

KIC 008700537

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})
008700537-01	OBS	4170.01	43.796618	158.910390	218.6	19.317	15.3	17.4	0.94	6109	2.76	20.45
008700537-02	OBS	No	43.797945	172.600131	195.4	7.326	11.0	10.9	0.94	6109	2.60	20.44

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008700537-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
008700537-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—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 008700537-01

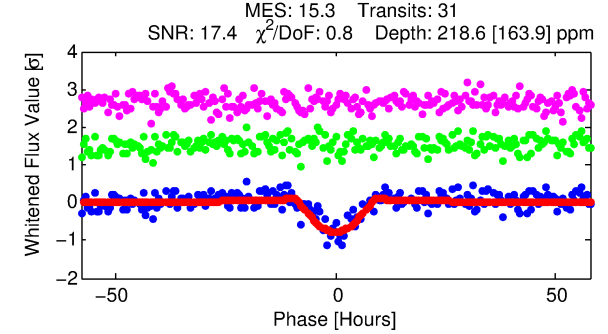
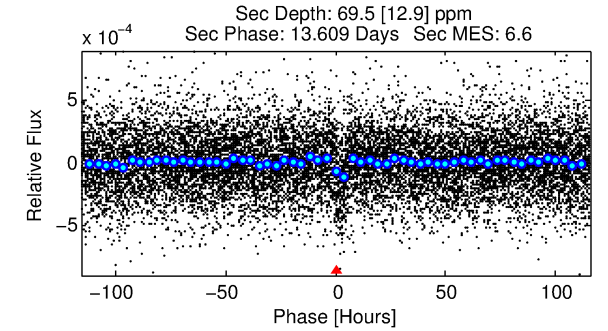
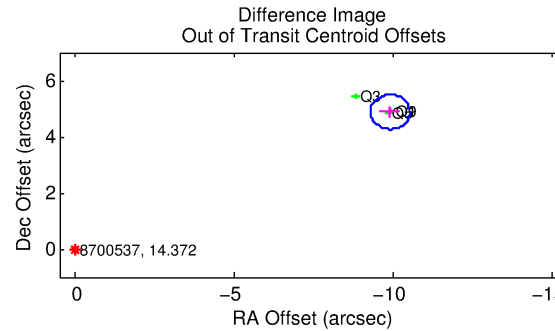
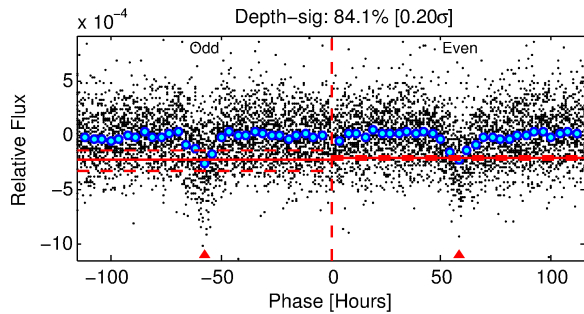
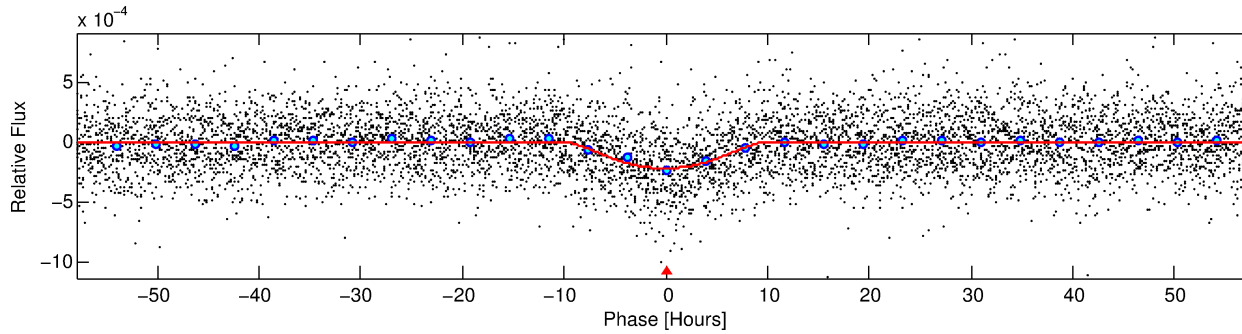
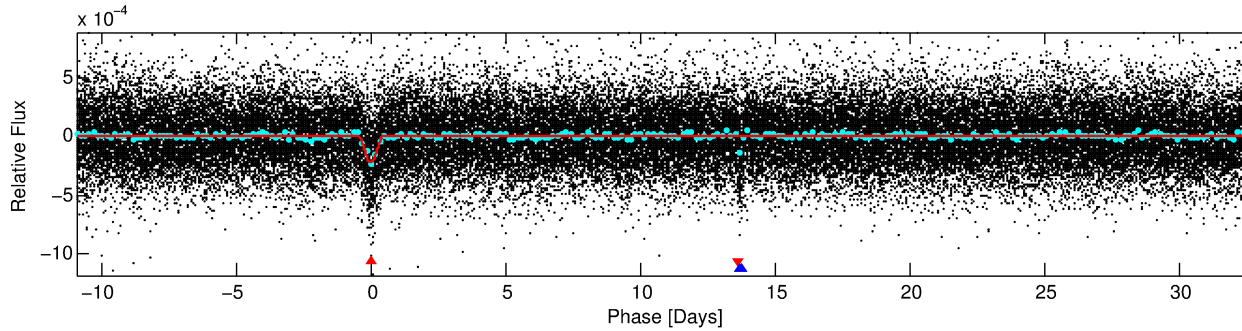
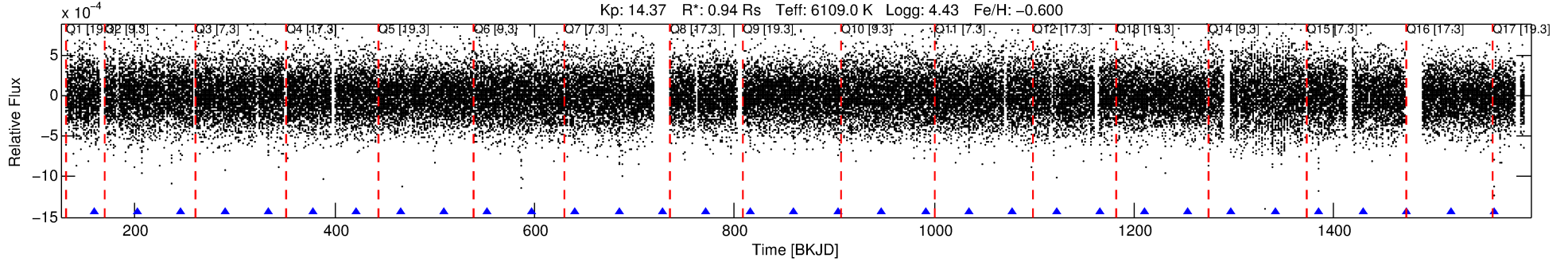
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
008700537-01	8700537	008700506-02	8700506	1:1	21.8	-5	4	13.48	14.37	1873.10	Direct-PRF	0	0.08	0.04

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: 8700537 Candidate: 1 of 2 Period: 43.797 d
KOI: K04170 Corr: No Ephemeris Match

Kp: 14.37 R*: 0.94 Rs Teff: 6109.0 K Logg: 4.43 Fe/H: -0.600



DV Fit Results:

Period = 43.79662 [0.00133] d
Epoch = 158.9104 [0.0242] BKJD
Rp/R* = 0.0269 [0.0488]
a/R* = 4.17 [1.90]
b = 1.00 [0.09]
Seff = 20.44 [6.98]
Teq = 542 [46] K
Rp = 2.76 [5.07] Re
a = 0.2325 [0.0513] AU
Ag = 271.74 [993.18] [0.27σ]
Teff = 3404 [3100] K [0.92σ]

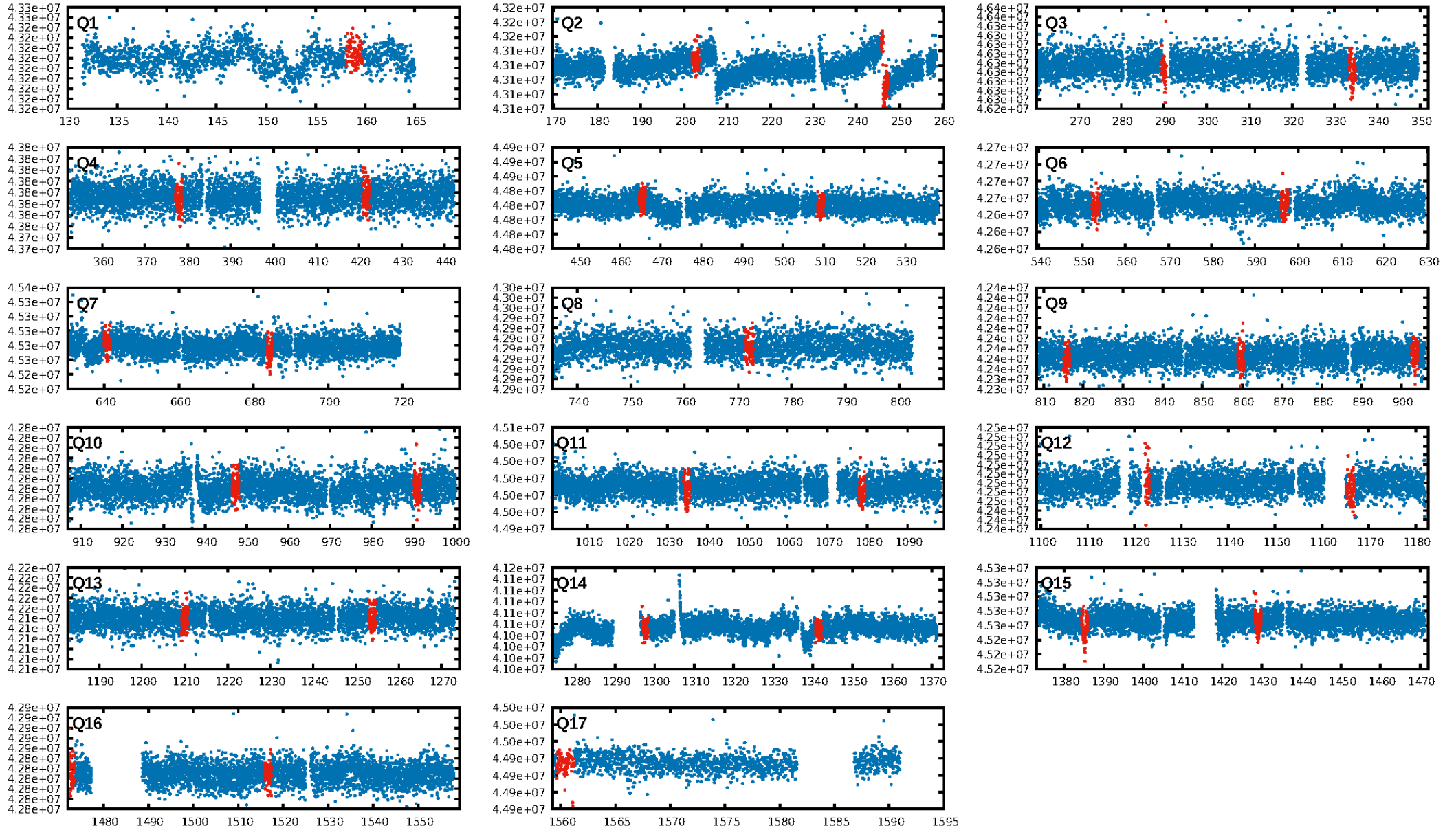
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.1% [0.00σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 8.92e-51
RollingBand-fgt: 1.00 [29/29]
GhostDiagnostic-chr: -0.2827
Centroid-sig: 0.0%
Centroid-so: 9.219 arcsec [17.11σ]
OotOffset-rm: 11.031 arcsec [53.87σ]
KicOffset-rm: 11.088 arcsec [56.24σ]
OotOffset-st: 0/1/0/3 [4]
KicOffset-st: 0/1/0/3 [4]
DiffImageQuality-fgm: 1.00 [4/4]
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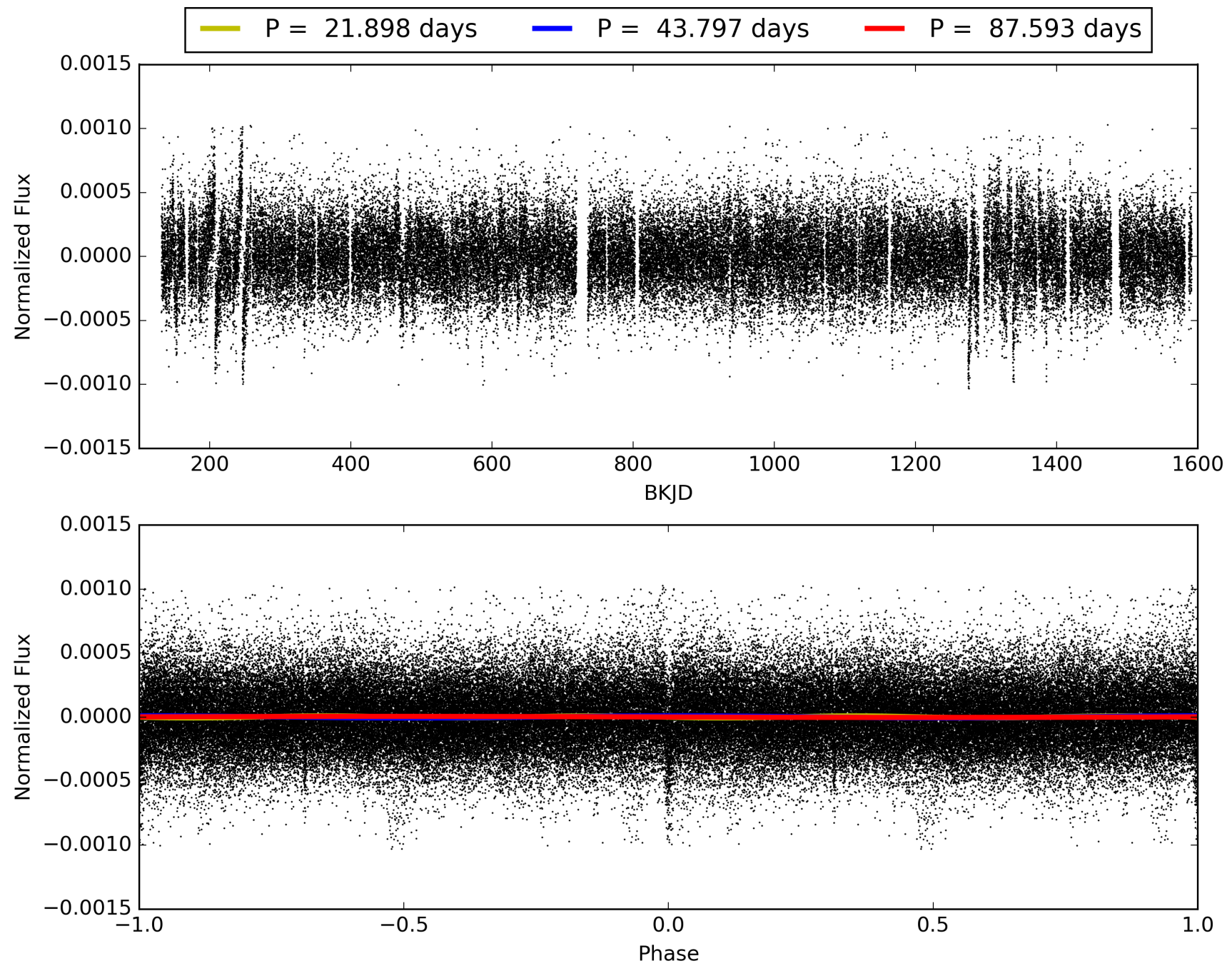
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 18:36:02 Z

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

TCE 008700537-01, PDC Light Curves

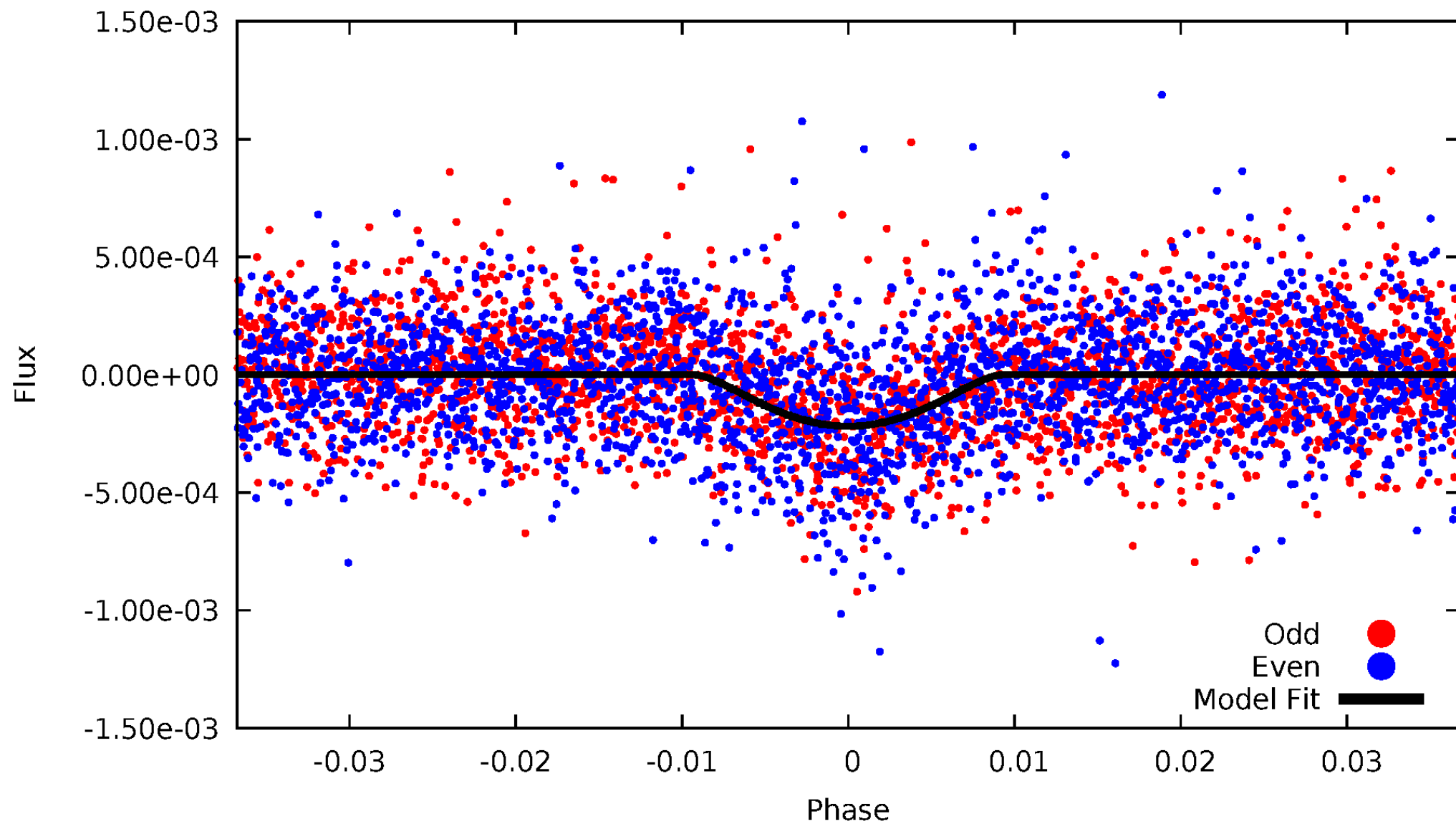


TCE 008700537-01



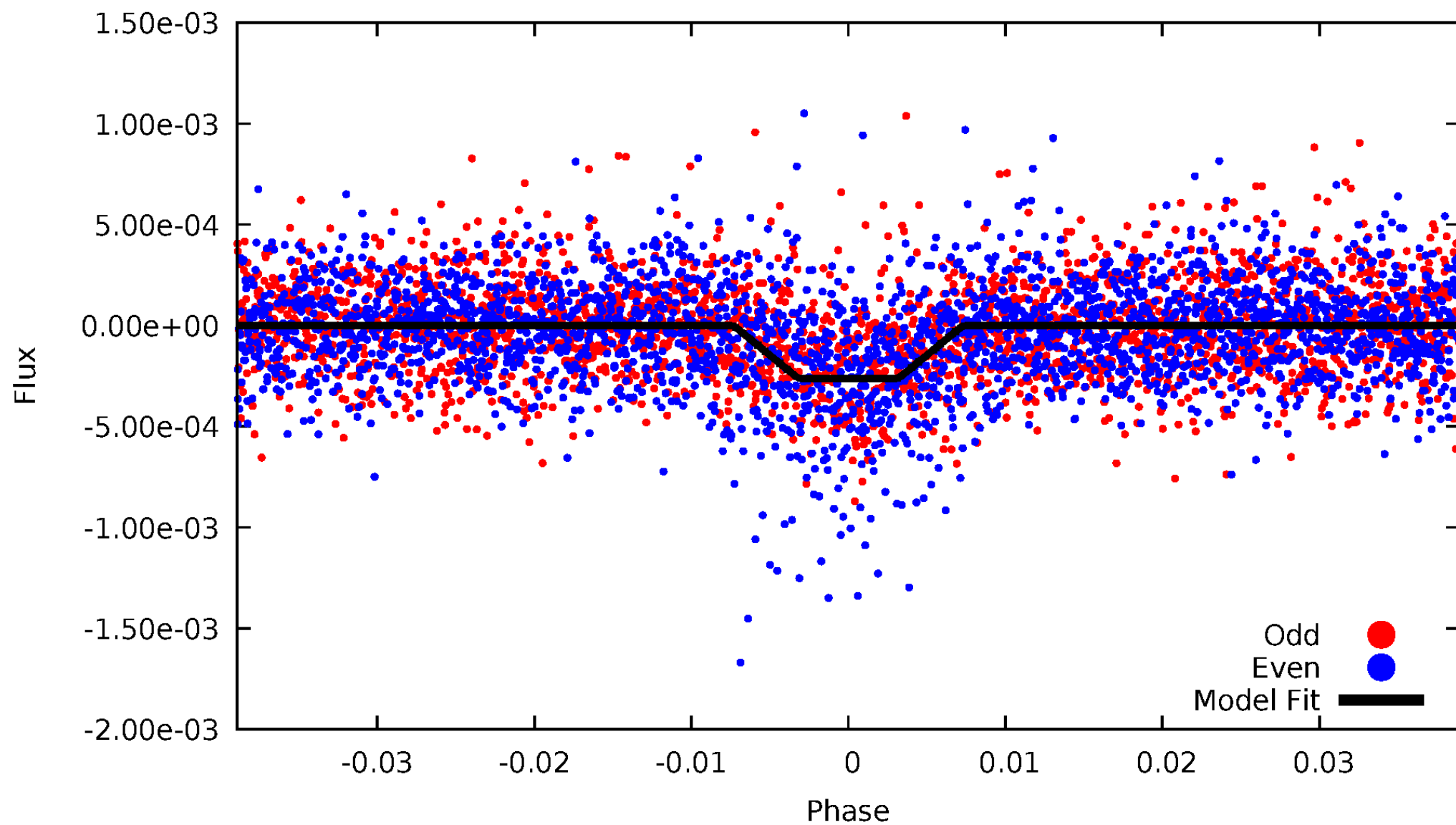
DV Odd/Even

TCE 008700537-01

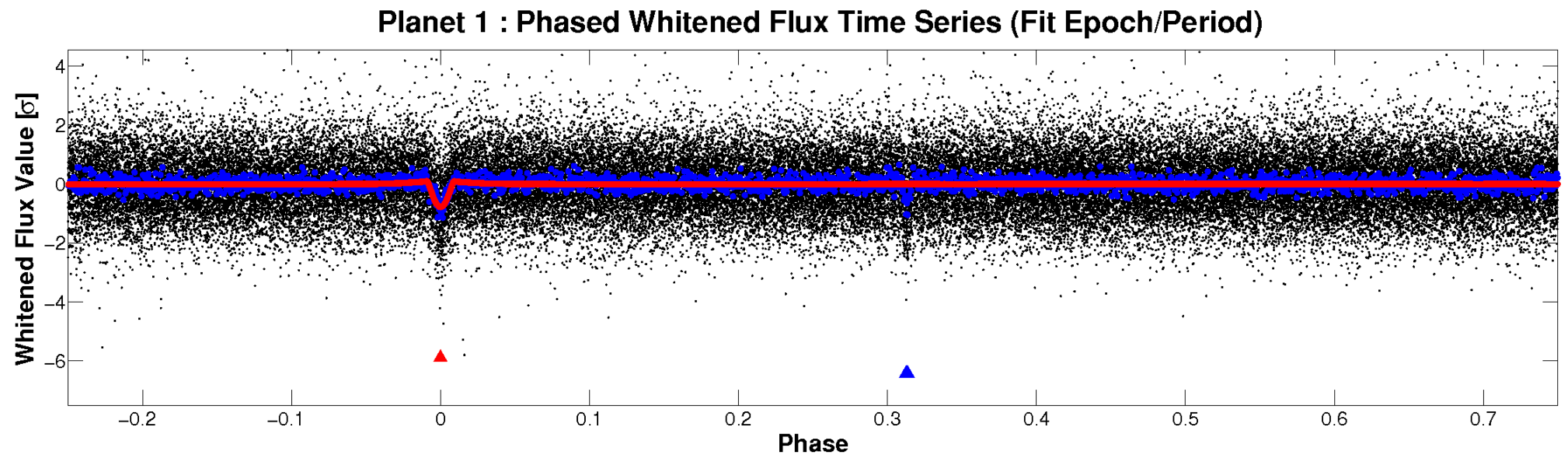
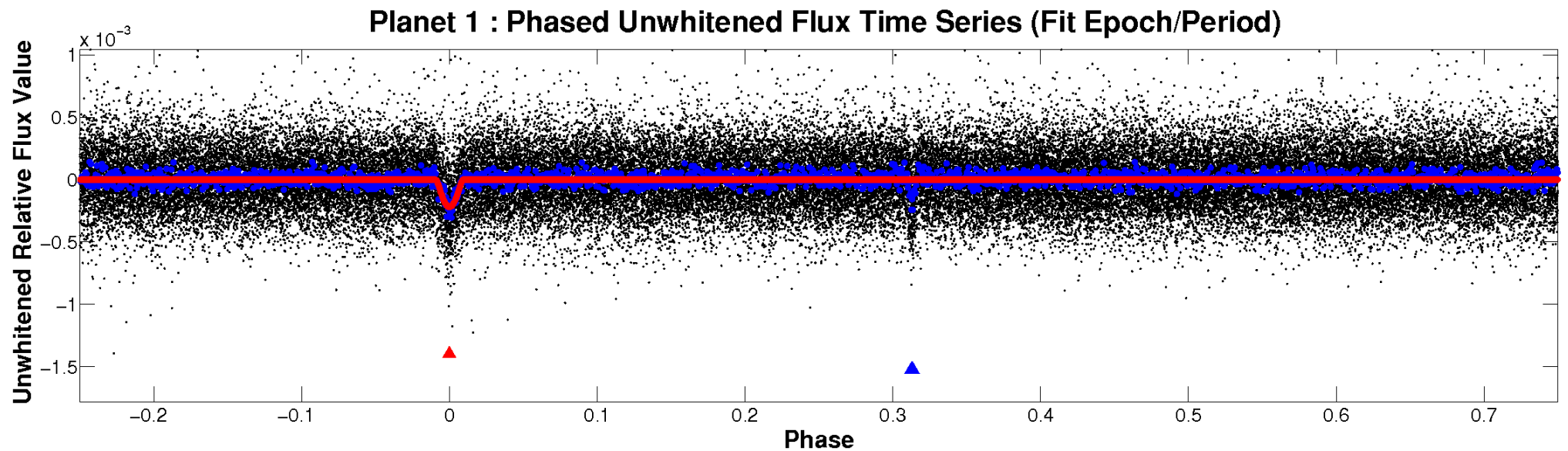


ALT Odd/Even

TCE 008700537-01

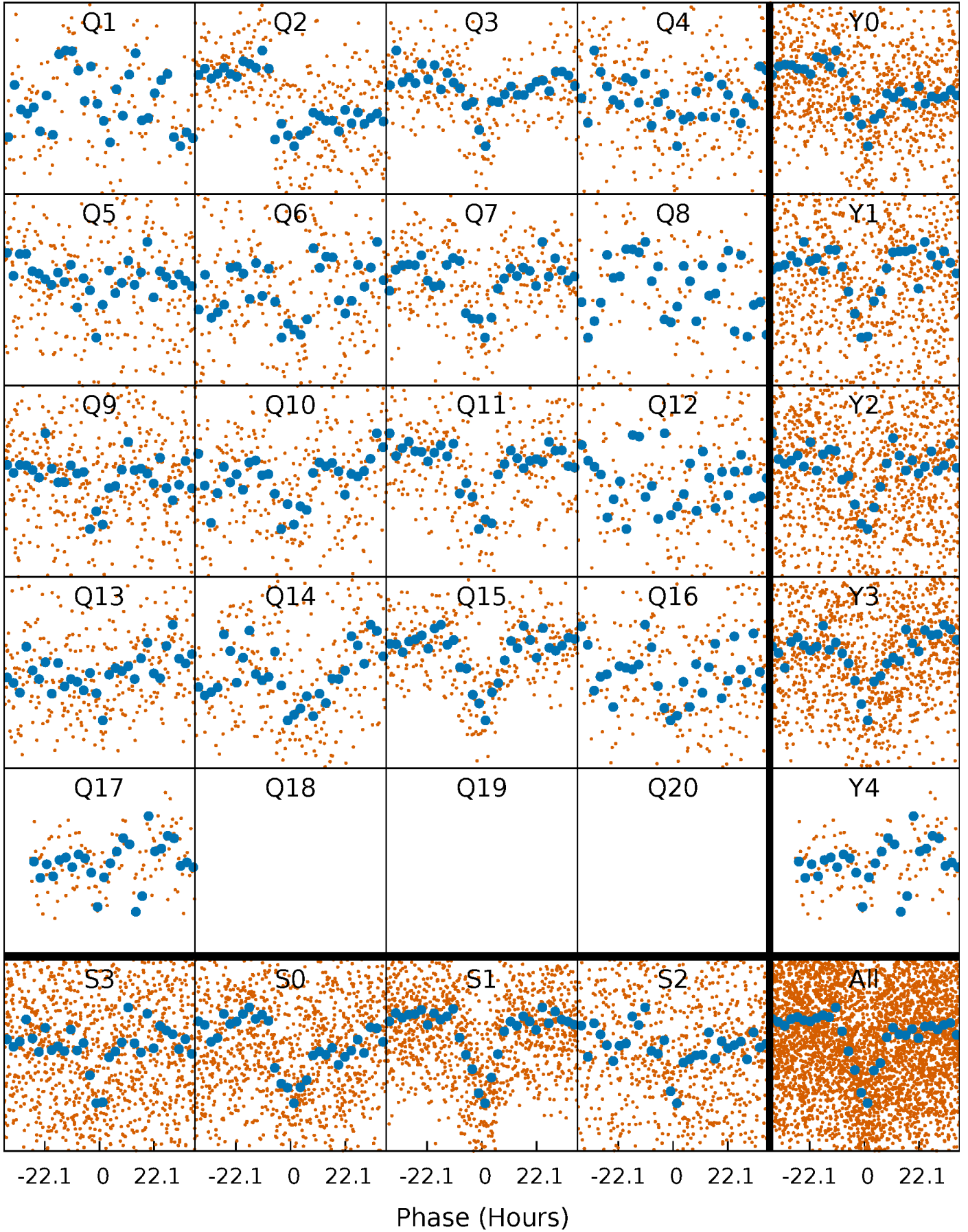


Non-Whitened Vs. Whitened Light Curve



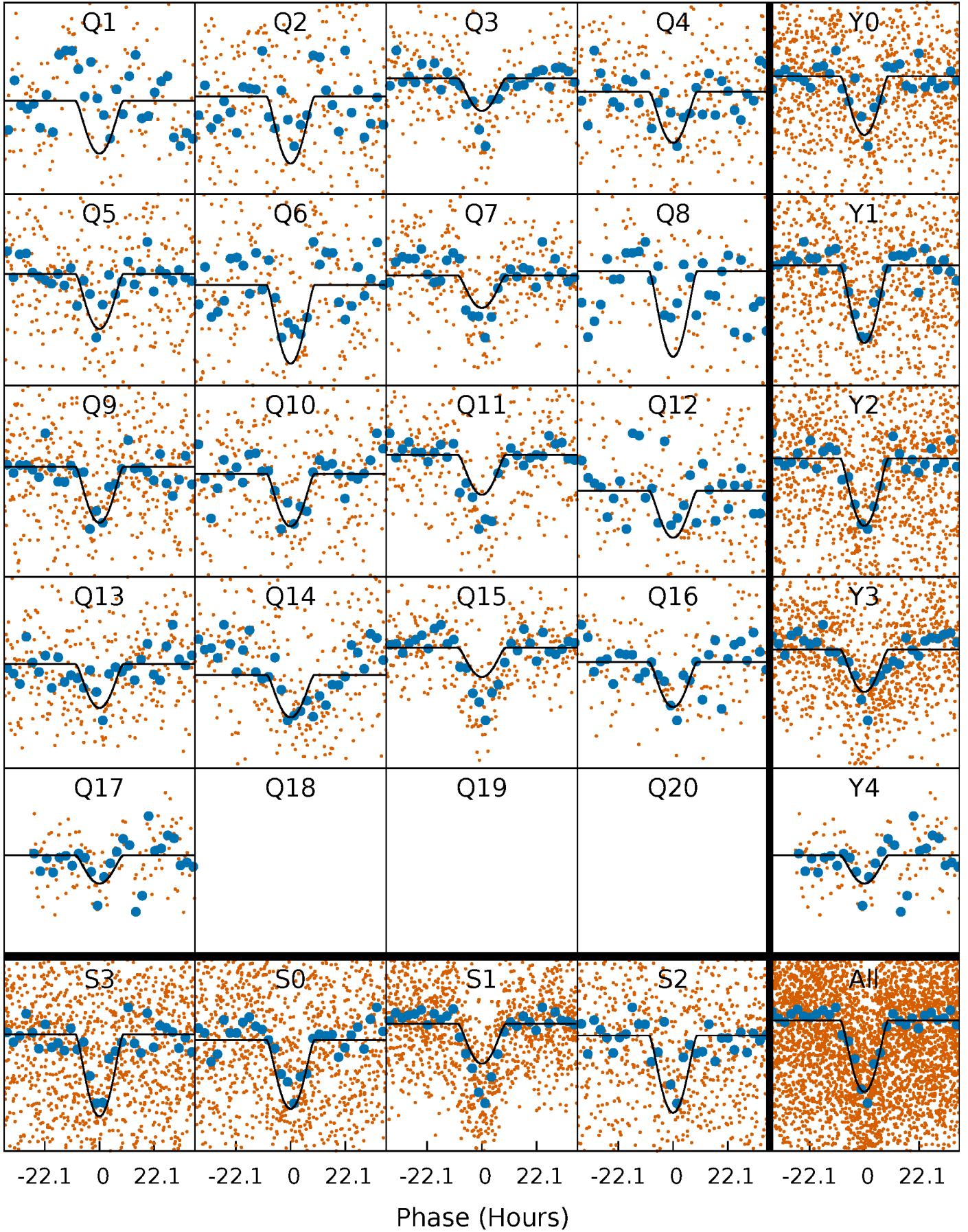
PDC Quarter-Phased Transit Curves

TCE 008700537-01 $P = 43.796618$ Days $T_0 = 158.910390$ (BKJD)



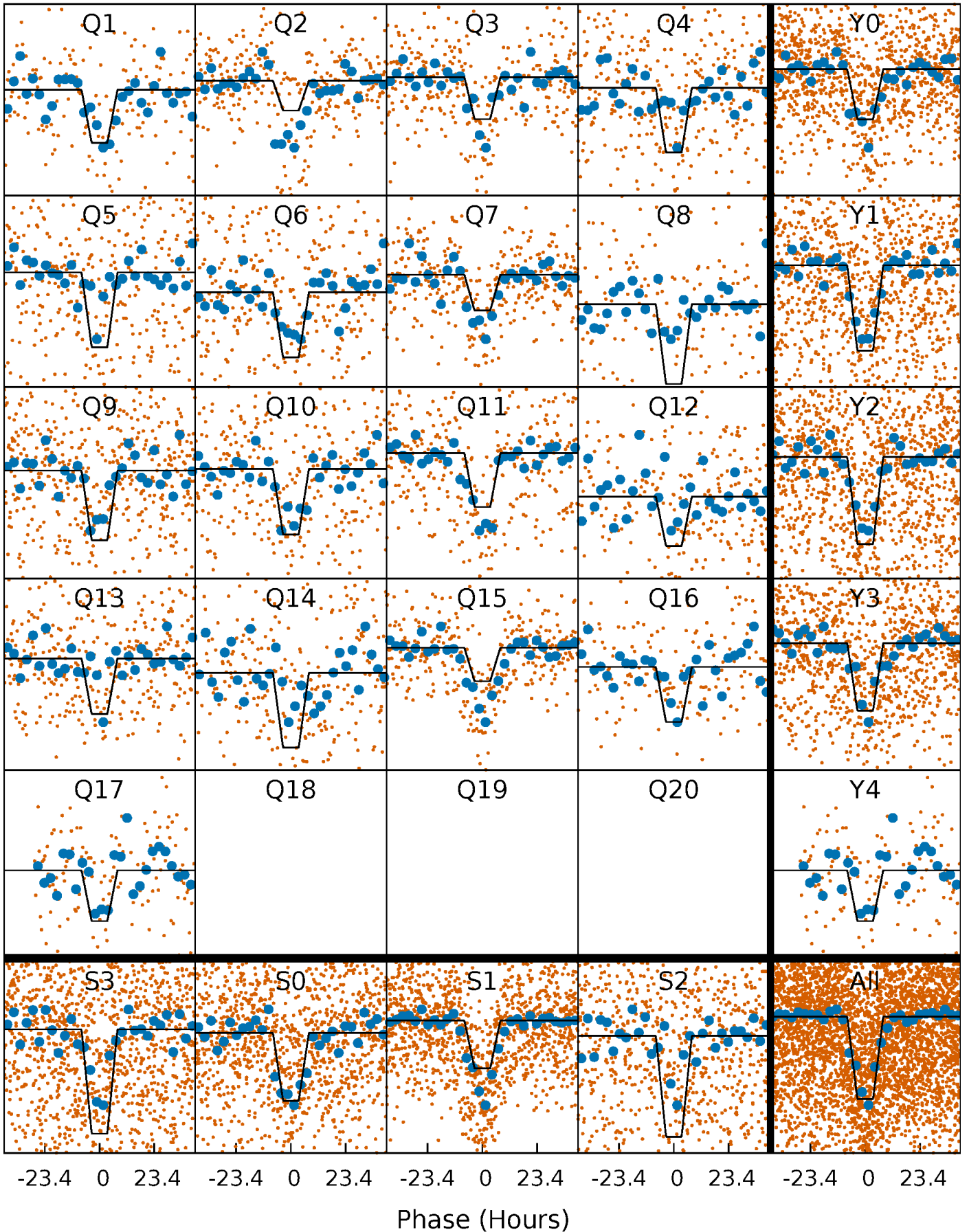
DV Quarter-Phased Transit Curves

TCE 008700537-01 P= 43.796618 Days $T_0=158.910390$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

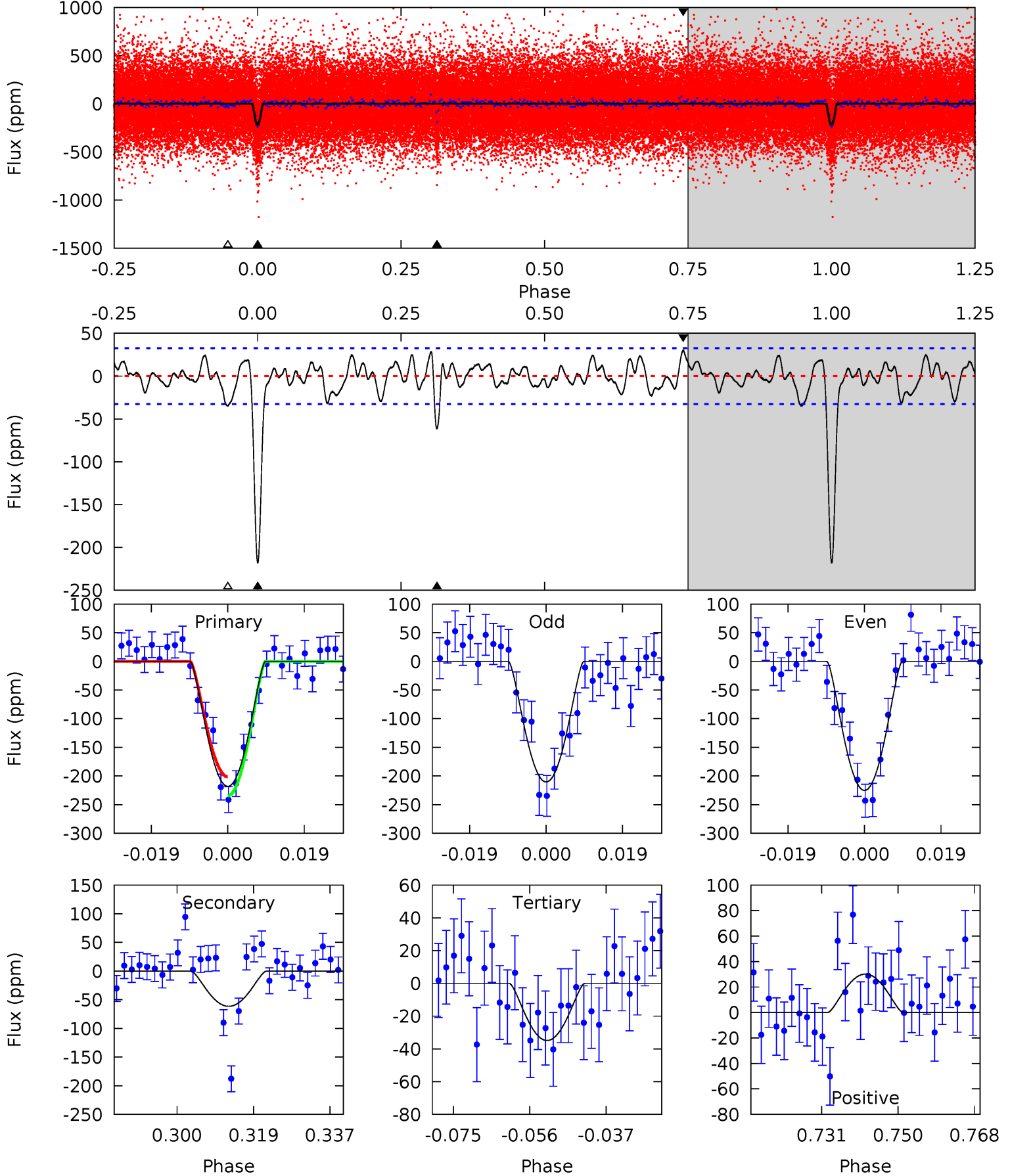
TCE 008700537-01 P= 43.796461 Days $T_0=158.915239$ (BKJD)



DV Model-Shift Uniqueness Test

008700537-01, P = 43.796618 Days, E = 115.113772 Days

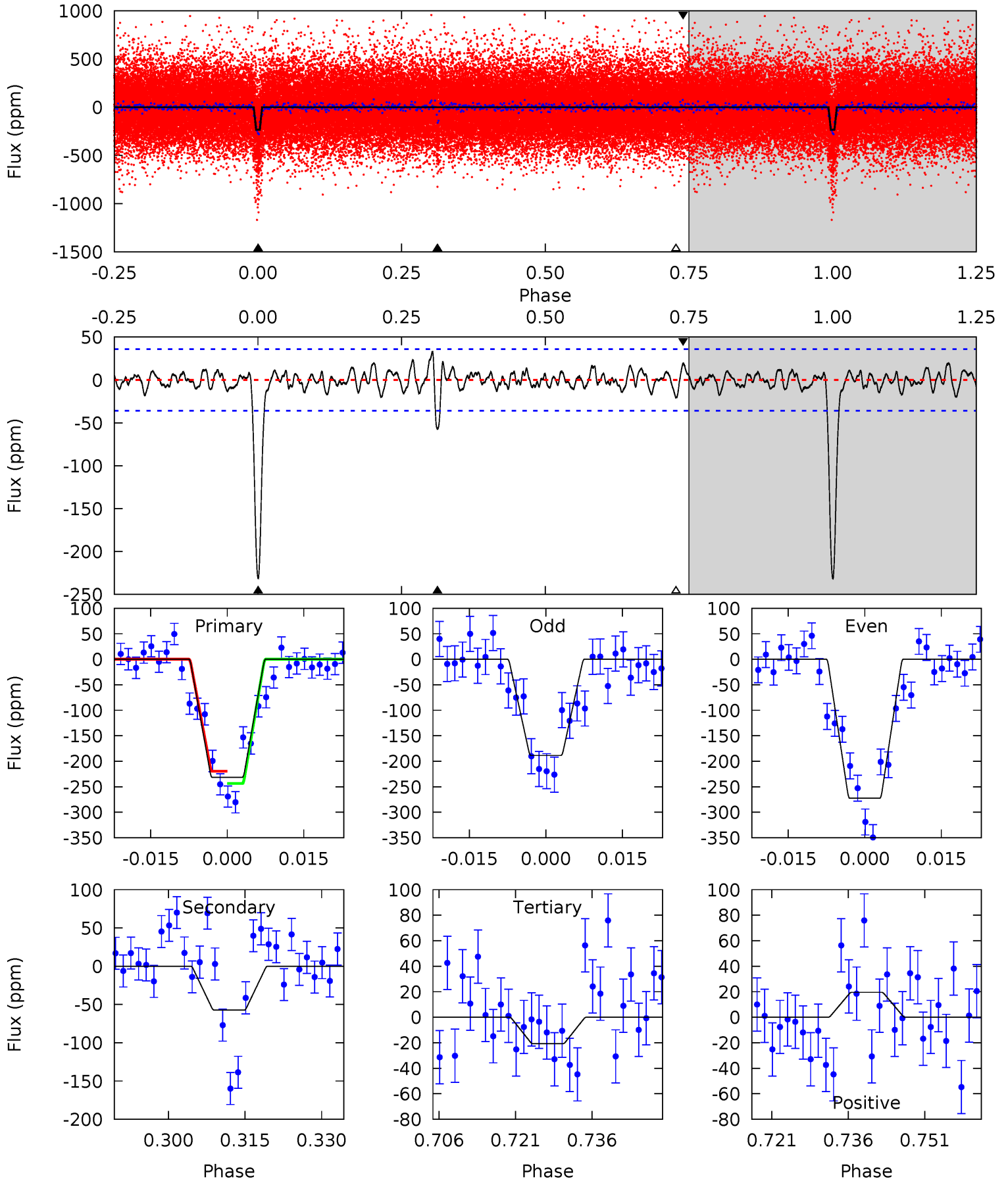
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
32.8	9.25	5.25	4.54	4.90	2.35	1.81	27.6	28.3	4.00	4.71	1.11	1.06	0.12	2.50



Alt Model-Shift Uniqueness Test

008700537-01, P = 43.796461 Days, E = 115.118778 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
31.9	7.89	2.85	2.69	4.95	2.43	1.08	29.0	29.2	5.04	5.20	5.79	1.14	0.13	1.63



Stellar Parameters For KIC 008700537

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6109^{+182}_{-182}	$4.432^{+0.116}_{-0.174}$	$-0.600^{+0.300}_{-0.300}$	$0.941^{+0.248}_{-0.134}$	$0.872^{+0.099}_{-0.081}$	$1.476^{+0.673}_{-0.706}$
	+3%/-3%	+3%/-4%	+50%/-50%	+26%/-14%	+11%/-9%	+46%/-48%
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 008700537-01 / KOI 4170.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-61 ± 7	$4.93^{+3.97}_{-3.30}$	766^{+47}_{-45}	3121^{+1393}_{-477}	78^{+557}_{-56}
Alt.	-57 ± 7	$3.88^{+4.15}_{-2.80}$	764^{+49}_{-47}	3305^{+1925}_{-615}	113^{+1241}_{-88}

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 $A_{obs} \gg 1.0$

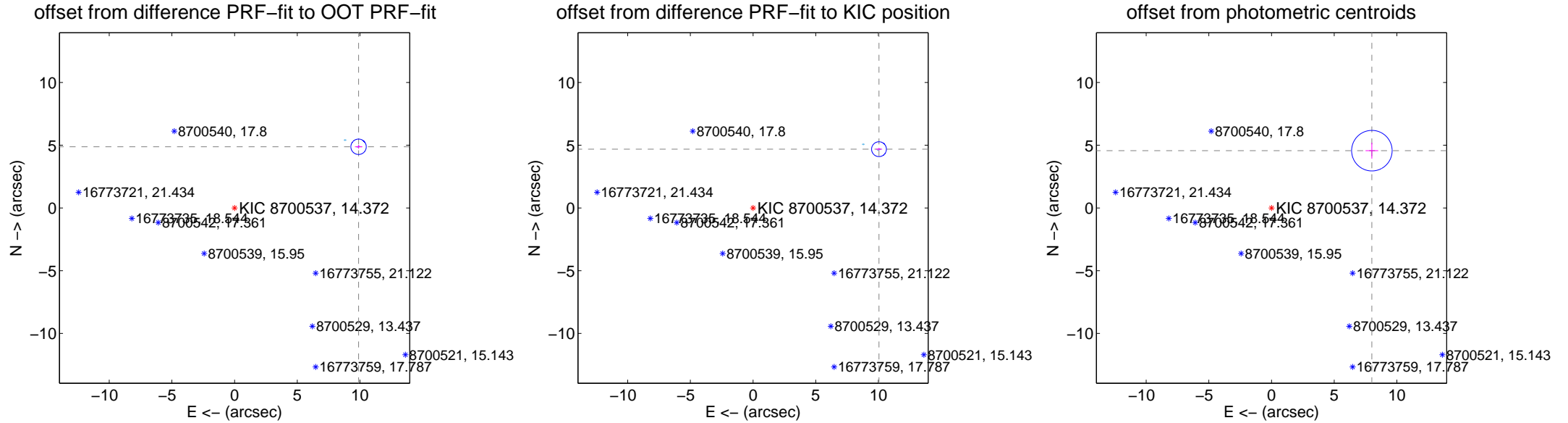
DV Centroid Data

Supplemental centroid analysis for 008700537-01. Kepler magnitude: 14.37. Transit SNR 17.38

There are 4 quarters with good PRF difference image offsets

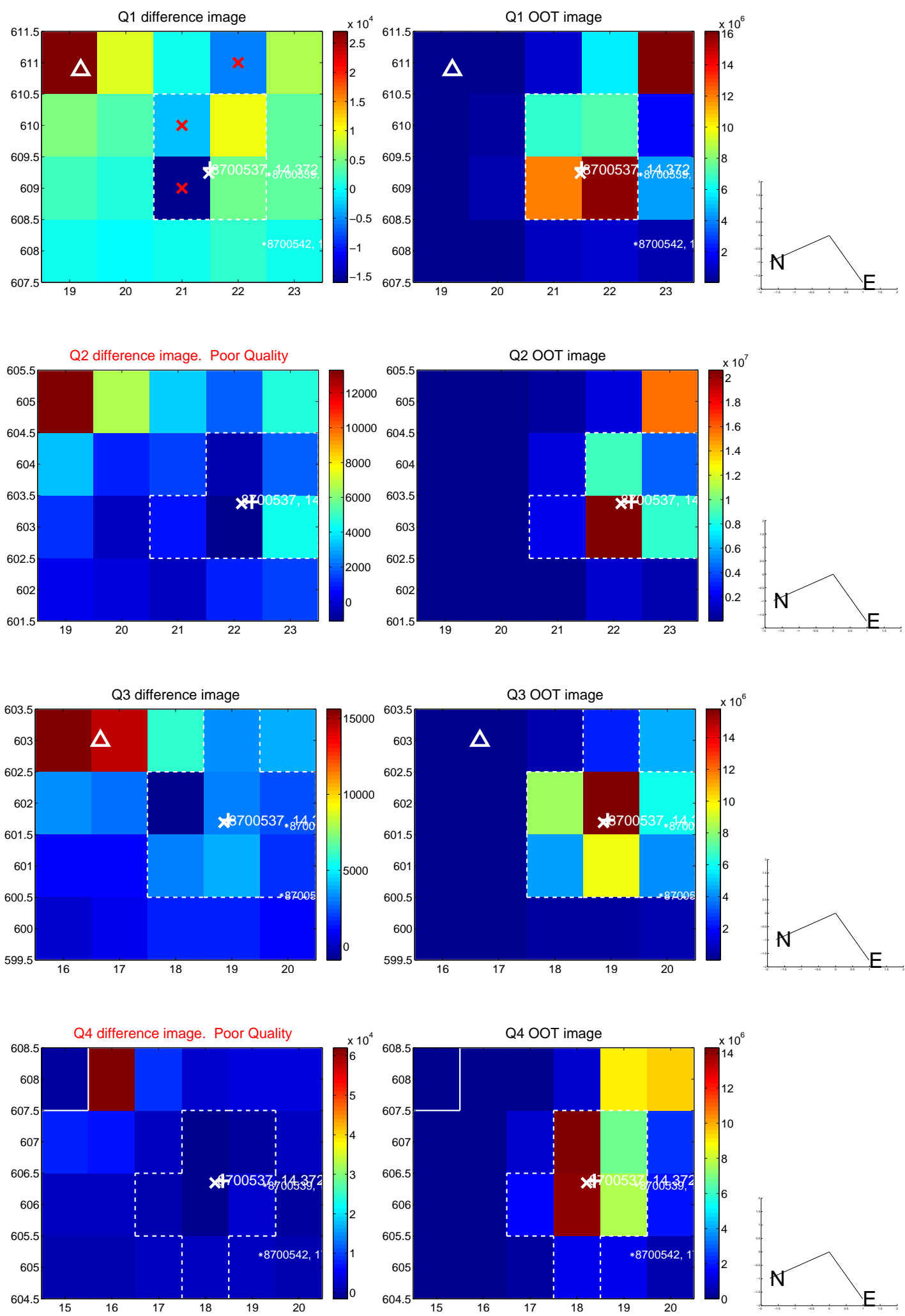
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	11.031 ± 0.205	53.87	-9.894 ± 0.291	4.877 ± 0.154
PRF-fit source offset from KIC position	11.088 ± 0.197	56.24	-10.050 ± 0.251	4.685 ± 0.107
photometric centroid source offset	9.22 ± 0.54	17.11	-8.01 ± 0.50	4.57 ± 0.63

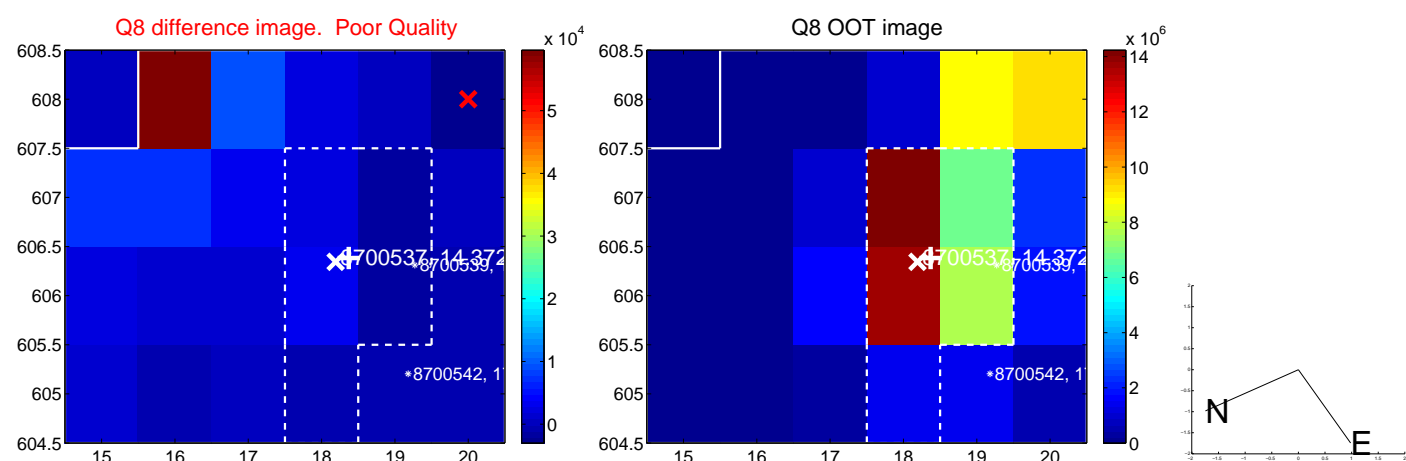
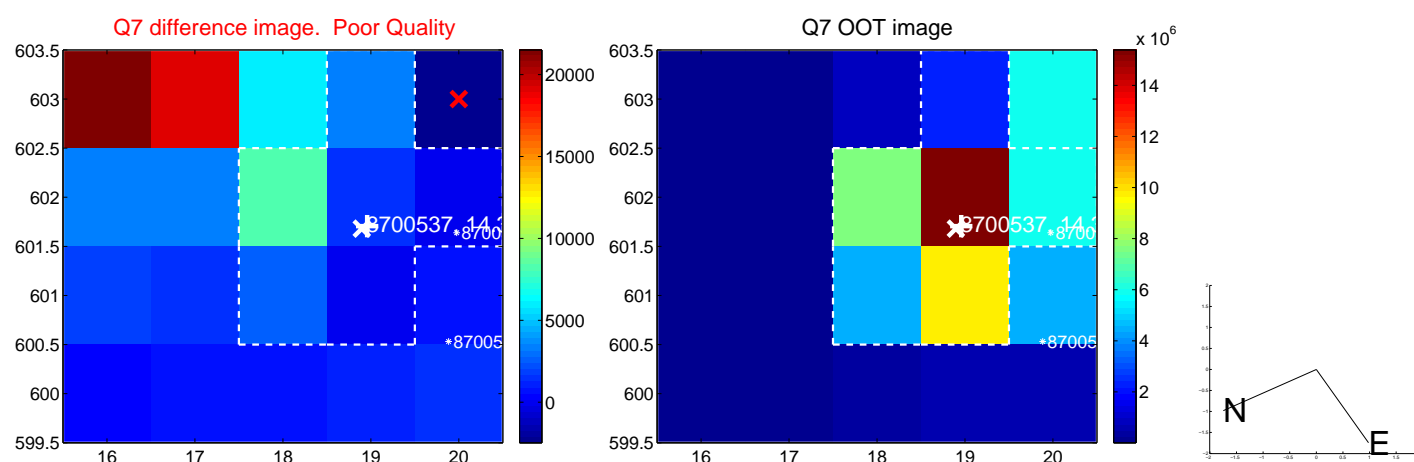
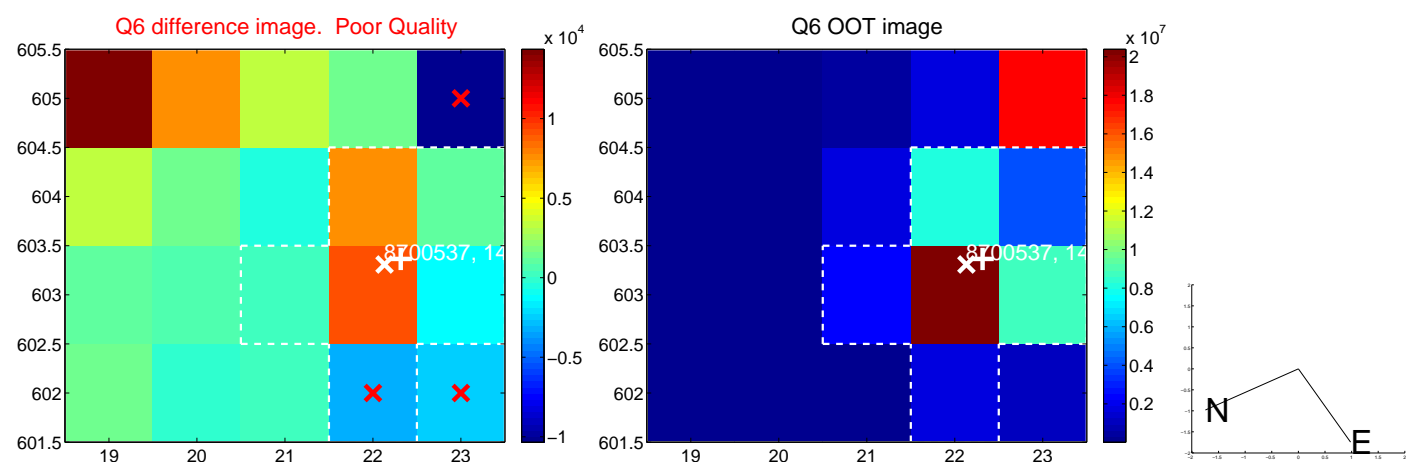
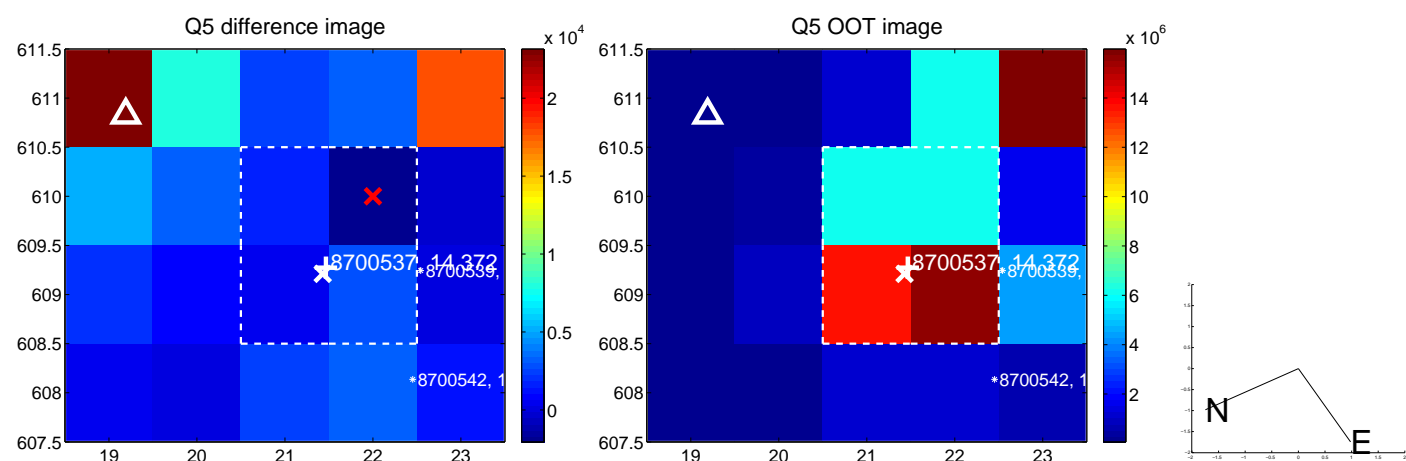


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

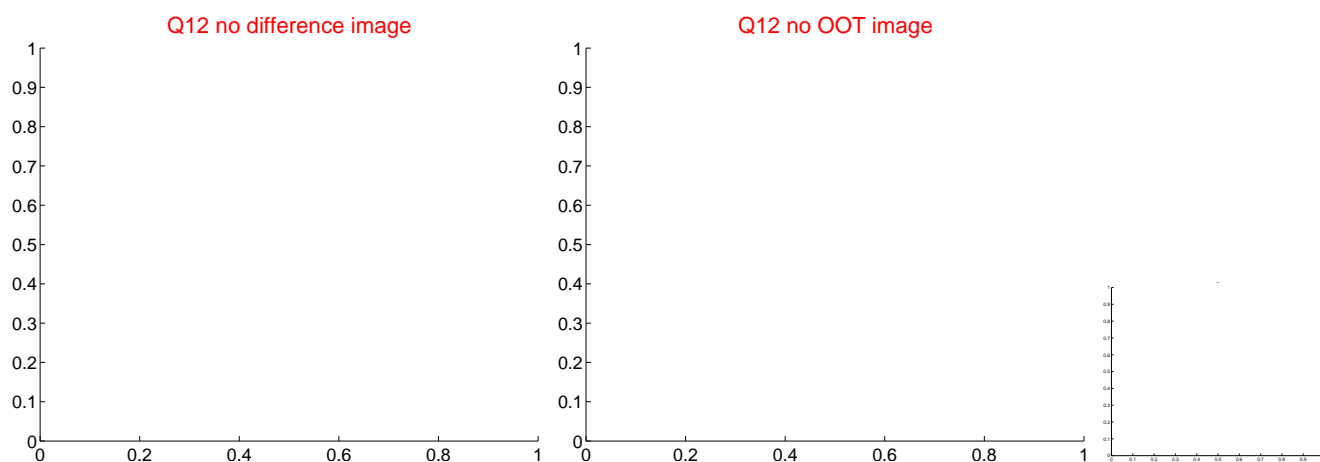
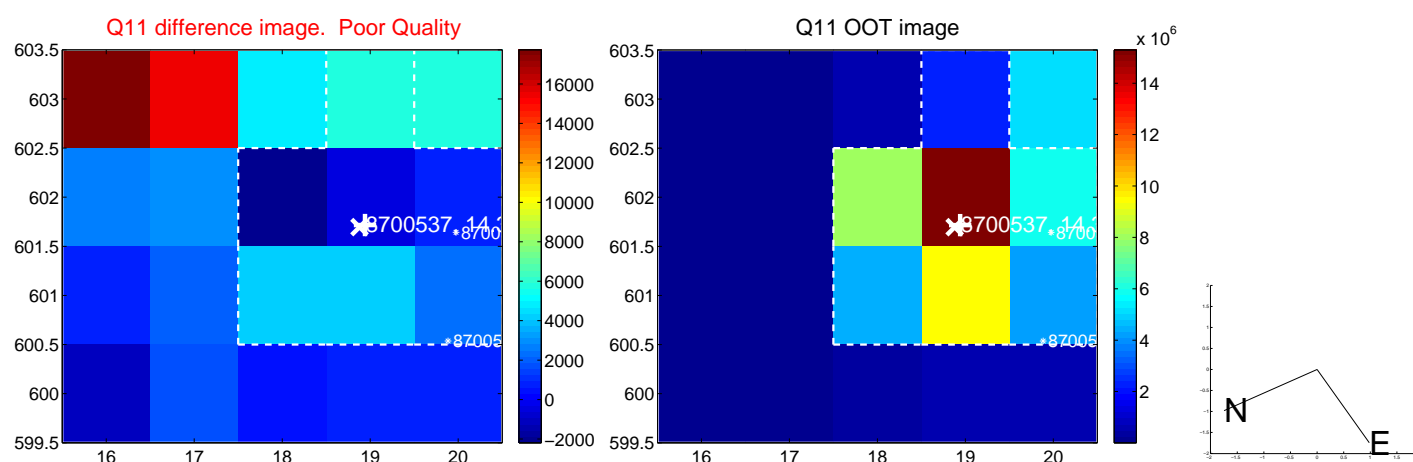
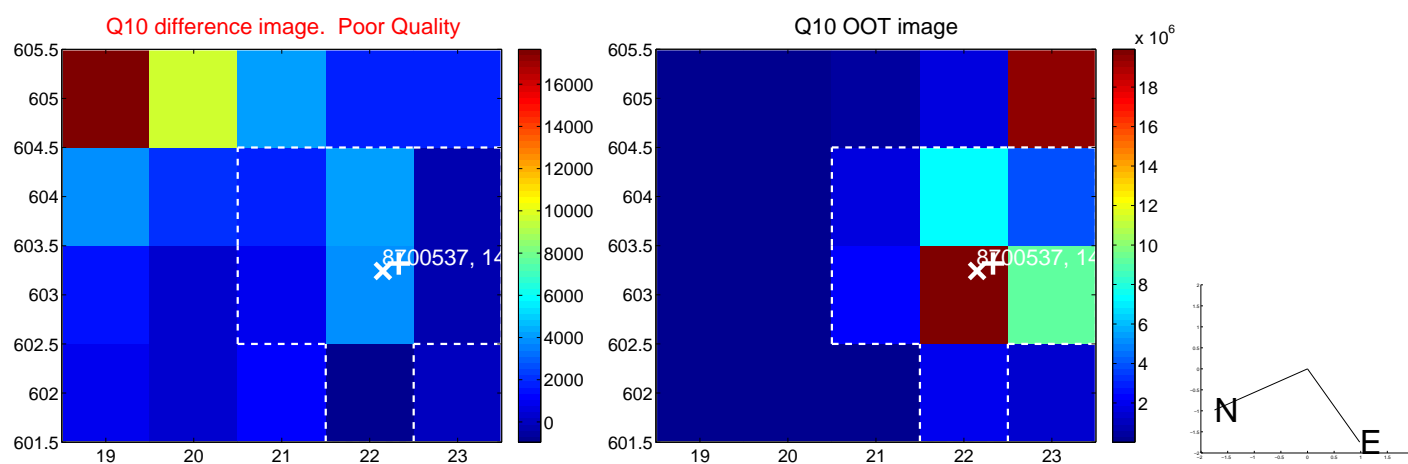
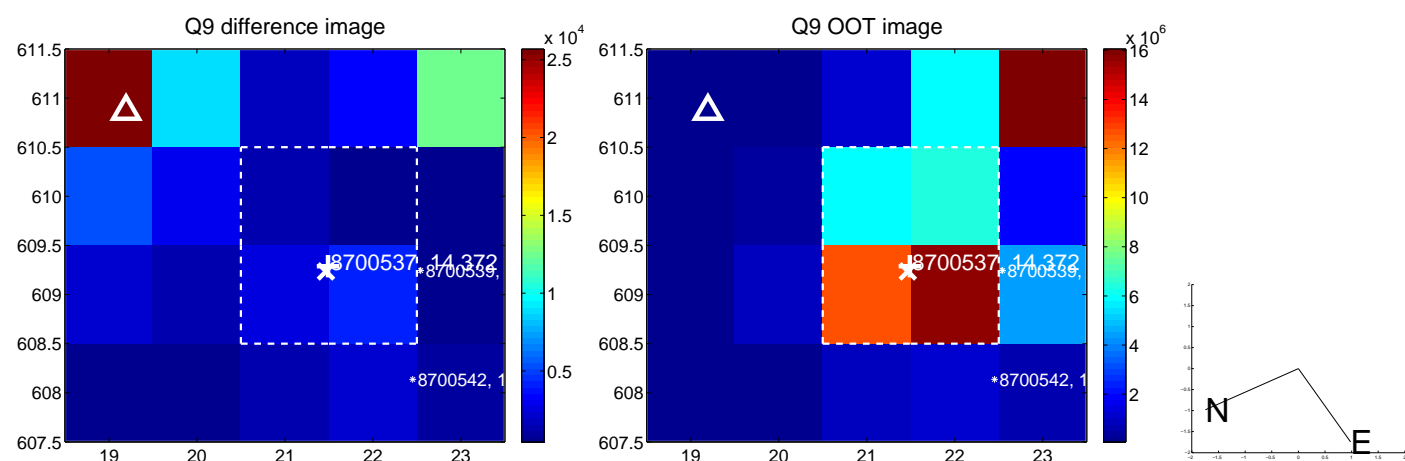
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



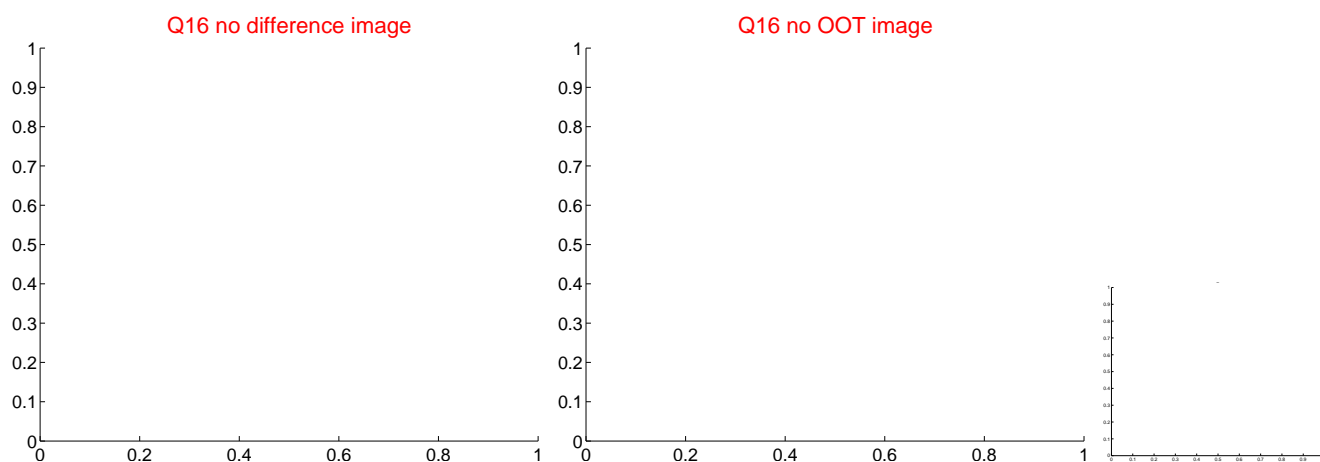
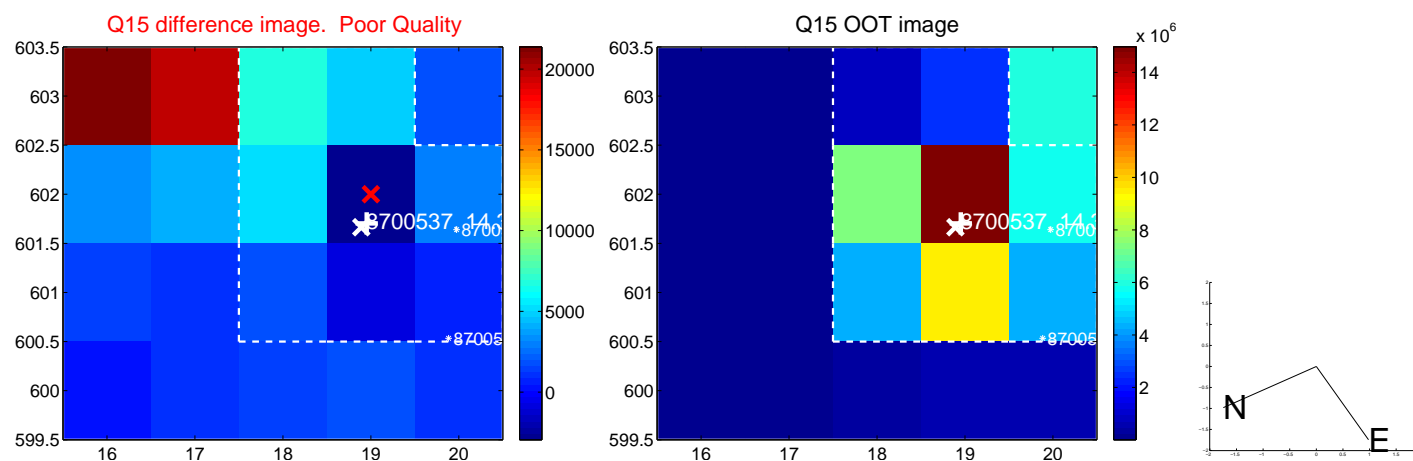
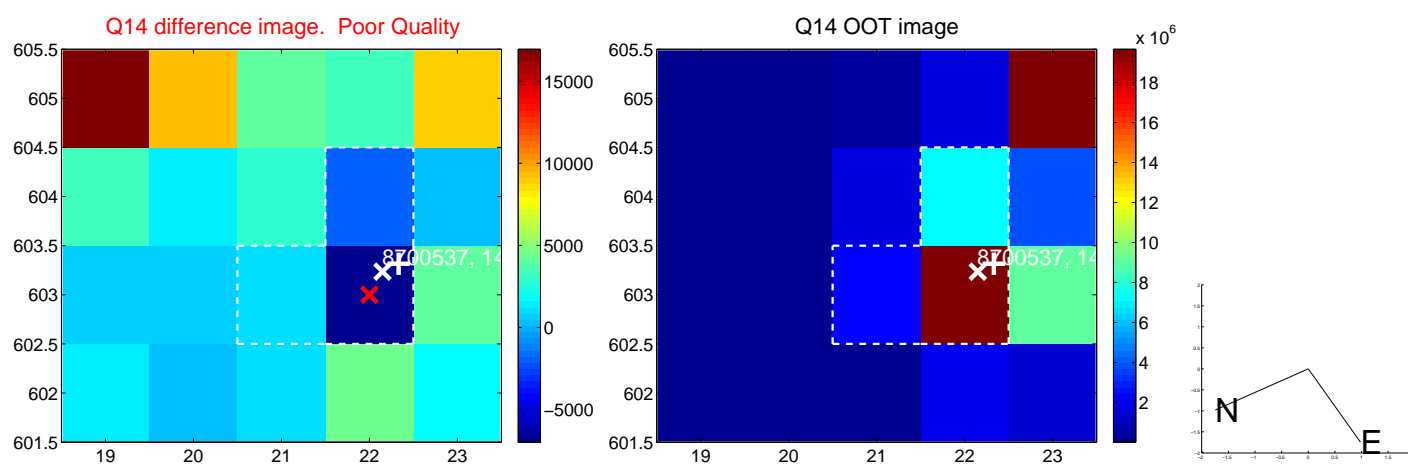
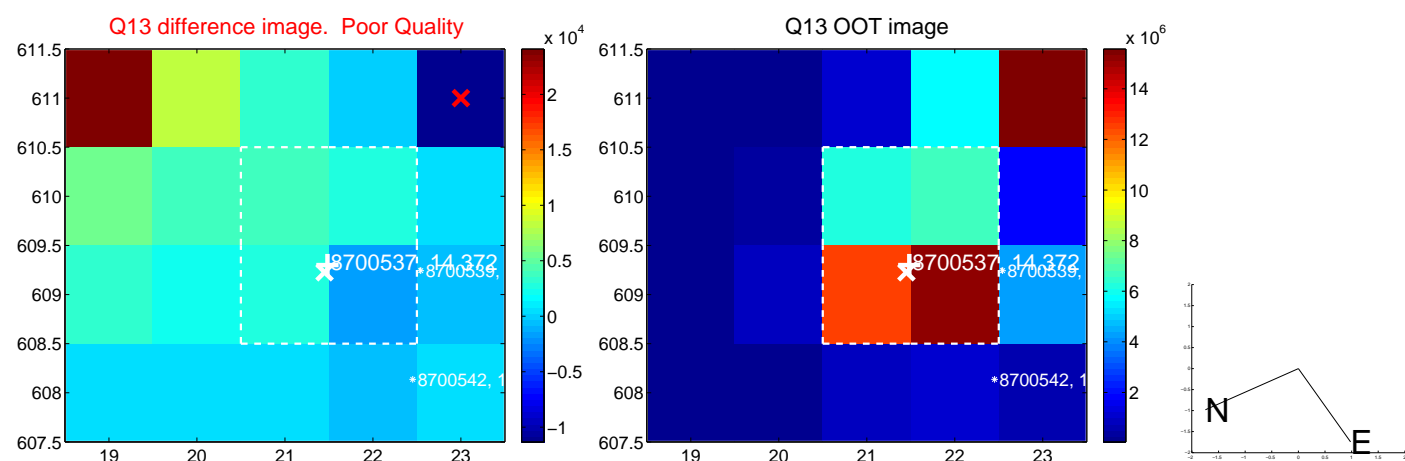
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



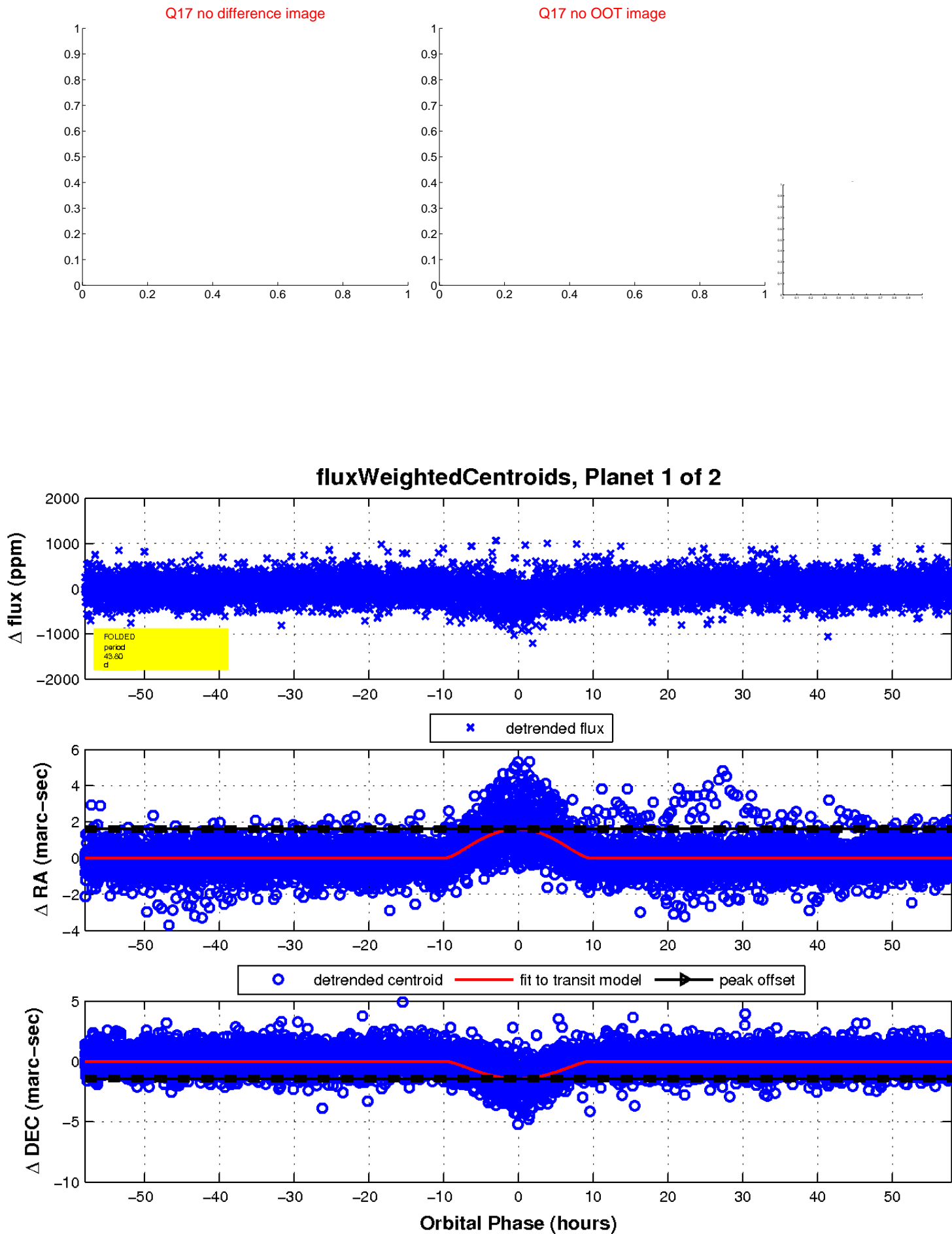
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

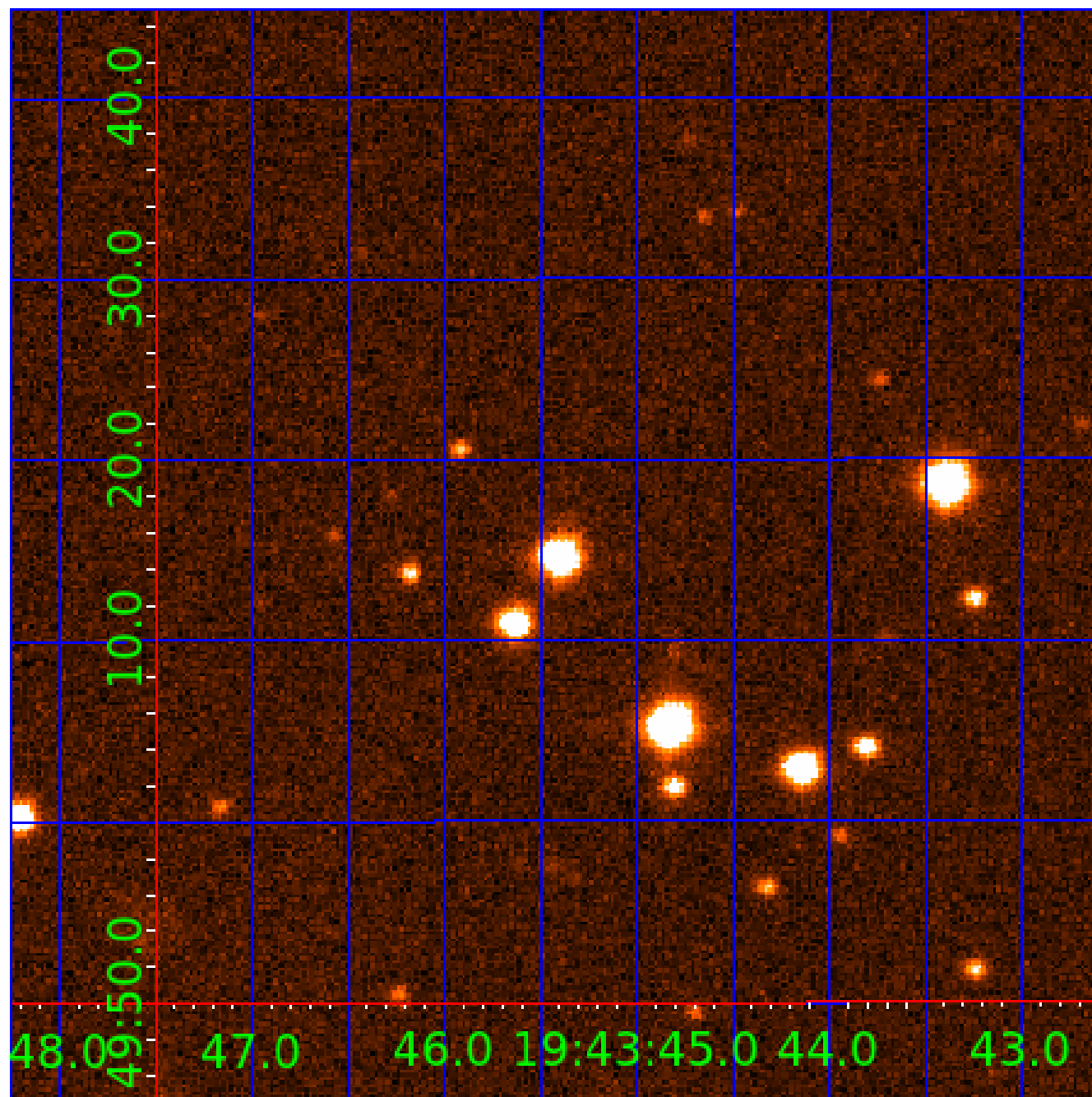


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008700537

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})
008700537-01	OBS	4170.01	43.796618	158.910390	218.6	19.317	15.3	17.4	0.94	6109	2.76	20.45
008700537-02	OBS	No	43.797945	172.600131	195.4	7.326	11.0	10.9	0.94	6109	2.60	20.44

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008700537-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
008700537-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—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 008700537-02

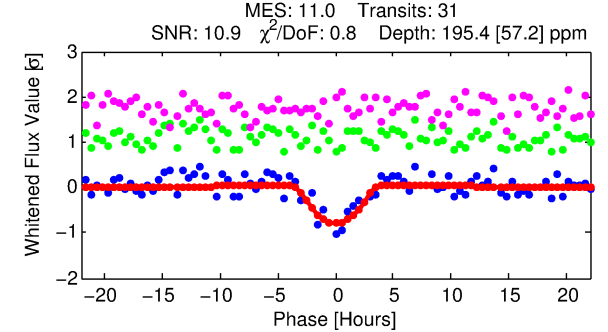
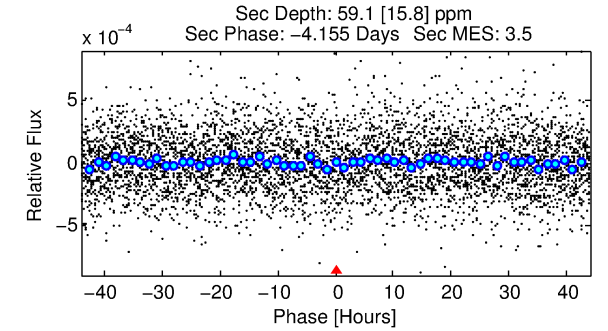
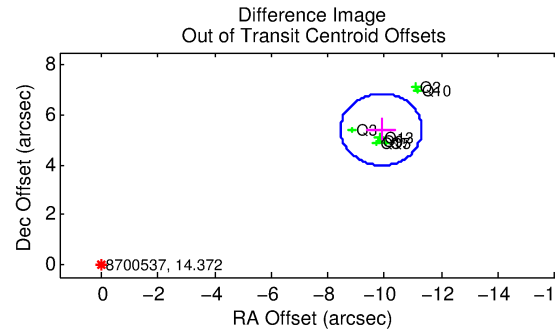
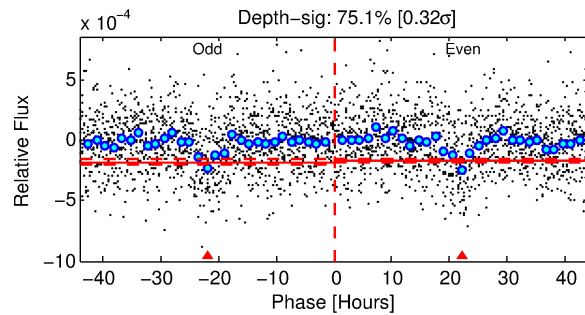
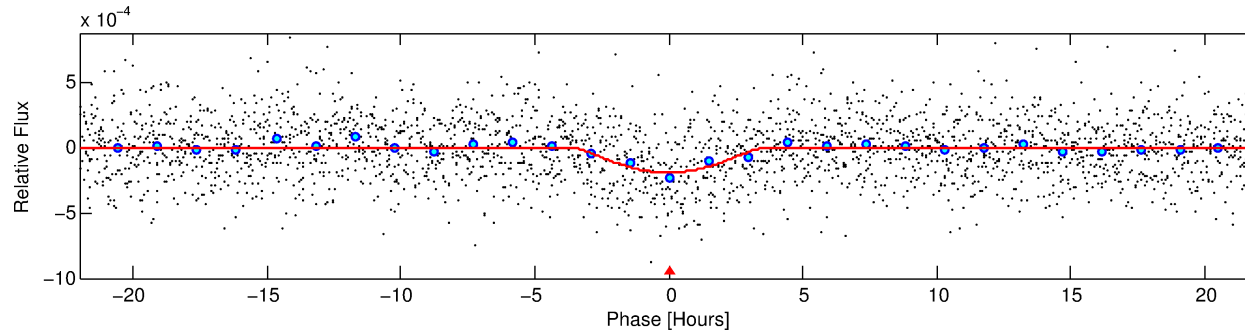
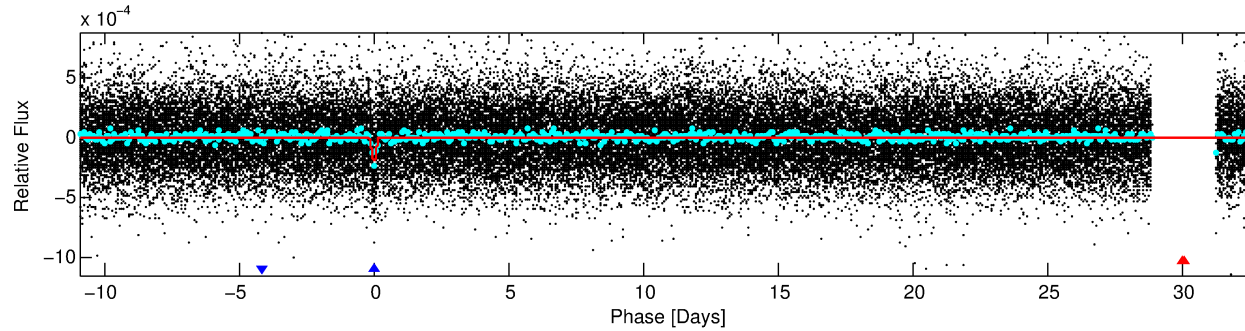
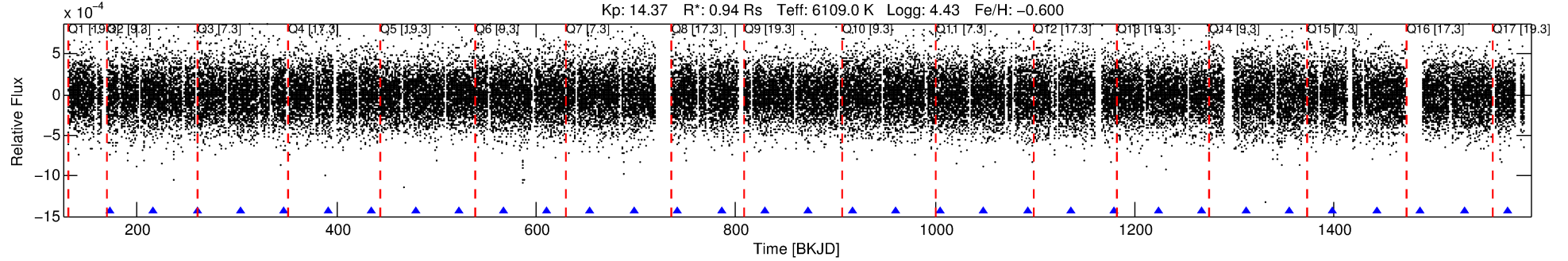
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
008700537-02	8700537	008700506-01	8700506	1:1	21.8	-5	4	13.48	14.37	2187.50	Direct-PRF	0	0.31	0.18

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: 8700537 Candidate: 2 of 2 Period: 43.798 d
KOI: K04170 Corr: No Ephemeris Match

Kp: 14.37 R*: 0.94 Rs Teff: 6109.0 K Logg: 4.43 Fe/H: -0.600



DV Fit Results:

Period = 43.79795 [0.00085] d
Epoch = 172.6001 [0.0157] BKJD
Rp/R* = 0.0253 [0.0794]
a/R* = 10.45 [8.80]
b = 1.00 [0.12]
Seff = 20.44 [6.98]
Teq = 542 [46] K
Rp = 2.60 [8.18] Re
a = 0.2325 [0.0513] AU
Ag = 260.24 [1636.07] [0.16σ]
Teff = 3367 [5286] K [0.53σ]

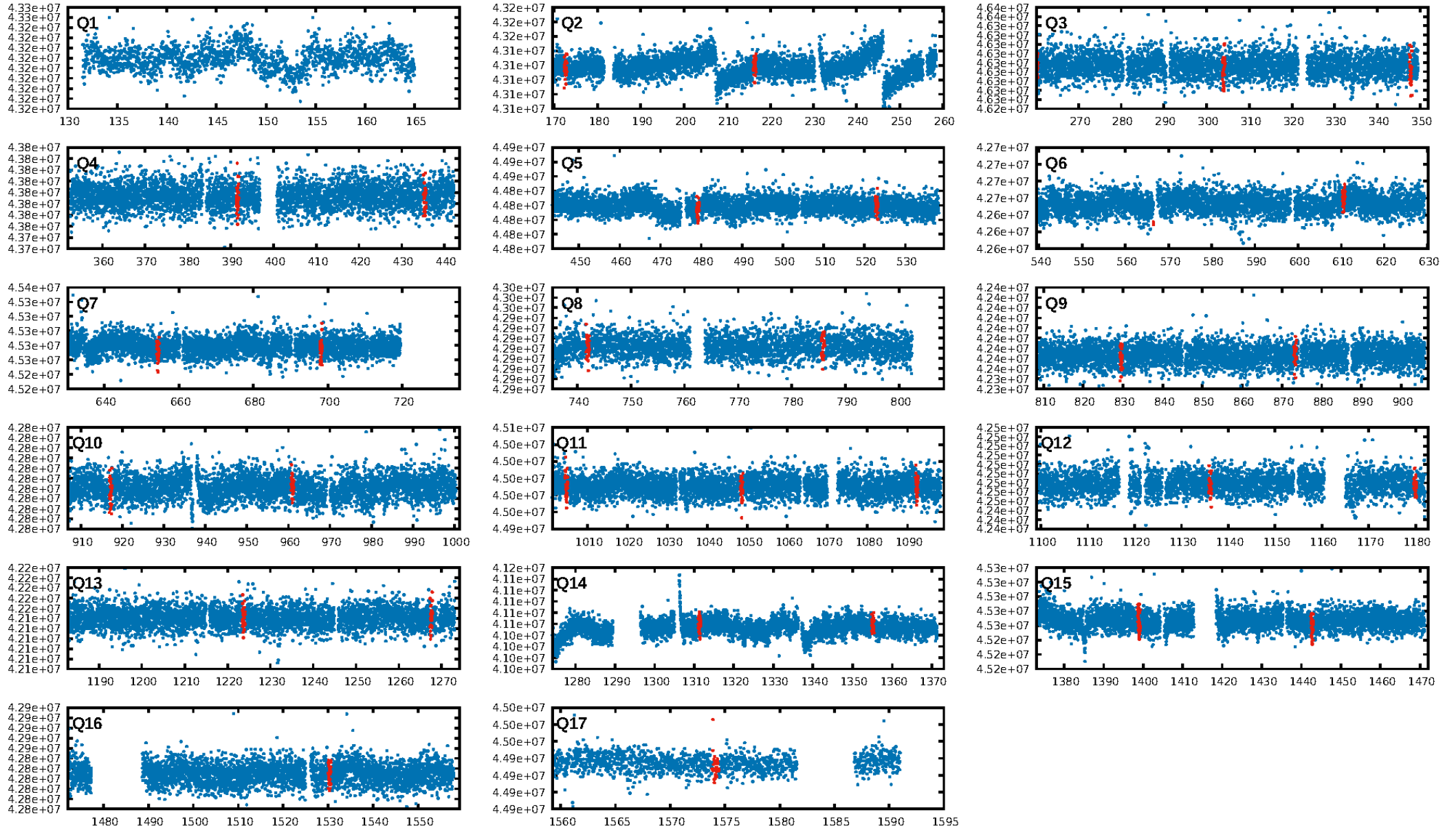
DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 11.3%
ModelChiSquareGoF-sig: 100.0%
Bootstrap-pfa: 6.85e-28
RollingBand-fgt: 1.00 [30/30]
GhostDiagnostic-chr: -0.2447
Centroid-sig: 0.0%
Centroid-so: 8.421 arcsec [10.02σ]
OotOffset-rm: 11.266 arcsec [23.50σ]
KicOffset-rm: 11.256 arcsec [32.29σ]
OotOffset-st: 2/1/0/4 [7]
KicOffset-st: 2/1/0/4 [7]
DiffImageQuality-fgm: 1.00 [7/7]
DiffImageOverlap-fno: 1.00 [16/16]

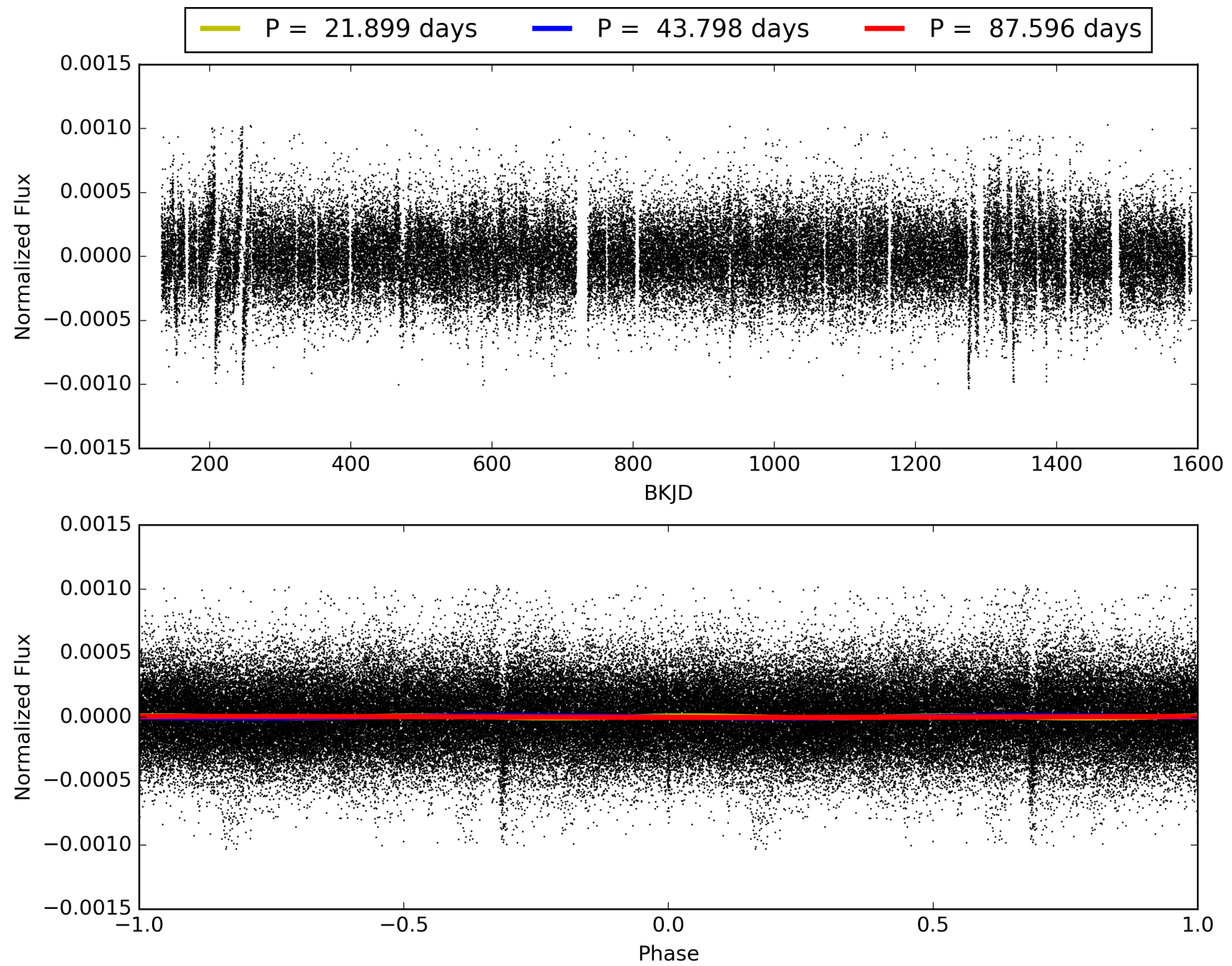
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 18:36:09 Z

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

TCE 008700537-02, PDC Light Curves

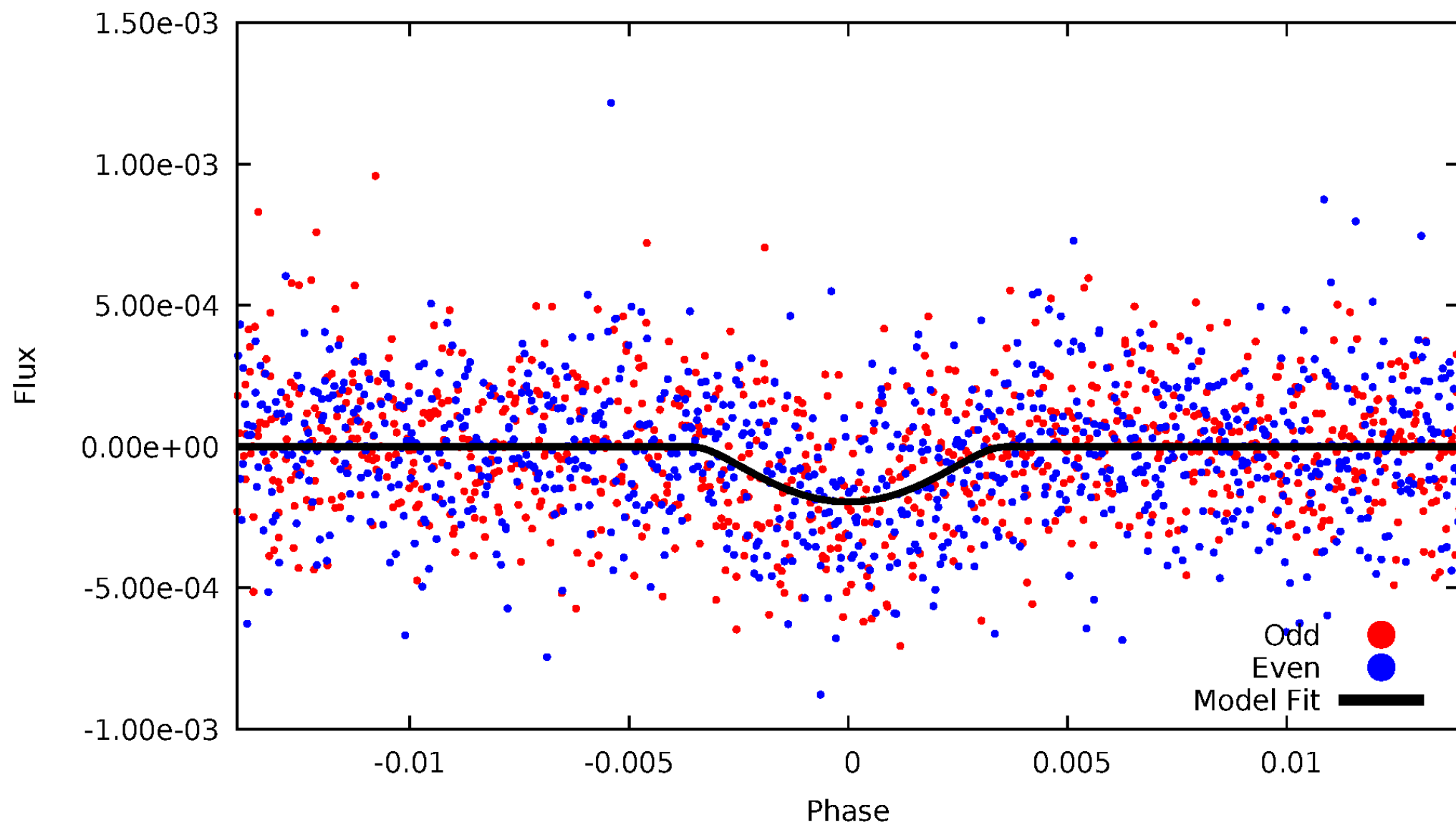


TCE 008700537-02



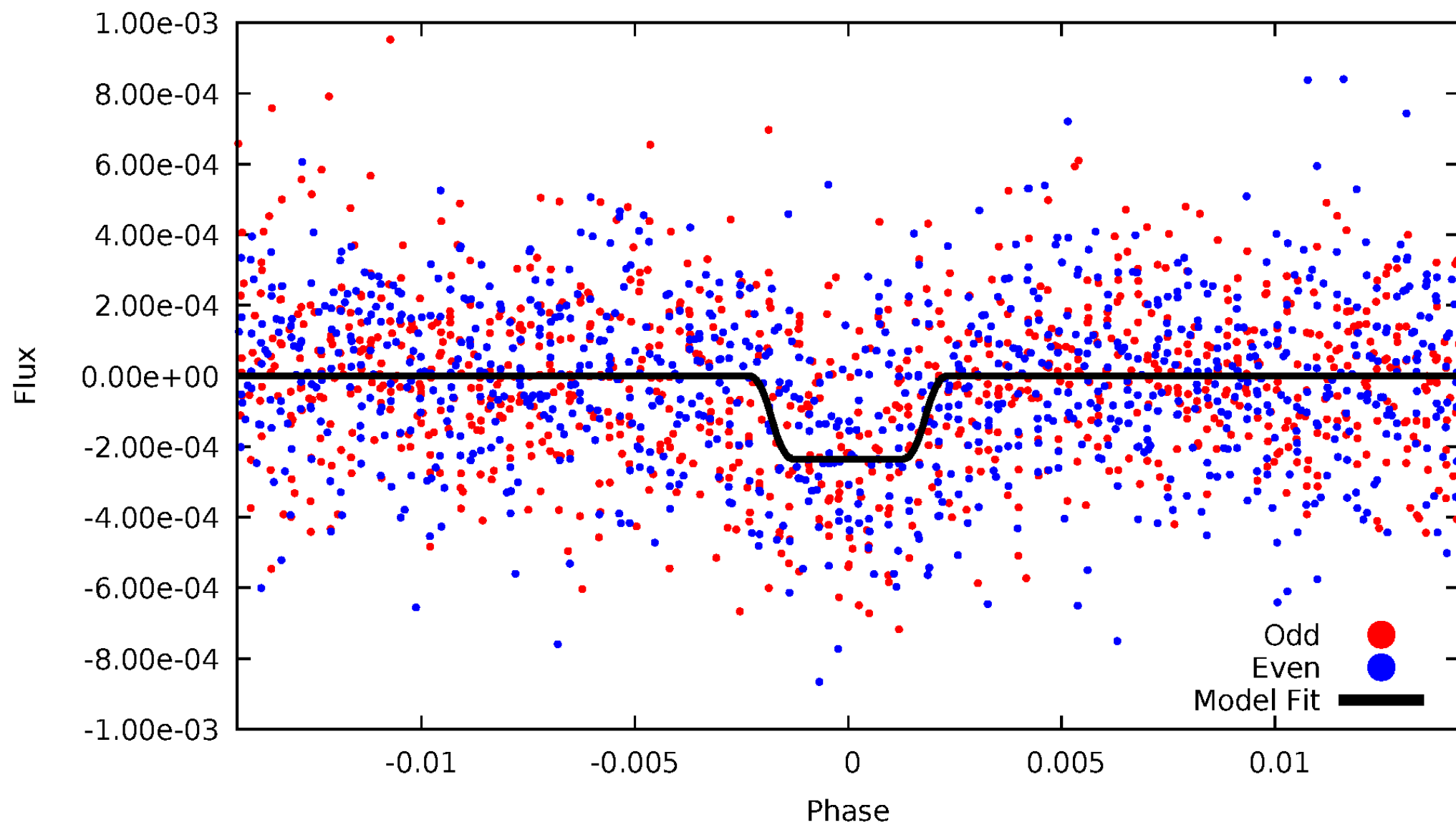
DV Odd/Even

TCE 008700537-02



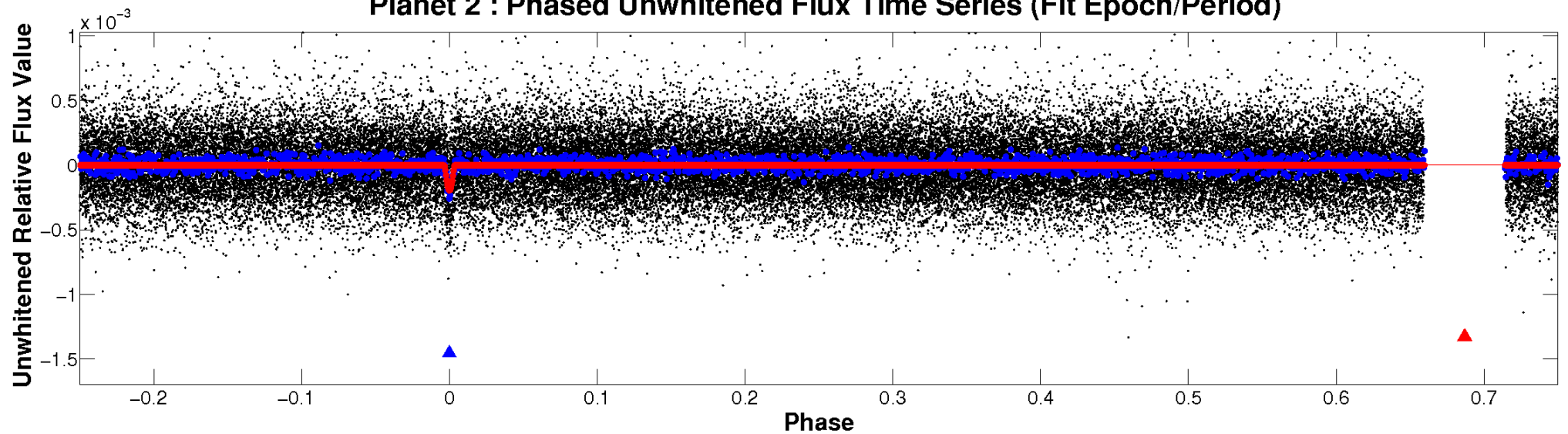
ALT Odd/Even

TCE 008700537-02

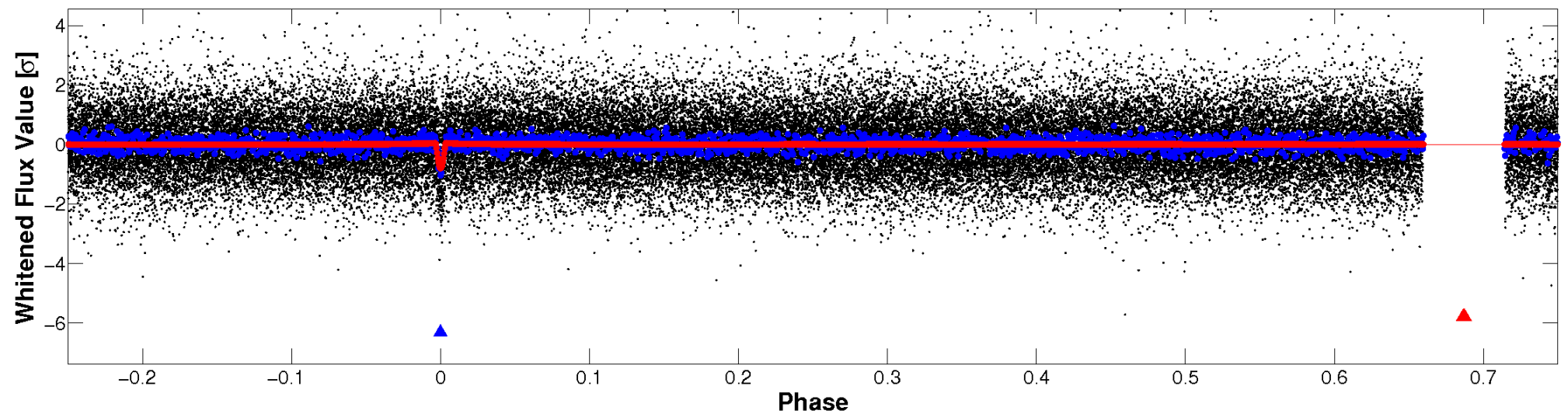


Non-Whitened Vs. Whitened Light Curve

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

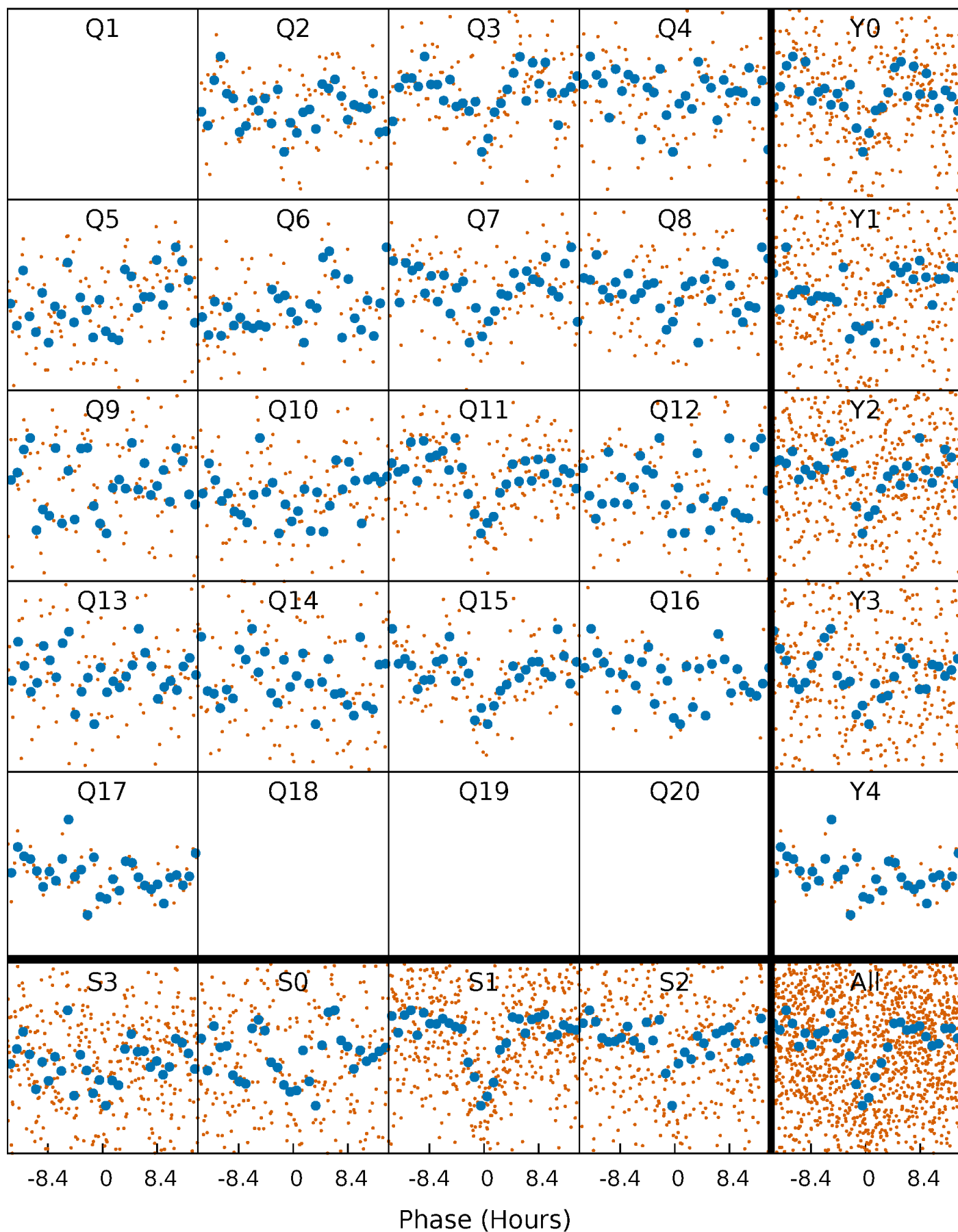


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



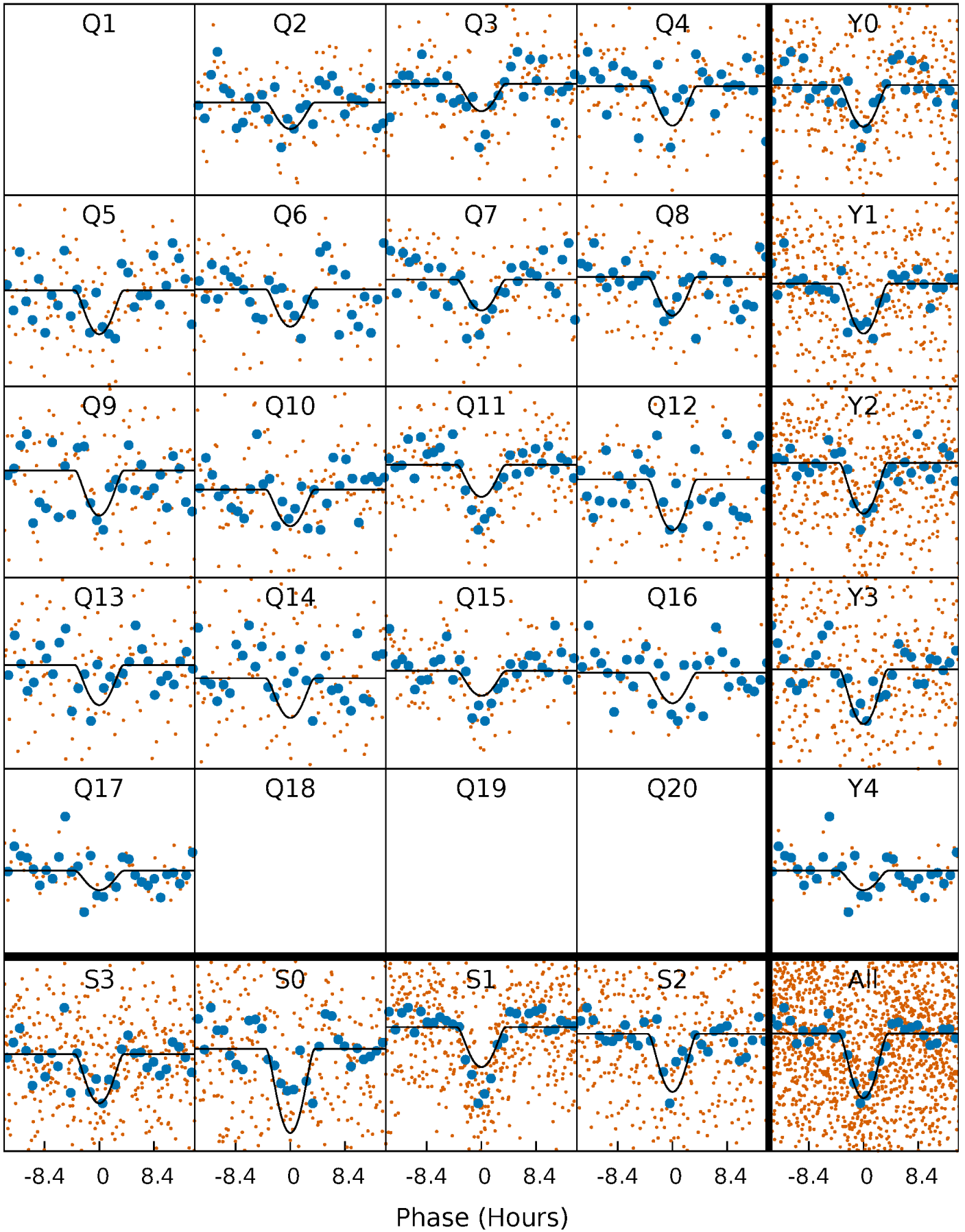
PDC Quarter-Phased Transit Curves

TCE 008700537-02 P= 43.797945 Days $T_0=172.600131$ (BKJD)



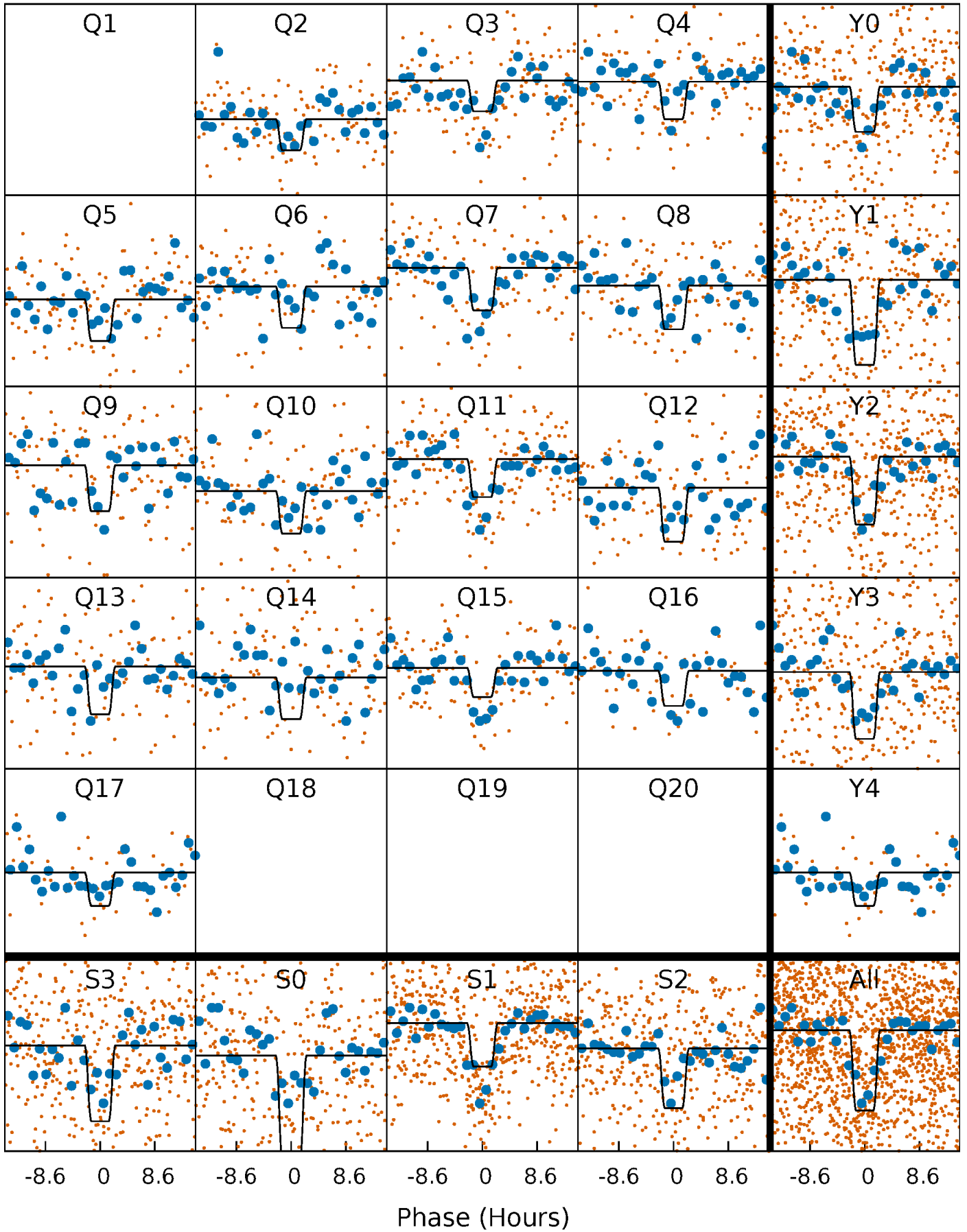
DV Quarter-Phased Transit Curves

TCE 008700537-02 $P = 43.797945$ Days $T_0 = 172.600131$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

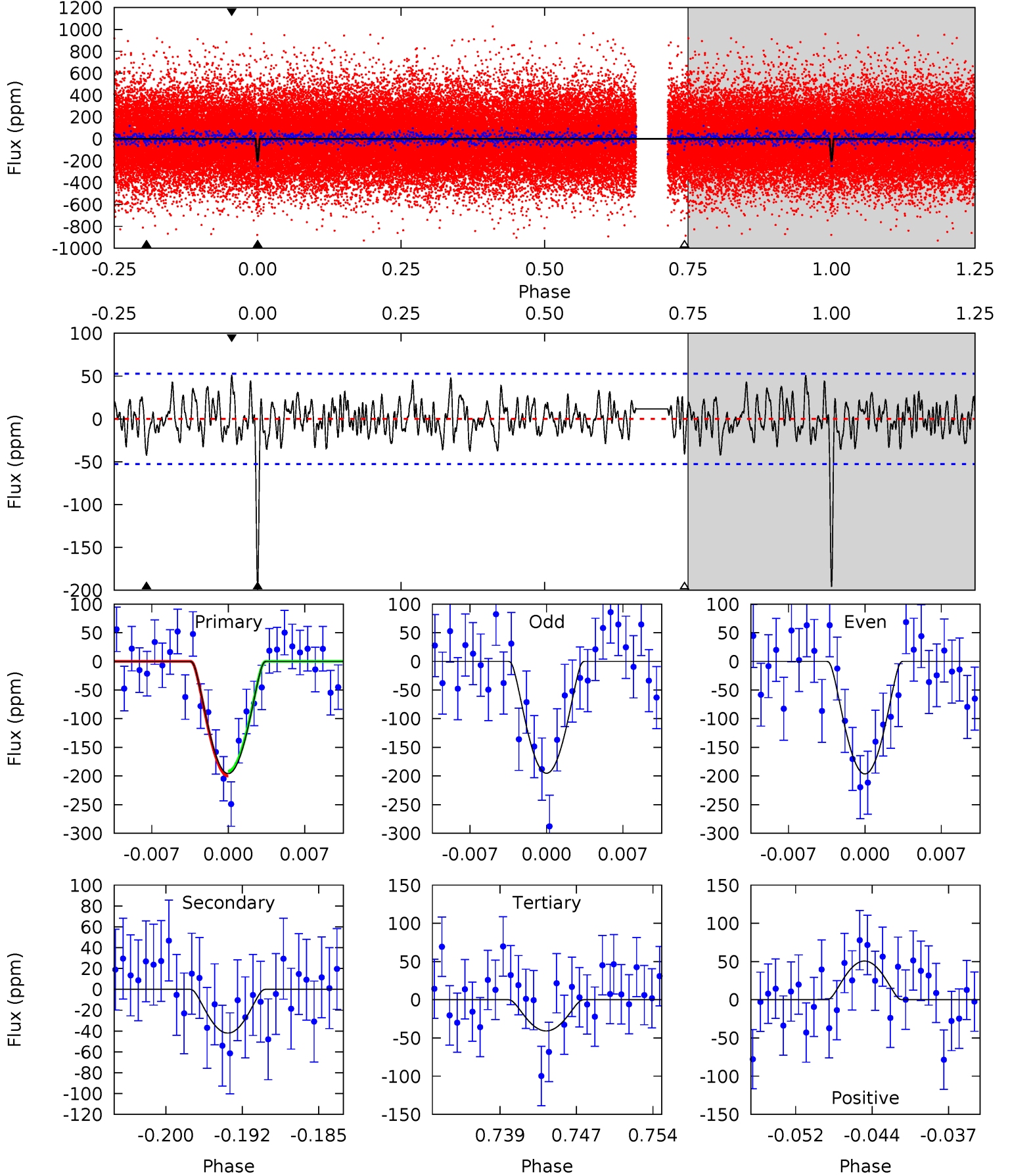
TCE 008700537-02 P= 43.798198 Days $T_0=172.597066$ (BKJD)



DV Model-Shift Uniqueness Test

008700537-02, $P = 43.797945$ Days, $E = 128.802186$ Days

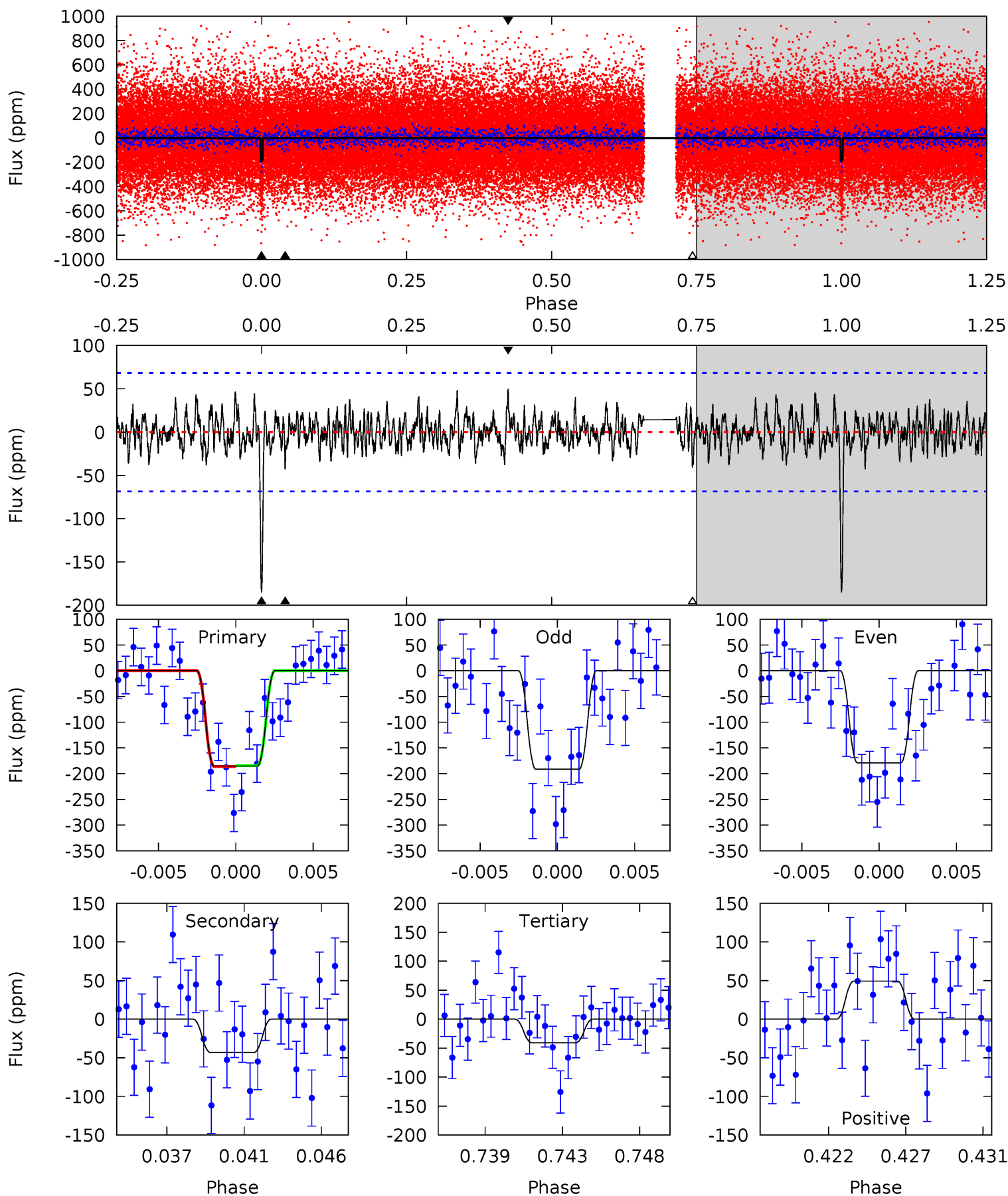
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.9	4.05	3.94	4.89	5.08	2.68	1.53	15.0	14.0	0.11	-0.84	0.05	1.04	0.21	0.40



Alt Model-Shift Uniqueness Test

008700537-02, P = 43.798198 Days, E = 128.798868 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	3.26	3.10	3.73	5.17	2.83	1.12	10.9	10.3	0.16	-0.47	0.46	1.02	0.21	0.06



Stellar Parameters For KIC 008700537

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6109^{+182}_{-182}	$4.432^{+0.116}_{-0.174}$	$-0.600^{+0.300}_{-0.300}$	$0.941^{+0.248}_{-0.134}$	$0.872^{+0.099}_{-0.081}$	$1.476^{+0.673}_{-0.706}$
	+3%/-3%	+3%/-4%	+50%/-50%	+26%/-14%	+11%/-9%	+46%/-48%
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 008700537-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-42 ± 10	$6.81^{+6.64}_{-4.64}$	764^{+46}_{-43}	2710^{+1044}_{-440}	27^{+233}_{-21}
Alt.	-43 ± 13	$6.06^{+6.64}_{-4.18}$	760^{+46}_{-39}	2769^{+1209}_{-466}	32^{+318}_{-24}

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

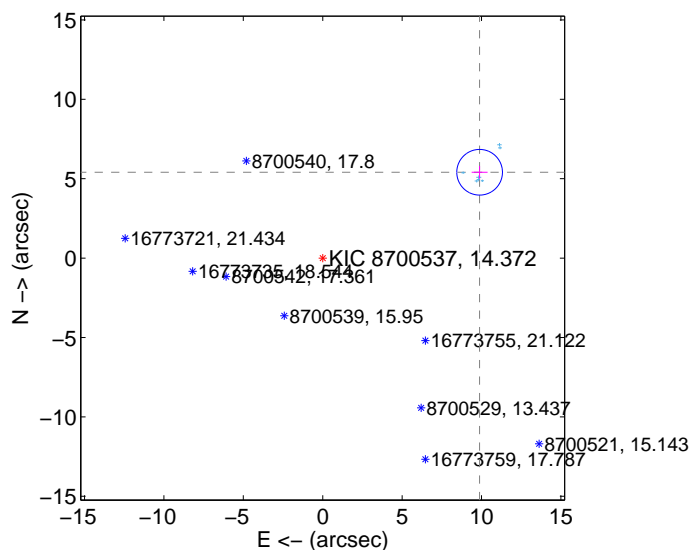
Supplemental centroid analysis for 008700537-02. Kepler magnitude: 14.37. Transit SNR 10.94

There are 7 quarters with good PRF difference image offsets

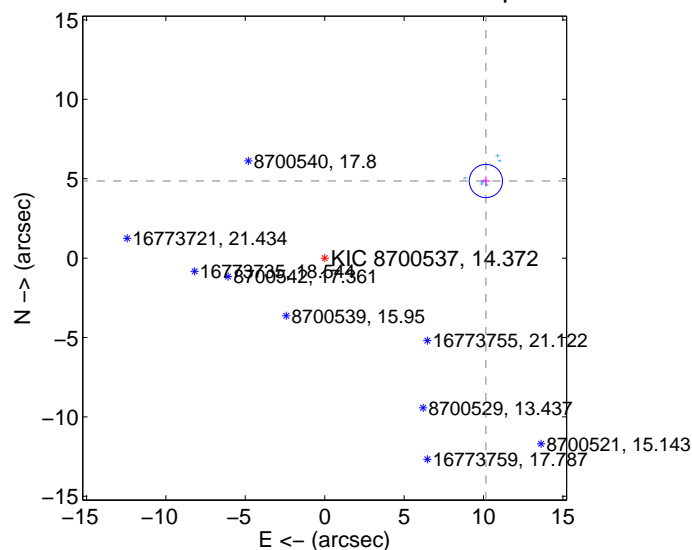
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	11.266 ± 0.479	23.50	-9.883 ± 0.501	5.407 ± 0.400
PRF-fit source offset from KIC position	11.256 ± 0.349	32.29	-10.155 ± 0.286	4.856 ± 0.284
photometric centroid source offset	8.42 ± 0.84	10.02	-7.05 ± 0.78	4.60 ± 0.96

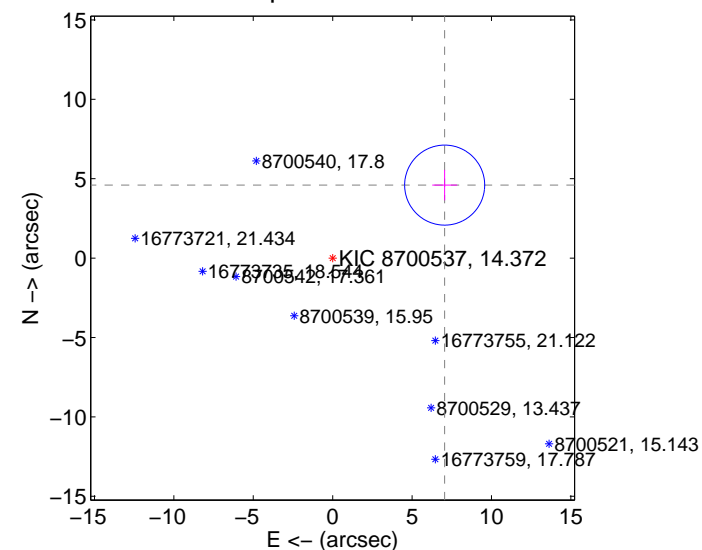
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

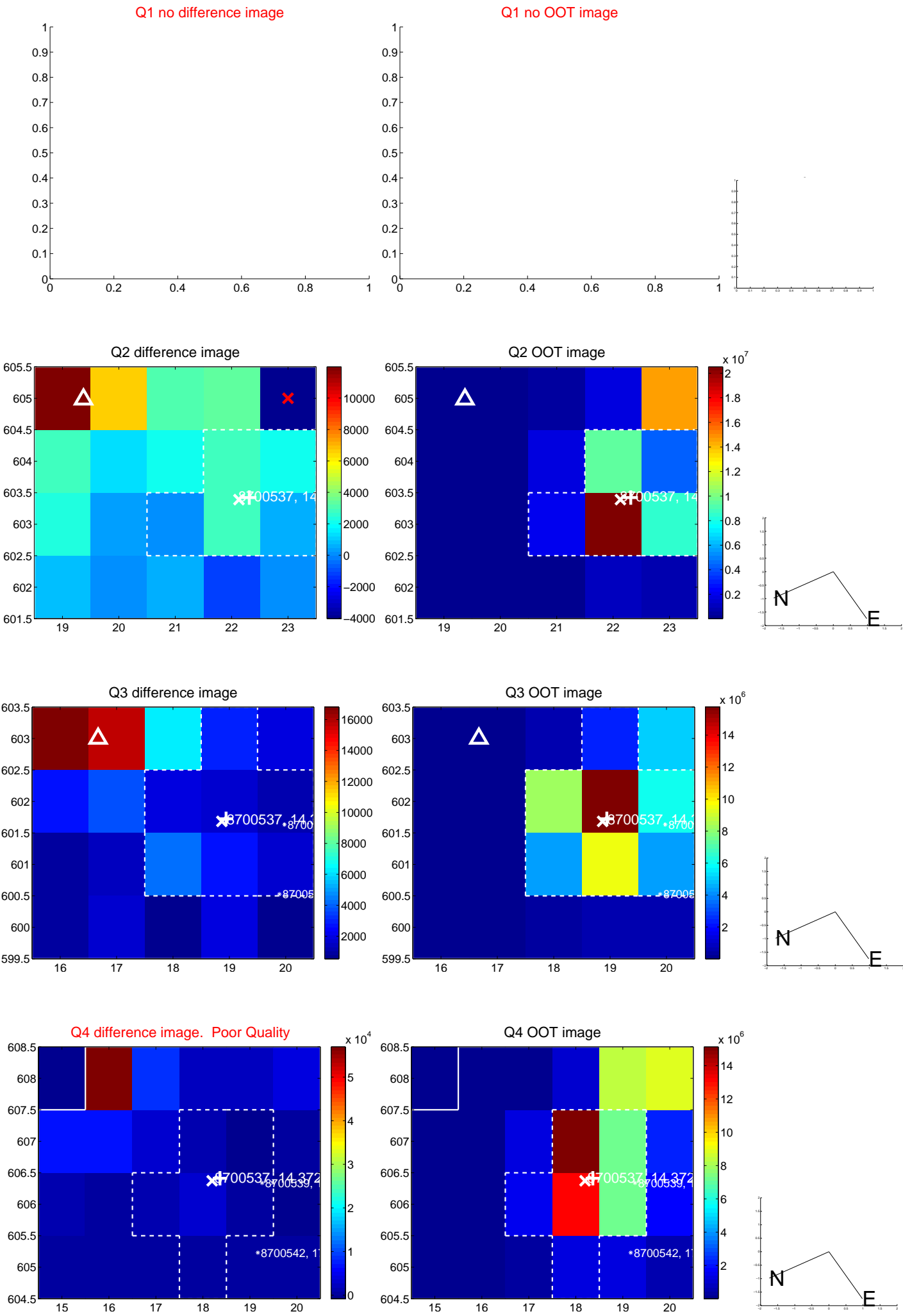


offset from photometric centroids

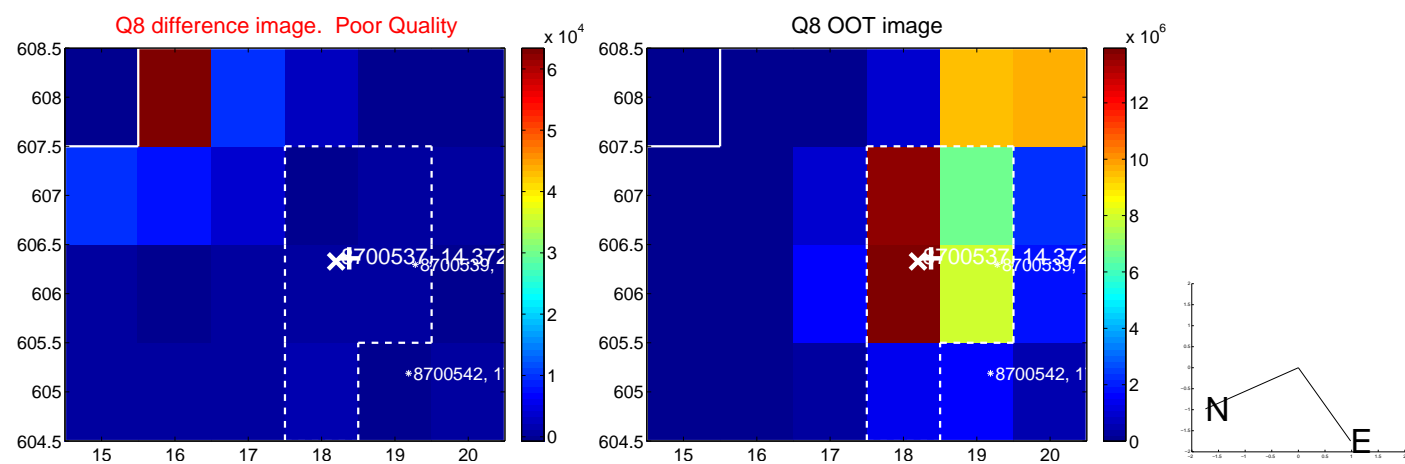
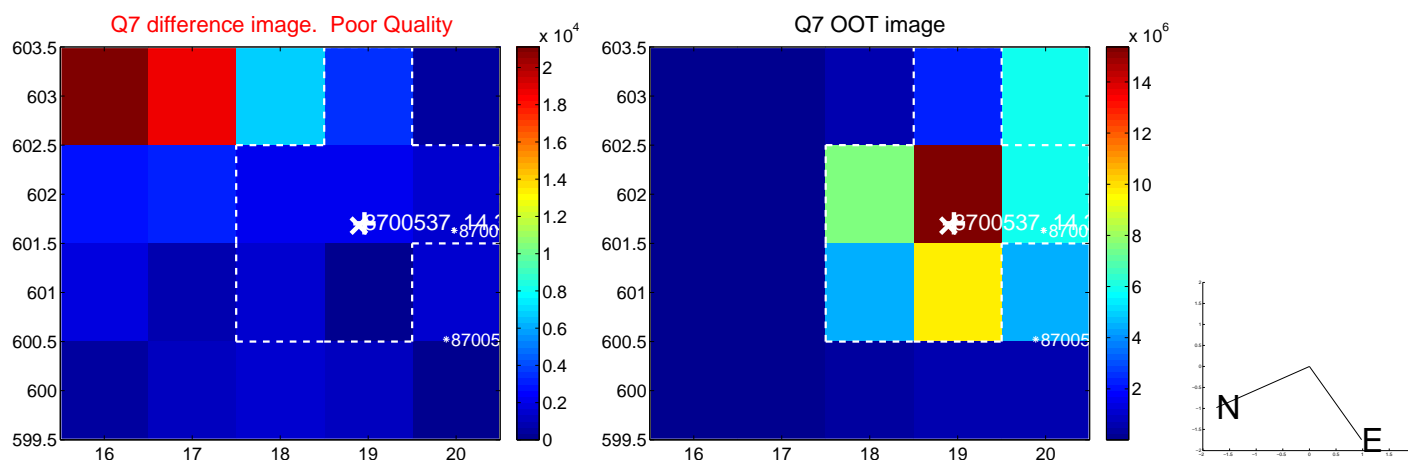
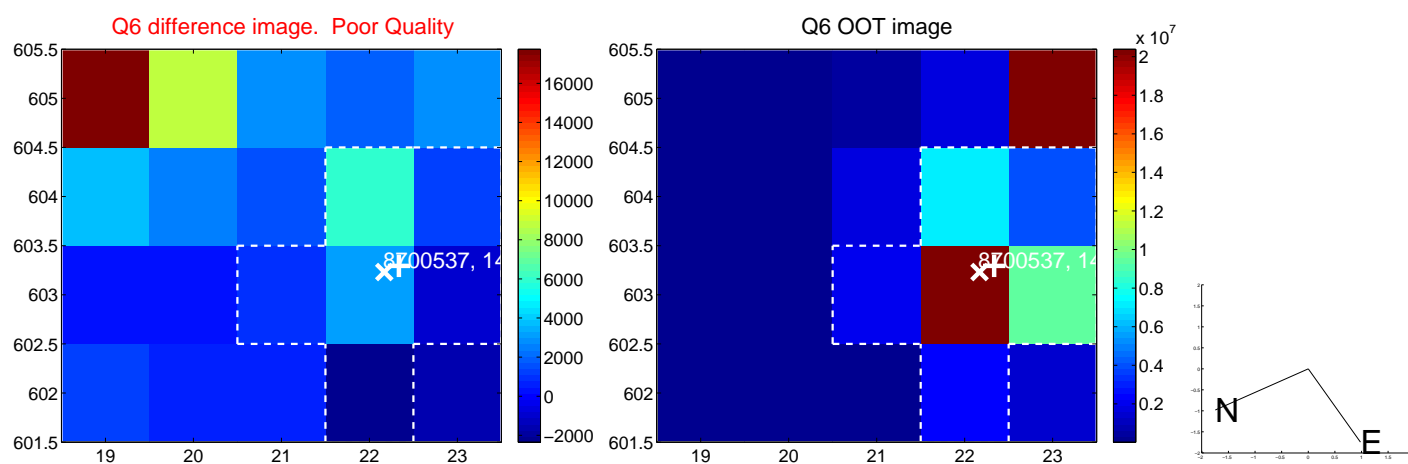
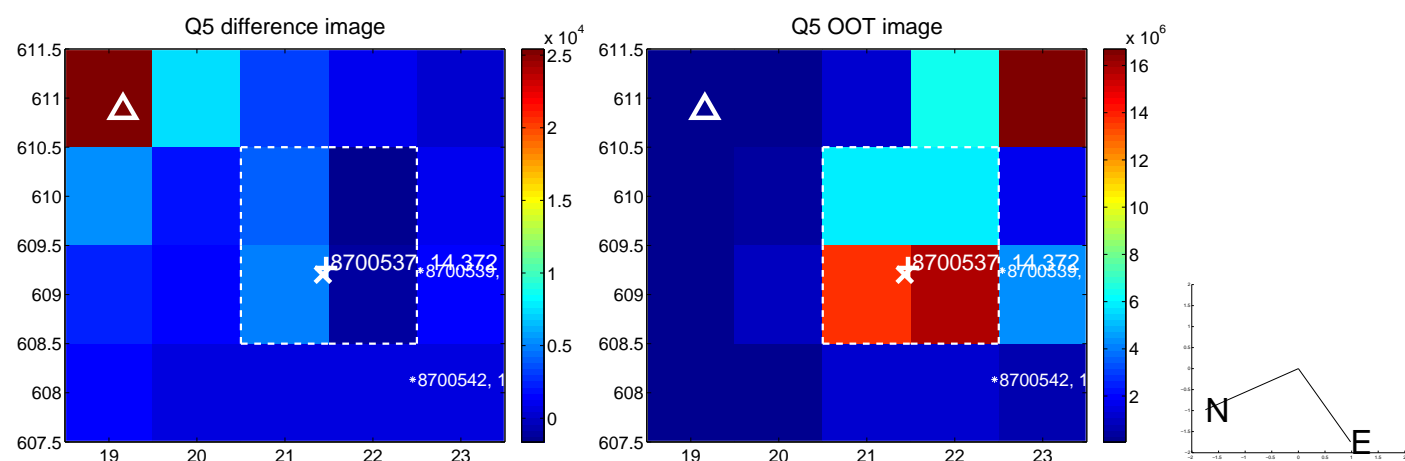


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

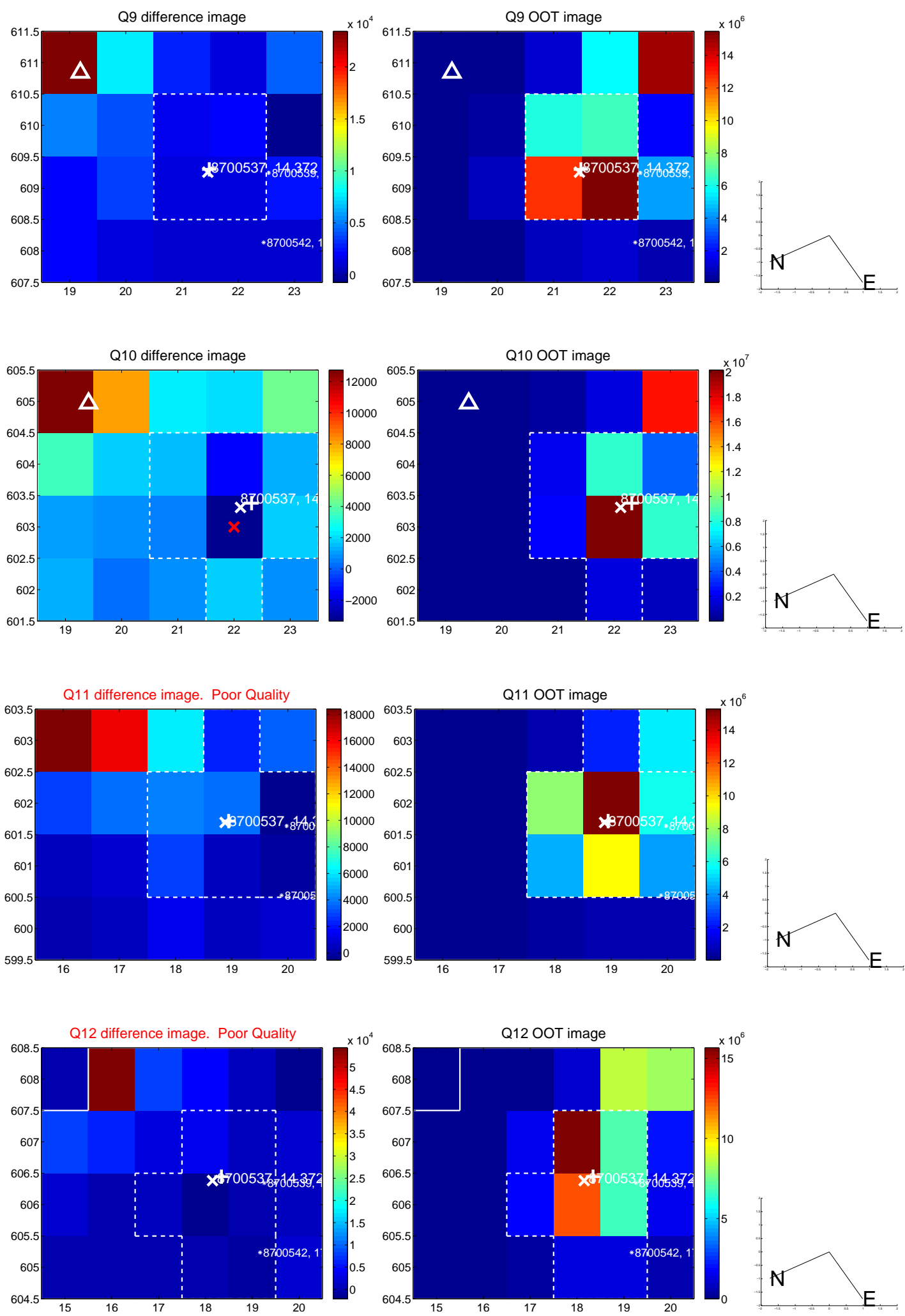
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



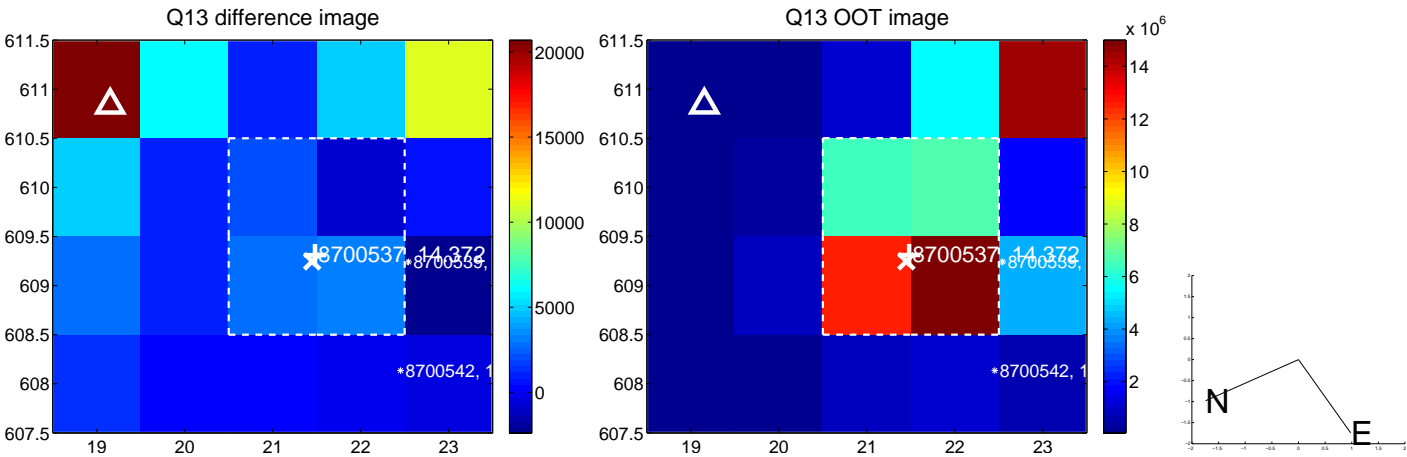
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



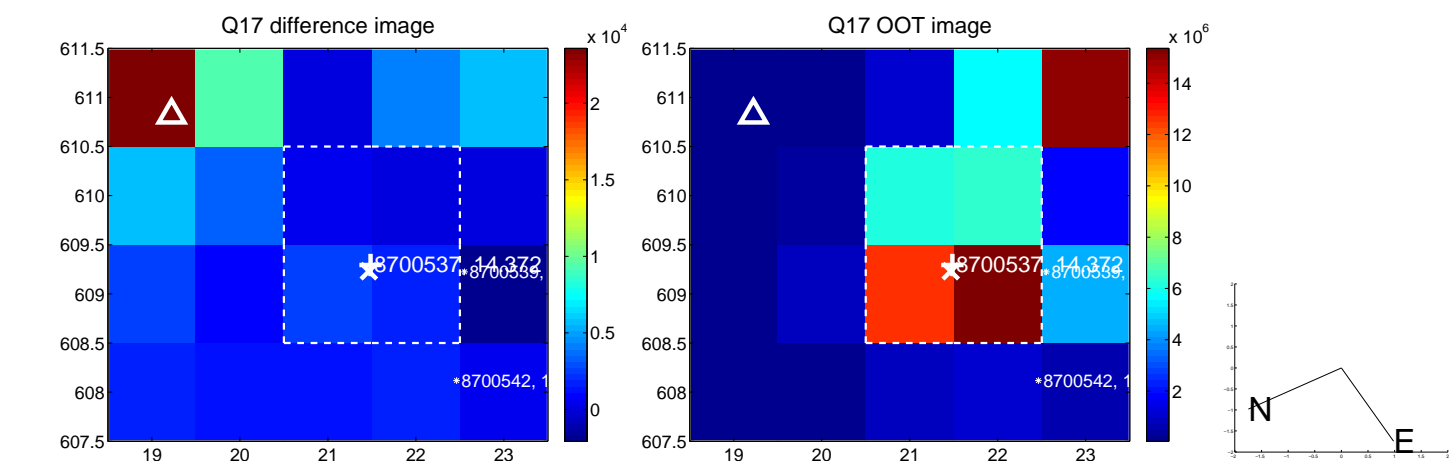
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



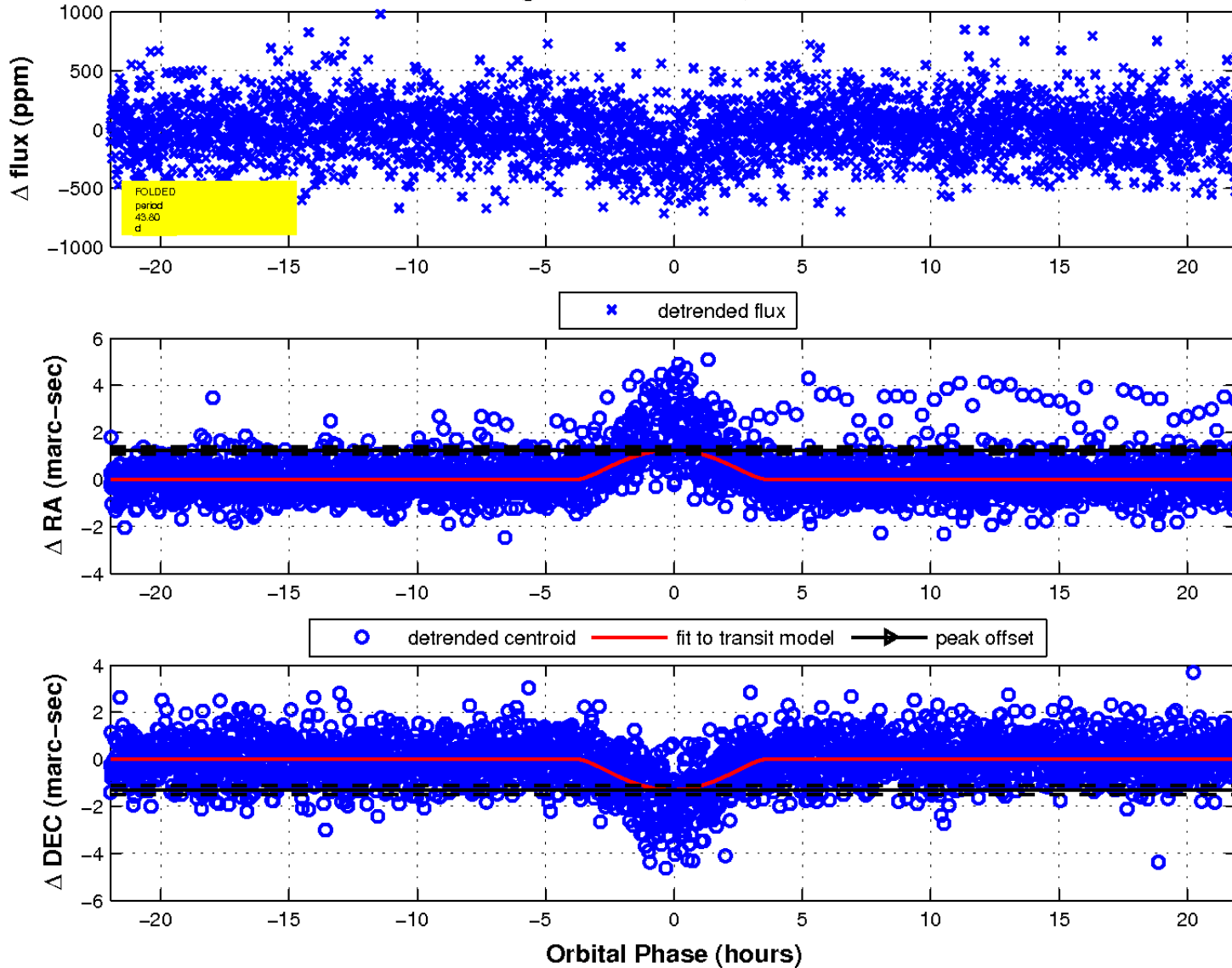
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

