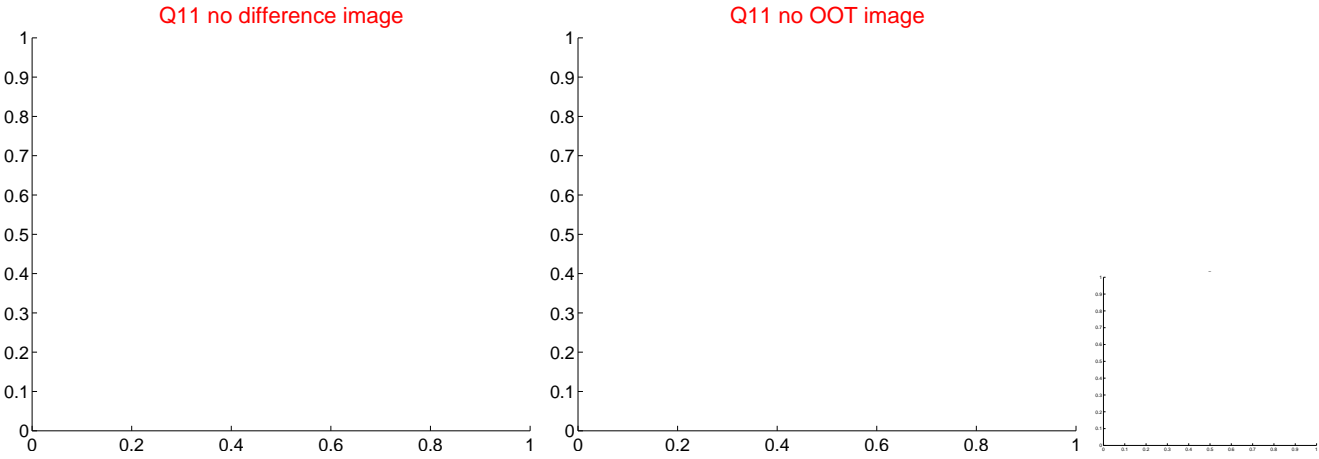
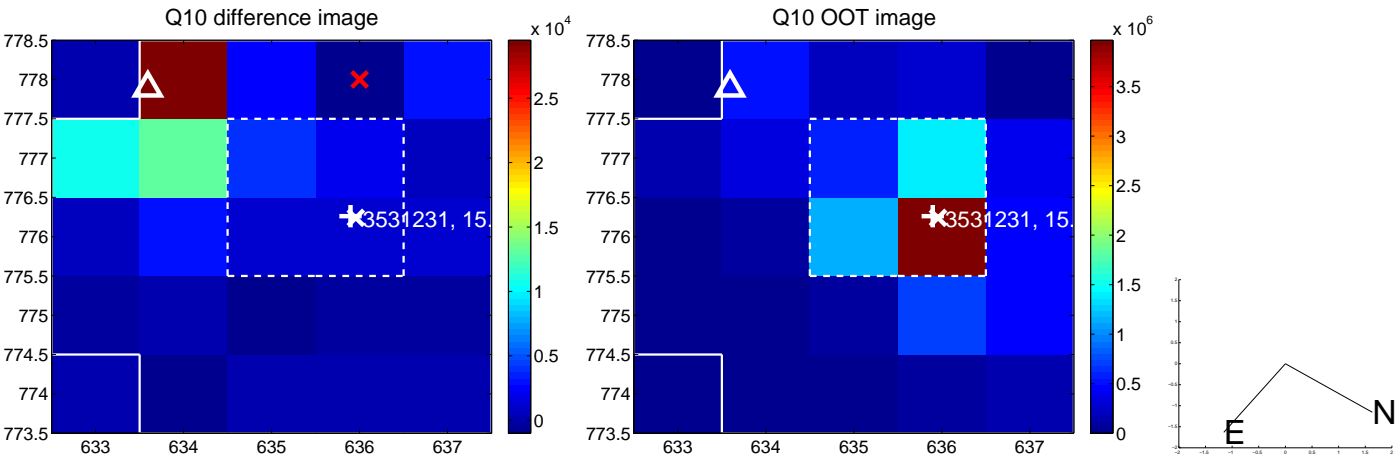
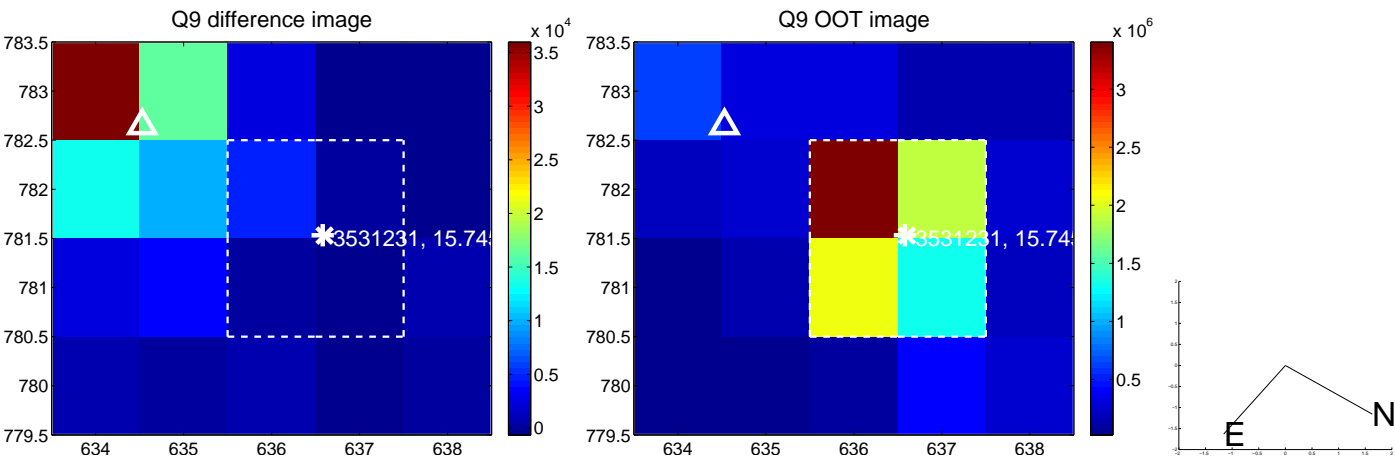
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



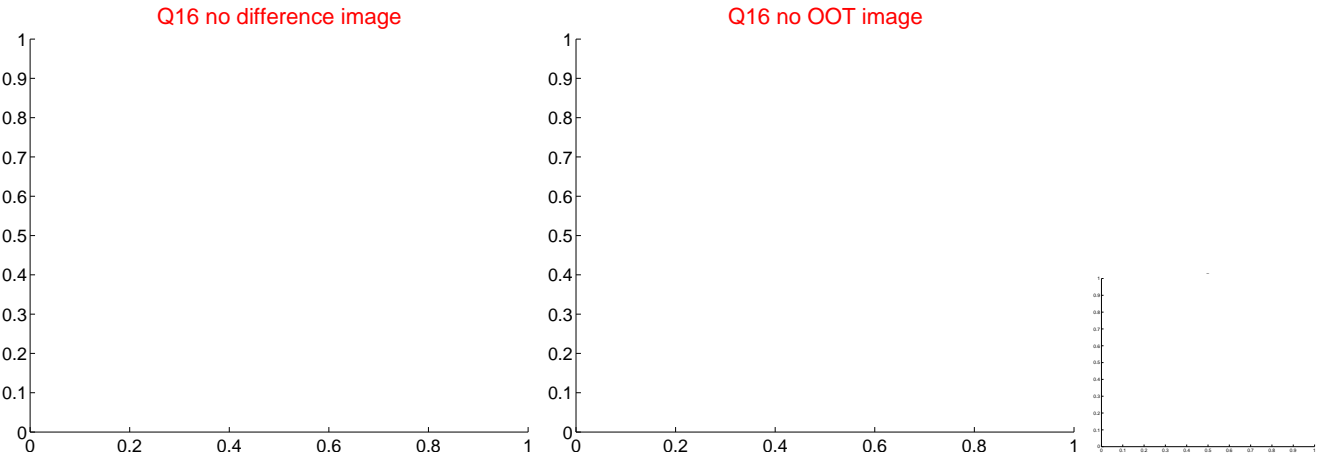
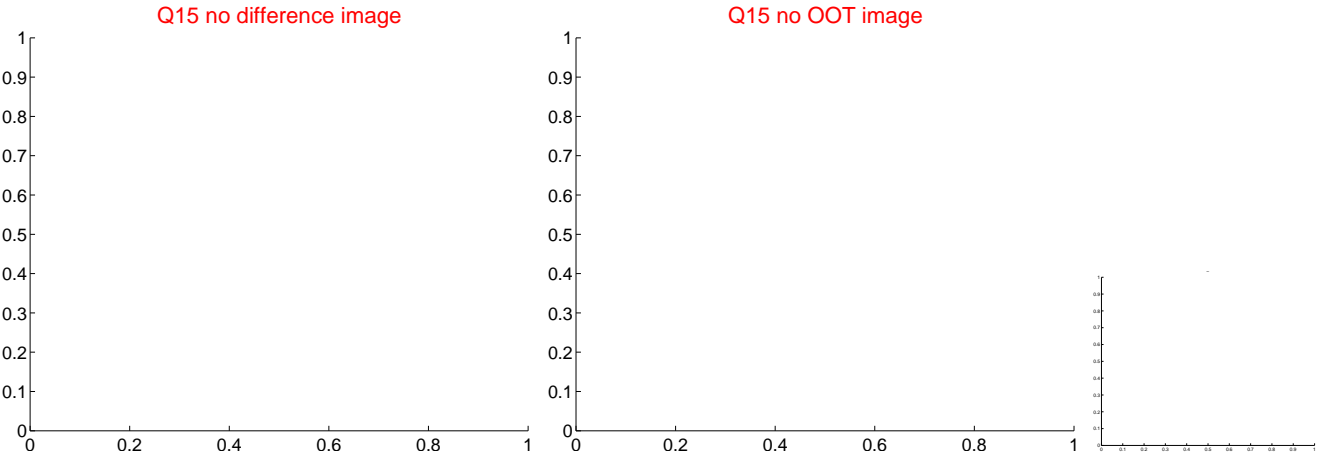
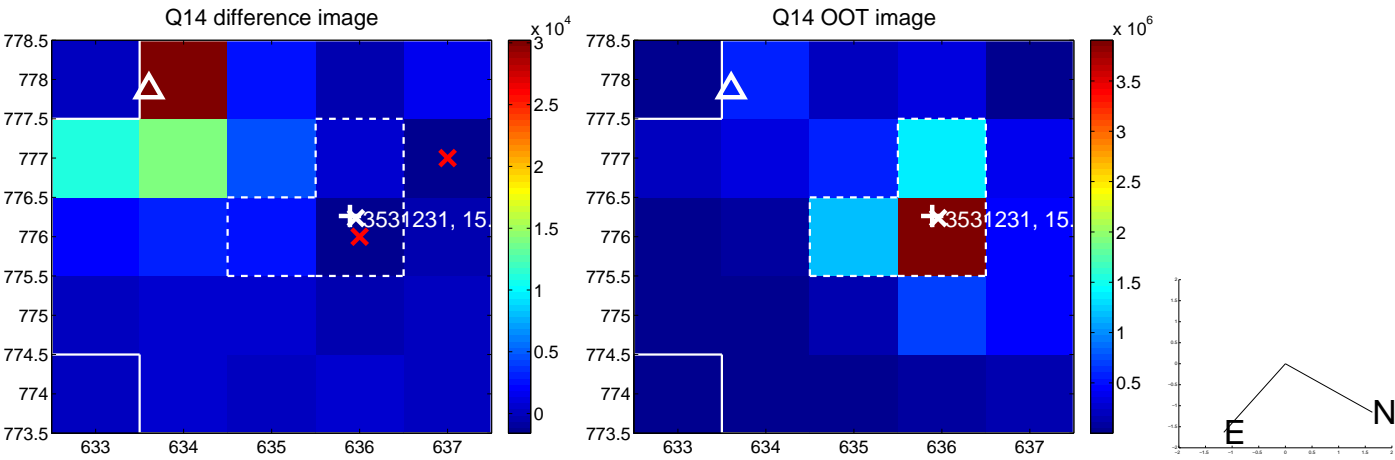
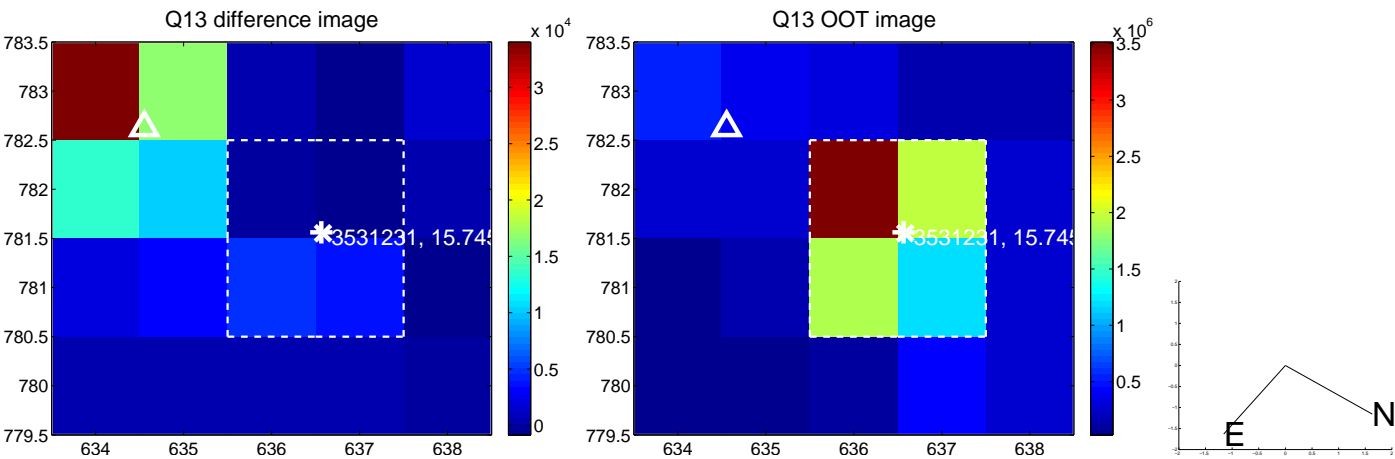
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



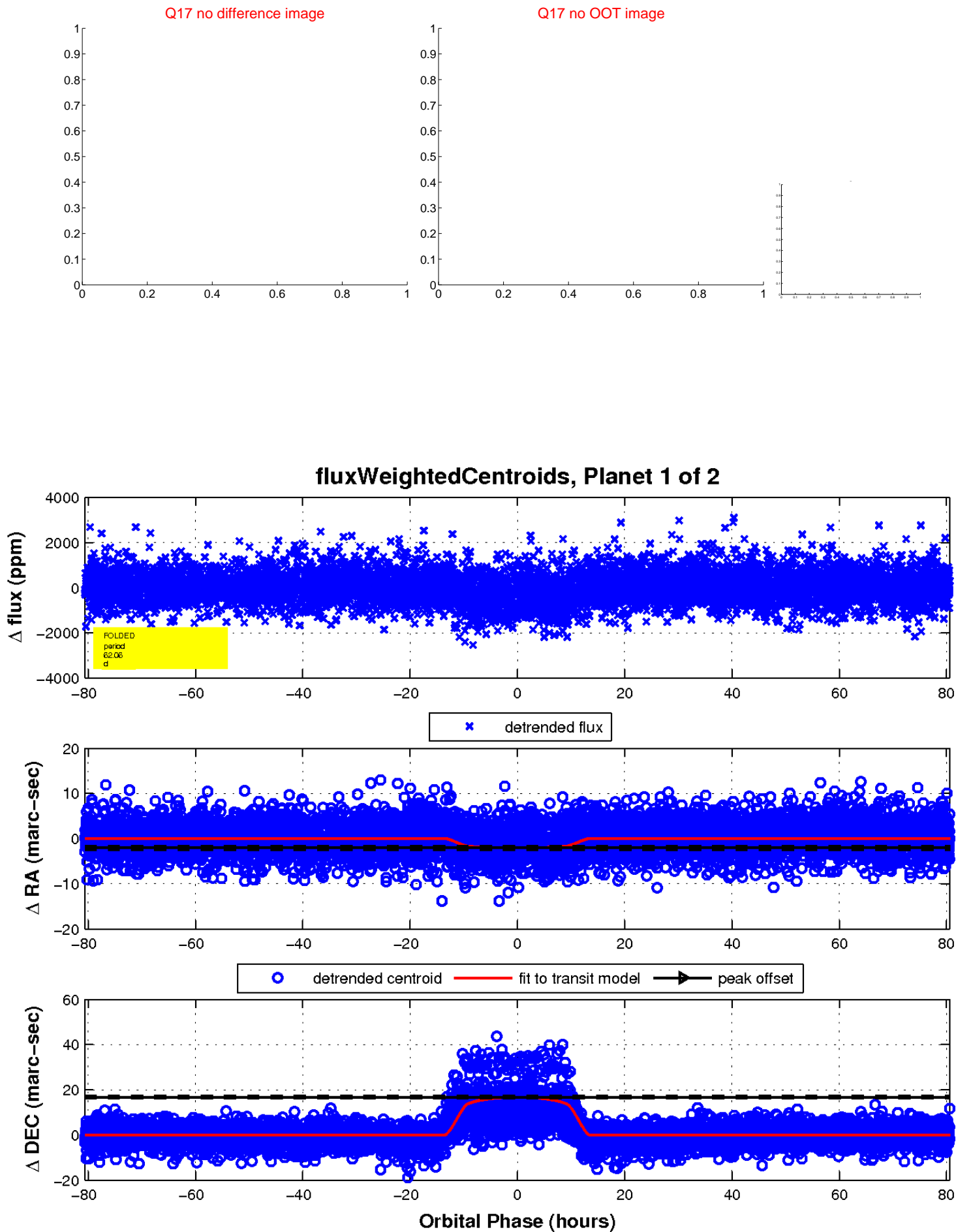
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

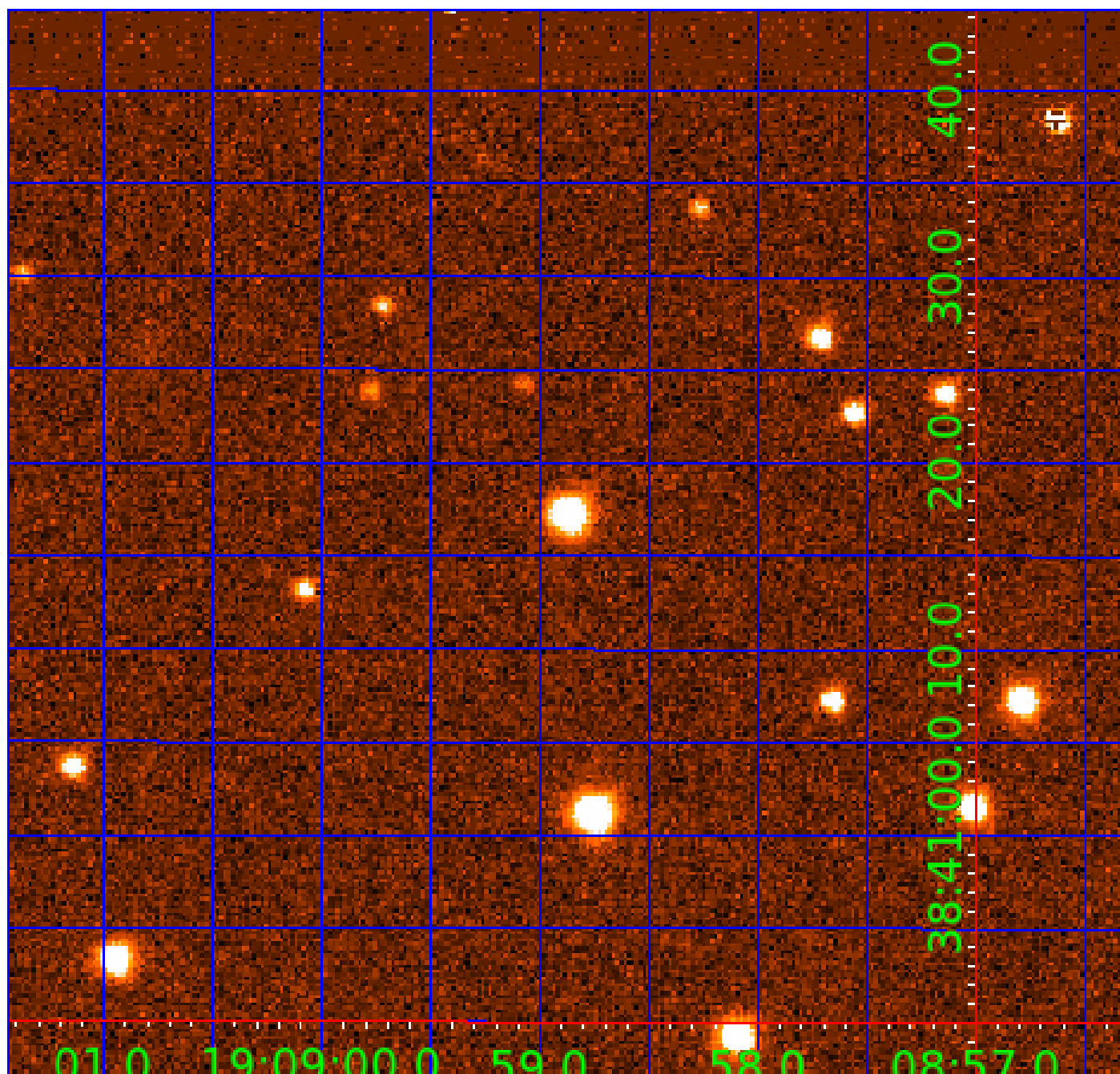


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 003531231

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})
003531231-01	OBS	7657.01	62.059782	134.517344	405.2	26.877	9.8	13.8	0.78	5526	1.96	6.09
003531231-02	OBS	No	62.064146	170.030766	377.6	19.851	10.1	10.1	0.78	5526	1.84	6.08

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003531231-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET
003531231-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET

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

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

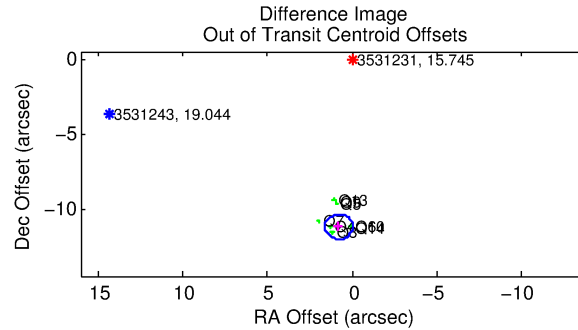
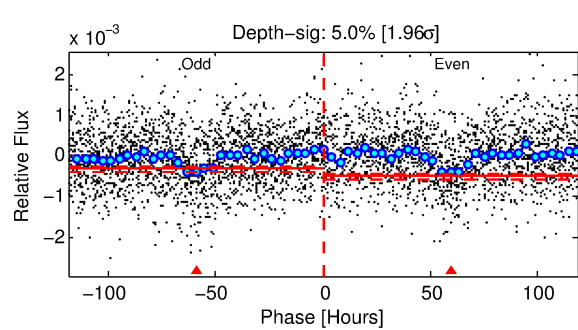
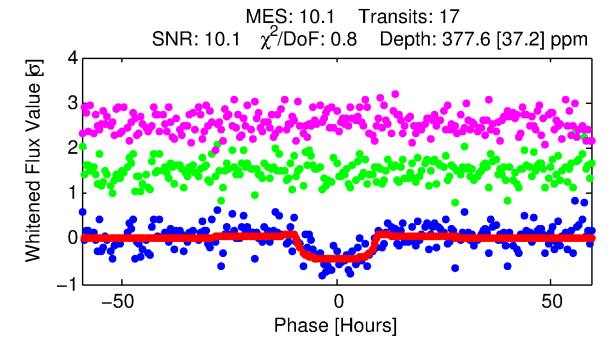
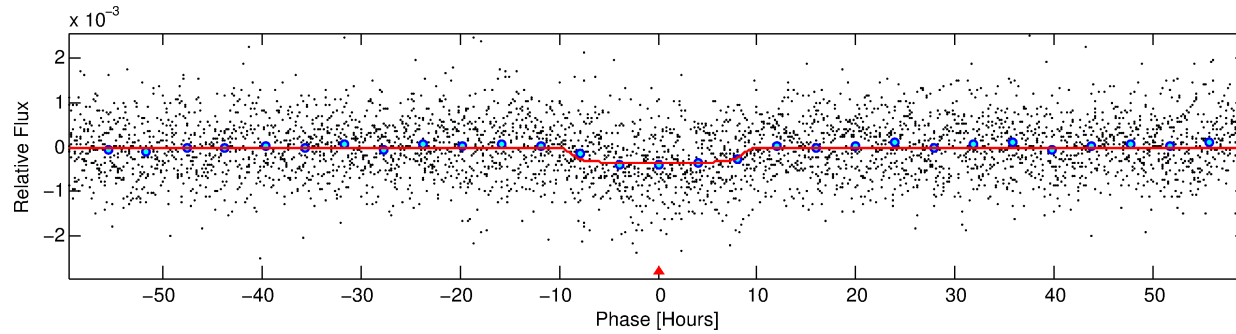
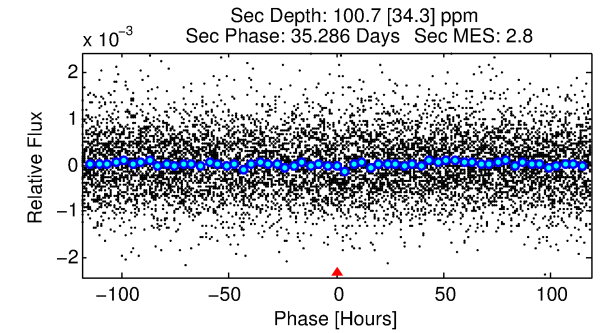
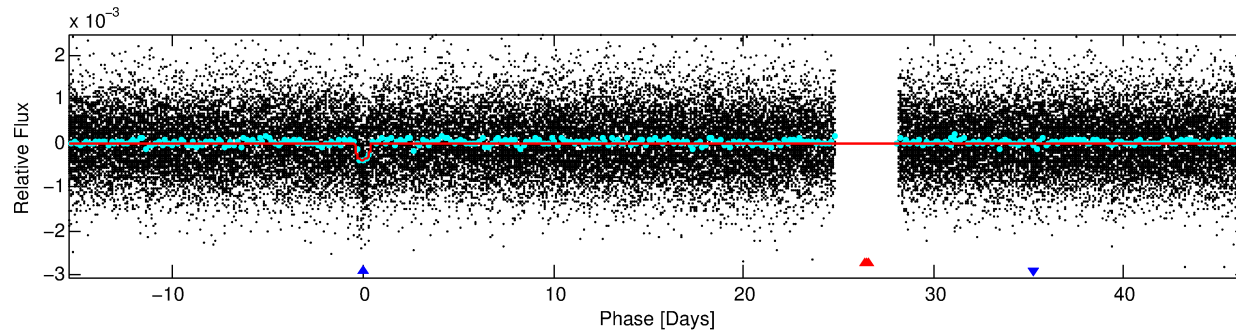
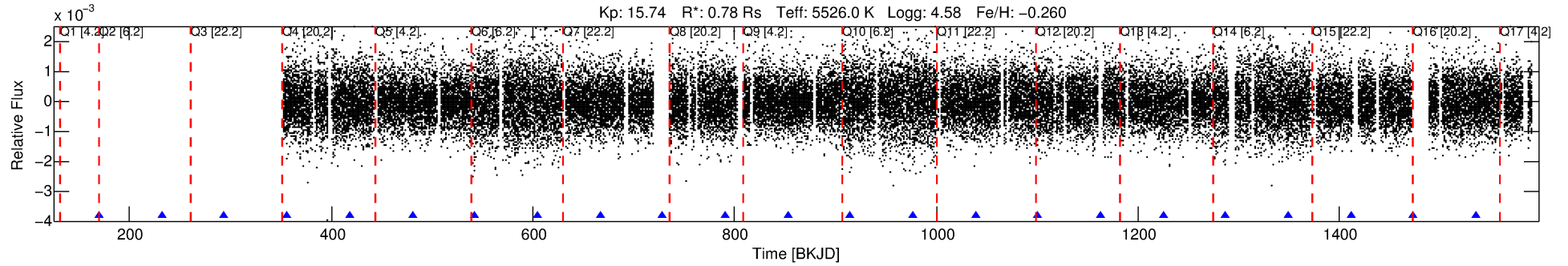
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 003531231-02

No Significant Match Found

DV One-Page Summary

KIC: 3531231 Candidate: 2 of 2 Period: 62.064 d



DV Fit Results:

Period = 62.06415 [0.00288] d
Epoch = 170.0308 [0.0388] BKJD
Rp/R* = 0.0215 [0.0024]
a/R* = 11.06 [4.79]
b = 0.91 [0.08]
Seff = 6.09 [1.87]
Teq = 400 [31] K
Rp = 1.84 [0.48] Re
a = 0.2905 [0.0558] AU
Ag = 1381.42 [674.42] [2.05σ]
Teff = 3775 [407] K [8.27σ]

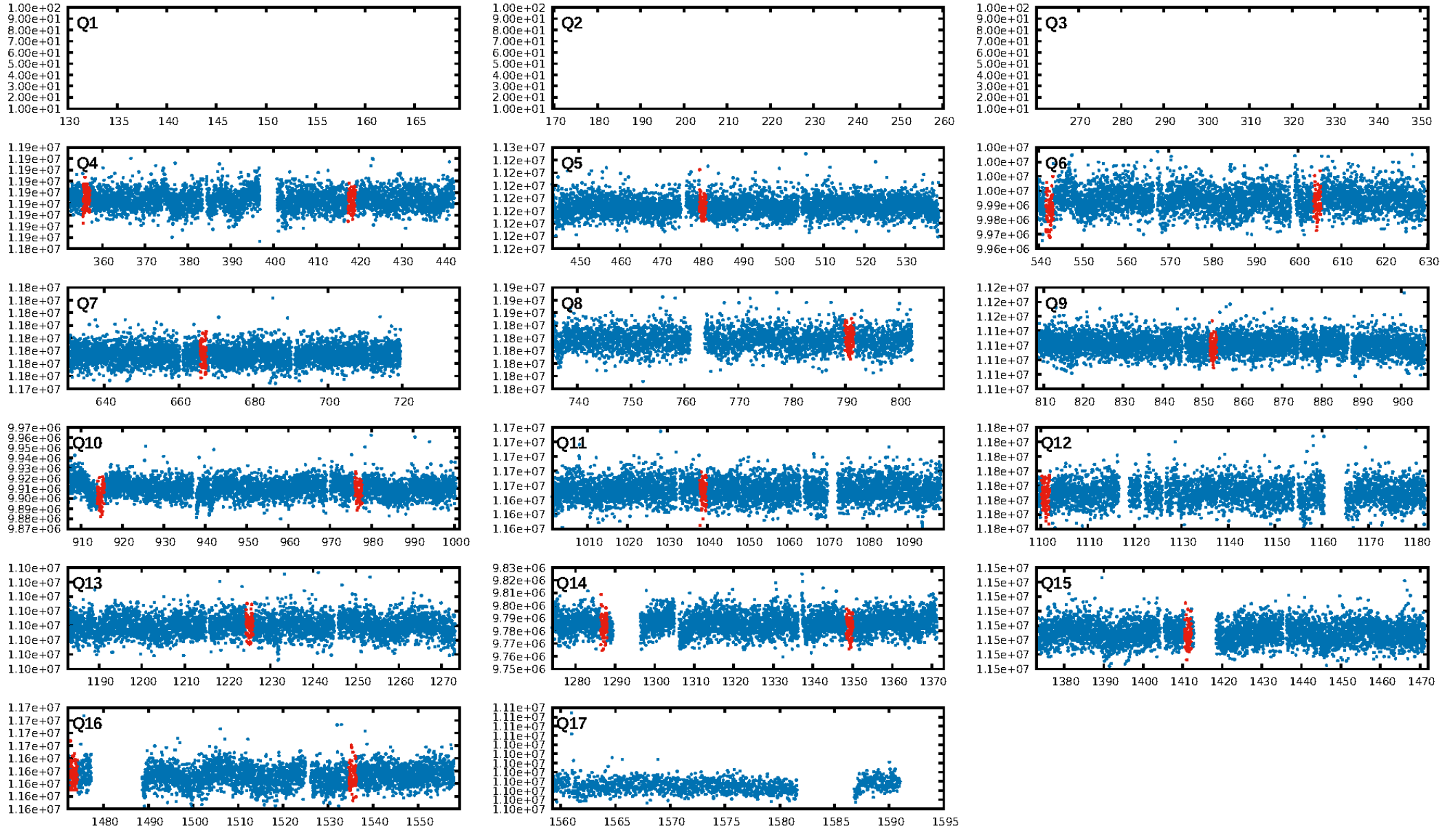
DV Diagnostic Results:

ShortPeriod-sig: 0.3% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 1.7%
ModelChiSquareGoF-sig: 100.0%
Bootstrap-pfa: 1.21e-19
RollingBand-fgt: 1.00 [17/17]
GhostDiagnostic-chr: -0.3745
Centroid-sig: 0.0%
Centroid-so: 34.965 arcsec [19.74σ]
OotOffset-rm: 11.247 arcsec [40.94σ]
KicOffset-rm: 11.402 arcsec [33.34σ]
OotOffset-st: 3/1/2/3 [9]
KicOffset-st: 3/1/2/3 [9]
DiffImageQuality-fgm: 1.00 [9/9]
DiffImageOverlap-fno: 1.00 [10/10]

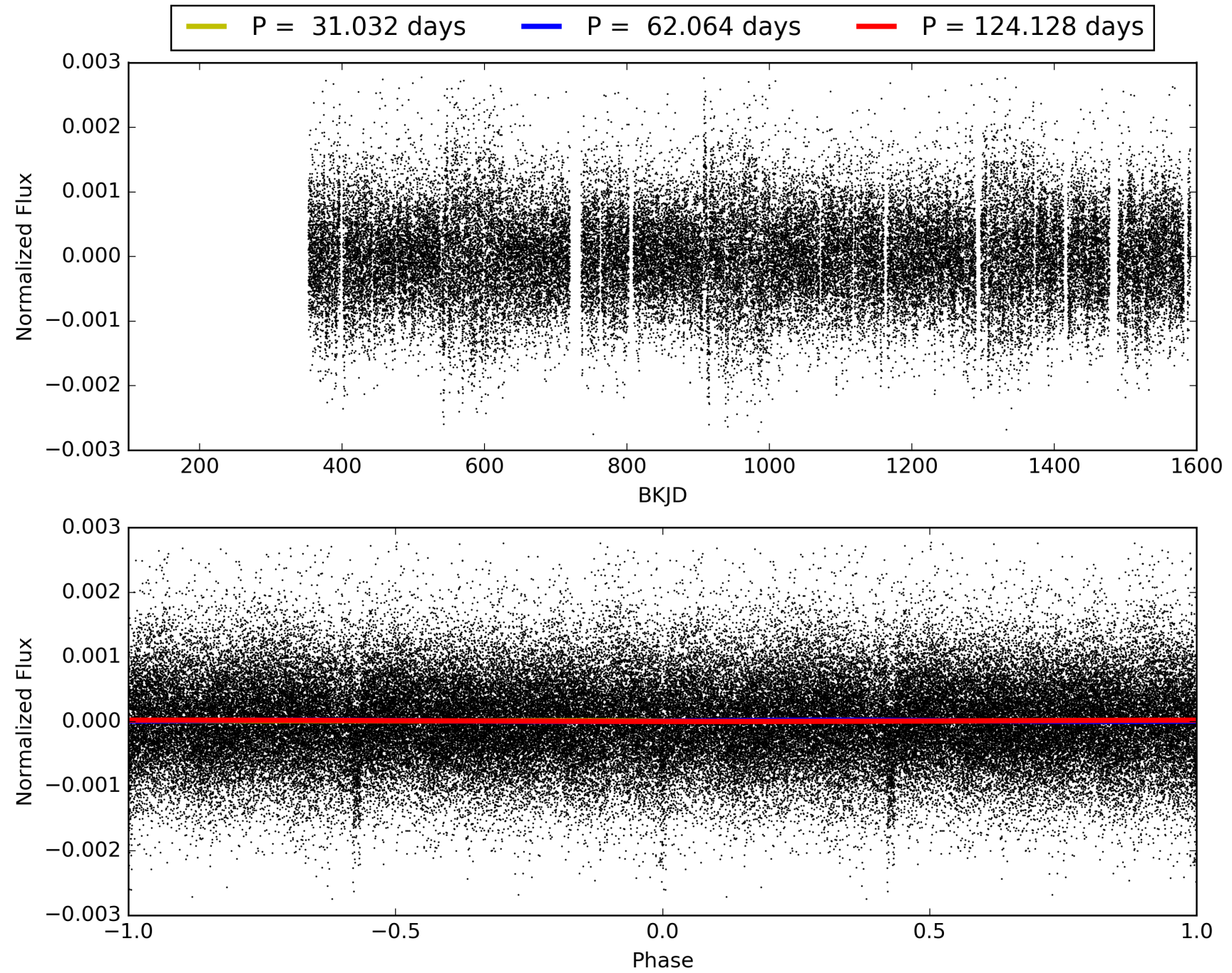
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:03:05 Z

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

TCE 003531231-02, PDC Light Curves

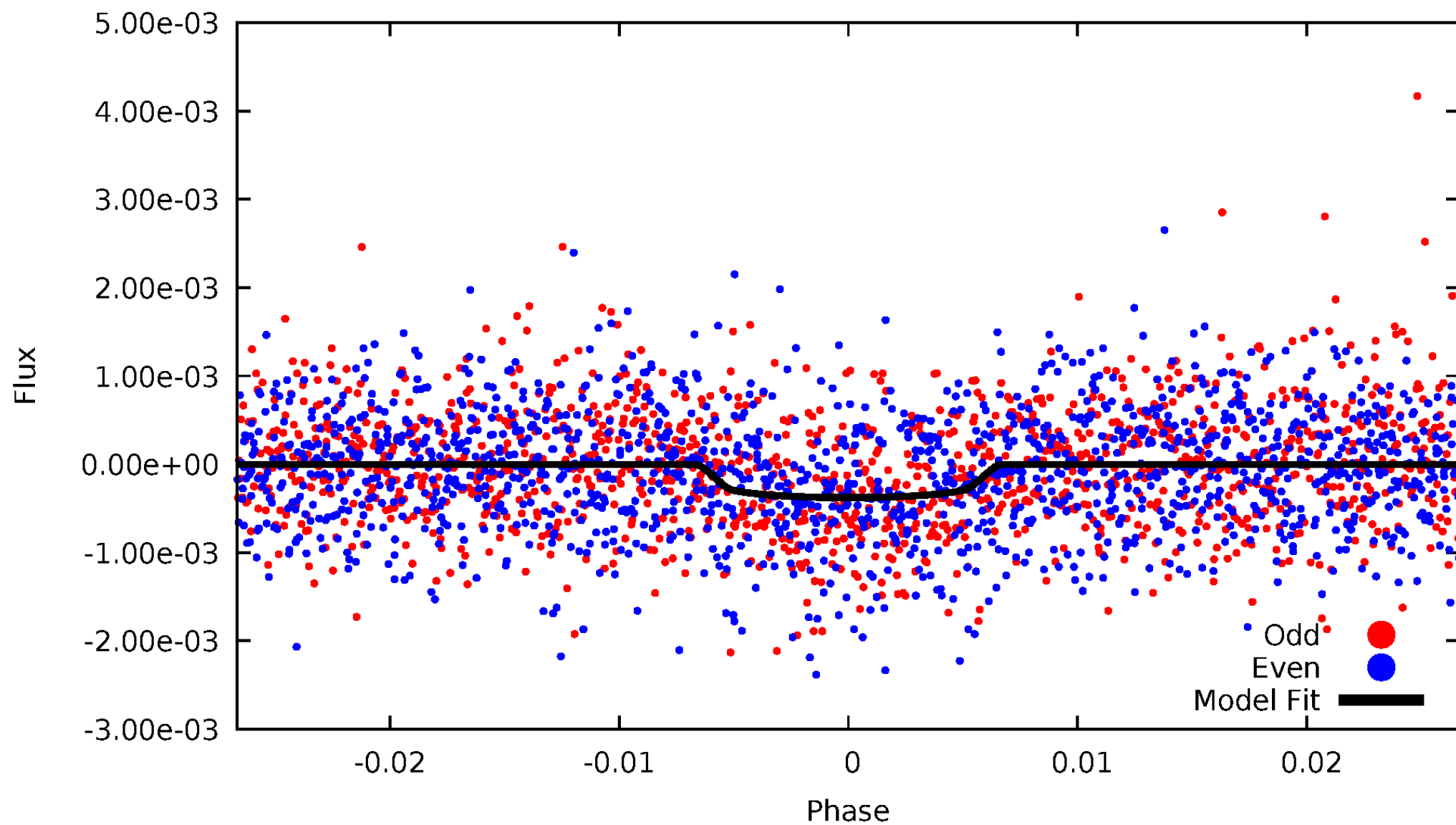


TCE 003531231-02



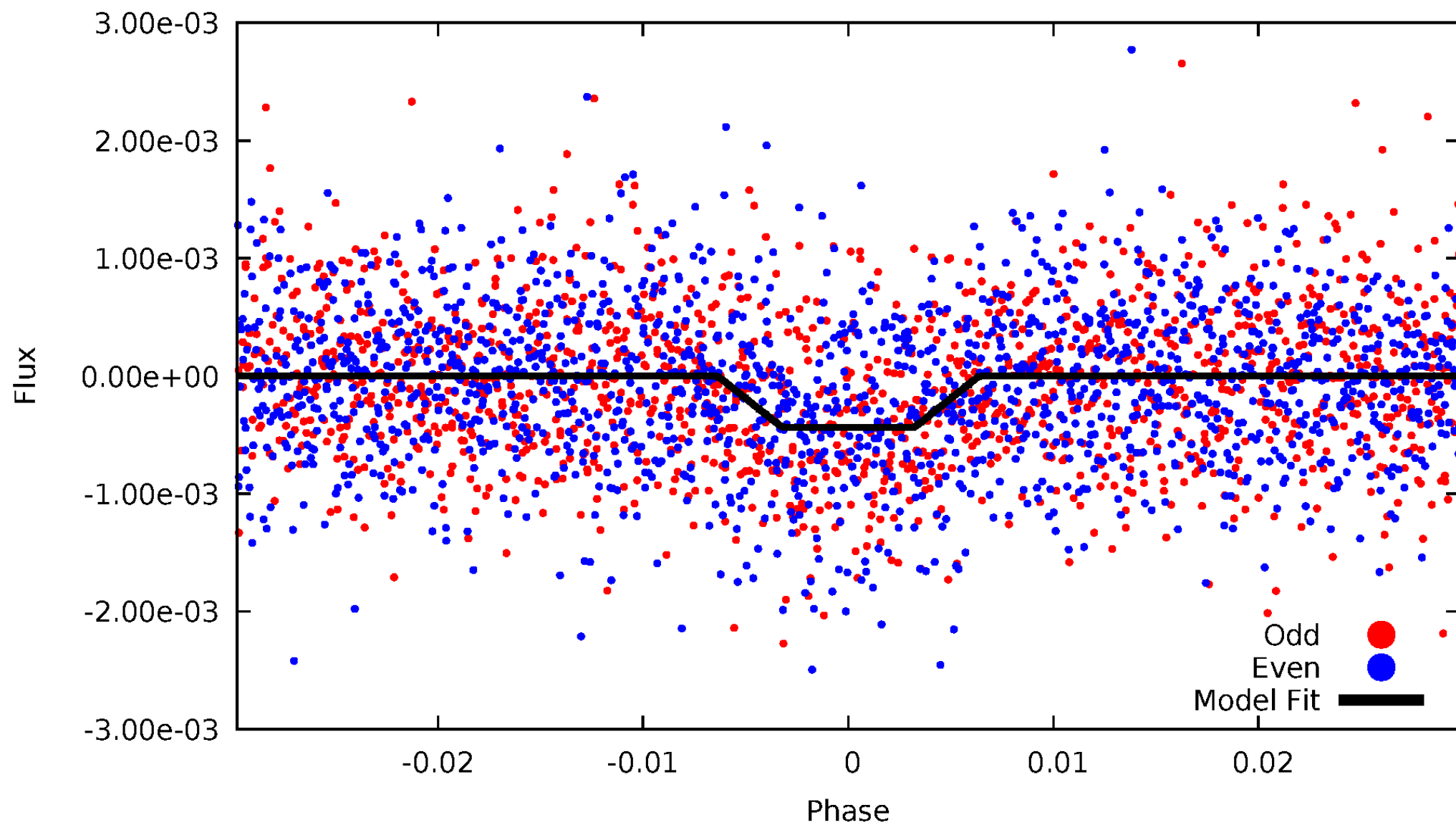
DV Odd/Even

TCE 003531231-02



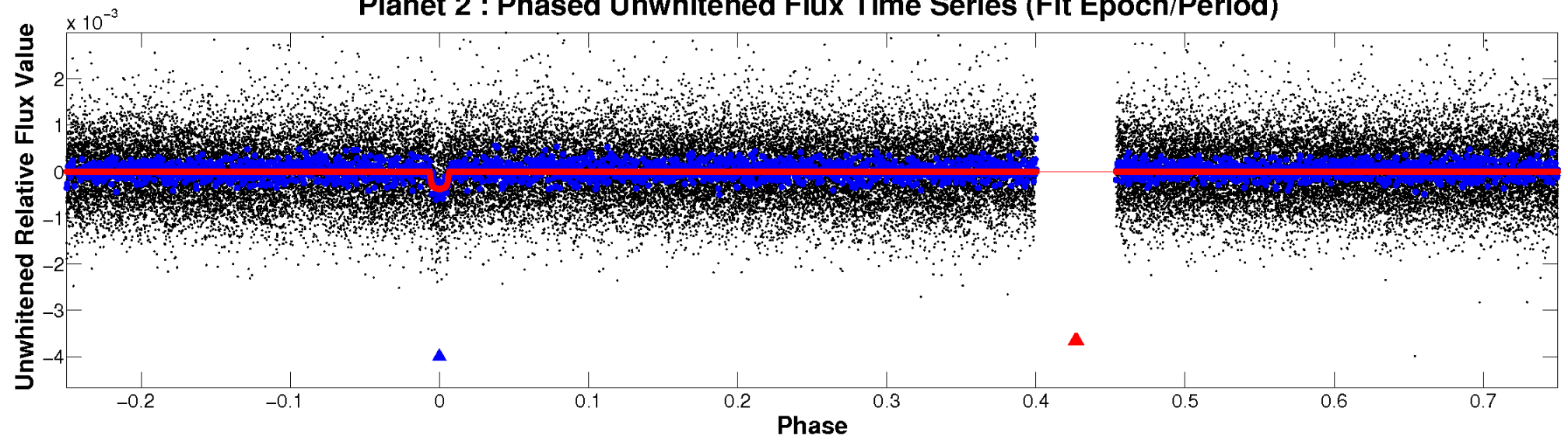
ALT Odd/Even

TCE 003531231-02

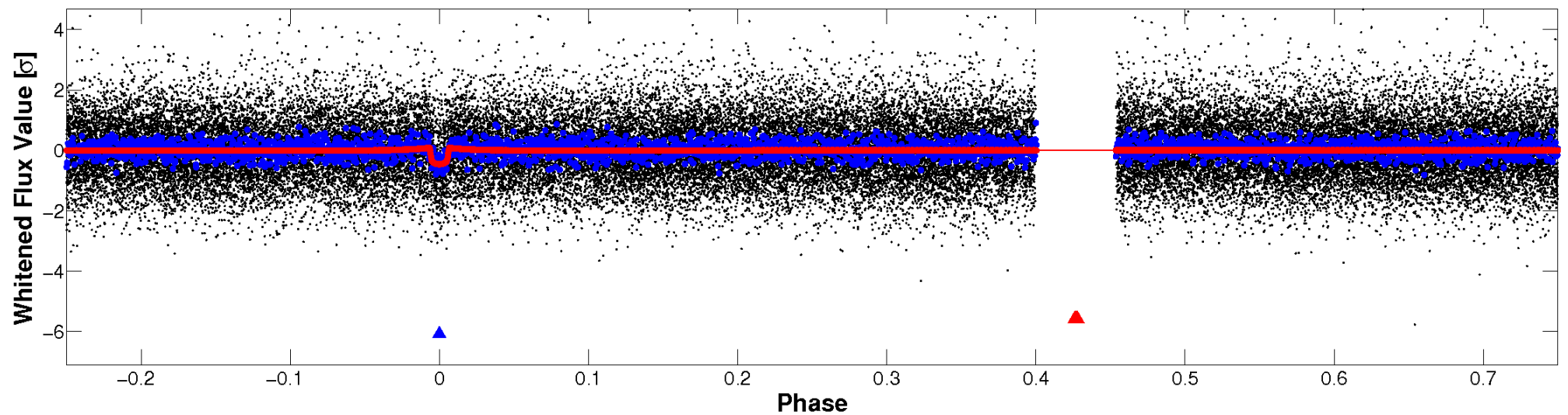


Non-Whitened Vs. Whitened Light Curve

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

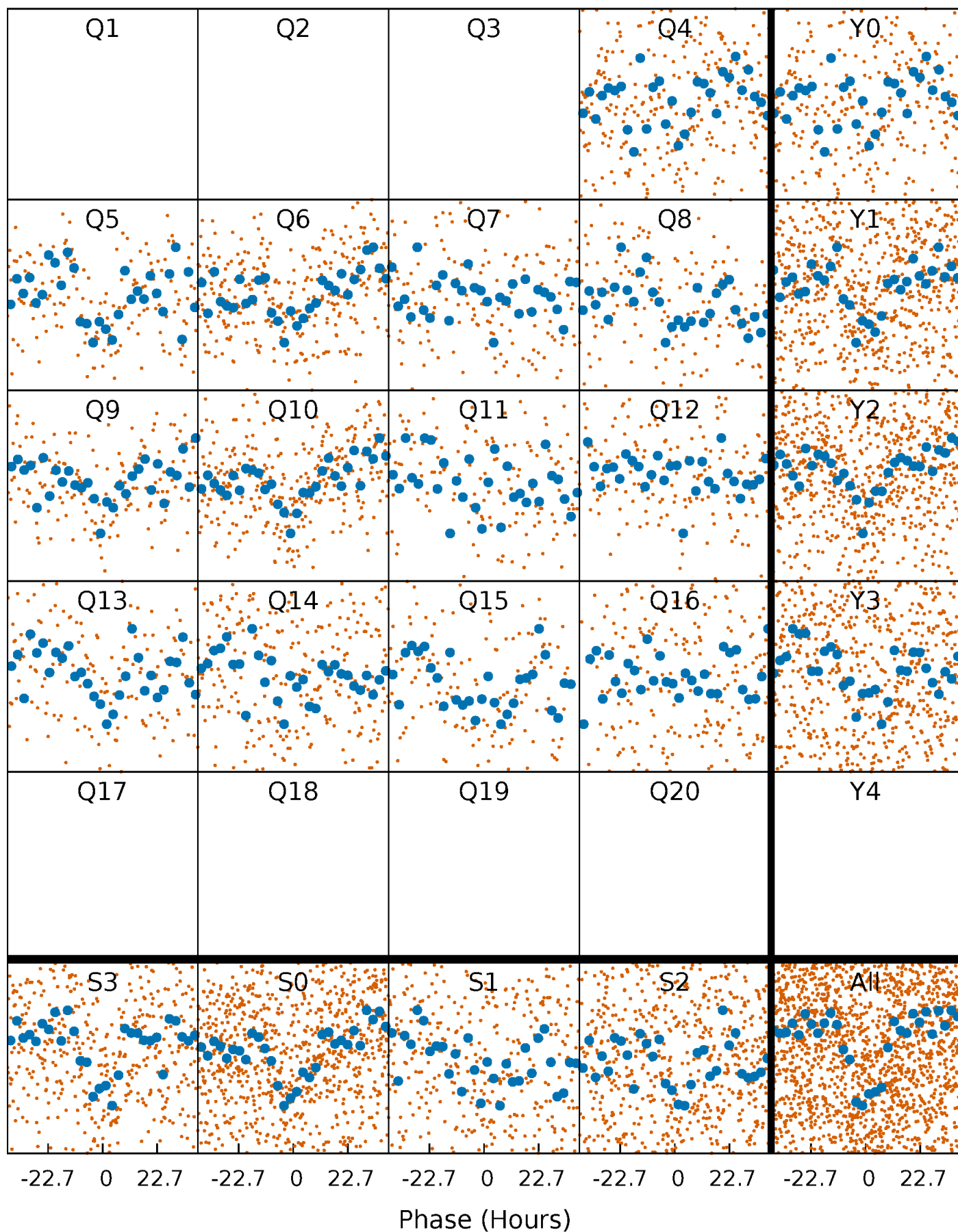


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



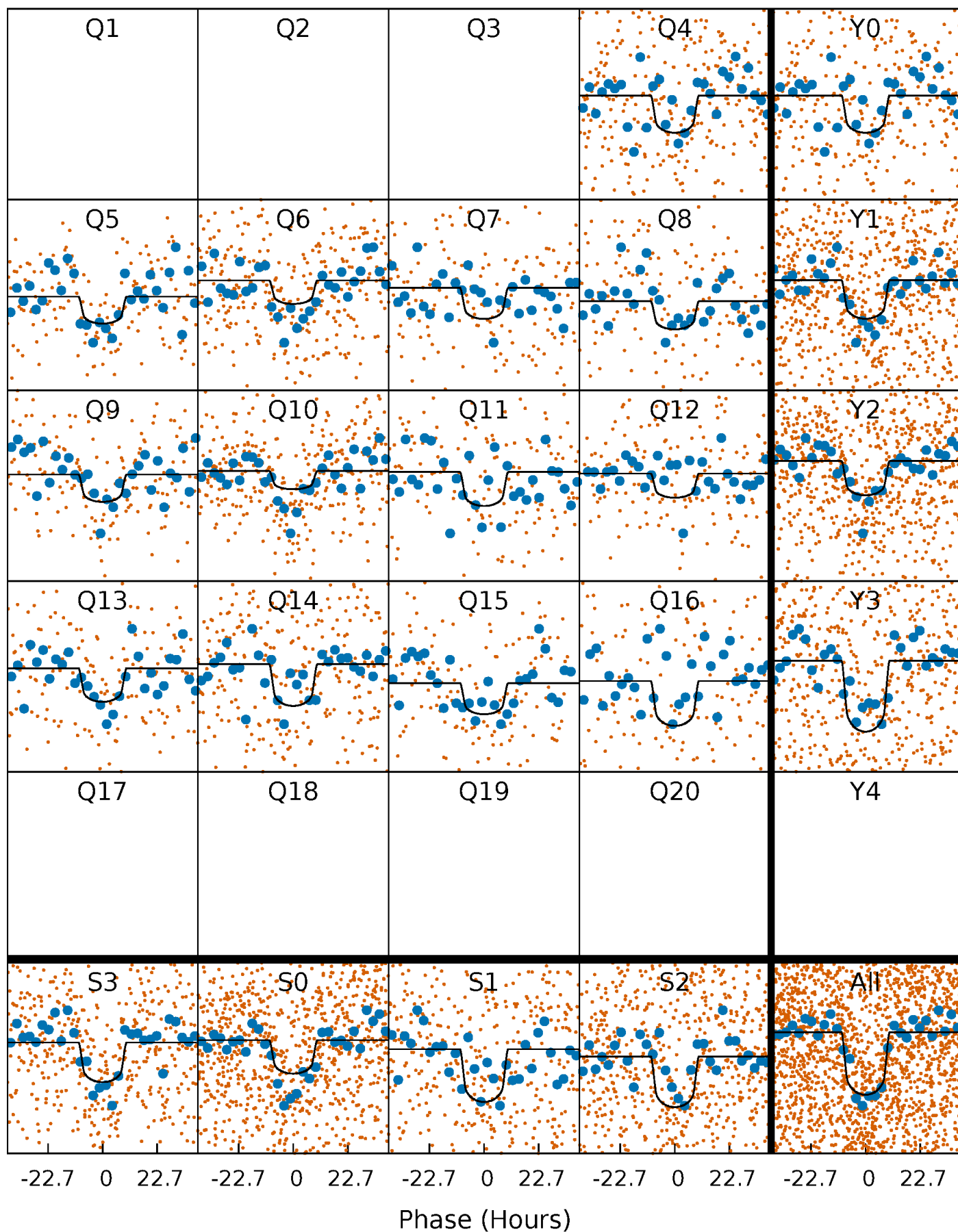
PDC Quarter-Phased Transit Curves

TCE 003531231-02 P= 62.064146 Days $T_0=170.030766$ (BKJD)



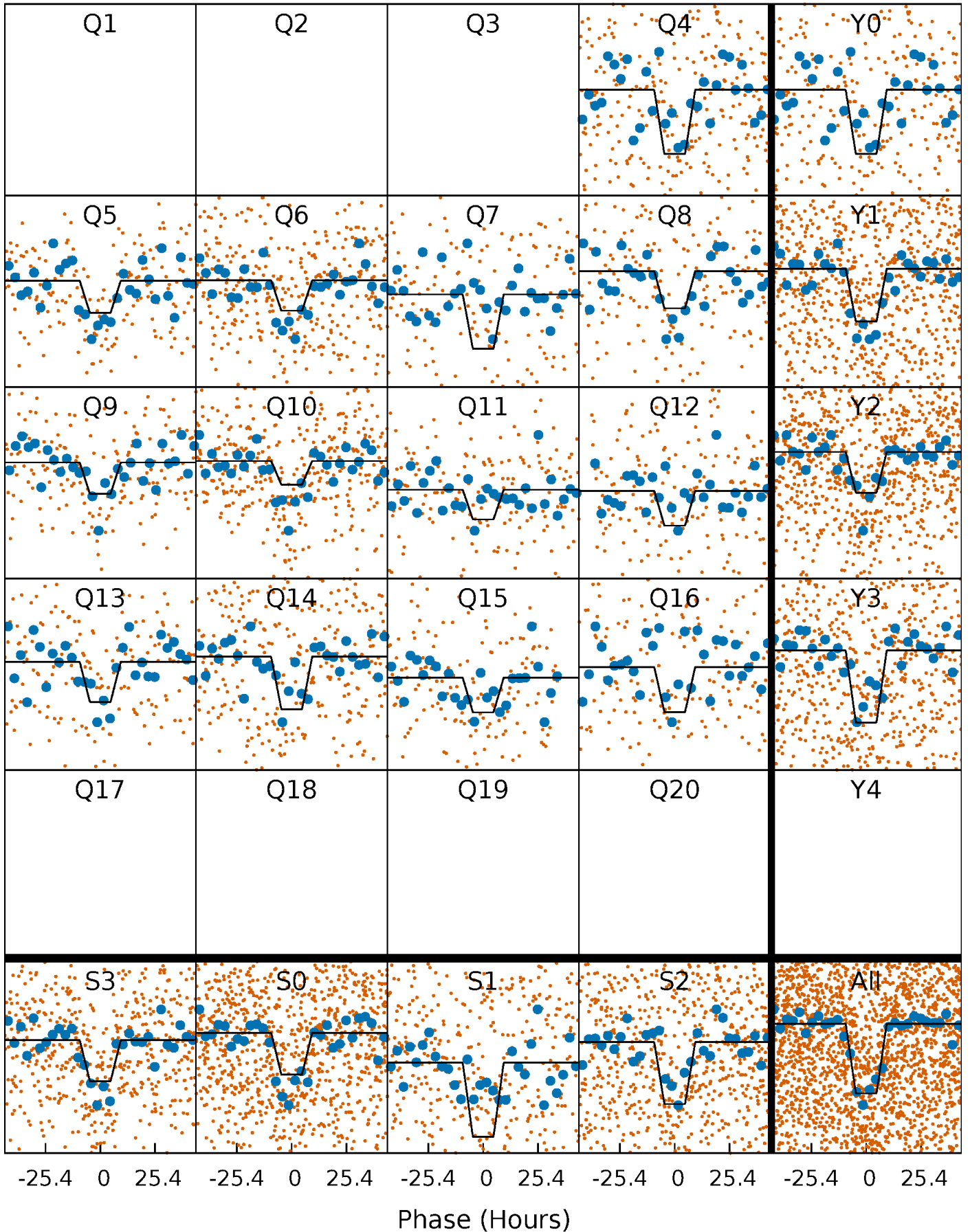
DV Quarter-Phased Transit Curves

TCE 003531231-02 P= 62.064146 Days $T_0=170.030766$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

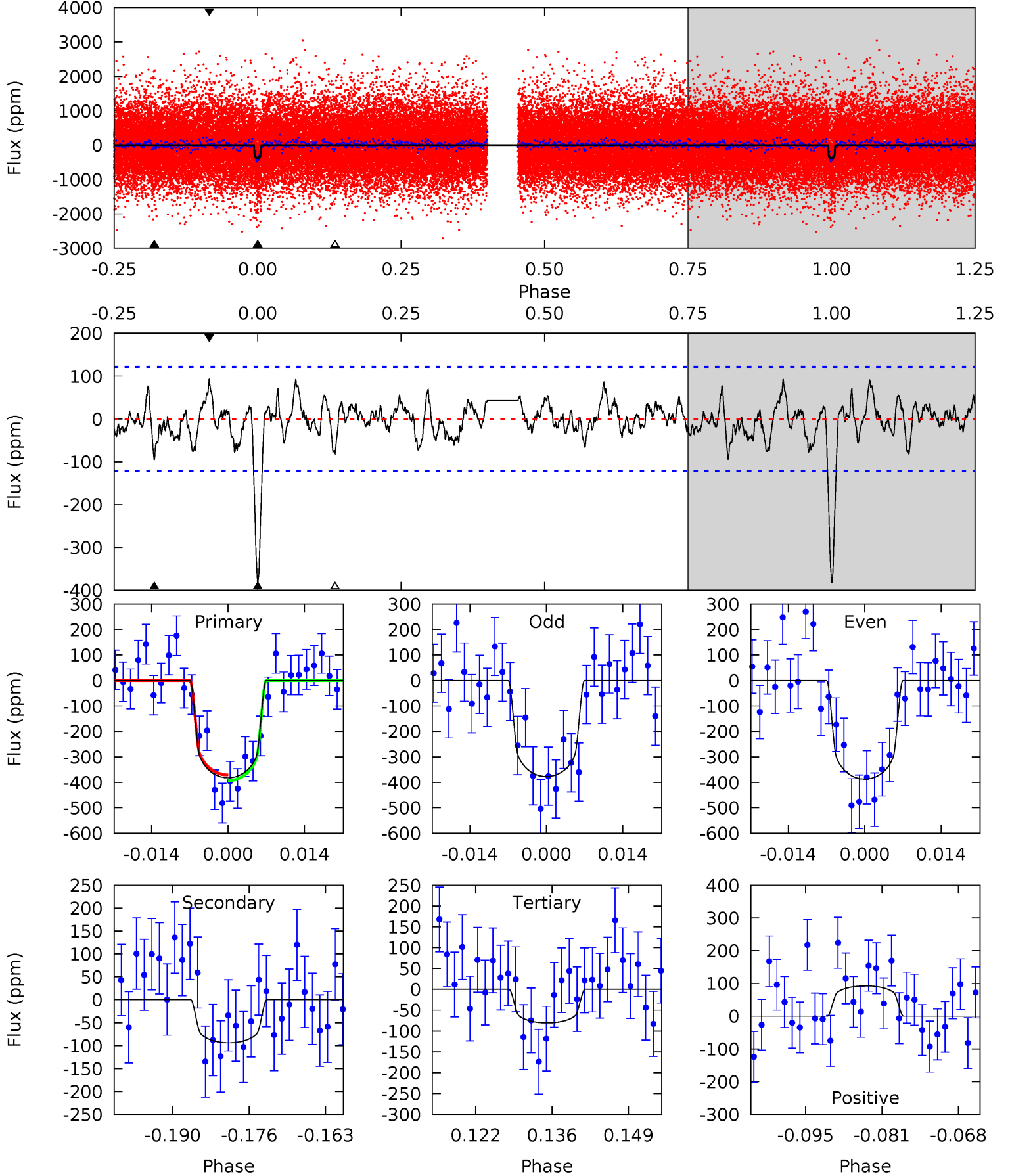
TCE 003531231-02 P= 62.068072 Days $T_0=170.006562$ (BKJD)



DV Model-Shift Uniqueness Test

003531231-02, P = 62.064146 Days, E = 170.030766 Days

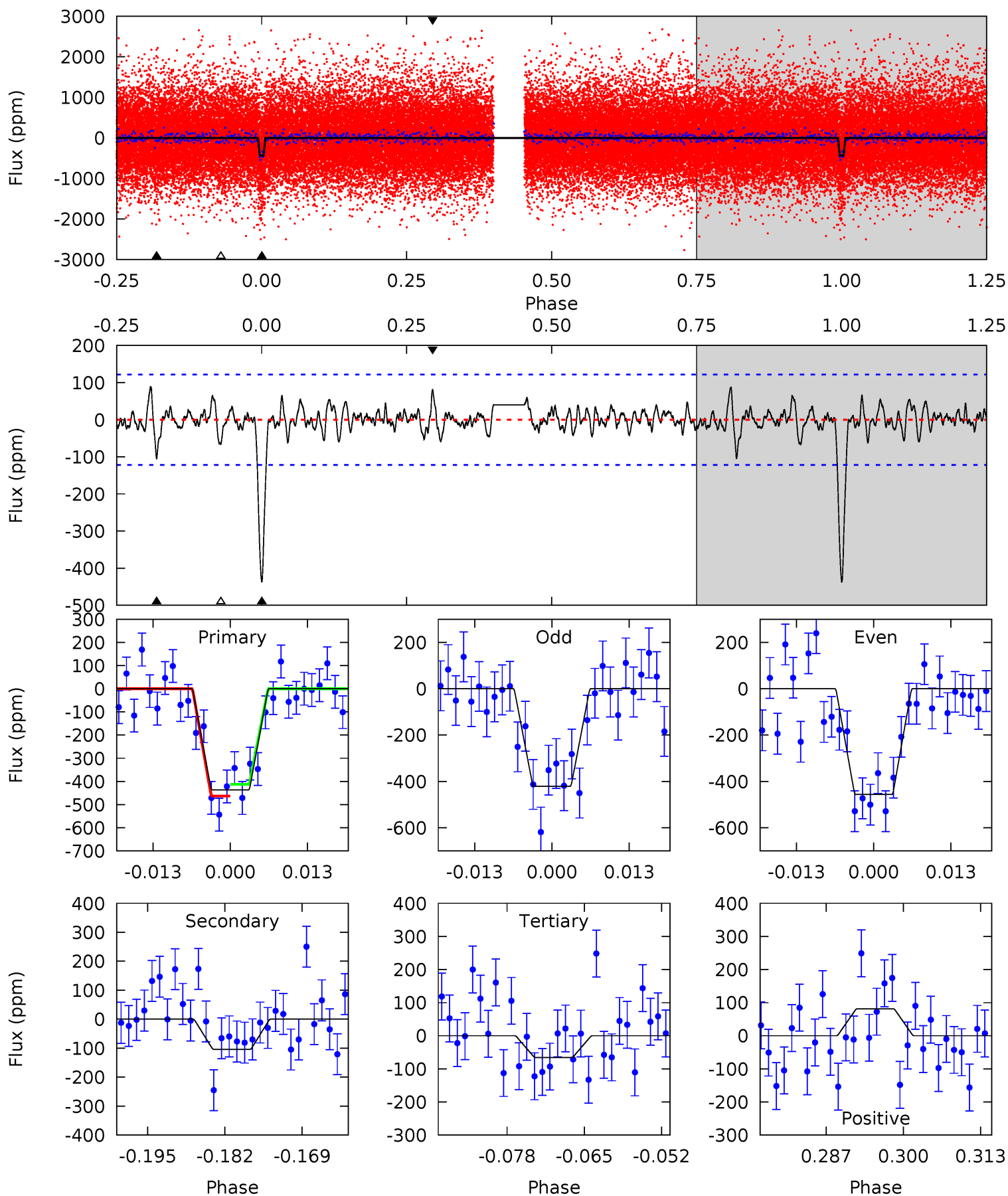
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.6	3.84	3.29	3.78	4.97	2.47	1.27	12.3	11.8	0.55	0.06	0.20	1.22	0.19	0.46



Alt Model-Shift Uniqueness Test

003531231-02, P = 62.068072 Days, E = 170.006562 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.9	4.25	2.69	3.32	4.98	2.48	0.93	15.2	14.5	1.56	0.94	0.72	1.05	0.17	1.03



Stellar Parameters For KIC 003531231

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5526^{+200}_{-183}	$4.578^{+0.045}_{-0.144}$	$-0.260^{+0.300}_{-0.300}$	$0.784^{+0.185}_{-0.062}$	$0.850^{+0.091}_{-0.091}$	$2.486^{+0.493}_{-1.046}$
	+4%/-3%	+1%/-3%	+115%/-115%	+24%/-8%	+11%/-11%	+20%/-42%
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 003531231-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-94 ± 24	$1.90^{+0.31}_{-0.25}$	571^{+33}_{-28}	4007^{+294}_{-273}	1178^{+505}_{-404}
Alt.	-104 ± 24	$1.85^{+0.26}_{-0.24}$	569^{+32}_{-27}	4112^{+296}_{-252}	1382^{+561}_{-404}

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 $A_{obs} \gg 1.0$

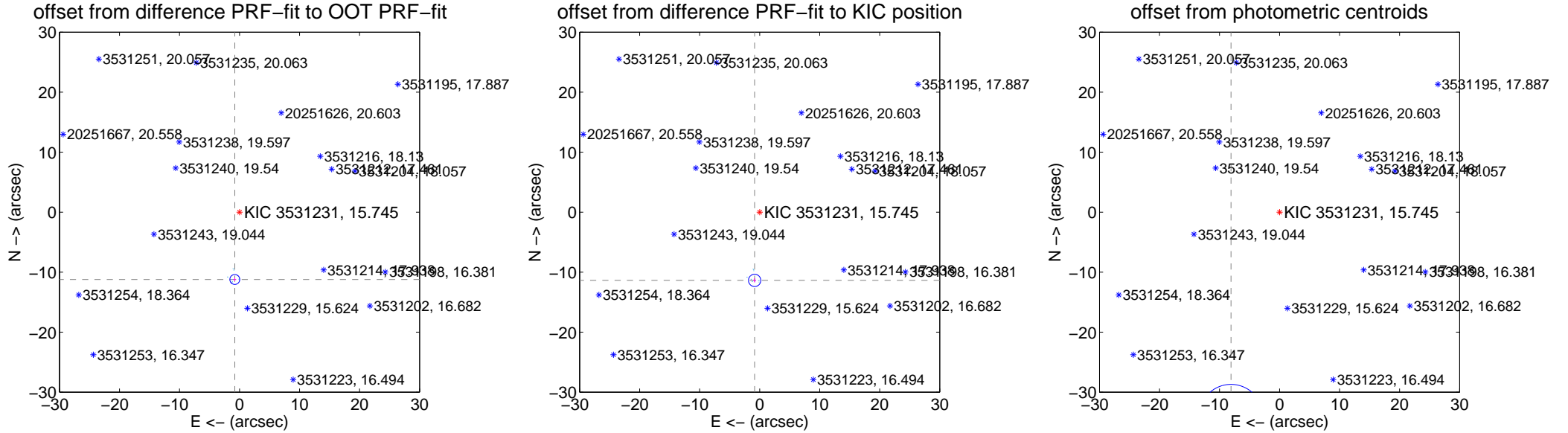
DV Centroid Data

Supplemental centroid analysis for 003531231-02. Kepler magnitude: 15.74. Transit SNR 10.08

There are 9 quarters with good PRF difference image offsets

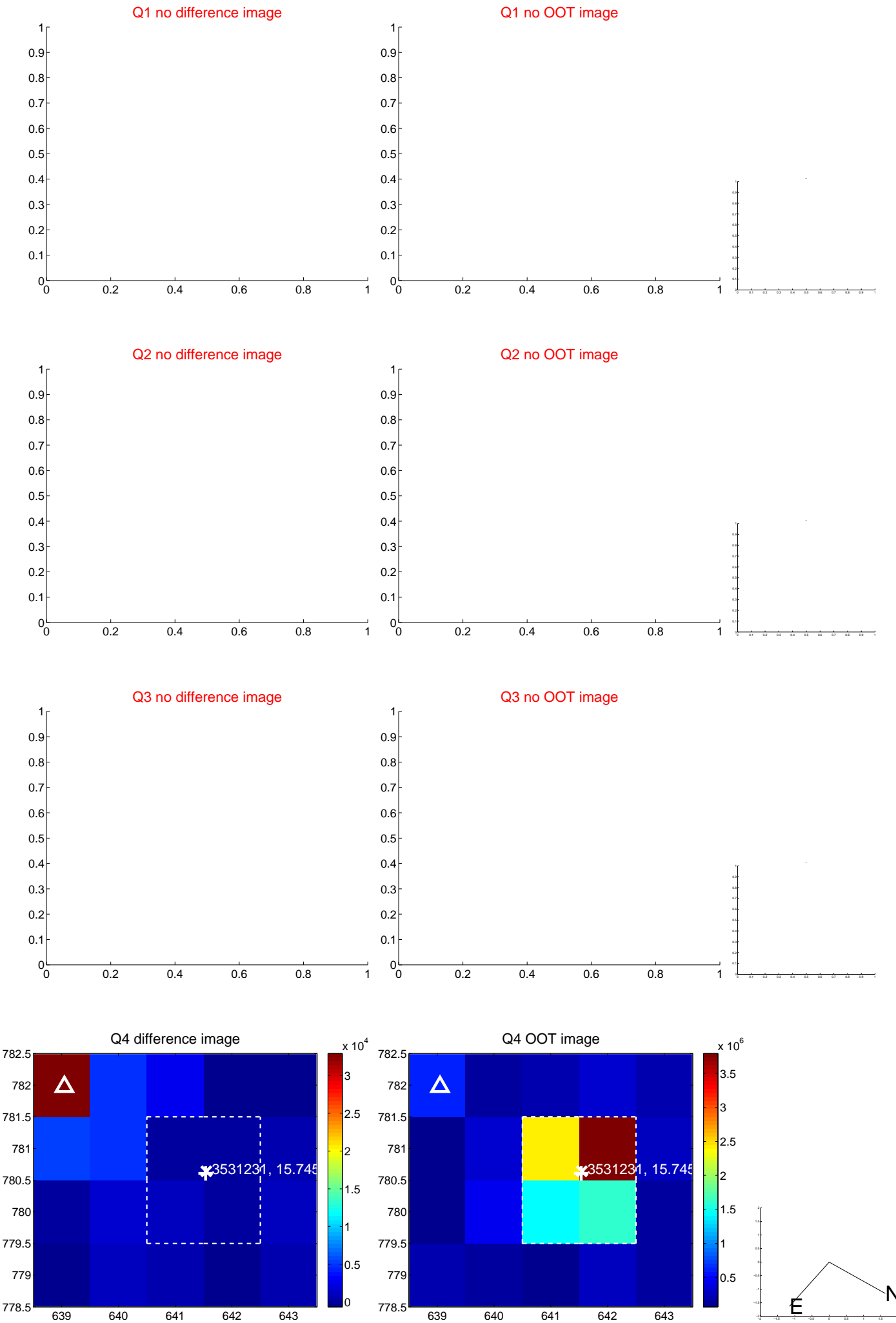
The direct PRF centroid is offset from the target star catalog position by about 0.32 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	11.247 ± 0.275	40.94	0.789 ± 0.225	-11.219 ± 0.278
PRF-fit source offset from KIC position	11.402 ± 0.342	33.34	0.841 ± 0.220	-11.371 ± 0.343
photometric centroid source offset	34.96 ± 1.77	19.74	8.09 ± 1.33	-34.02 ± 1.79

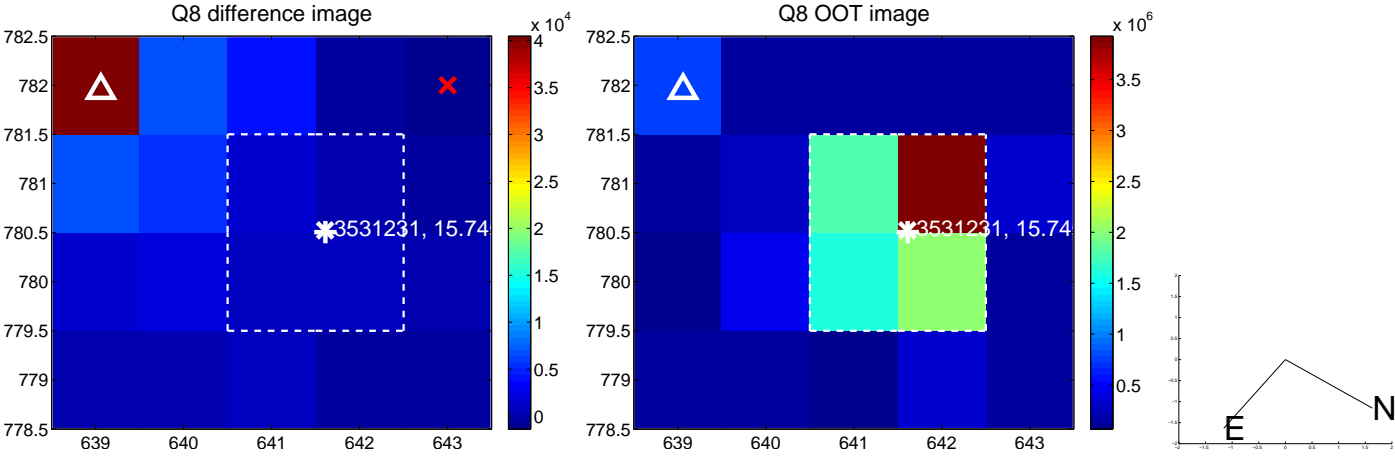
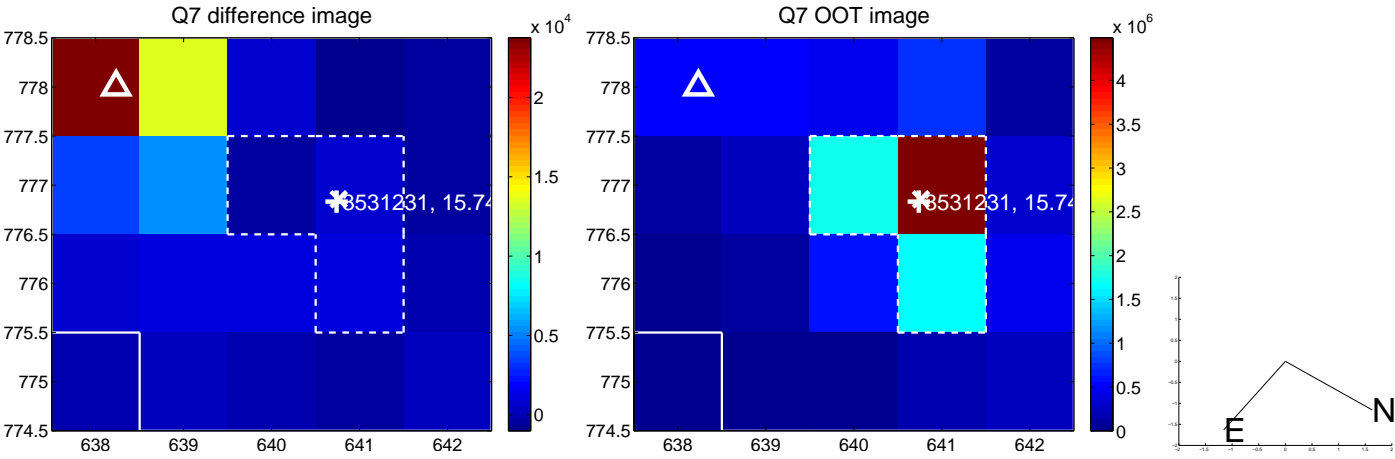
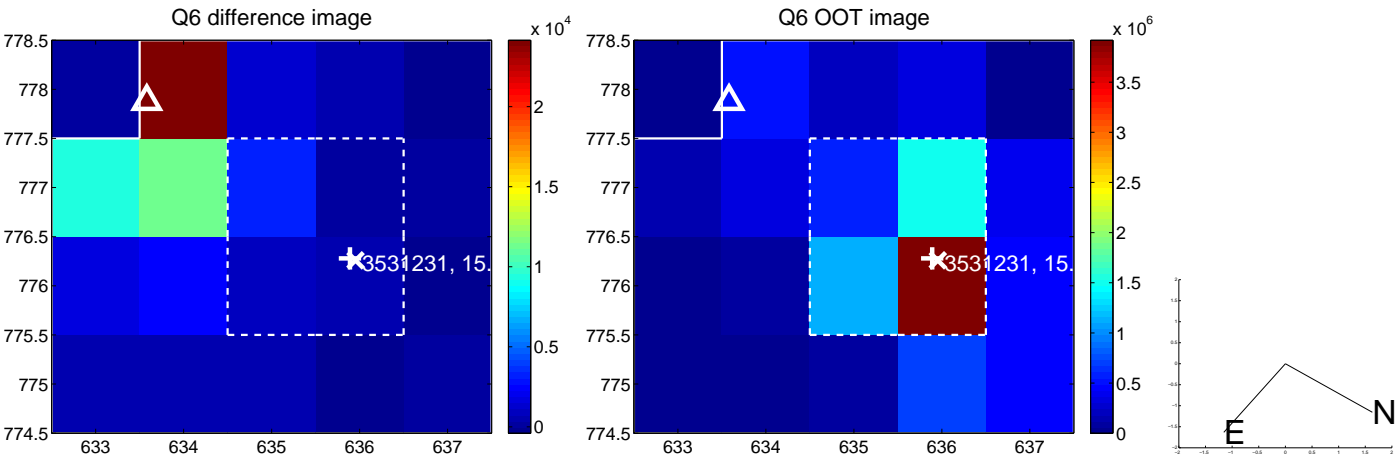
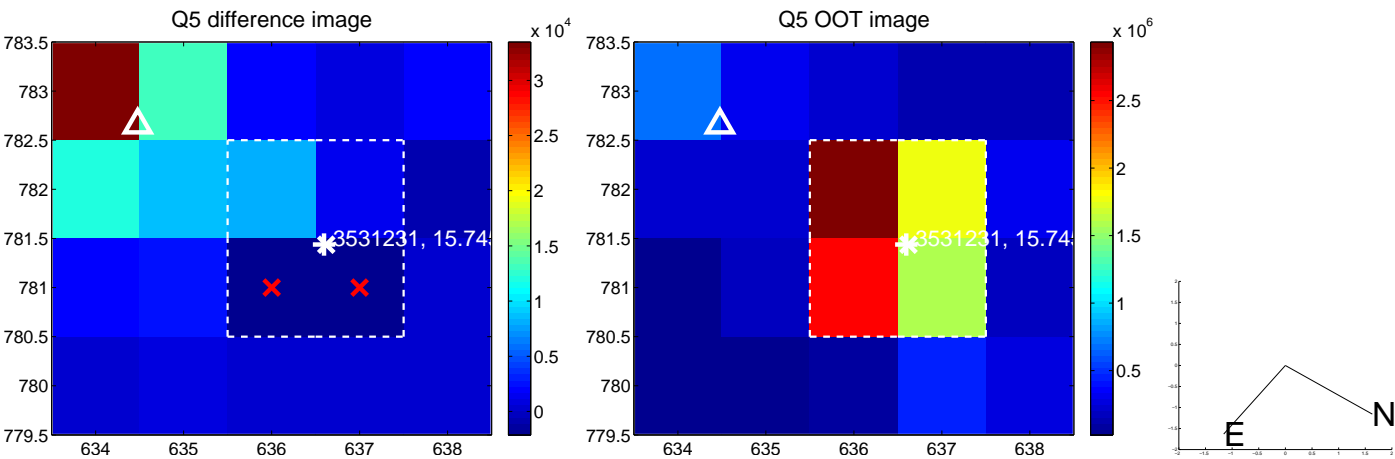


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

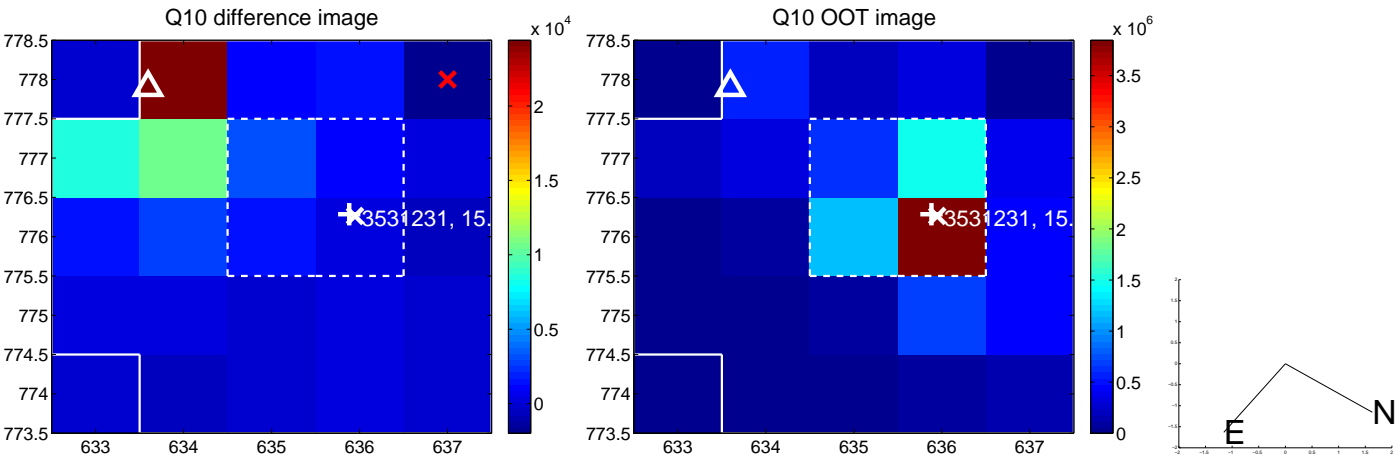
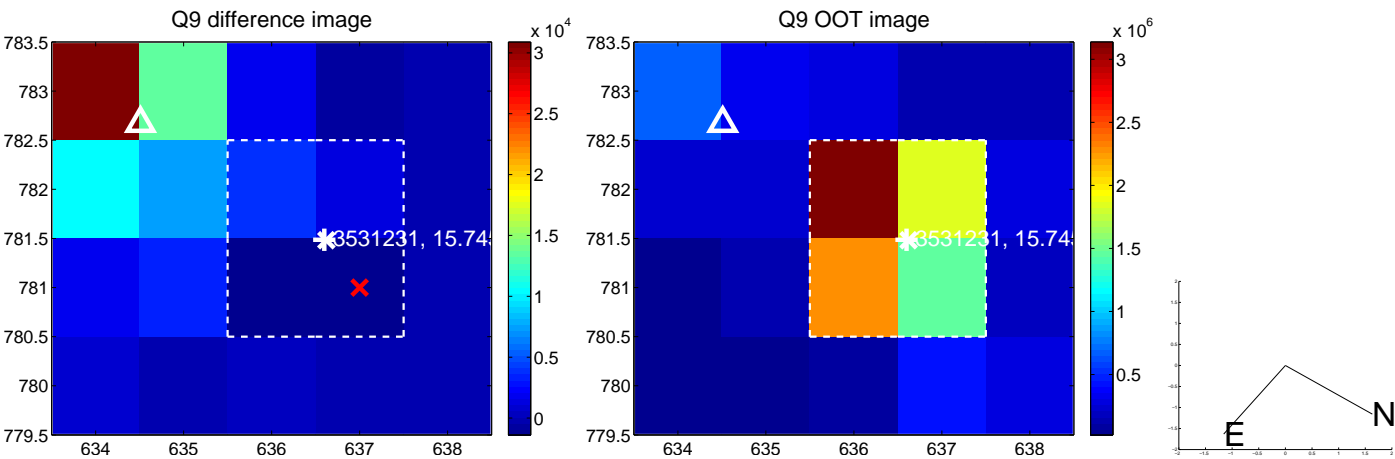
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



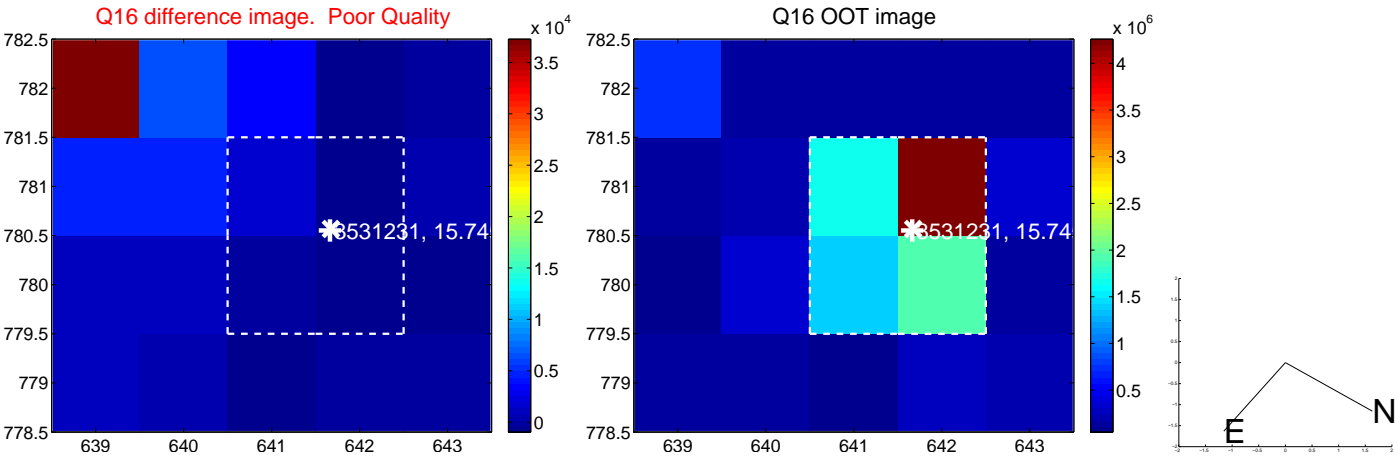
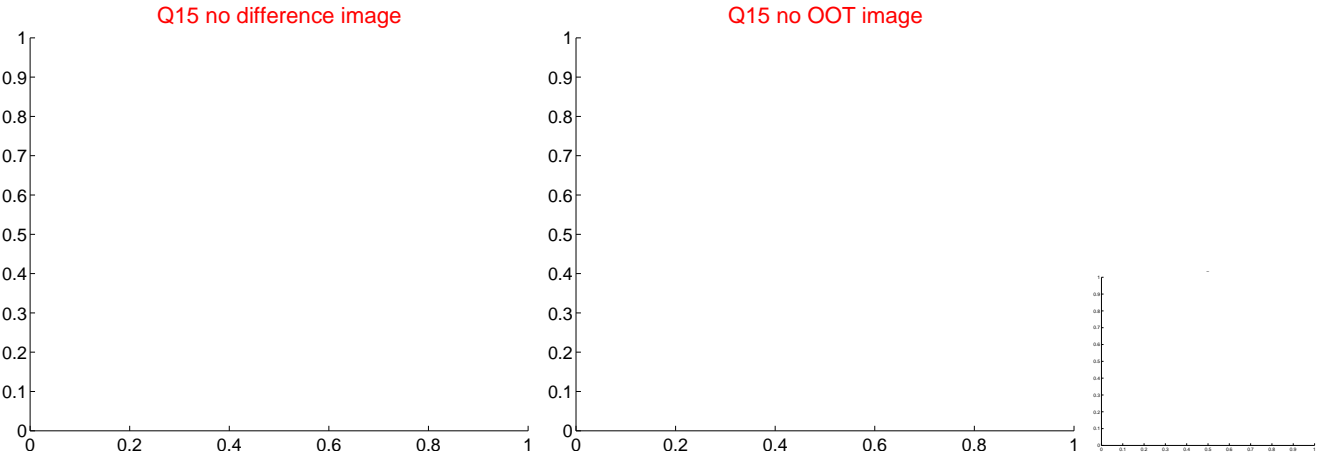
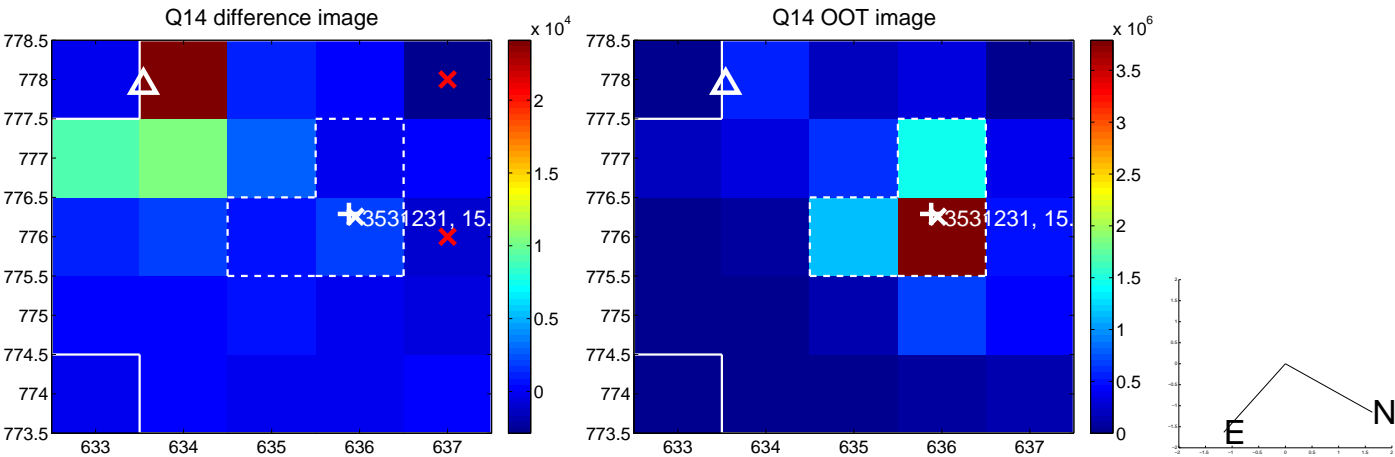
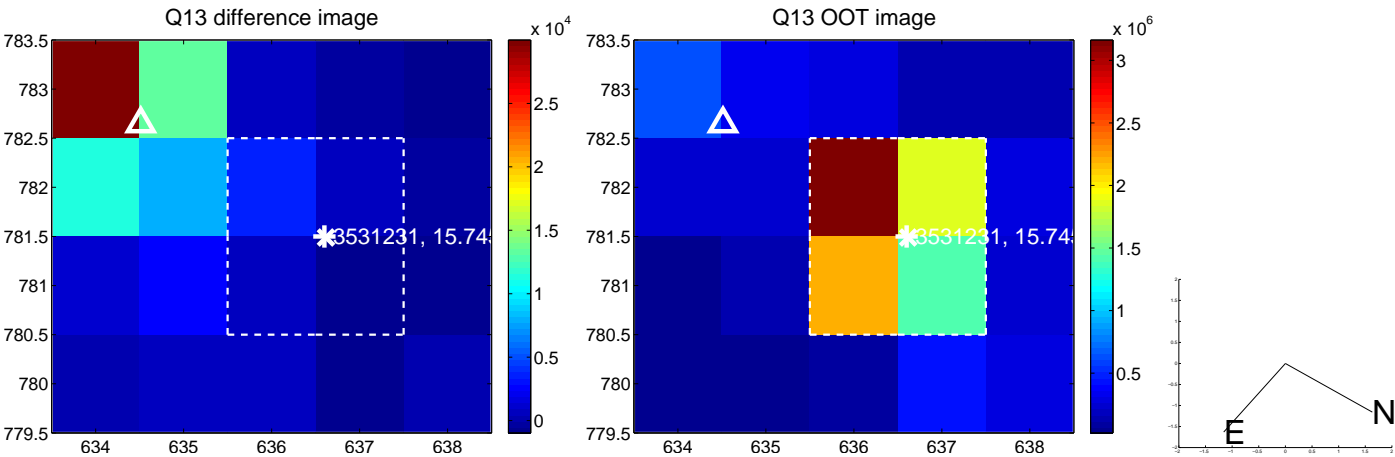
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



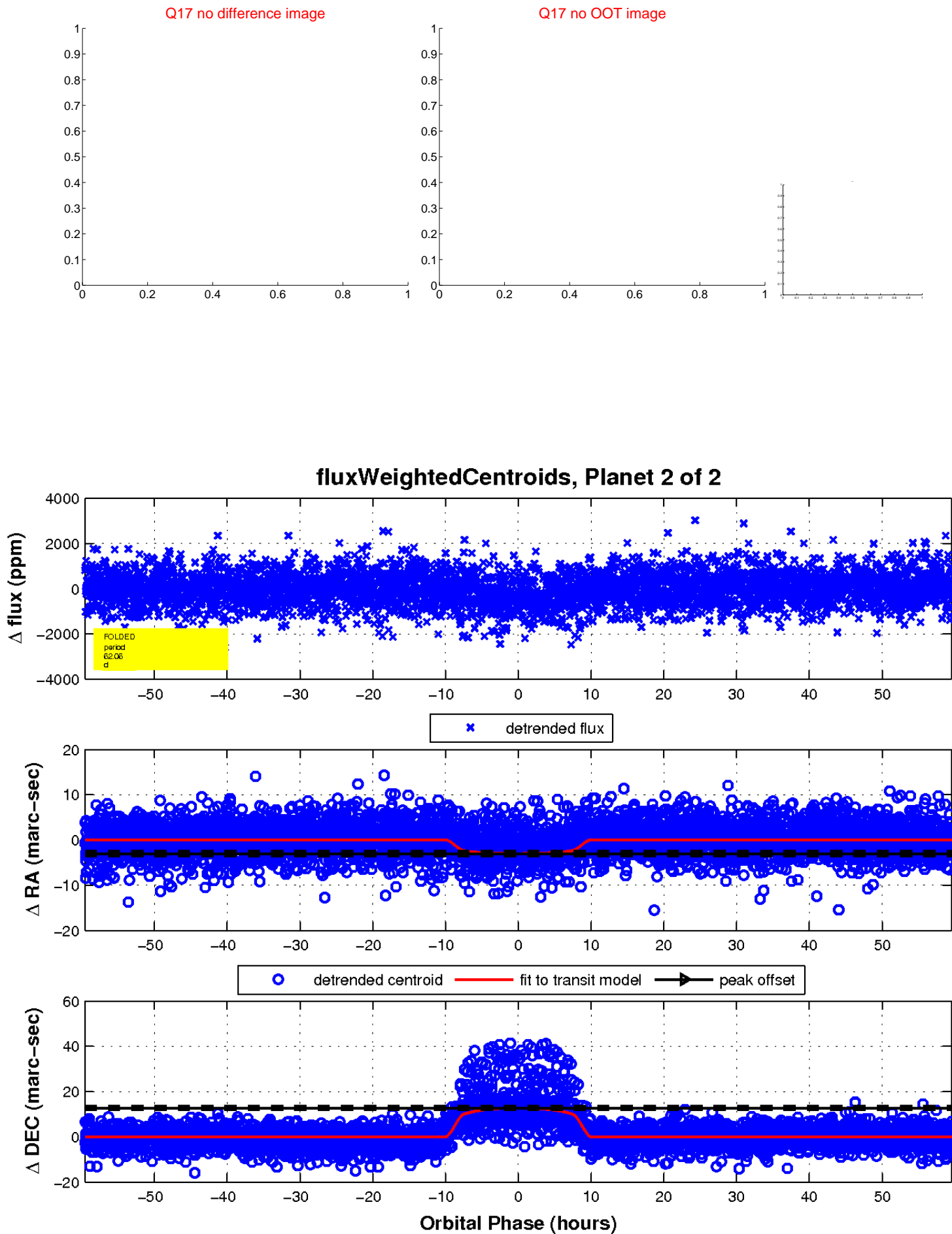
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

