

KIC 003962872

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})
003962872-01	OBS	4539.01	25.953003	154.839357	87.5	15.690	9.7	8.9	1.04	6058	1.08	44.00
003962872-02	OBS	No	25.955557	148.767689	84.9	15.854	9.4	9.5	1.04	6058	1.00	43.99

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003962872-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—HALO_GHOST—EPHEM_MATCH
003962872-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_FEW_DIFFS—HALO_GHOST—EPHEM_MATCH

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 003962872-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist (")	ΔRow	ΔCol	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
003962872-01	3962872	003858884-01	3858884	1:1	213.5	31	45	9.28	14.15	4581.10	Direct-PRF	0	1.47	1.14

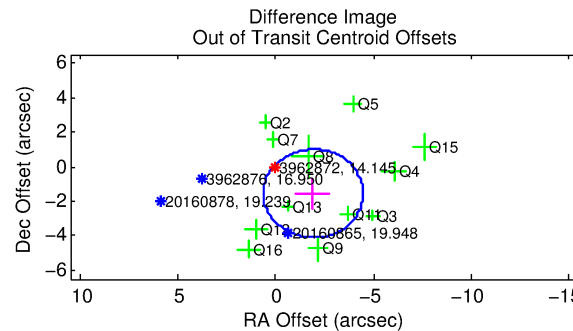
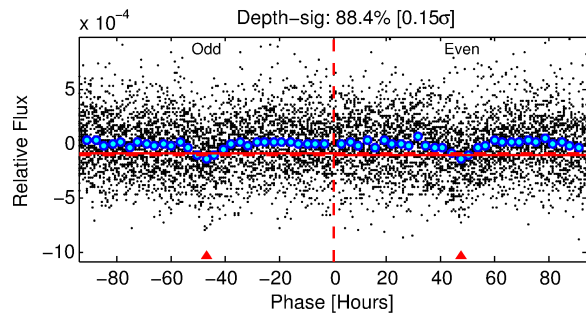
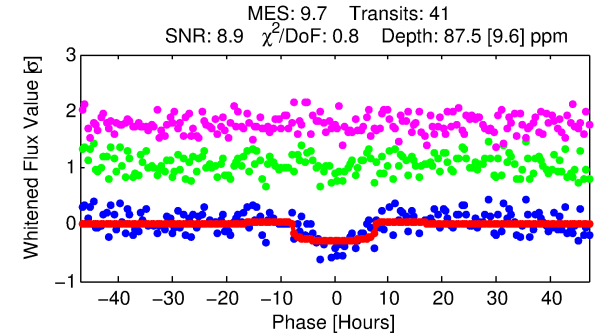
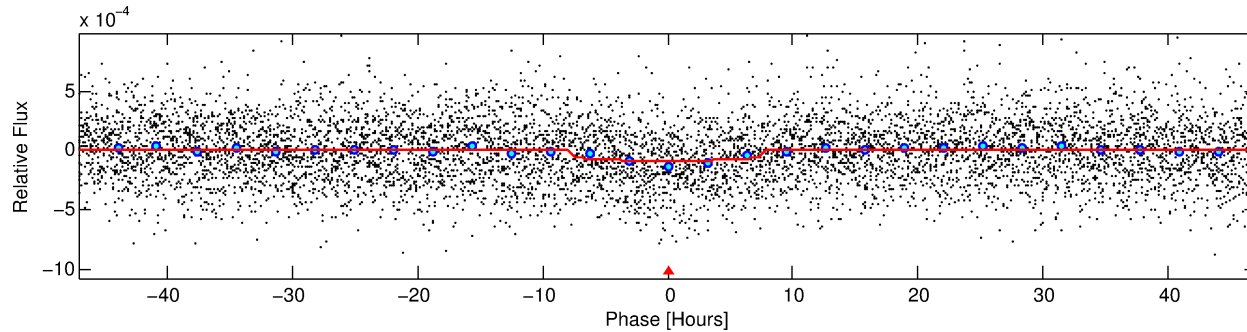
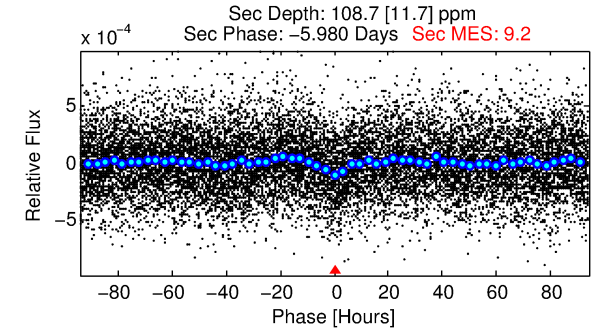
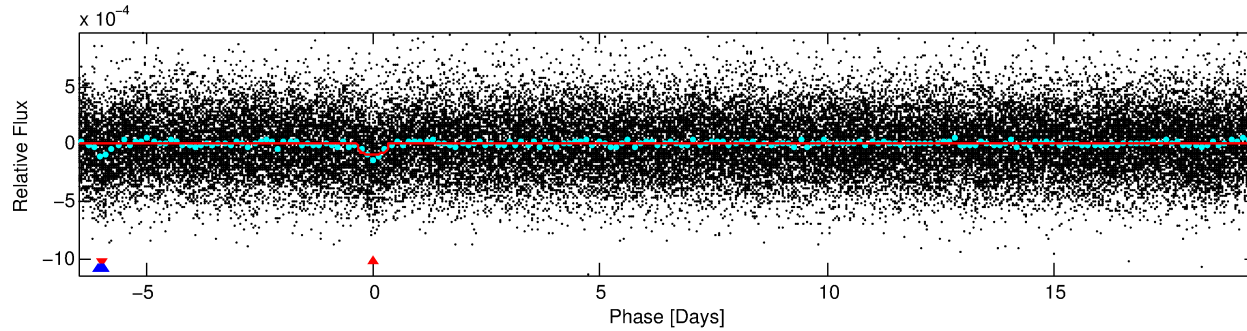
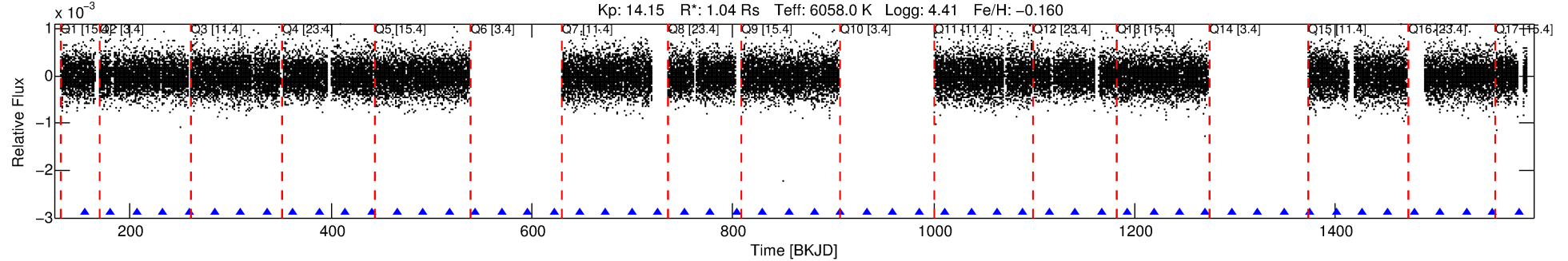
Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. ΔRow and ΔCol are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 3962872 Candidate: 1 of 2 Period: 25.953 d

KOI: K04539 Corr: No Ephemeris Match

Kp: 14.15 R*: 1.04 Rs Teff: 6058.0 K Logg: 4.41 Fe/H: -0.160



DV Fit Results:

Period = 25.95300 [0.00071] d
Epoch = 154.8394 [0.0215] BKJD
Rp/R* = 0.0095 [0.0026]
a/R* = 7.64 [10.31]
b = 0.81 [0.58]
Seff = 44.00 [17.28]
Teq = 657 [64] K
Rp = 1.08 [0.45] Re
a = 0.1719 [0.0446] AU
Ag = 1515.07 [1027.13] [1.47σ]
Teffp = 6335 [915] K [6.19σ]

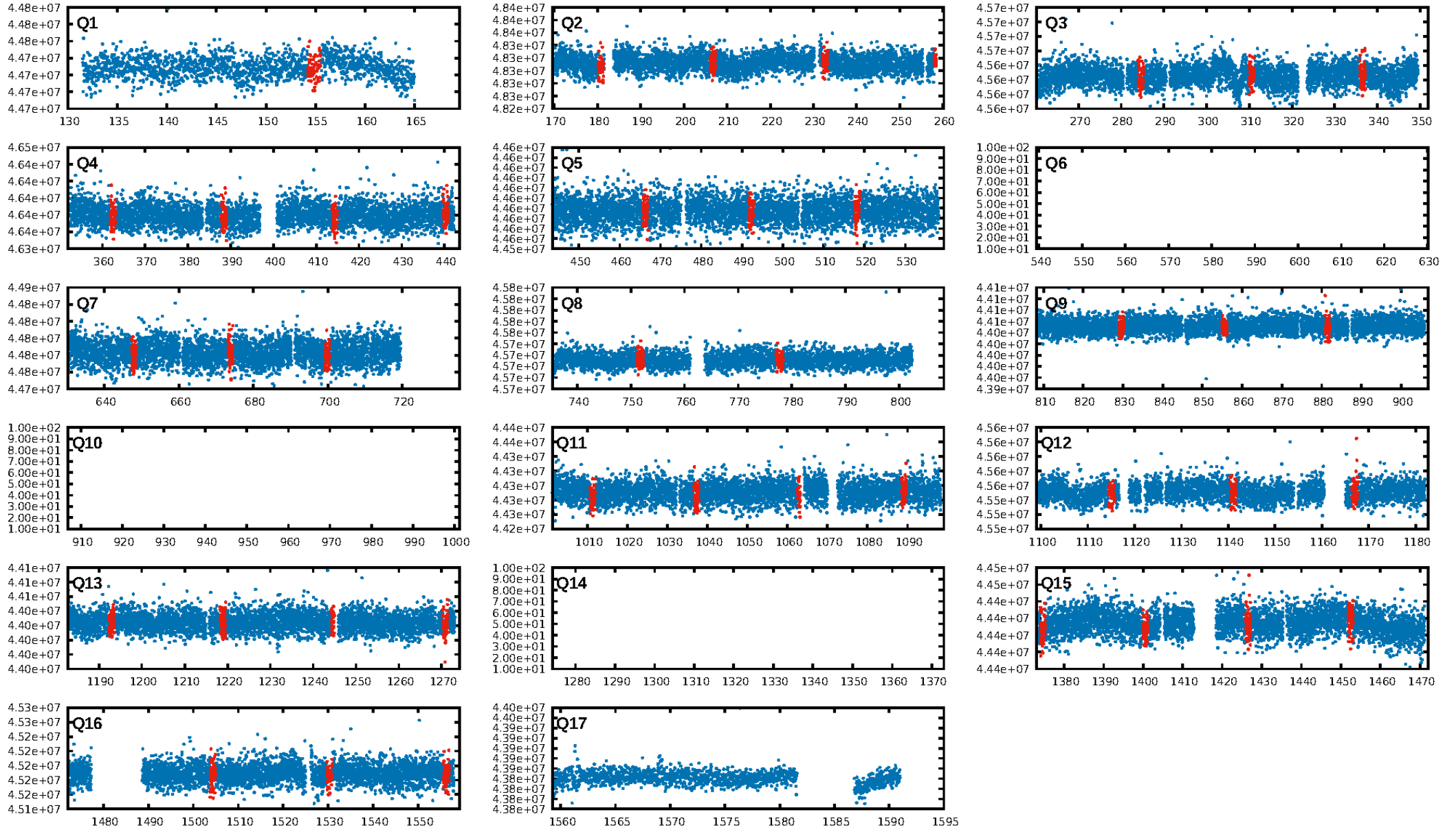
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.2% [0.00σ]
ModelChiSquare2-sig: 65.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 4.15e-20
RollingBand-fgt: 1.00 [40/40]
GhostDiagnostic-chr: 0.1132
Centroid-sig: 8.9%
Centroid-so: 1.799 arcsec [1.14σ]
OotOffset-rm: 2.464 arcsec [2.90σ]
KicOffset-rm: 2.617 arcsec [3.06σ]
OotOffset-st: 1/4/4/3 [12]
KicOffset-st: 1/4/4/3 [12]
DiffImageQuality-fgm: 0.17 [2/12]
DiffImageOverlap-fno: 1.00 [13/13]

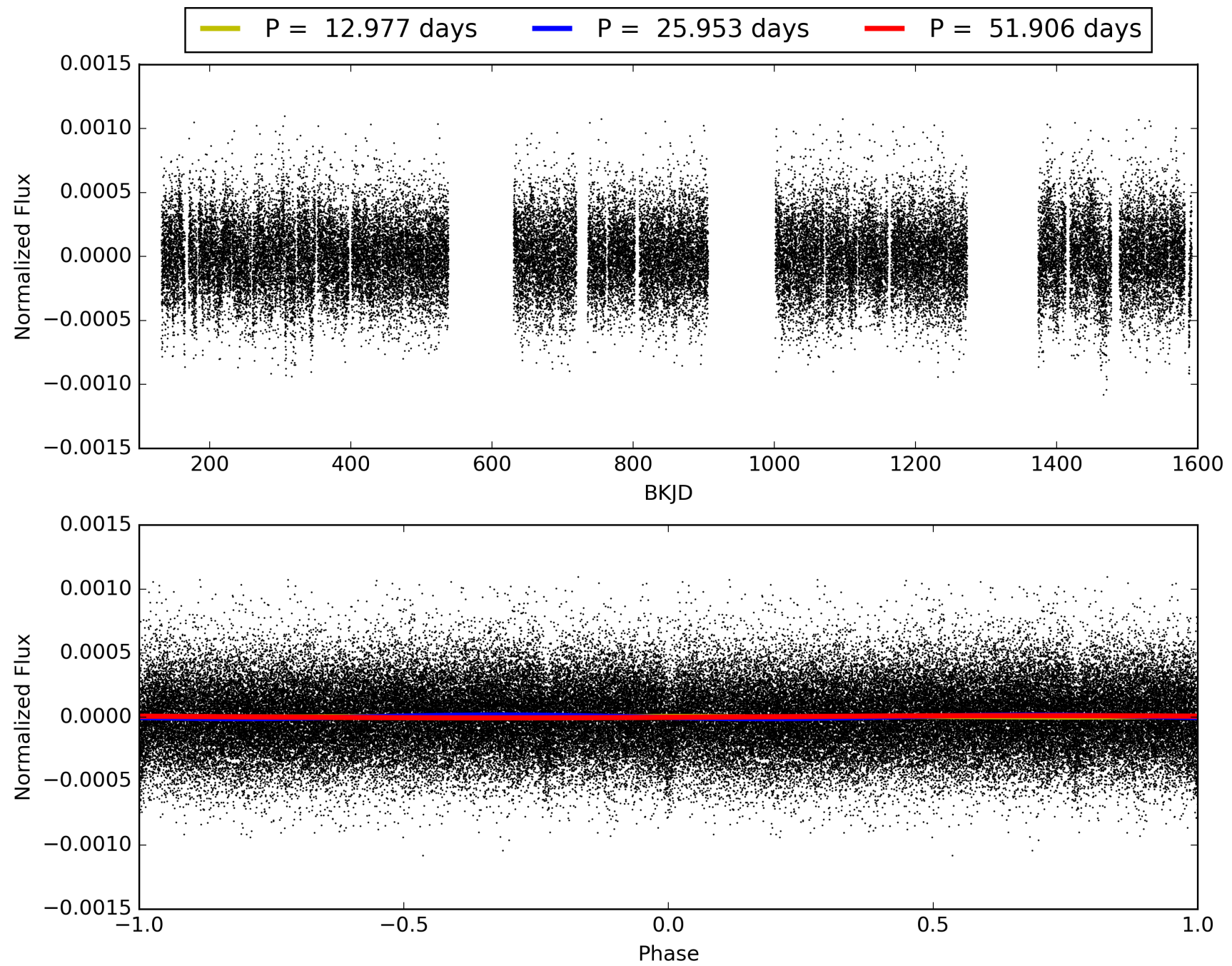
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 003962872-01, PDC Light Curves

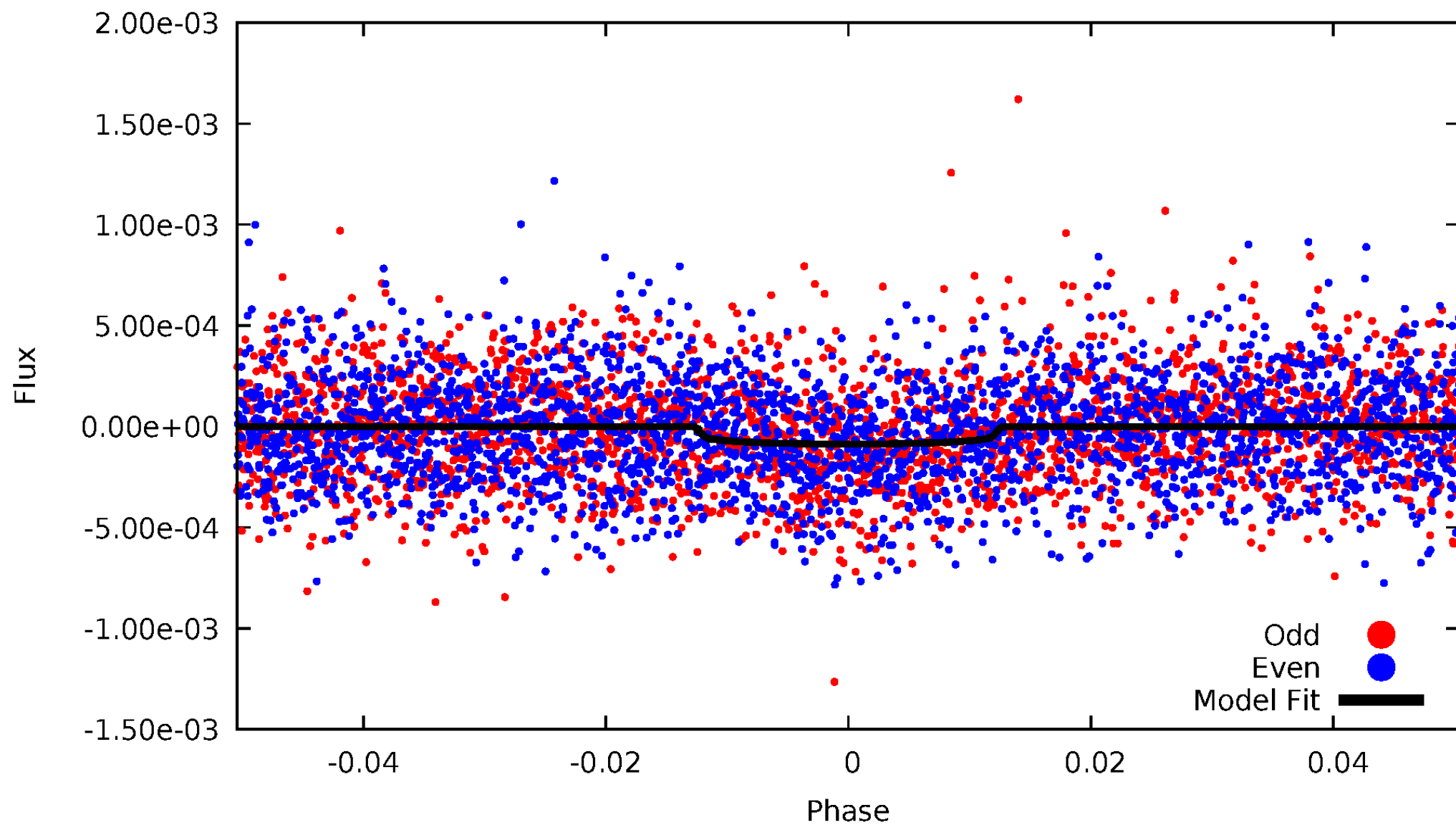


TCE 003962872-01



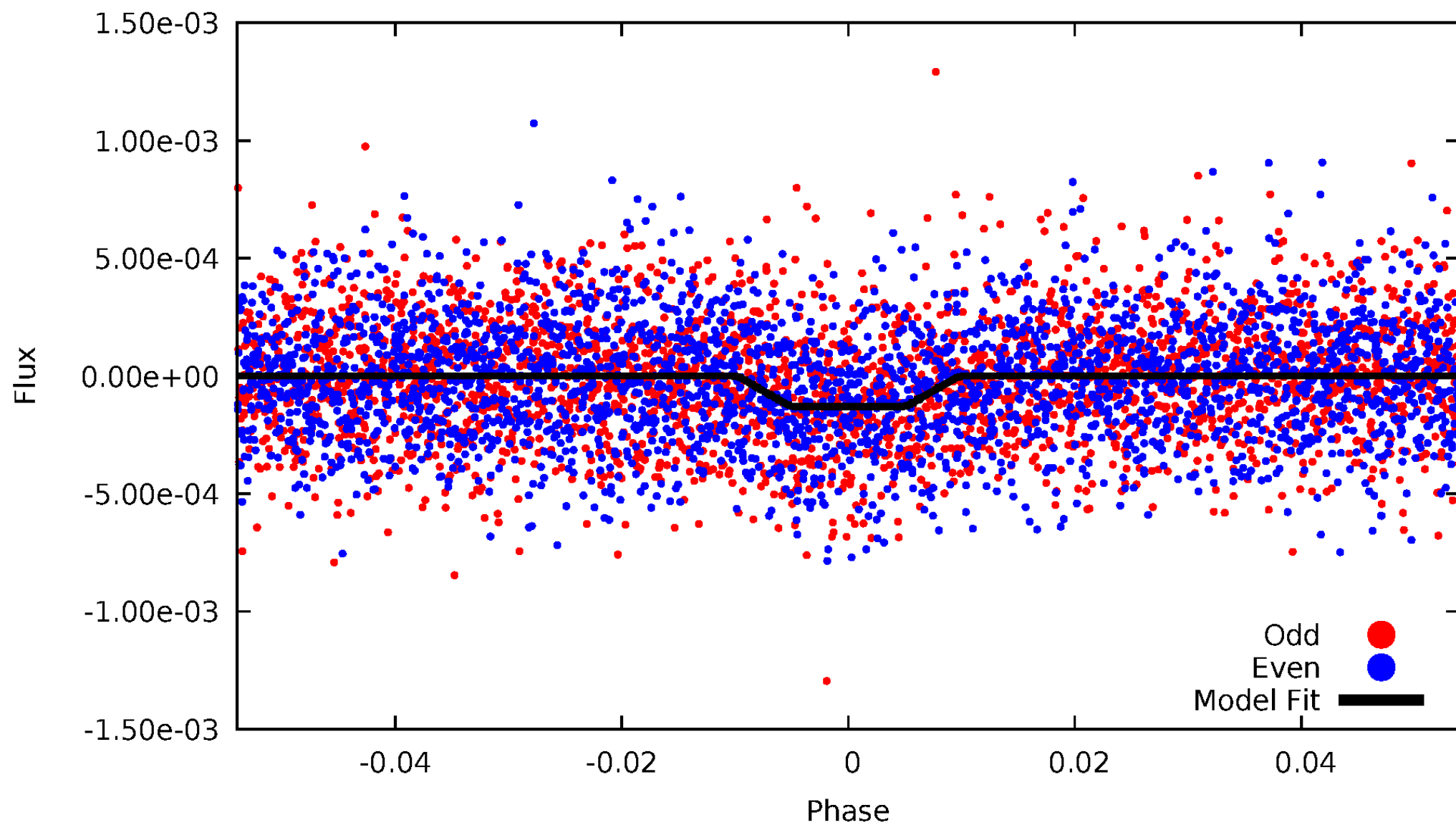
DV Odd/Even

TCE 003962872-01

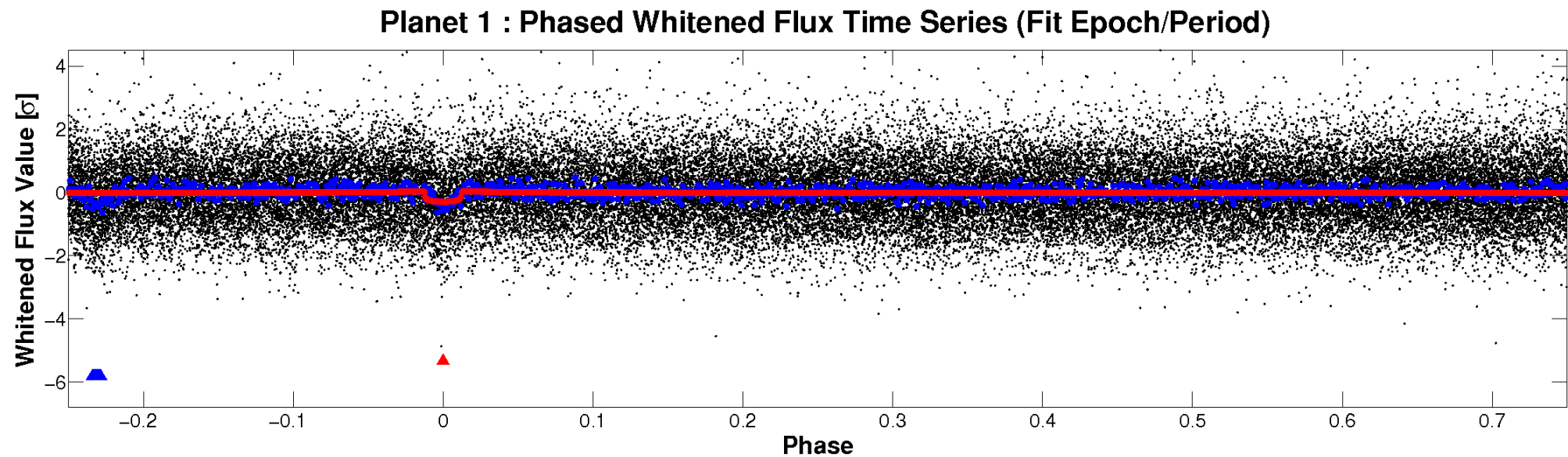
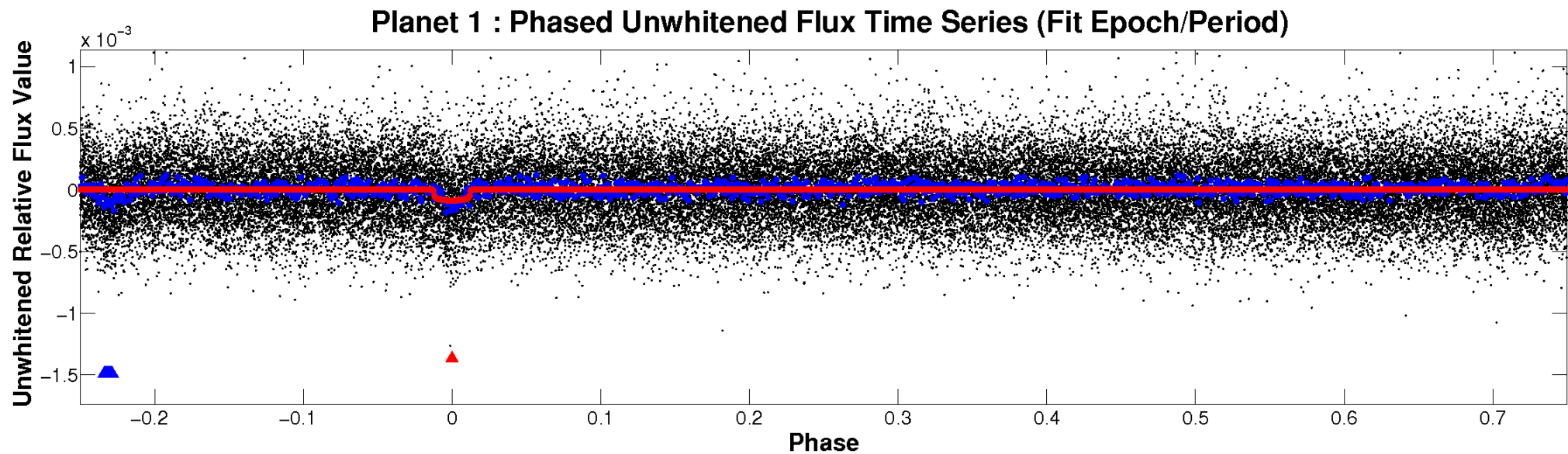


ALT Odd/Even

TCE 003962872-01

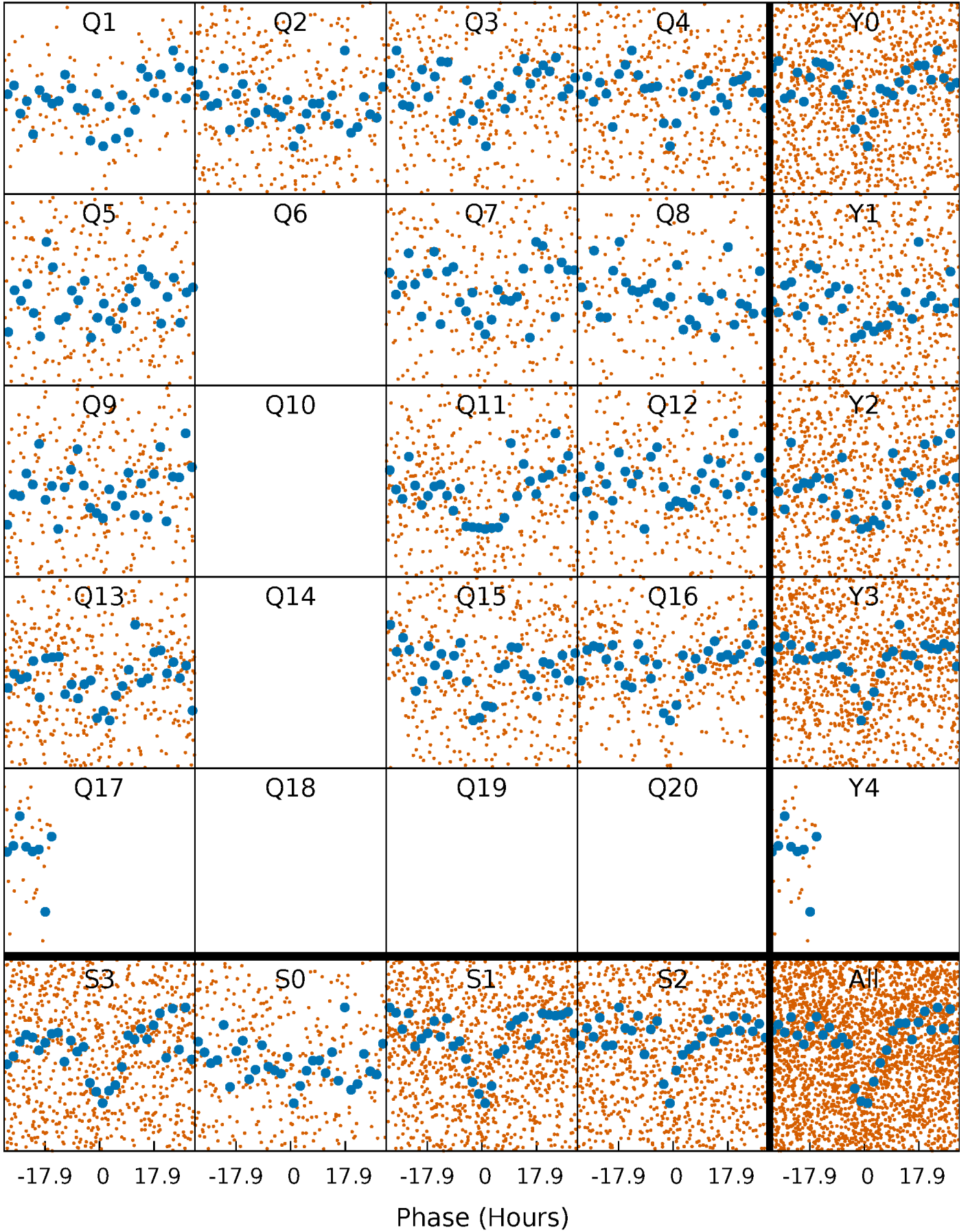


Non-Whitened Vs. Whitened Light Curve



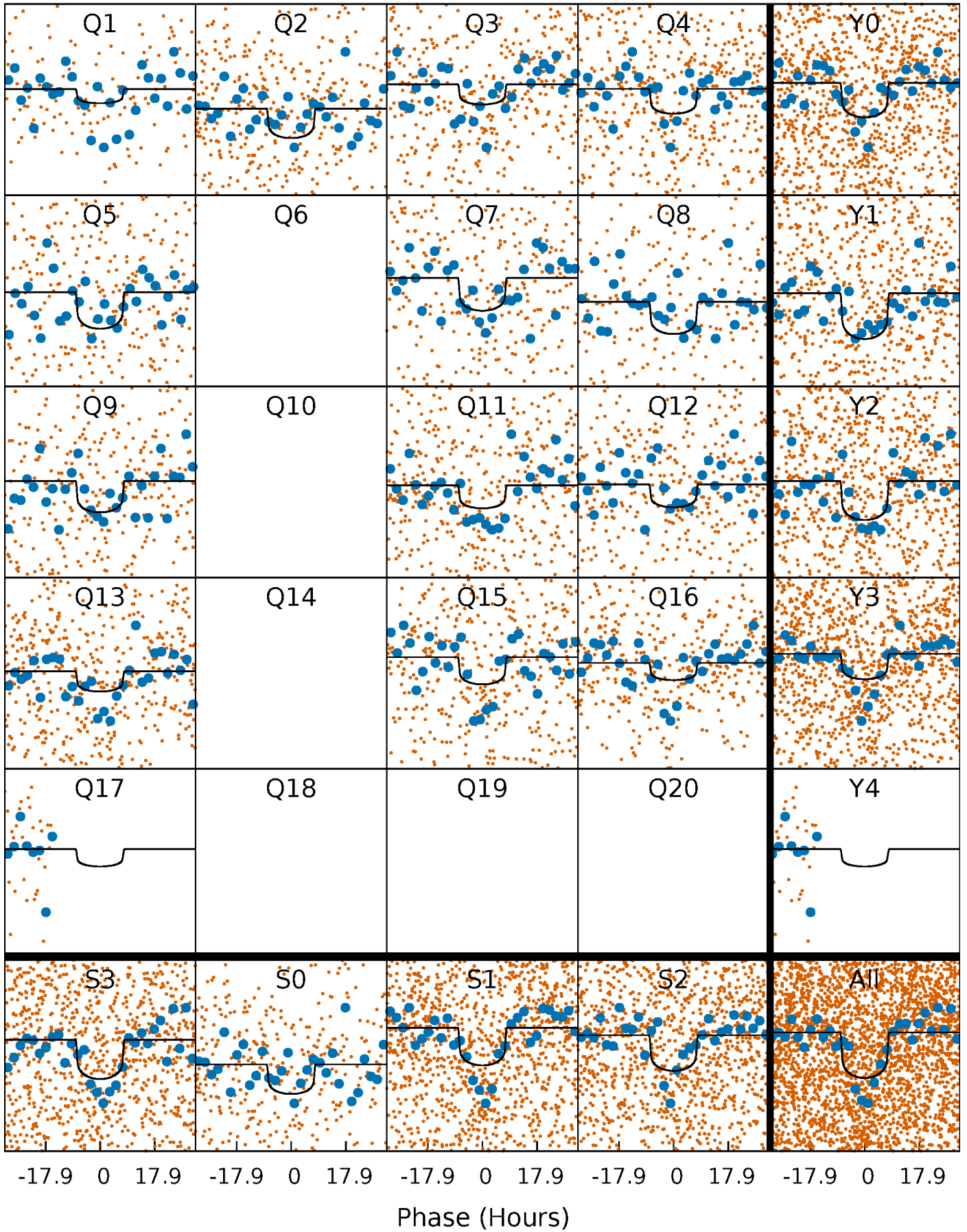
PDC Quarter-Phased Transit Curves

TCE 003962872-01 P= 25.953003 Days $T_0=154.839357$ (BKJD)



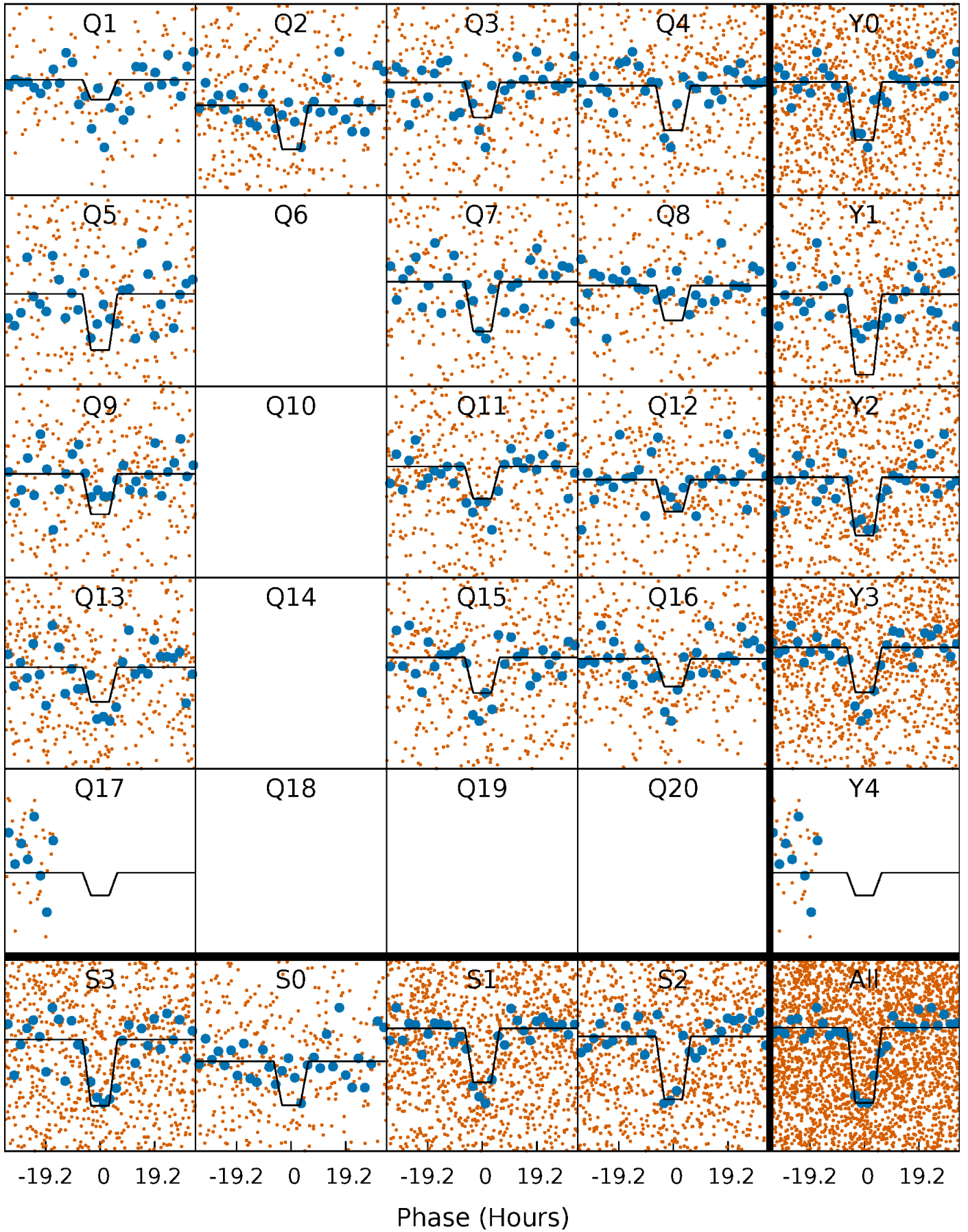
DV Quarter-Phased Transit Curves

TCE 003962872-01 P= 25.953003 Days $T_0=154.839357$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

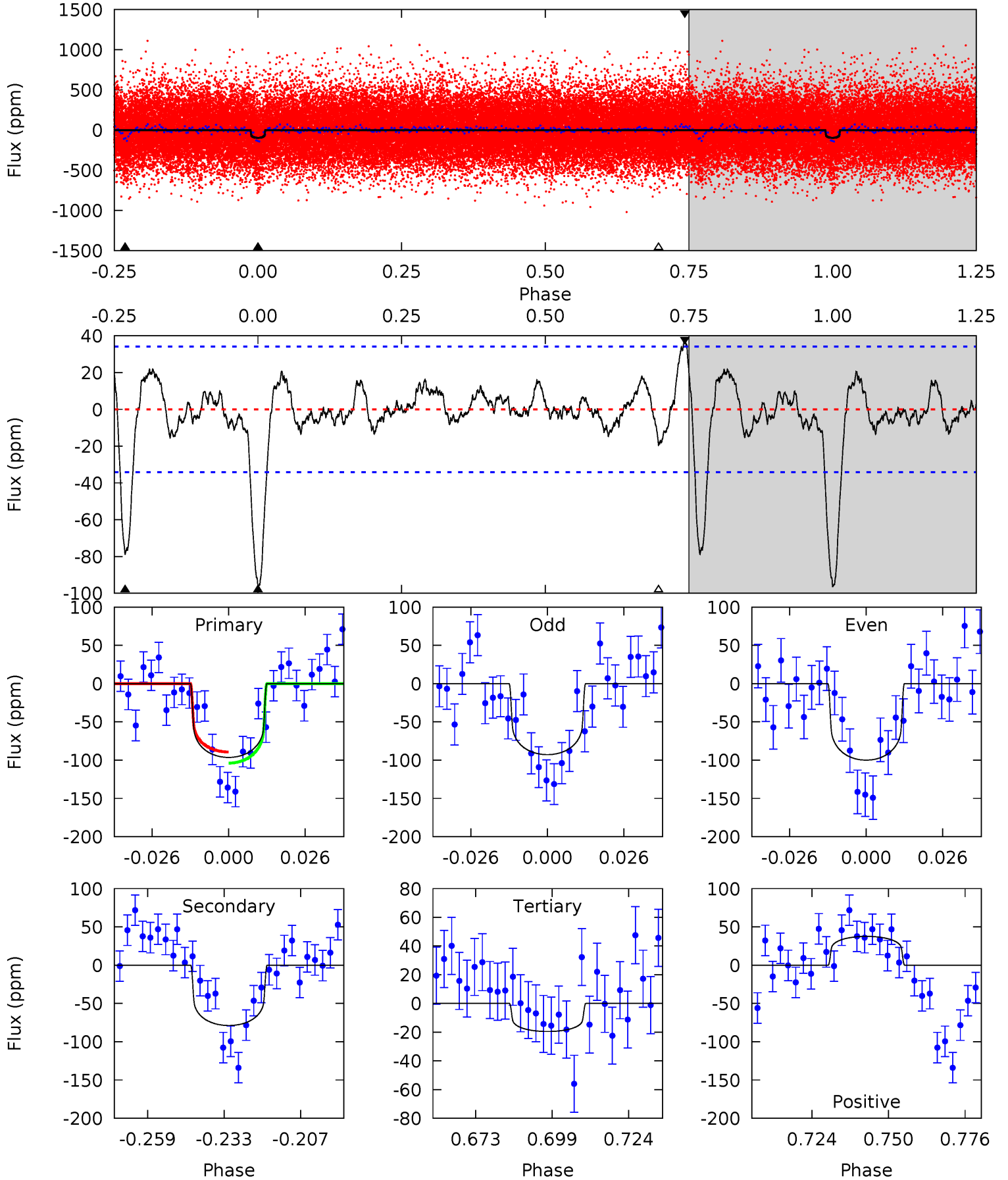
TCE 003962872-01 P= 25.952905 Days $T_0=154.863532$ (BKJD)



DV Model-Shift Uniqueness Test

003962872-01, P = 25.953003 Days, E = 128.886354 Days

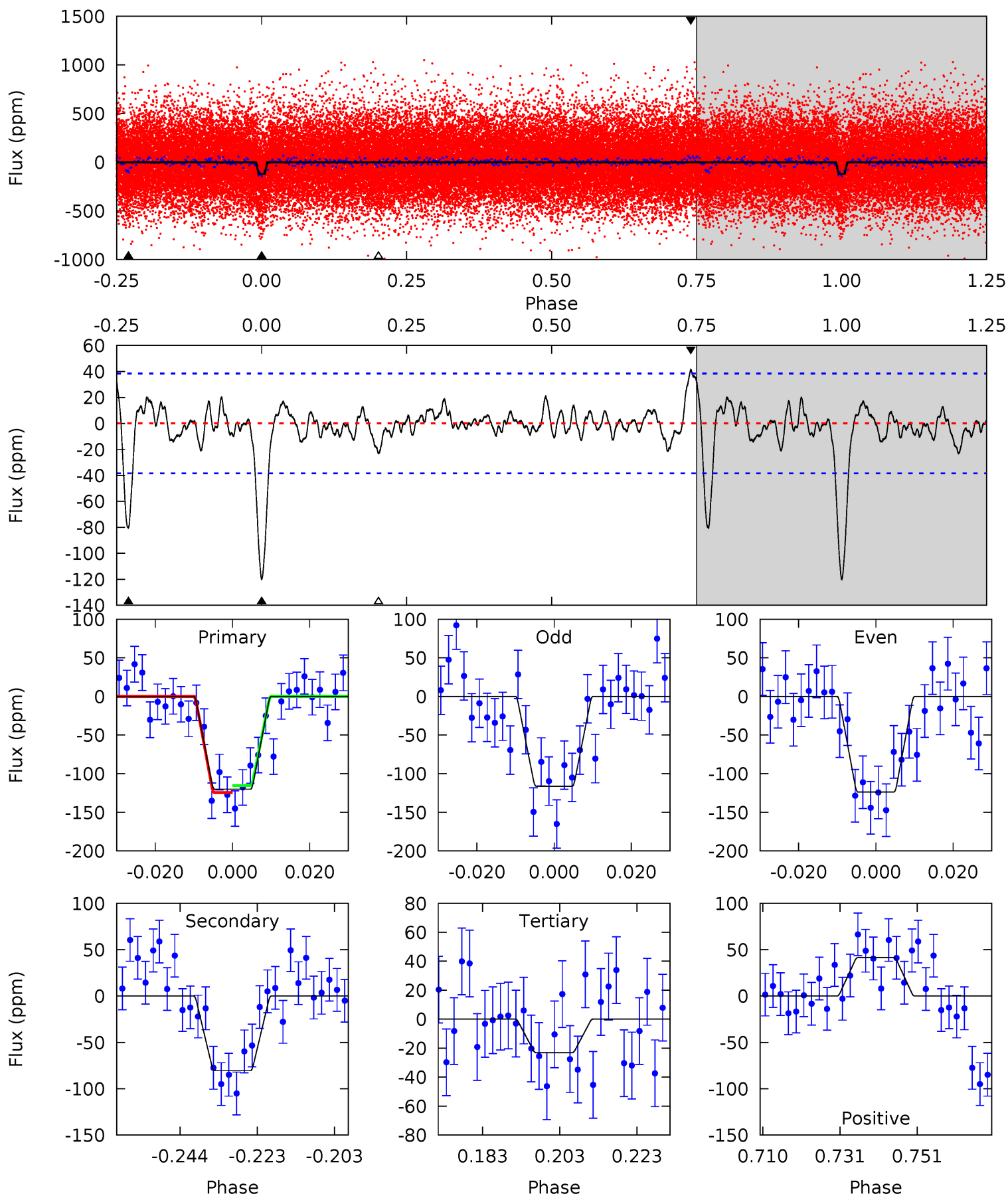
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.7	11.2	2.77	5.33	4.84	2.23	1.33	10.9	8.35	8.41	5.85	0.51	1.04	0.28	1.03



Alt Model-Shift Uniqueness Test

003962872-01, P = 25.952905 Days, E = 128.910627 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.2	10.2	2.94	5.27	4.89	2.32	1.22	12.3	9.98	7.28	4.95	0.47	1.05	0.26	0.59



Stellar Parameters For KIC 003962872

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6058^{+180}_{-180}	$4.408^{+0.087}_{-0.203}$	$-0.160^{+0.300}_{-0.300}$	$1.038^{+0.323}_{-0.139}$	$1.004^{+0.143}_{-0.117}$	$1.266^{+0.580}_{-0.676}$
	+3%/-3%	+2%/-5%	+188%/-188%	+31%/-13%	+14%/-12%	+46%/-53%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 003962872-01 / KOI 4539.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-79 ± 7	$1.13^{+0.38}_{-0.30}$	936^{+71}_{-52}	5833^{+936}_{-639}	1004^{+813}_{-449}
Alt.	-80 ± 8	$1.35^{+0.35}_{-0.33}$	932^{+63}_{-52}	5426^{+733}_{-536}	732^{+556}_{-292}

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 $A_{obs} \gg 1.0$

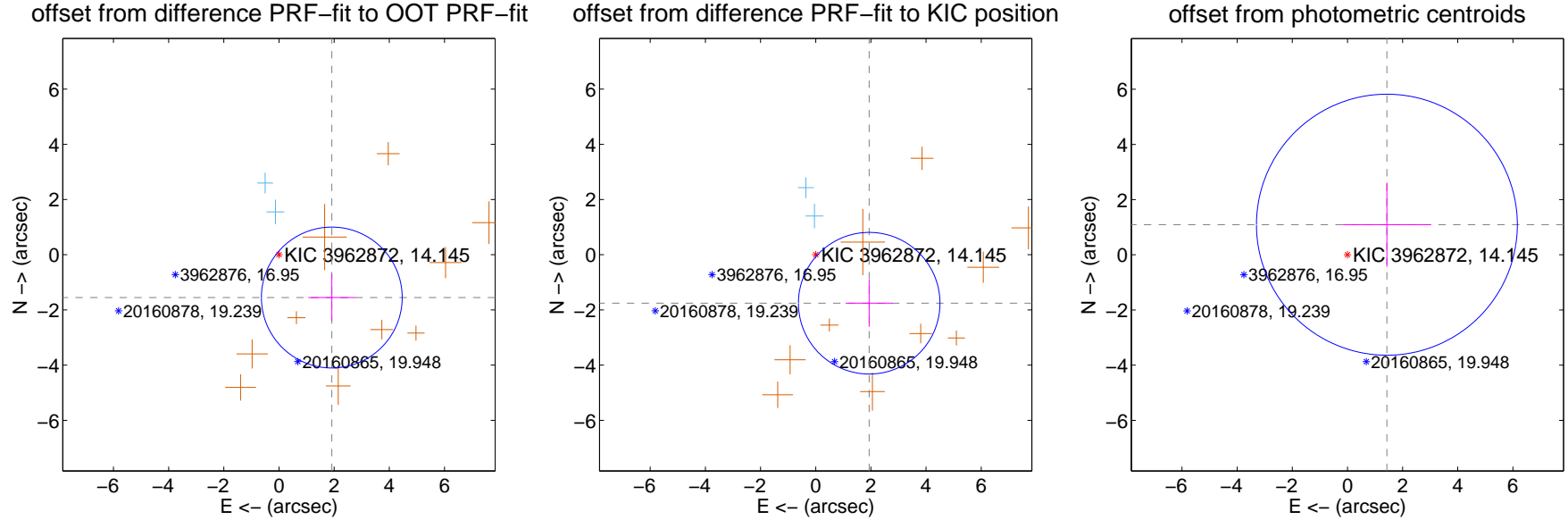
DV Centroid Data

Supplemental centroid analysis for 003962872-01. Kepler magnitude: 14.14. Transit SNR 8.92

There are 2 quarters with good PRF difference image offsets

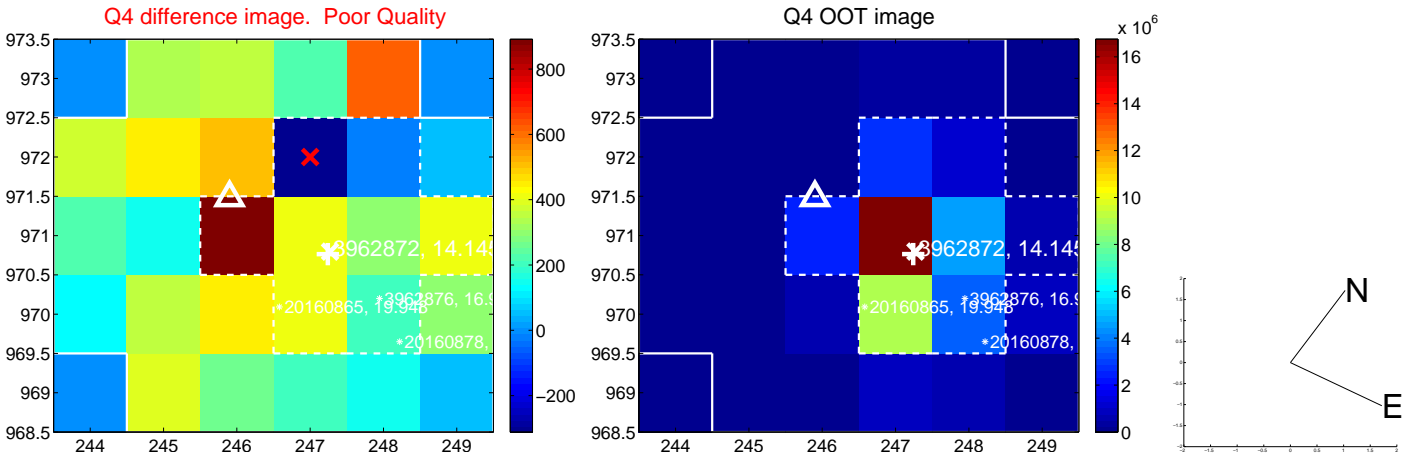
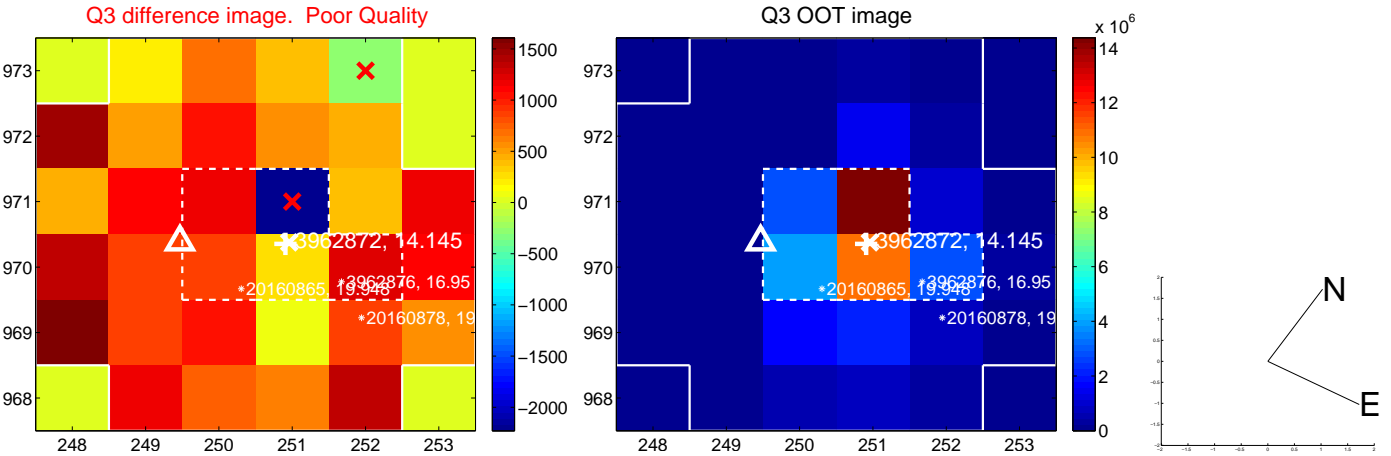
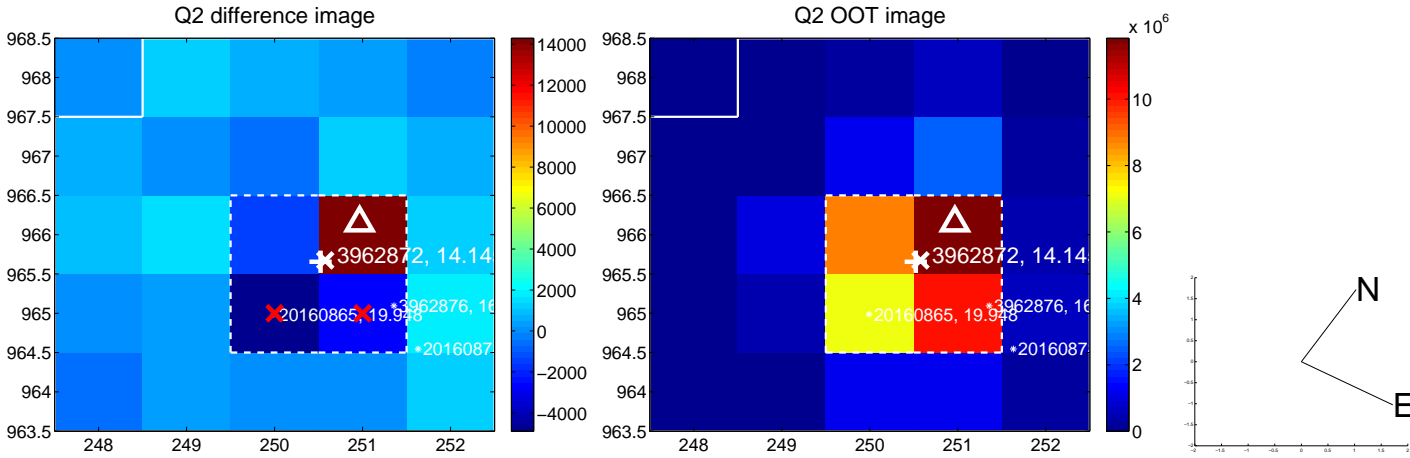
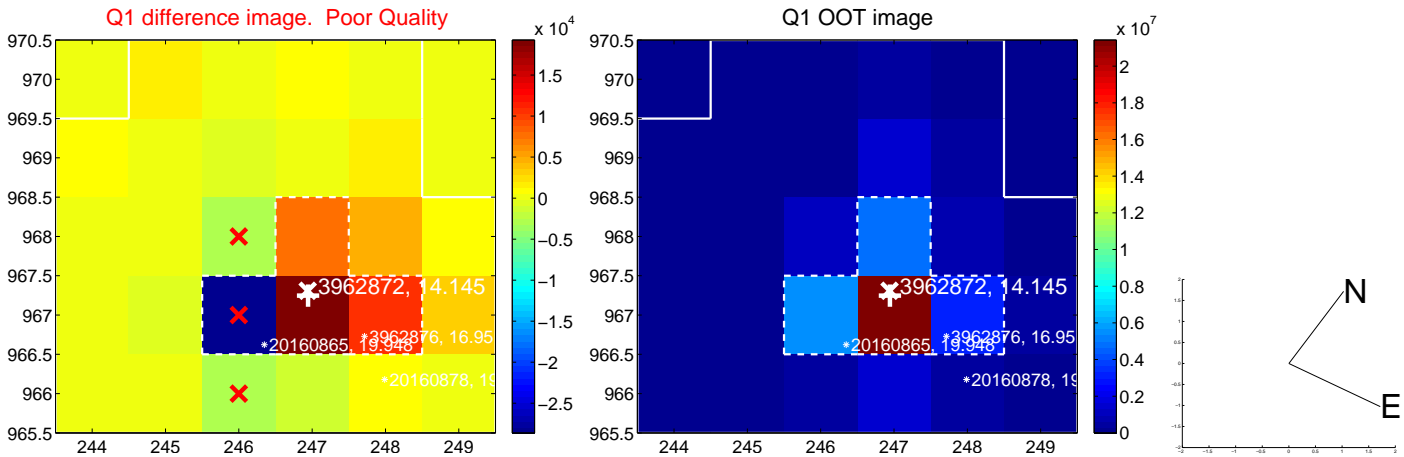
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.464 ± 0.851	2.90	-1.915 ± 0.853	-1.551 ± 0.848
PRF-fit source offset from KIC position	2.617 ± 0.855	3.06	-1.939 ± 0.854	-1.757 ± 0.857
photometric centroid source offset	1.80 ± 1.58	1.14	-1.43 ± 1.60	1.09 ± 1.53

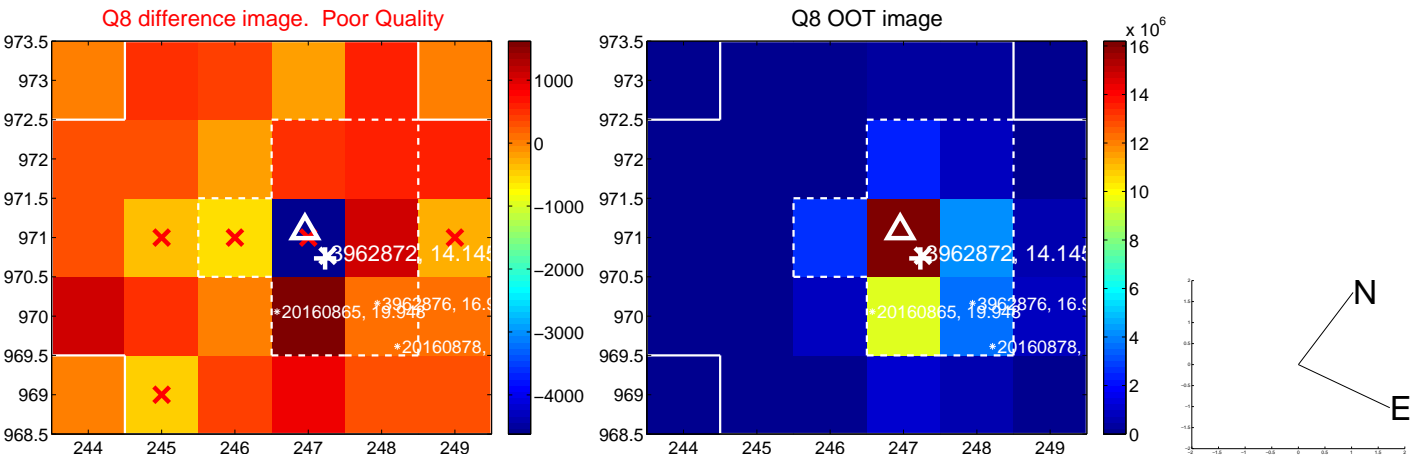
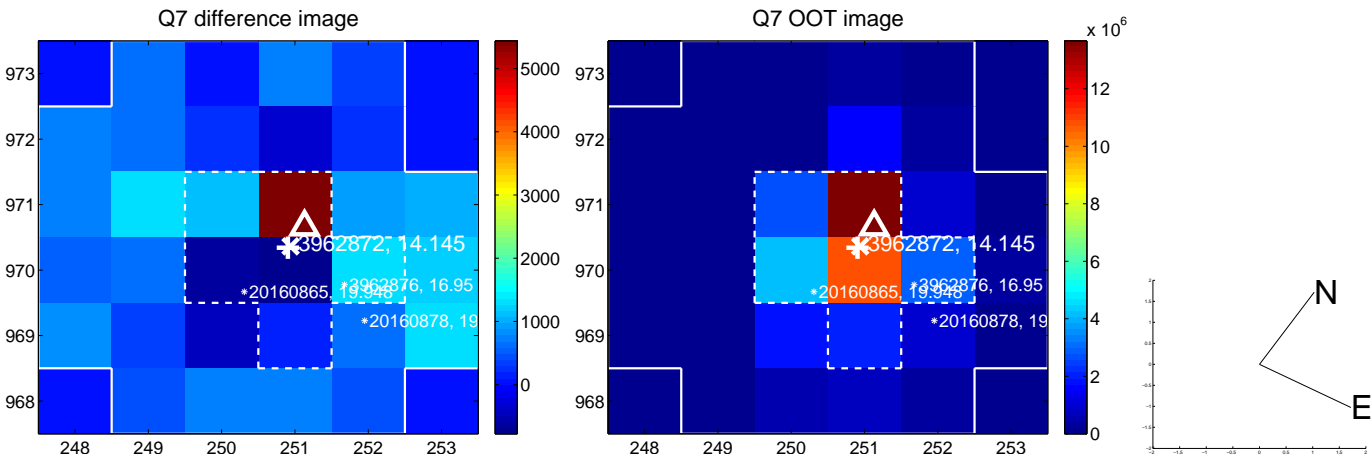
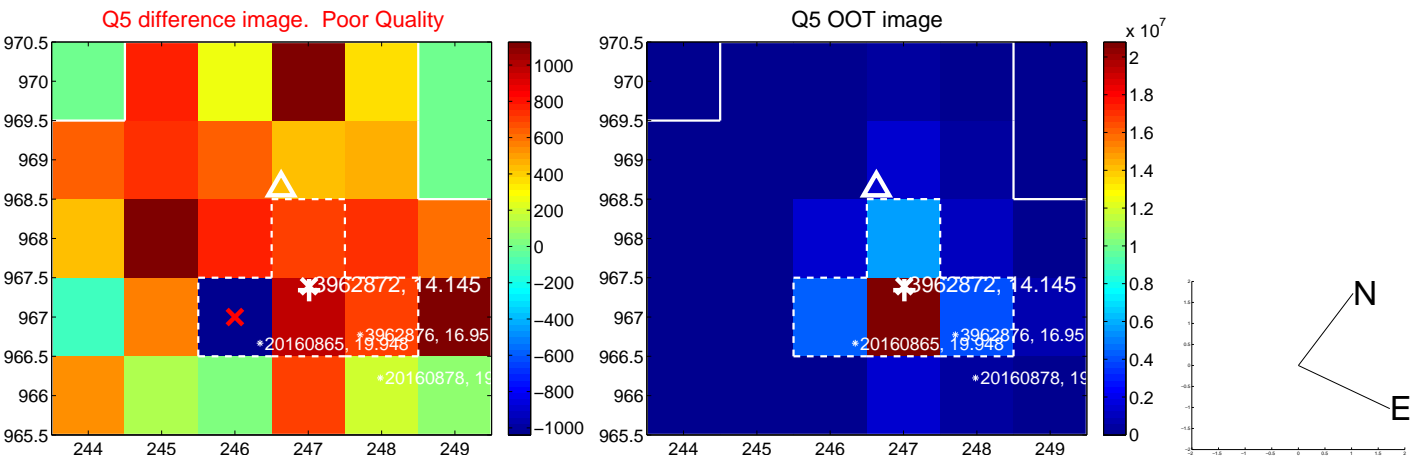


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

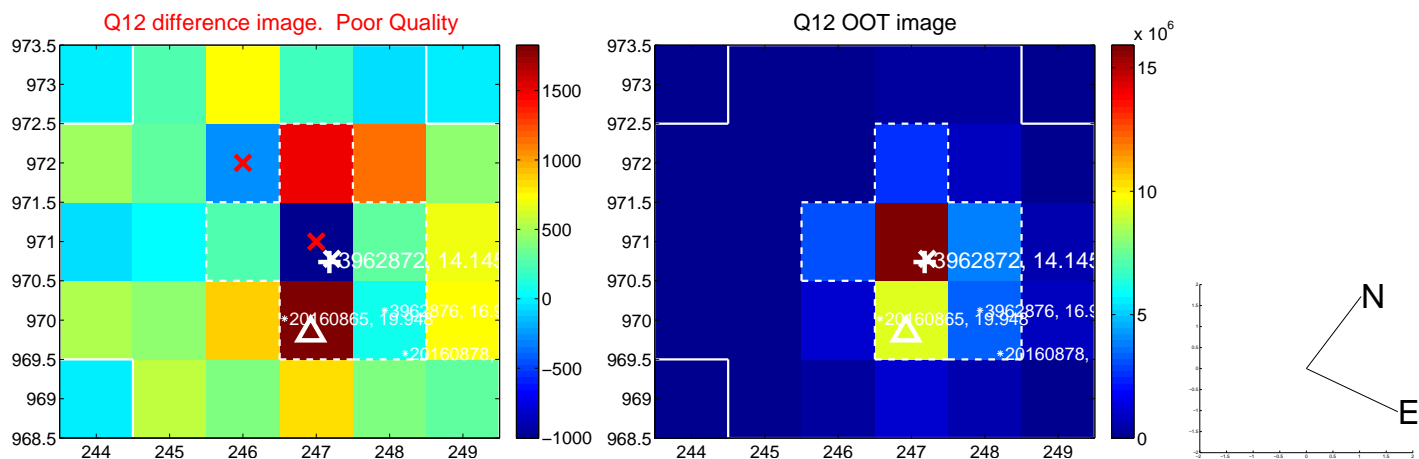
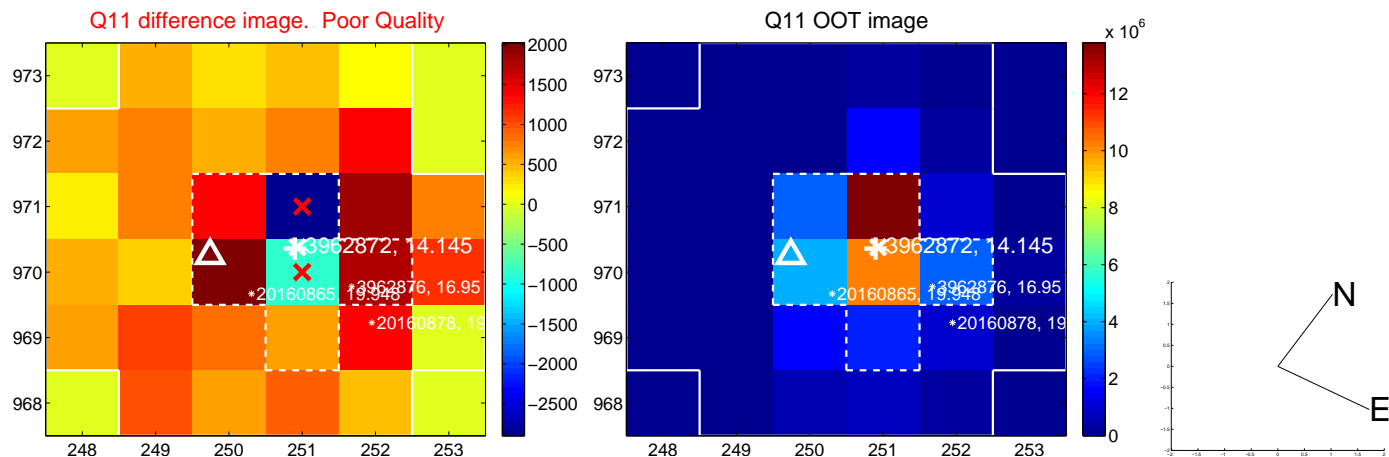
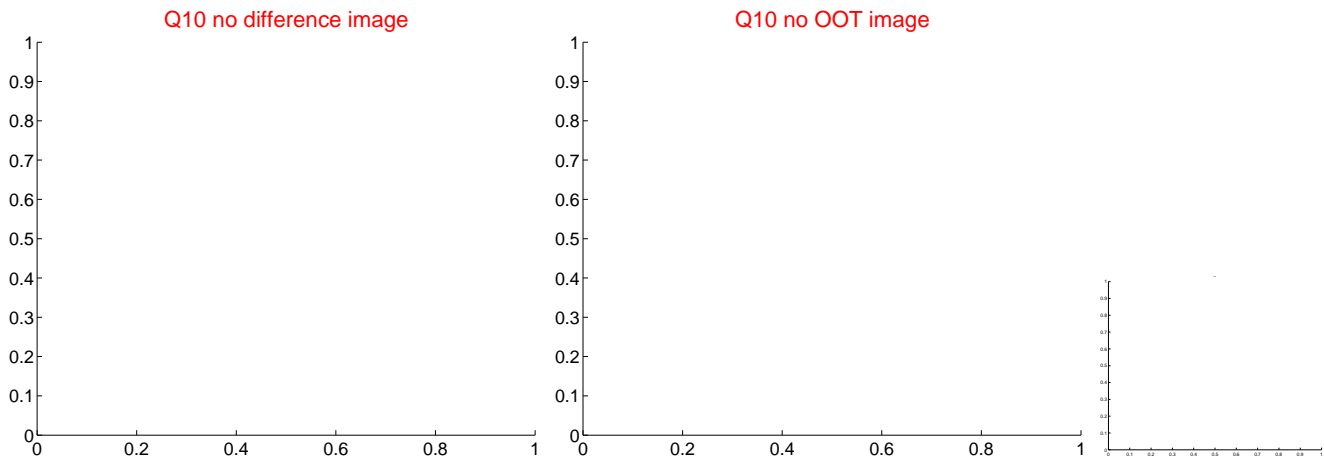
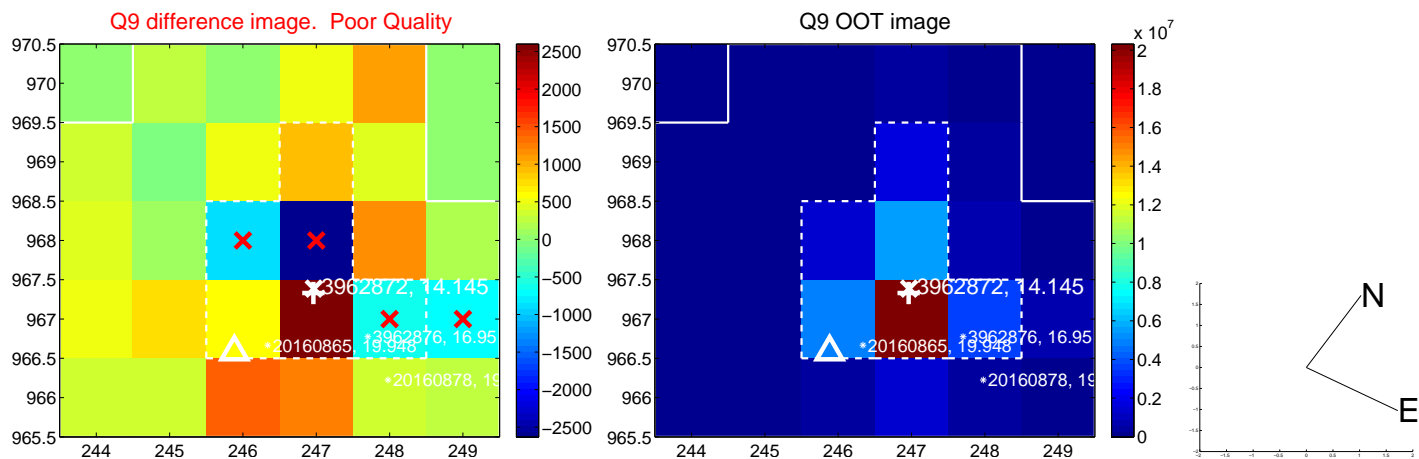
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



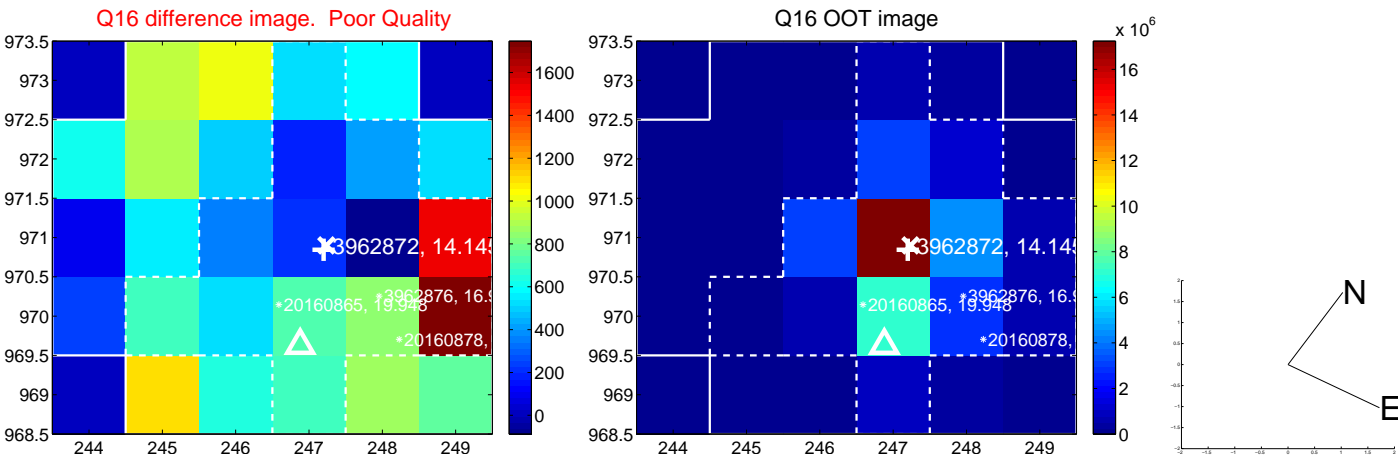
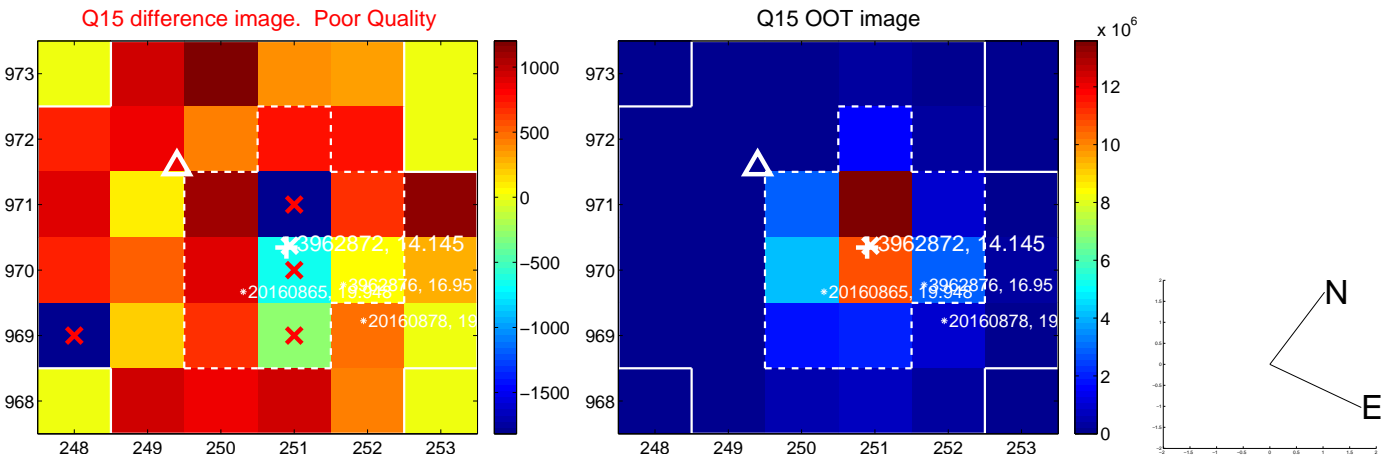
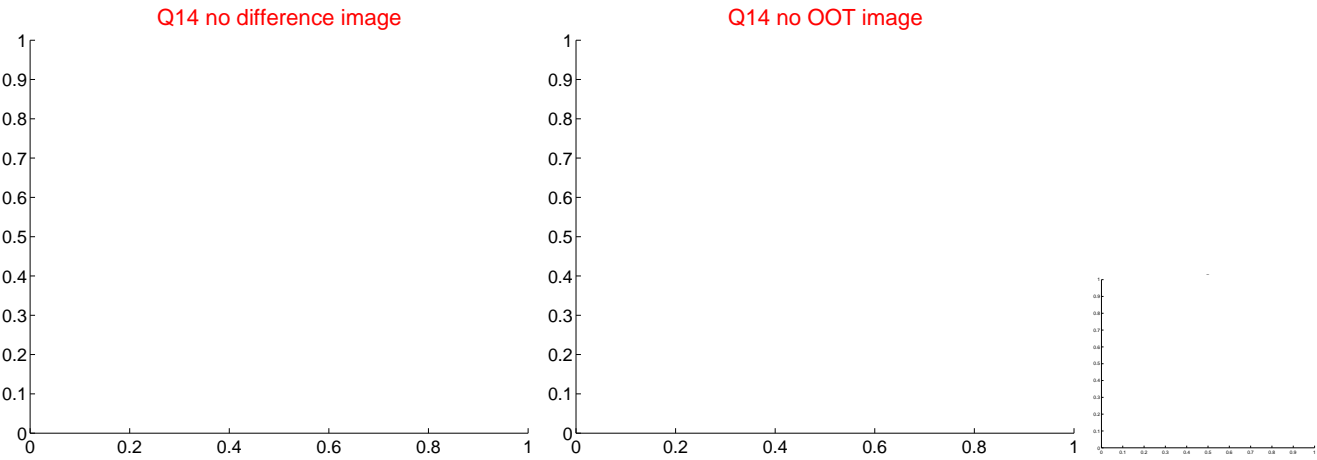
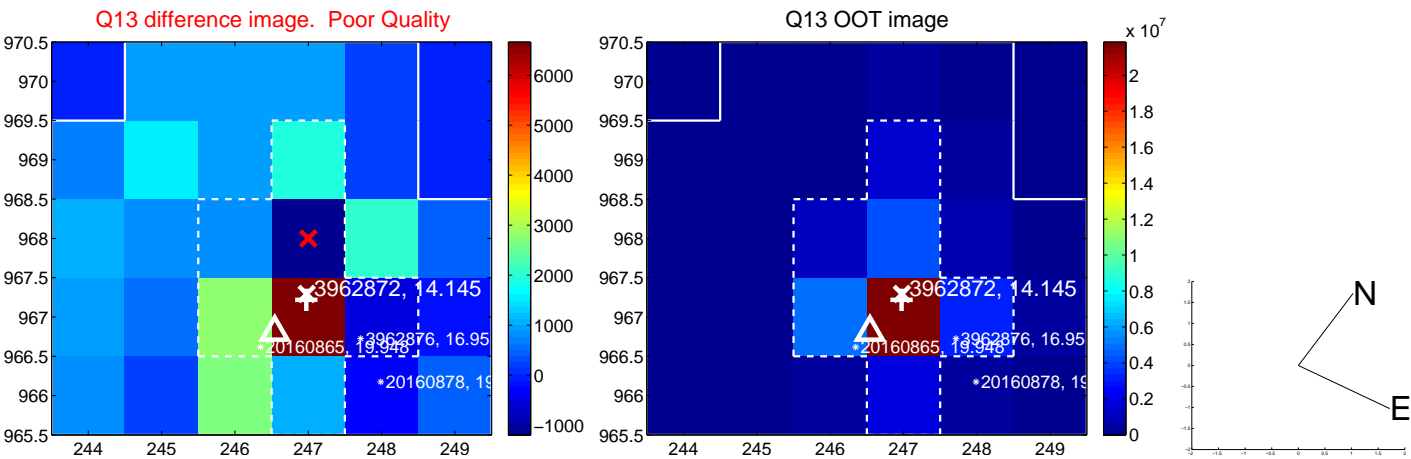
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



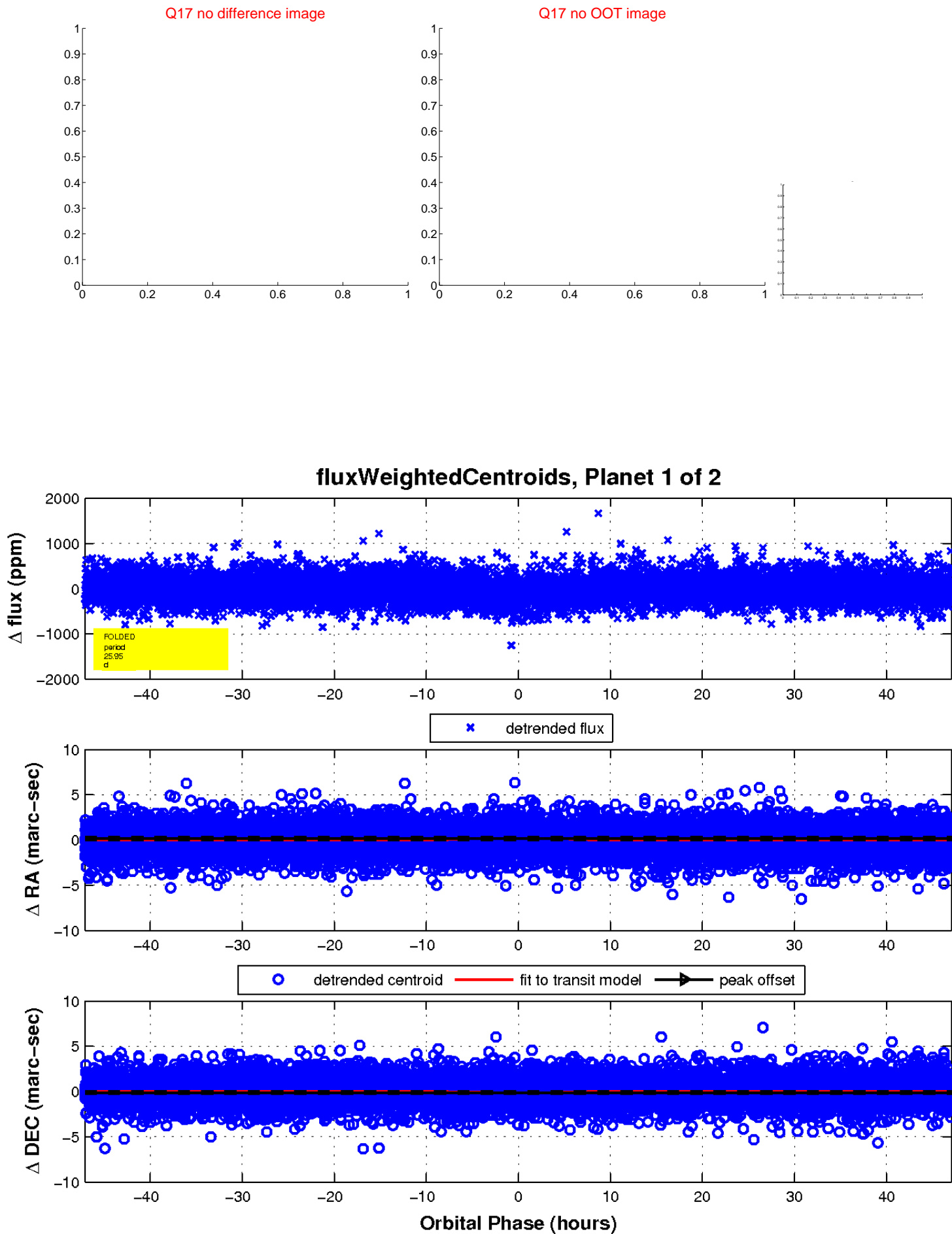
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



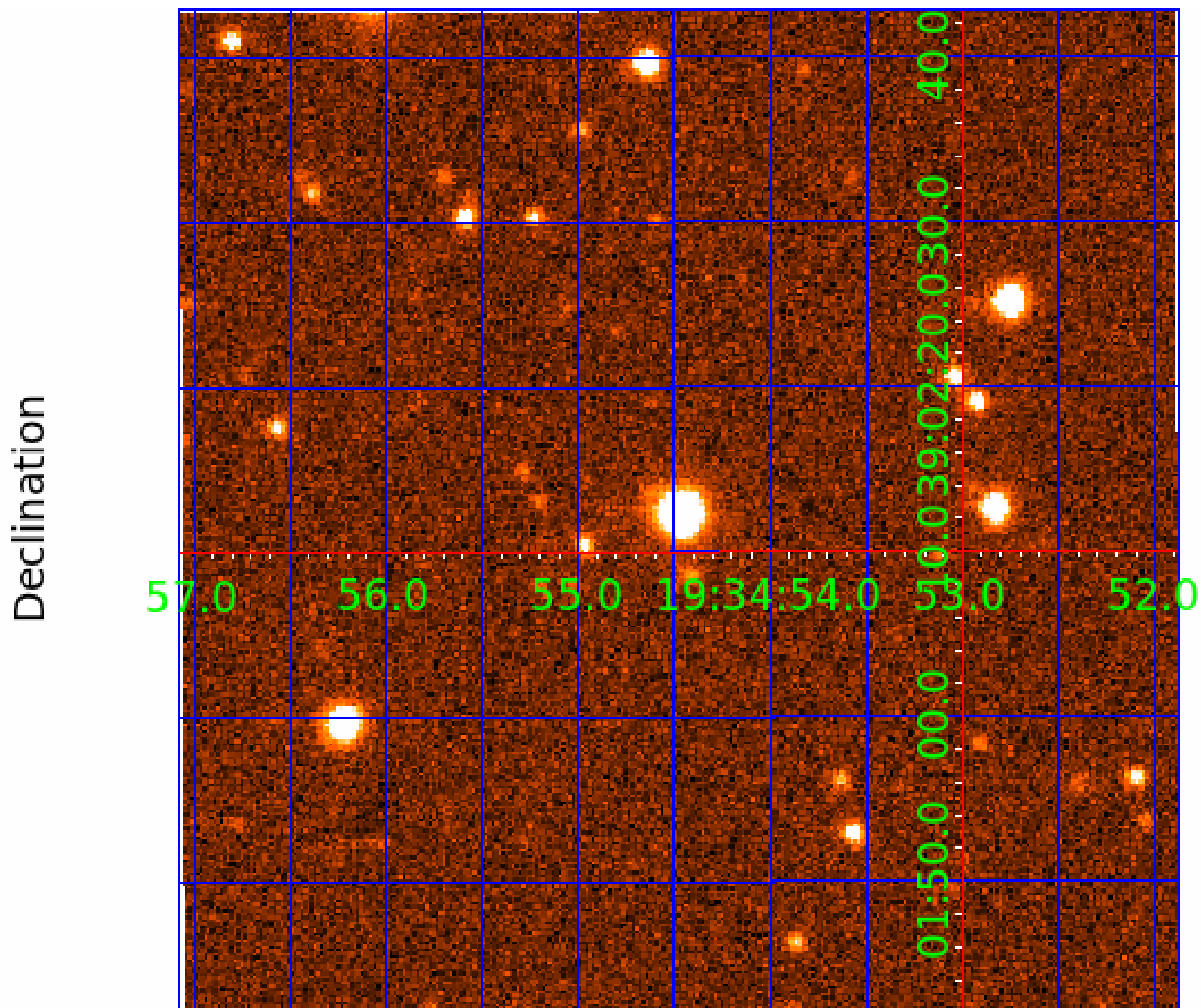
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



UKIRT Image



KIC 003962872

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})
003962872-01	OBS	4539.01	25.953003	154.839357	87.5	15.690	9.7	8.9	1.04	6058	1.08	44.00
003962872-02	OBS	No	25.955557	148.767689	84.9	15.854	9.4	9.5	1.04	6058	1.00	43.99

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003962872-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—HALO_GHOST—EPHEM_MATCH
003962872-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_FEW_DIFFS—HALO_GHOST—EPHEM_MATCH

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 003962872-02

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist (")	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
003962872-02	3962872	003858884-02	3858884	1:1	213.5	31	45	9.28	14.15	3966.20	Direct-PRF	0	4.05	3.65

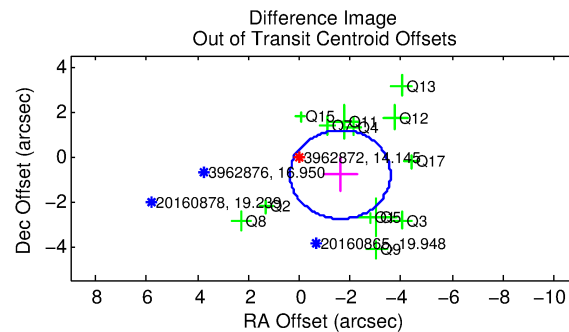
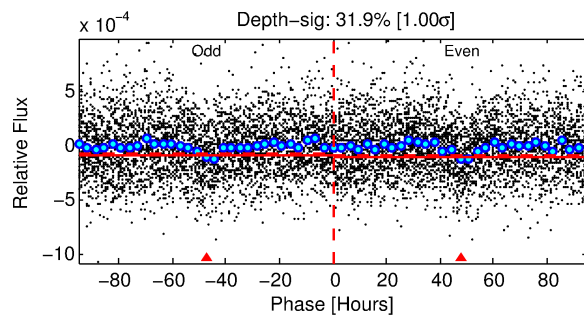
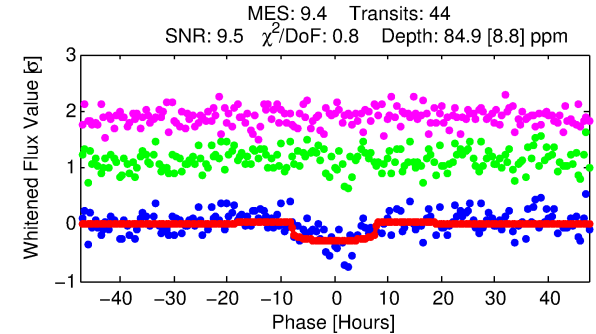
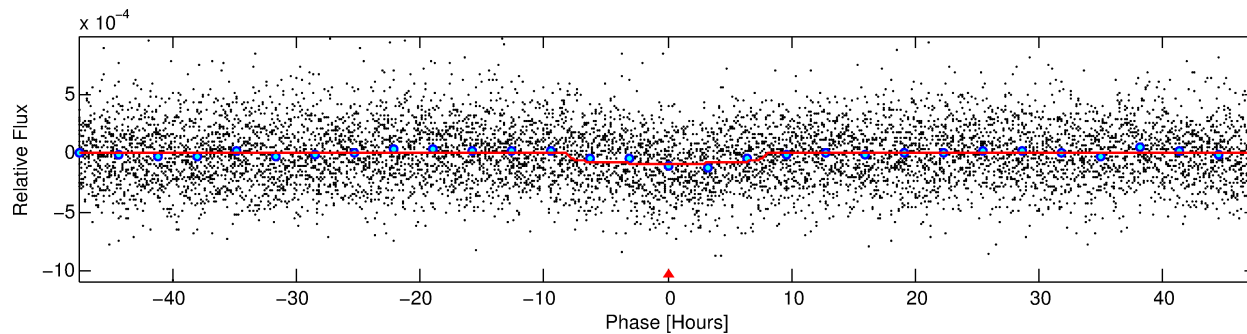
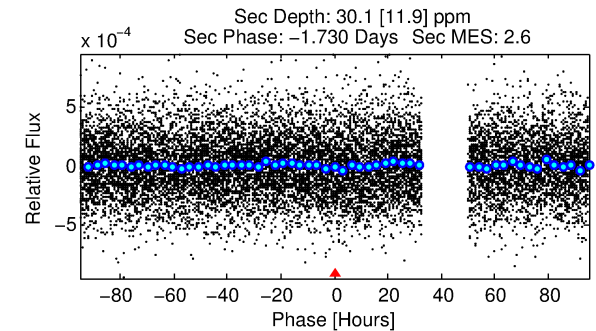
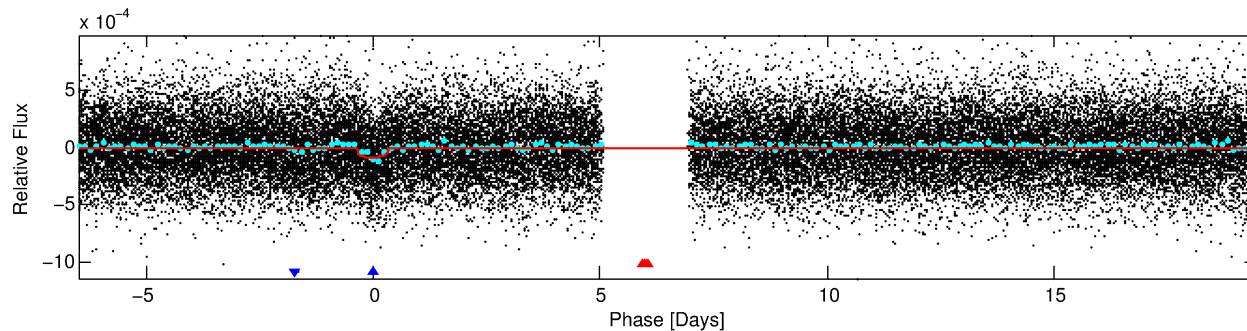
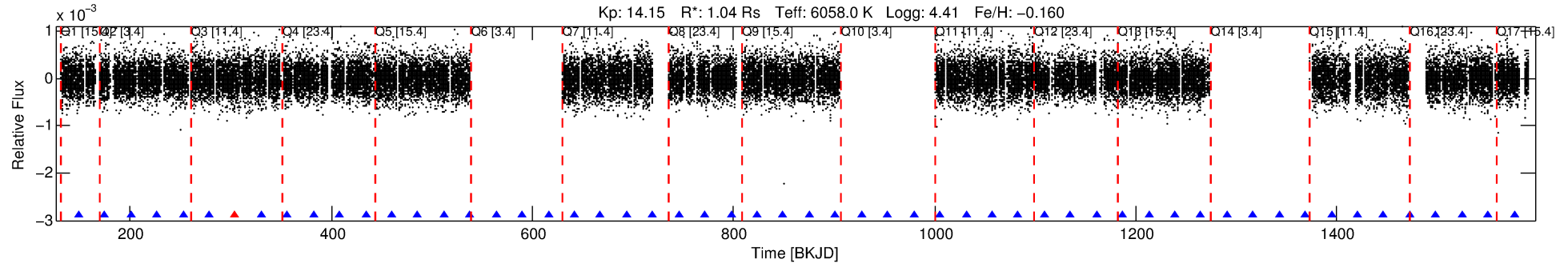
Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 3962872 Candidate: 2 of 2 Period: 25.956 d

KOI: K04539 Corr: No Ephemeris Match

Kp: 14.15 R*: 1.04 Rs Teff: 6058.0 K Logg: 4.41 Fe/H: -0.160



DV Fit Results:

Period = 25.95556 [0.00068] d
Epoch = 148.7677 [0.0201] BKJD
Rp/R* = 0.0088 [0.0046]
a/R* = 10.25 [26.17]
b = 0.59 [2.85]
Seff = 43.99 [17.28]
Teq = 657 [64] K
Rp = 1.00 [0.61] Re
a = 0.1719 [0.0446] AU
Ag = 492.84 [584.69] [0.84σ]
Teffp = 4784 [1354] K [3.05σ]

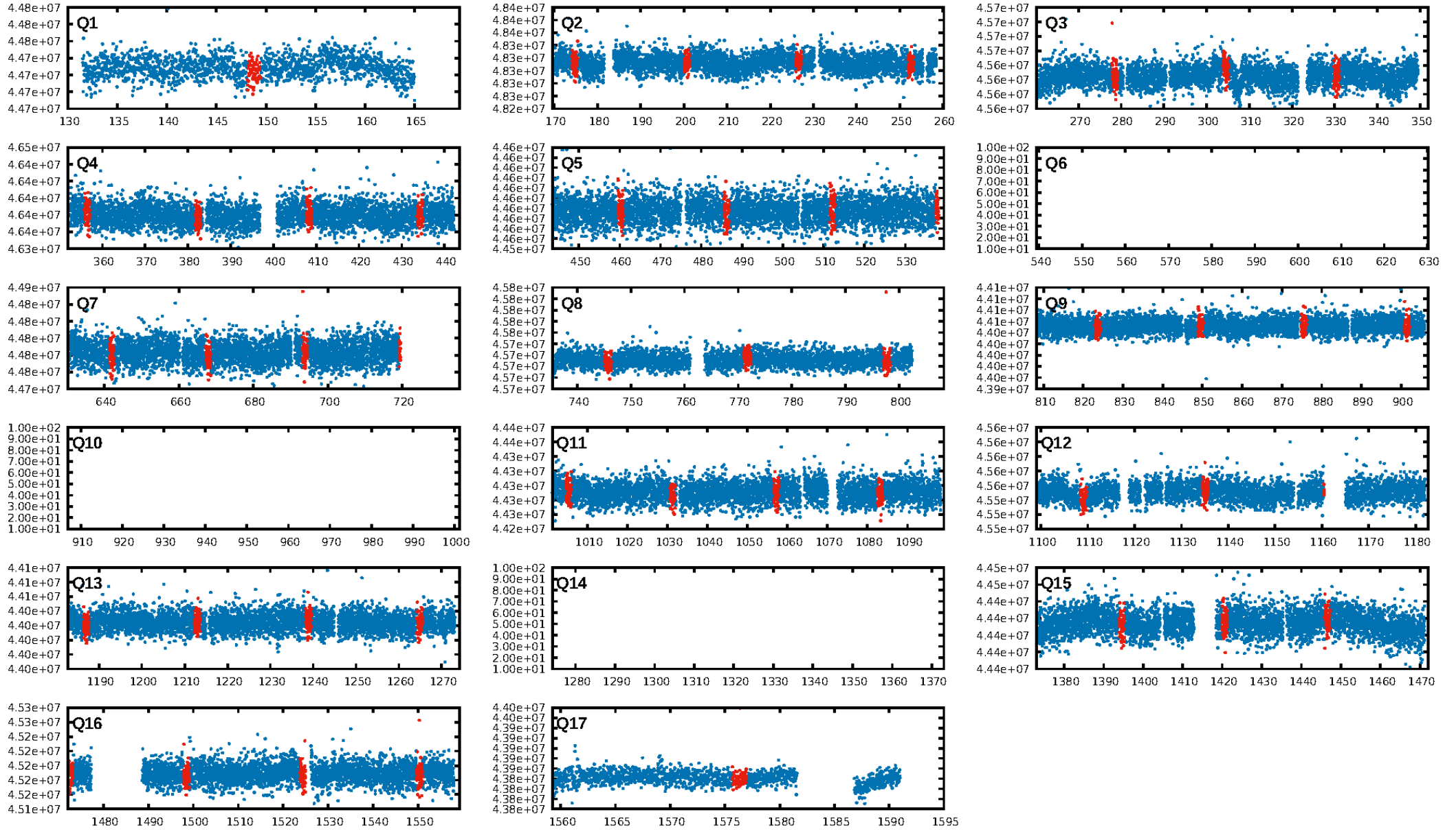
DV Diagnostic Results:

ShortPeriod-sig: 0.2% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 58.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.39e-19
RollingBand-fgt: 0.98 [41/42]
GhostDiagnostic-chr: 0.1191
Centroid-sig: 9.0%
Centroid-so: 2.083 arcsec [1.33σ]
OotOffset-rm: 1.804 arcsec [2.74σ]
KicOffset-rm: 1.946 arcsec [2.94σ]
OotOffset-st: 1/4/3/5 [13]
KicOffset-st: 1/4/3/5 [13]
DiffImageQuality-fgm: 0.23 [3/13]
DiffImageOverlap-fno: 1.00 [13/13]

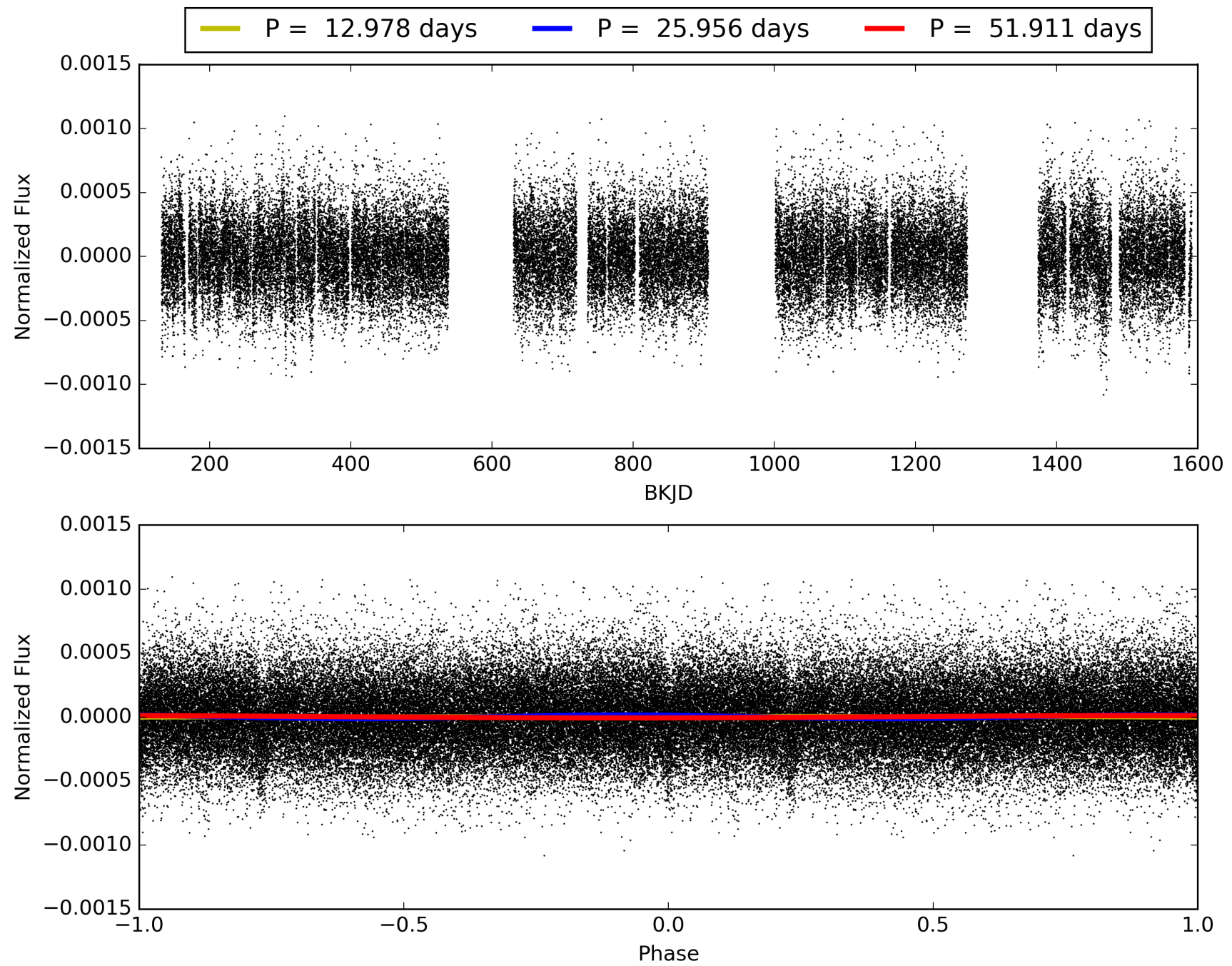
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 003962872-02, PDC Light Curves

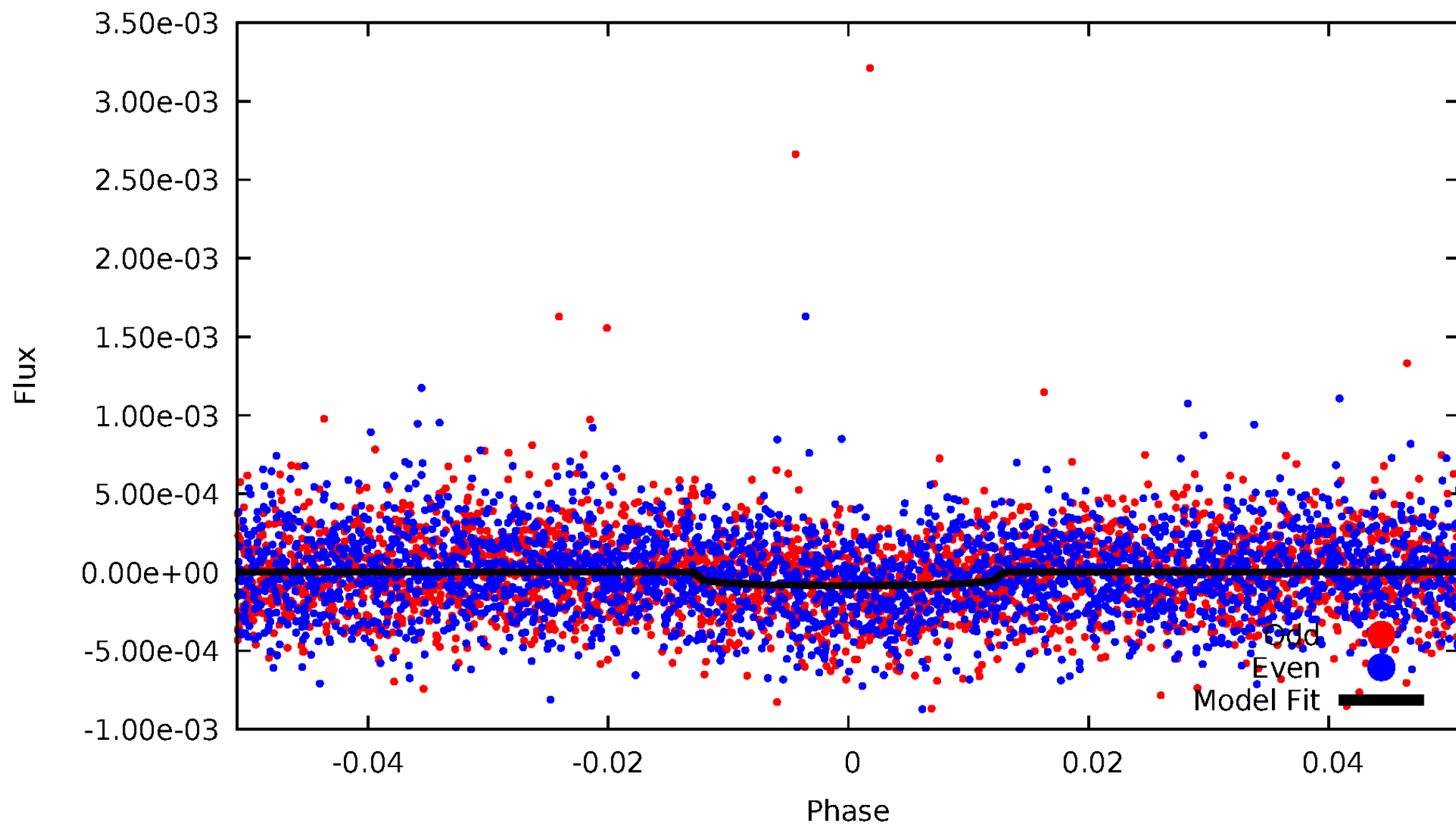


TCE 003962872-02



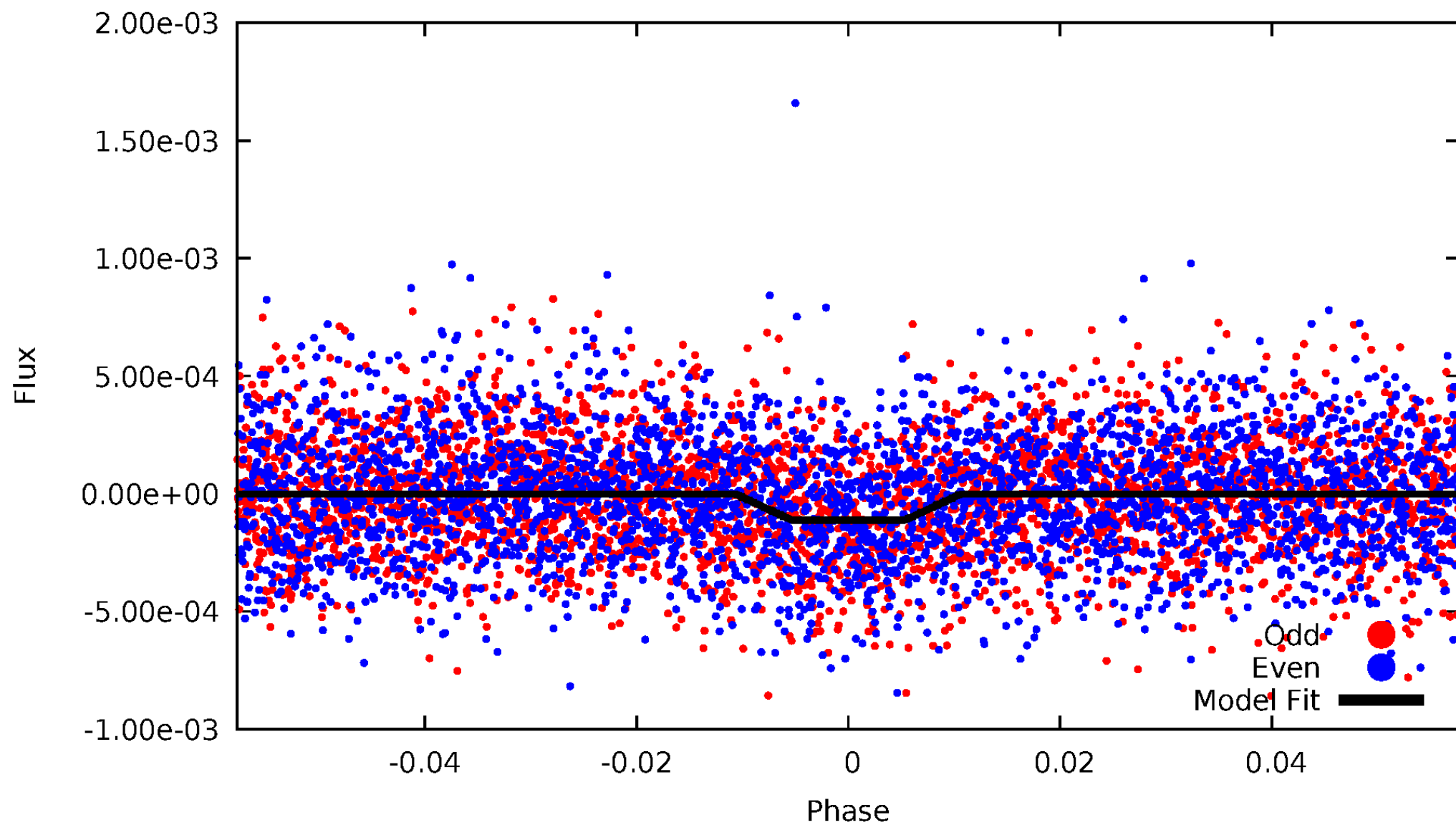
DV Odd/Even

TCE 003962872-02



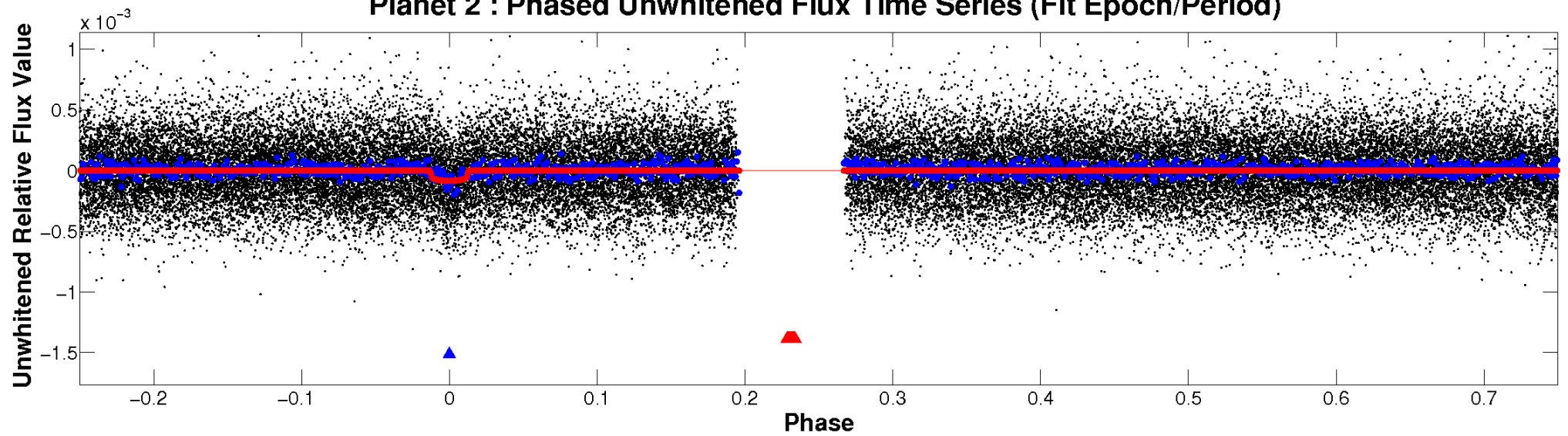
ALT Odd/Even

TCE 003962872-02

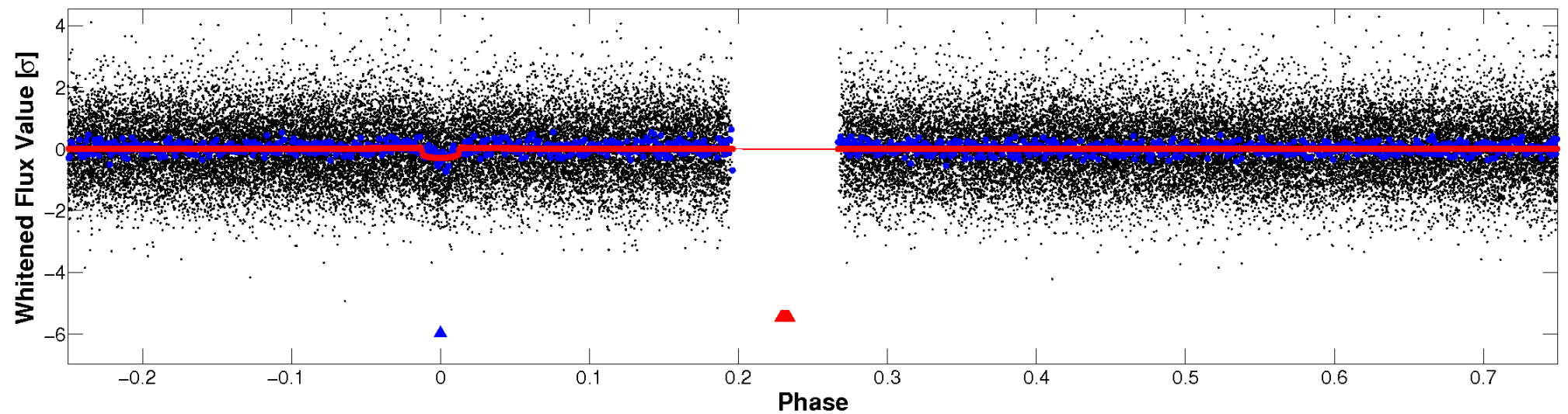


Non-Whitened Vs. Whitened Light Curve

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

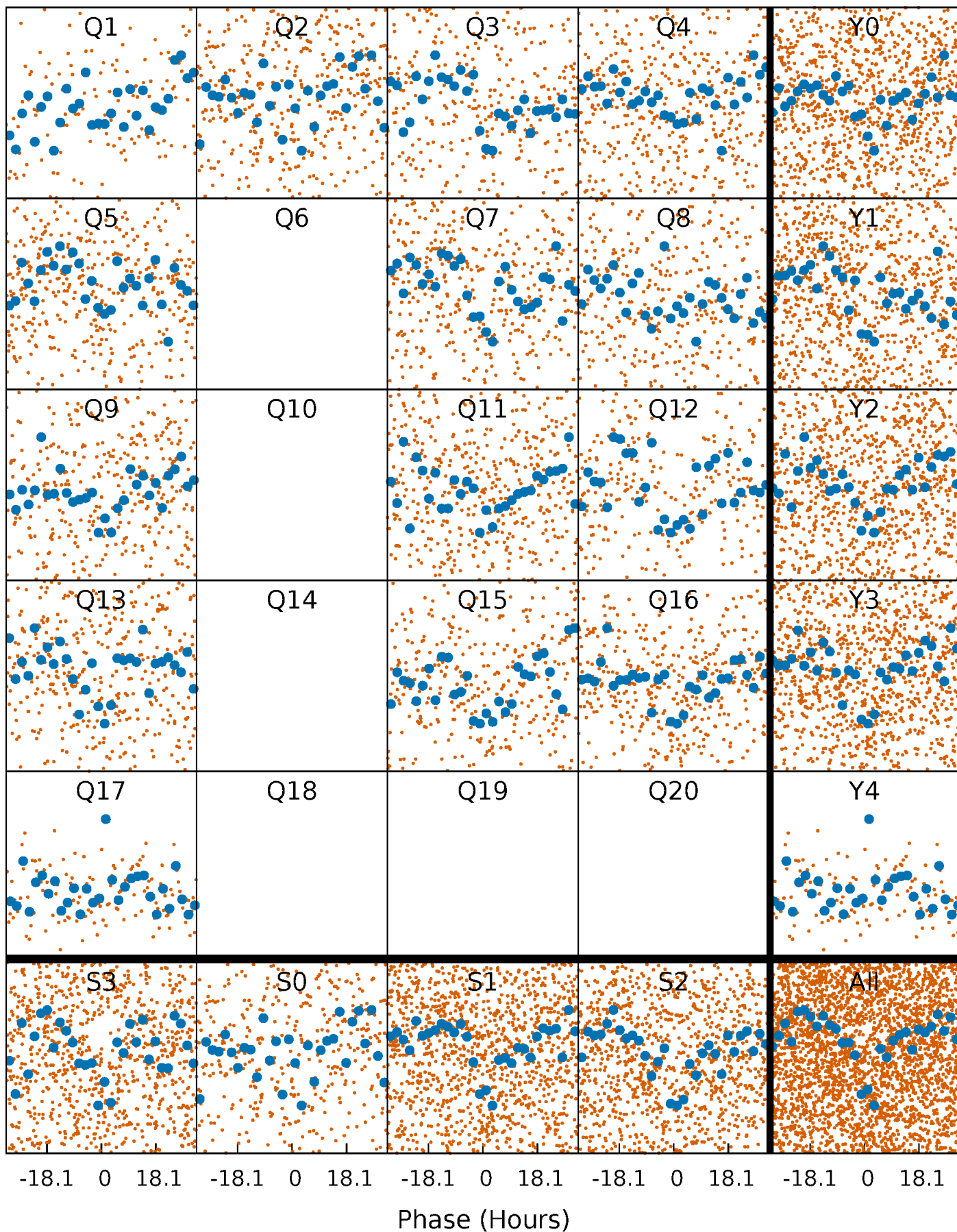


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



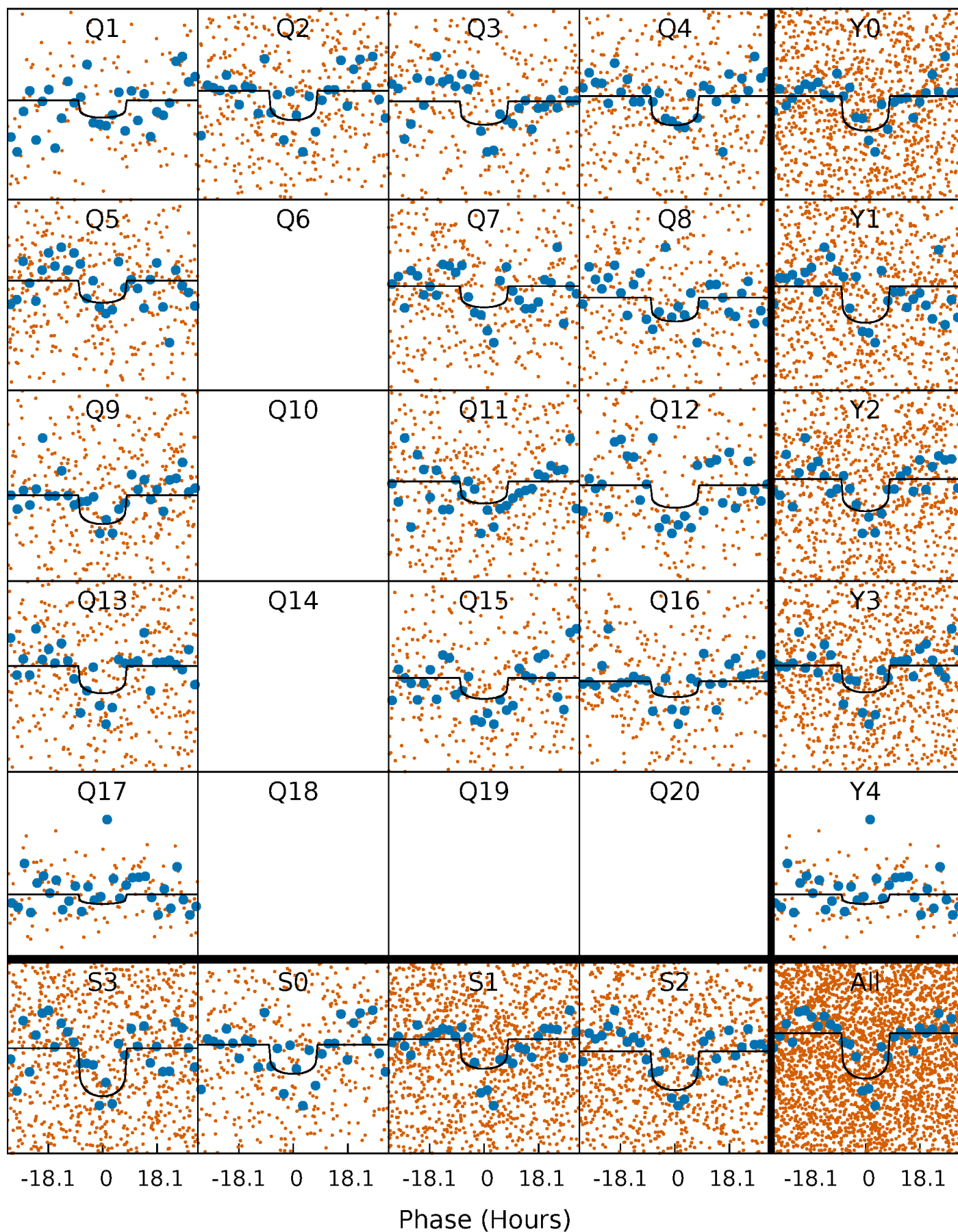
PDC Quarter-Phased Transit Curves

TCE 003962872-02 P= 25.955557 Days $T_0=148.767689$ (BKJD)



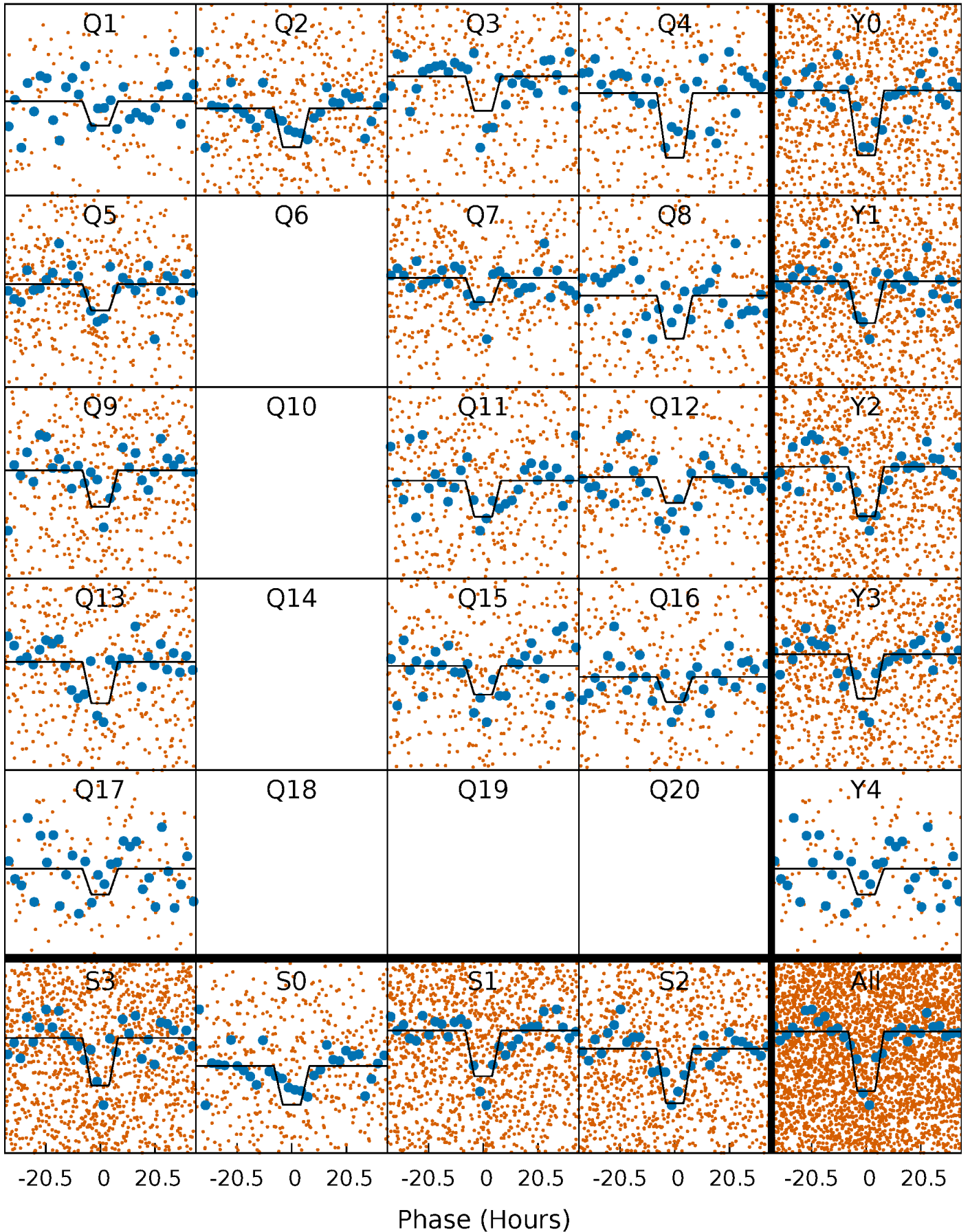
DV Quarter-Phased Transit Curves

TCE 003962872-02 P= 25.955557 Days $T_0=148.767689$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

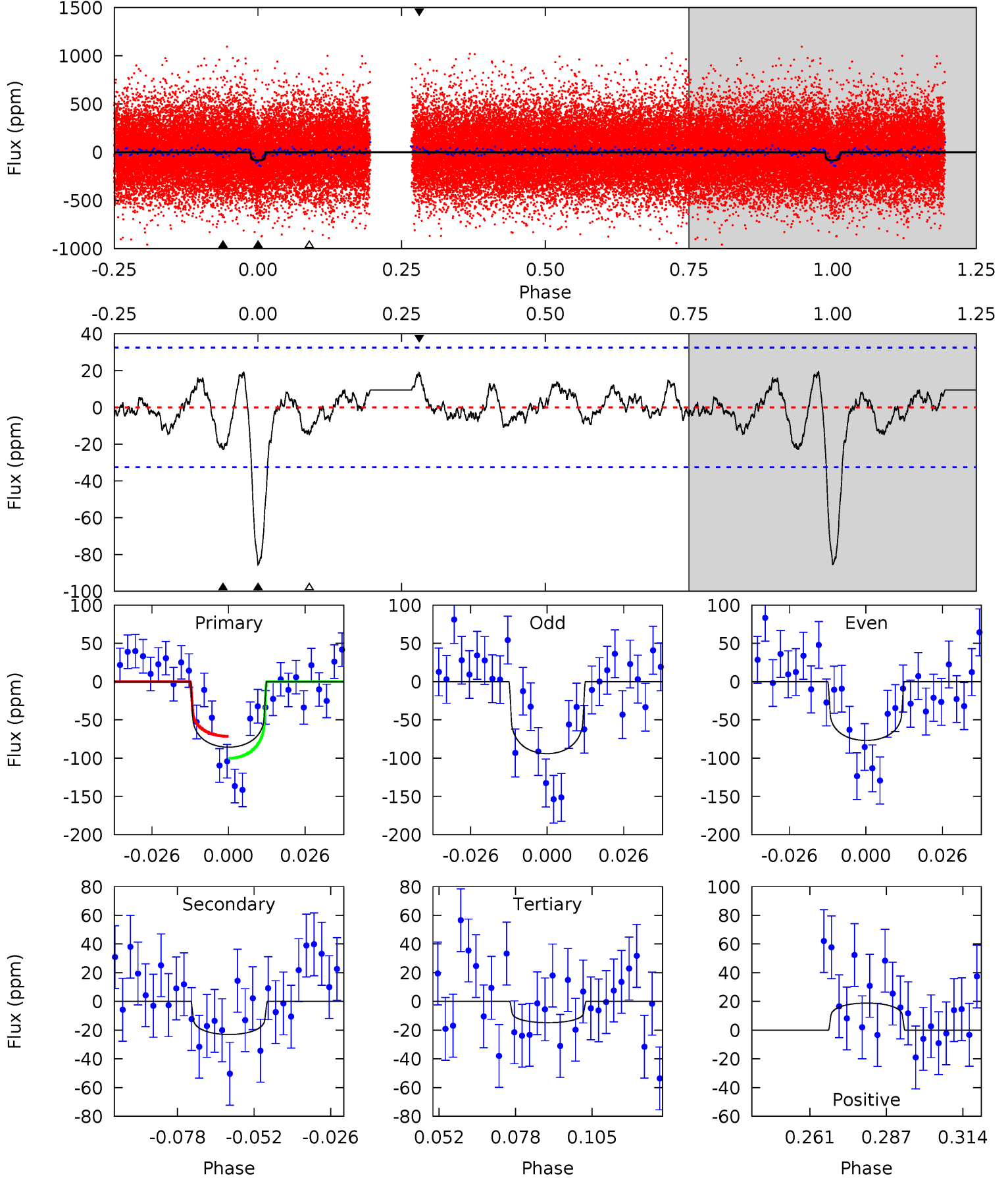
TCE 003962872-02 P= 25.955414 Days $T_0=148.812979$ (BKJD)



DV Model-Shift Uniqueness Test

003962872-02, P = 25.955557 Days, E = 122.812132 Days

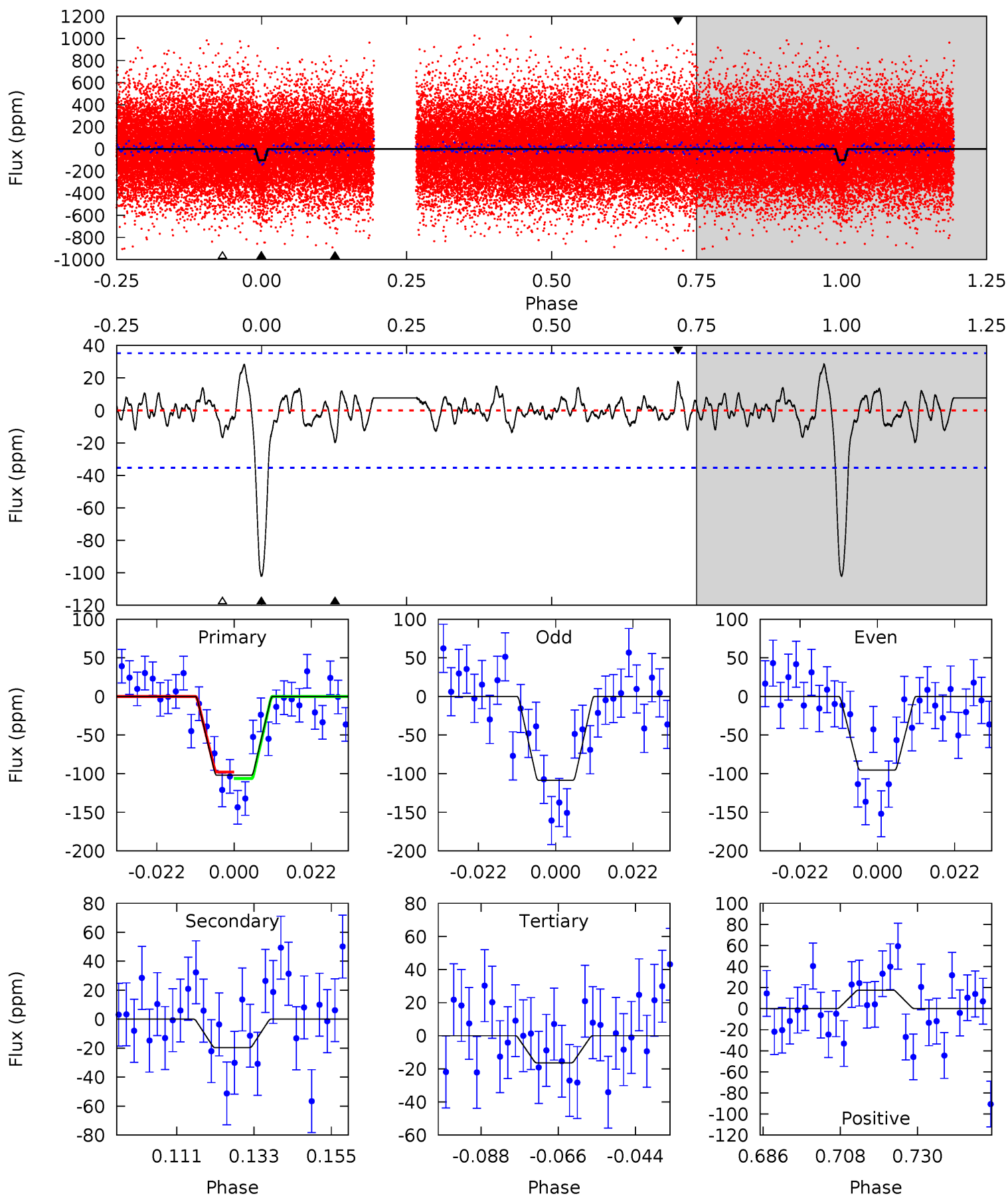
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.8	3.43	2.20	2.81	4.84	2.22	1.01	10.6	9.95	1.23	0.62	1.28	0.85	0.18	2.14



Alt Model-Shift Uniqueness Test

003962872-02, P = 25.955414 Days, E = 122.857565 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.1	2.71	2.26	2.43	4.87	2.29	0.94	11.8	11.7	0.45	0.28	0.91	1.10	0.22	0.59



Stellar Parameters For KIC 003962872

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6058^{+180}_{-180}	$4.408^{+0.087}_{-0.203}$	$-0.160^{+0.300}_{-0.300}$	$1.038^{+0.323}_{-0.139}$	$1.004^{+0.143}_{-0.117}$	$1.266^{+0.580}_{-0.676}$
	+3%/-3%	+2%/-5%	+188%/-188%	+31%/-13%	+14%/-12%	+46%/-53%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 003962872-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-23 ± 7	$1.07^{+0.58}_{-0.52}$	932^{+70}_{-49}	4533^{+1437}_{-670}	321^{+866}_{-198}
Alt.	-20 ± 7	$1.31^{+0.58}_{-0.53}$	934^{+69}_{-49}	4090^{+947}_{-522}	177^{+357}_{-100}

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 $A_{obs} \gg 1.0$

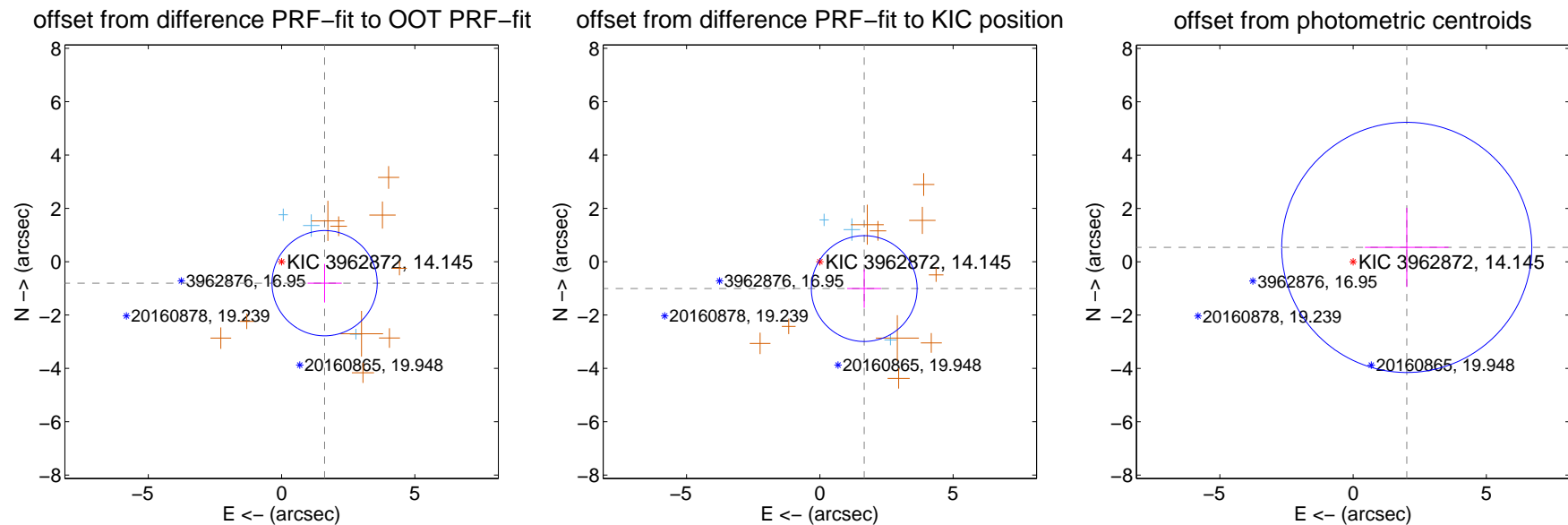
DV Centroid Data

Supplemental centroid analysis for 003962872-02. Kepler magnitude: 14.14. Transit SNR 9.46

There are 3 quarters with good PRF difference image offsets

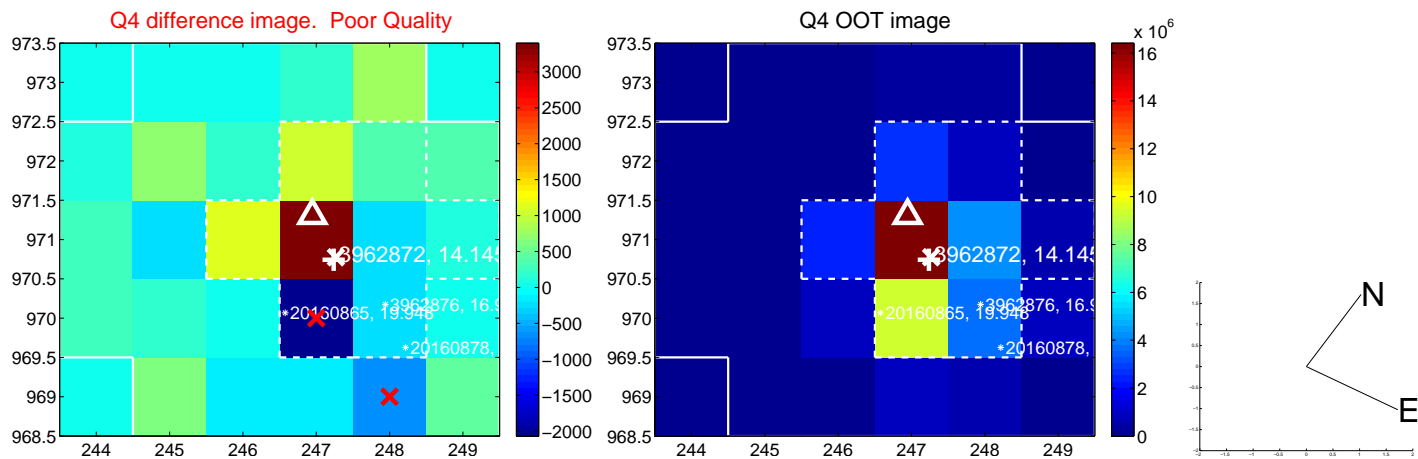
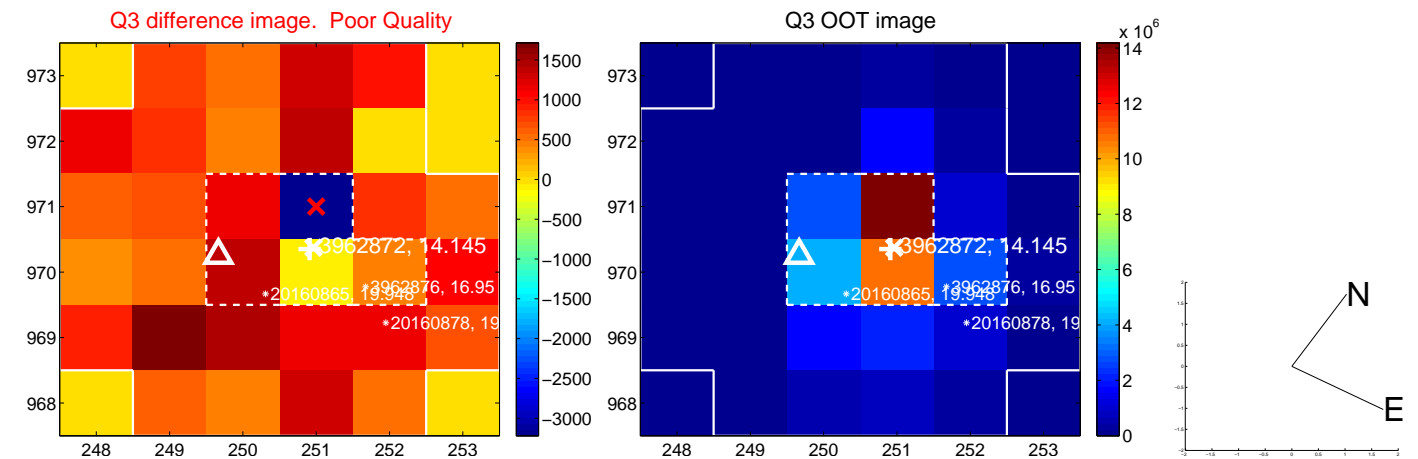
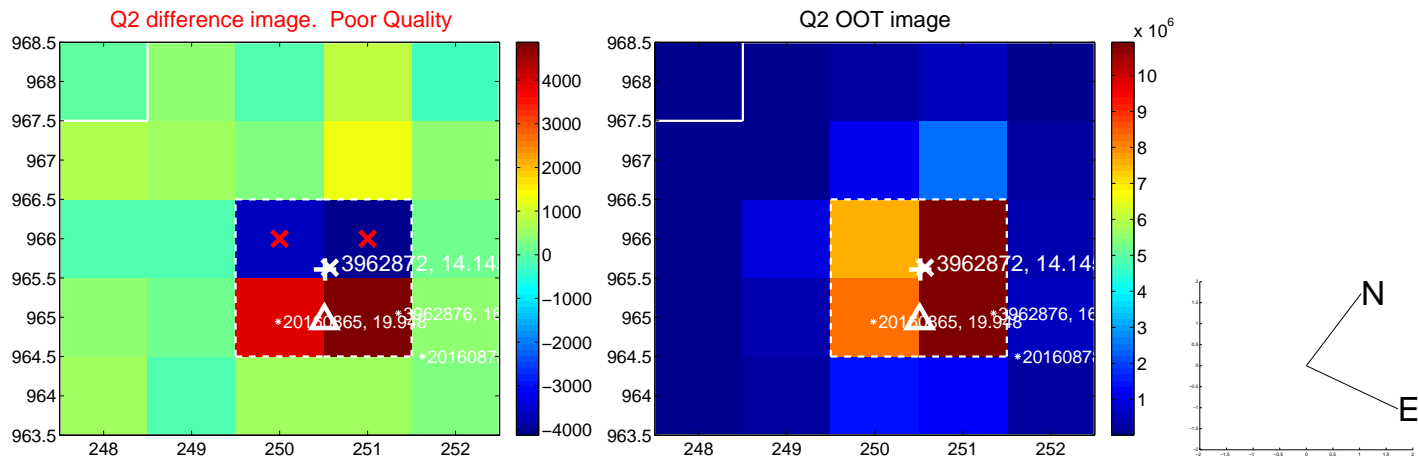
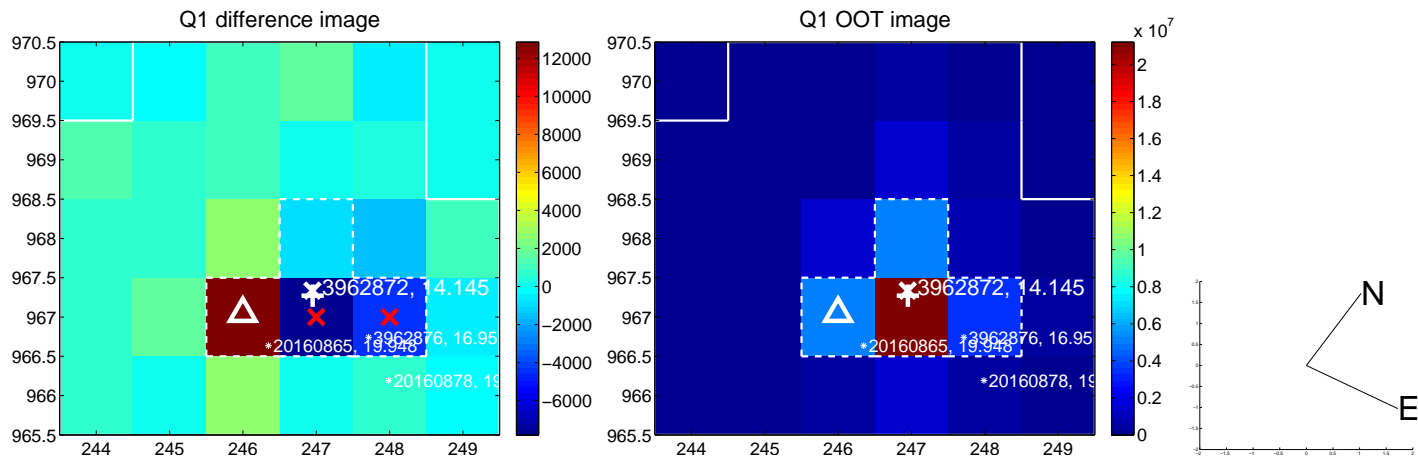
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.804 ± 0.658	2.74	-1.614 ± 0.640	-0.806 ± 0.724
PRF-fit source offset from KIC position	1.946 ± 0.661	2.94	-1.665 ± 0.638	-1.008 ± 0.720
photometric centroid source offset	2.08 ± 1.56	1.33	-2.01 ± 1.57	0.54 ± 1.48

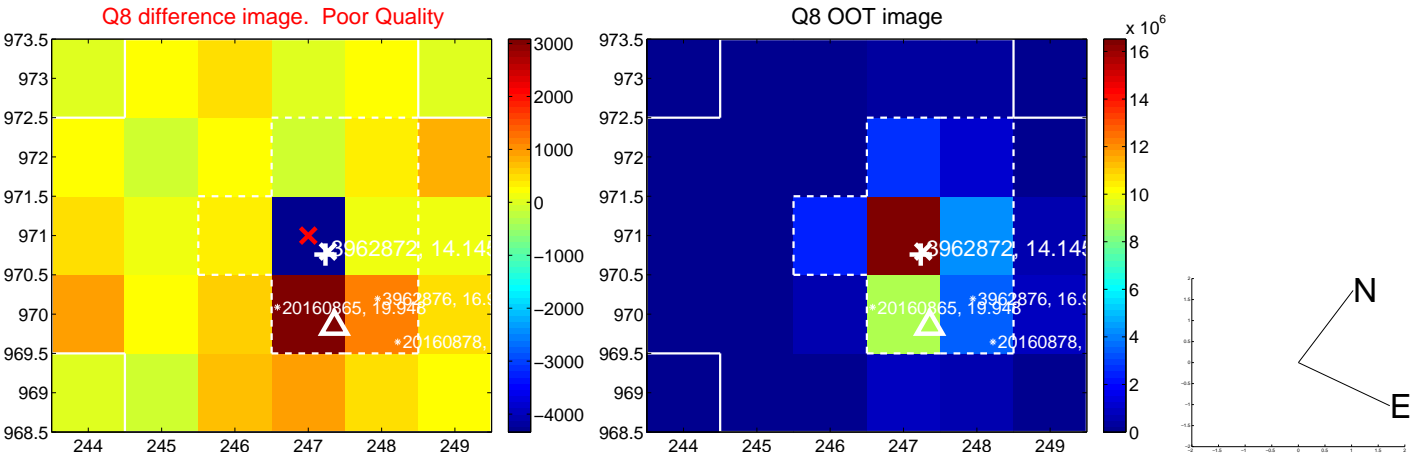
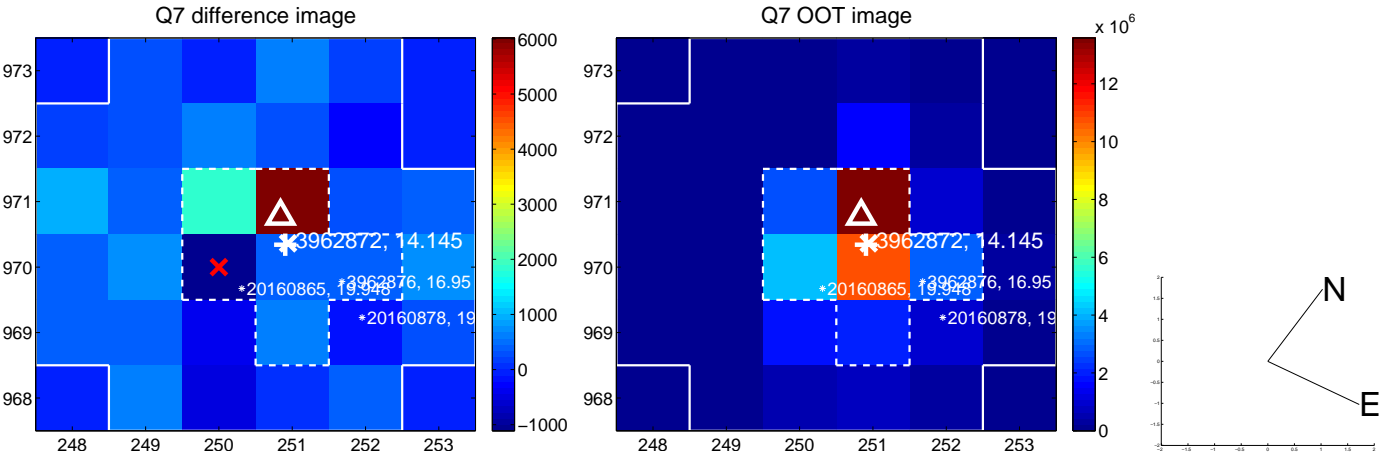
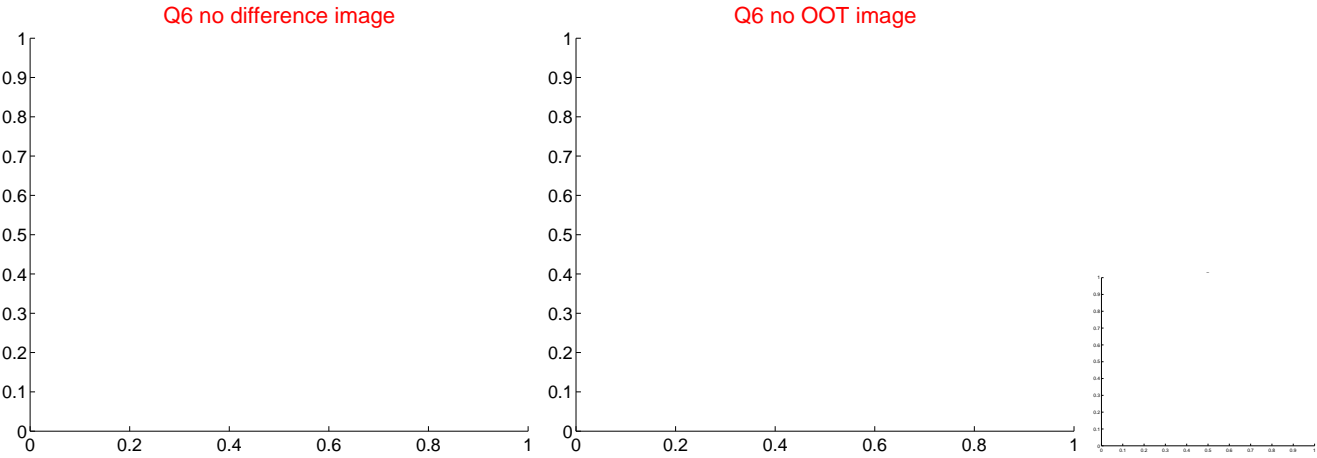
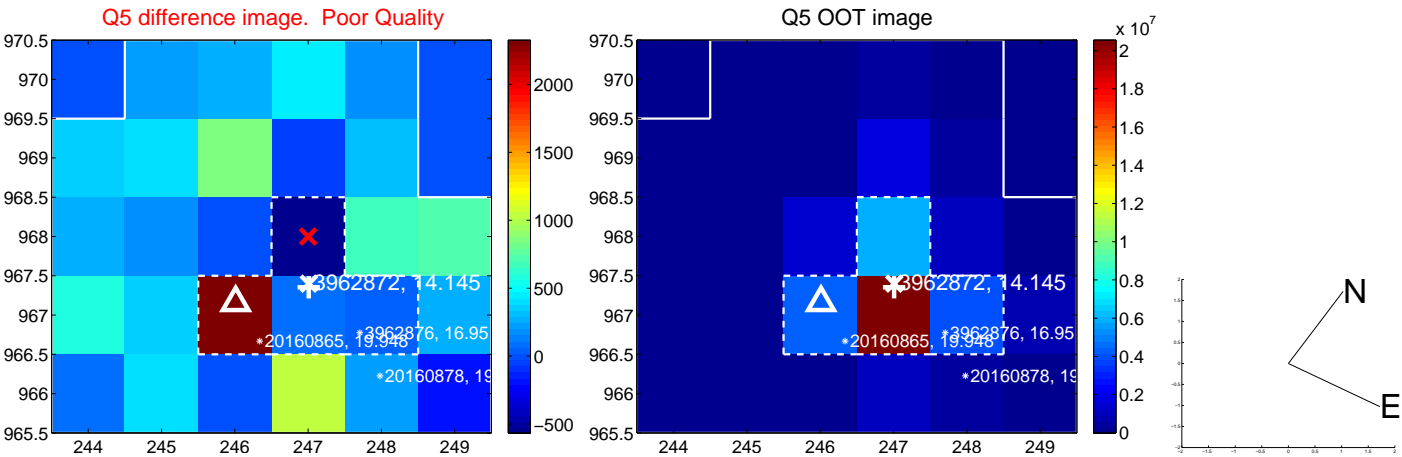


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

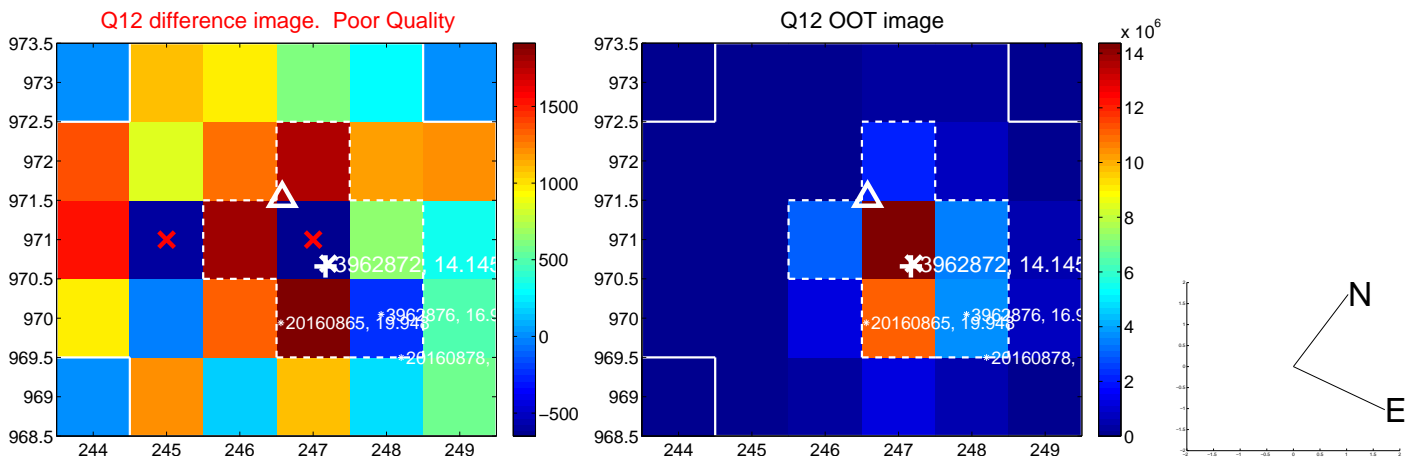
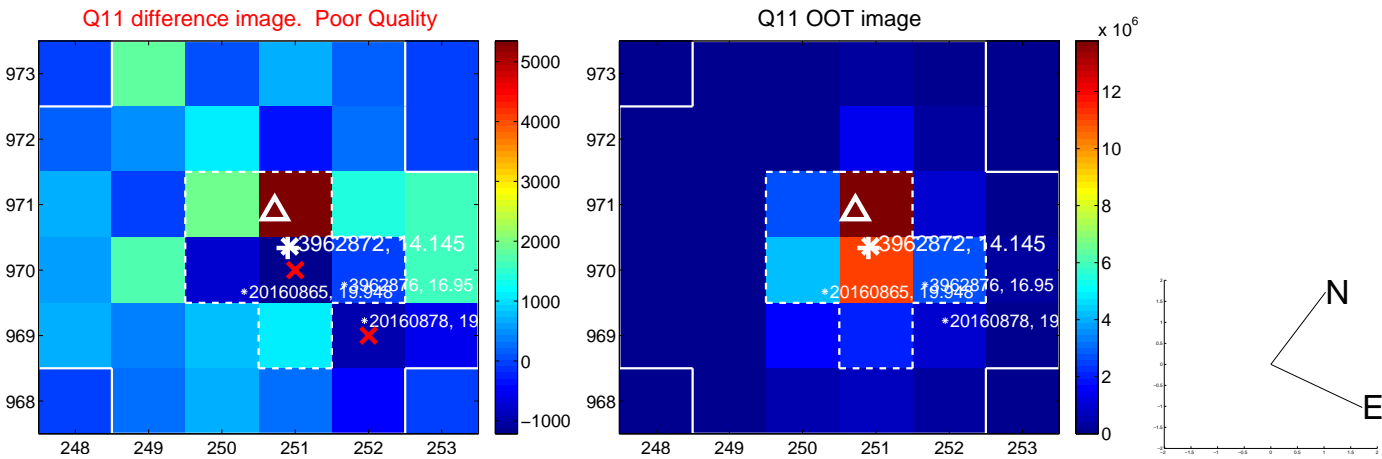
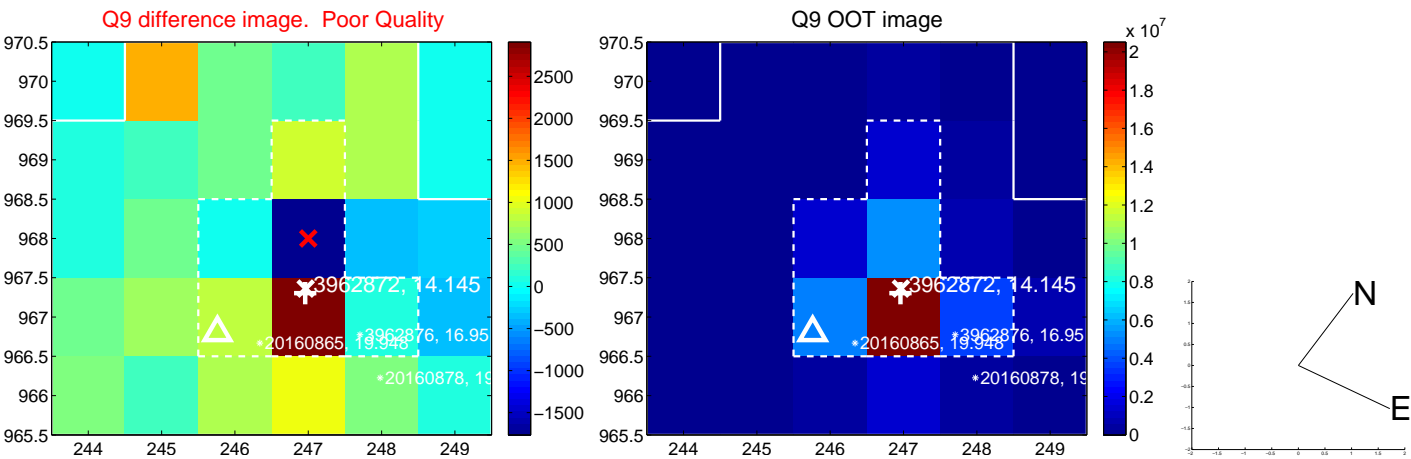
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



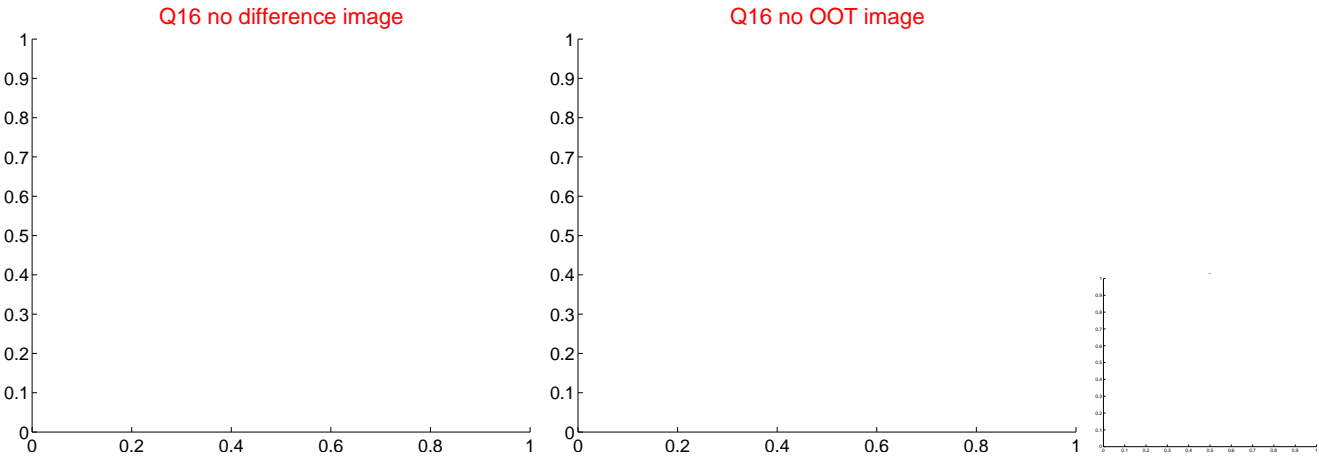
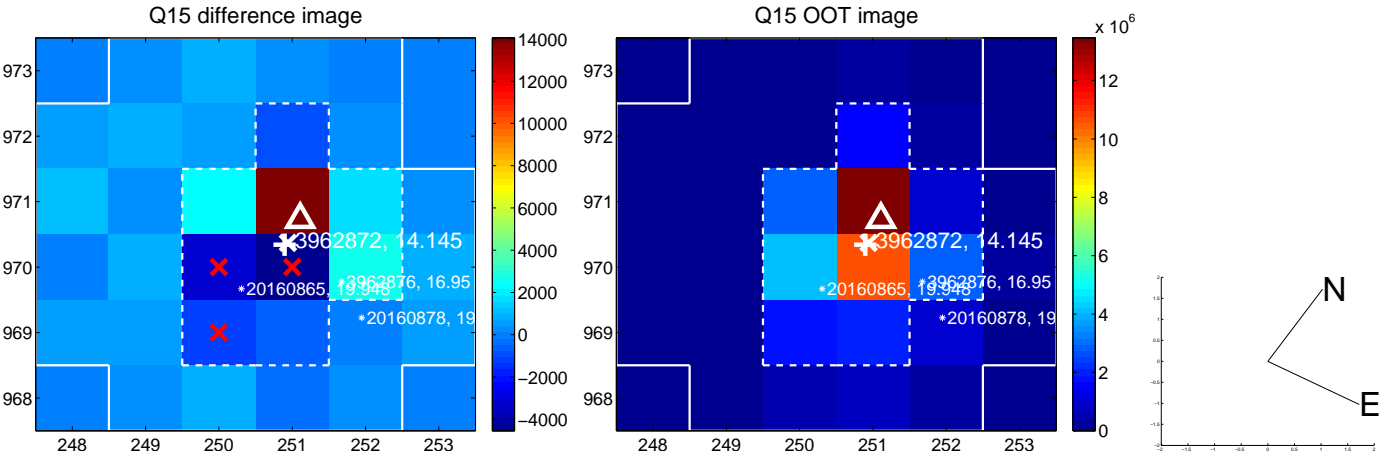
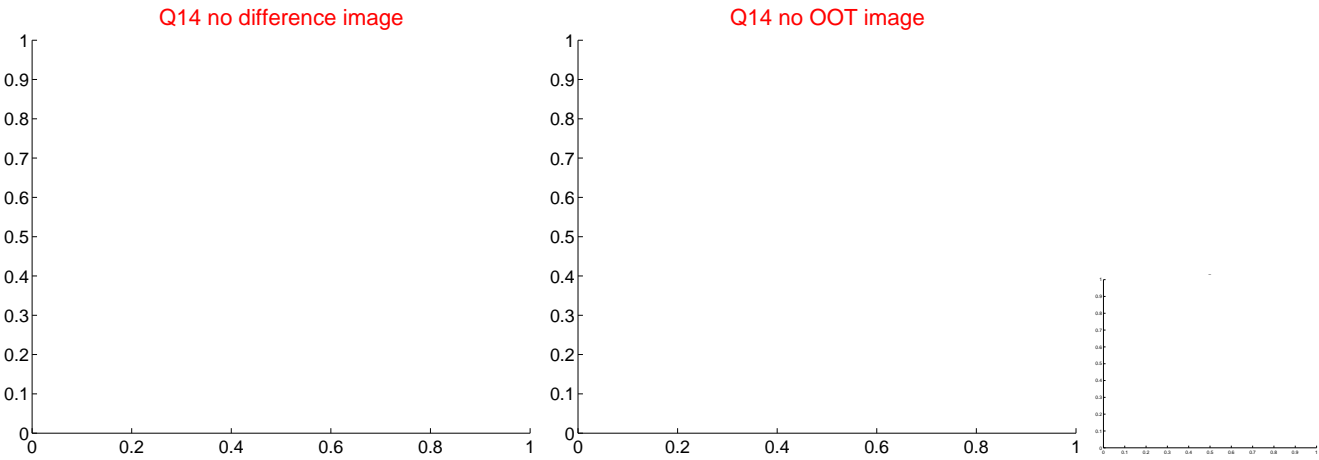
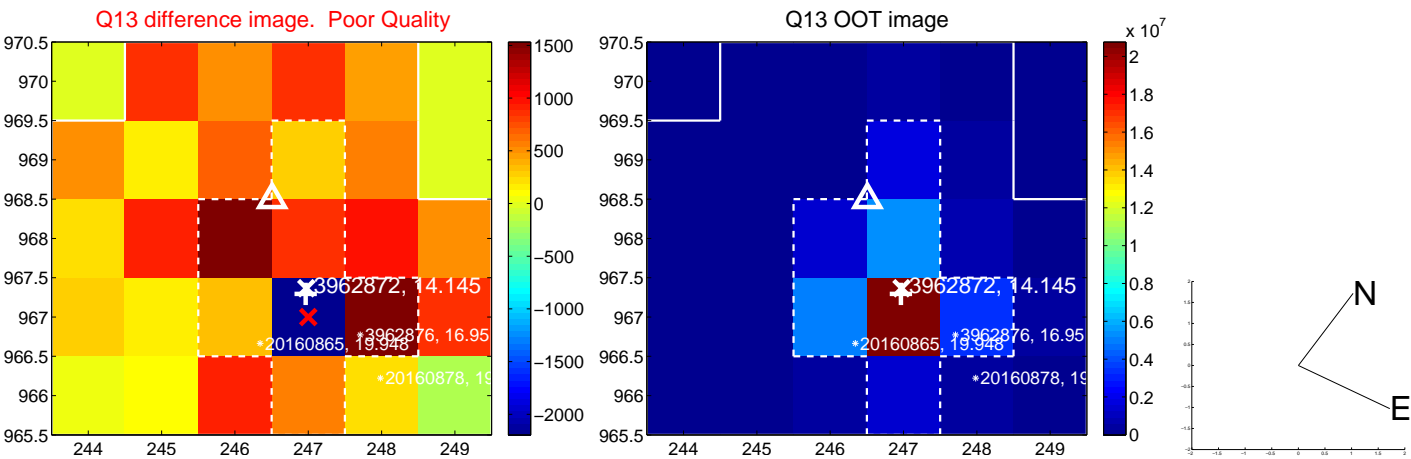
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



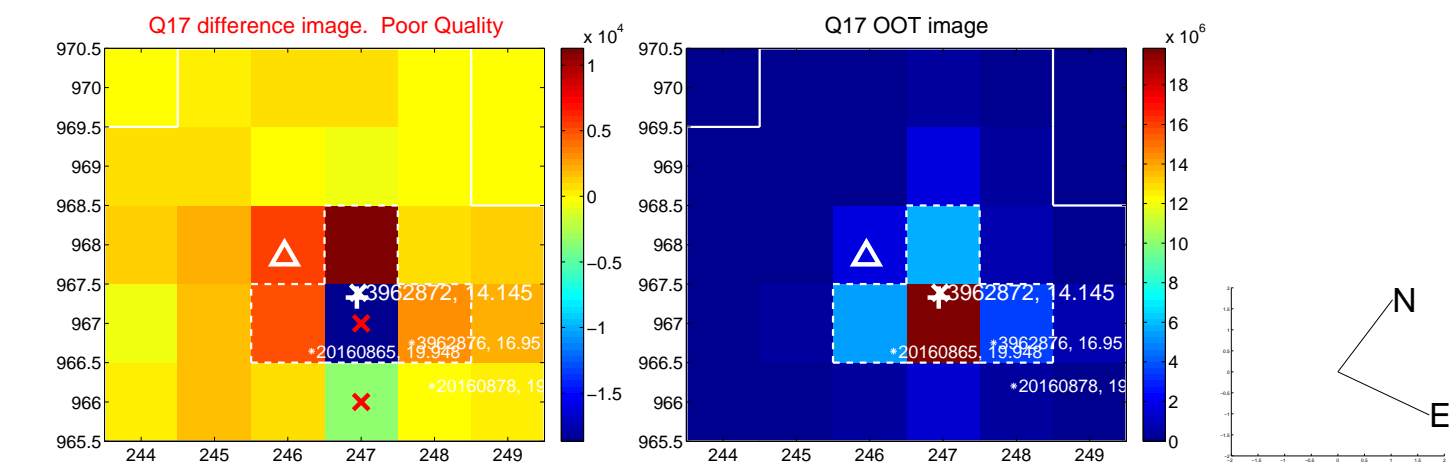
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



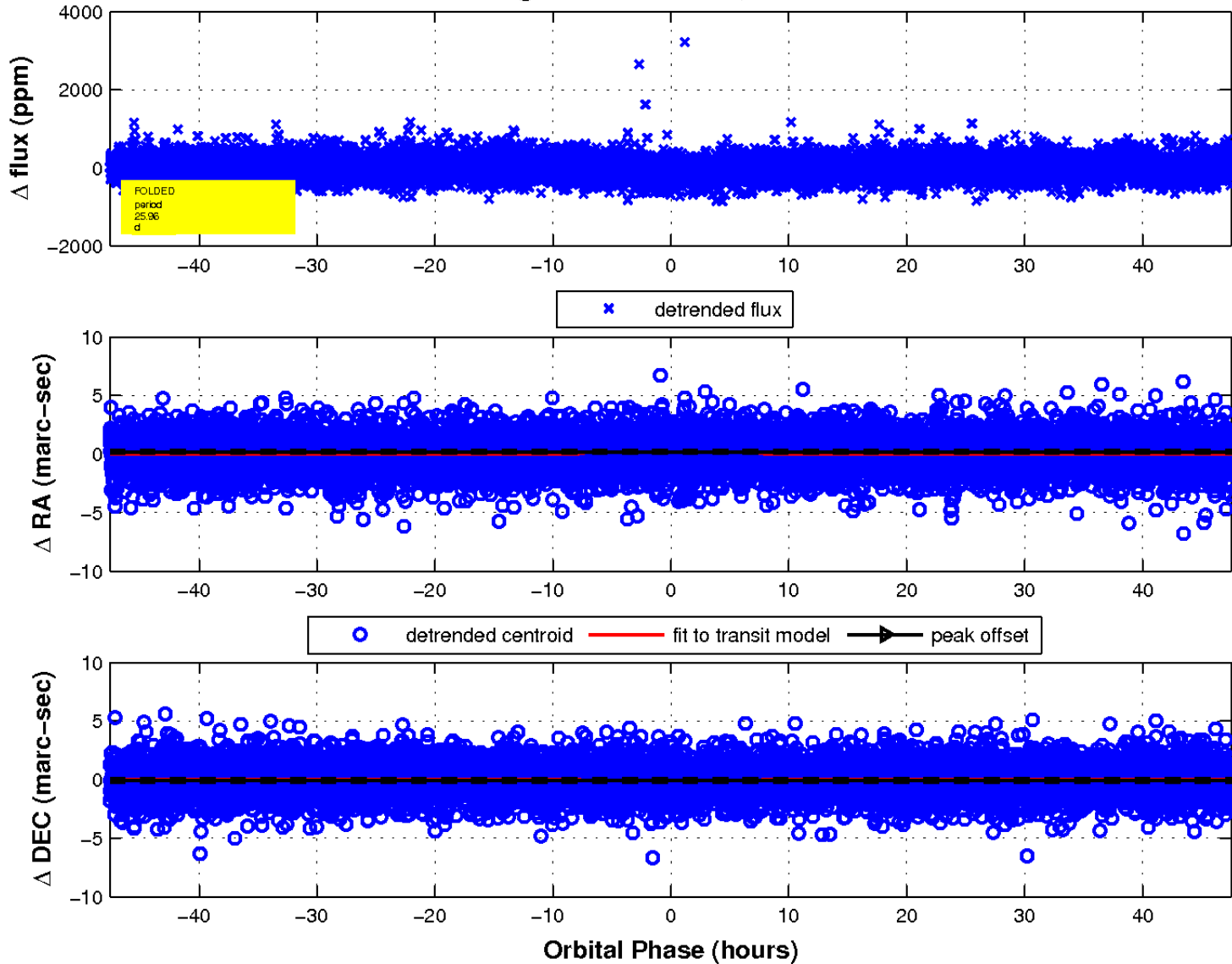
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

