

KIC 003962728

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})
003962728-01	OBS	5028.01	25.949317	155.025349	302.9	12.230	10.0	9.8	0.53	4835	1.02	6.63
003962728-02	OBS	No	25.952106	148.891196	218.7	20.410	9.4	9.5	0.53	4835	0.86	6.63

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003962728-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
003962728-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—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.

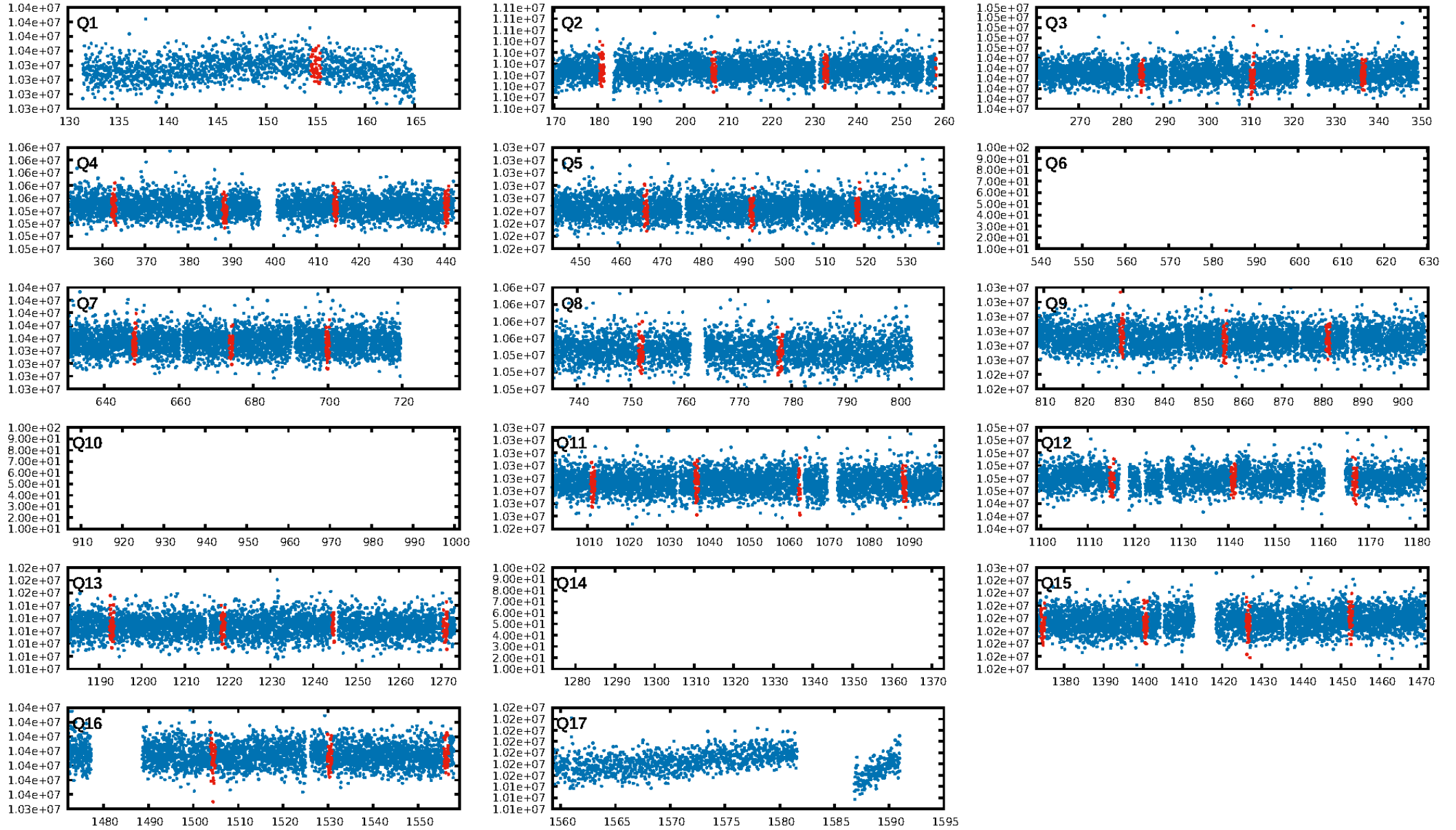
Ephemeris Match Information For 003962728-01

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
003962728-01	3962728	003858884-01	3858884	1:1	141.9	32	17	9.28	15.75	1315.40	Direct-PRF	0	2.36	3.02

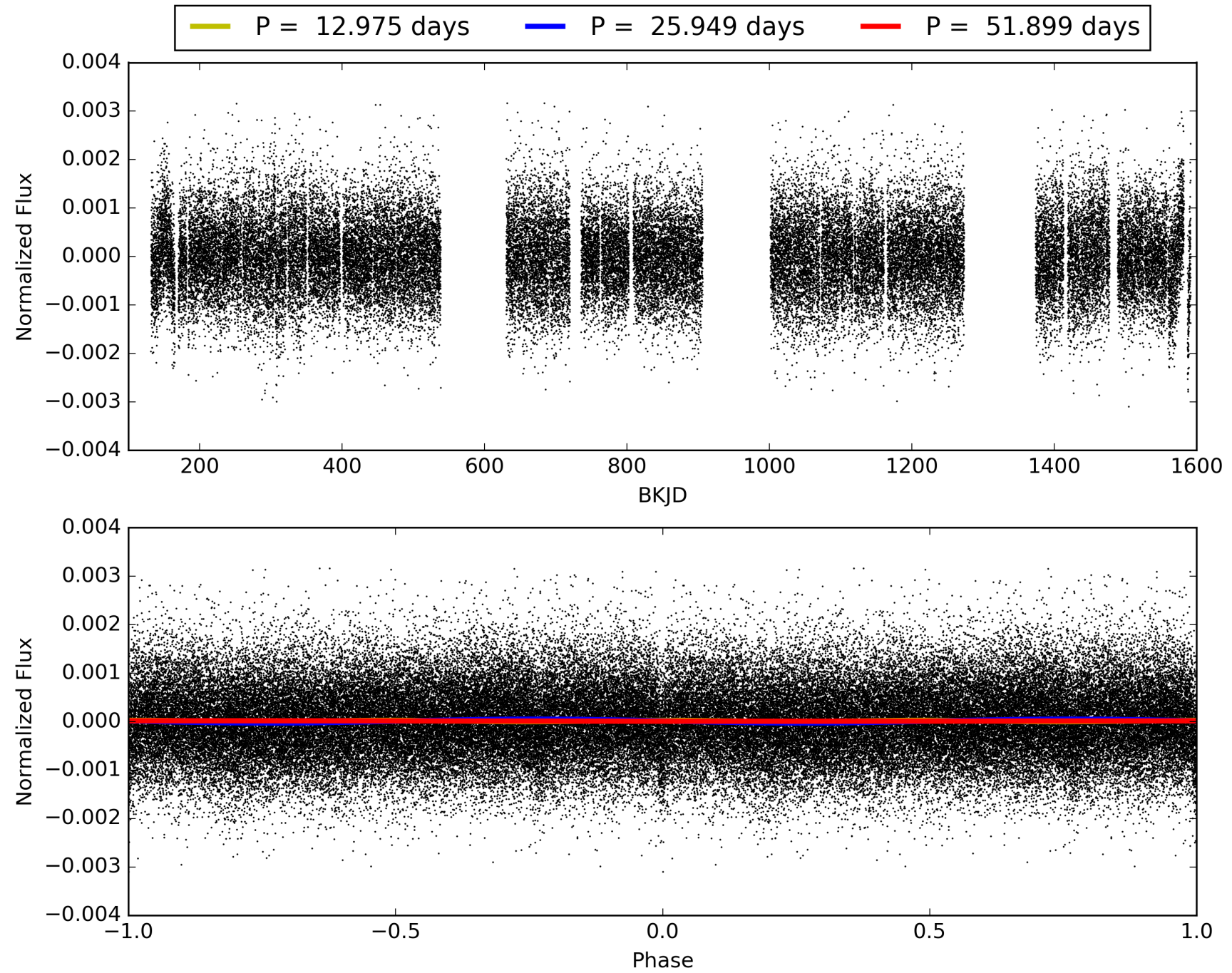
Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match 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.

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

TCE 003962728-01, PDC Light Curves

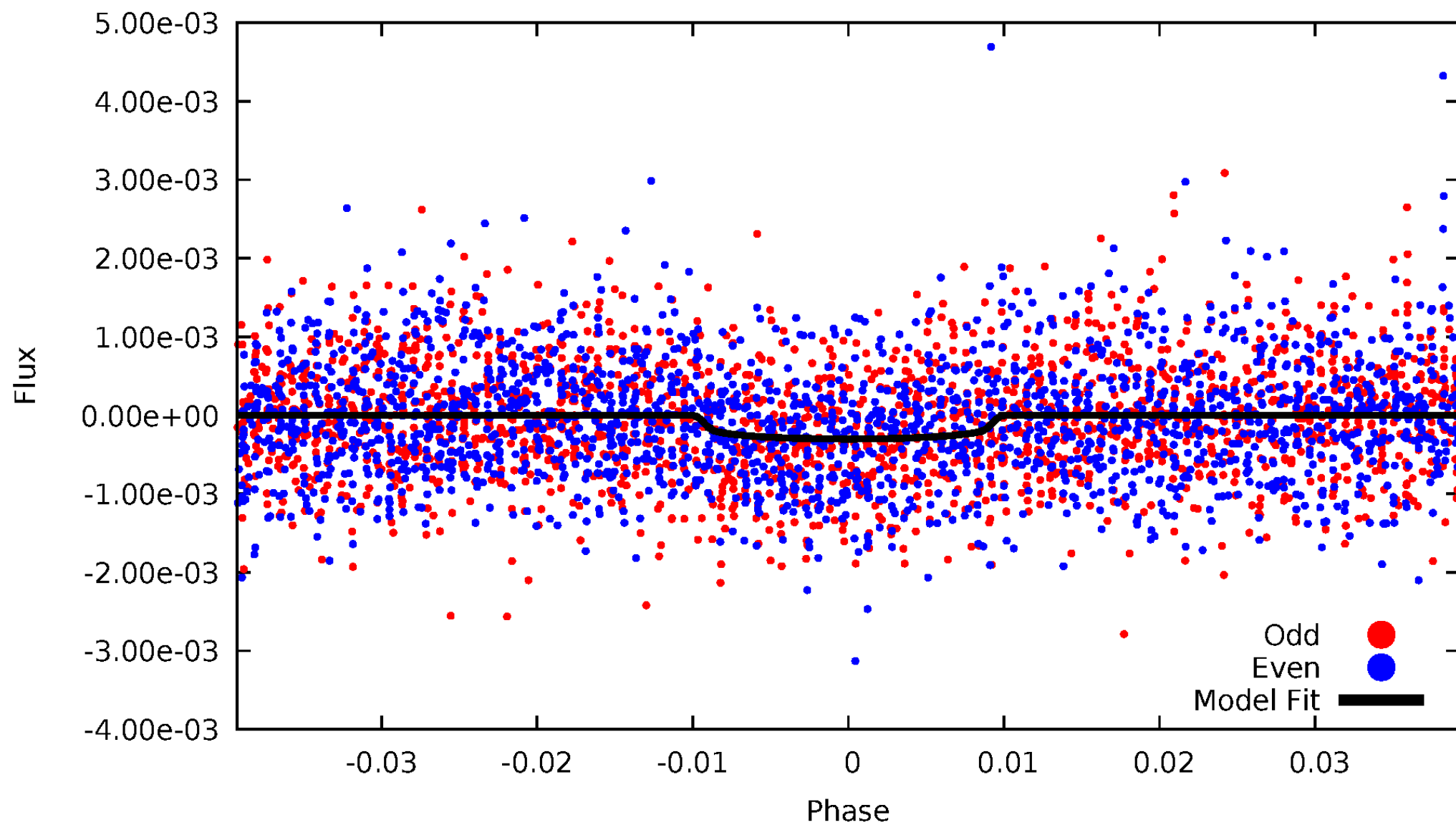


TCE 003962728-01



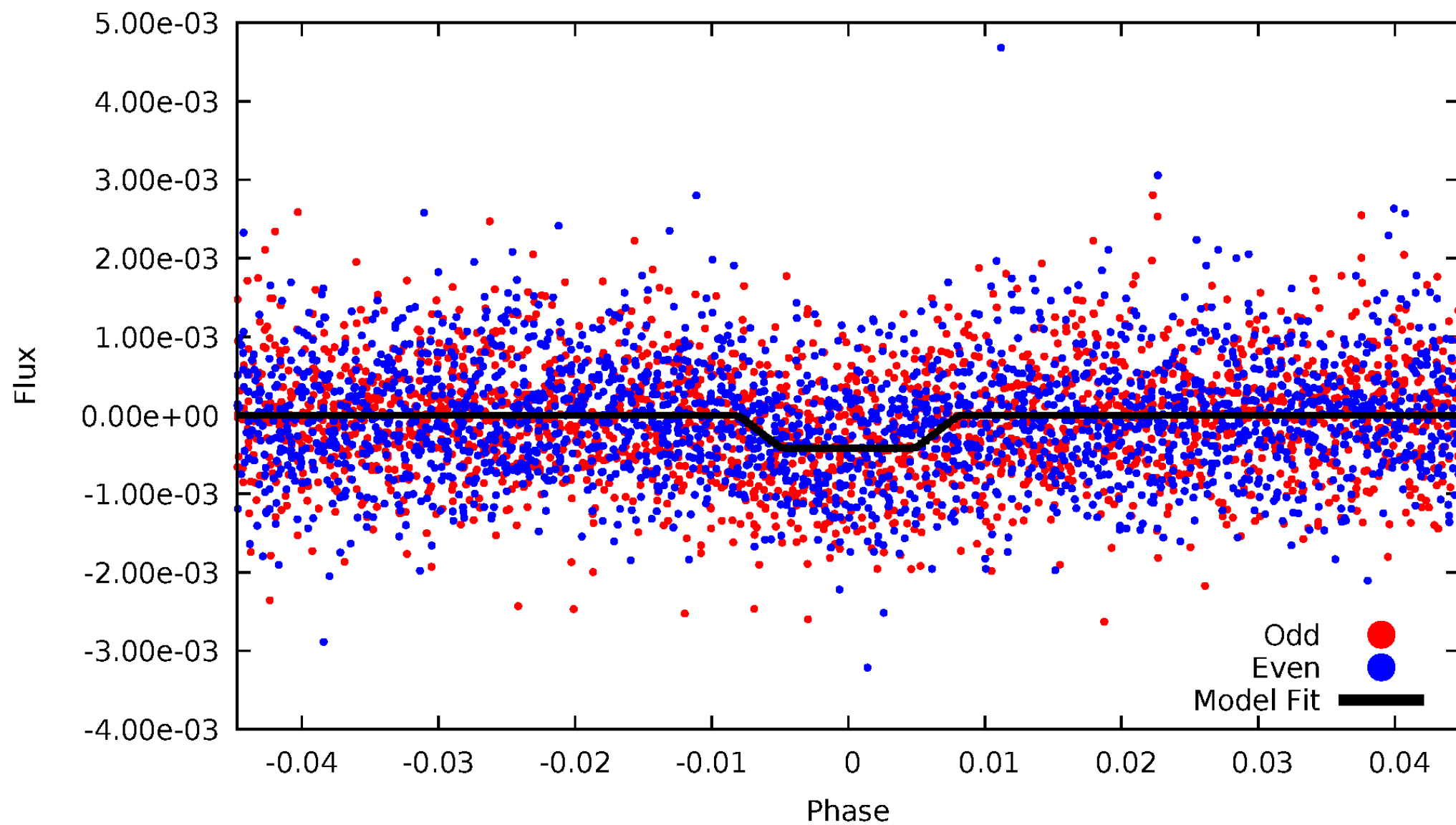
DV Odd/Even

TCE 003962728-01



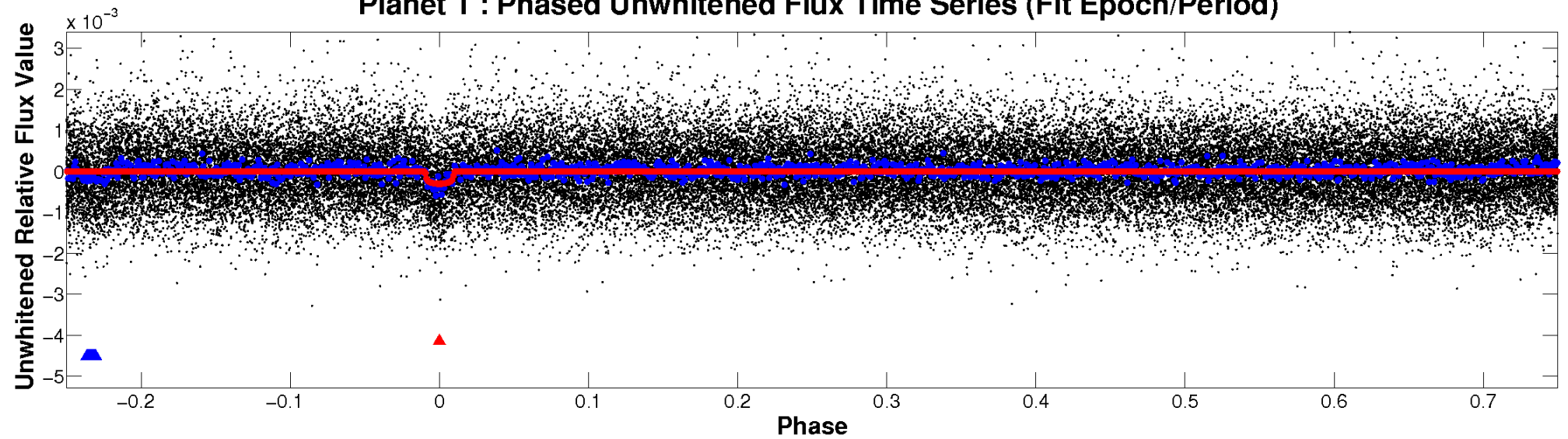
ALT Odd/Even

TCE 003962728-01

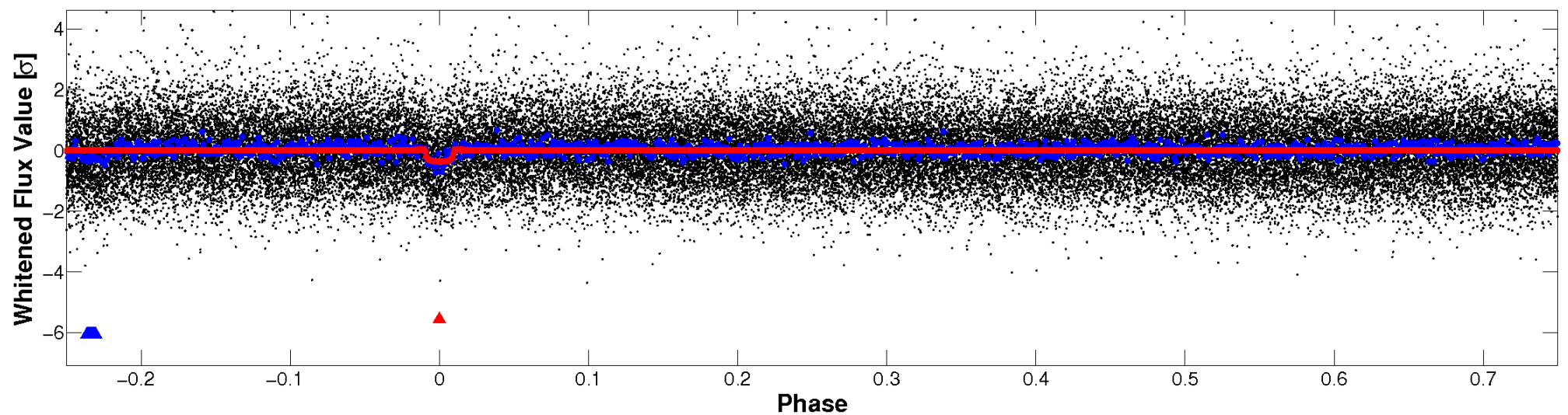


Non-Whitened Vs. Whitened Light Curve

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

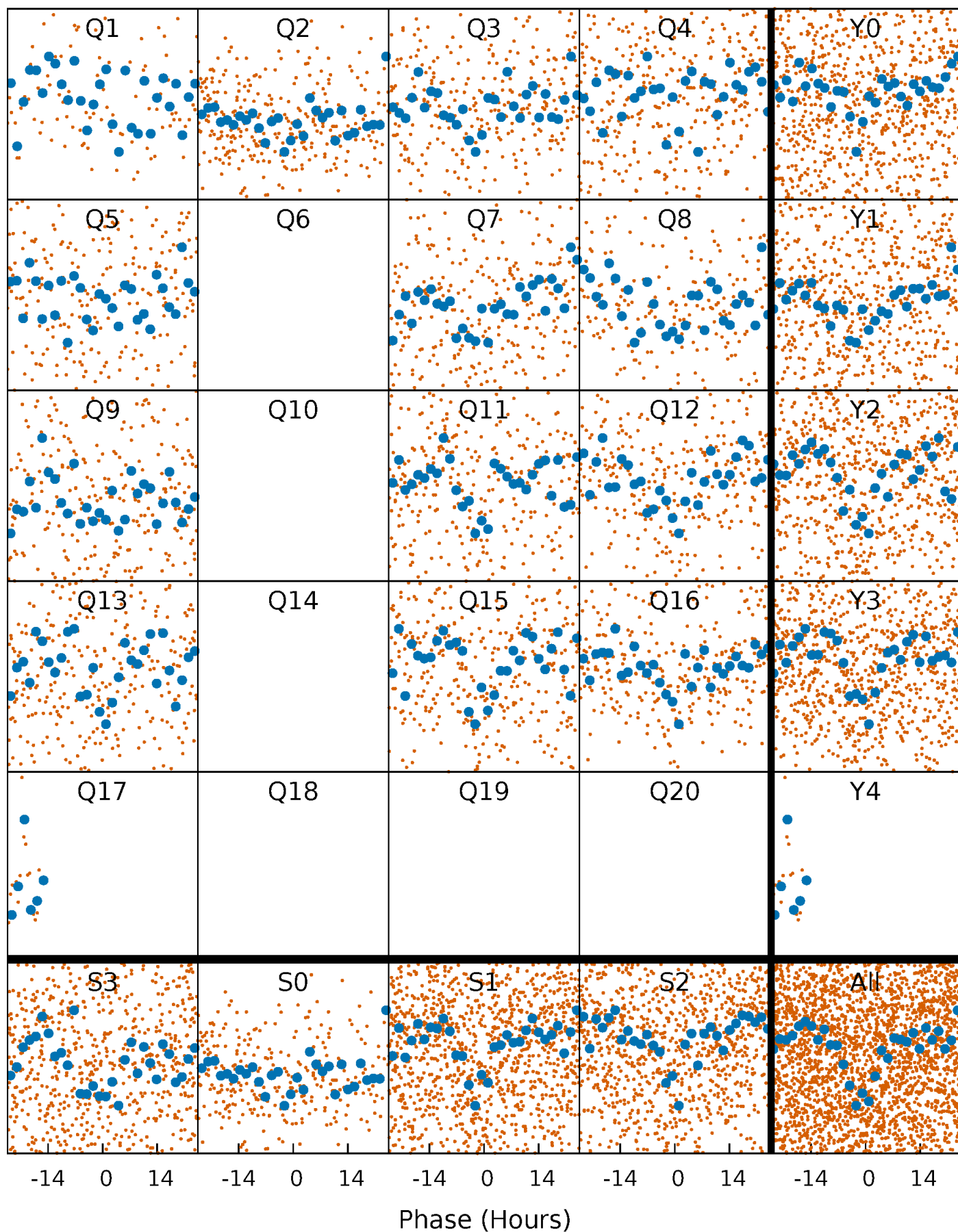


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



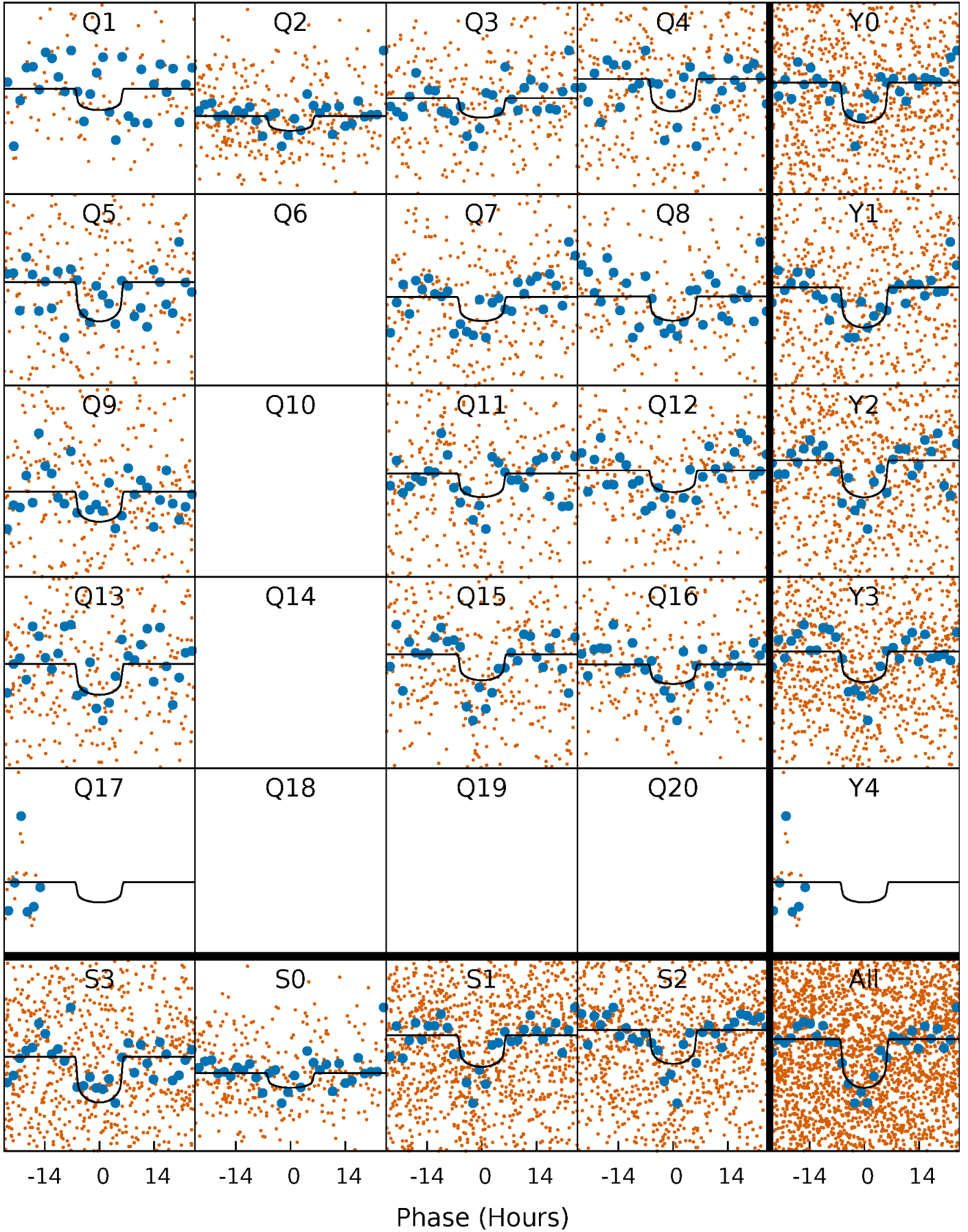
PDC Quarter-Phased Transit Curves

TCE 003962728-01 P= 25.949317 Days $T_0=155.025349$ (BKJD)



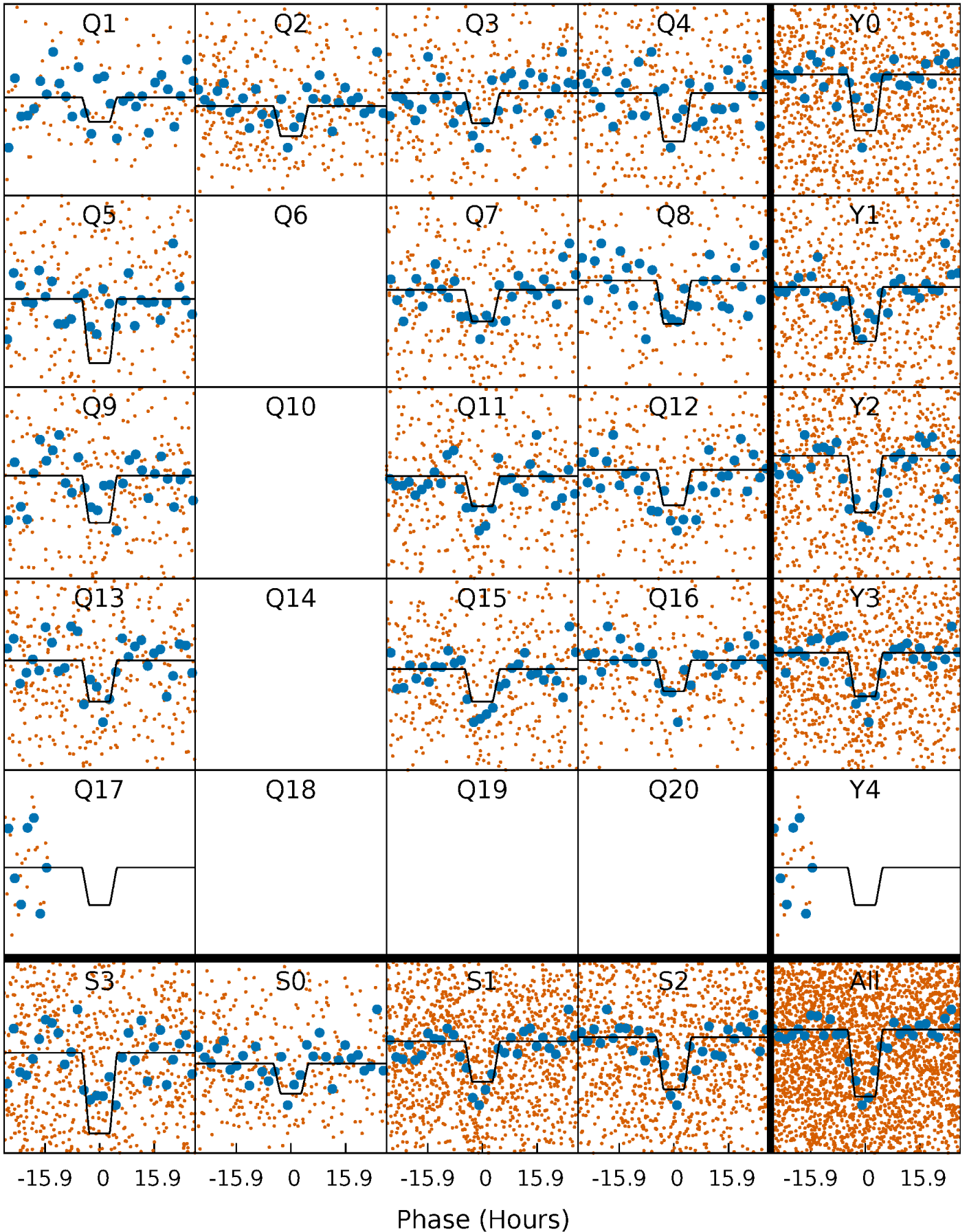
DV Quarter-Phased Transit Curves

TCE 003962728-01 P= 25.949317 Days $T_0=155.025349$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

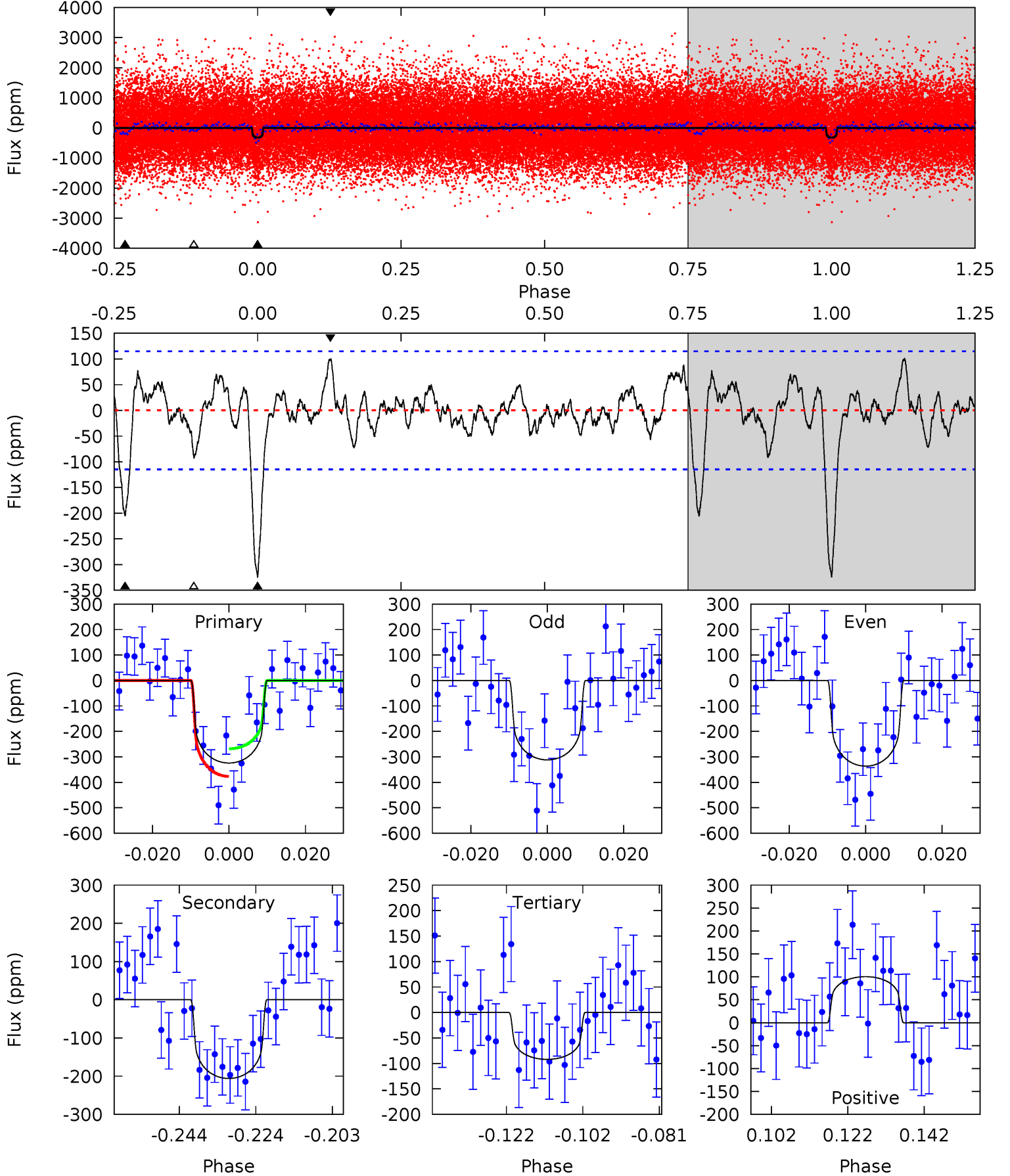
TCE 003962728-01 P= 25.949905 Days $T_0=154.970114$ (BKJD)



DV Model-Shift Uniqueness Test

003962728-01, P = 25.949317 Days, E = 129.076032 Days

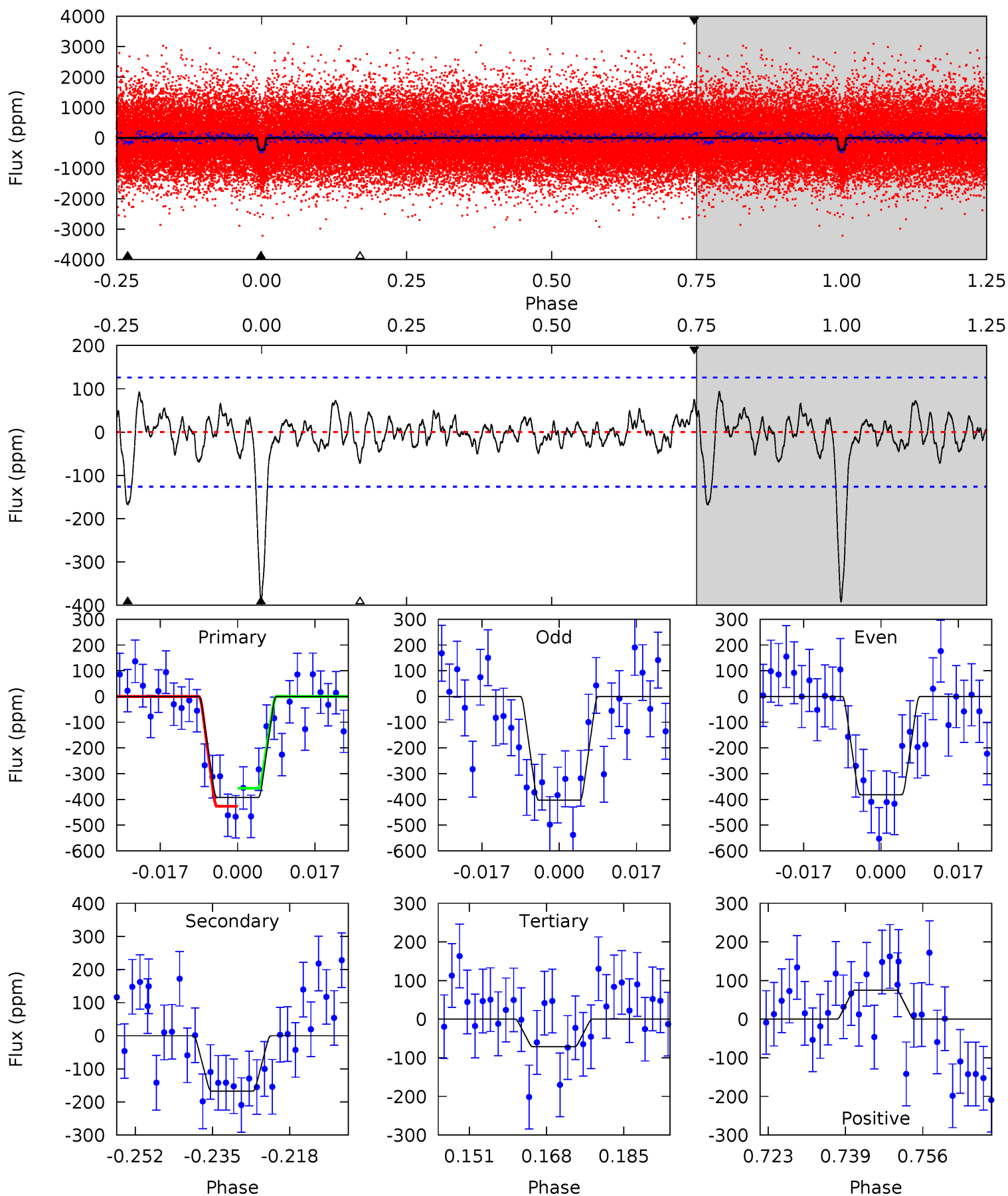
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.8	8.77	3.92	4.27	4.89	2.32	1.36	9.87	9.52	4.85	4.50	0.52	1.07	0.24	2.30



Alt Model-Shift Uniqueness Test

003962728-01, P = 25.949905 Days, E = 129.020209 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.3	6.53	2.79	2.93	4.93	2.39	1.08	12.5	12.4	3.74	3.61	0.42	1.10	0.19	1.37



Stellar Parameters For KIC 003962728

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4835^{+145}_{-145}	$4.758^{+0.021}_{-0.049}$	$-1.320^{+0.300}_{-0.300}$	$0.526^{+0.035}_{-0.025}$	$0.578^{+0.027}_{-0.034}$	$5.600^{+0.567}_{-0.918}$
	+3%/-3%	+0%/-1%	+23%/-23%	+7%/-5%	+5%/-6%	+10%/-16%
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 003962728-01 / KOI 5028.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-206 ± 24	$1.03^{+0.31}_{-0.31}$	574^{+21}_{-19}	4441^{+729}_{-421}	2169^{+2215}_{-887}
Alt.	-167 ± 26	$1.20^{+0.29}_{-0.31}$	575^{+20}_{-19}	4043^{+471}_{-349}	1312^{+1039}_{-510}

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

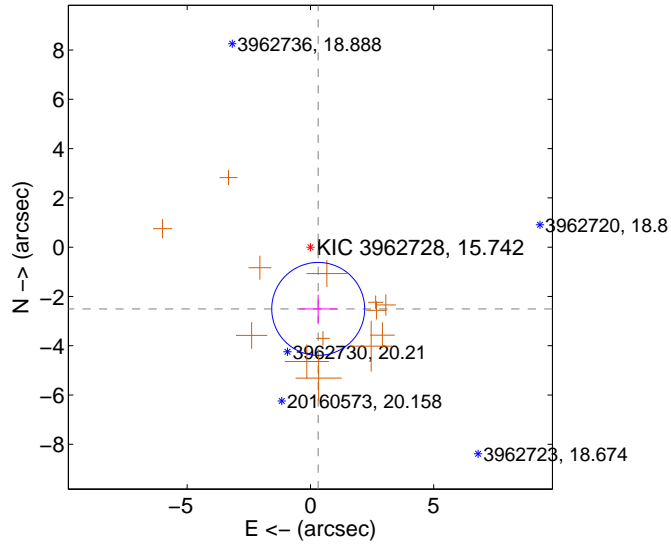
Supplemental centroid analysis for 003962728-01. Kepler magnitude: 15.74. Transit SNR 9.79

There are 0 quarters with good PRF difference image offsets

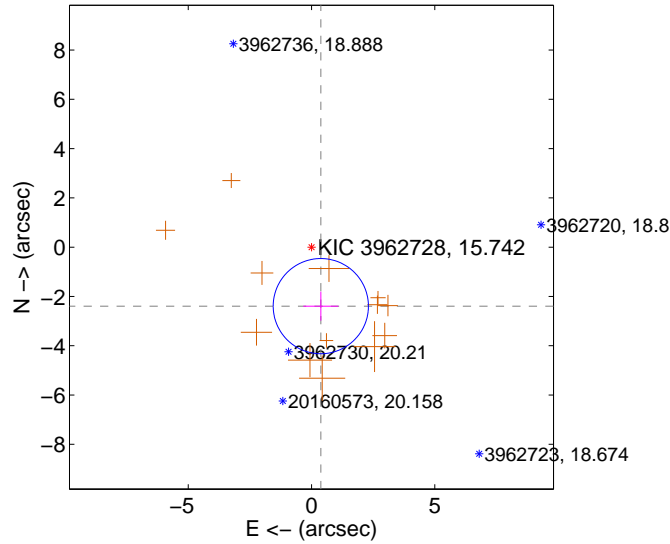
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.524 ± 0.628	4.02	-0.315 ± 0.768	-2.504 ± 0.574
PRF-fit source offset from KIC position	2.422 ± 0.644	3.76	-0.377 ± 0.710	-2.393 ± 0.589
photometric centroid source offset	4.11 ± 1.36	3.03	2.86 ± 1.40	2.95 ± 1.31

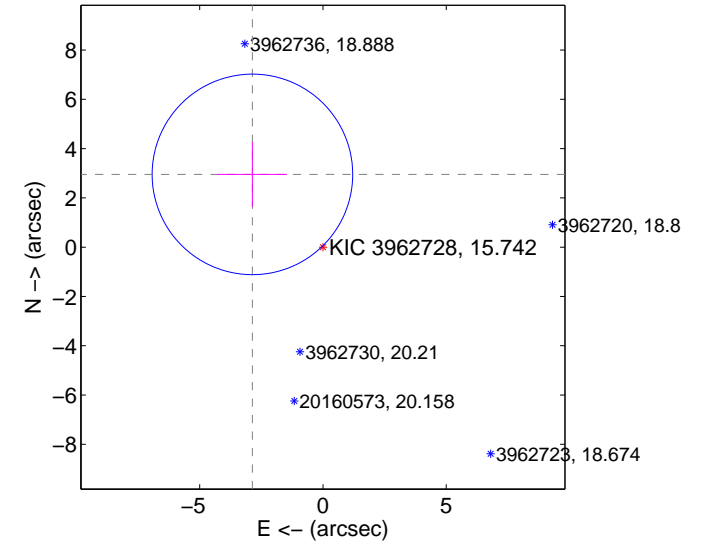
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

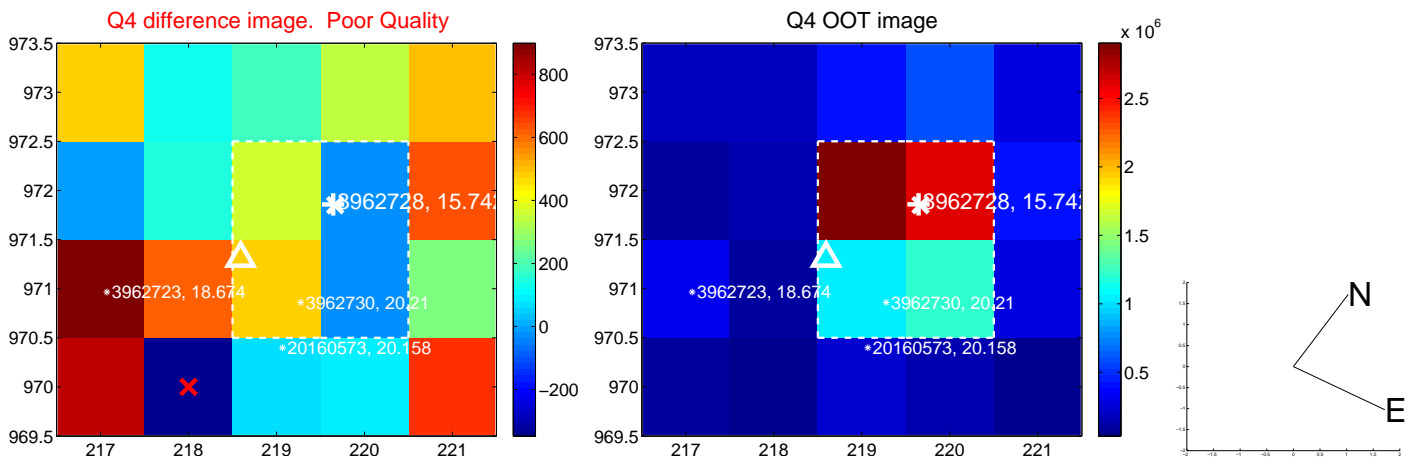
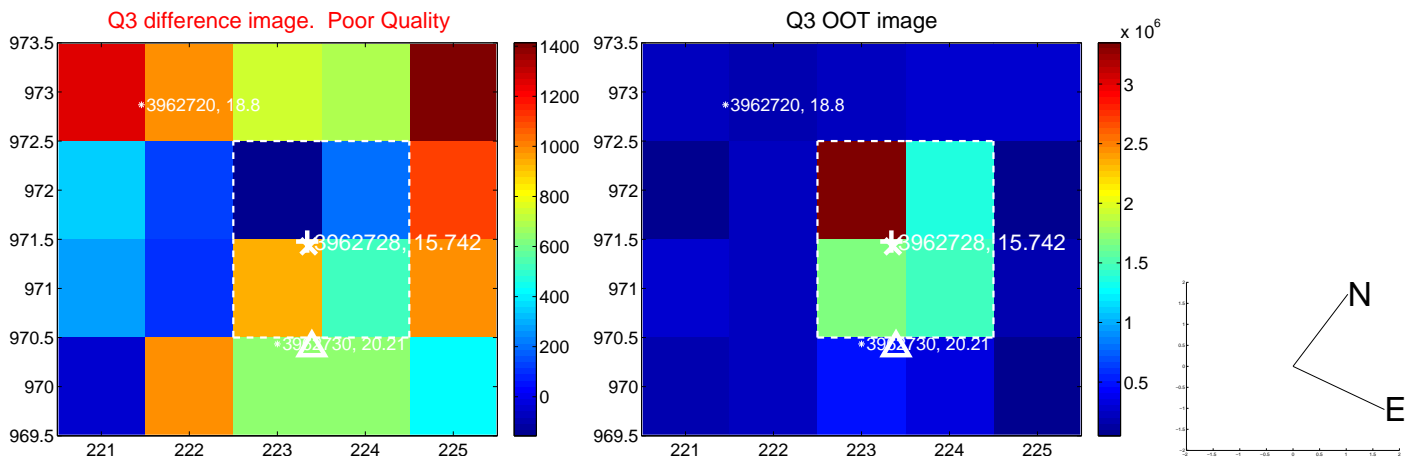
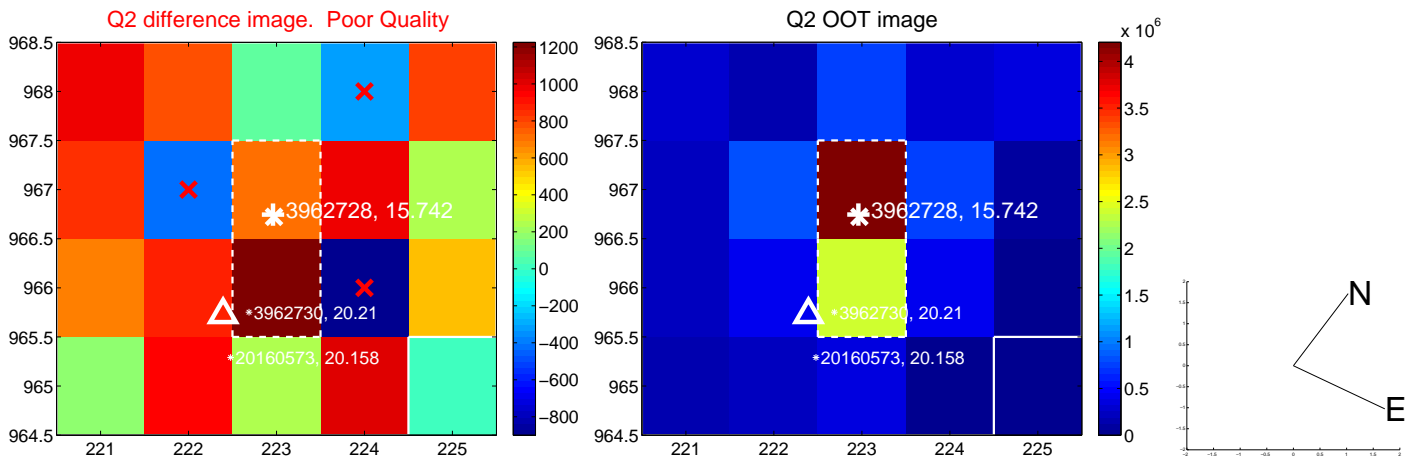
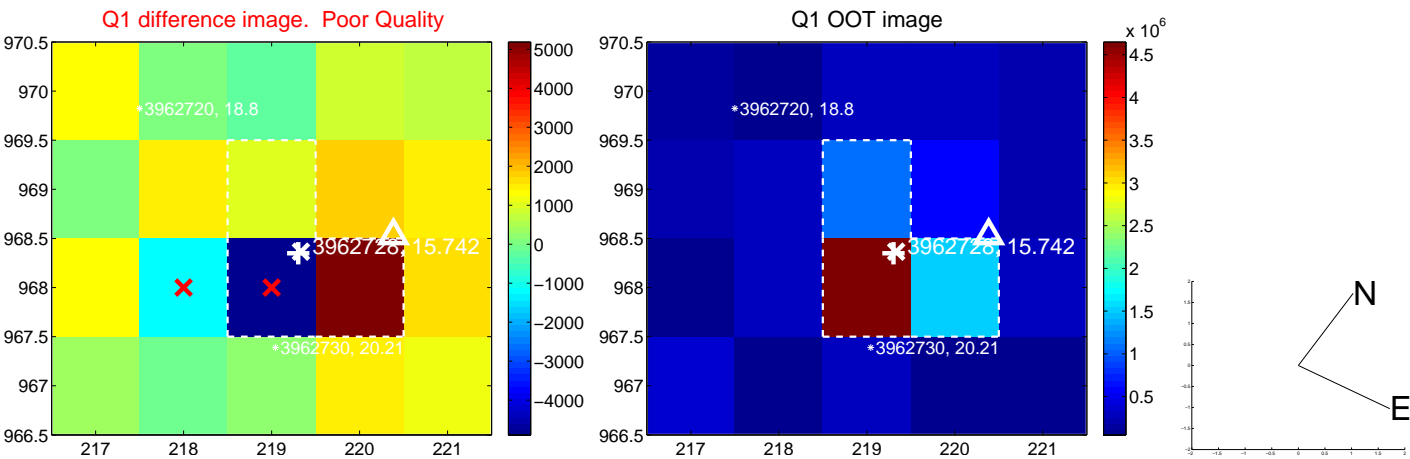


offset from photometric centroids

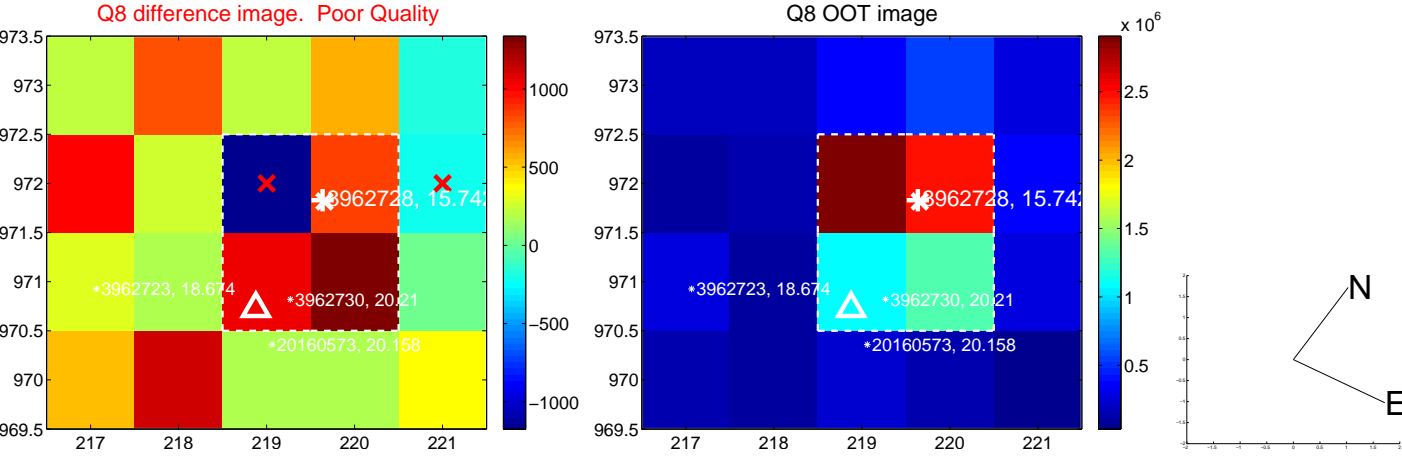
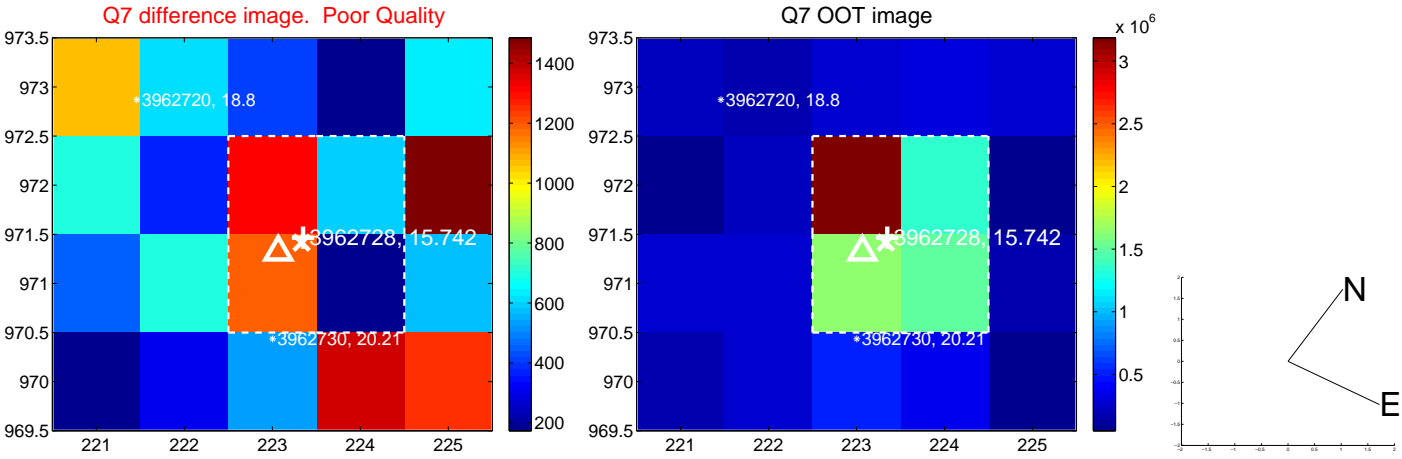
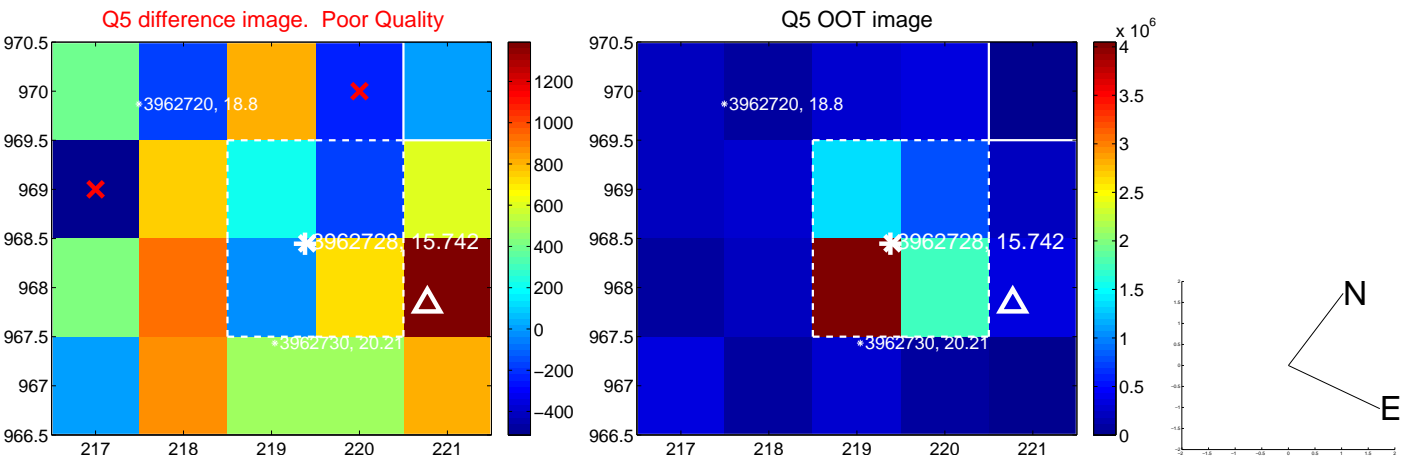


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

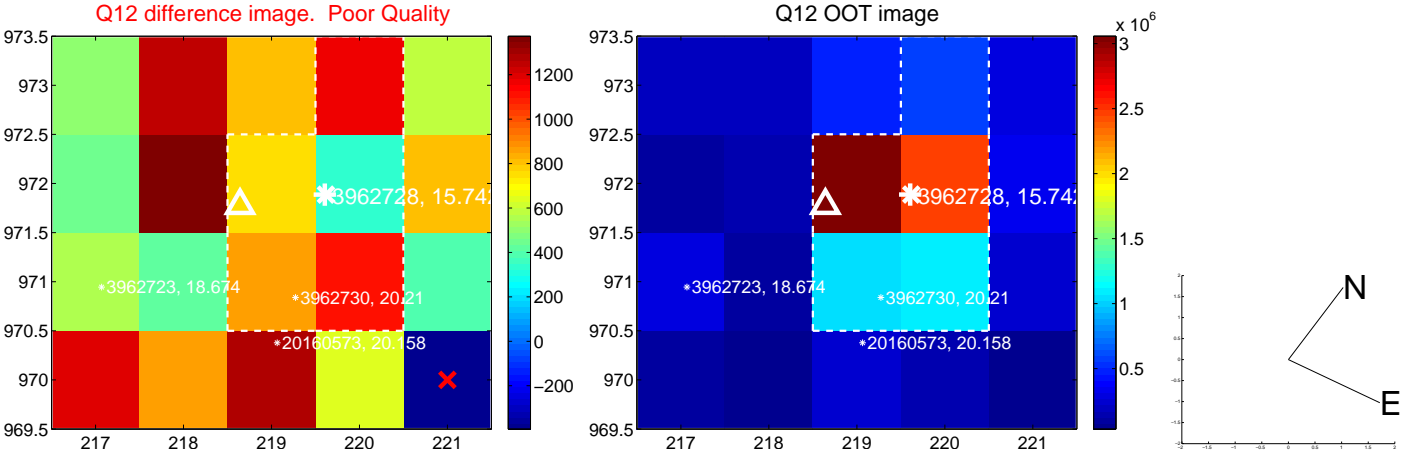
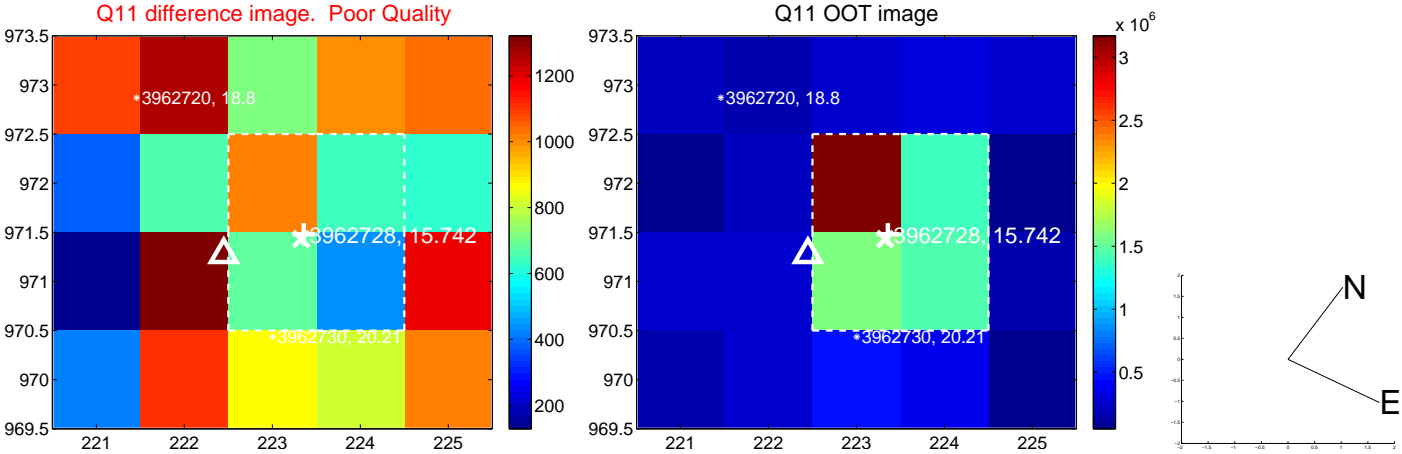
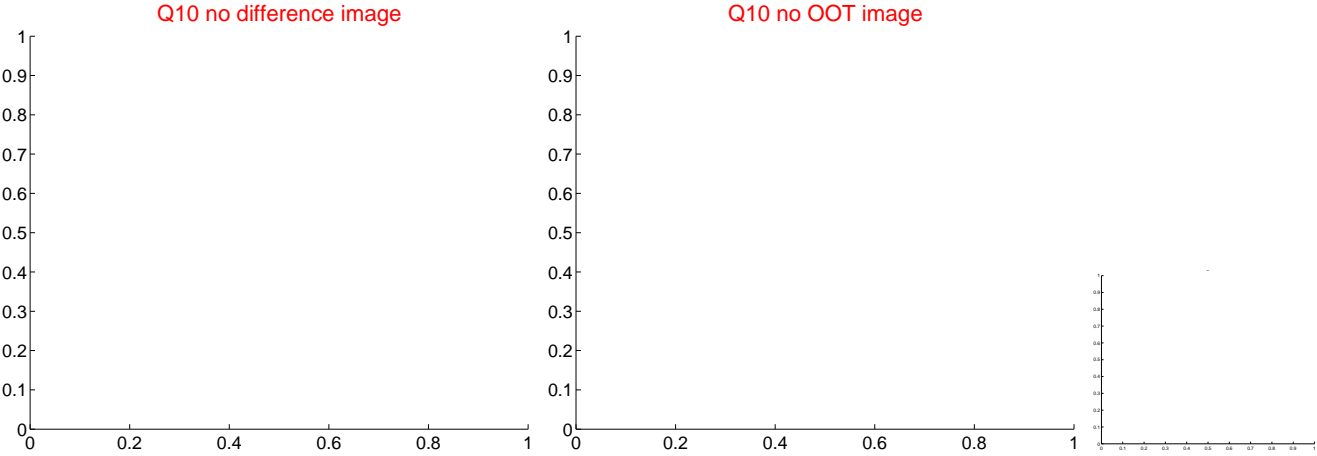
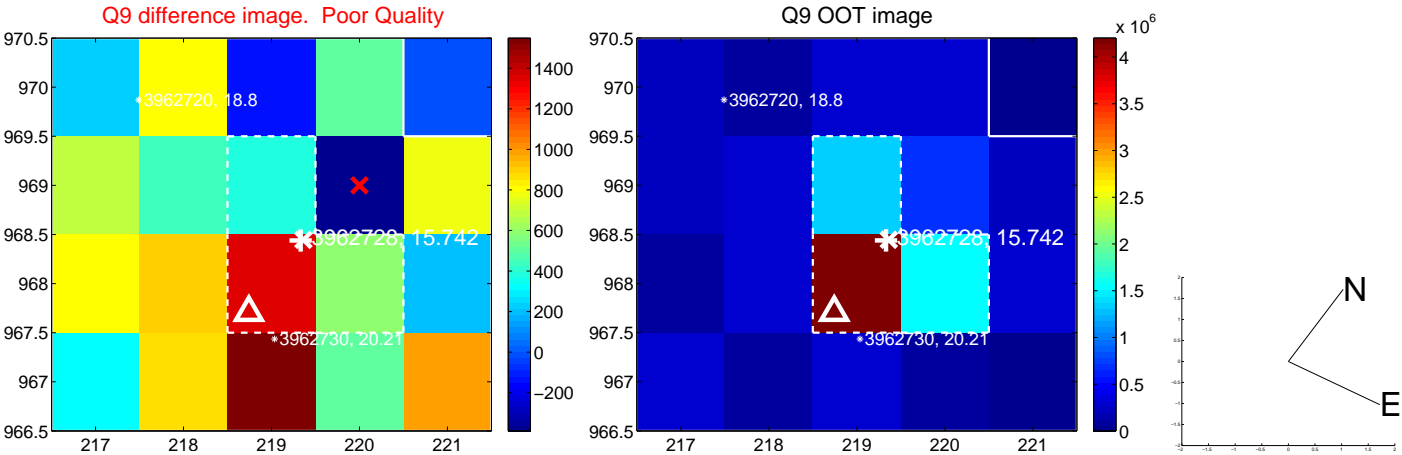
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



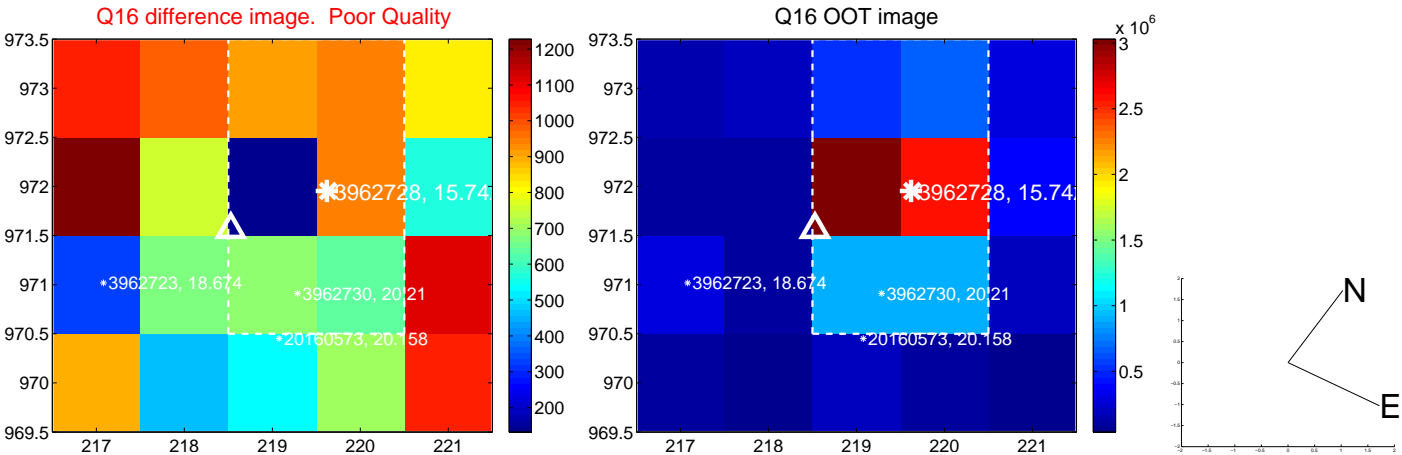
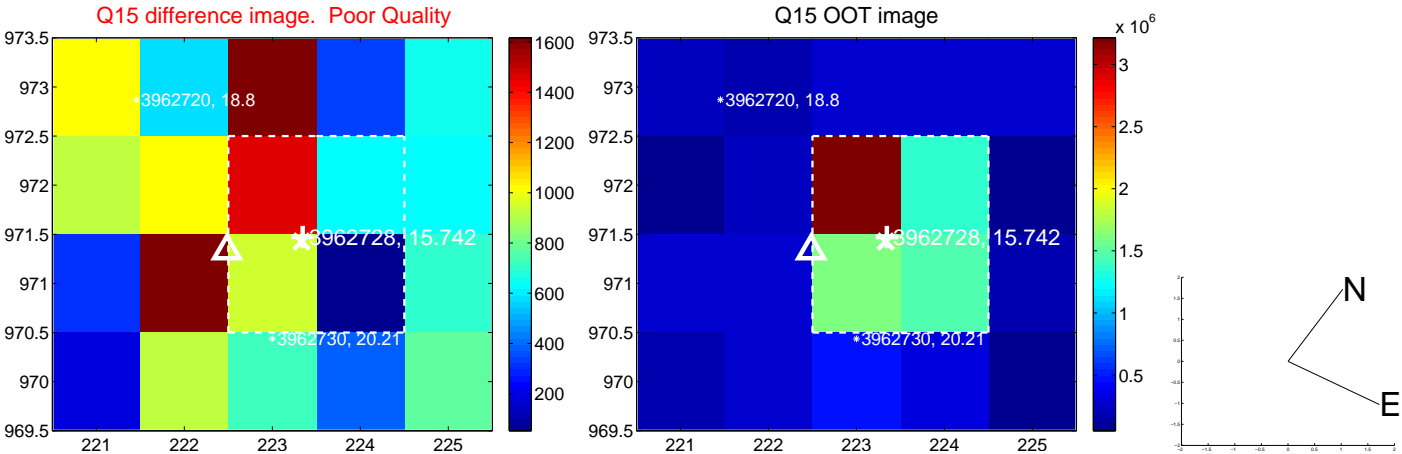
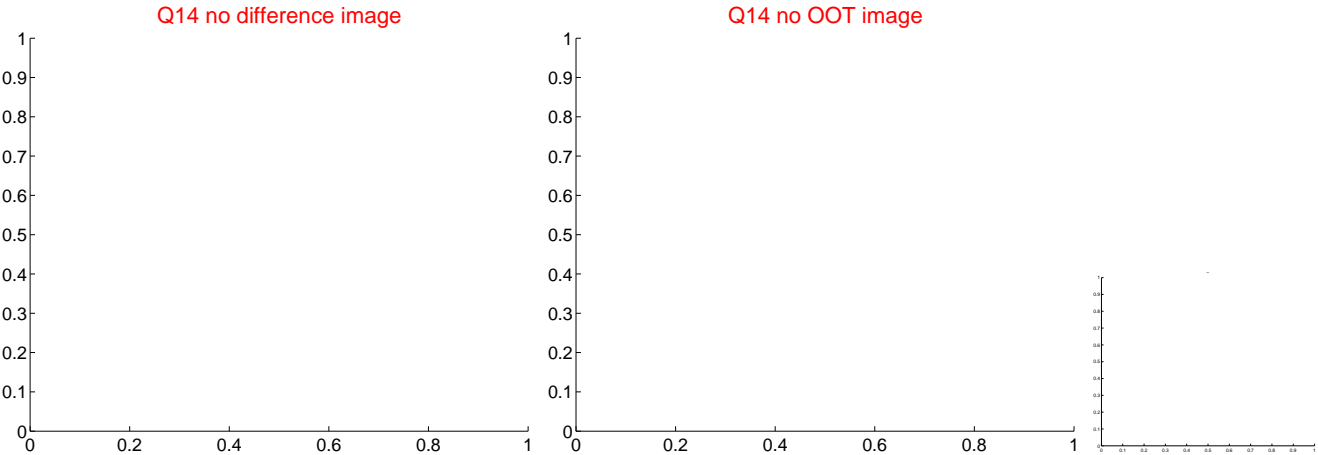
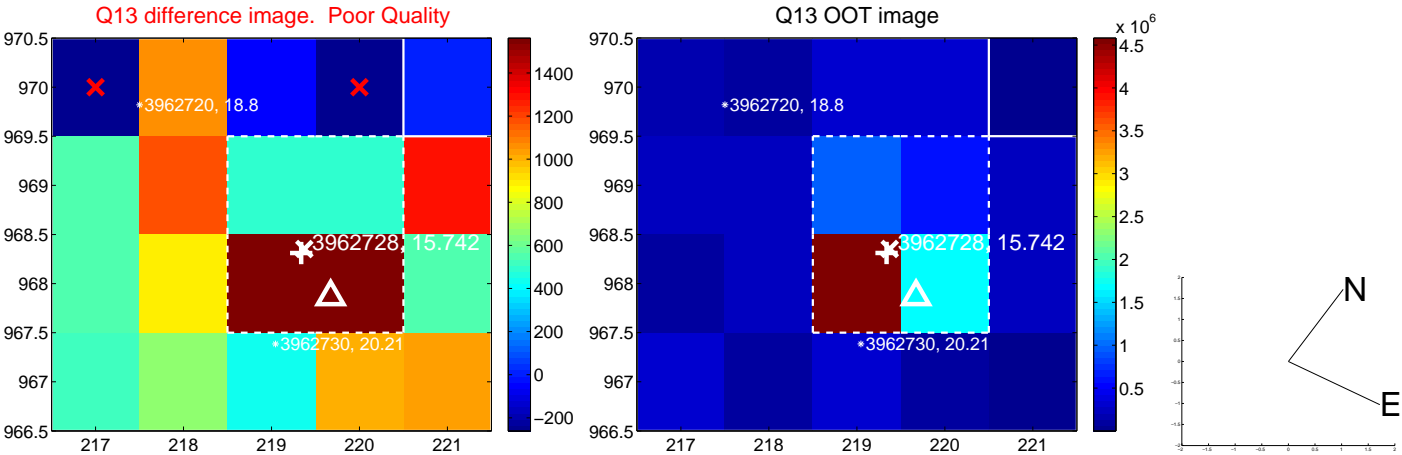
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



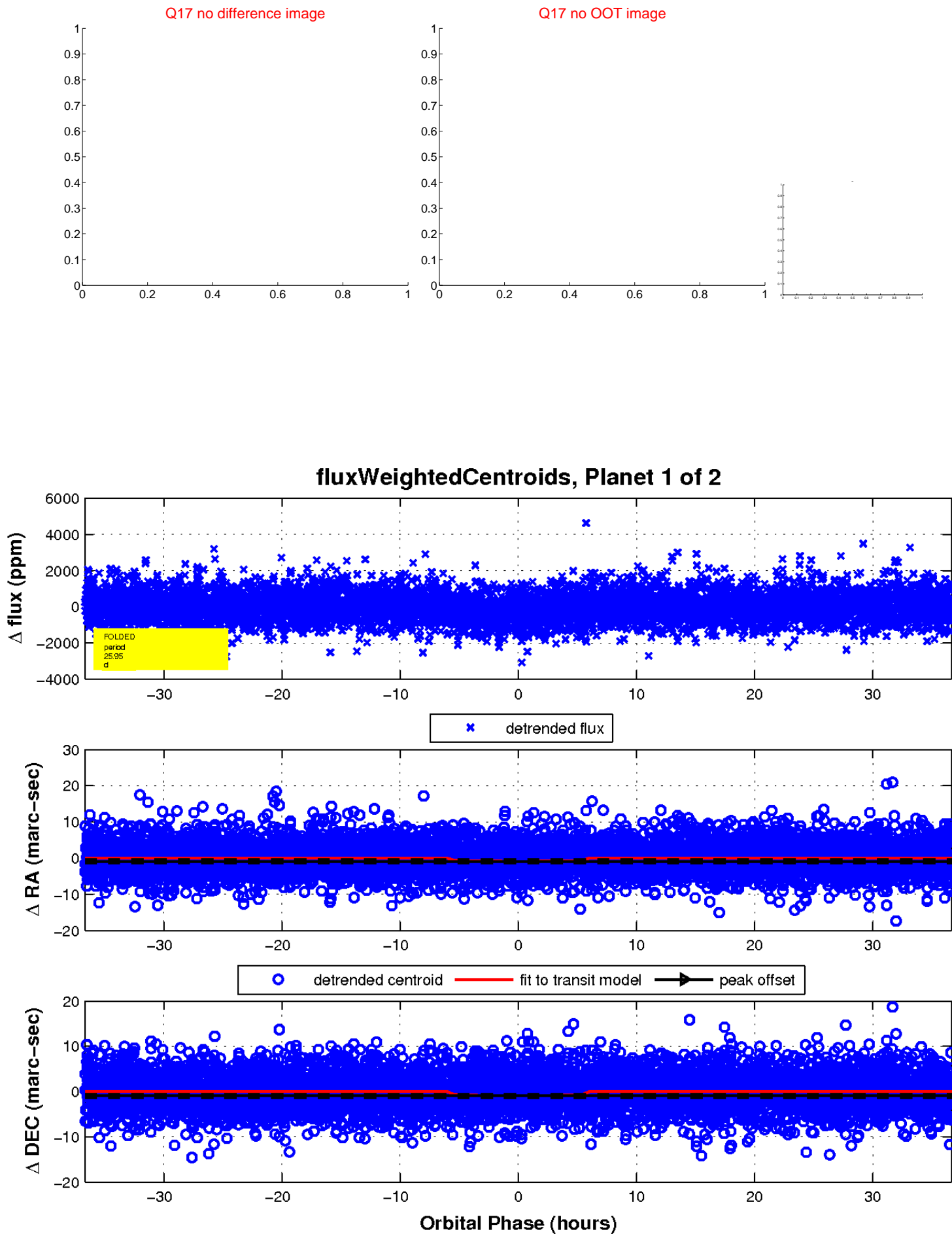
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

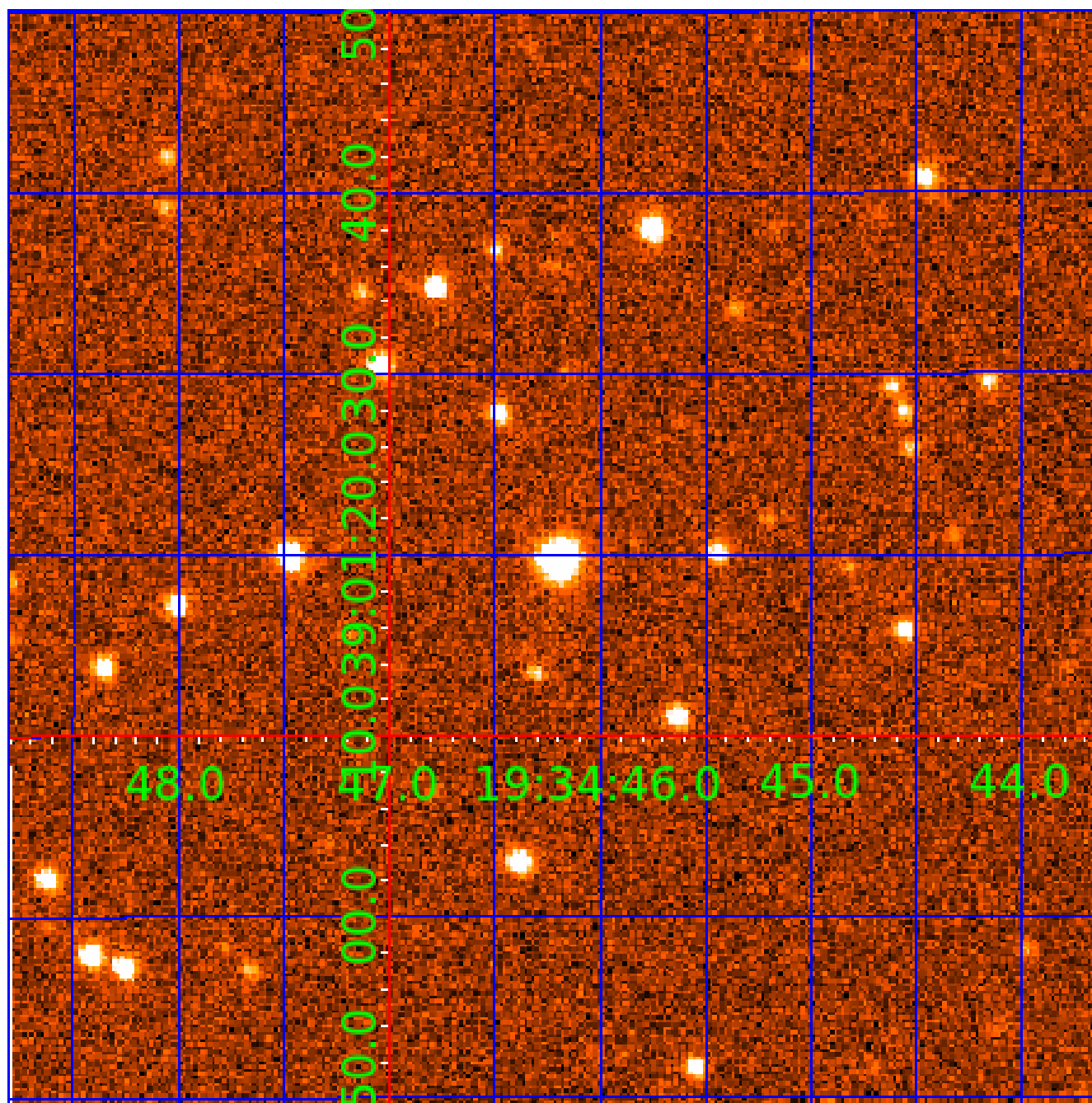


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 003962728

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})
003962728-01	OBS	5028.01	25.949317	155.025349	302.9	12.230	10.0	9.8	0.53	4835	1.02	6.63
003962728-02	OBS	No	25.952106	148.891196	218.7	20.410	9.4	9.5	0.53	4835	0.86	6.63

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003962728-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
003962728-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—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 003962728-02

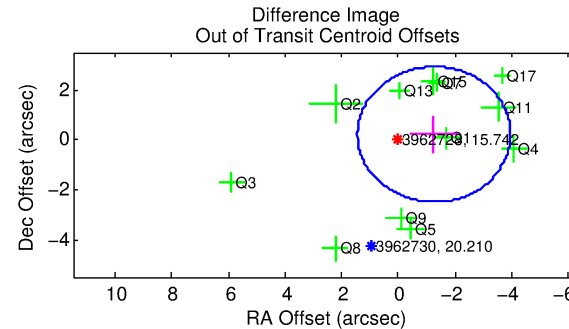
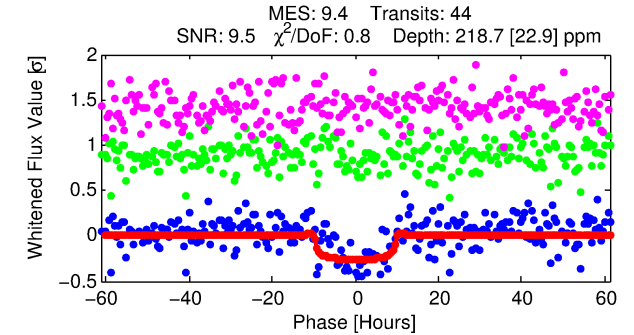
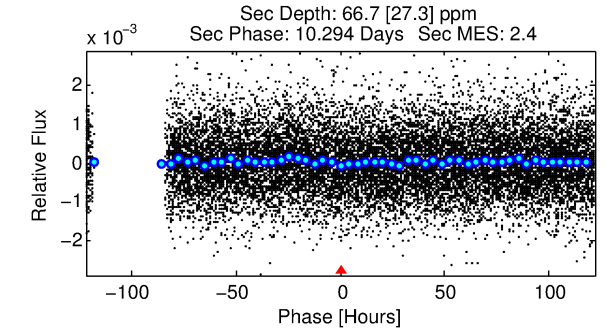
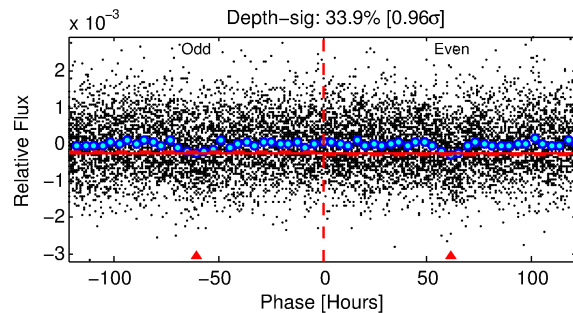
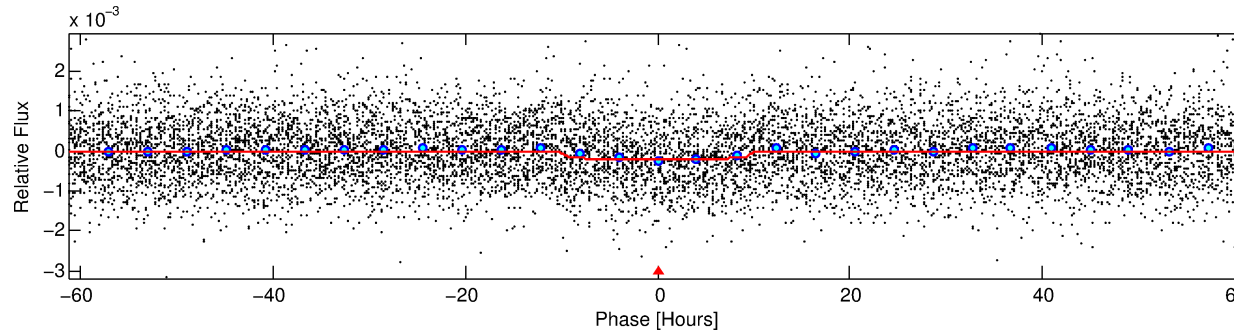
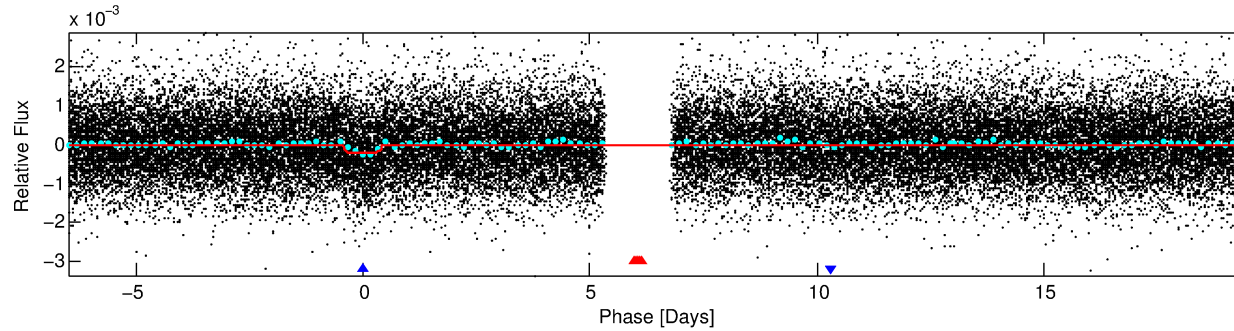
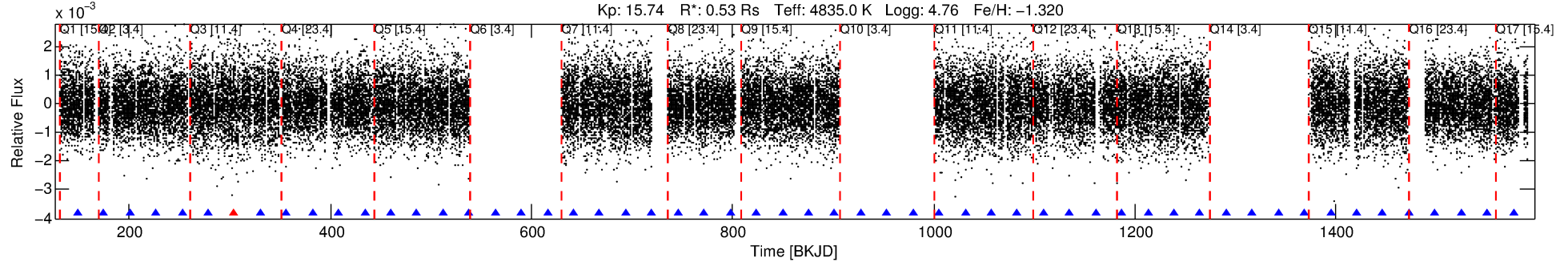
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist (")	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
003962728-02	3962728	003858884-02	3858884	1:1	141.9	32	17	9.28	15.75	1539.40	Direct-PRF	0	0.46	0.88

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: 3962728 Candidate: 2 of 2 Period: 25.952 d
KOI: K05028 Corr: No Ephemeris Match

Kp: 15.74 R*: 0.53 Rs Teff: 4835.0 K Logg: 4.76 Fe/H: -1.320



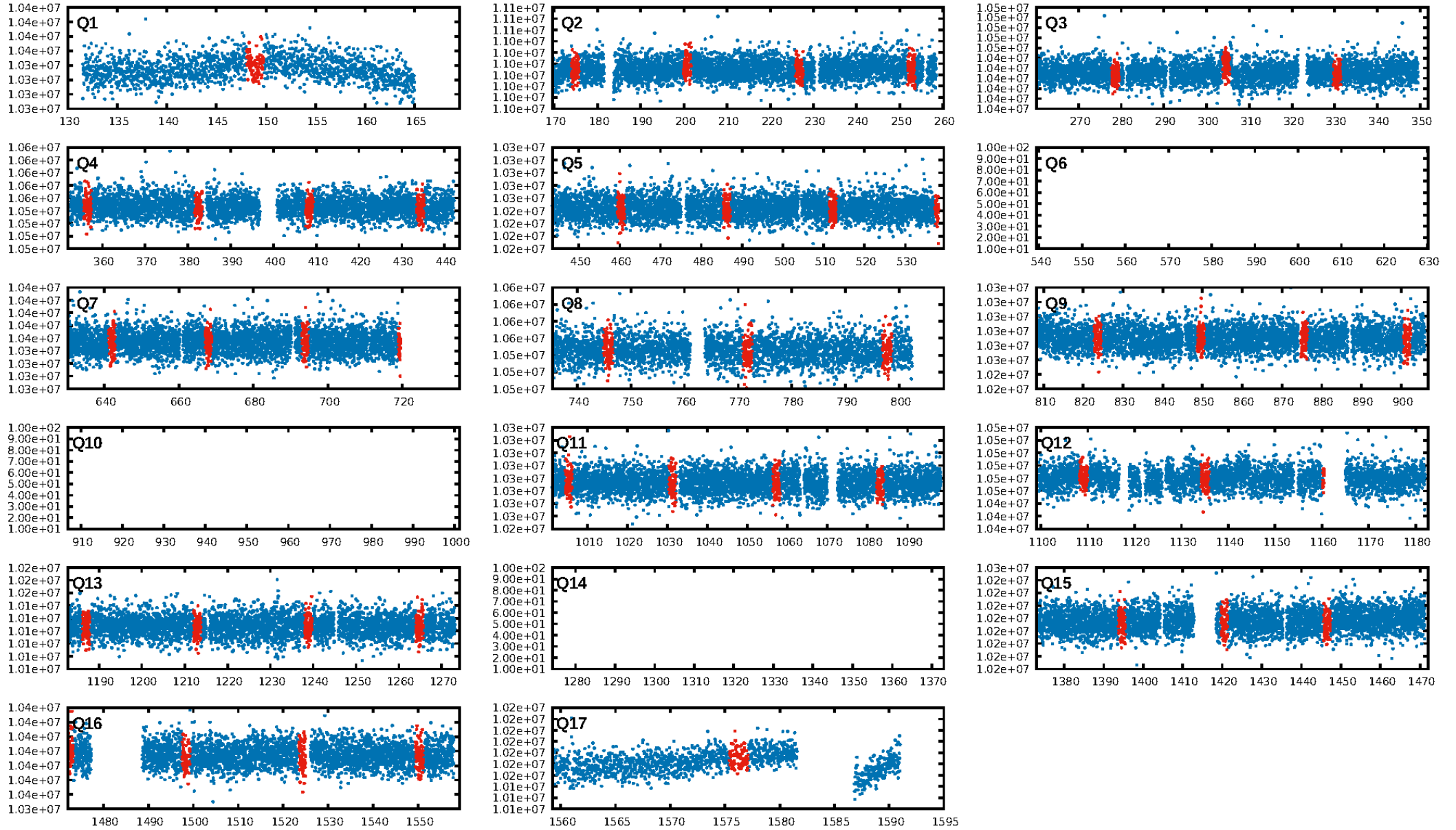
DV Fit Results:

Period = 25.95211 [0.00099] d
Epoch = 148.8912 [0.0299] BKJD
Rp/R* = 0.0149 [0.0040]
a/R* = 6.33 [7.03]
b = 0.78 [0.57]
Seff = 6.63 [0.98]
Teq = 409 [15] K
Rp = 0.86 [0.24] Re
a = 0.1429 [0.0083] AU
Ag = 1021.60 [699.11] [1.46σ]
Teffp = 3577 [616] K [5.14σ]

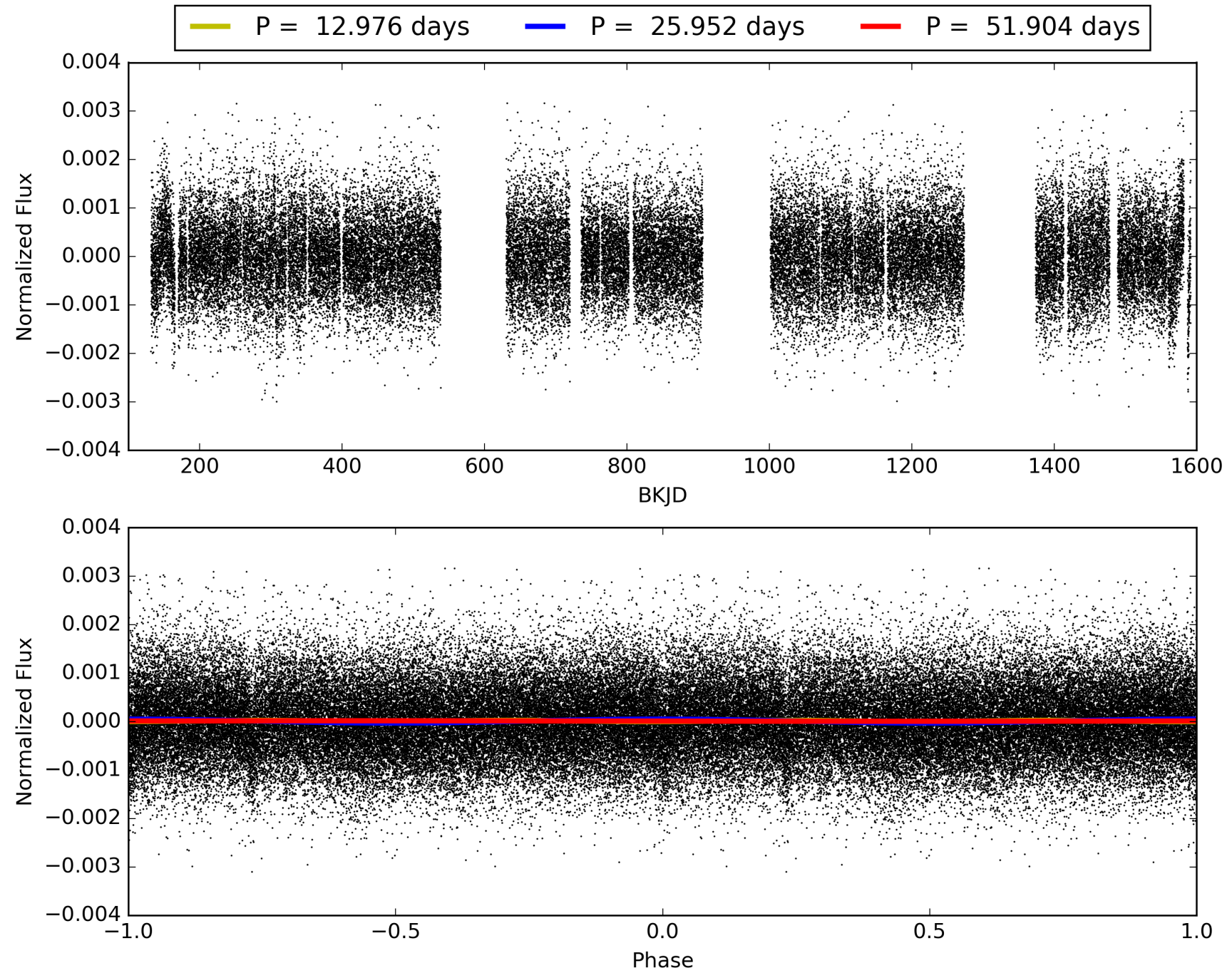
DV Diagnostic Results:

ShortPeriod-sig: 0.2% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 34.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.70e-20
RollingBand-fgm: 0.98 [41/42]
GhostDiagnostic-chr: 0.1507
Centroid-sig: 33.2%
Centroid-so: 1.124 arcsec [0.80σ]
OotOffset-rm: 1.284 arcsec [1.42σ]
KicOffset-rm: 1.349 arcsec [1.54σ]
OotOffset-st: 1/4/2/5 [12]
KicOffset-st: 1/4/2/5 [12]
DiffImageQuality-fgm: 0.17 [2/12]
DiffImageOverlap-fno: 1.00 [12/12]

TCE 003962728-02, PDC Light Curves

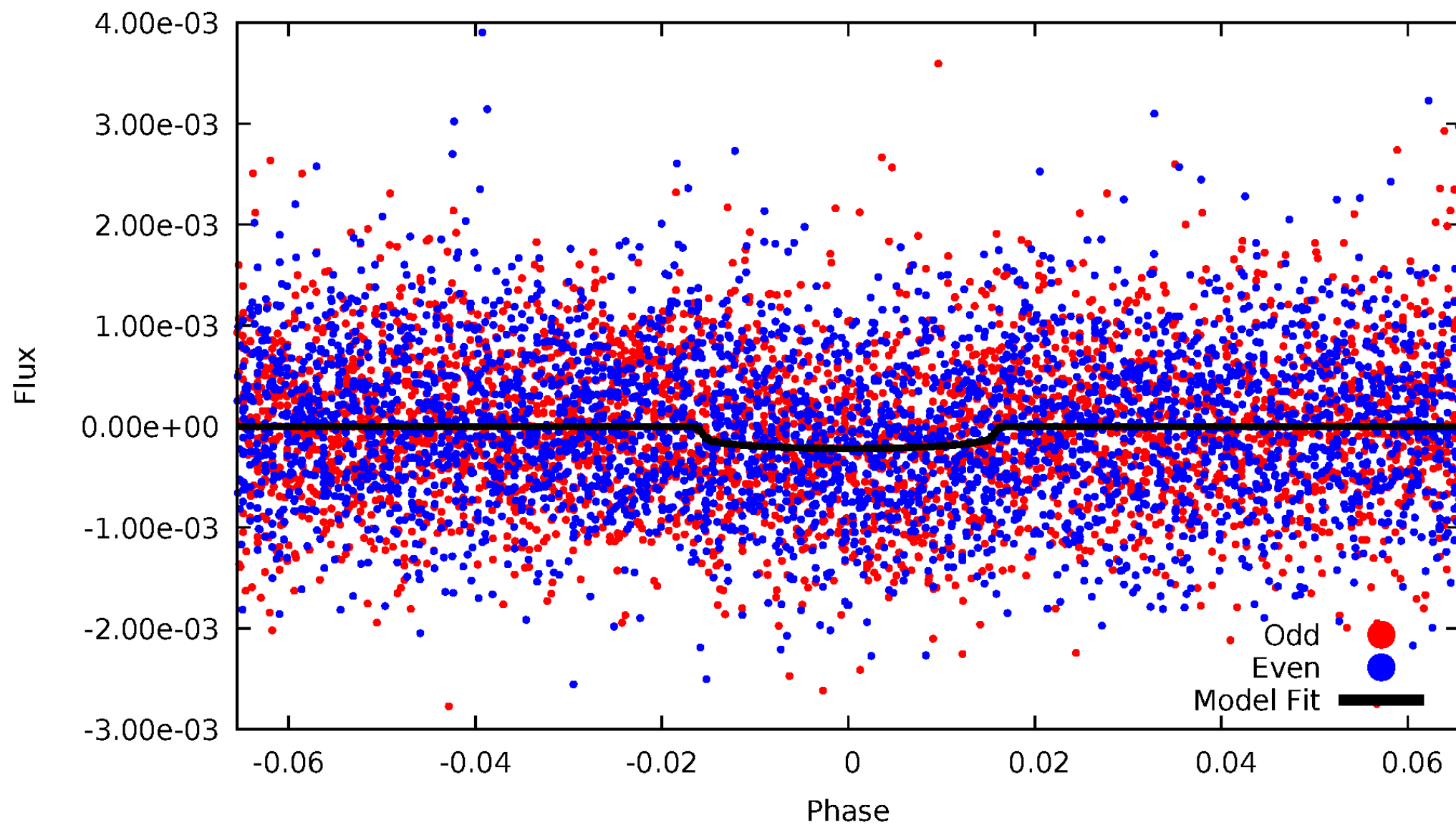


TCE 003962728-02



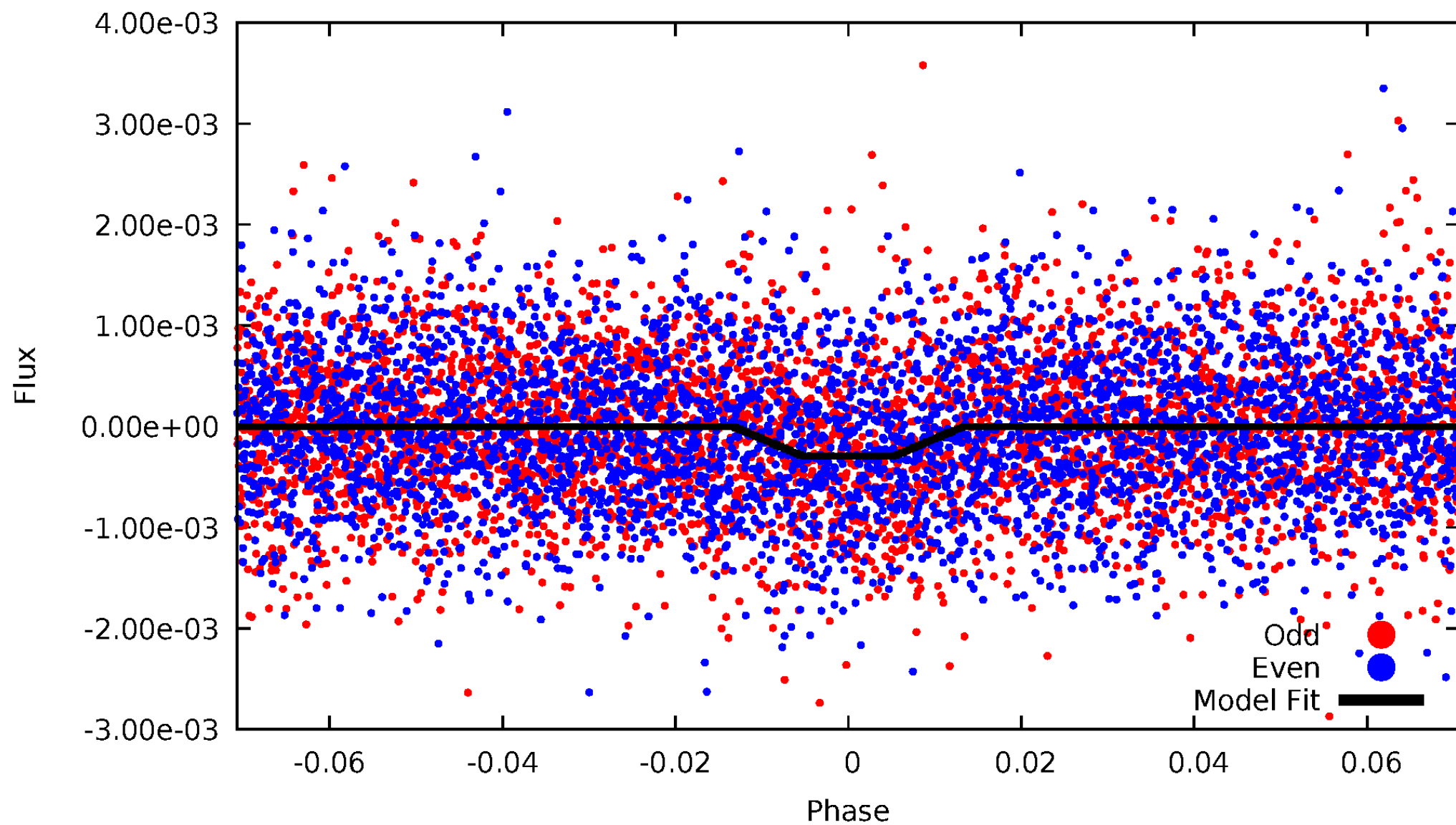
DV Odd/Even

TCE 003962728-02



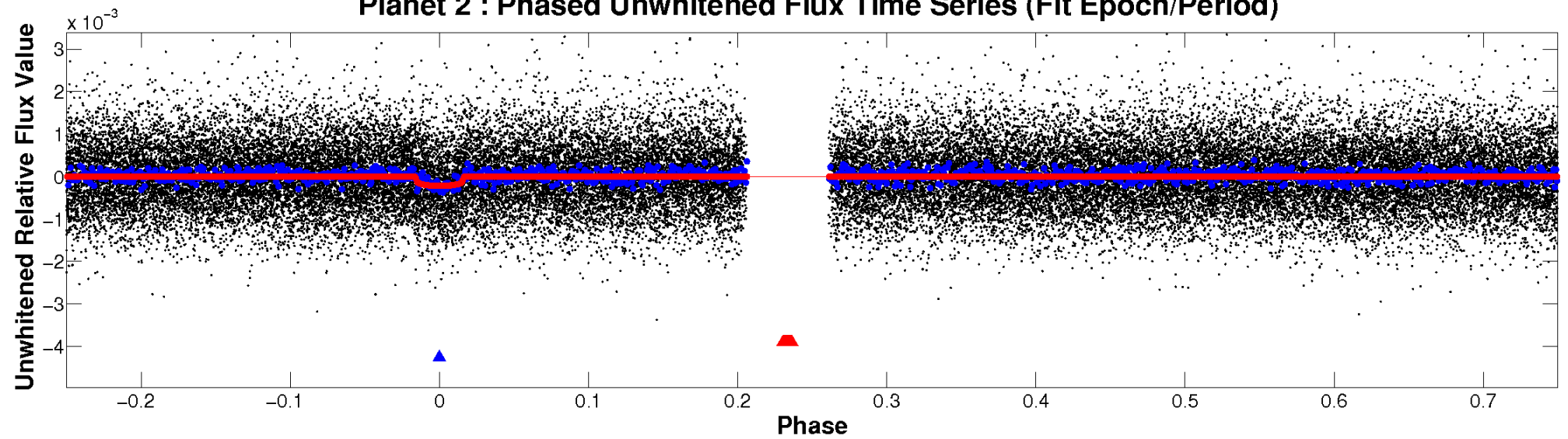
ALT Odd/Even

TCE 003962728-02

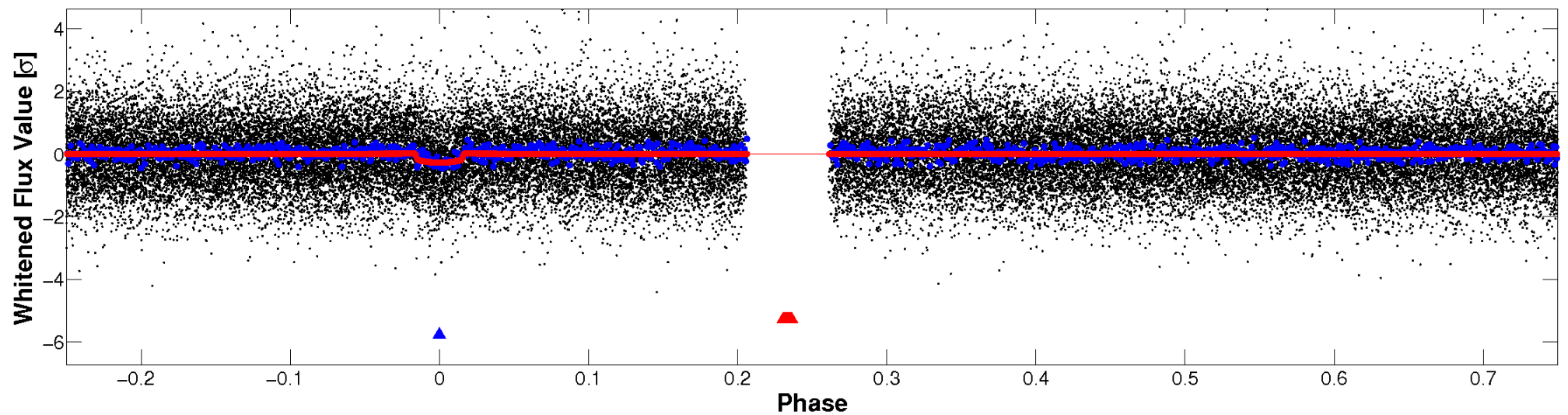


Non-Whitened Vs. Whitened Light Curve

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

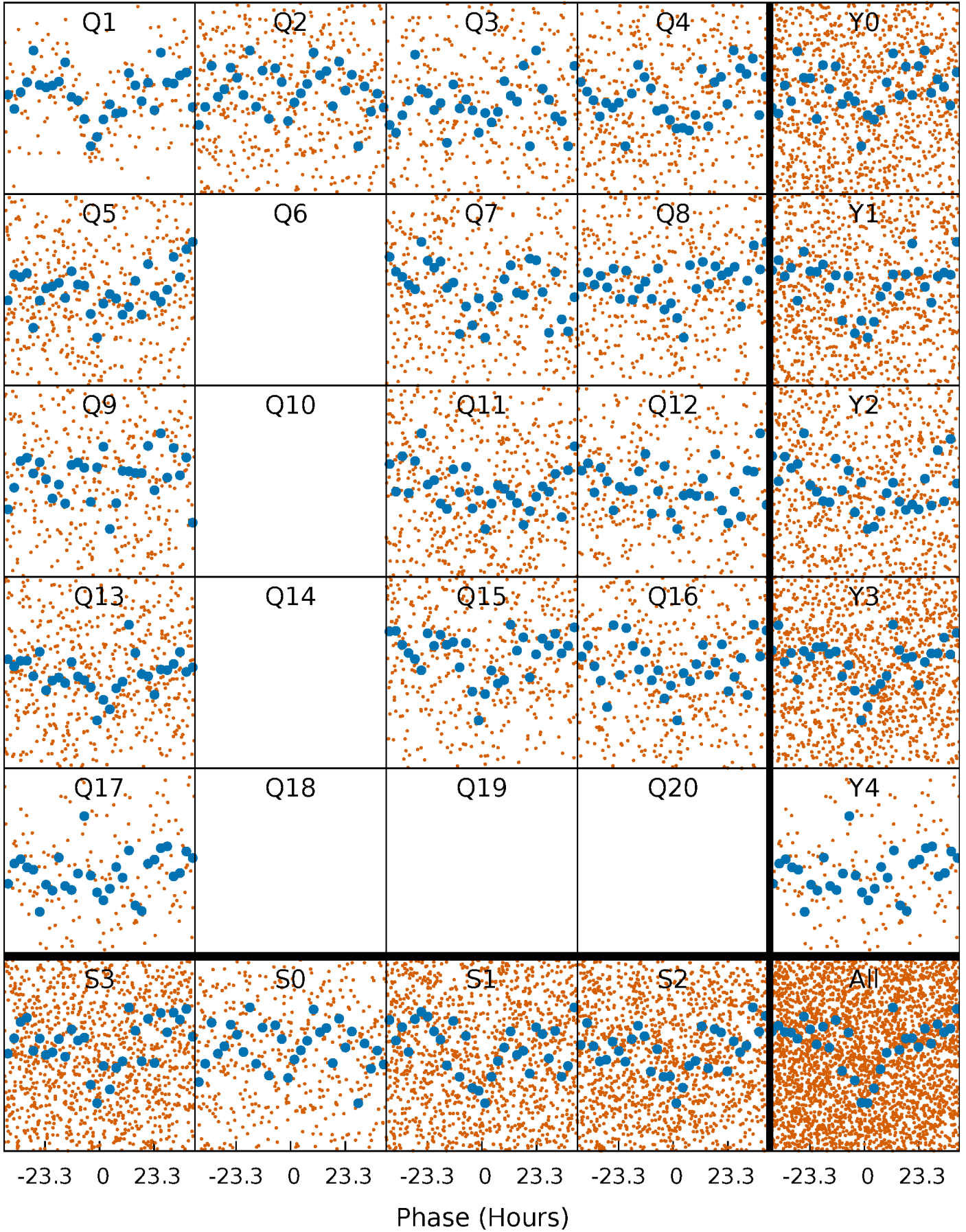


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



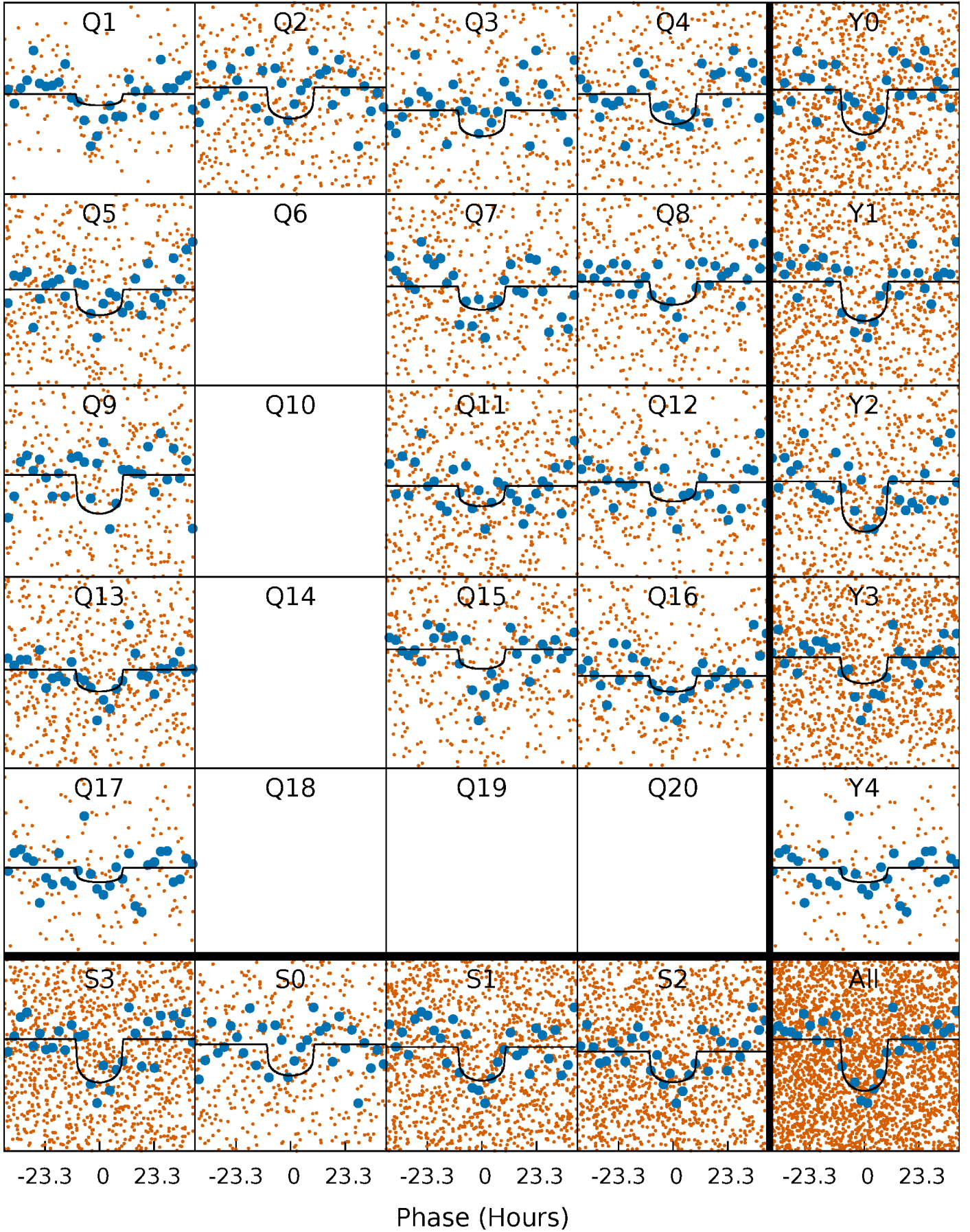
PDC Quarter-Phased Transit Curves

TCE 003962728-02 P= 25.952106 Days $T_0=148.891196$ (BKJD)



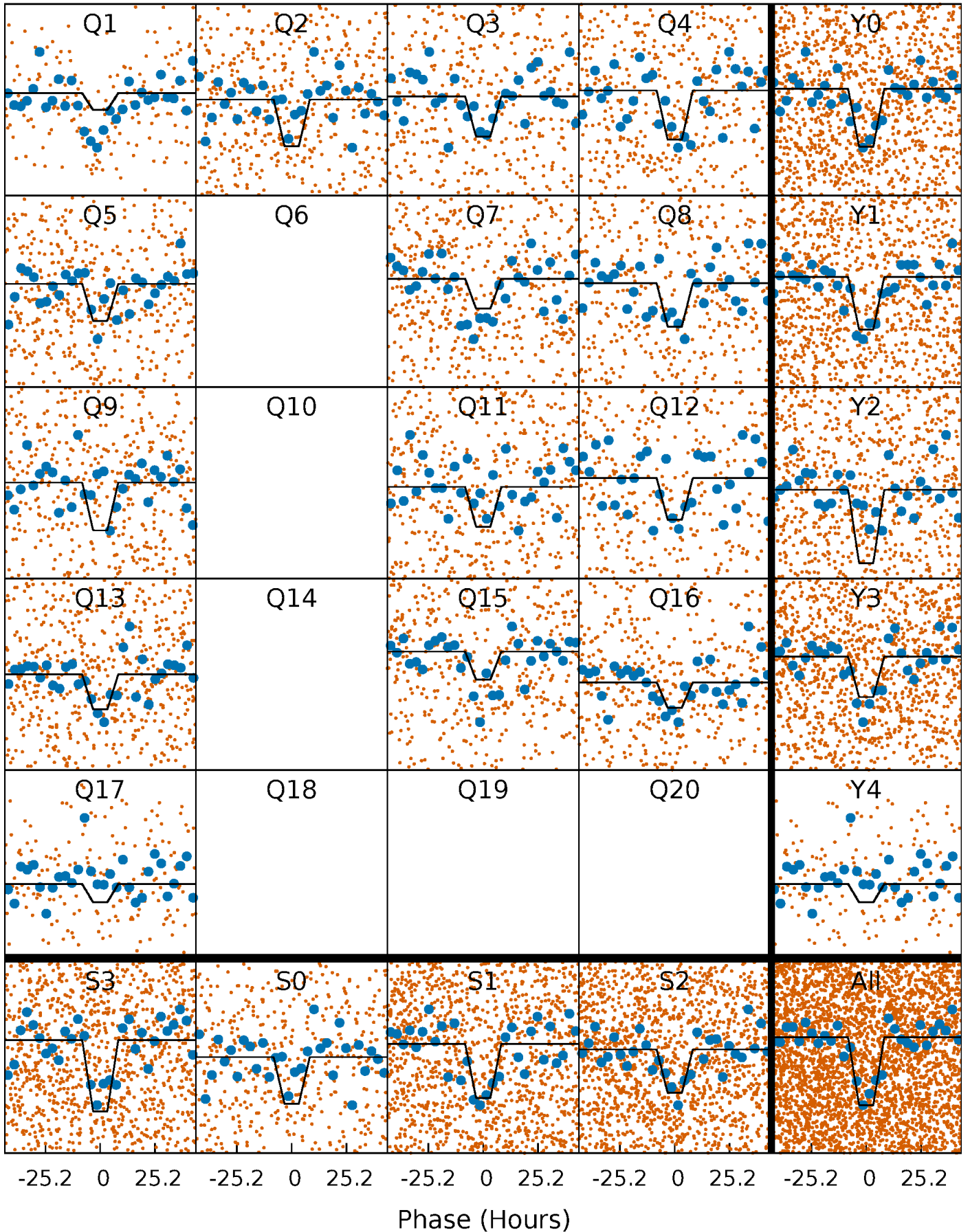
DV Quarter-Phased Transit Curves

TCE 003962728-02 P= 25.952106 Days $T_0=148.891196$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

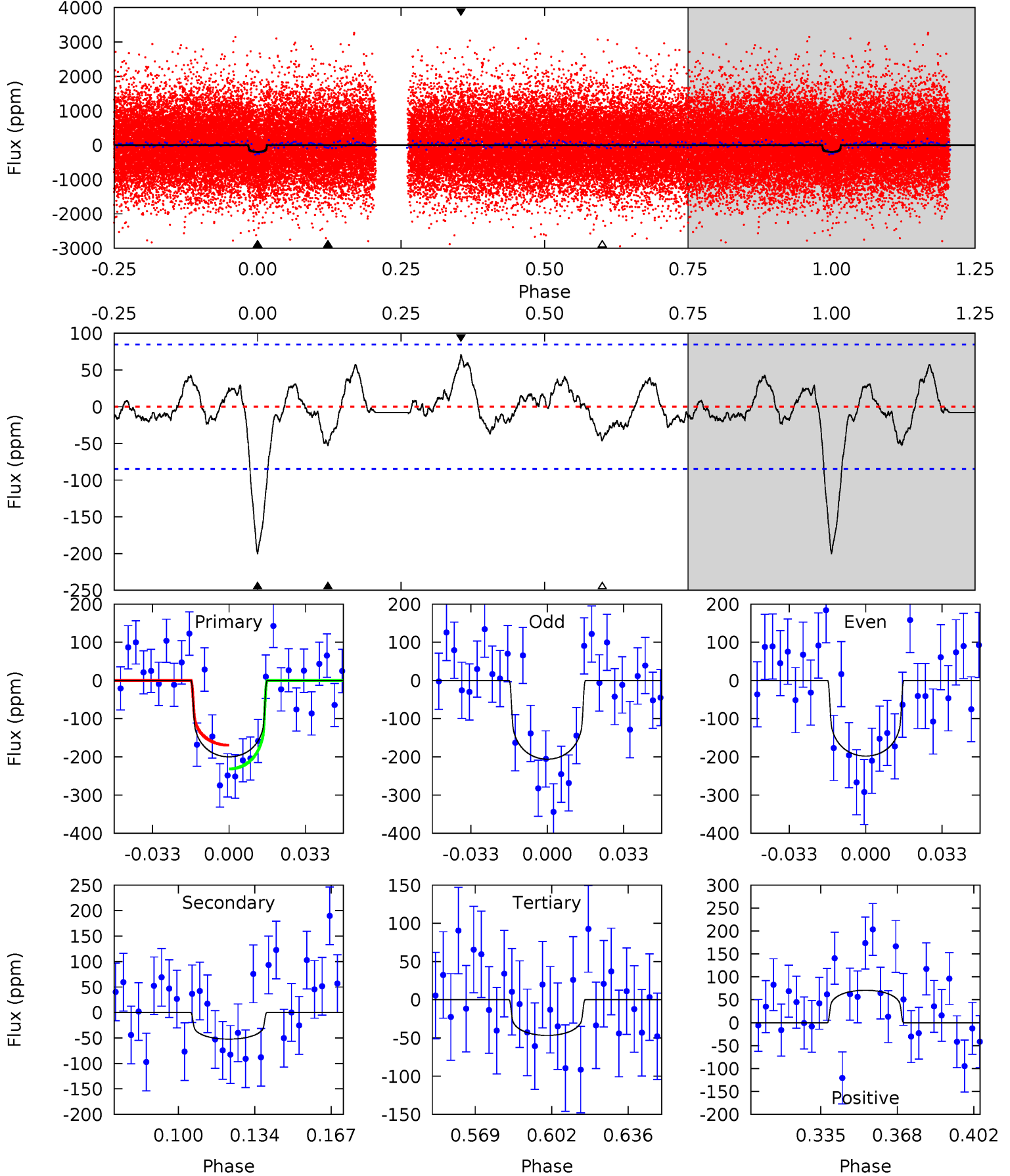
TCE 003962728-02 P= 25.952751 Days $T_0=148.896133$ (BKJD)



DV Model-Shift Uniqueness Test

003962728-02, $P = 25.952106$ Days, $E = 122.939090$ Days

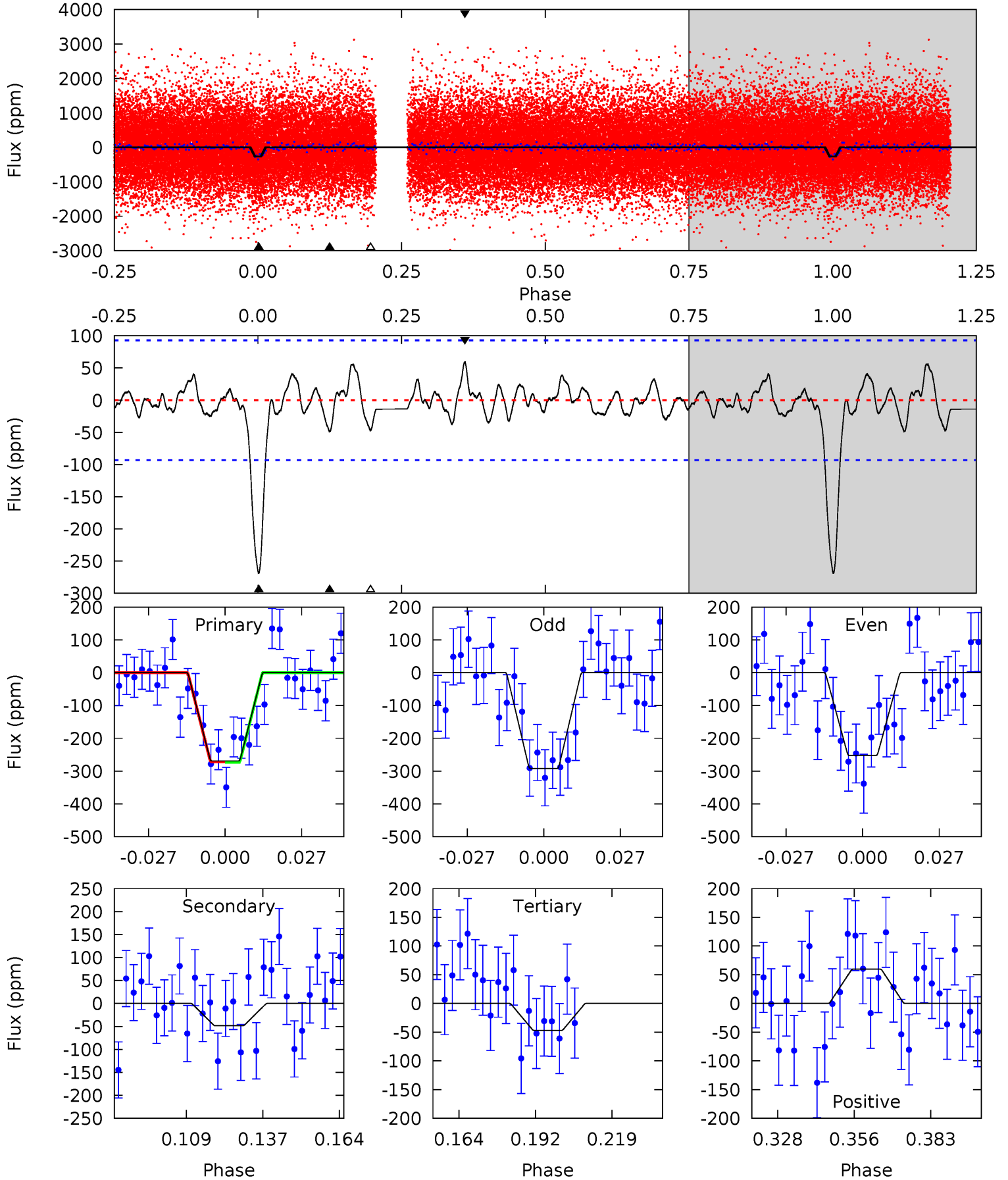
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.3	2.96	2.64	4.00	4.79	2.13	1.27	8.67	7.31	0.32	-1.04	0.23	0.96	0.26	1.76



Alt Model-Shift Uniqueness Test

003962728-02, P = 25.952751 Days, E = 122.943382 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.0	2.52	2.44	3.10	4.83	2.21	0.98	11.5	10.9	0.08	-0.58	1.03	0.92	0.18	0.05



Stellar Parameters For KIC 003962728

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4835^{+145}_{-145}	$4.758^{+0.021}_{-0.049}$	$-1.320^{+0.300}_{-0.300}$	$0.526^{+0.035}_{-0.025}$	$0.578^{+0.027}_{-0.034}$	$5.600^{+0.567}_{-0.918}$
	+3%/-3%	+0%/-1%	+23%/-23%	+7%/-5%	+5%/-6%	+10%/-16%
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 003962728-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-52 ± 18	$0.87^{+0.24}_{-0.24}$	574^{+20}_{-18}	3685^{+504}_{-355}	776^{+799}_{-366}
Alt.	-49 ± 19	$0.99^{+0.24}_{-0.22}$	576^{+20}_{-19}	3485^{+382}_{-318}	535^{+457}_{-242}

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

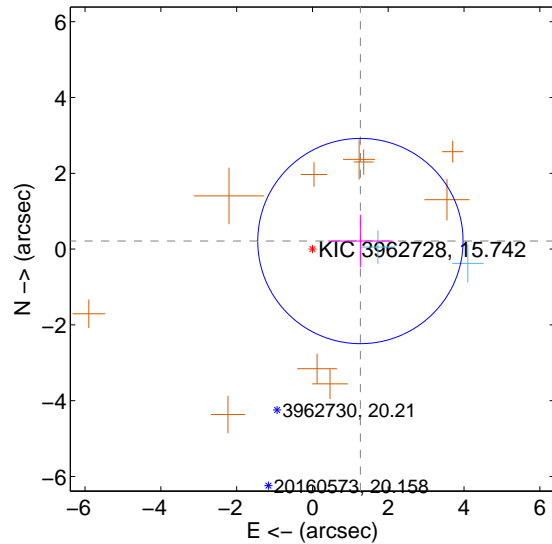
Supplemental centroid analysis for 003962728-02. Kepler magnitude: 15.74. Transit SNR 9.51

There are 2 quarters with good PRF difference image offsets

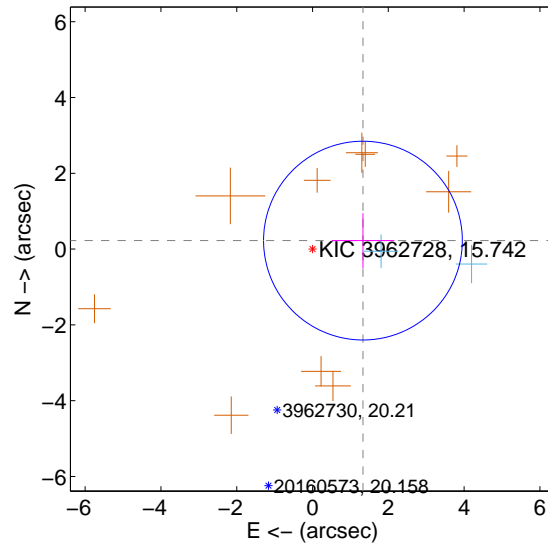
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.284 ± 0.903	1.42	-1.266 ± 0.850	0.213 ± 0.692
PRF-fit source offset from KIC position	1.349 ± 0.874	1.54	-1.331 ± 0.828	0.224 ± 0.723
photometric centroid source offset	1.12 ± 1.40	0.80	0.87 ± 1.43	0.71 ± 1.34

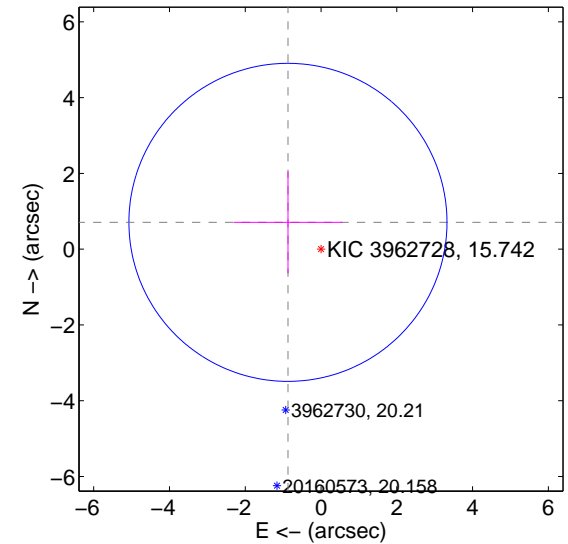
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

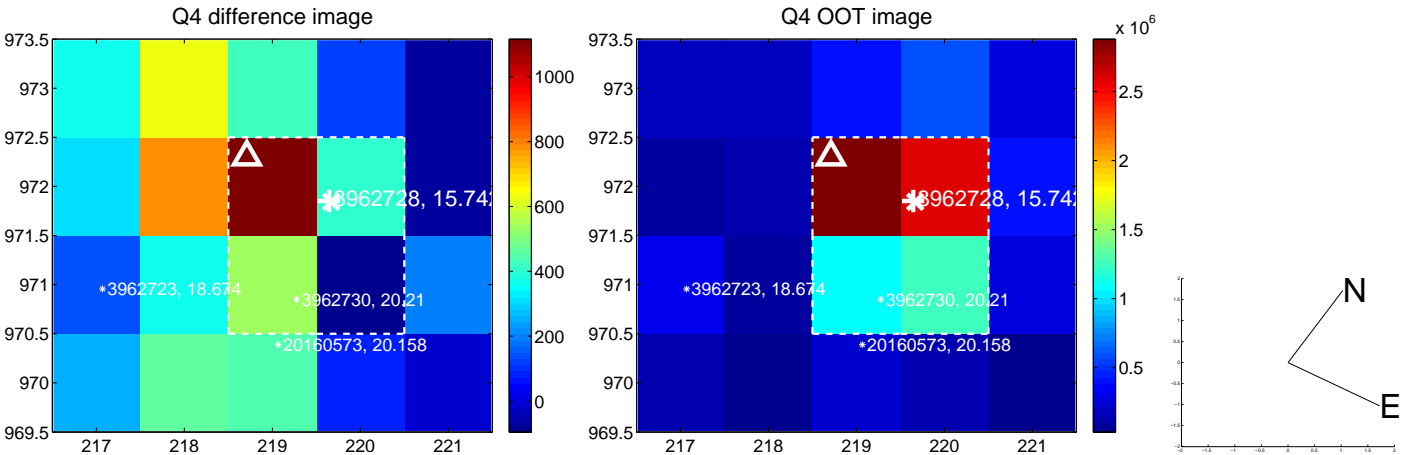
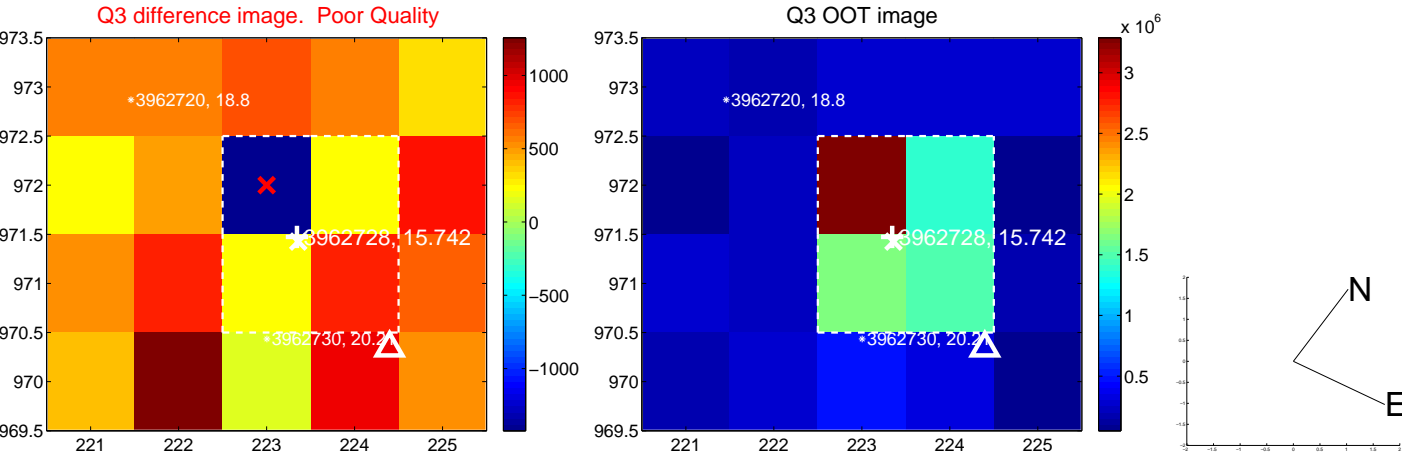
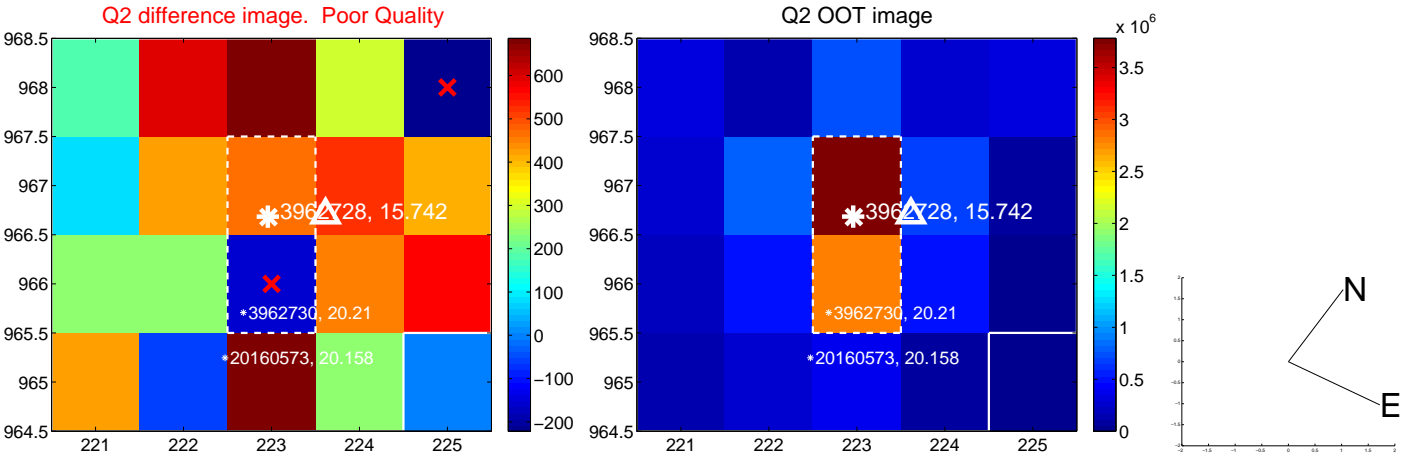
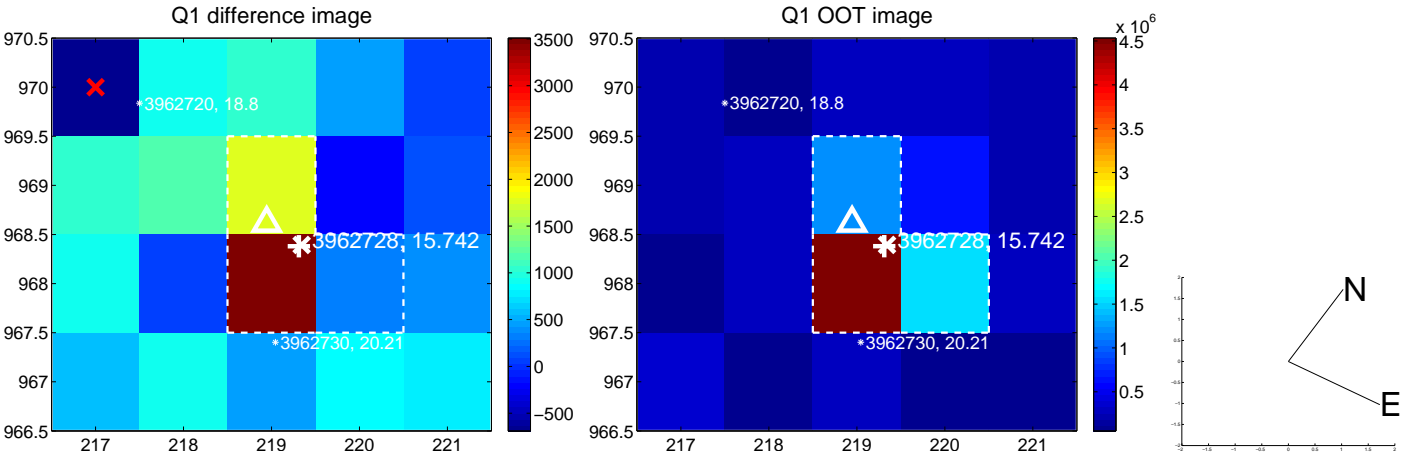


offset from photometric centroids

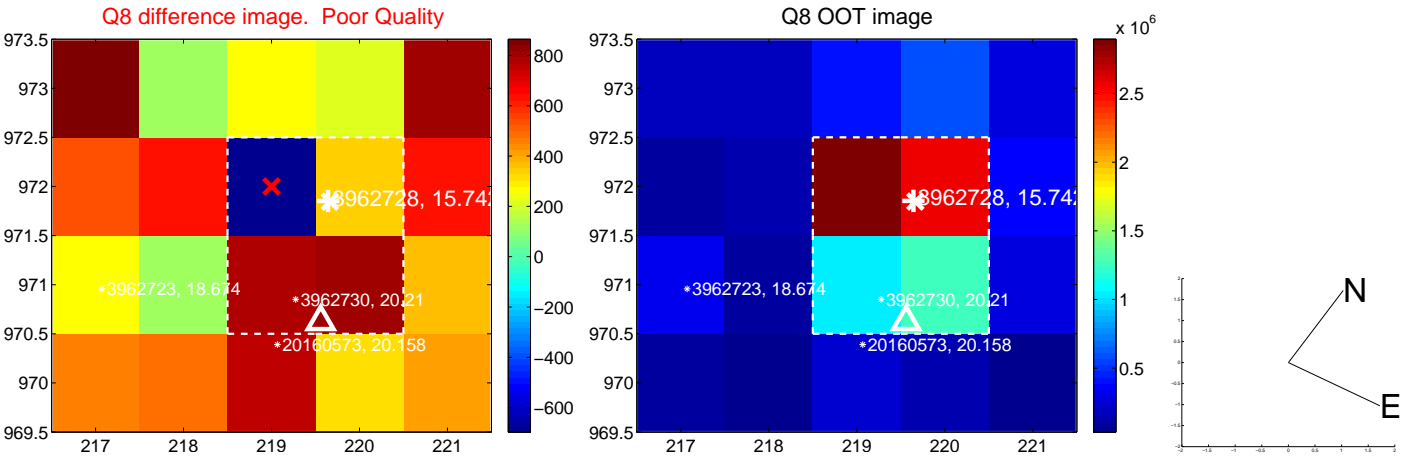
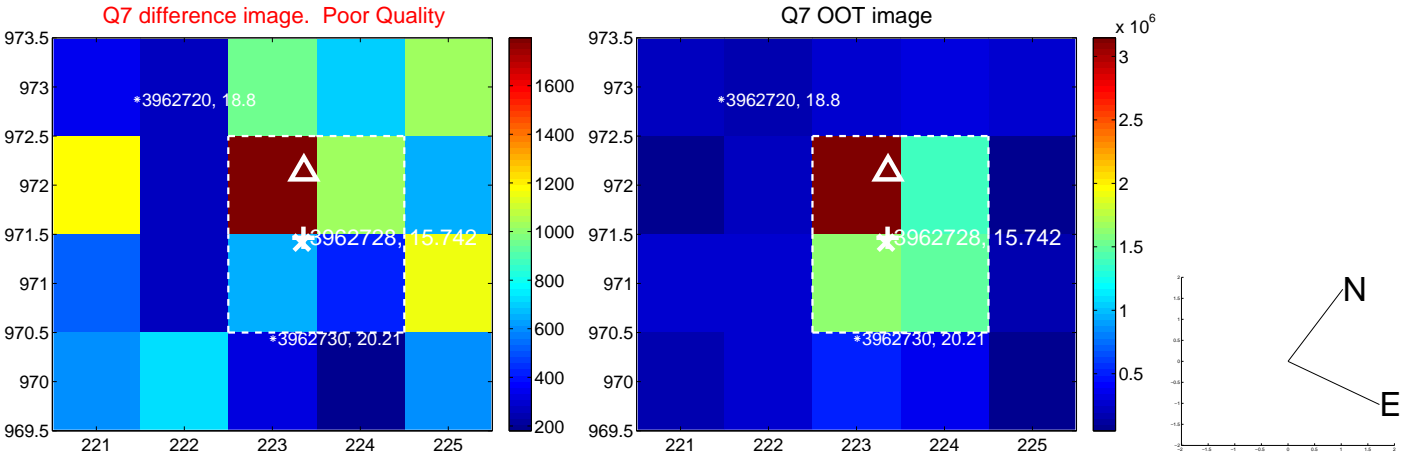
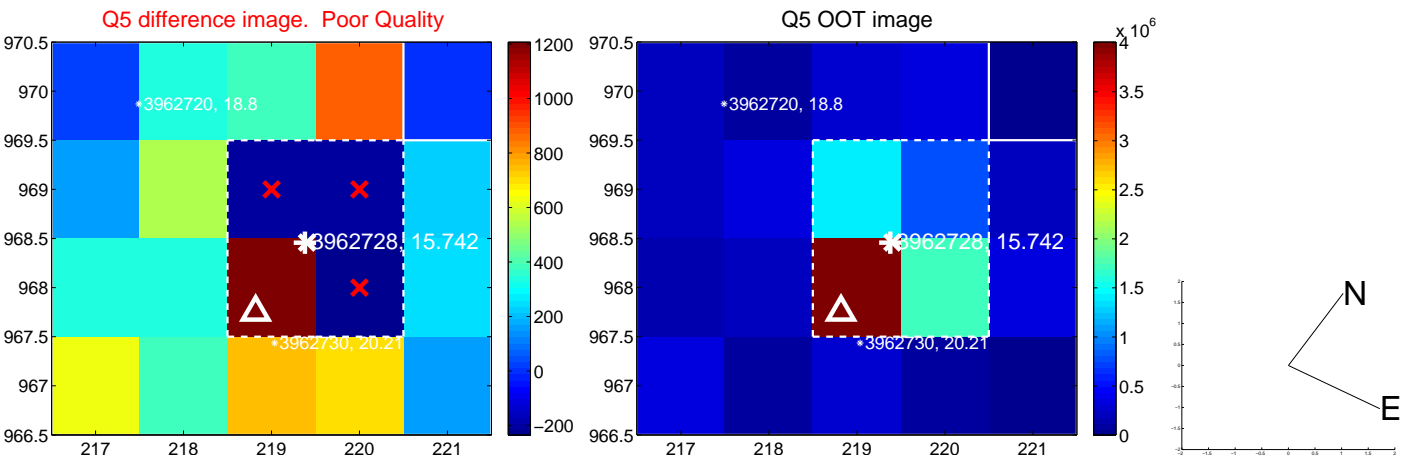


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

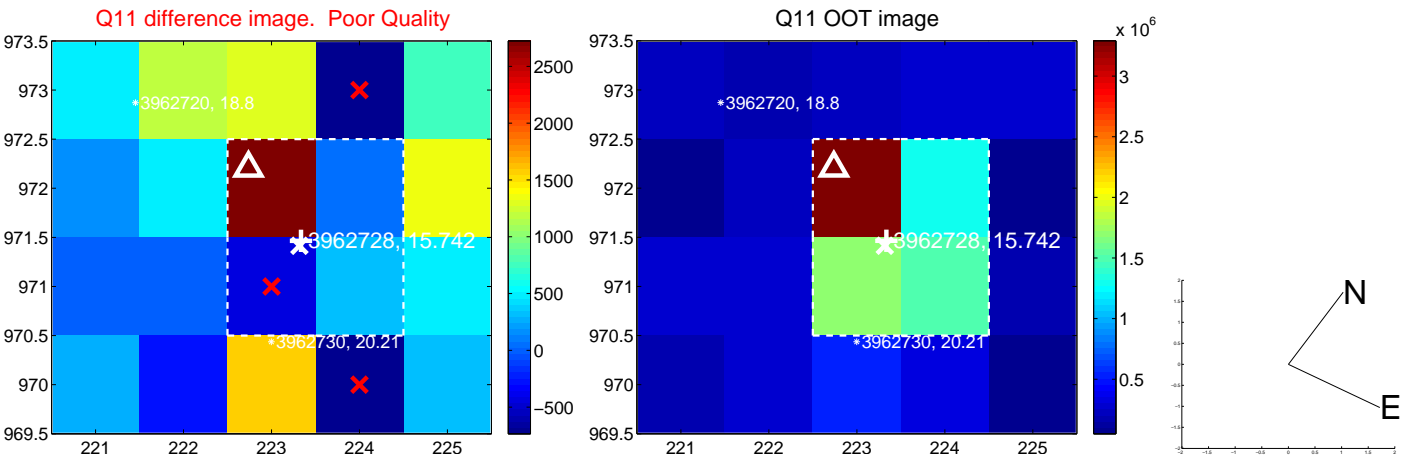
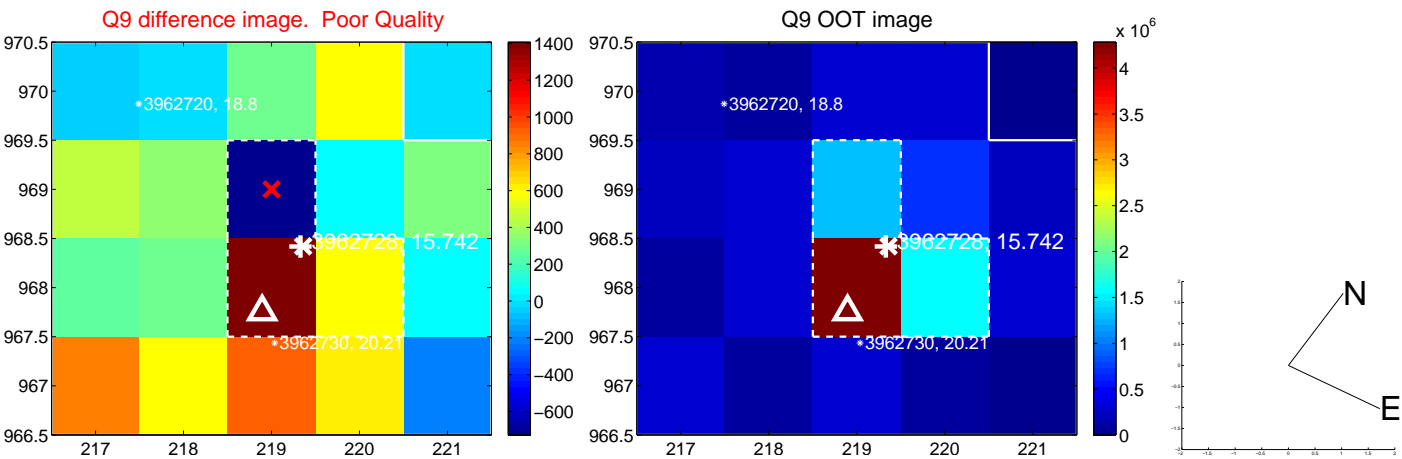
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



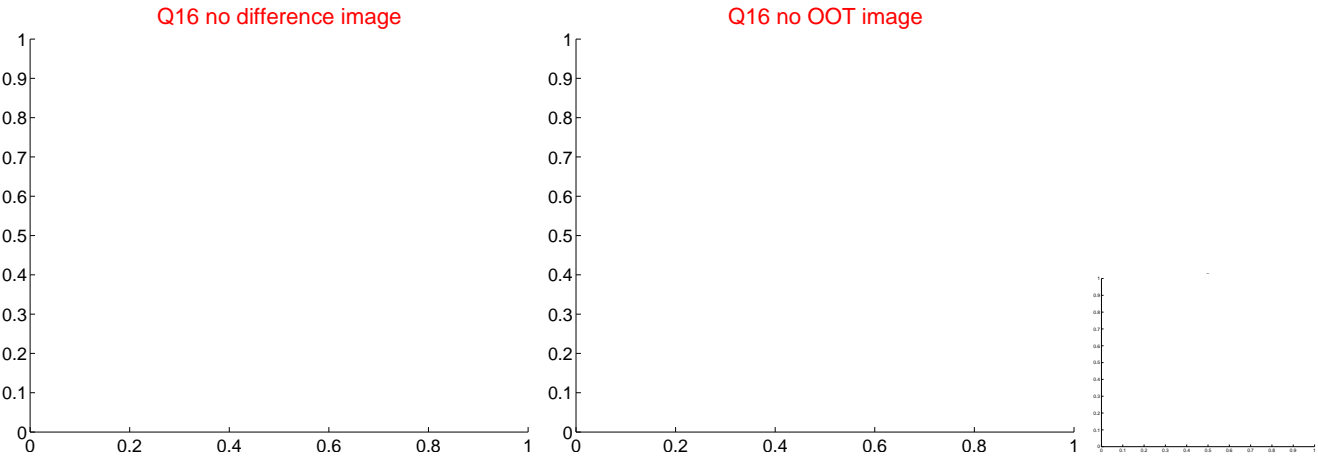
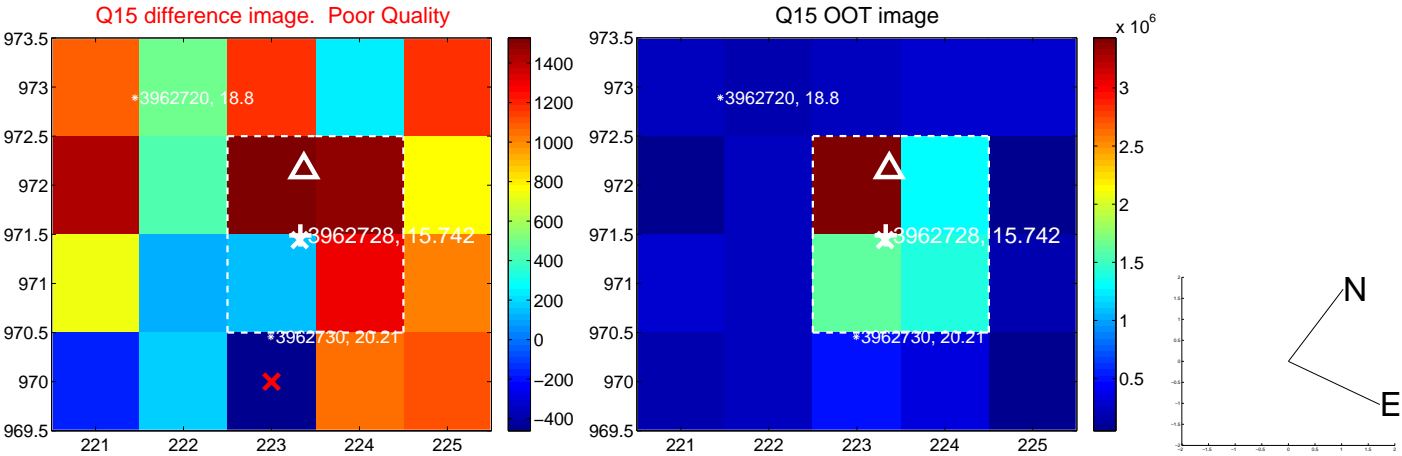
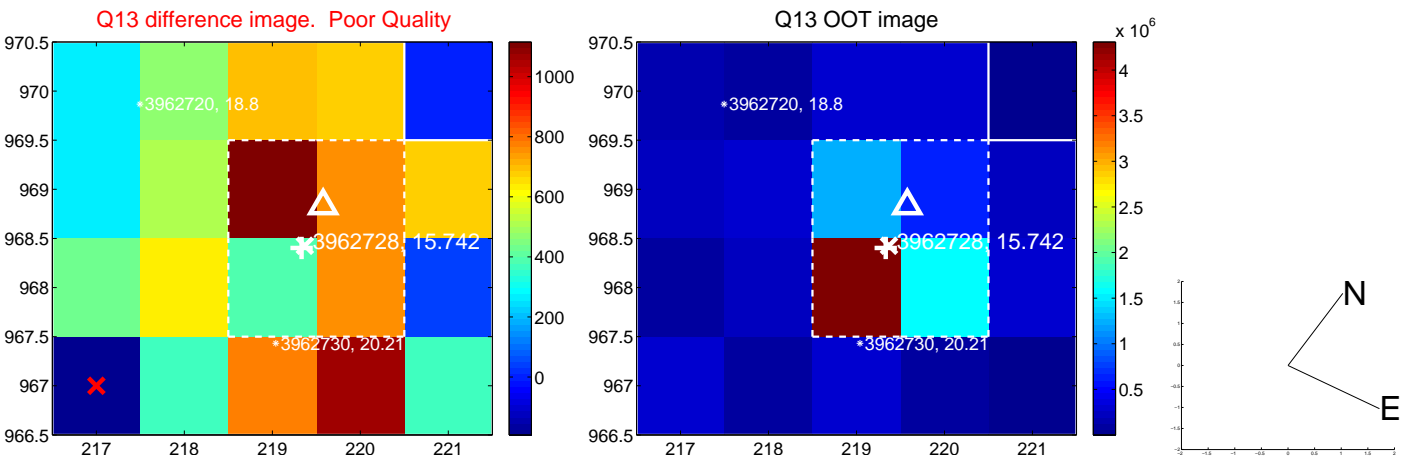
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



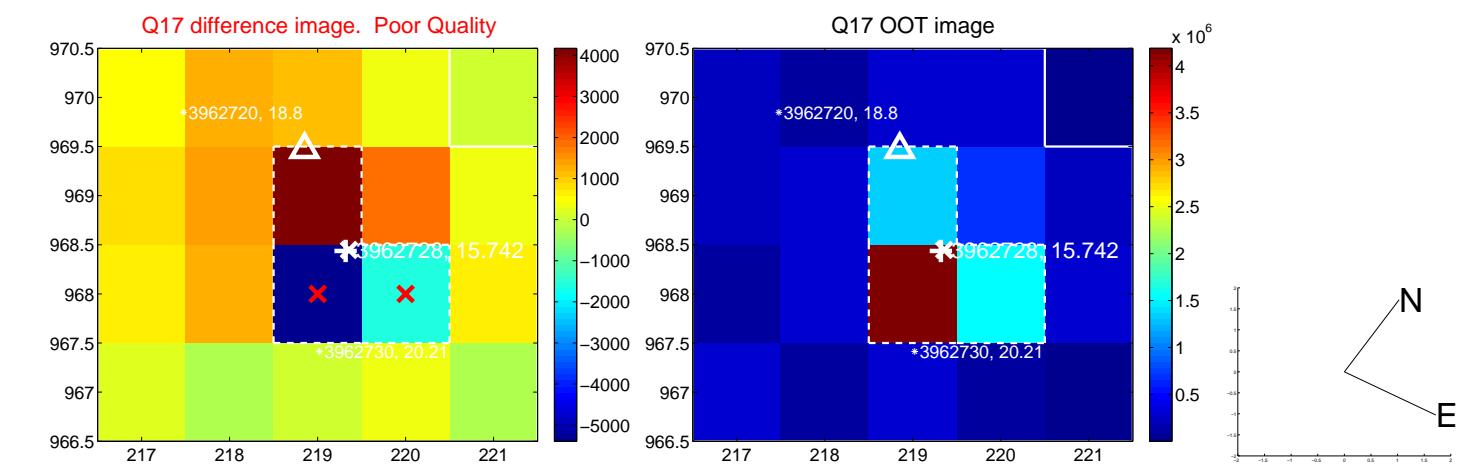
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



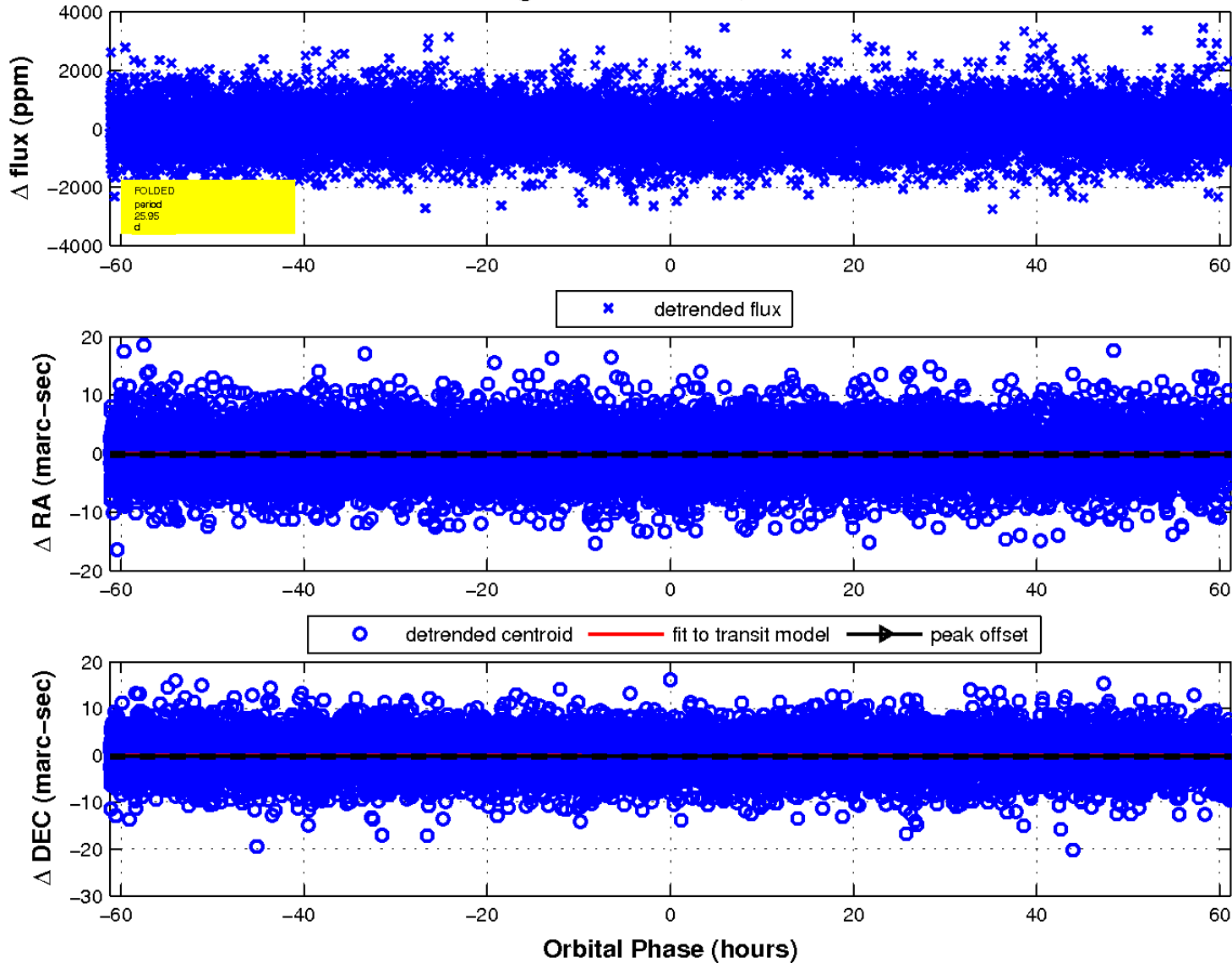
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

