

KIC 005471059

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})
005471059-01	OBS	3956.01	2.636891	132.078224	399.1	0.827	21.6	29.4	0.85	5524	1.71	457.48
005471059-02	OBS	No	2.636905	133.933681	207.1	1.312	16.9	19.3	0.85	5524	1.47	457.48
005471059-03	OBS	3956.02	12.424268	141.624811	146.5	33.073	10.6	14.3	0.85	5524	1.99	57.92
005471059-04	OBS	No	12.424849	134.001105	120.6	29.083	10.3	14.3	0.85	5524	1.27	57.91

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005471059-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
005471059-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
005471059-03	OBS	FP	0.00	1	0	1	1	LPP_DV—HALO_GHOST—EPHEM_MATCH
005471059-04	OBS	FP	0.00	1	0	1	1	LPP_DV—SAME_NTL_PERIOD—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.

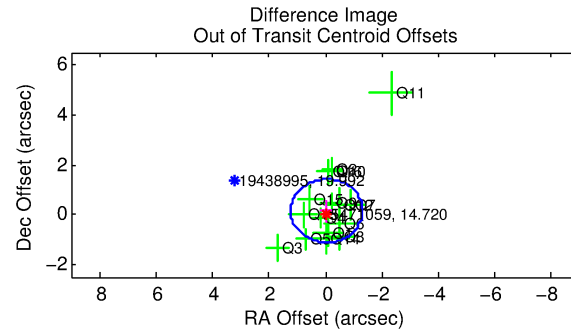
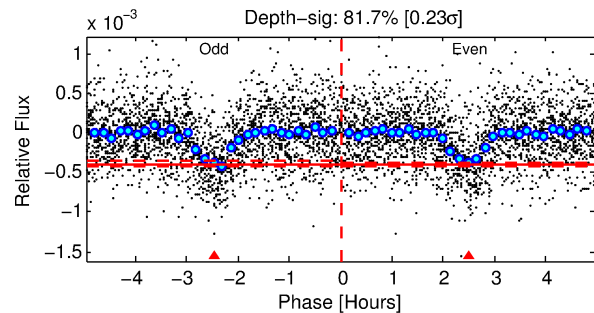
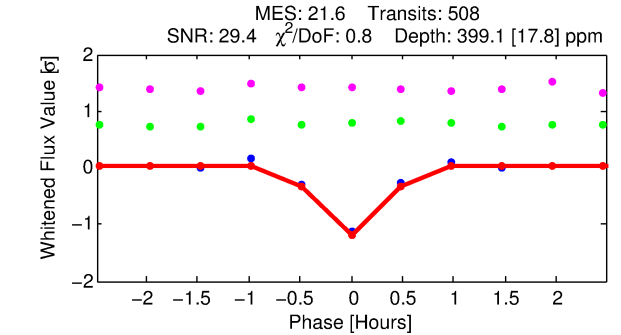
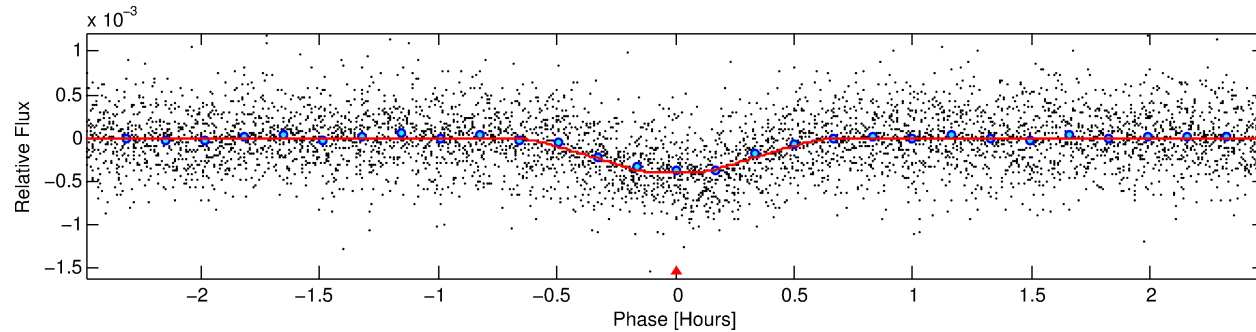
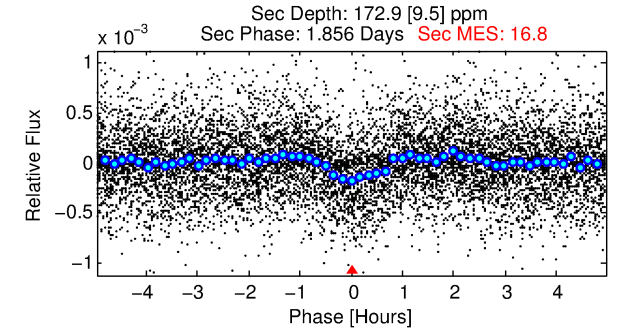
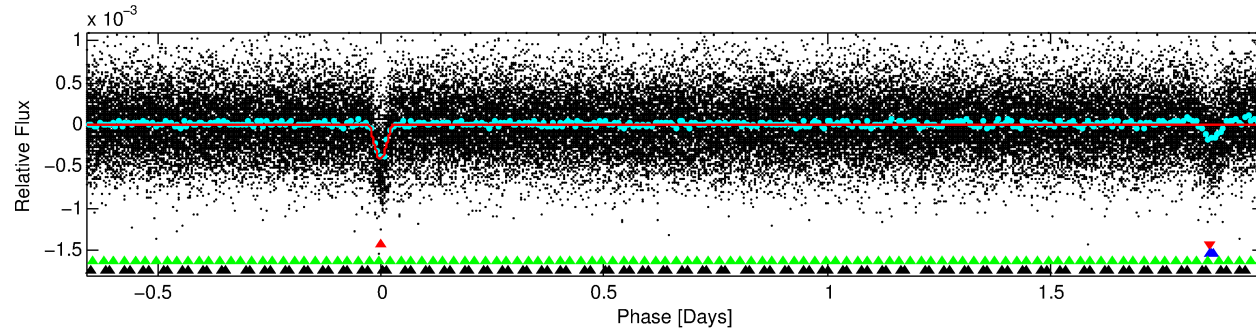
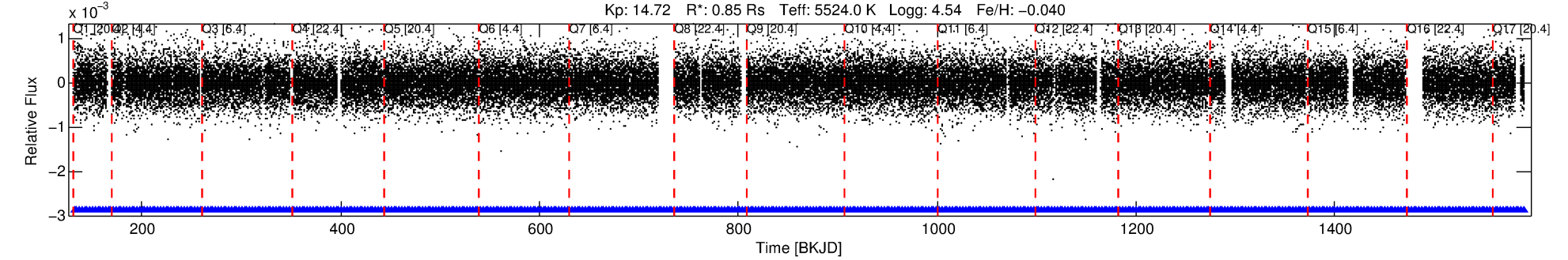
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005471059-01

No Significant Match Found

DV One-Page Summary

KIC: 5471059 Candidate: 1 of 4 Period: 2.637 d
KOI: K03956.01 Corr: 0.887



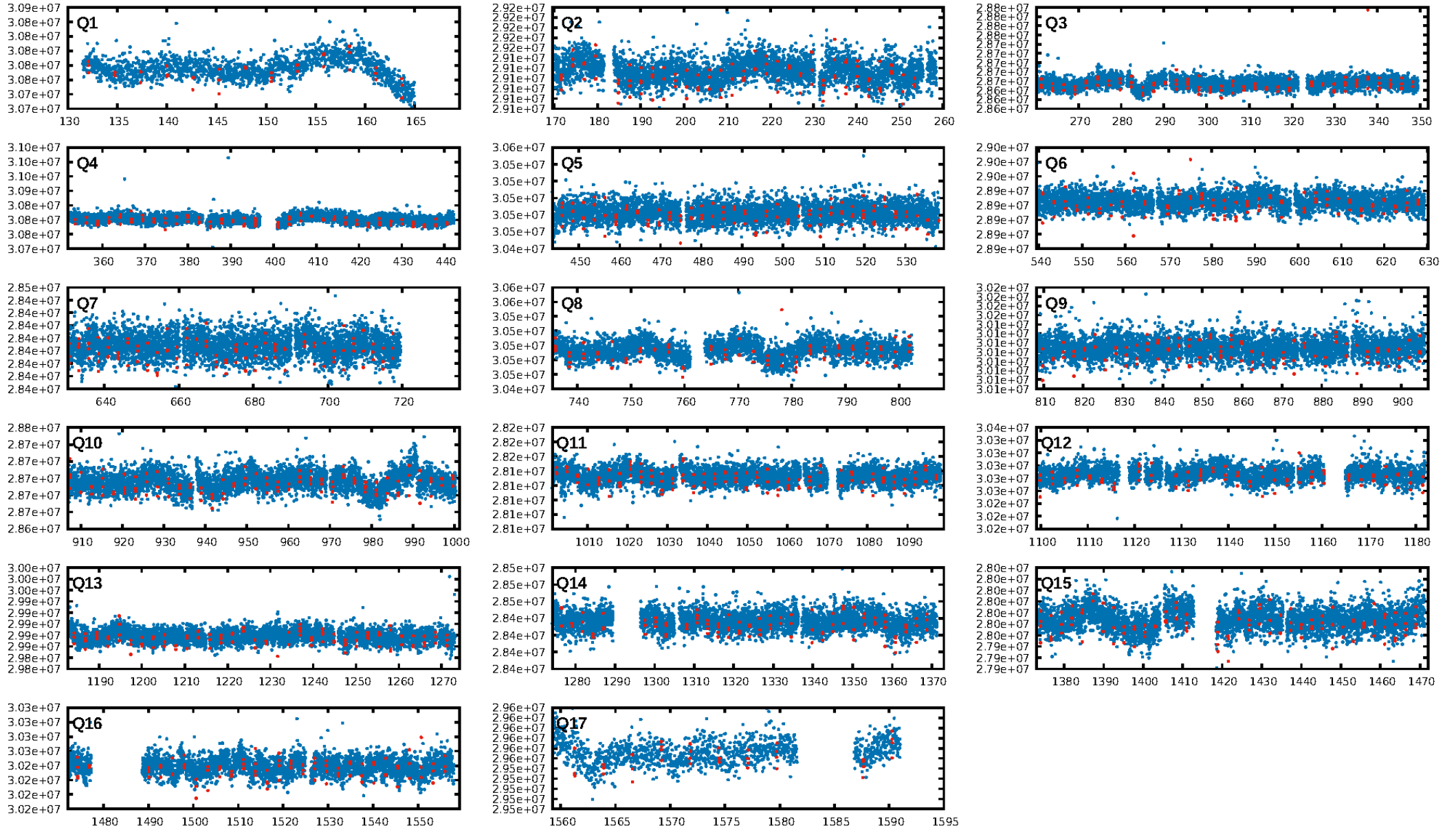
DV Fit Results:

Period = 2.63689 [0.00000] d
Epoch = 132.0782 [0.0005] BKJD
Rp/R* = 0.0185 [0.0078]
a/R* = 23.58 [40.39]
b = 0.32 [4.89]
Seff = 457.48 [148.80]
Teff = 1179 [96] K
Rp = 1.71 [0.84] Re
a = 0.0362 [0.0075] AU
Ag = 42.47 [37.97] [1.09 σ]
Teffp = 4655 [993] K [3.48 σ]

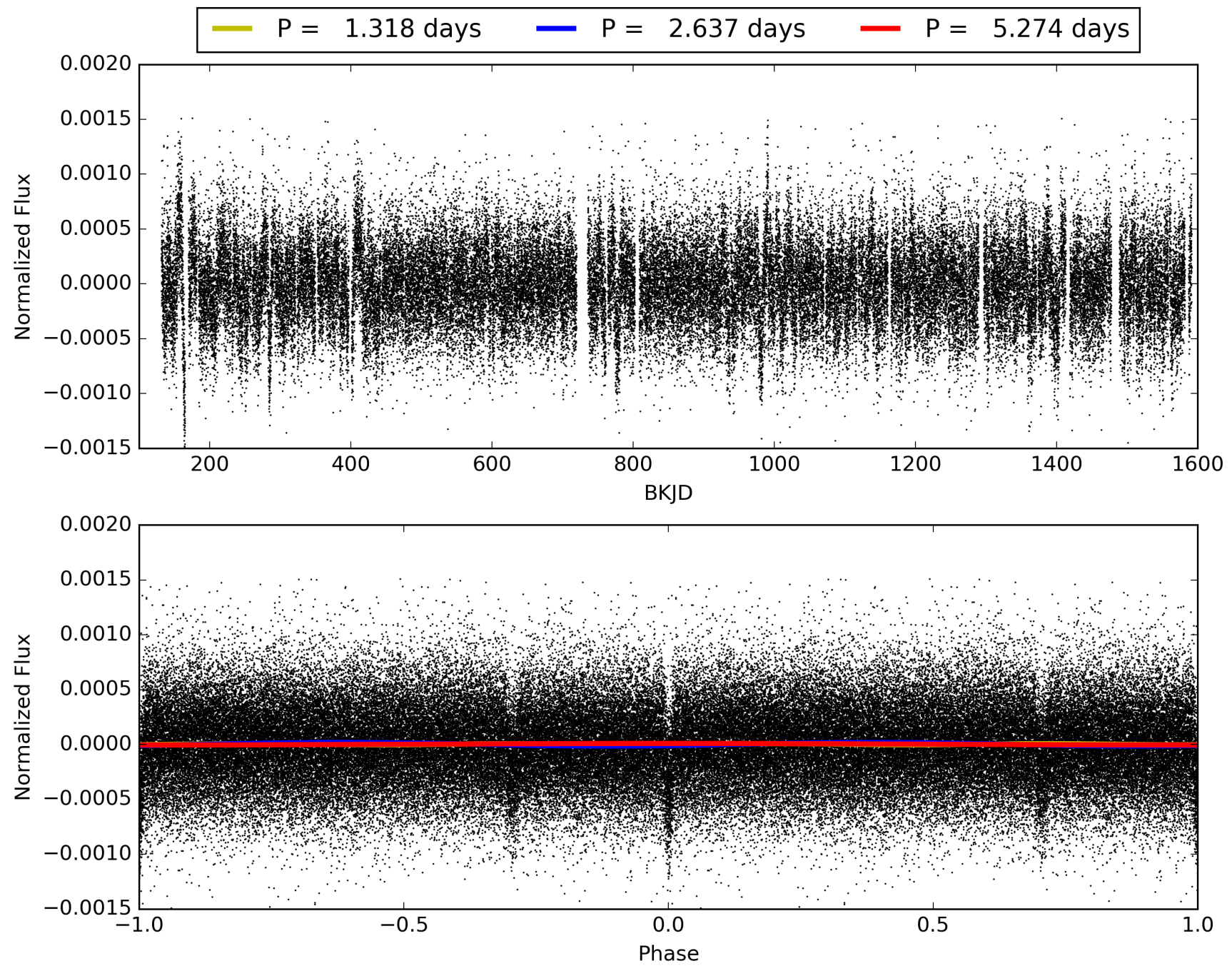
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 9.46e-102
RollingBand-fgt: 1.00 [485/485]
GhostDiagnostic-chr: 4.667
Centroid-sig: 0.0%
Centroid-so: 0.975 arcsec [2.34 σ]
OotOffset-rm: 0.152 arcsec [0.36 σ]
KicOffset-rm: 0.365 arcsec [1.05 σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.94 [15/16]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 005471059-01, PDC Light Curves

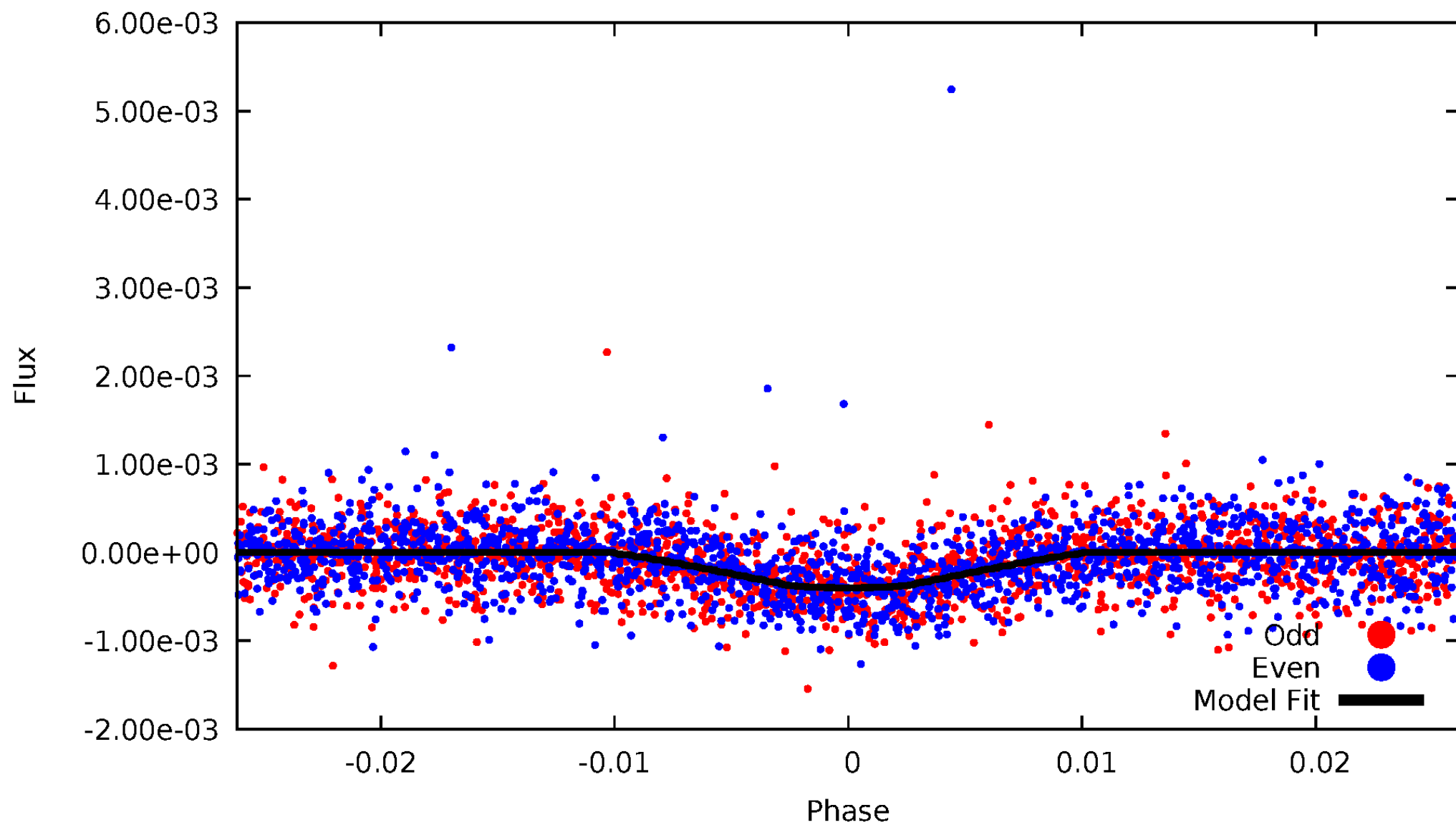


TCE 005471059-01



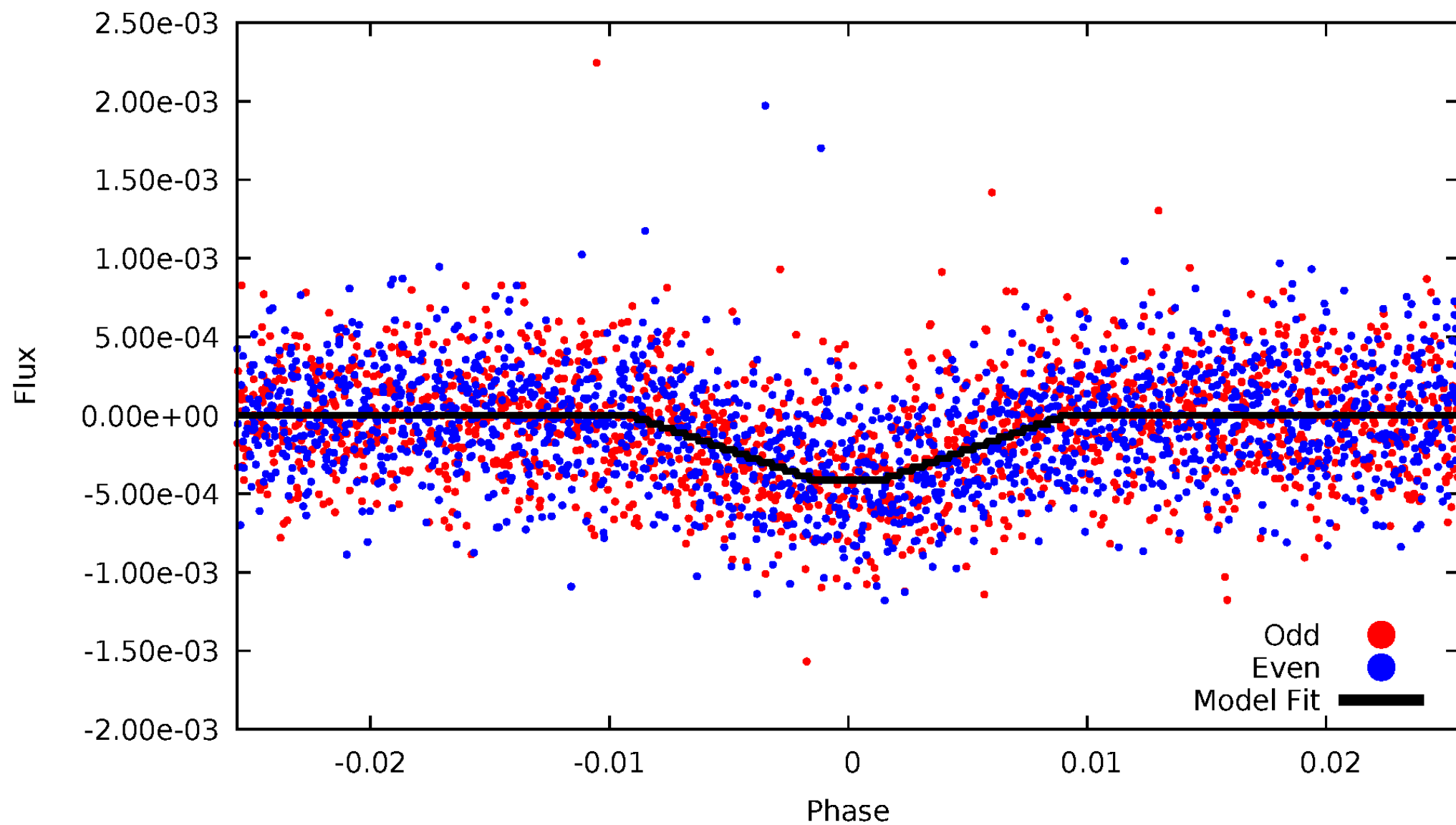
DV Odd/Even

TCE 005471059-01



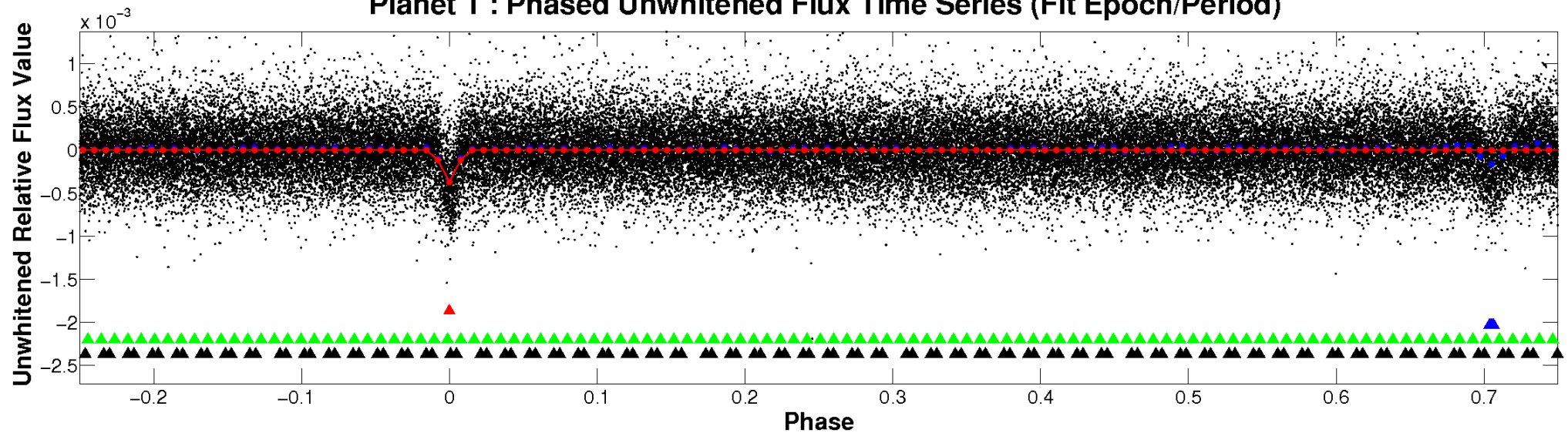
ALT Odd/Even

TCE 005471059-01

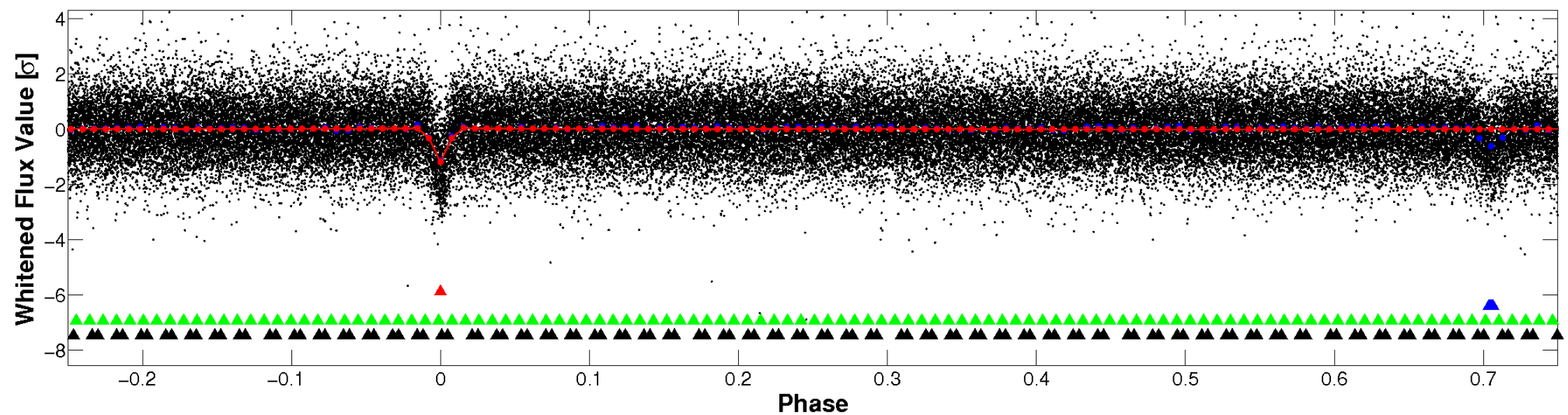


Non-Whitened Vs. Whitened Light Curve

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

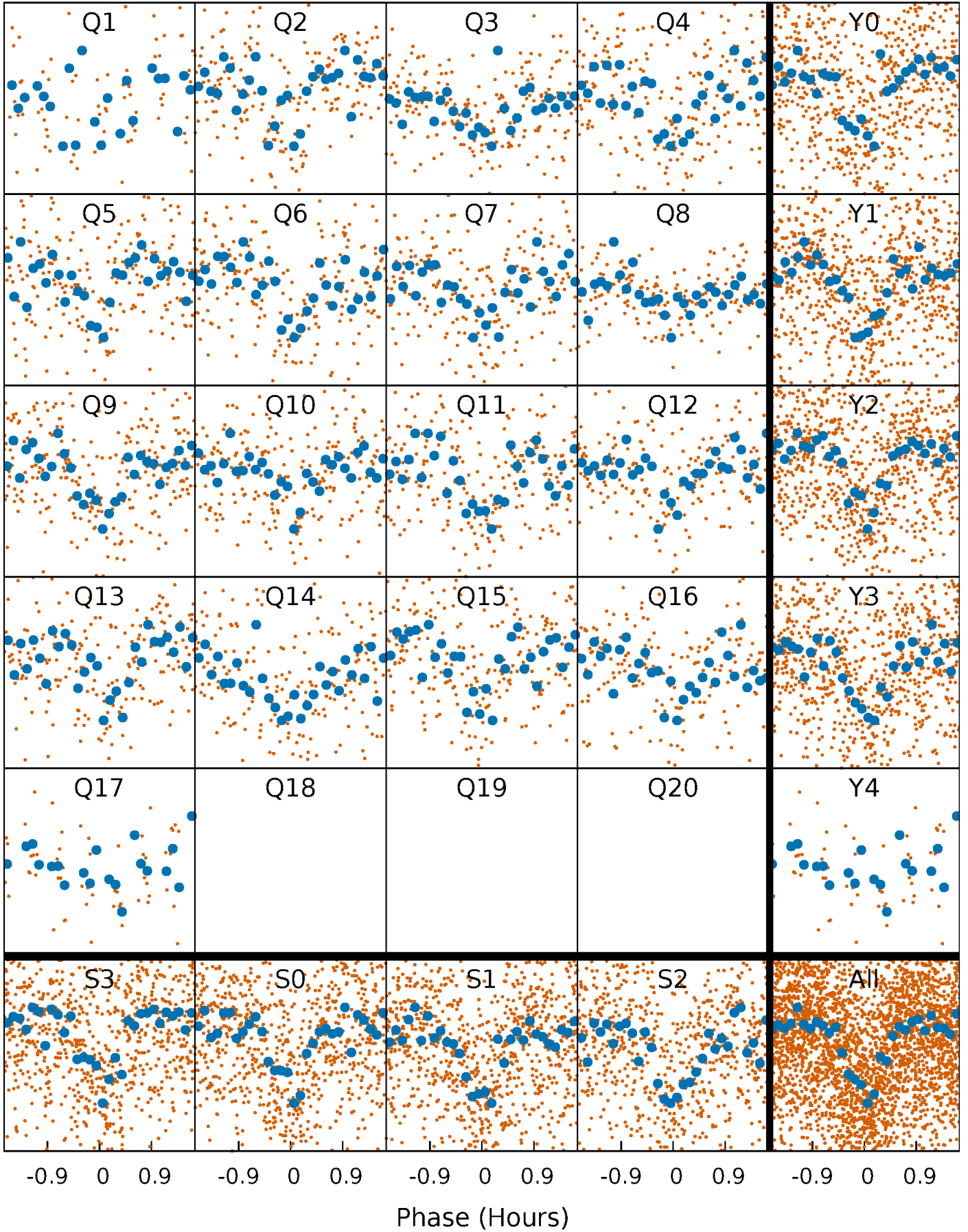


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



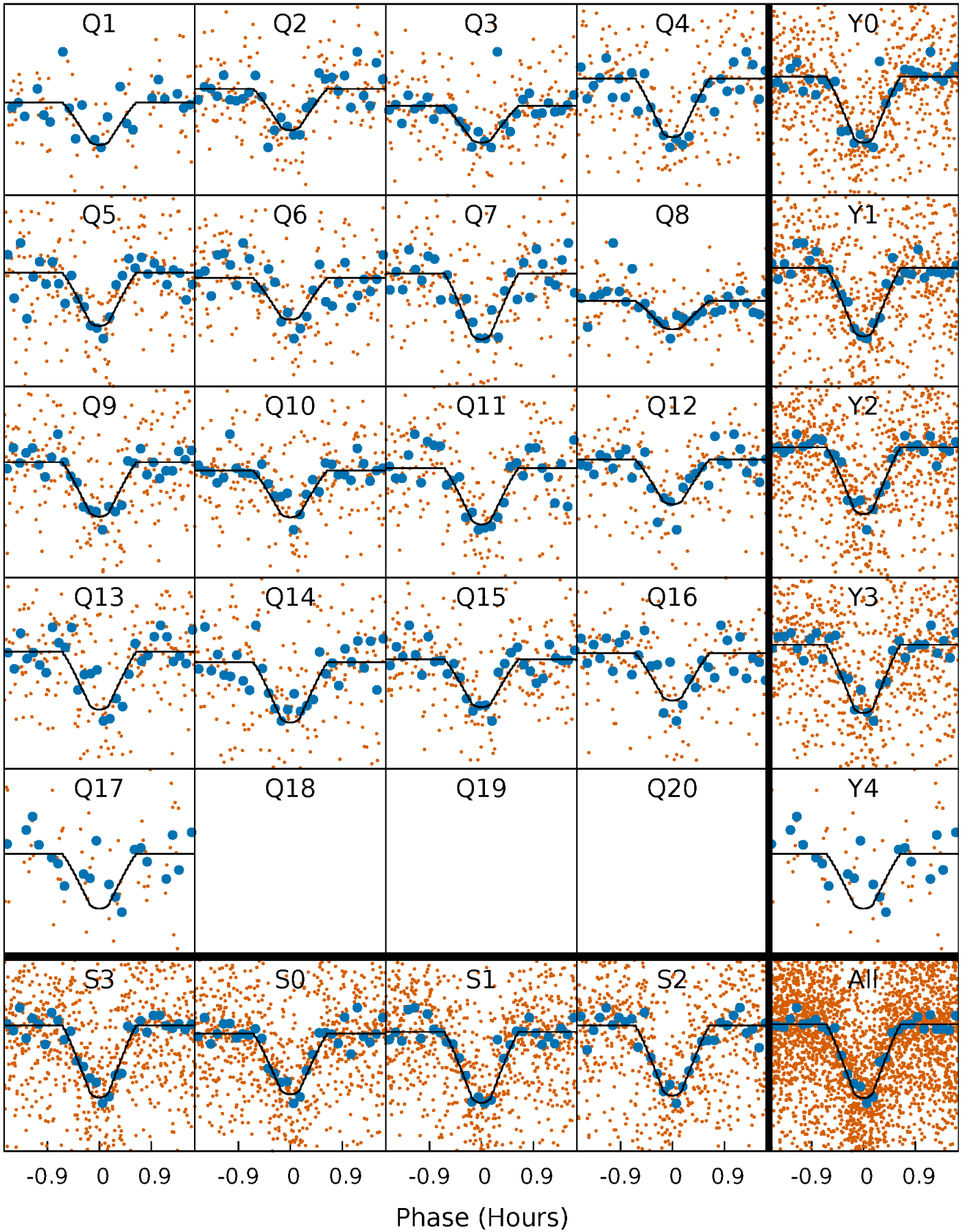
PDC Quarter-Phased Transit Curves

TCE 005471059-01 P= 2.636891 Days $T_0=132.078224$ (BKJD)



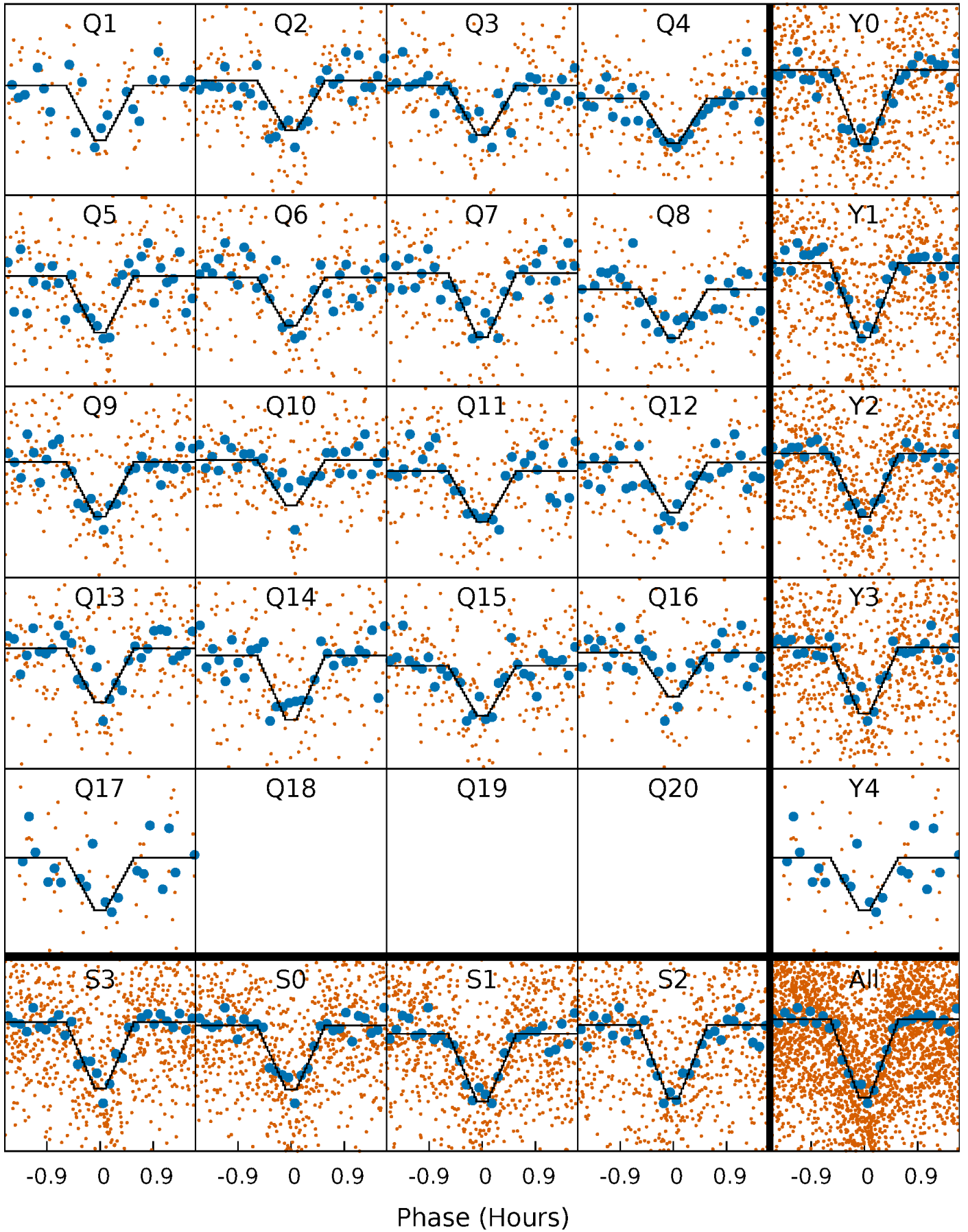
DV Quarter-Phased Transit Curves

TCE 005471059-01 $P = 2.636891$ Days $T_0 = 132.078224$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

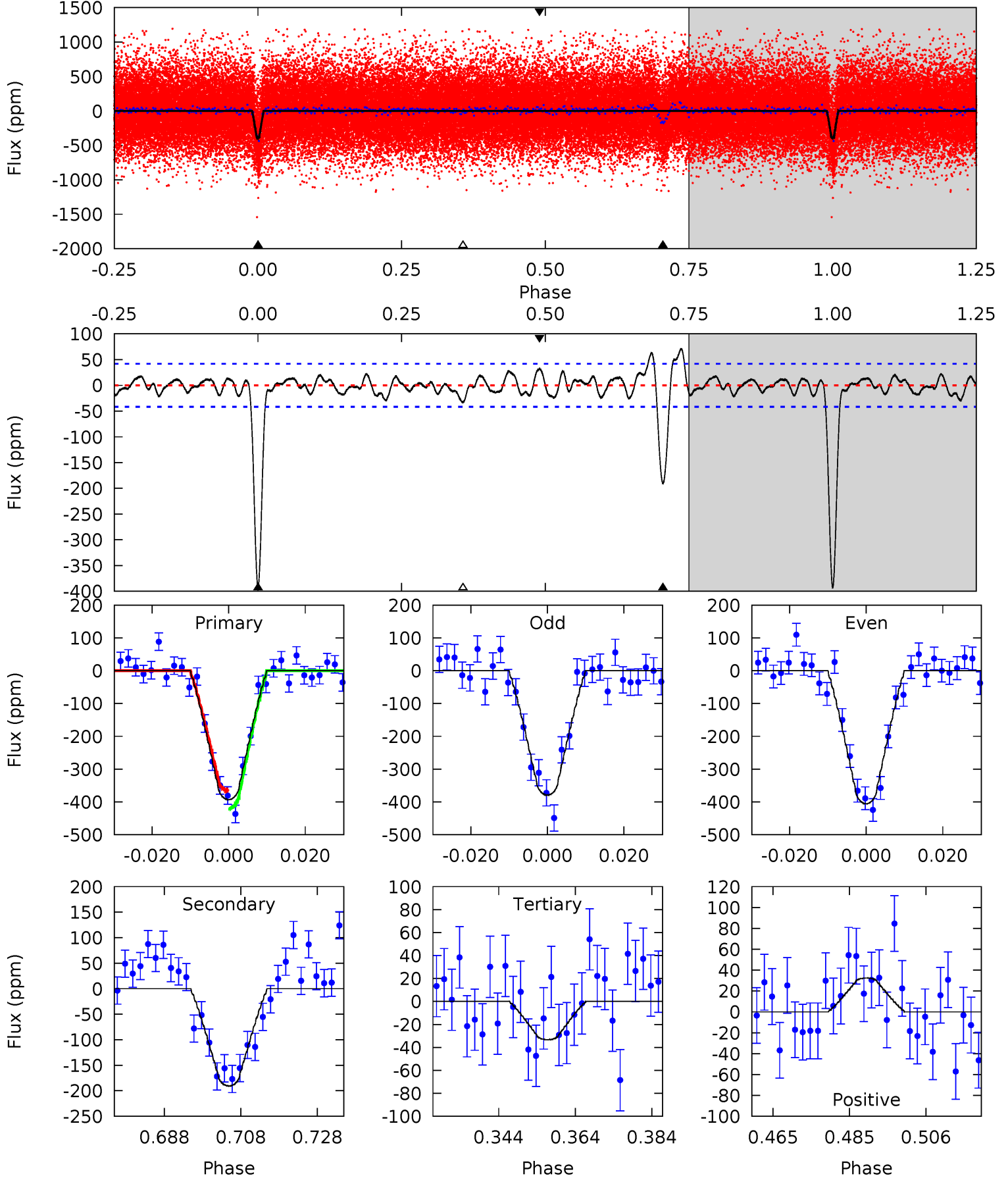
TCE 005471059-01 P= 2.636897 Days $T_0=132.077168$ (BKJD)



DV Model-Shift Uniqueness Test

005471059-01, P = 2.636891 Days, E = 129.441333 Days

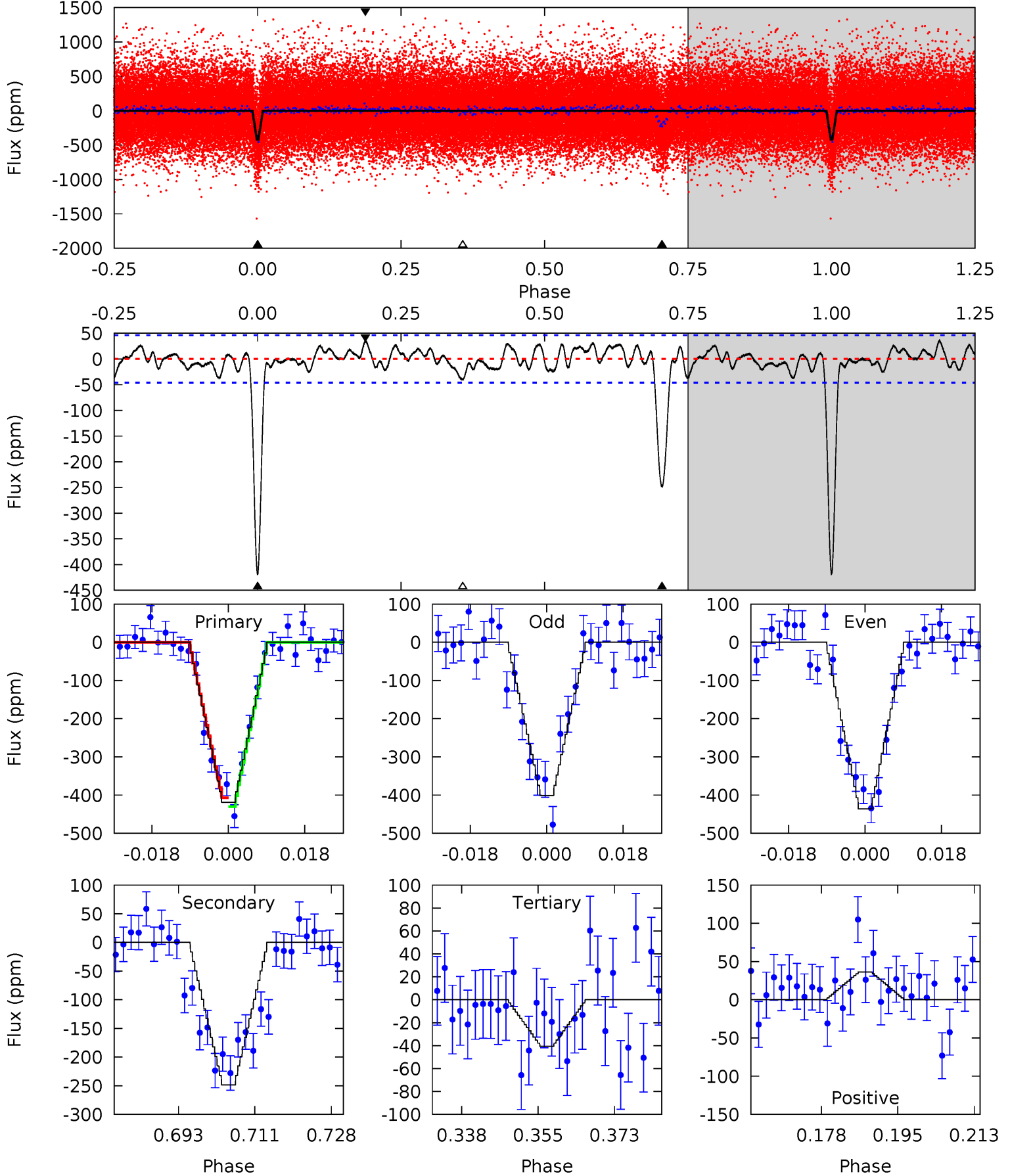
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
46.2	22.4	3.91	3.81	4.89	2.32	1.86	42.3	42.4	18.5	18.6	1.55	0.91	0.15	3.18



Alt Model-Shift Uniqueness Test

005471059-01, P = 2.636897 Days, E = 129.440271 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
44.5	26.5	4.32	3.87	4.91	2.37	1.68	40.2	40.7	22.1	22.6	1.85	0.93	0.08	1.22



Stellar Parameters For KIC 005471059

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5524^{+166}_{-182}	$4.540^{+0.040}_{-0.160}$	$-0.040^{+0.300}_{-0.300}$	$0.847^{+0.213}_{-0.071}$	$0.908^{+0.092}_{-0.092}$	$2.102^{+0.449}_{-0.922}$
	+3%/-3%	+1%/-4%	+750%/-750%	+25%/-8%	+10%/-10%	+21%/-44%
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 005471059-01 / KOI 3956.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-191 ± 9	$1.73^{+0.81}_{-0.69}$	1674^{+94}_{-69}	4874^{+1354}_{-659}	44^{+84}_{-23}
Alt.	-249 ± 9	$1.98^{+0.74}_{-0.81}$	1672^{+100}_{-68}	4891^{+1299}_{-574}	45^{+83}_{-21}

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 $A_{obs} \gg 1.0$

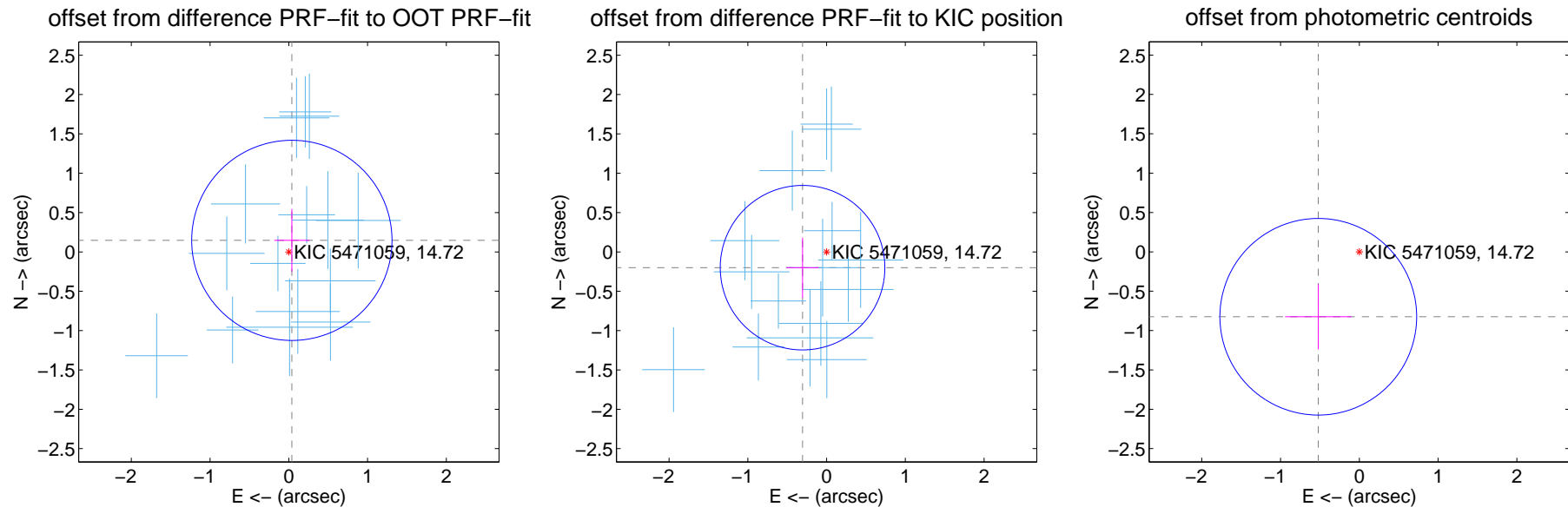
DV Centroid Data

Supplemental centroid analysis for 005471059-01. Kepler magnitude: 14.72. Transit SNR 29.40

There are 15 quarters with good PRF difference image offsets

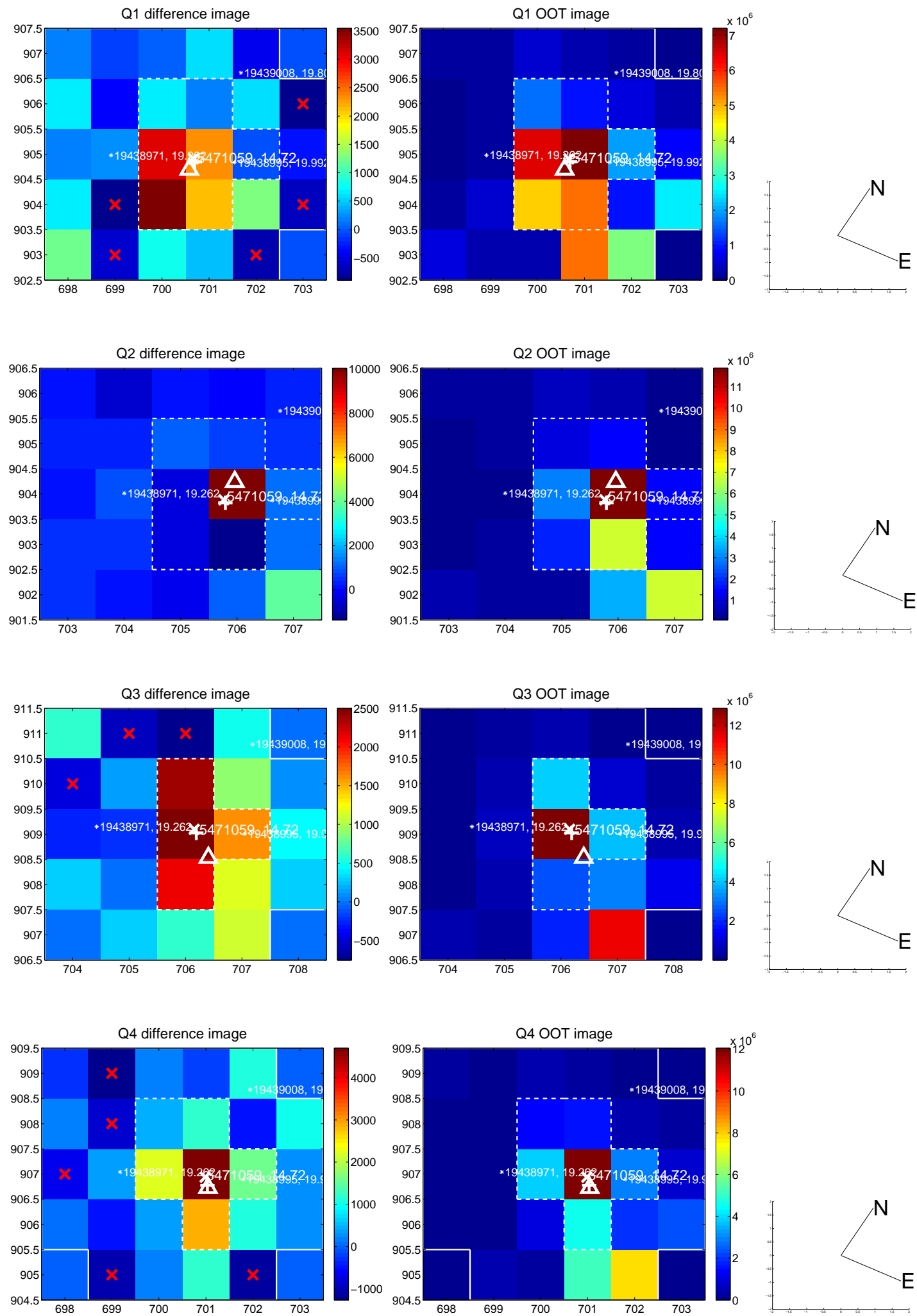
The direct PRF centroid is offset from the target star catalog position by about 0.86 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.152 ± 0.424	0.36	-0.038 ± 0.223	0.147 ± 0.398
PRF-fit source offset from KIC position	0.365 ± 0.348	1.05	0.305 ± 0.205	-0.200 ± 0.382
photometric centroid source offset	0.98 ± 0.42	2.34	0.52 ± 0.42	-0.82 ± 0.41

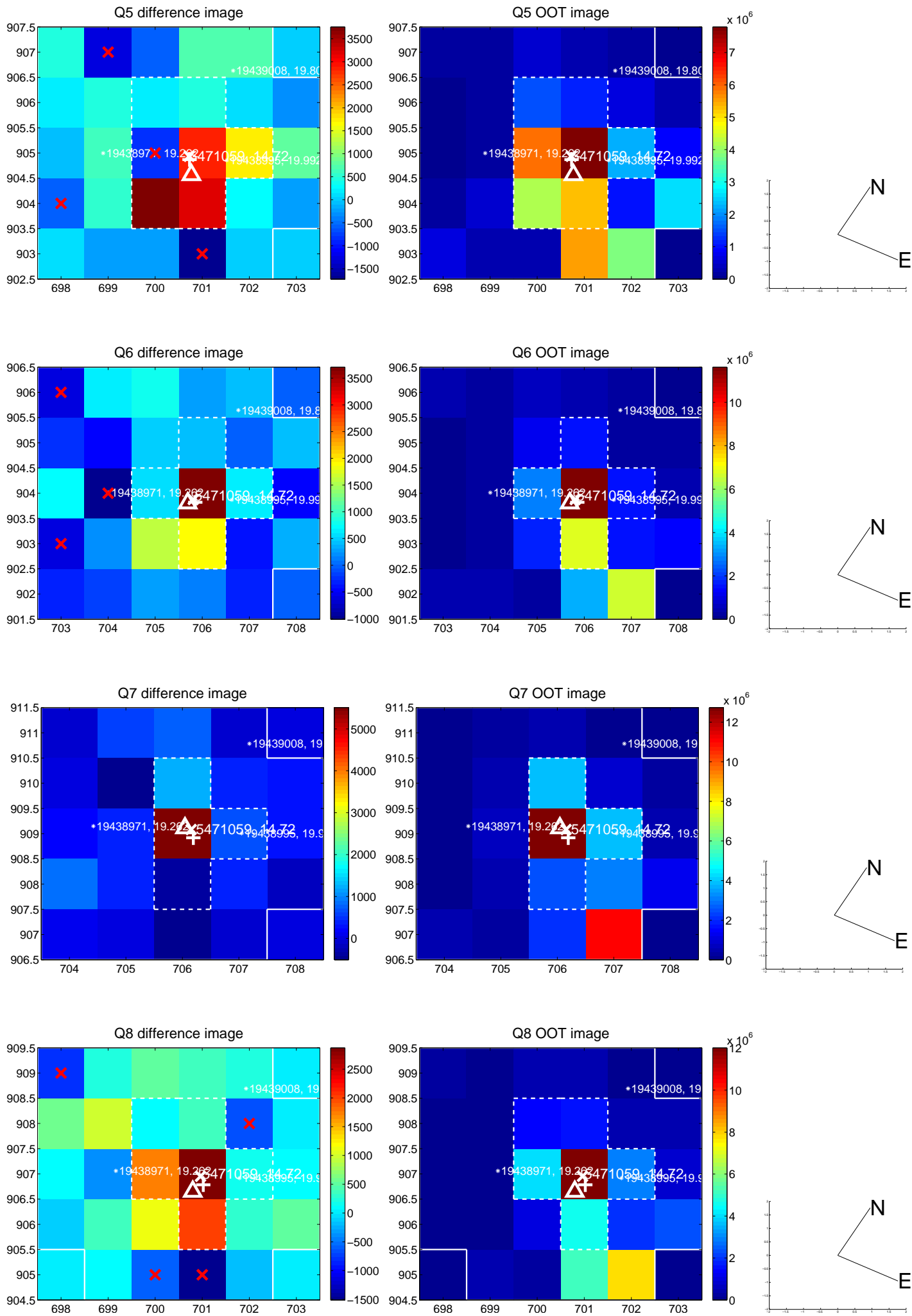


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

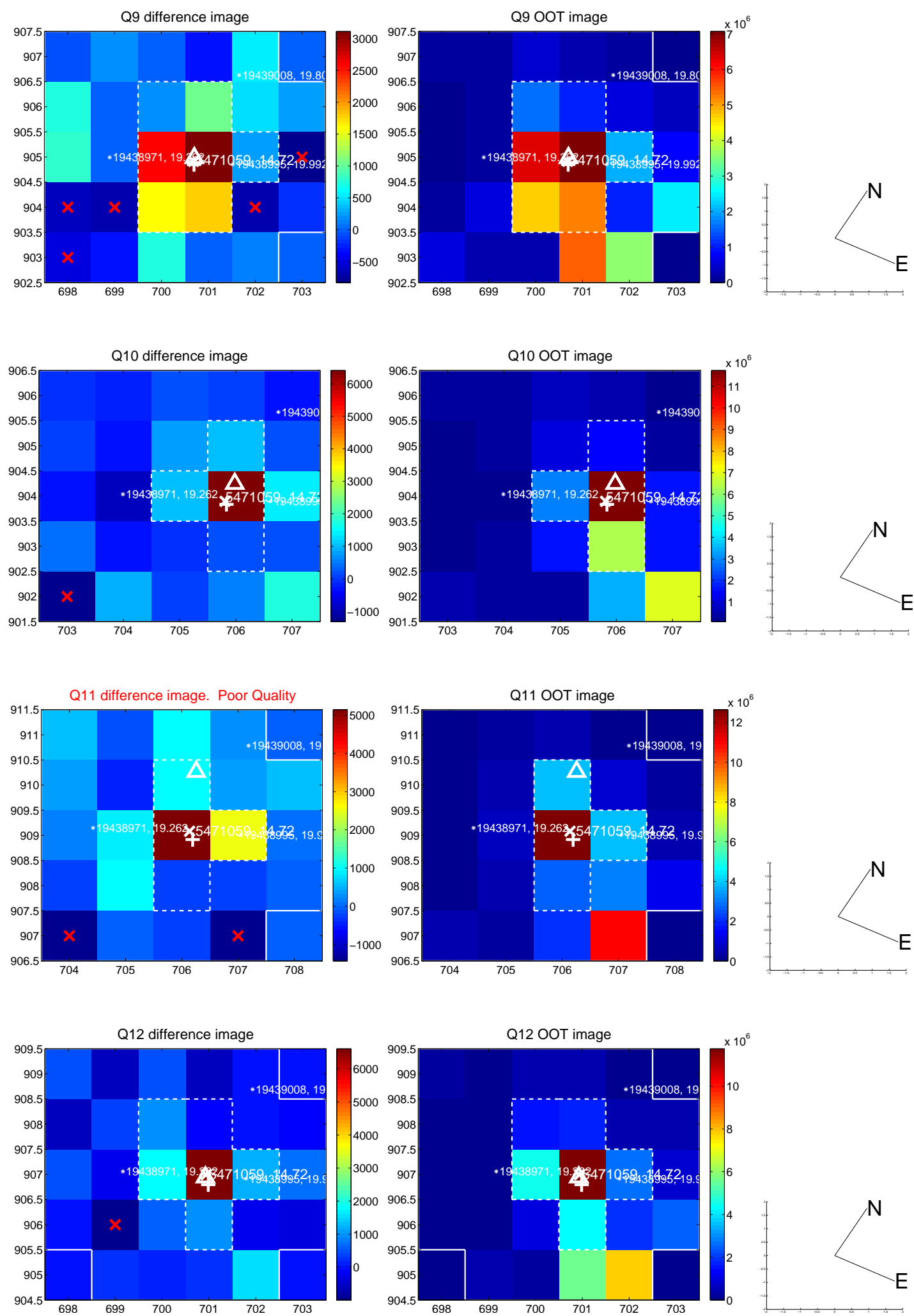
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



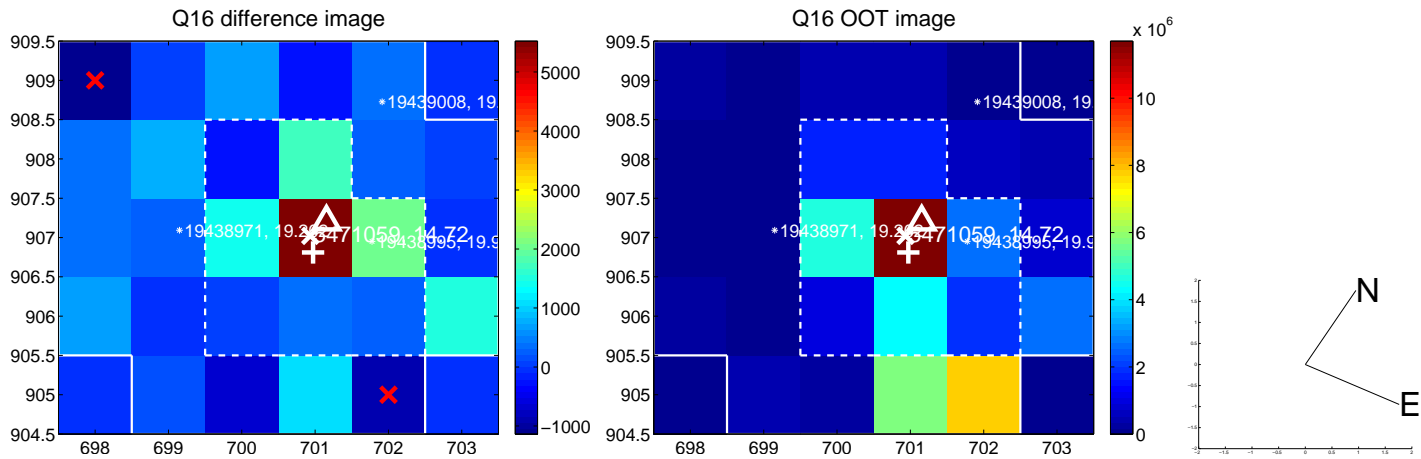
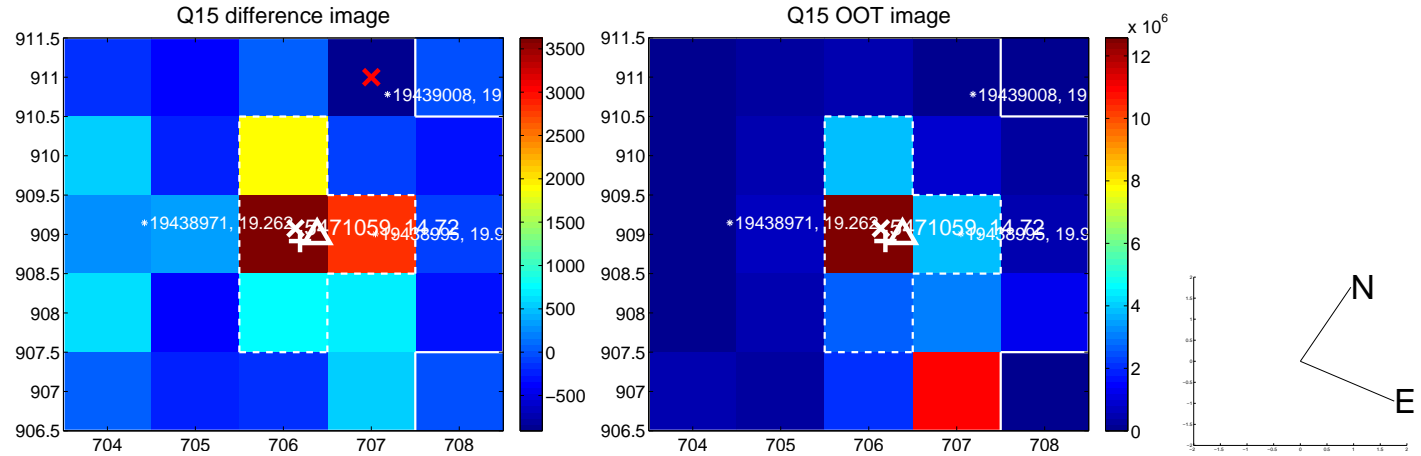
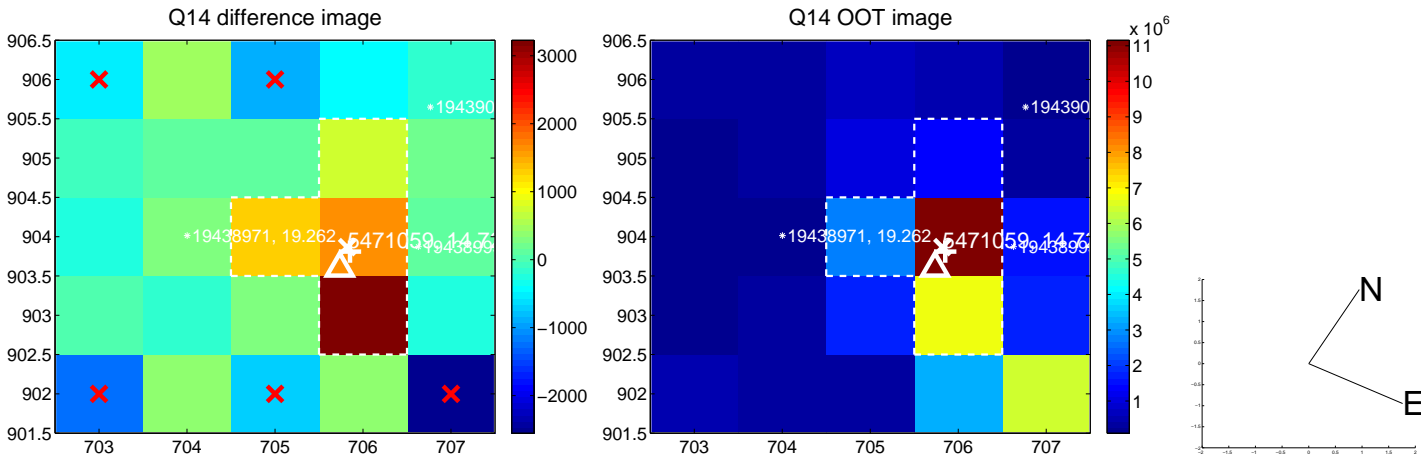
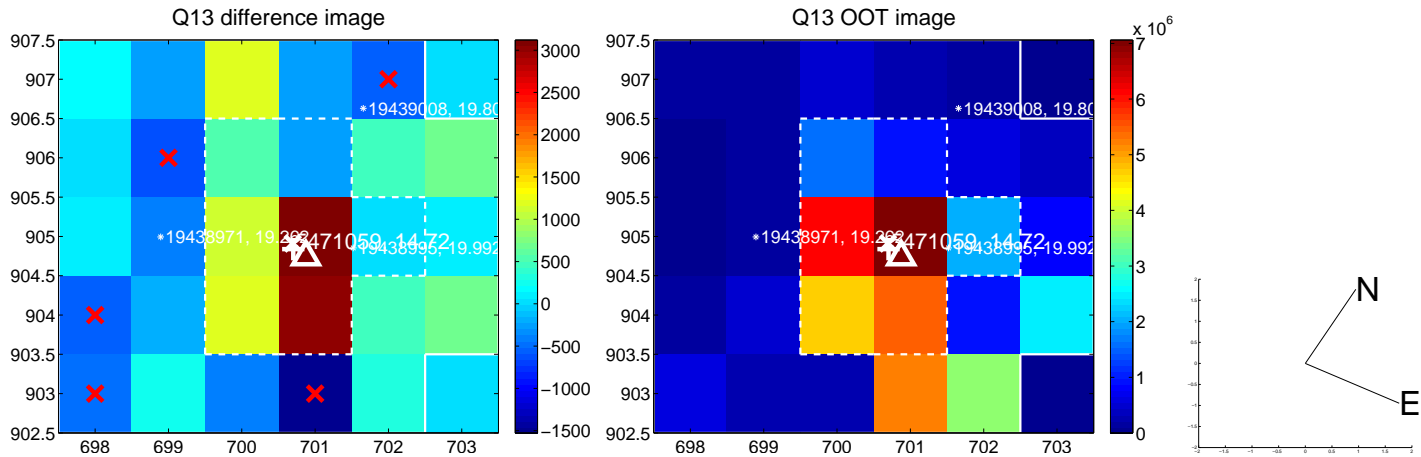
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



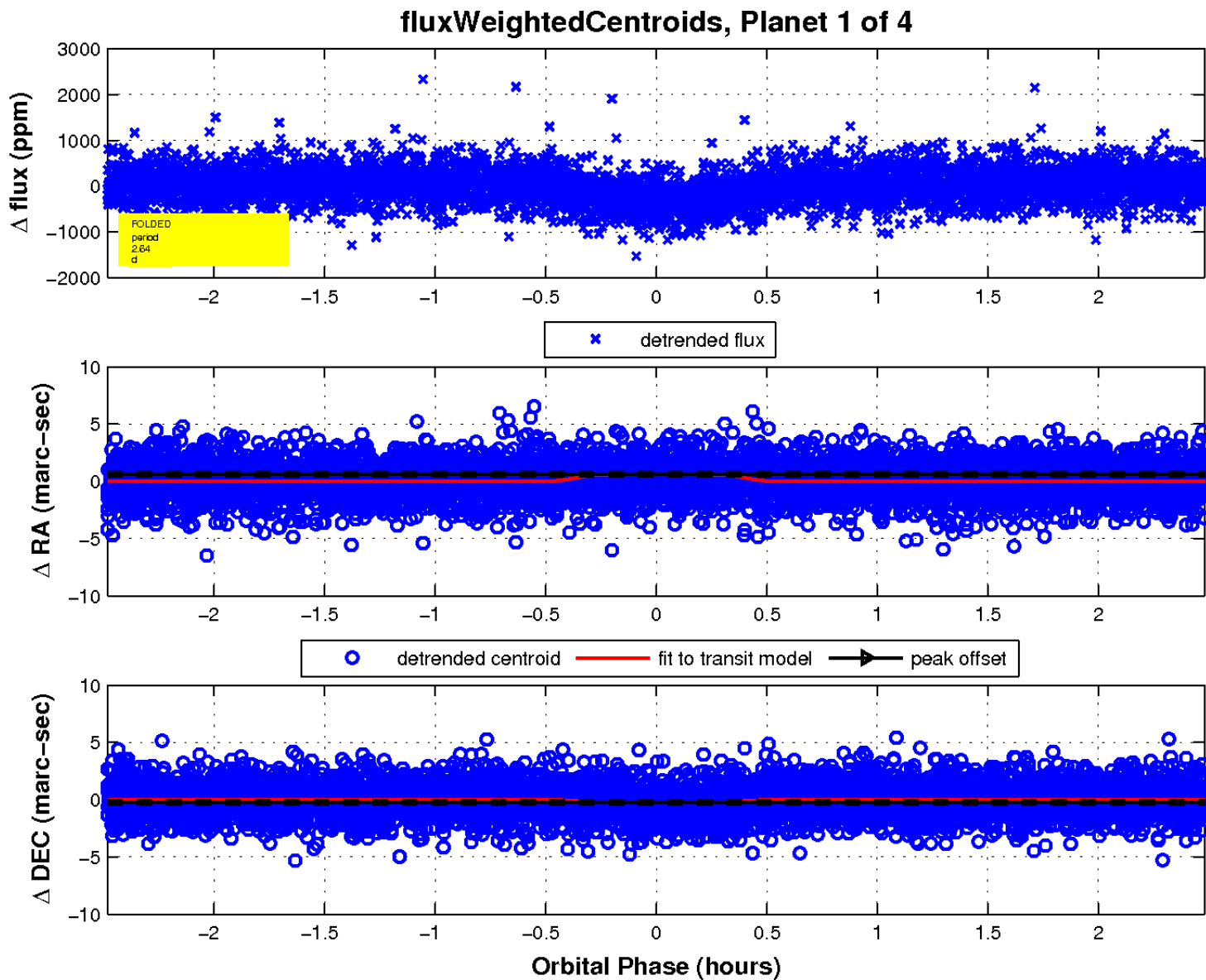
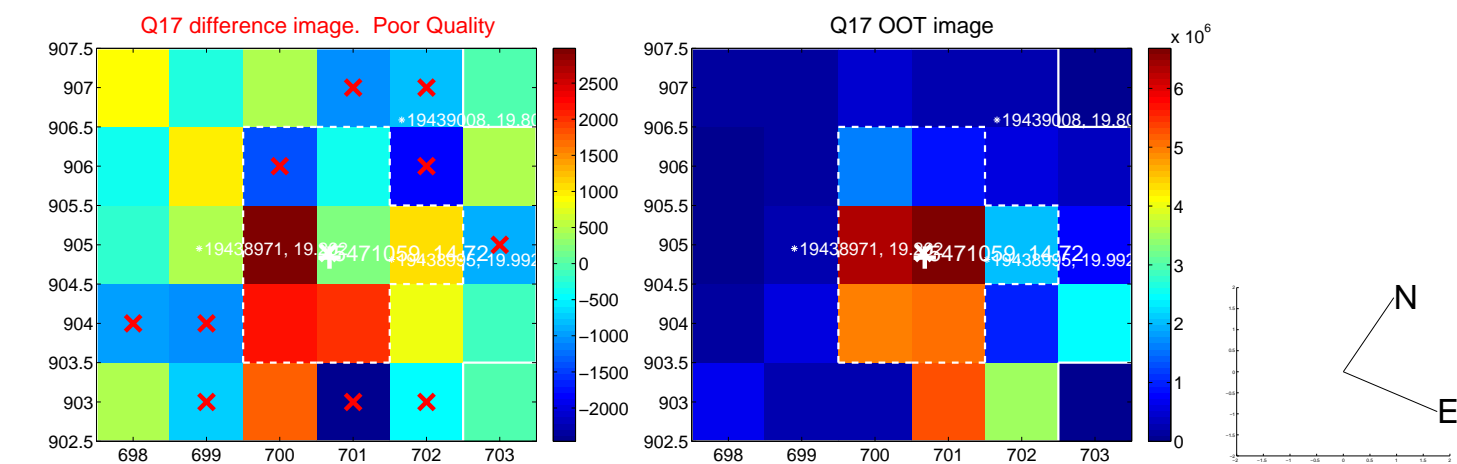
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



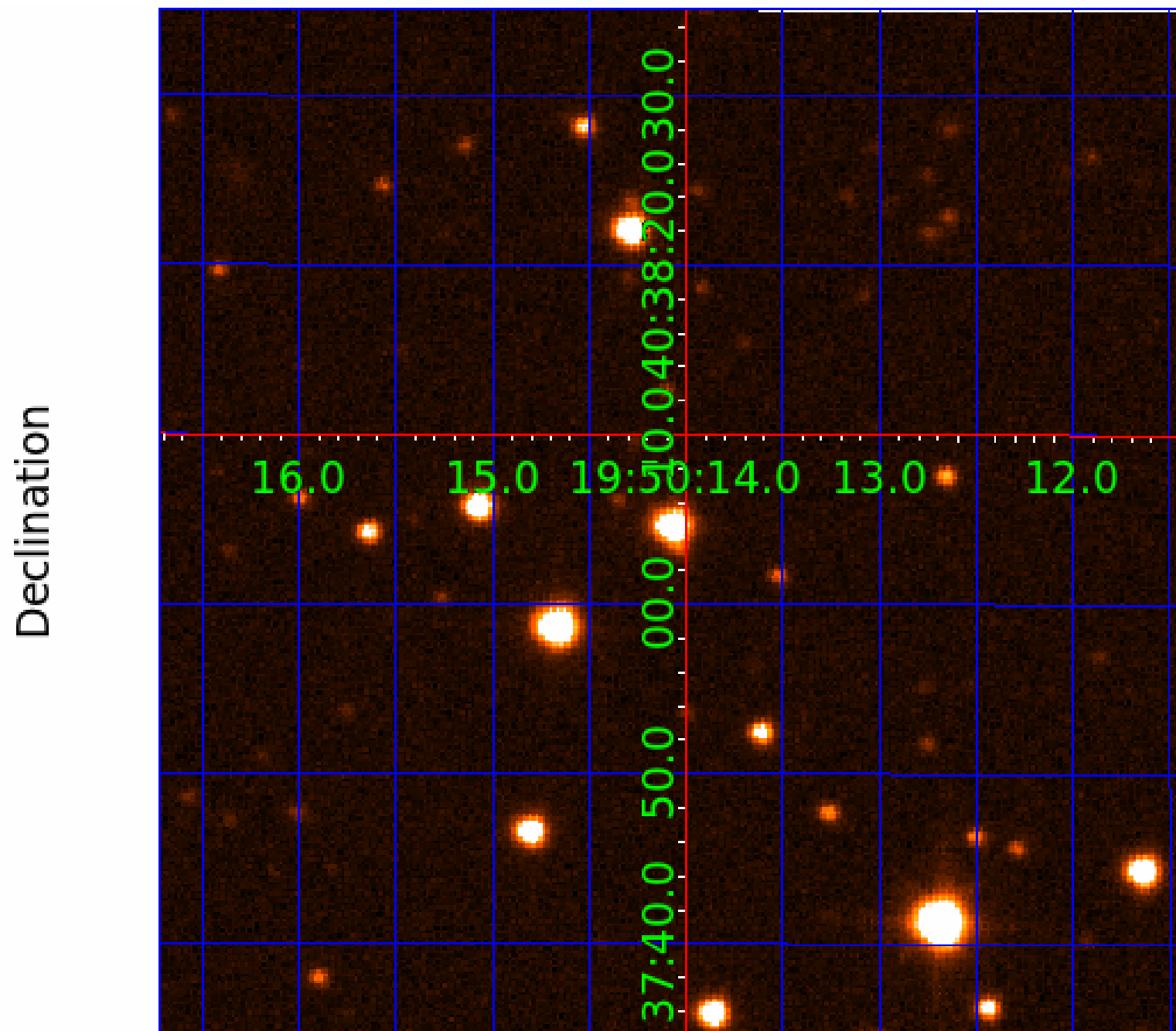
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 005471059

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})
005471059-01	OBS	3956.01	2.636891	132.078224	399.1	0.827	21.6	29.4	0.85	5524	1.71	457.48
005471059-02	OBS	No	2.636905	133.933681	207.1	1.312	16.9	19.3	0.85	5524	1.47	457.48
005471059-03	OBS	3956.02	12.424268	141.624811	146.5	33.073	10.6	14.3	0.85	5524	1.99	57.92
005471059-04	OBS	No	12.424849	134.001105	120.6	29.083	10.3	14.3	0.85	5524	1.27	57.91

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005471059-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
005471059-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
005471059-03	OBS	FP	0.00	1	0	1	1	LPP_DV—HALO_GHOST—EPHEM_MATCH
005471059-04	OBS	FP	0.00	1	0	1	1	LPP_DV—SAME_NTL_PERIOD—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 005471059-02

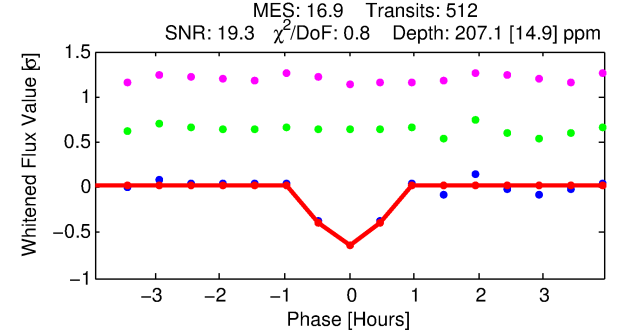
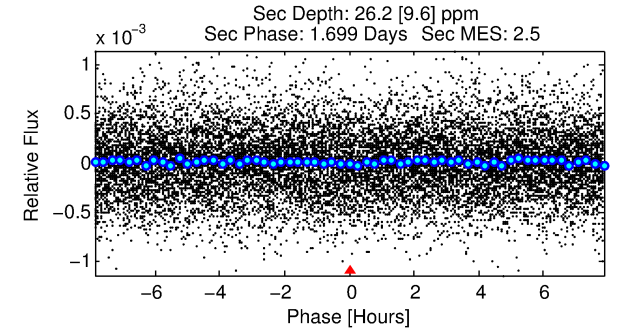
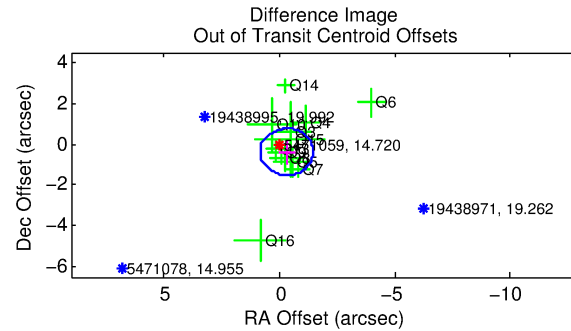
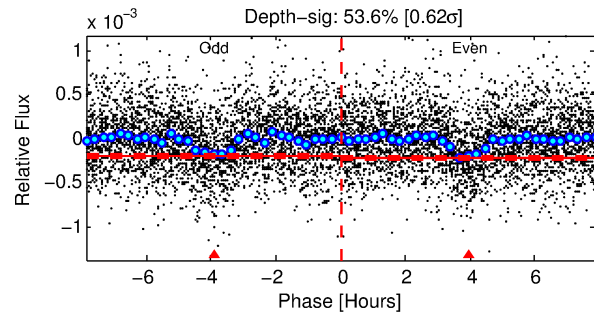
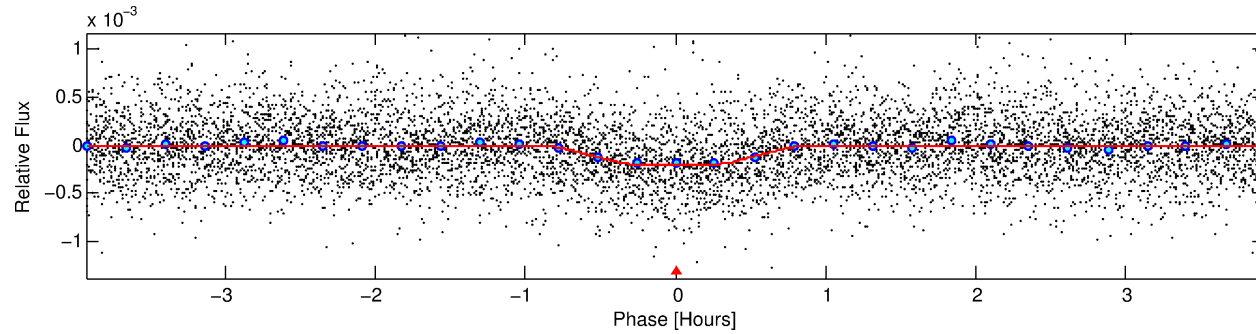
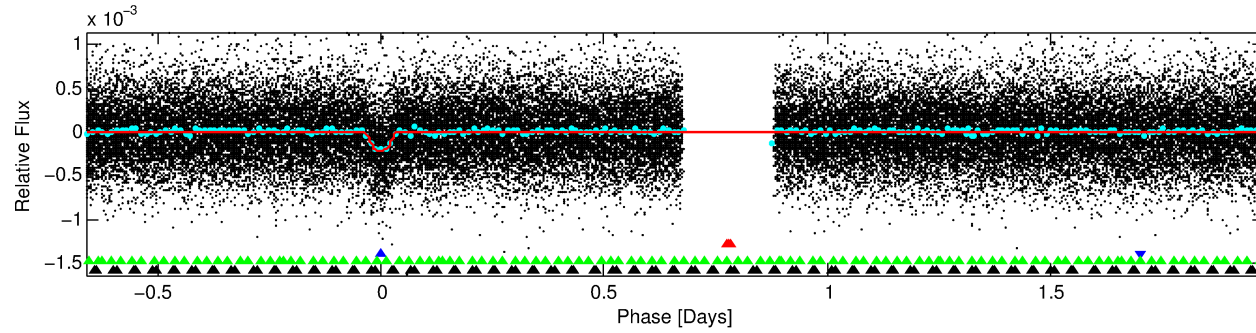
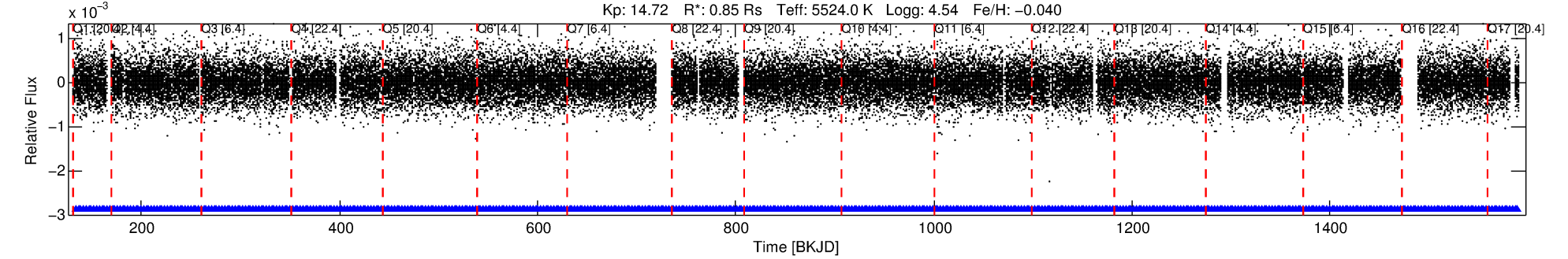
No Significant Match Found

DV One-Page Summary

KIC: 5471059 Candidate: 2 of 4 Period: 2.637 d

KOI: K03956 Corr: No Ephemeris Match

Kp: 14.72 R*: 0.85 Rs Teff: 5524.0 K Logg: 4.54 Fe/H: -0.040



DV Fit Results:

Period = 2.63690 [0.00001] d
Epoch = 133.9337 [0.0012] BKJD
Rp/R* = 0.0159 [0.0074]
a/R* = 7.22 [14.89]
b = 0.90 [0.44]
Seff = 457.48 [148.80]
Teff = 1179 [96] K
Rp = 1.47 [0.78] Re
a = 0.0362 [0.0075] AU
Ag = 8.70 [9.13] [0.84σ]
Teffp = 3132 [794] K [2.44σ]

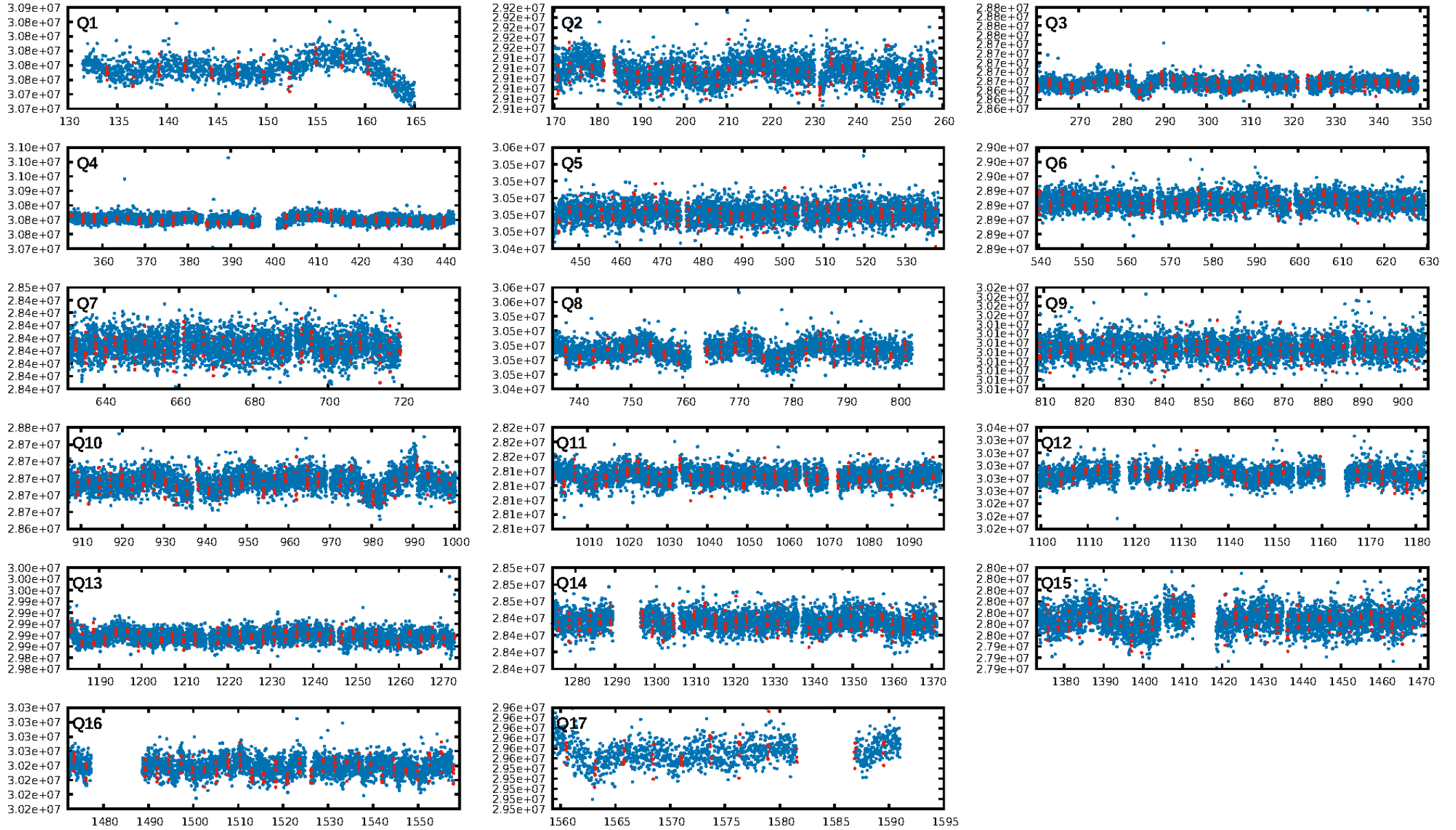
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: 100.0% [7.10σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 8.19e-64
RollingBand-fgt: 1.00 [489/489]
GhostDiagnostic-chr: 2.764
Centroid-sig: 12.4%
Centroid-so: 1.707 arcsec [2.61σ]
OotOffset-rm: 0.492 arcsec [1.30σ]
KicOffset-rm: 0.700 arcsec [1.25σ]
OotOffset-st: 3/3/3 [12]
KicOffset-st: 3/3/3 [12]
DiffImageQuality-fgm: 0.42 [5/12]
DiffImageOverlap-fno: 1.00 [17/17]

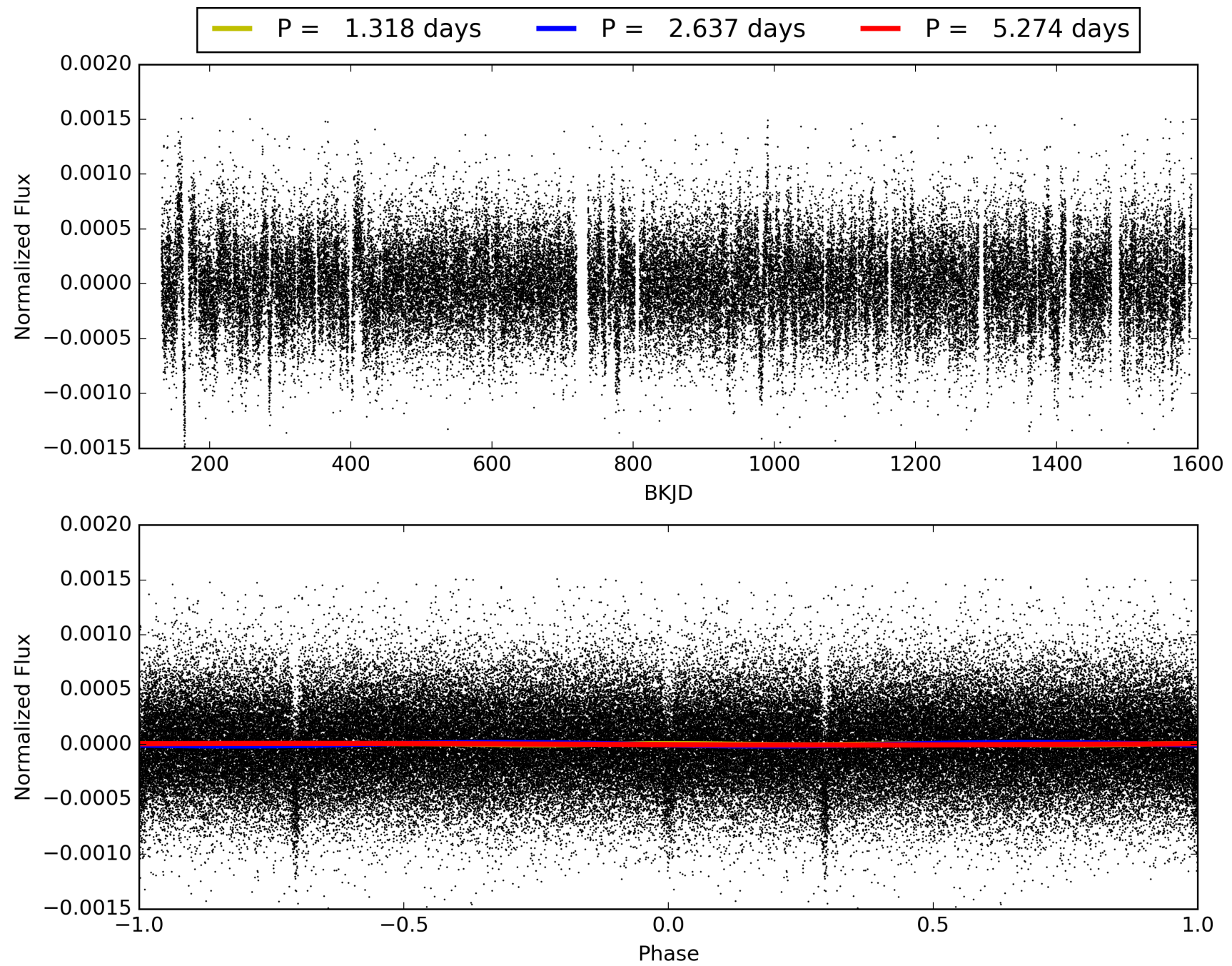
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:36:15 Z

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

TCE 005471059-02, PDC Light Curves

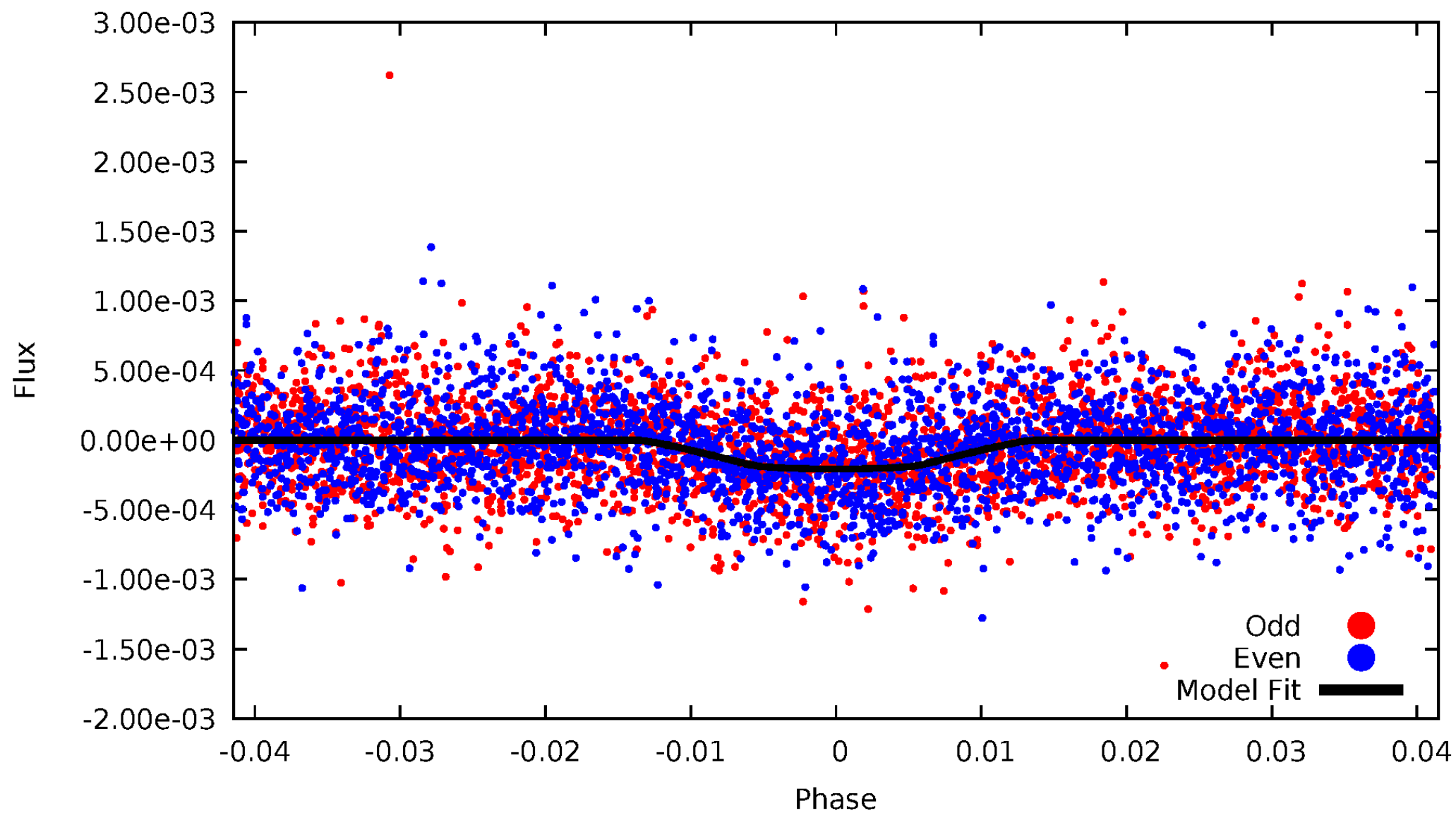


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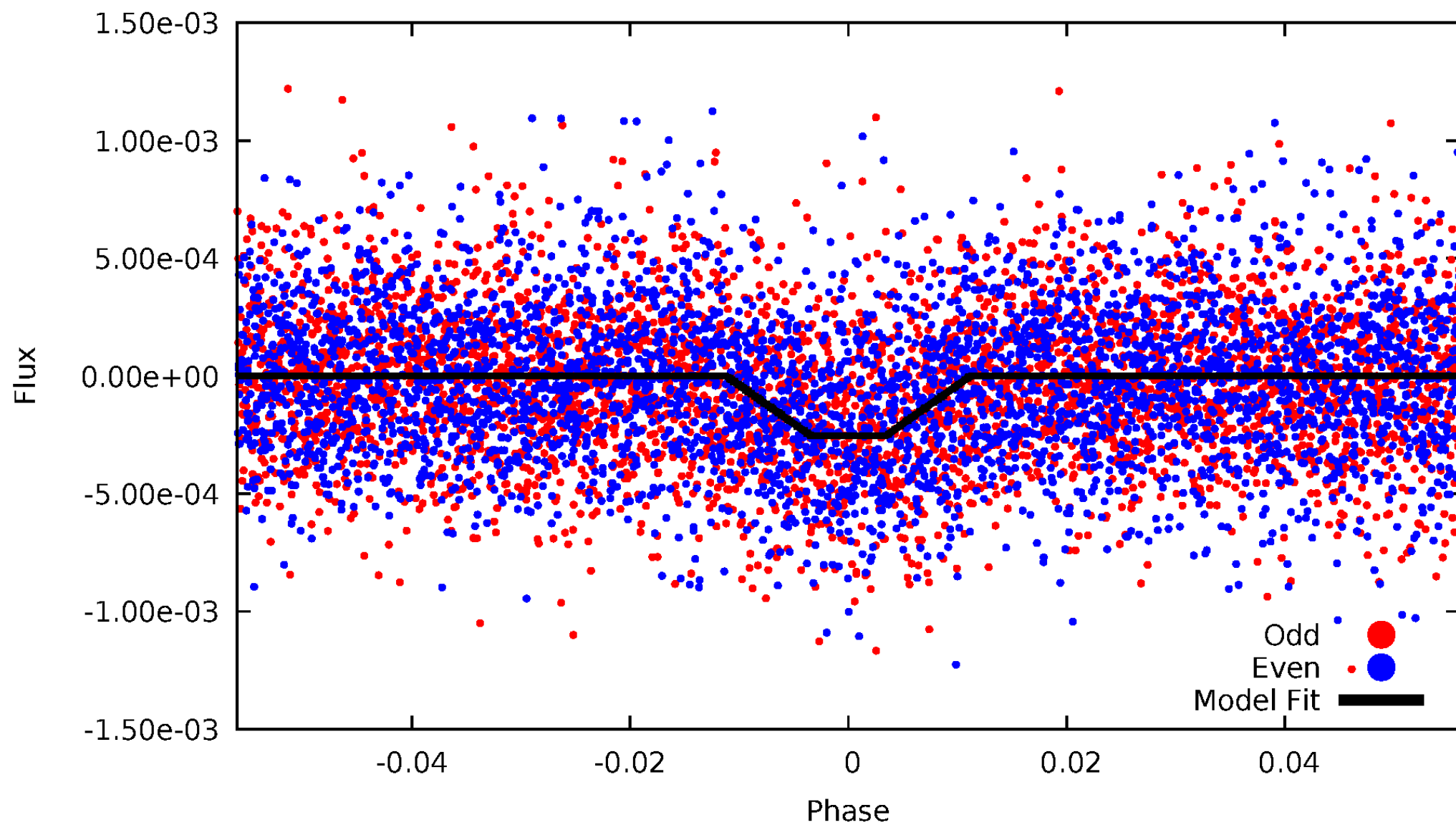
DV Odd/Even

TCE 005471059-02



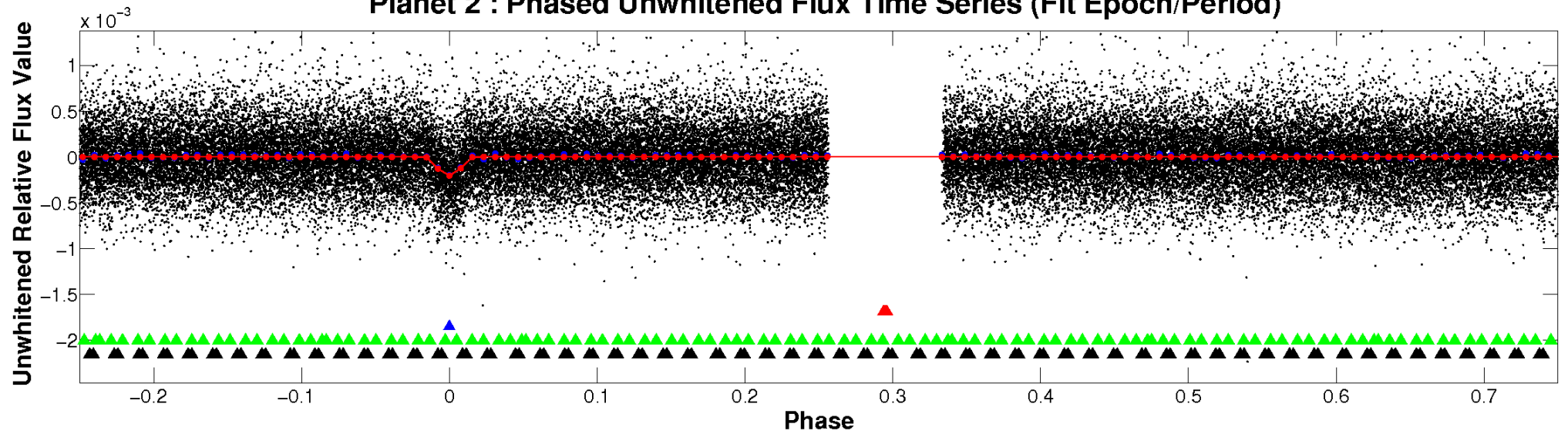
ALT Odd/Even

TCE 005471059-02

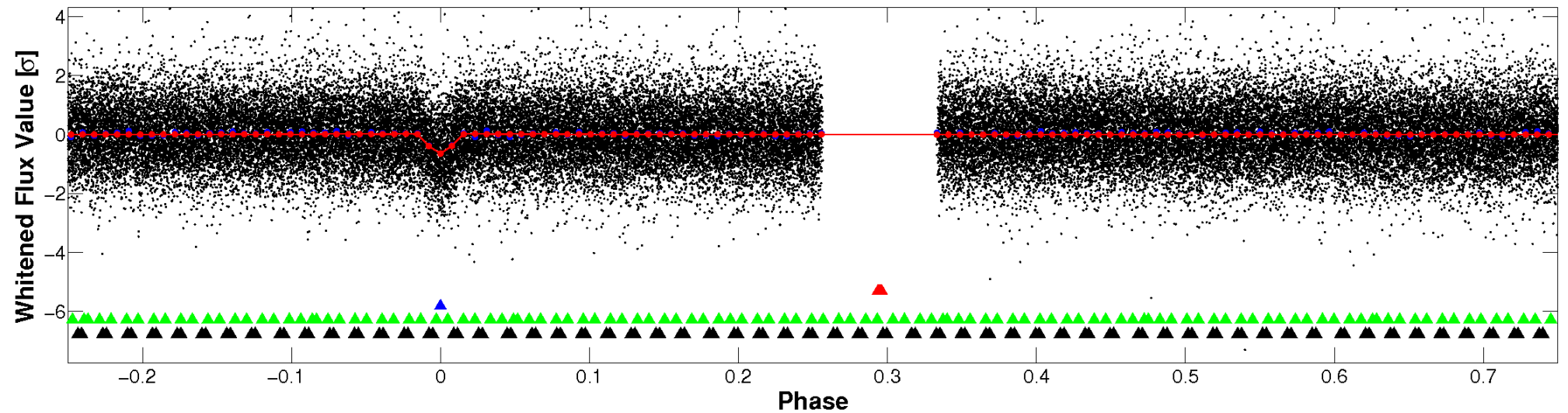


Non-Whitened Vs. Whitened Light Curve

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

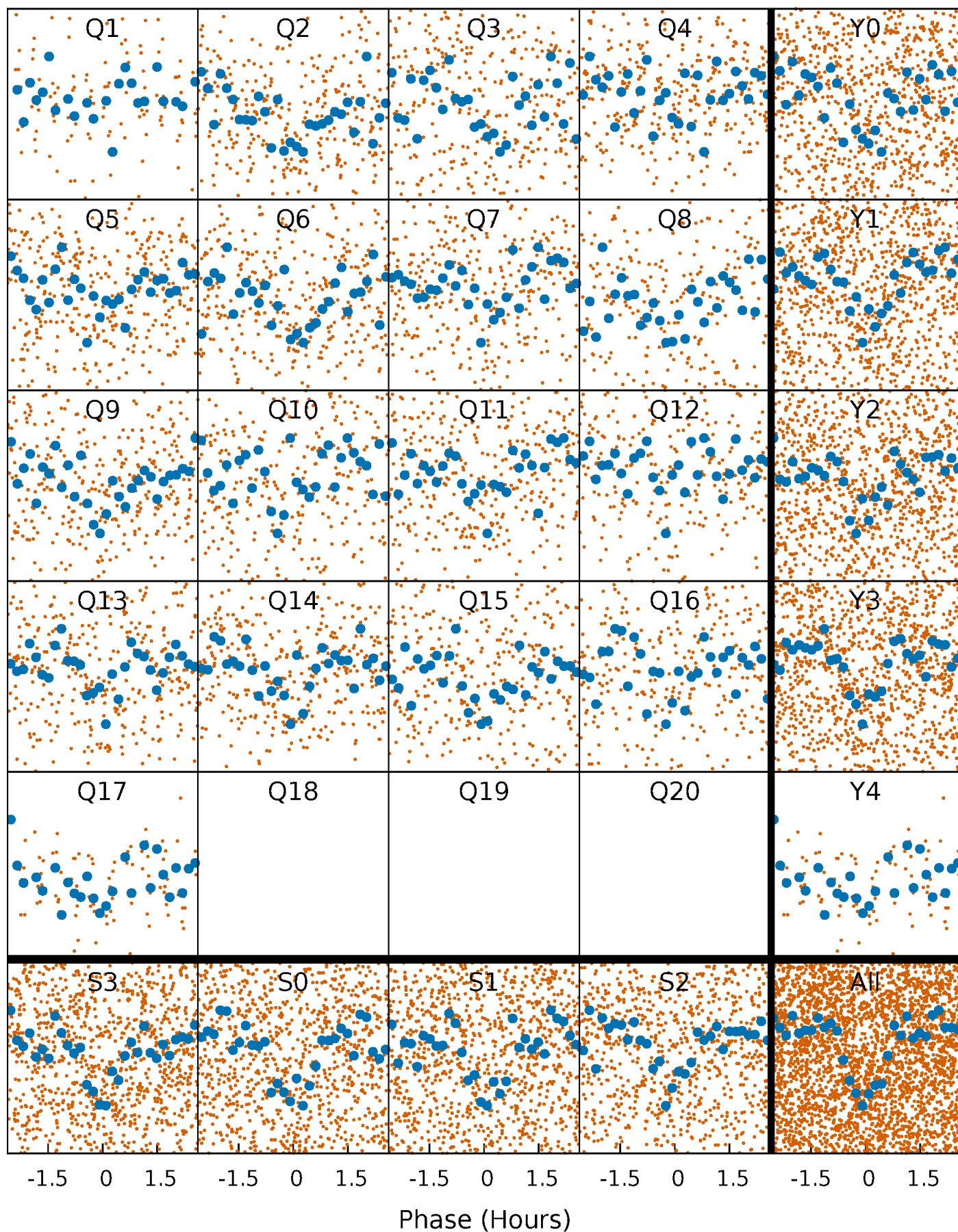


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



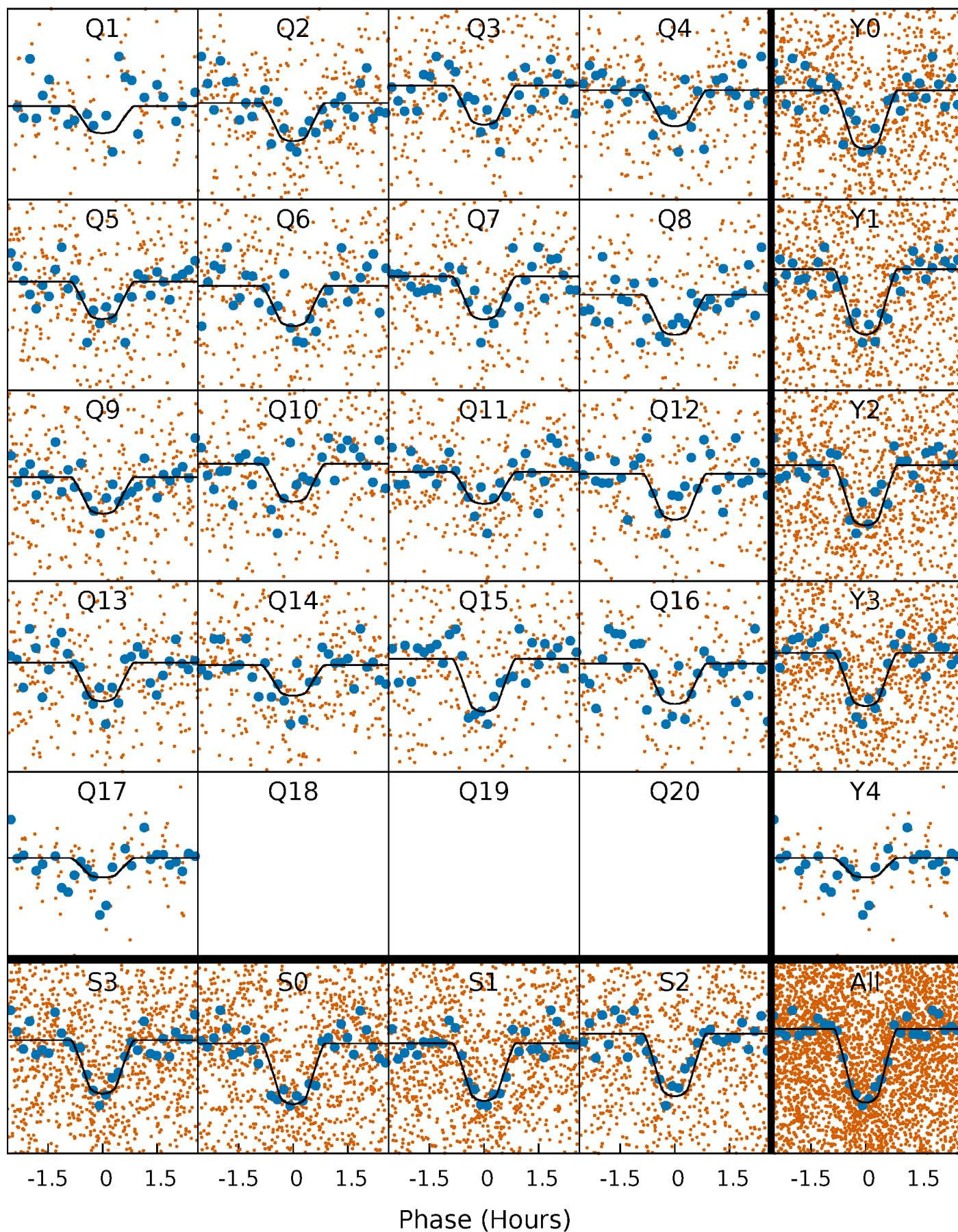
PDC Quarter-Phased Transit Curves

TCE 005471059-02 P= 2.636905 Days $T_0=133.933681$ (BKJD)



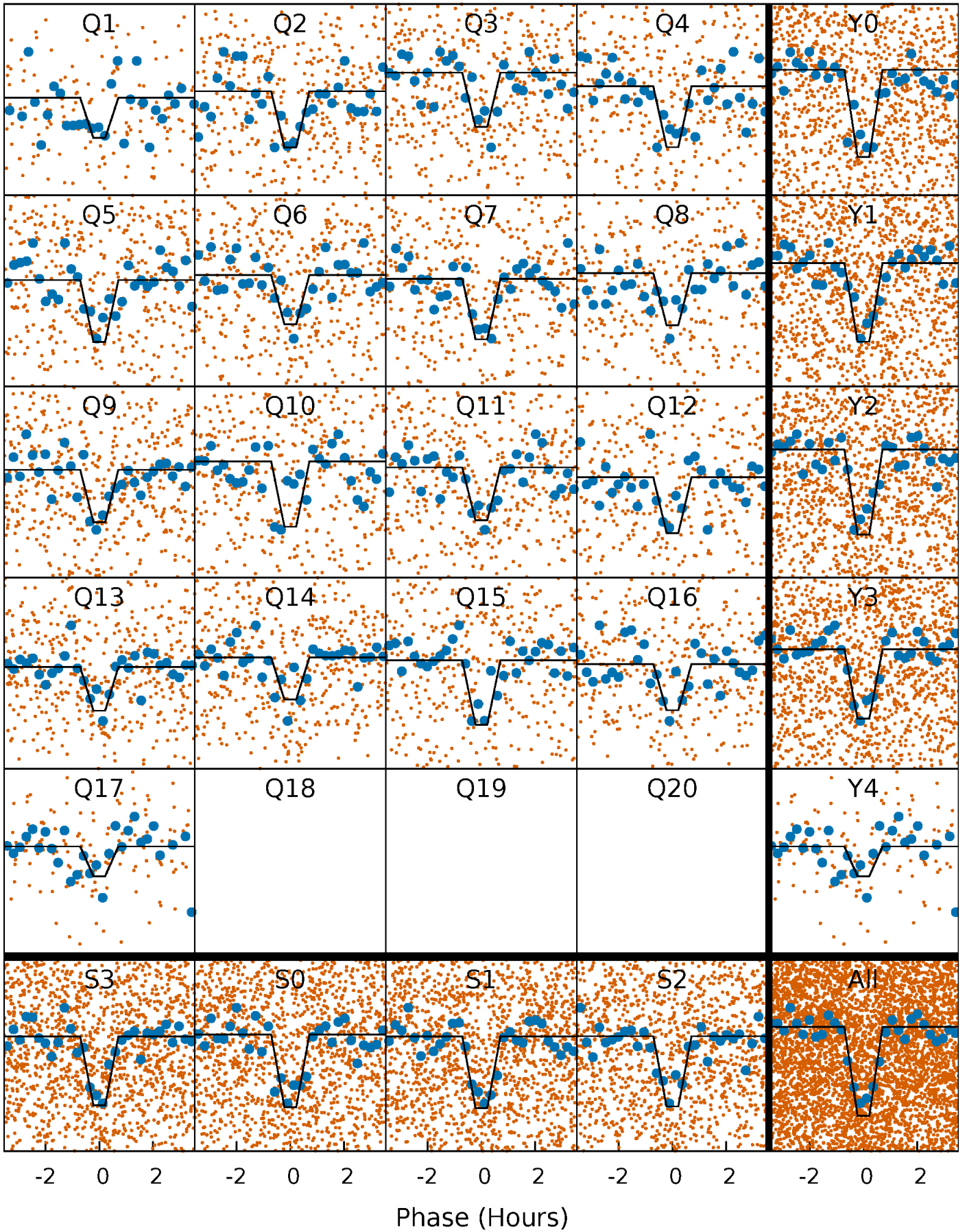
DV Quarter-Phased Transit Curves

TCE 005471059-02 P= 2.636905 Days $T_0=133.933681$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

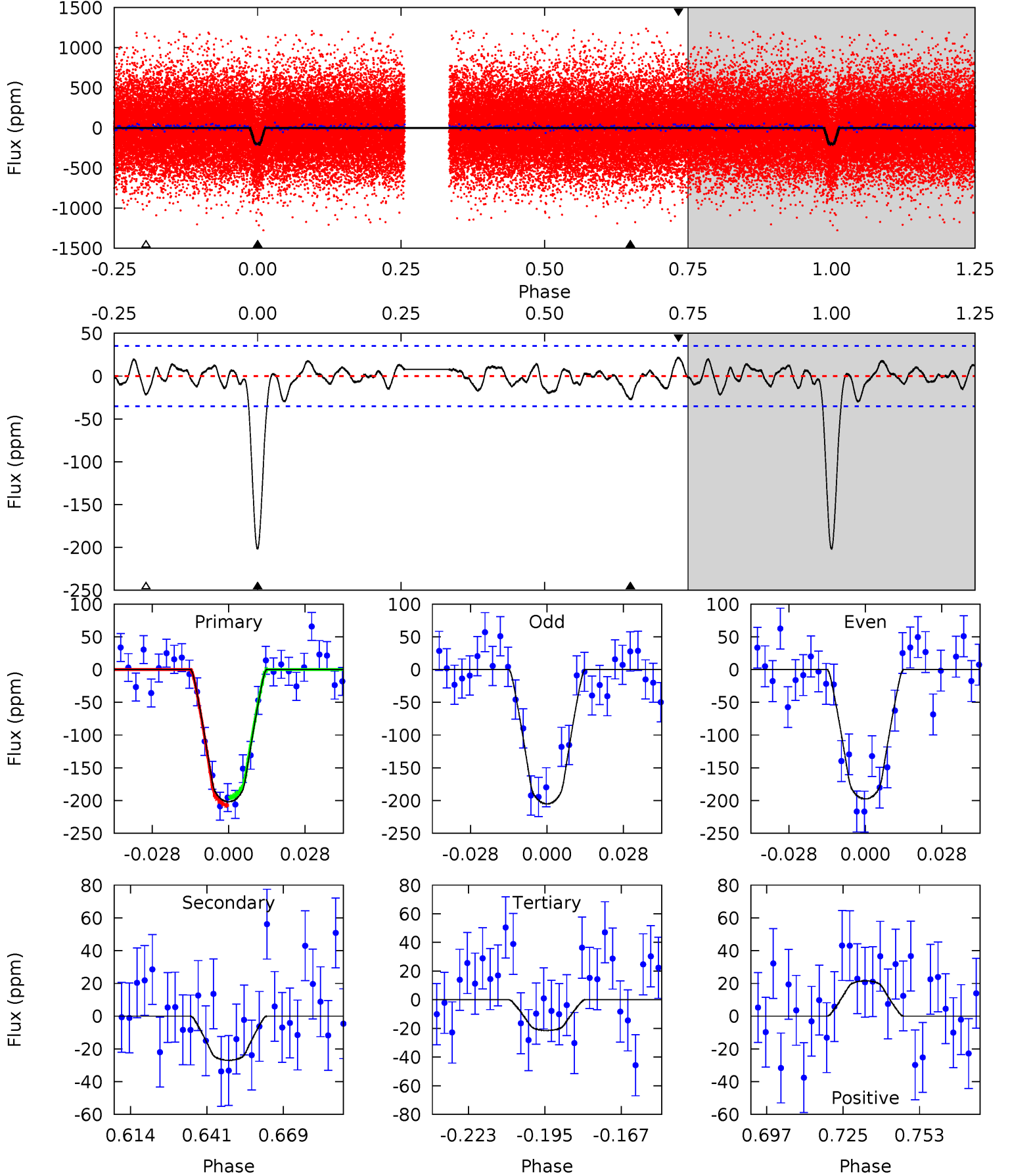
TCE 005471059-02 P= 2.636897 Days $T_0=133.935327$ (BKJD)



DV Model-Shift Uniqueness Test

005471059-02, P = 2.636905 Days, E = 131.296776 Days

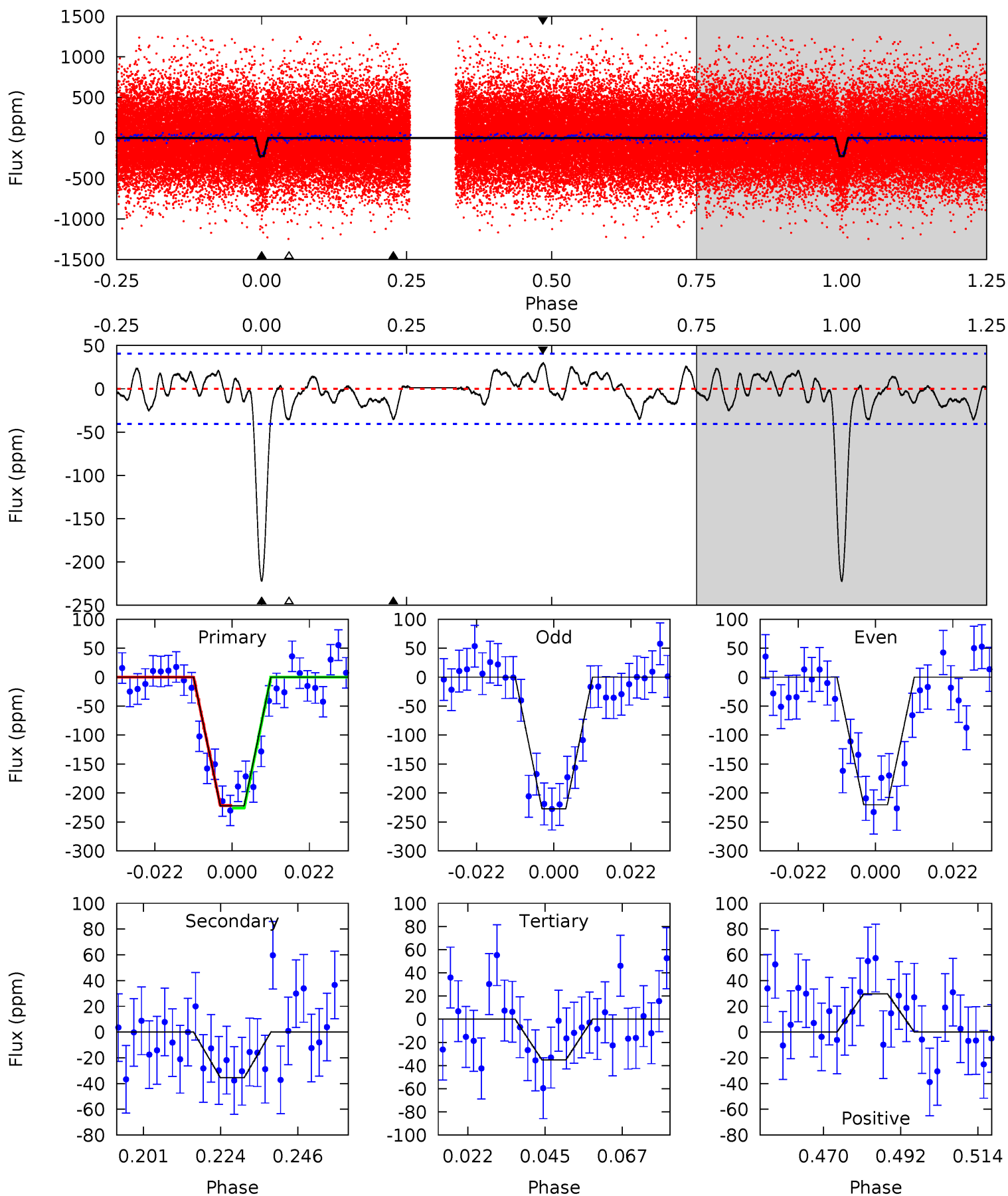
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.6	3.69	2.93	2.94	4.83	2.20	1.28	24.7	24.6	0.76	0.75	0.52	0.96	0.10	0.82



Alt Model-Shift Uniqueness Test

005471059-02, P = 2.636897 Days, E = 131.298430 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.6	4.24	4.22	3.55	4.87	2.28	1.61	22.4	23.1	0.02	0.69	0.42	0.97	0.12	0.26



Stellar Parameters For KIC 005471059

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5524^{+166}_{-182}	$4.540^{+0.040}_{-0.160}$	$-0.040^{+0.300}_{-0.300}$	$0.847^{+0.213}_{-0.071}$	$0.908^{+0.092}_{-0.092}$	$2.102^{+0.449}_{-0.922}$
	+3%/-3%	+1%/-4%	+750%/-750%	+25%/-8%	+10%/-10%	+21%/-44%
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 005471059-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-27 ± 7	$1.59^{+0.69}_{-0.71}$	1679^{+100}_{-77}	3538^{+773}_{-431}	$7.792^{+15.907}_{-4.341}$
Alt.	-35 ± 8	$1.49^{+0.79}_{-0.64}$	1674^{+97}_{-75}	3760^{+868}_{-513}	11^{+23}_{-6}

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 $A_{obs} \gg 1.0$

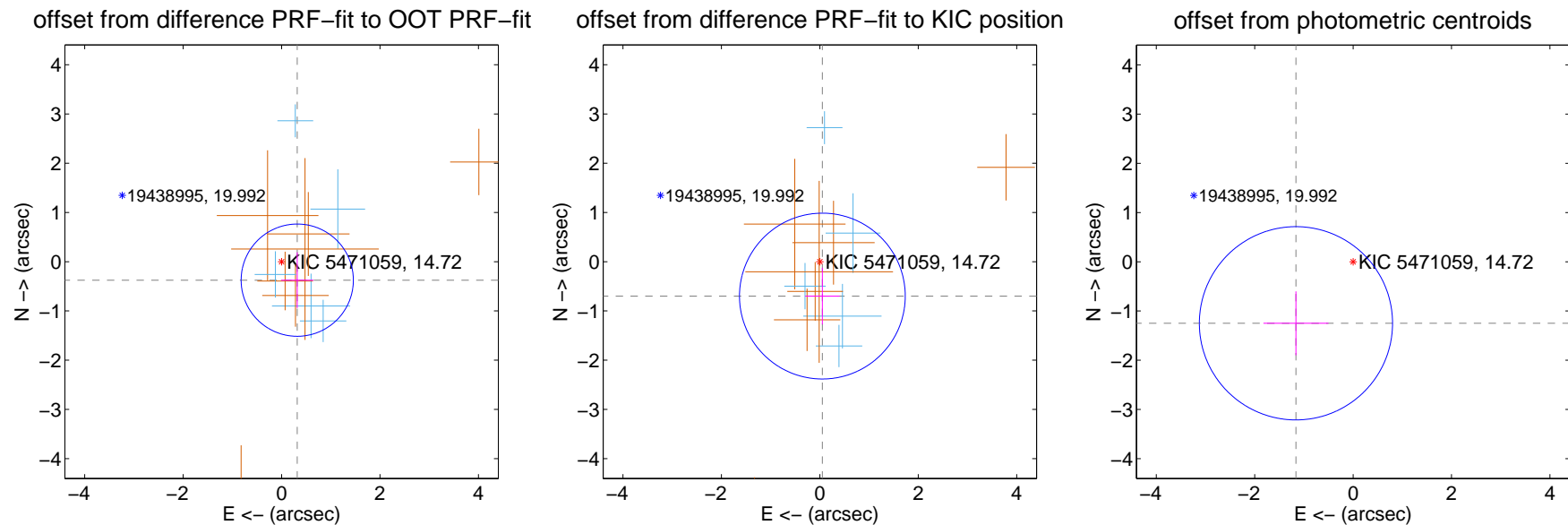
DV Centroid Data

Supplemental centroid analysis for 005471059-02. Kepler magnitude: 14.72. Transit SNR 19.31

There are 5 quarters with good PRF difference image offsets

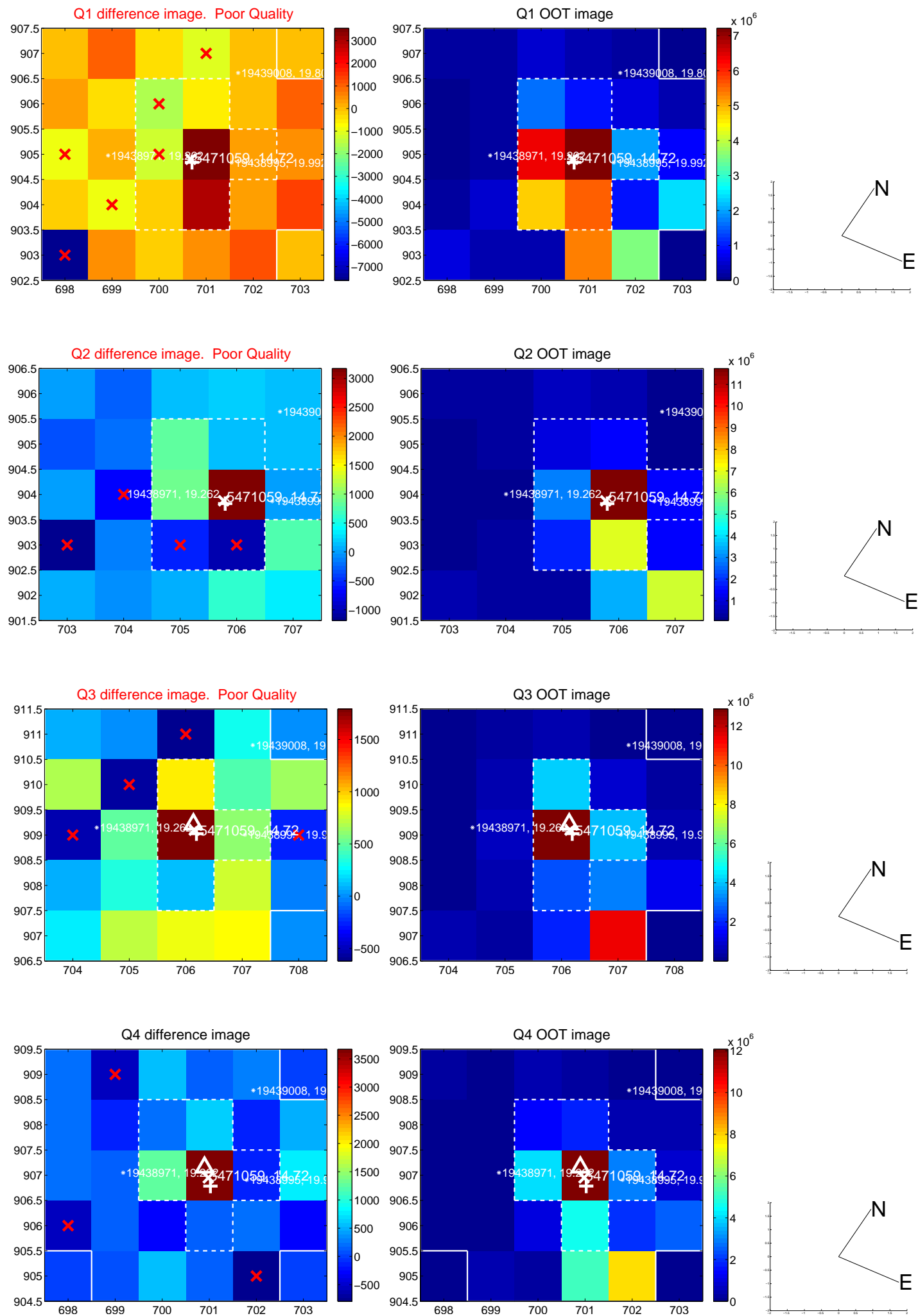
The direct PRF centroid is offset from the target star catalog position by about 0.82 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.492 ± 0.380	1.30	-0.318 ± 0.331	-0.375 ± 0.565
PRF-fit source offset from KIC position	0.700 ± 0.561	1.25	-0.051 ± 0.350	-0.698 ± 0.576
photometric centroid source offset	1.71 ± 0.65	2.61	1.16 ± 0.66	-1.25 ± 0.65

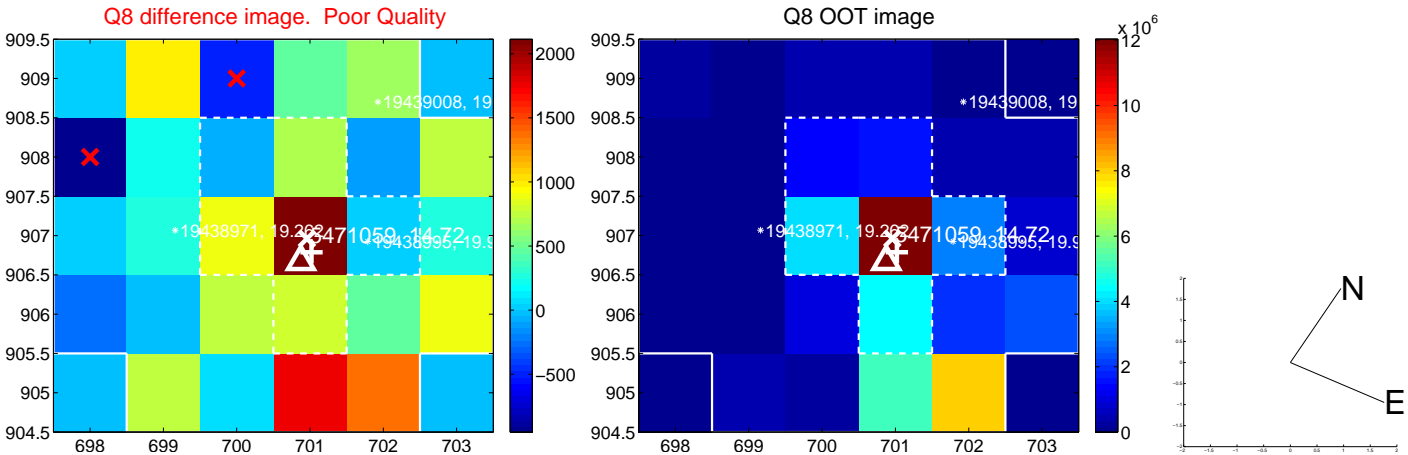
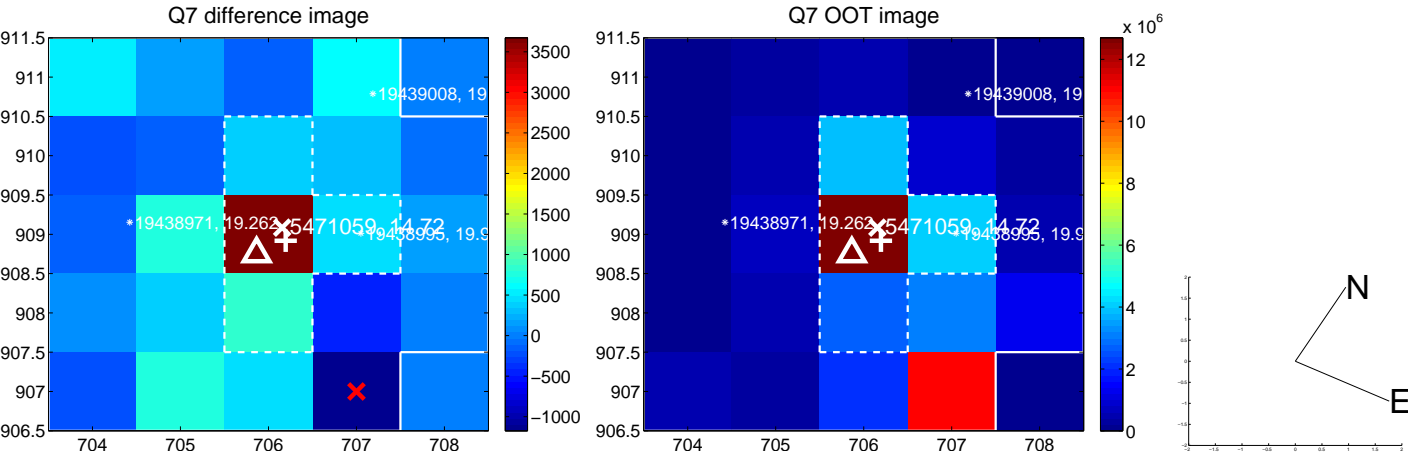
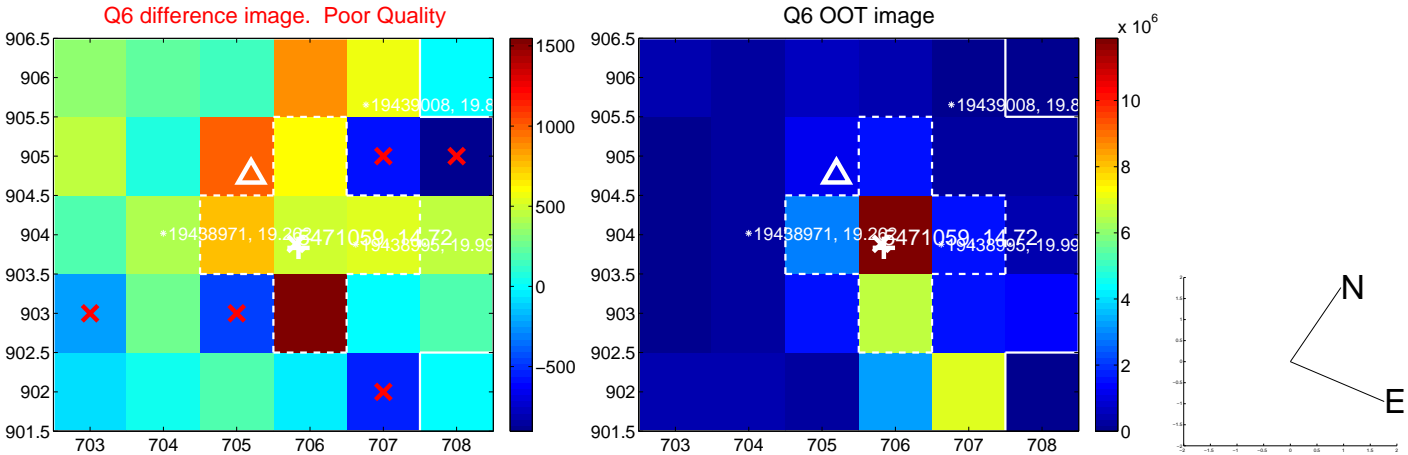
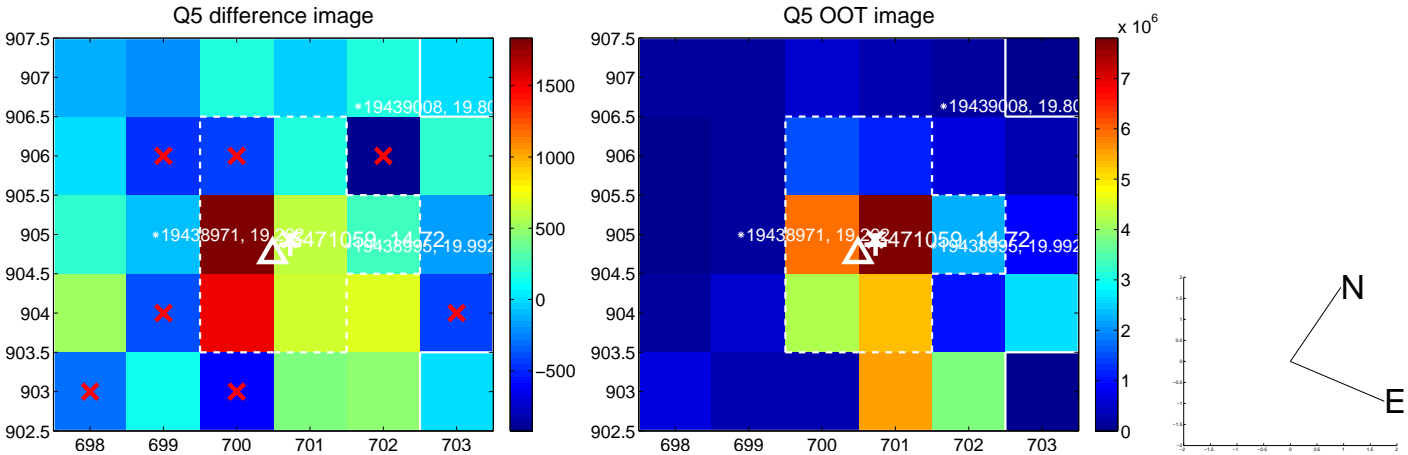


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

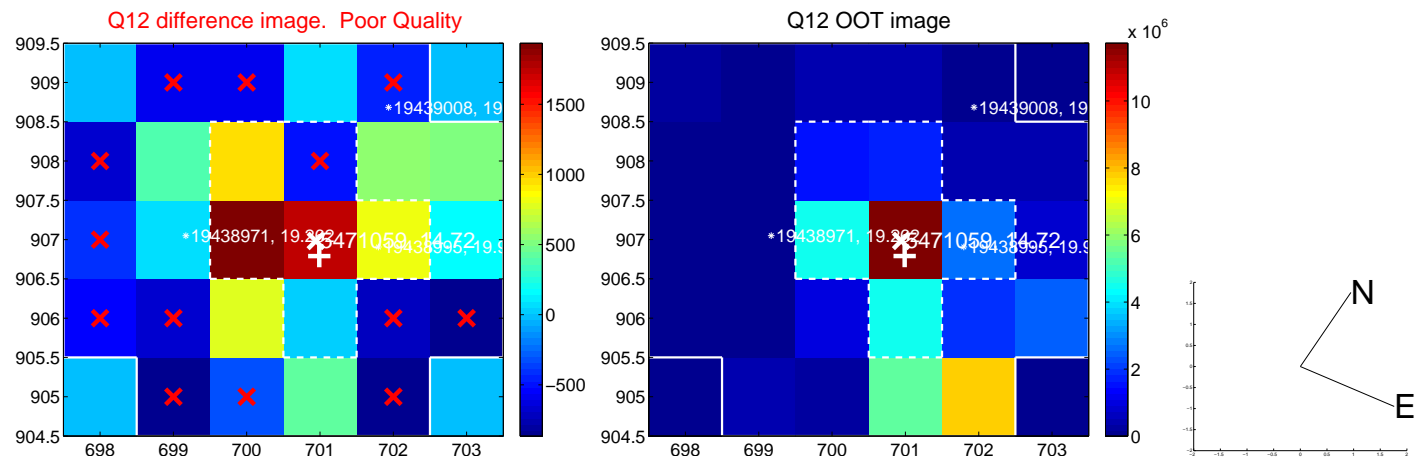
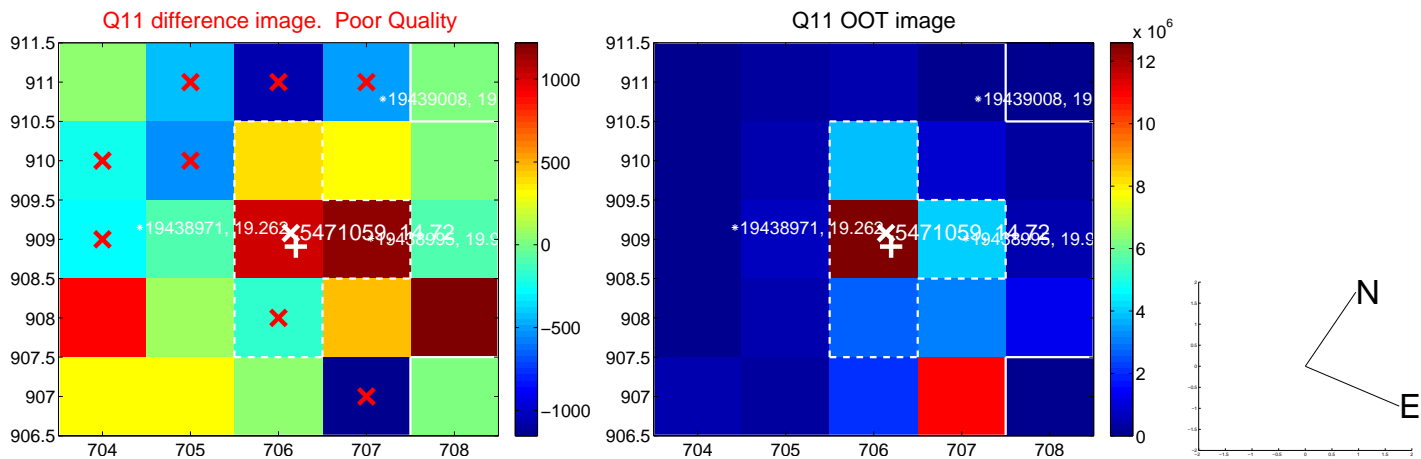
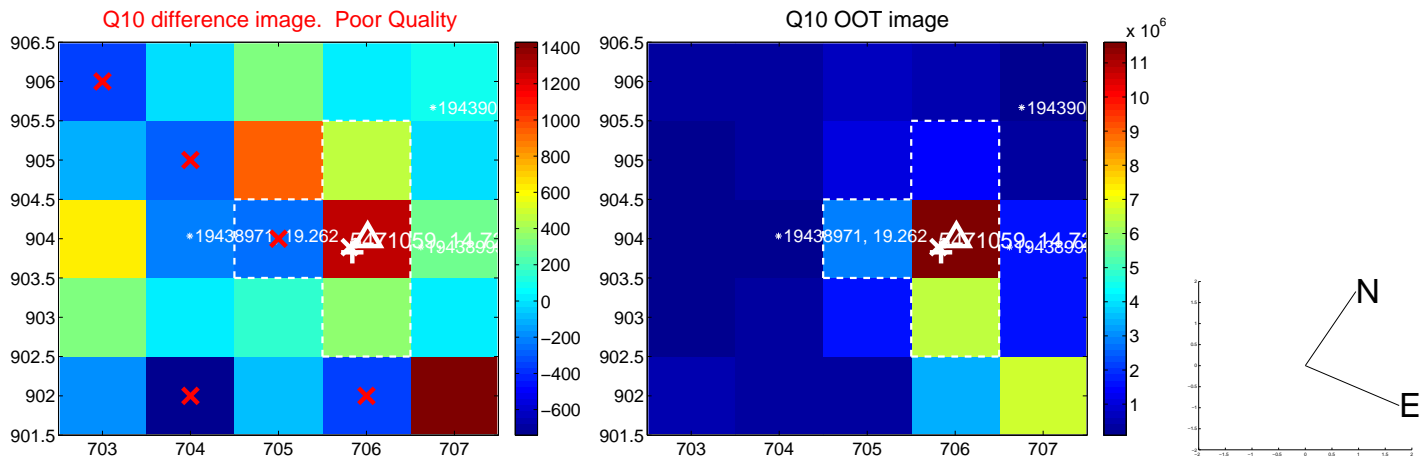
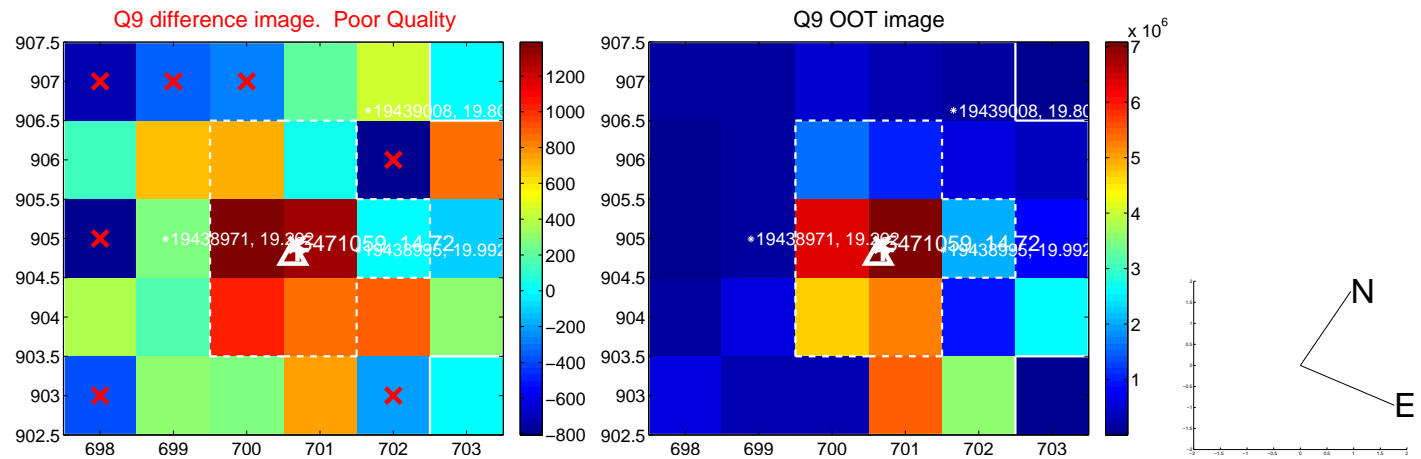
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



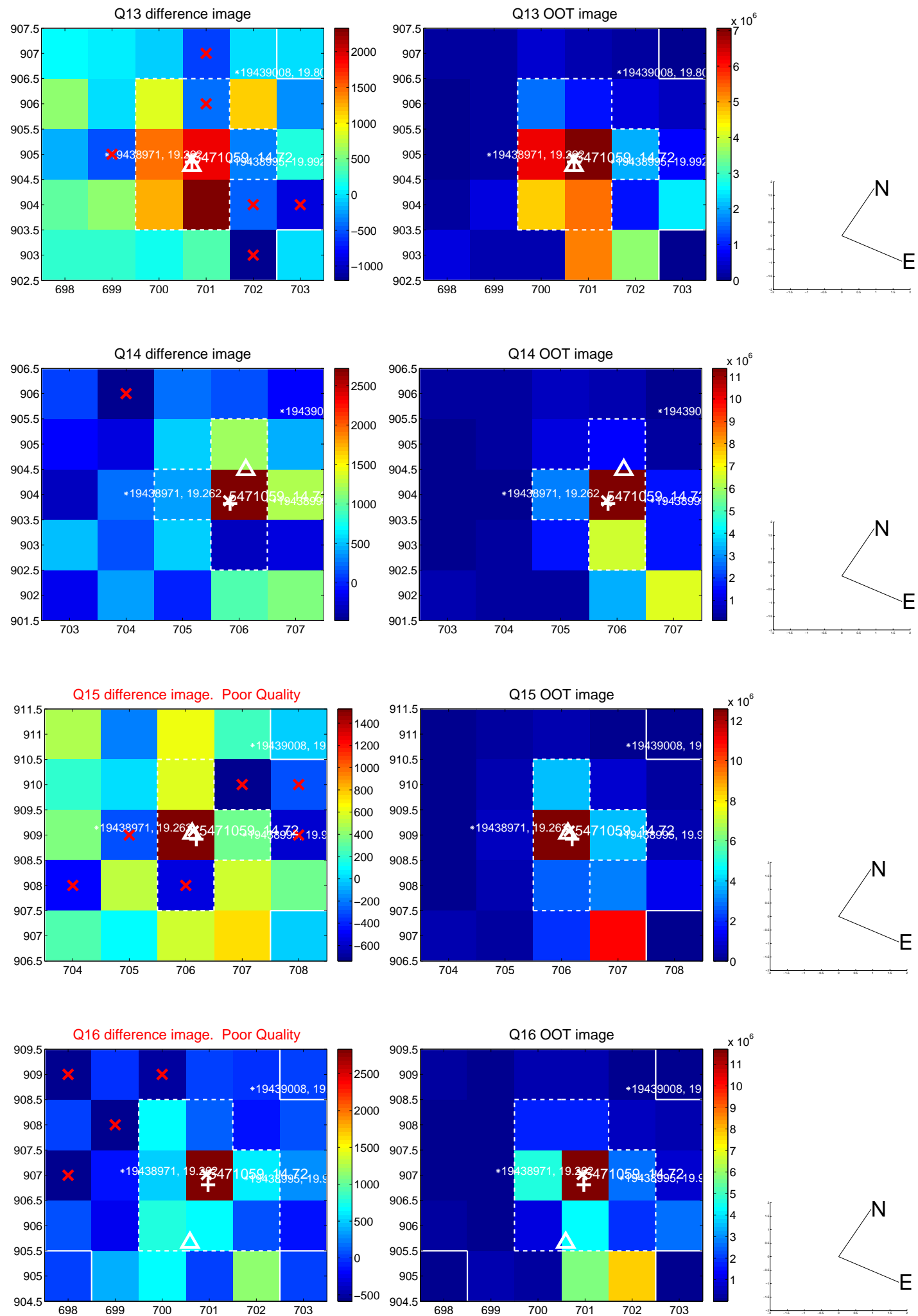
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



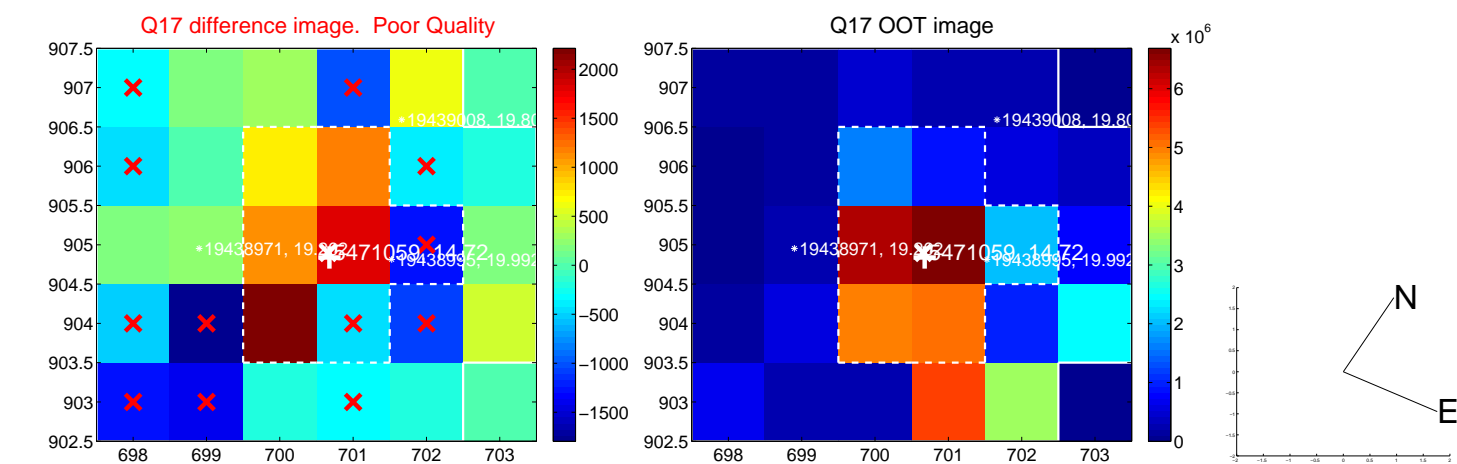
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



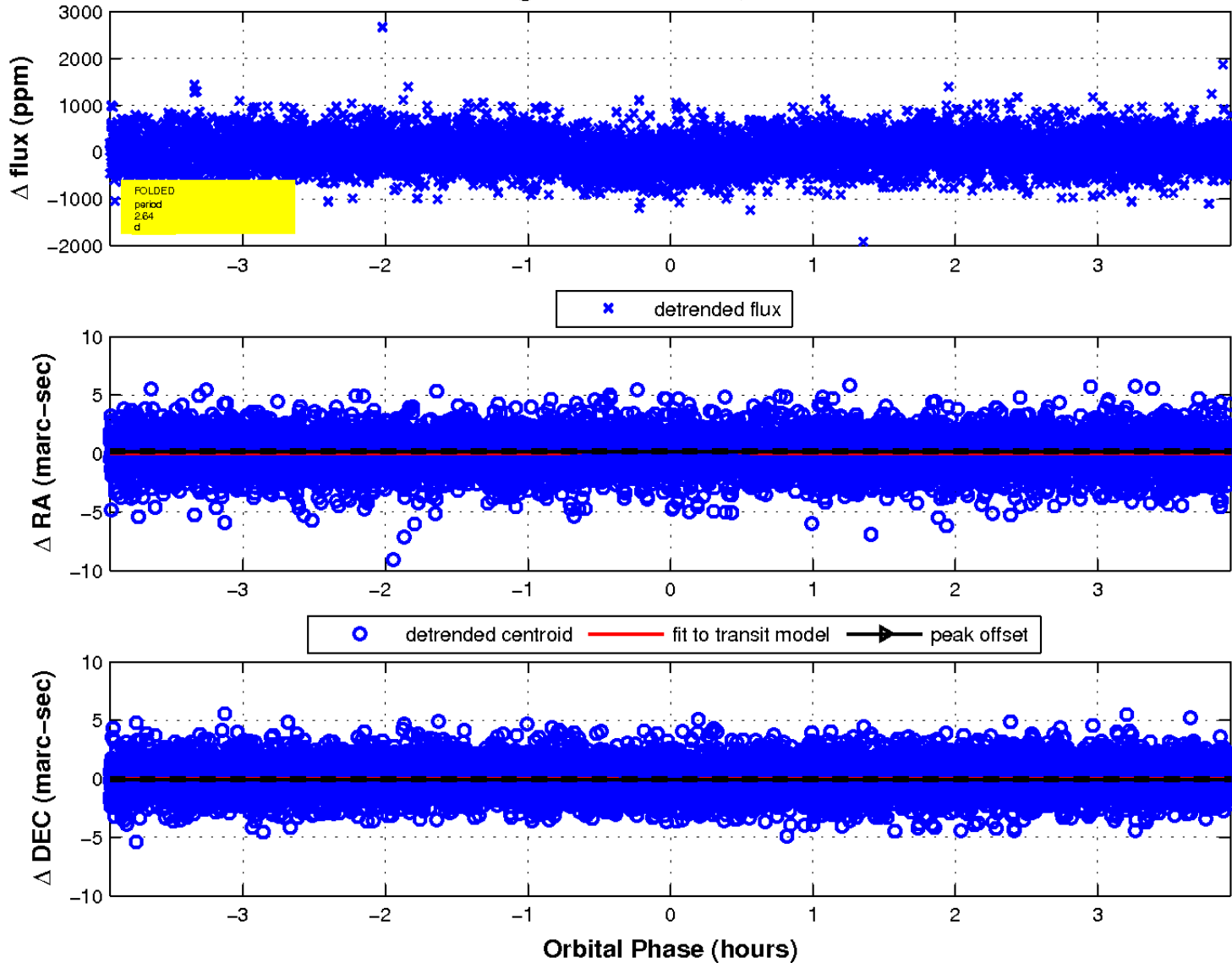
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



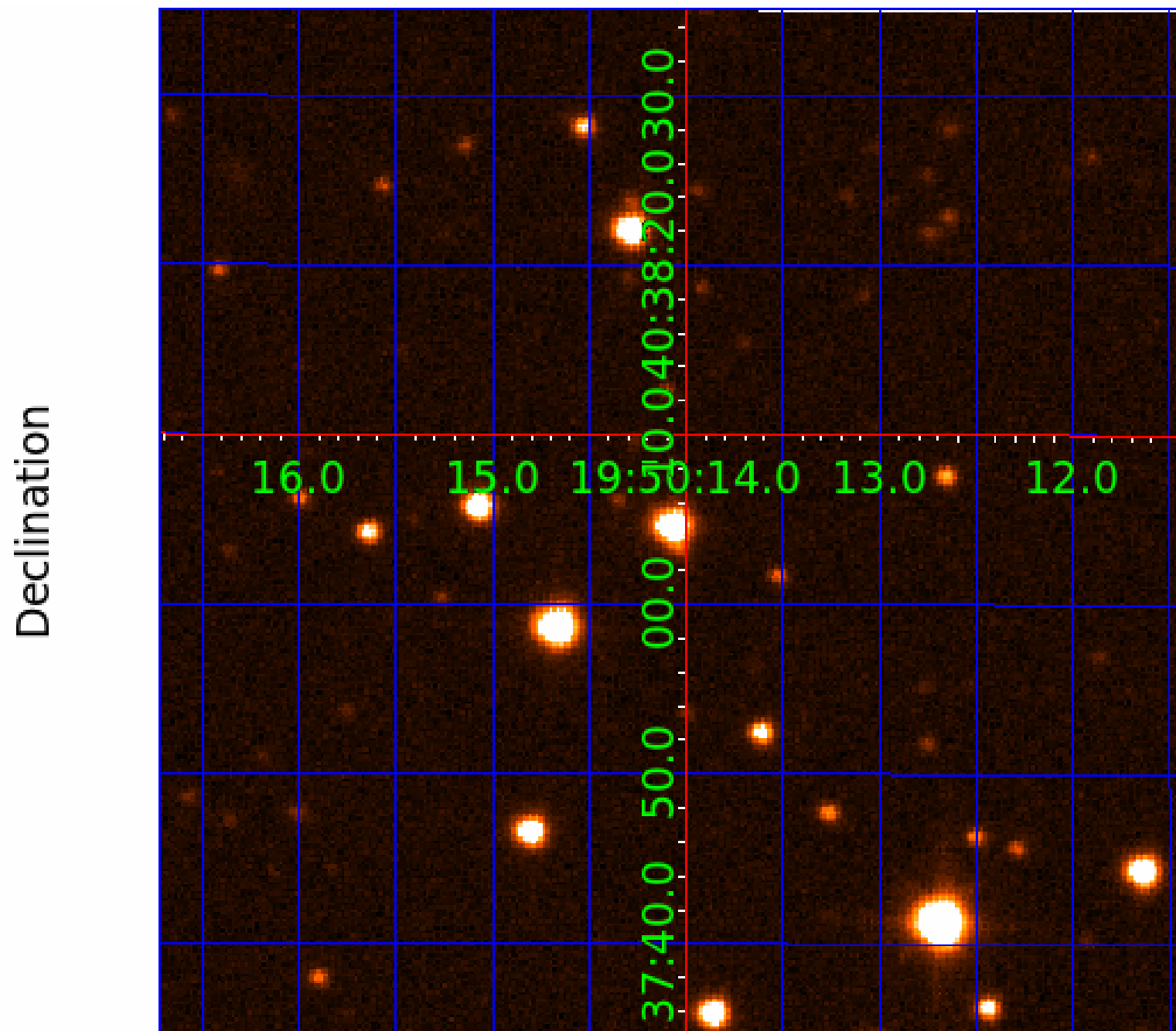
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 4



UKIRT Image



KIC 005471059

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})
005471059-01	OBS	3956.01	2.636891	132.078224	399.1	0.827	21.6	29.4	0.85	5524	1.71	457.48
005471059-02	OBS	No	2.636905	133.933681	207.1	1.312	16.9	19.3	0.85	5524	1.47	457.48
005471059-03	OBS	3956.02	12.424268	141.624811	146.5	33.073	10.6	14.3	0.85	5524	1.99	57.92
005471059-04	OBS	No	12.424849	134.001105	120.6	29.083	10.3	14.3	0.85	5524	1.27	57.91

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005471059-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
005471059-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
005471059-03	OBS	FP	0.00	1	0	1	1	LPP_DV—HALO_GHOST—EPHEM_MATCH
005471059-04	OBS	FP	0.00	1	0	1	1	LPP_DV—SAME_NTL_PERIOD—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 005471059-03

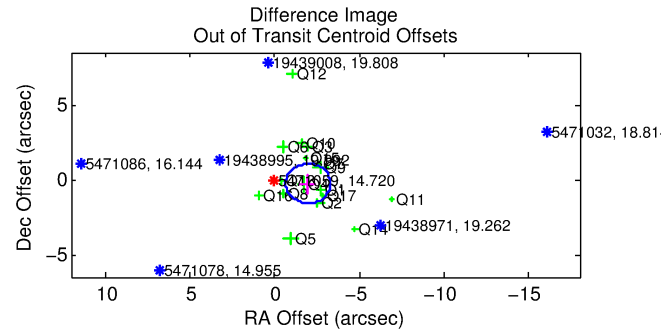
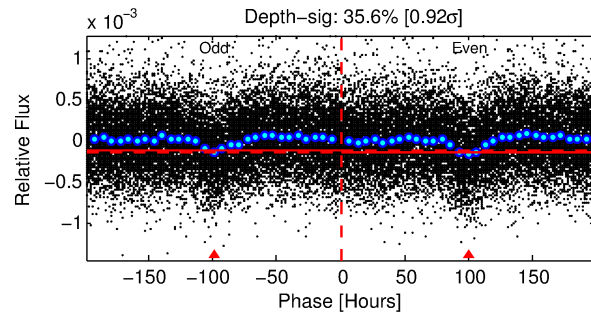
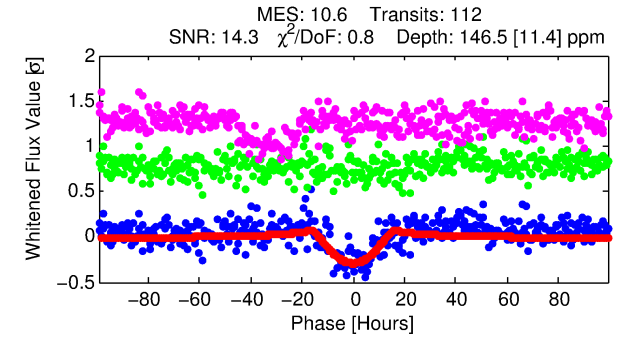
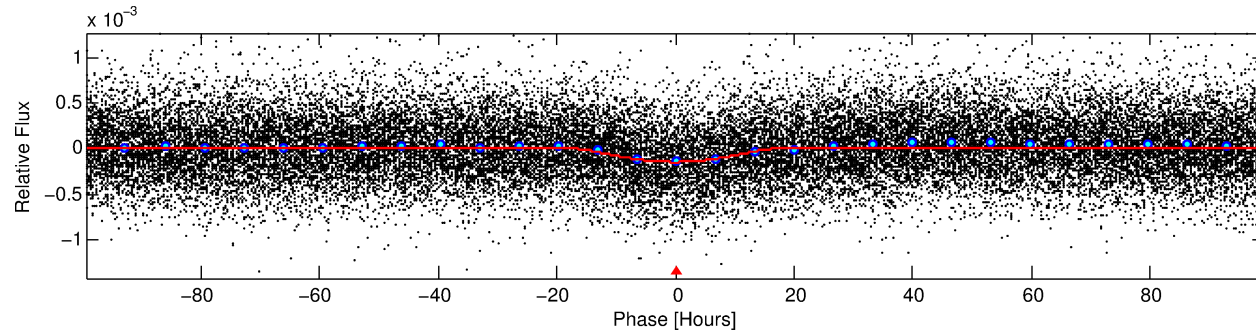
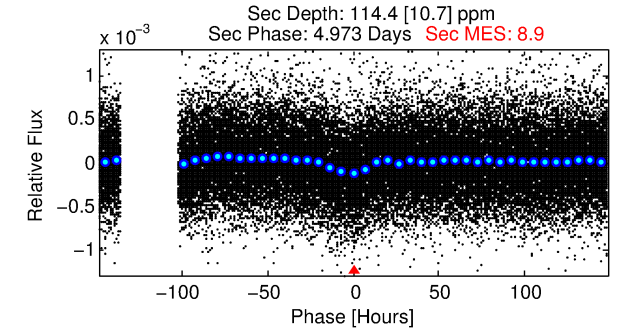
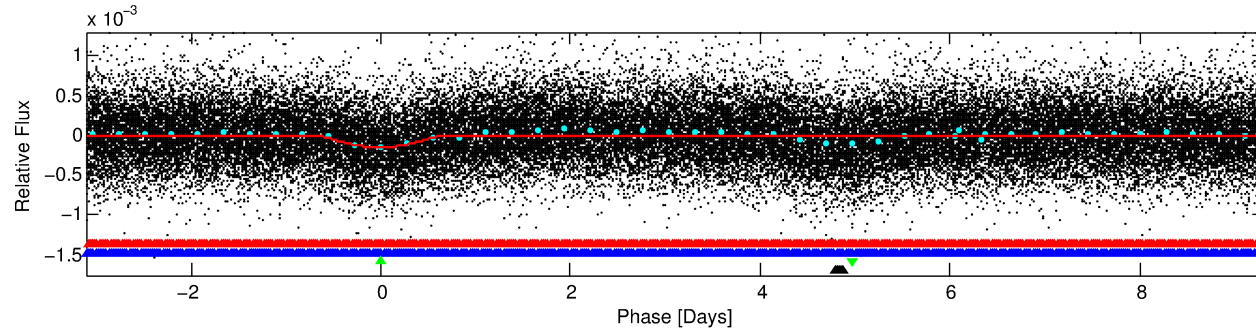
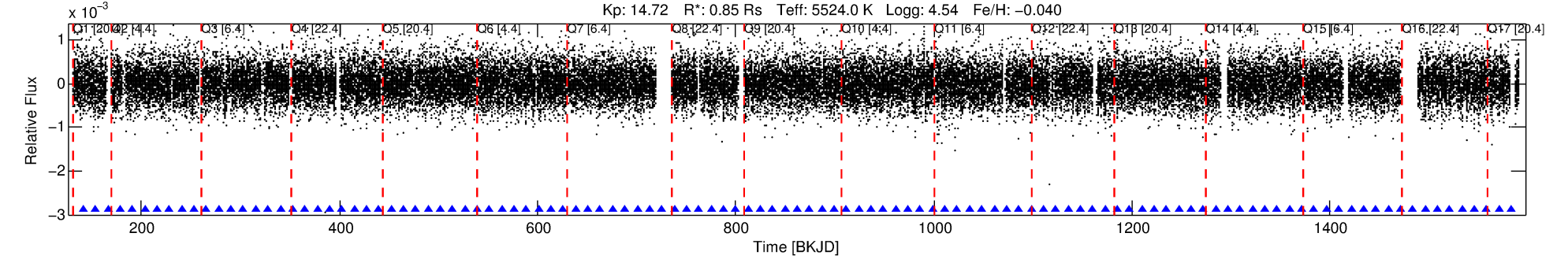
TCE (1)	KIC	Parent (2)	Parent KIC	P ₁ :P ₂	Dist (μ)	Δ Row	Δ Col	m ₂	m ₁	D ₂ /D ₁	Mechanism	Flag	σ_P	σ_T
005471059-03	5471059	V380-Cyg-pri	5385723	1:1	293.2	59	-43	5.77	14.72	985.94	Direct-PRF	0	4.16	2.60

Notes: P₁:P₂ 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. m₂ and m₁ are the magnitudes of the parent and child. D₂/D₁ 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: 5471059 Candidate: 3 of 4 Period: 12.424 d

KOI: K03956.02 Corr: 0.793



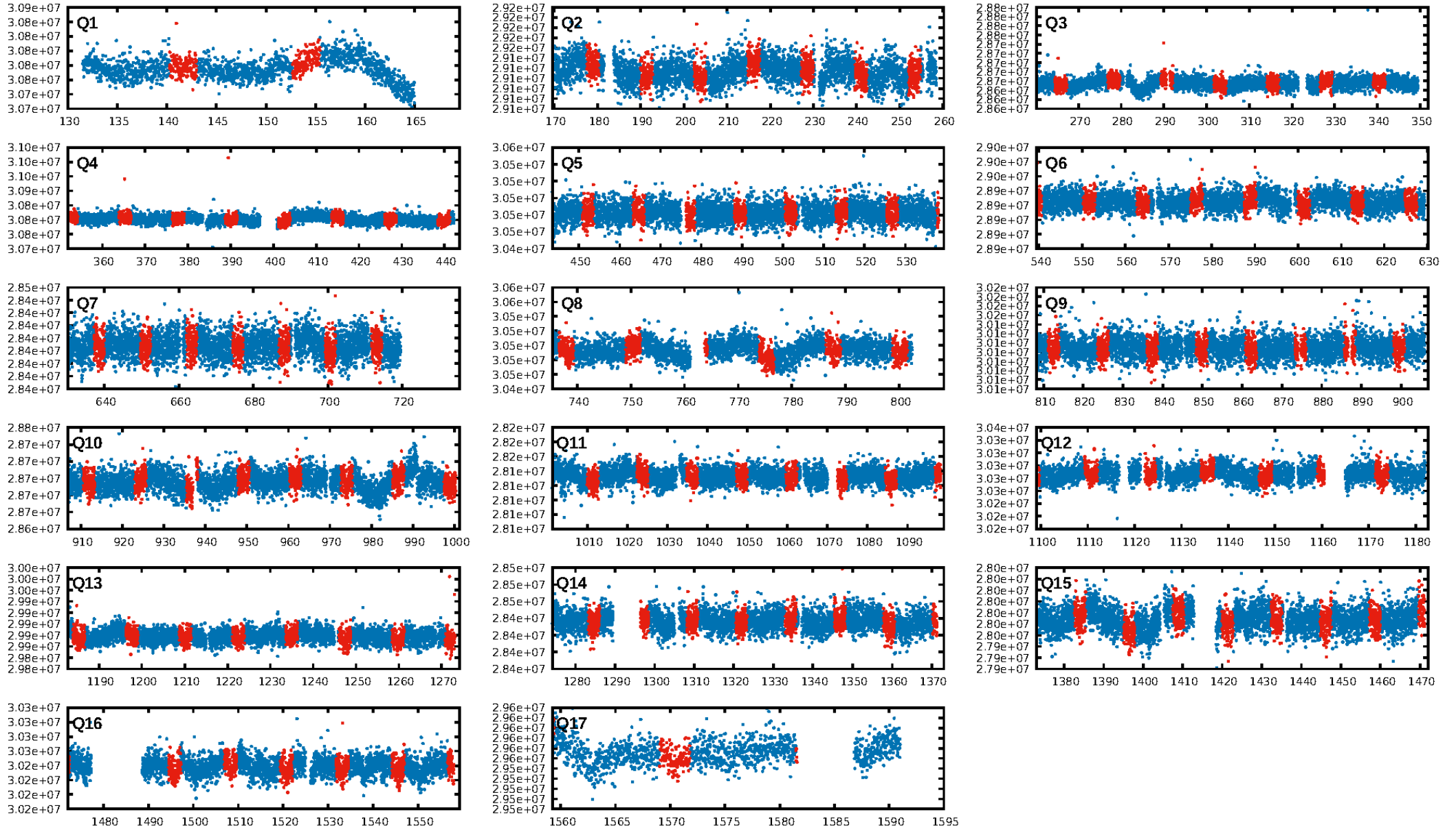
DV Fit Results:

Period = 12.42427 [0.00067] d
Epoch = 141.6248 [0.0427] BKJD
Rp/R* = 0.0215 [0.0272]
a/R* = 1.19 [0.10]
b = 1.00 [0.04]
Seff = 57.92 [18.84]
Teq = 703 [57] K
Rp = 1.99 [2.56] Re
a = 0.1017 [0.0211] AU
Ag = 163.96 [417.36] [0.39σ]
Teffp = 3892 [2463] K [1.29σ]

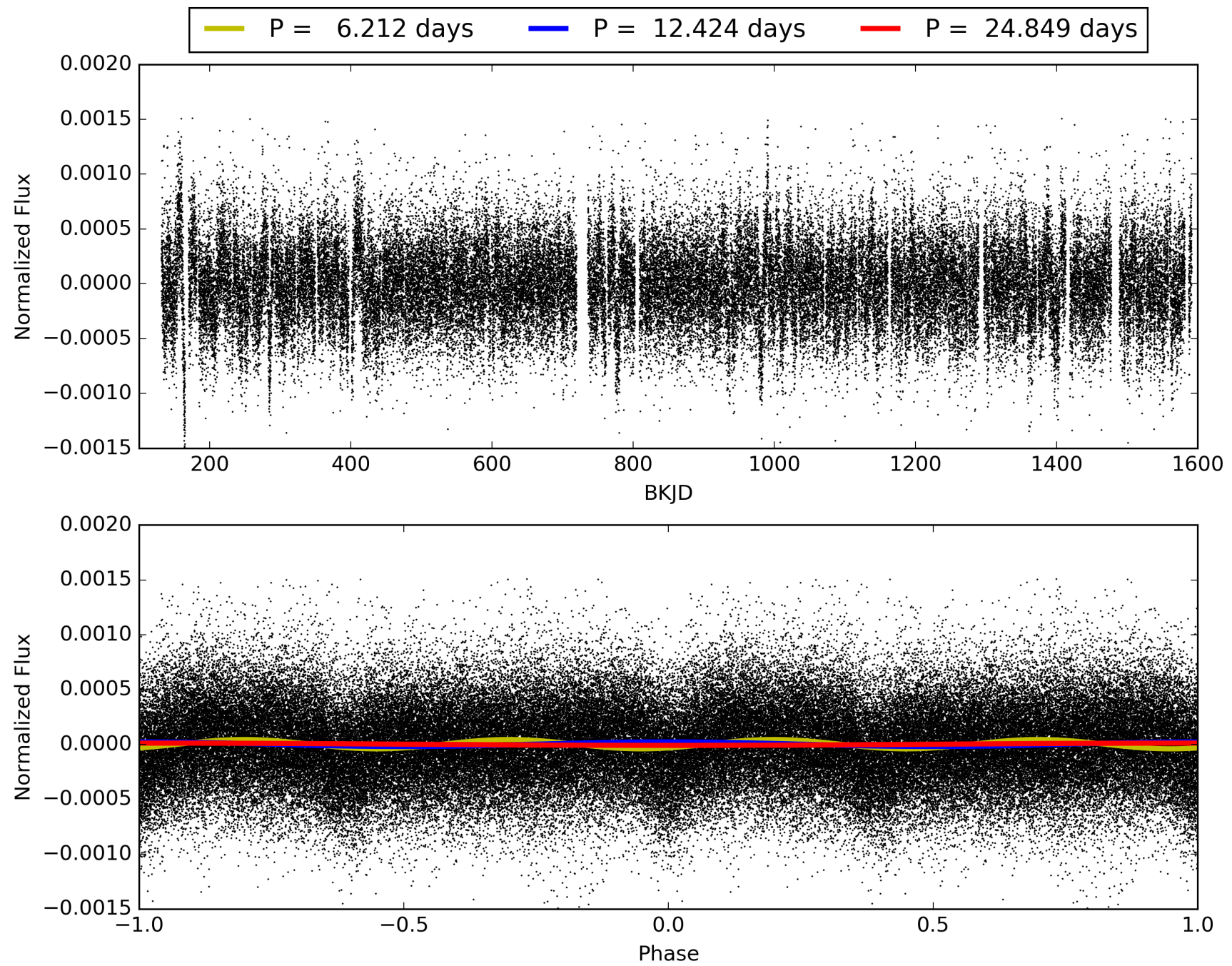
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [7.10σ]
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: 60.6%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 4.77e-29
RollingBand-fgt: 1.00 [109/109]
GhostDiagnostic-chr: -0.1474
Centroid-sig: 0.0%
Centroid-so: 2.195 arcsec [2.81σ]
OotOffset-rm: 1.979 arcsec [4.49σ]
KicOffset-rm: 1.782 arcsec [3.67σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.12 [2/17]
DiffImageOverlap-fno: 0.00 [0/17]

TCE 005471059-03, PDC Light Curves

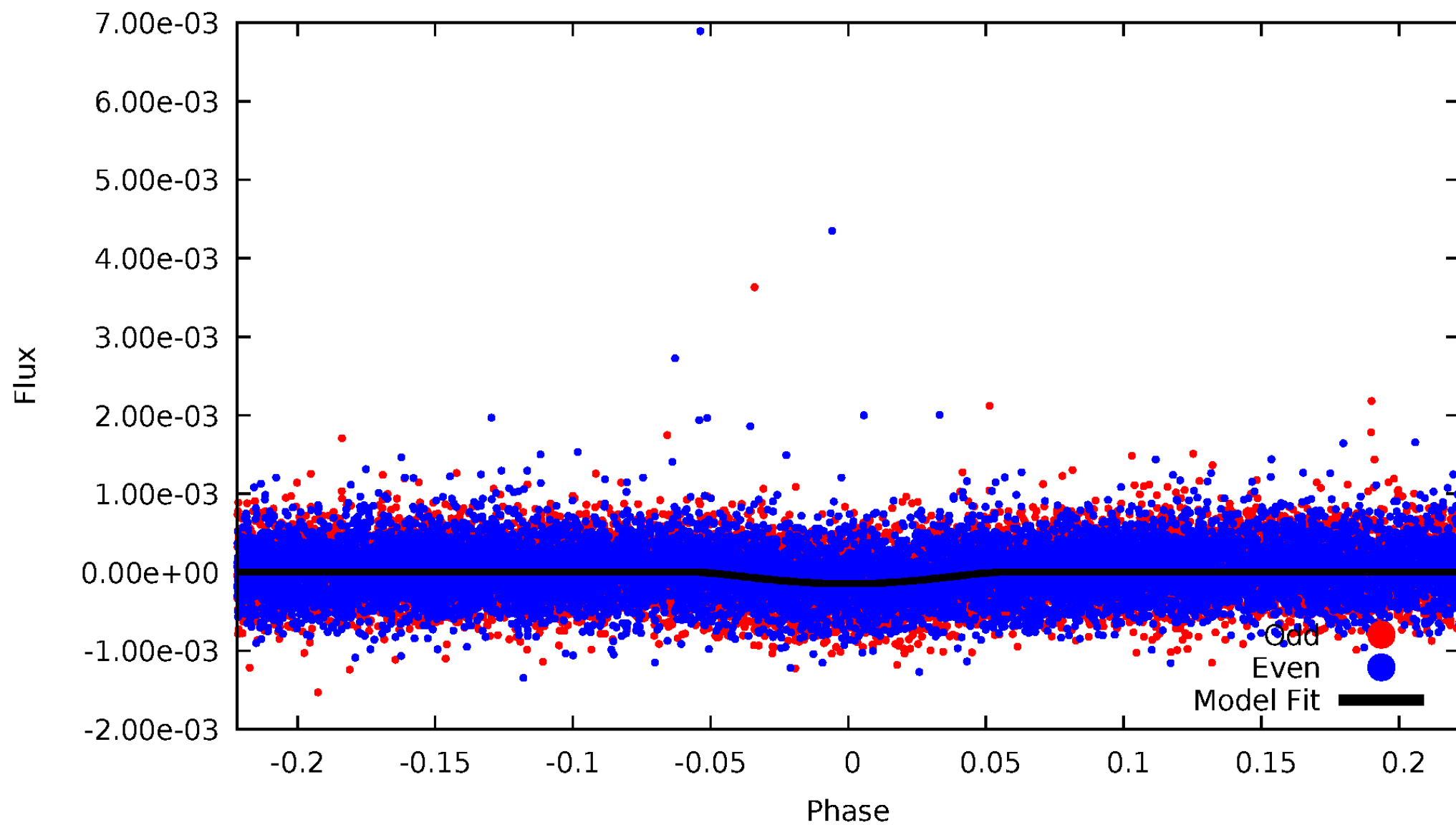


TCE 005471059-03



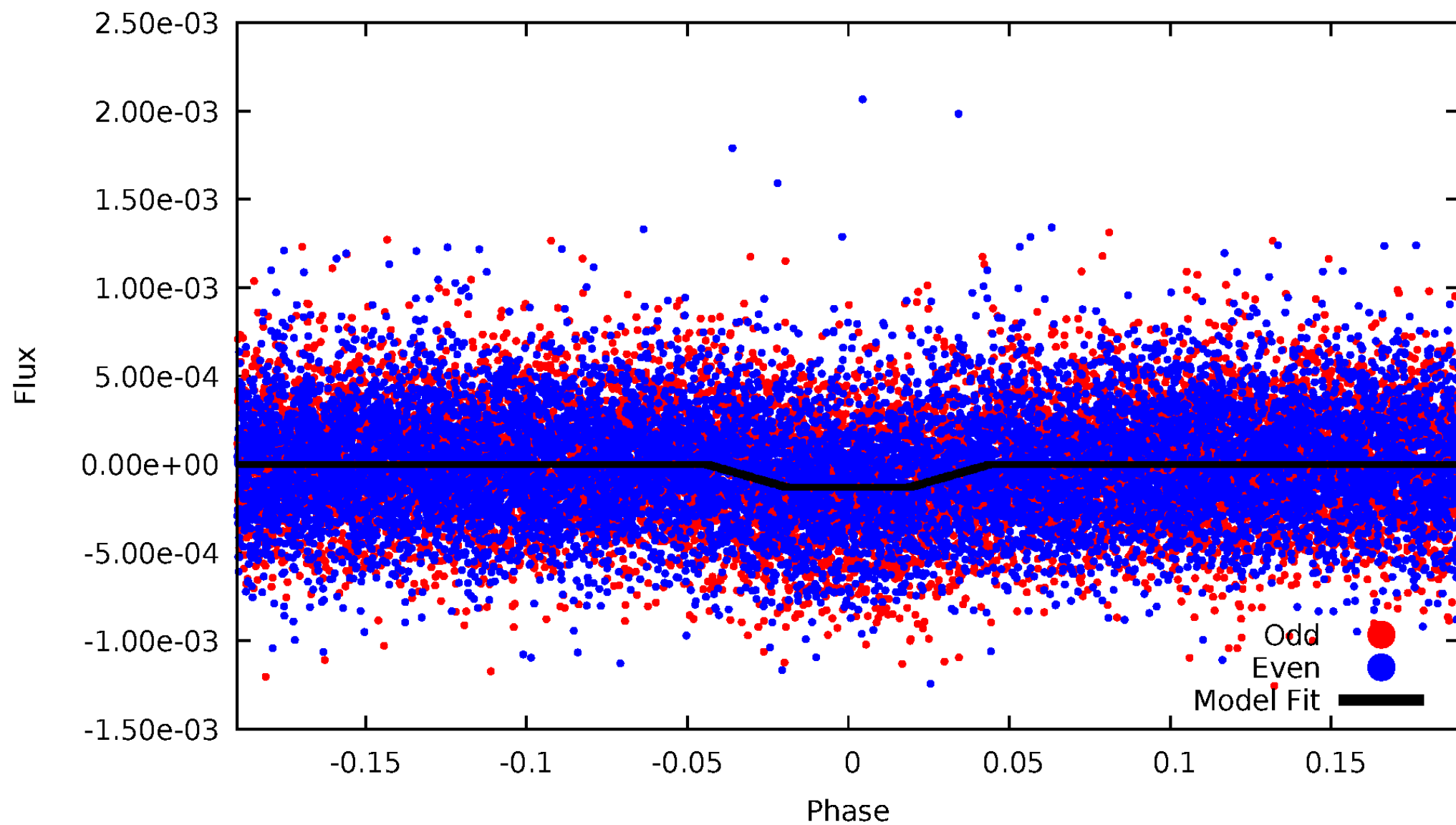
DV Odd/Even

TCE 005471059-03

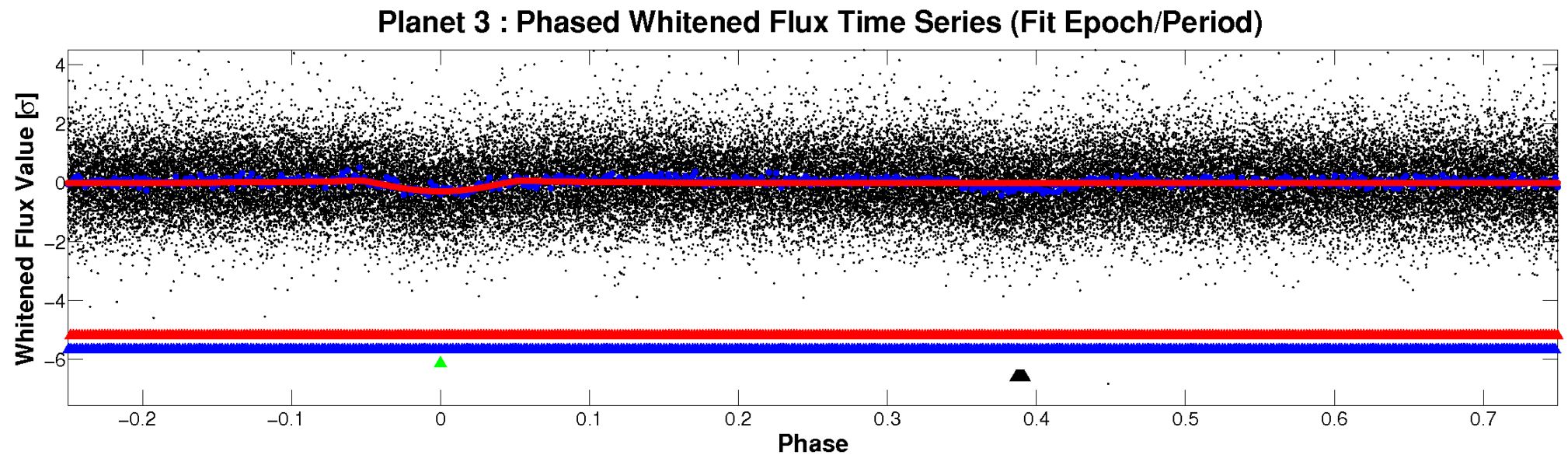
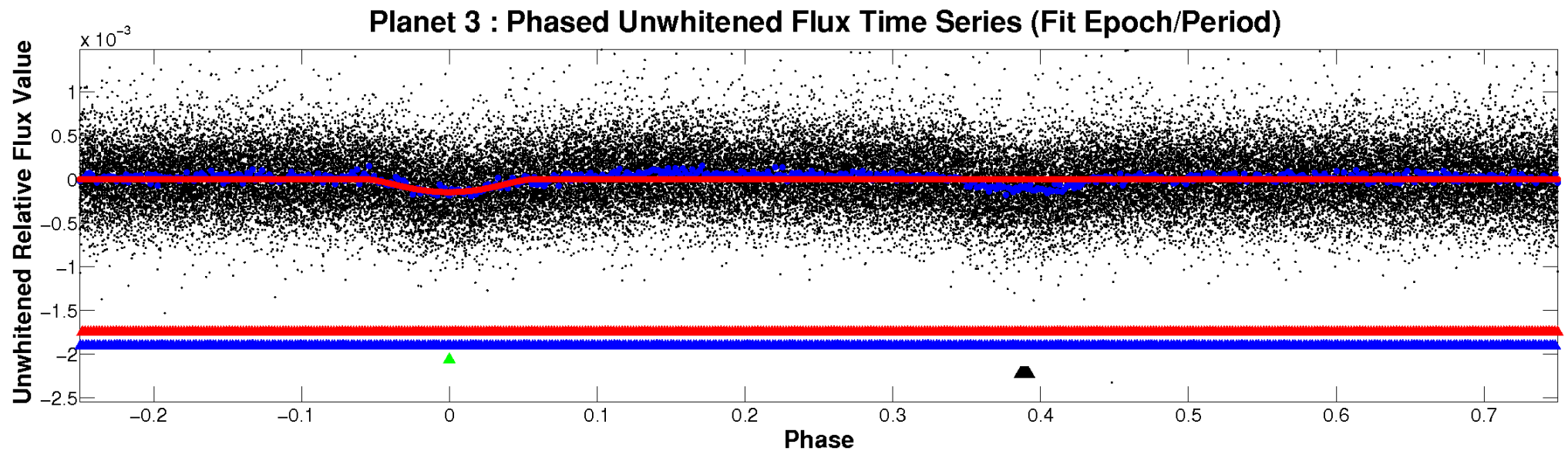


ALT Odd/Even

TCE 005471059-03

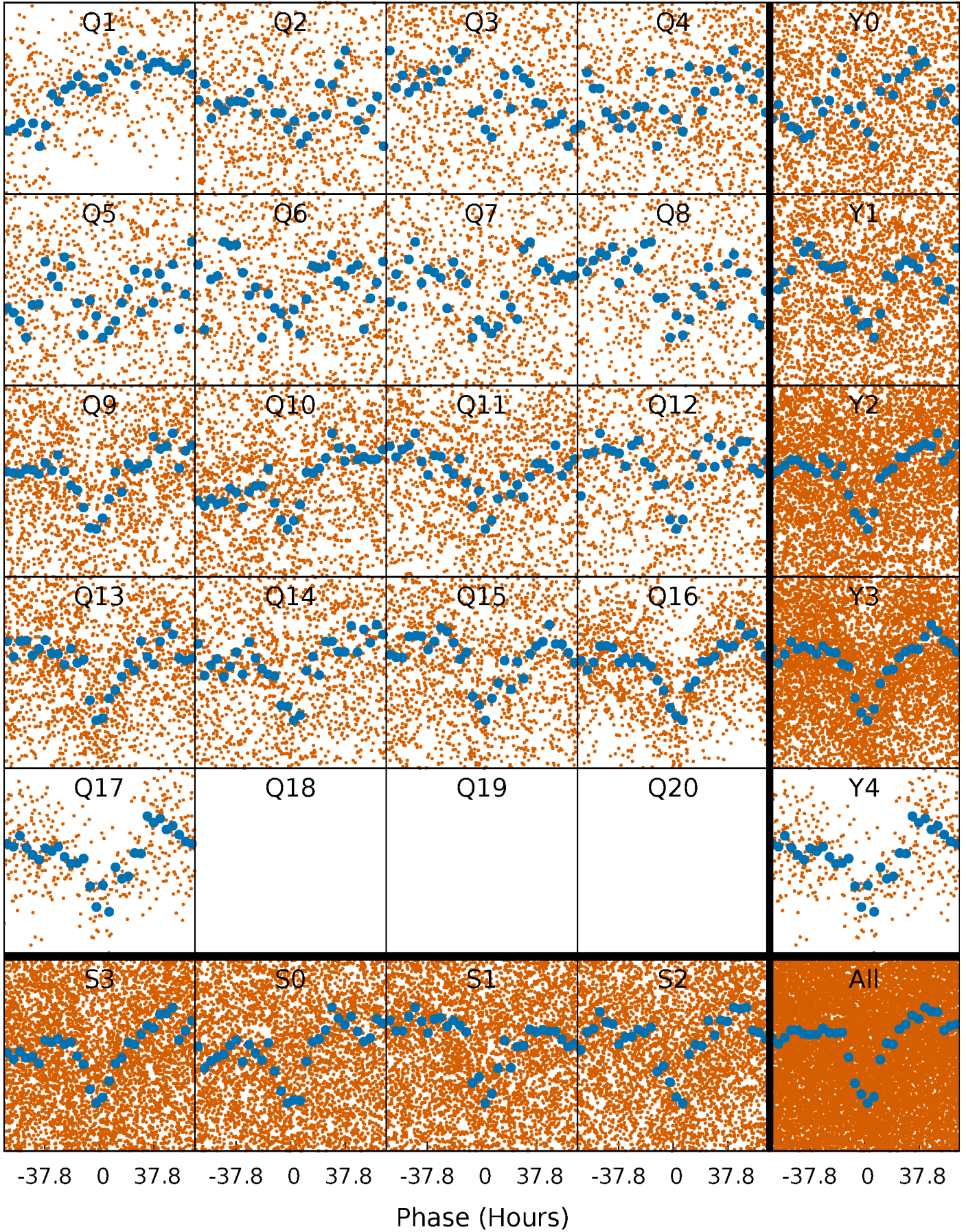


Non-Whitened Vs. Whitened Light Curve



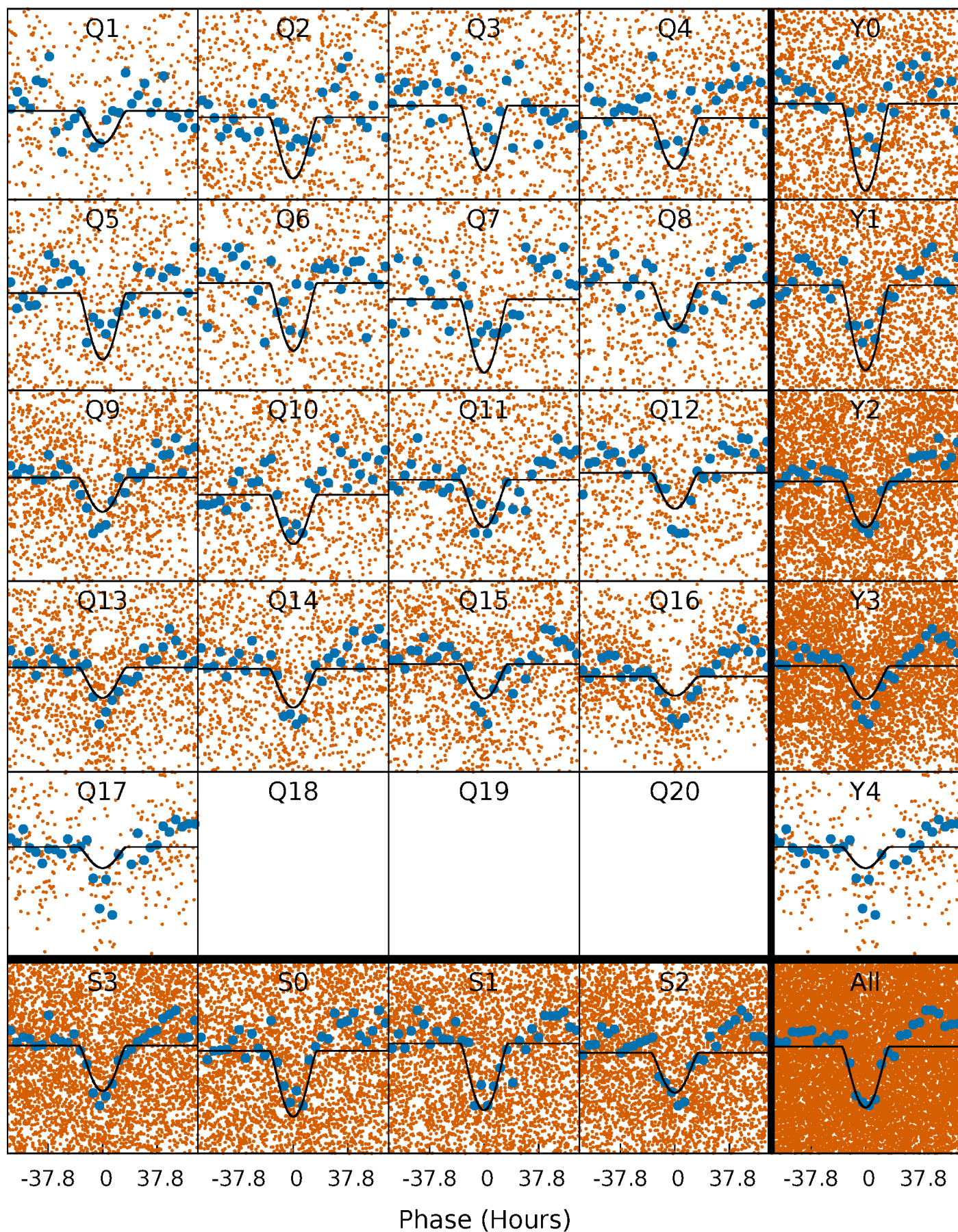
PDC Quarter-Phased Transit Curves

TCE 005471059-03 P= 12.424268 Days $T_0=141.624811$ (BKJD)



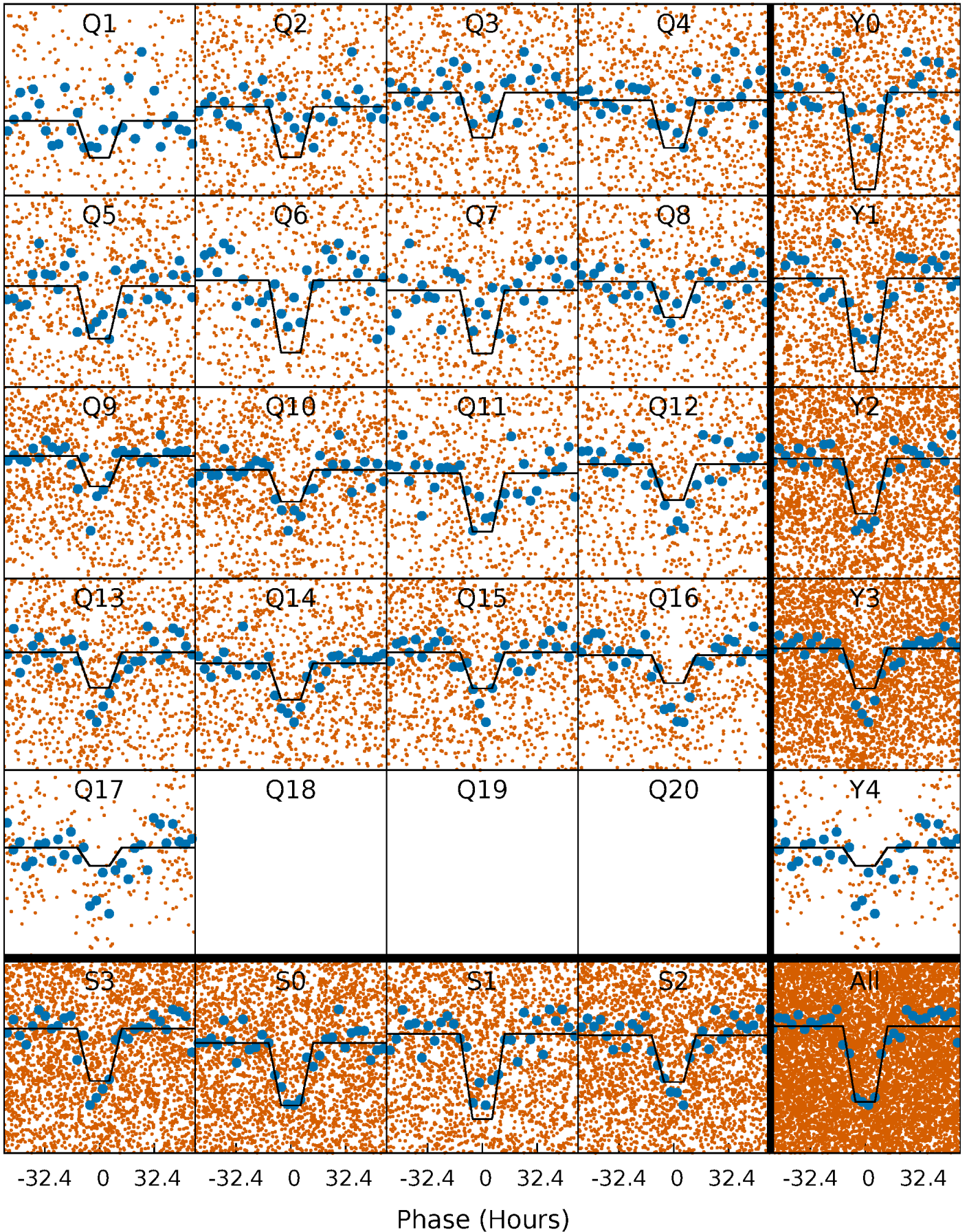
DV Quarter-Phased Transit Curves

TCE 005471059-03 P= 12.424268 Days $T_0=141.624811$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

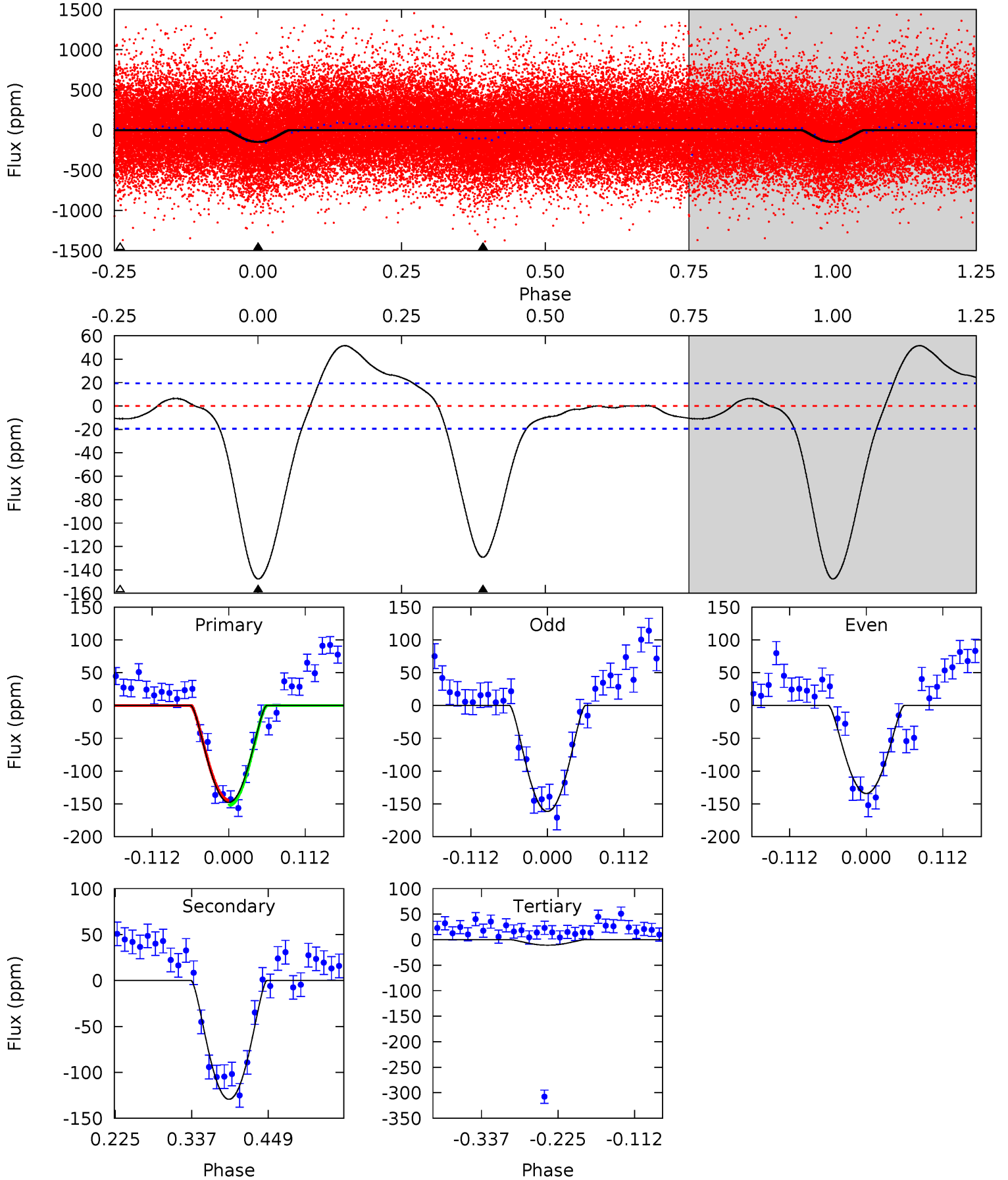
TCE 005471059-03 P= 12.424613 Days $T_0=141.600699$ (BKJD)



DV Model-Shift Uniqueness Test

005471059-03, P = 12.424268 Days, E = 129.200543 Days

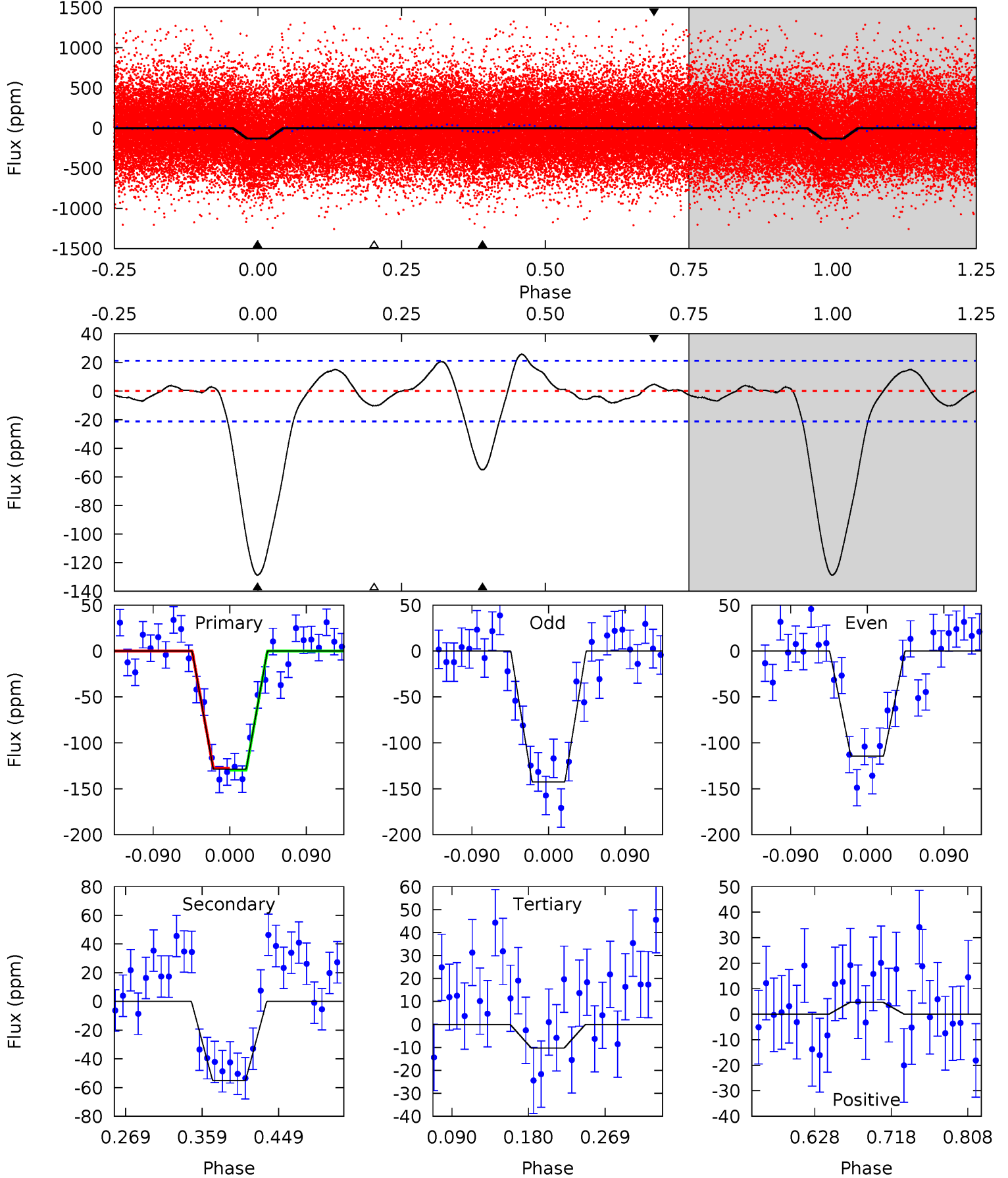
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
34.6	30.3	2.55	0	4.54	1.59	4.41	32.1	34.6	27.7	30.3	3.21	1.12	0.26	0.86



Alt Model-Shift Uniqueness Test

005471059-03, P = 12.424613 Days, E = 129.176086 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.9	12.0	2.23	1.02	4.59	1.70	1.37	25.7	26.9	9.73	10.9	3.07	0.92	0.17	0.21



Stellar Parameters For KIC 005471059

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5524^{+166}_{-182}	$4.540^{+0.040}_{-0.160}$	$-0.040^{+0.300}_{-0.300}$	$0.847^{+0.213}_{-0.071}$	$0.908^{+0.092}_{-0.092}$	$2.102^{+0.449}_{-0.922}$
	+3%/-3%	+1%/-4%	+750%/-750%	+25%/-8%	+10%/-10%	+21%/-44%
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 005471059-03 / KOI 3956.02

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-129 ± 4	$2.82^{+2.36}_{-1.82}$	1000^{+61}_{-43}	3789^{+1865}_{-660}	91^{+625}_{-64}
Alt.	-55 ± 5	$2.25^{+2.06}_{-1.61}$	1000^{+59}_{-45}	3560^{+2107}_{-622}	61^{+715}_{-44}

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

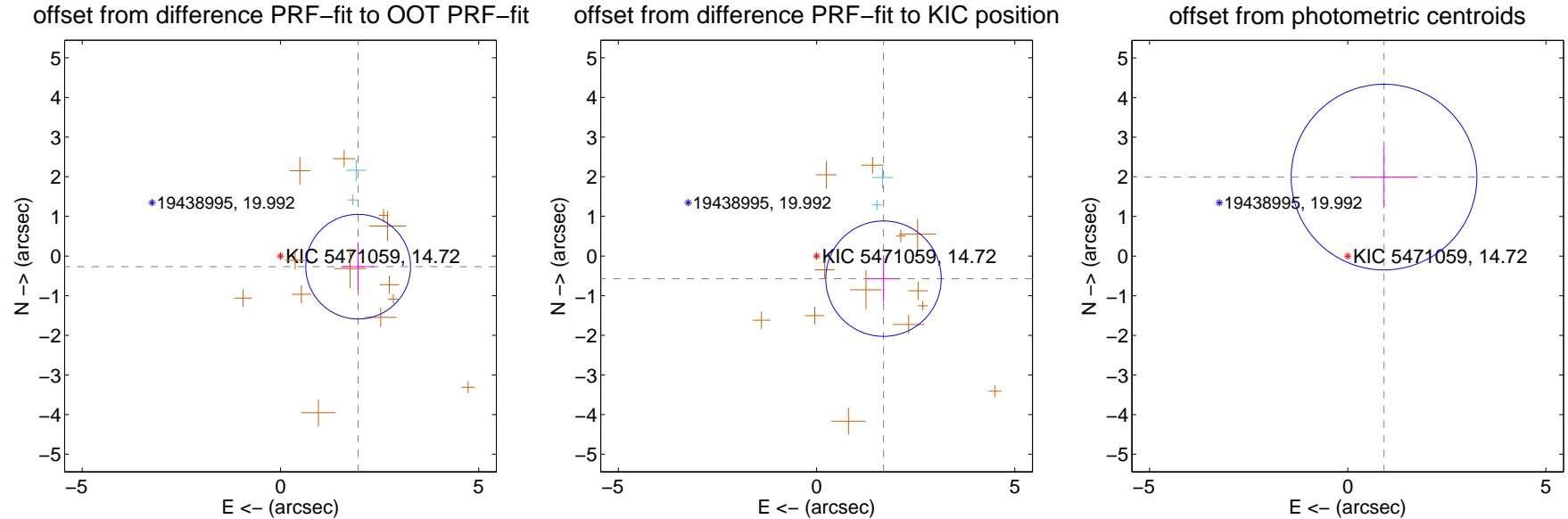
DV Centroid Data

Supplemental centroid analysis for 005471059-03. Kepler magnitude: 14.72. Transit SNR 14.26

There are 2 quarters with good PRF difference image offsets

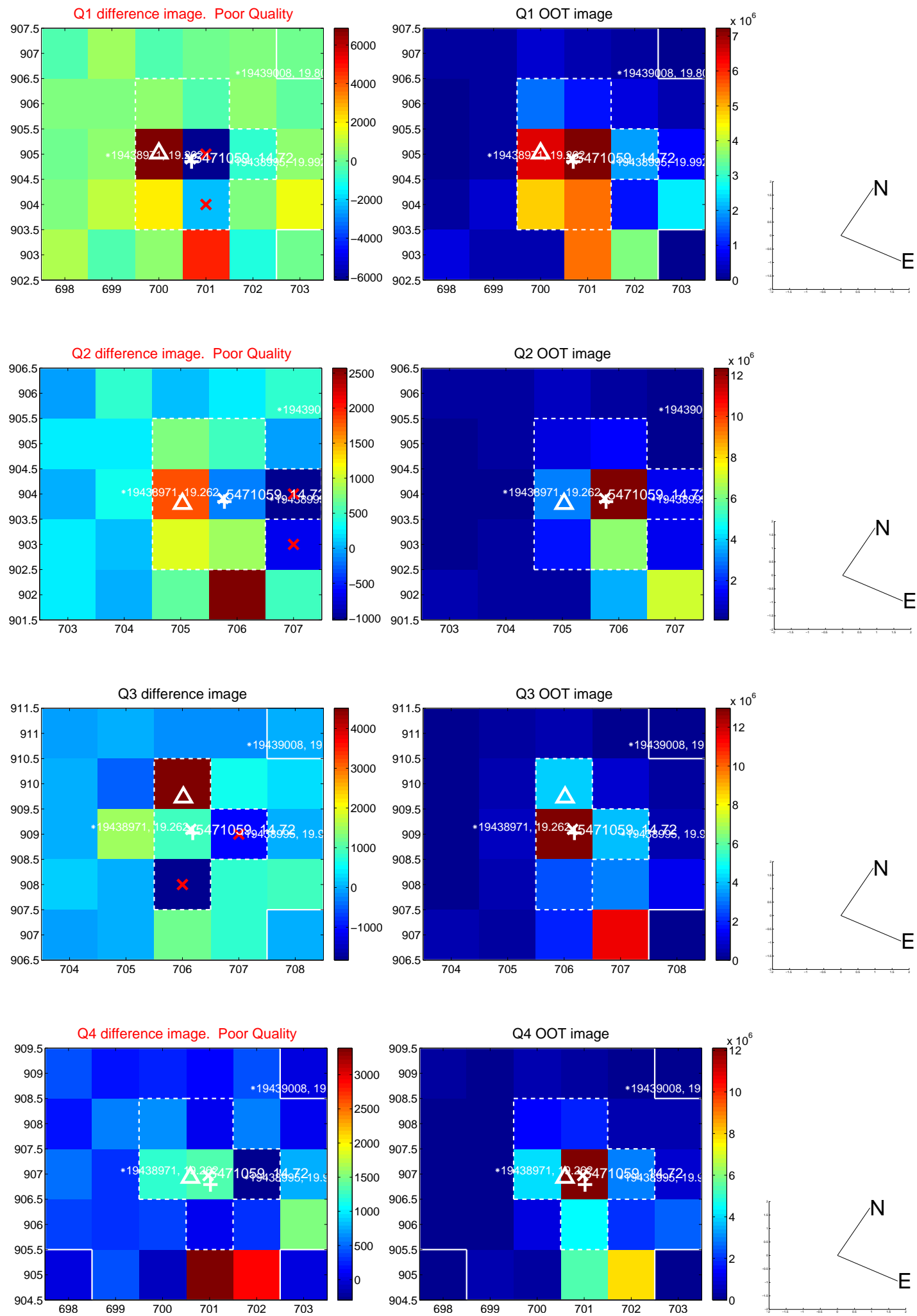
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.979 ± 0.440	4.49	-1.961 ± 0.415	-0.269 ± 0.615
PRF-fit source offset from KIC position	1.782 ± 0.485	3.67	-1.688 ± 0.426	-0.571 ± 0.588
photometric centroid source offset	2.19 ± 0.78	2.81	-0.92 ± 0.84	1.99 ± 0.77

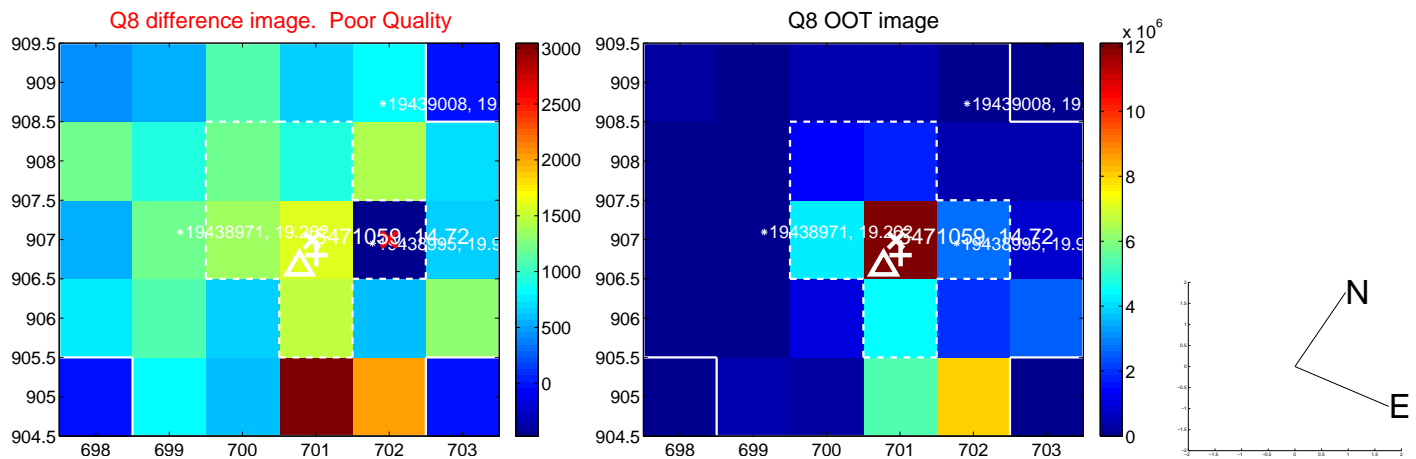
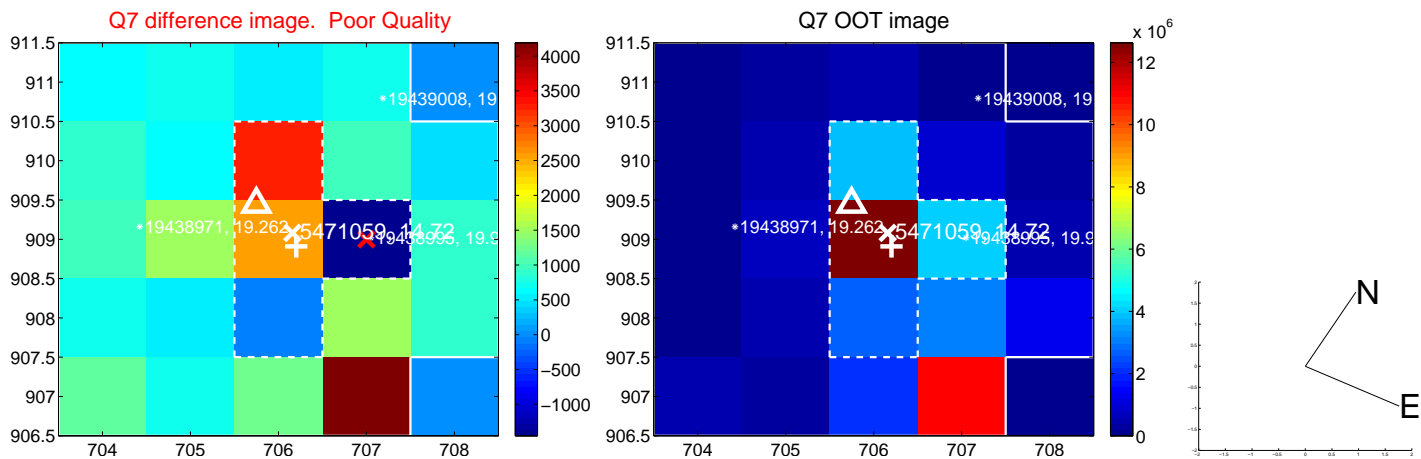
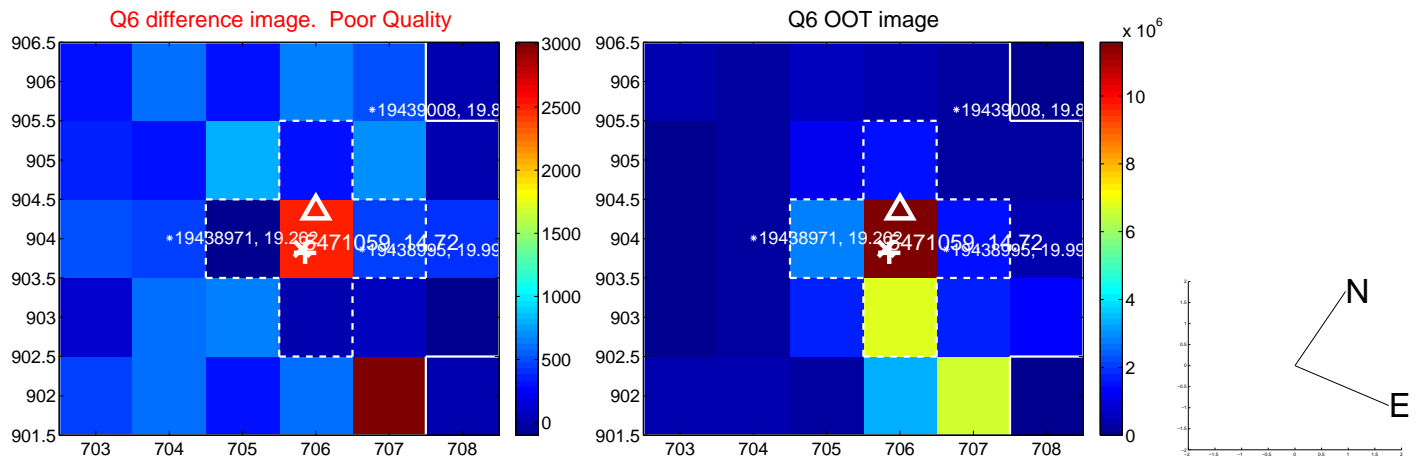
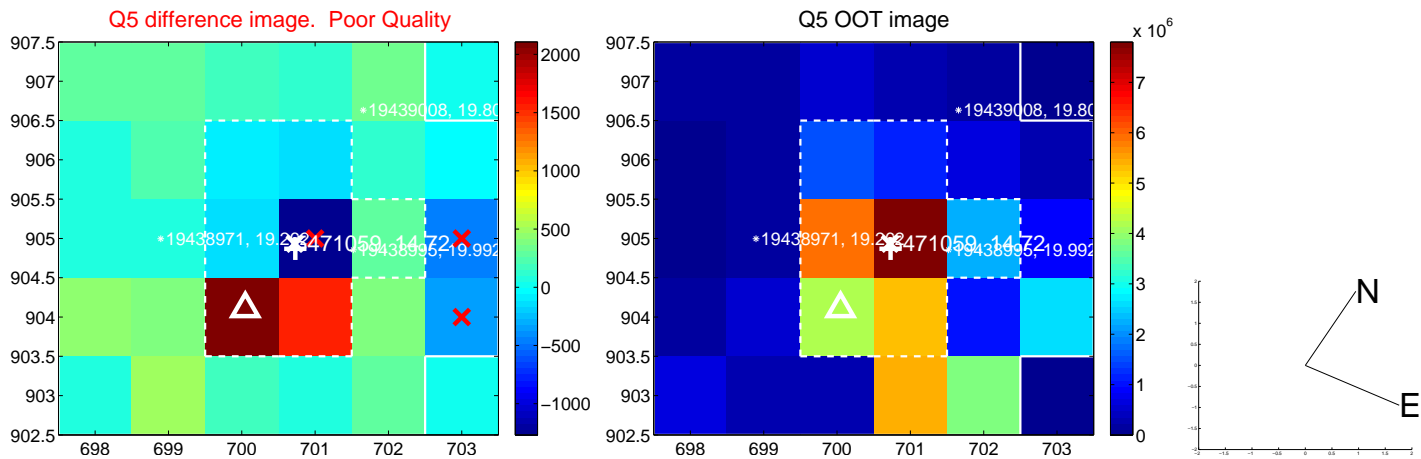


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

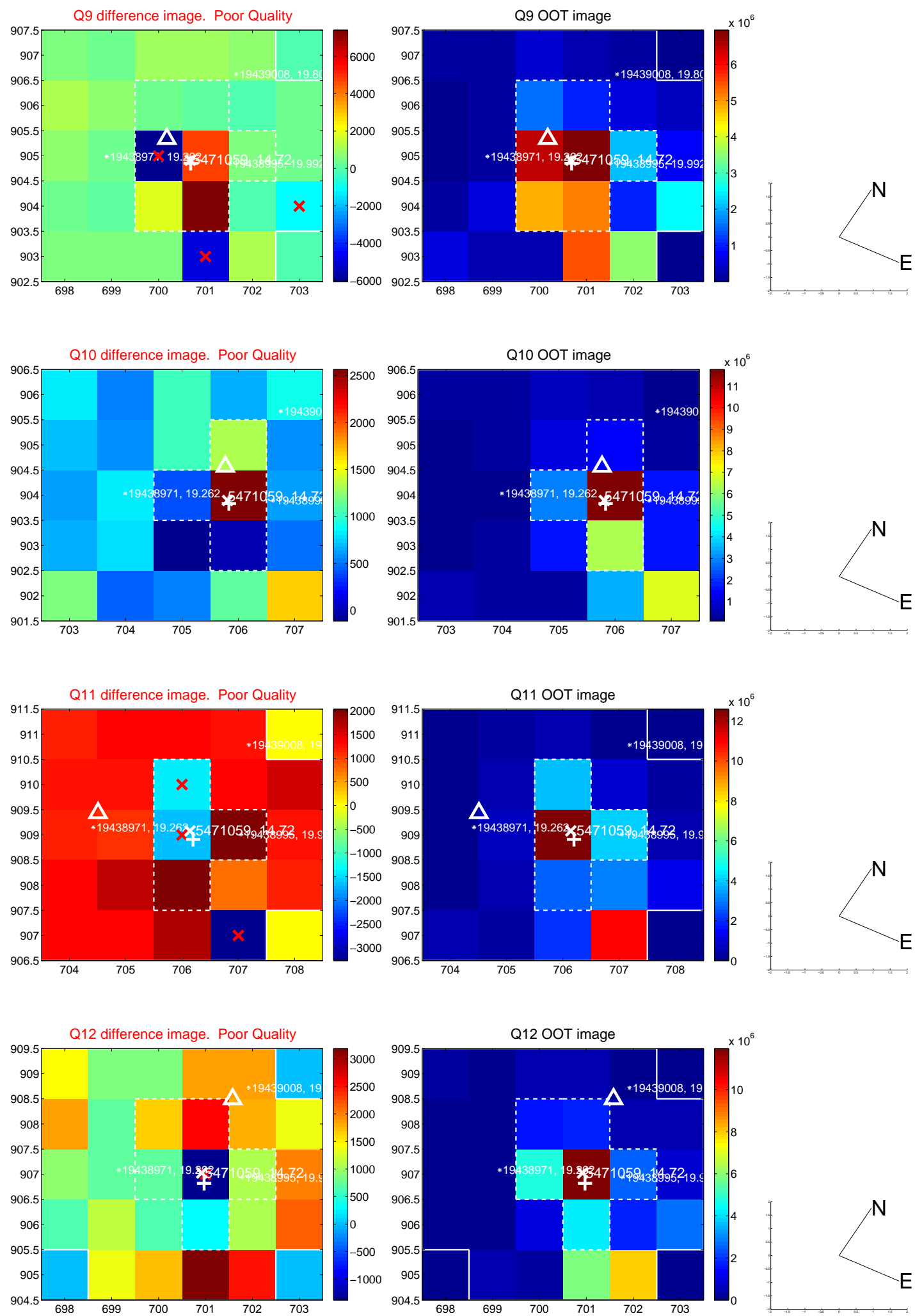
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



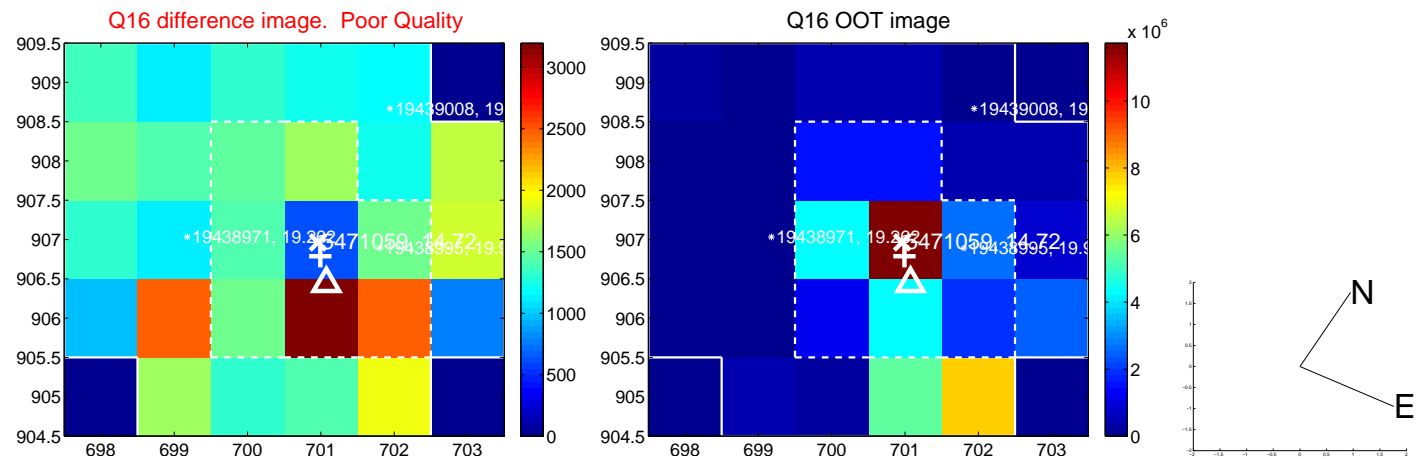
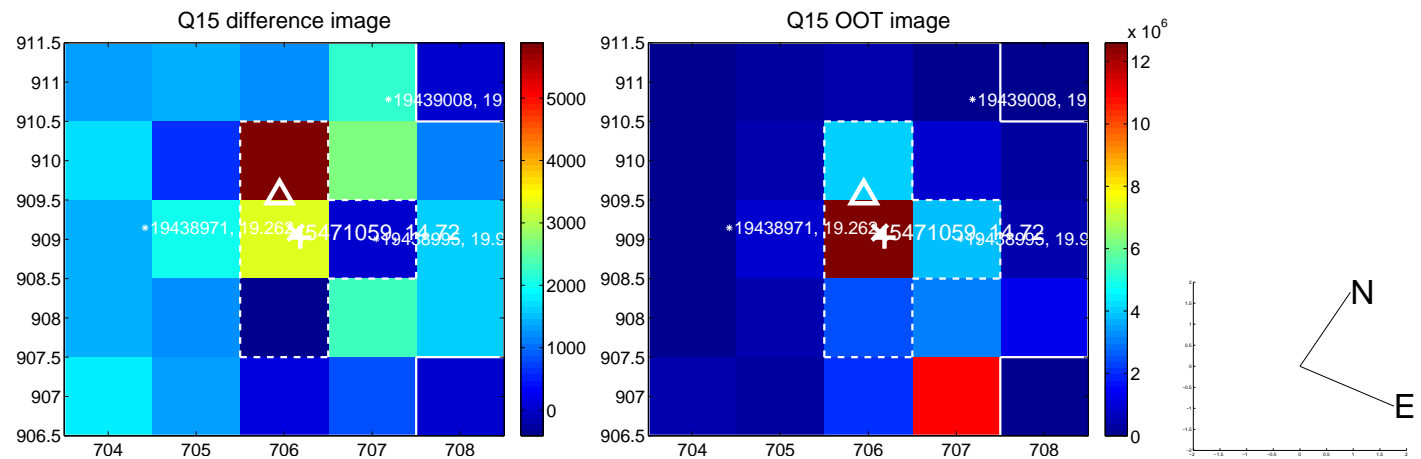
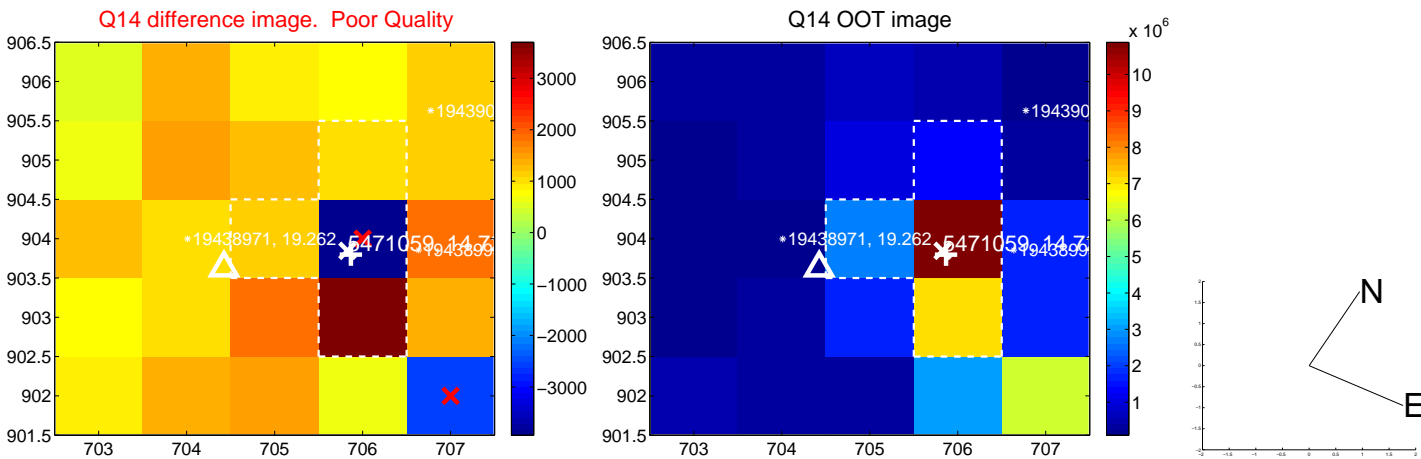
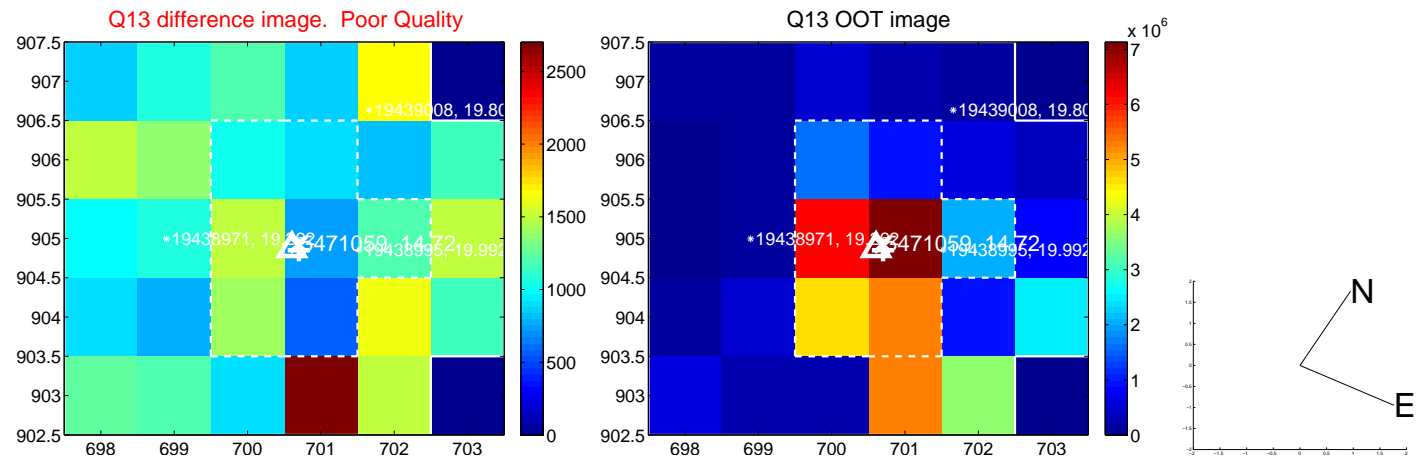
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



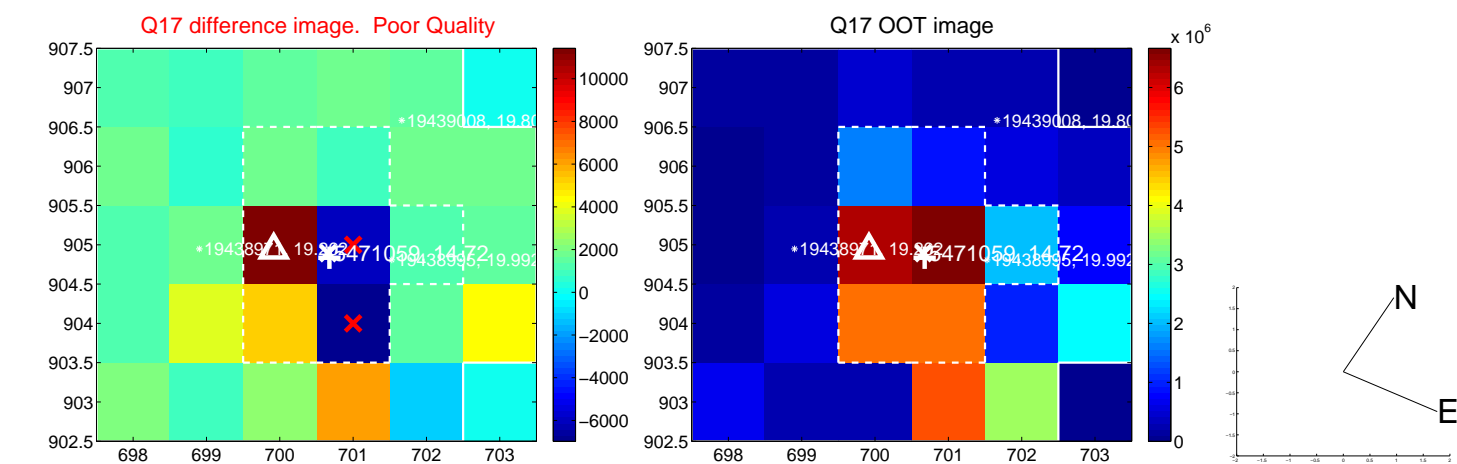
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



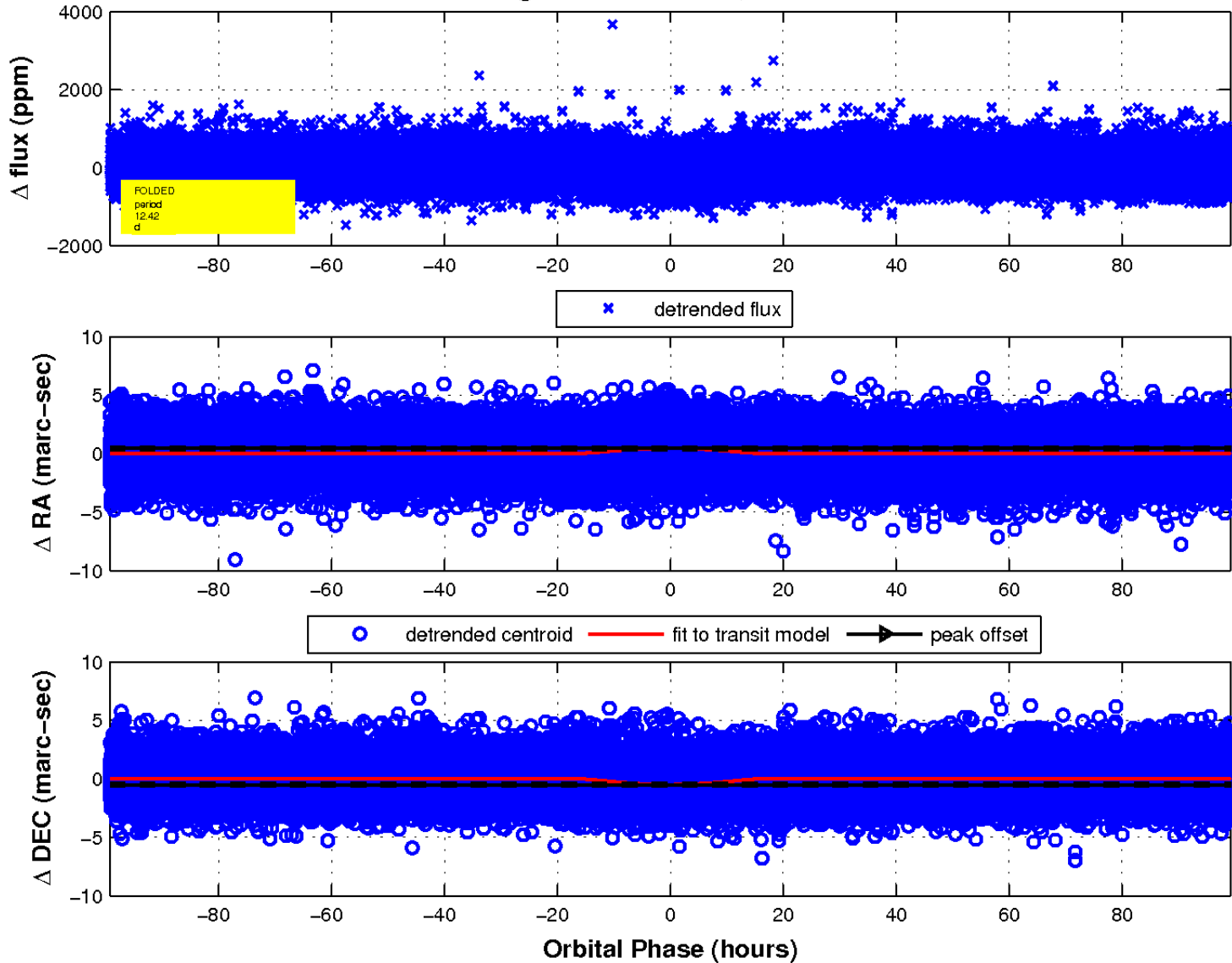
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



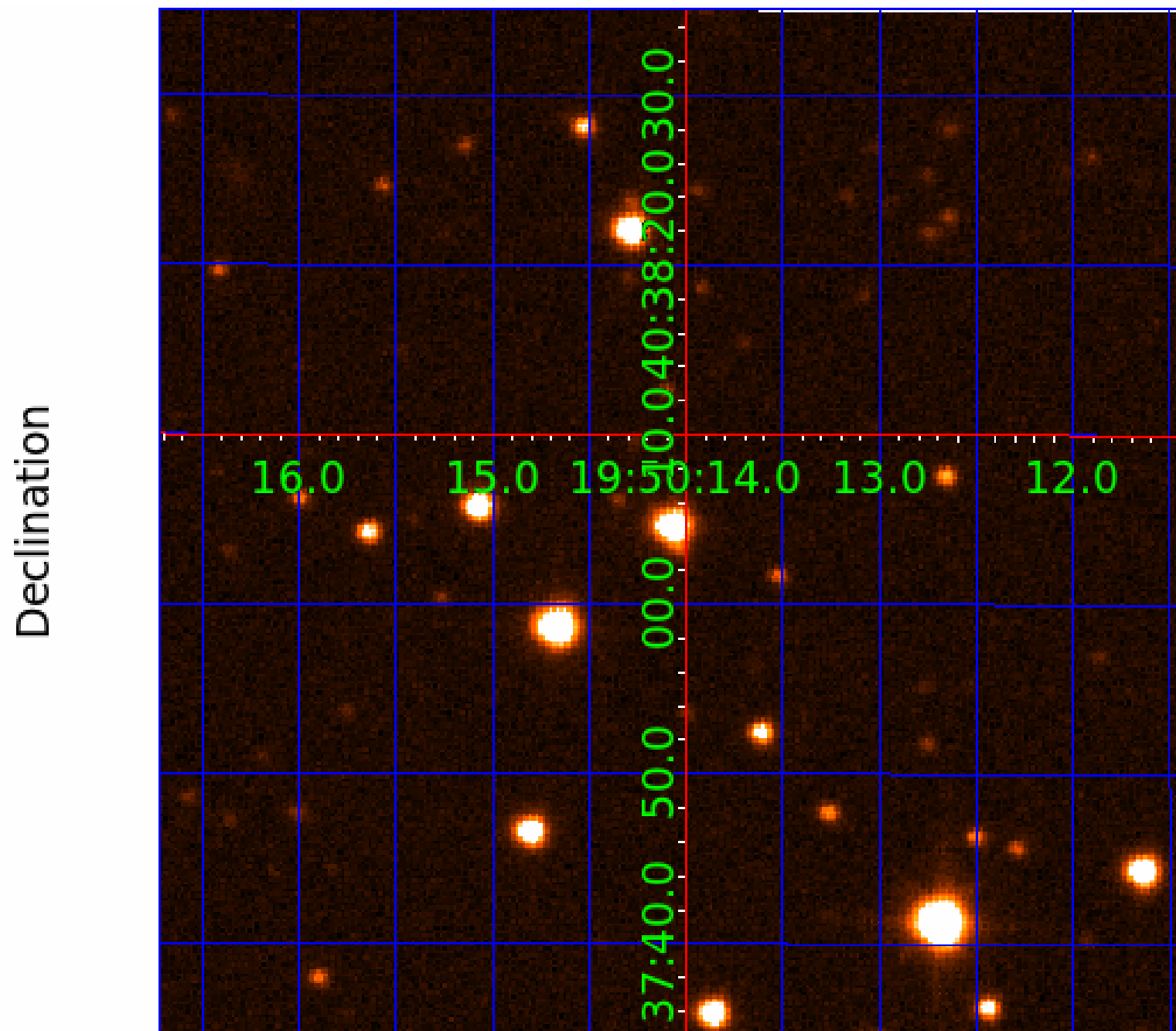
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 3 of 4



UKIRT Image



KIC 005471059

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})
005471059-01	OBS	3956.01	2.636891	132.078224	399.1	0.827	21.6	29.4	0.85	5524	1.71	457.48
005471059-02	OBS	No	2.636905	133.933681	207.1	1.312	16.9	19.3	0.85	5524	1.47	457.48
005471059-03	OBS	3956.02	12.424268	141.624811	146.5	33.073	10.6	14.3	0.85	5524	1.99	57.92
005471059-04	OBS	No	12.424849	134.001105	120.6	29.083	10.3	14.3	0.85	5524	1.27	57.91

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005471059-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
005471059-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
005471059-03	OBS	FP	0.00	1	0	1	1	LPP_DV—HALO_GHOST—EPHEM_MATCH
005471059-04	OBS	FP	0.00	1	0	1	1	LPP_DV—SAME_NTL_PERIOD—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 005471059-04

TCE (1)	KIC	Parent (2)	Parent KIC	P ₁ :P ₂	Dist (μ)	Δ Row	Δ Col	m ₂	m ₁	D ₂ /D ₁	Mechanism	Flag	σ_P	σ_T
005471059-04	5471059	V380-Cyg-sec	5385723	1:1	293.2	59	-43	5.77	14.72	1066.40	Direct-PRF	0	1.82	1.68

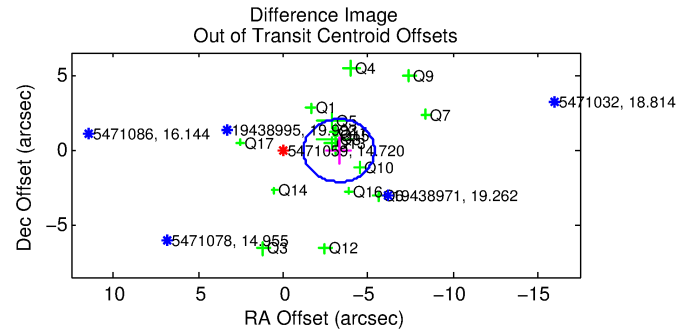
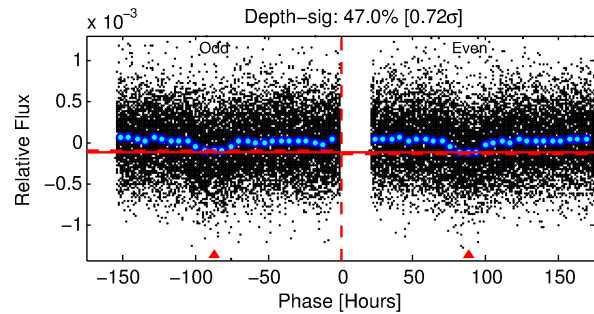
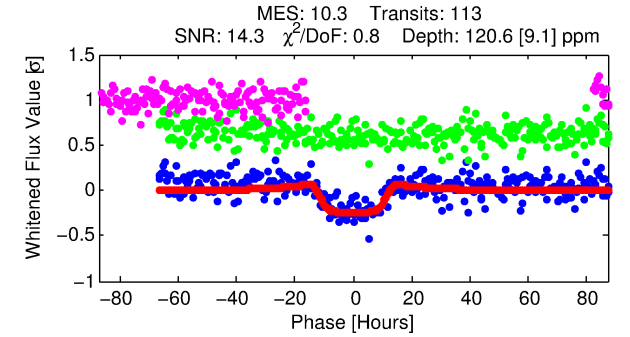
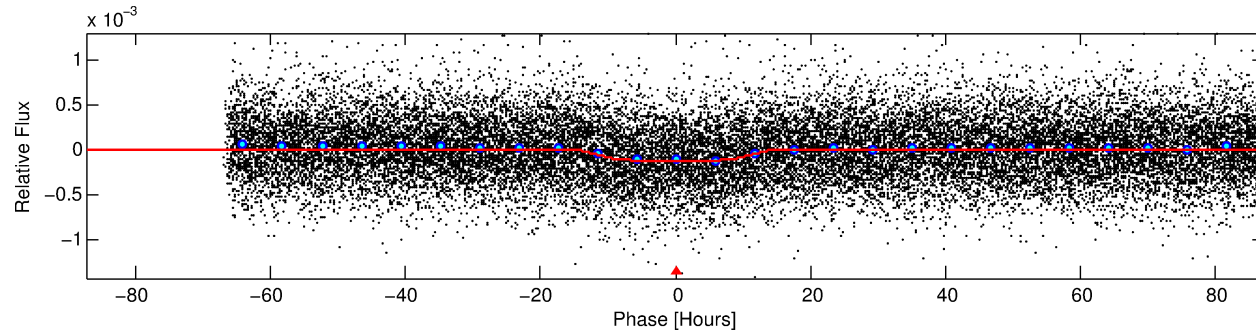
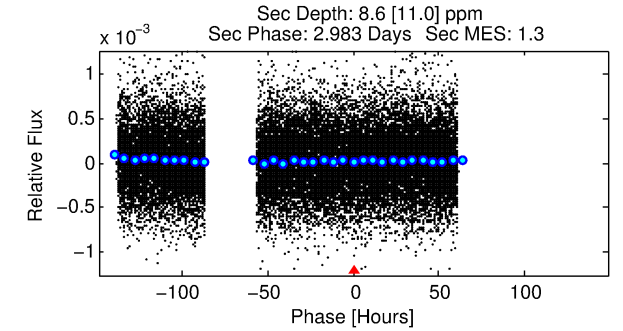
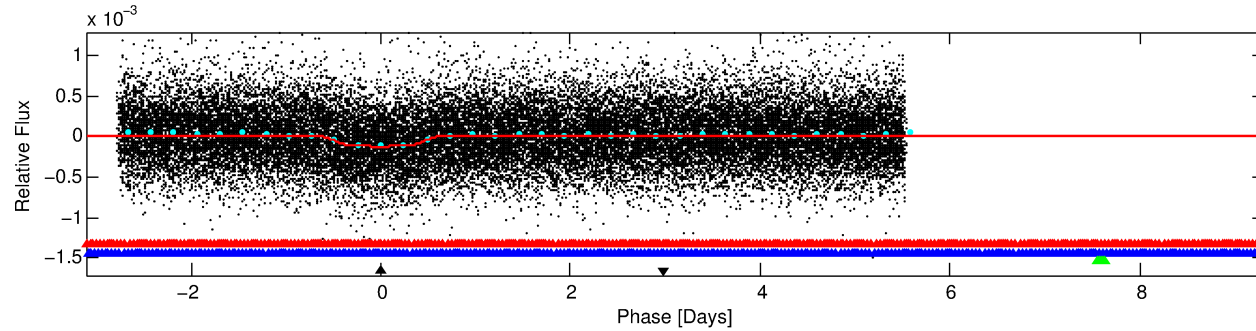
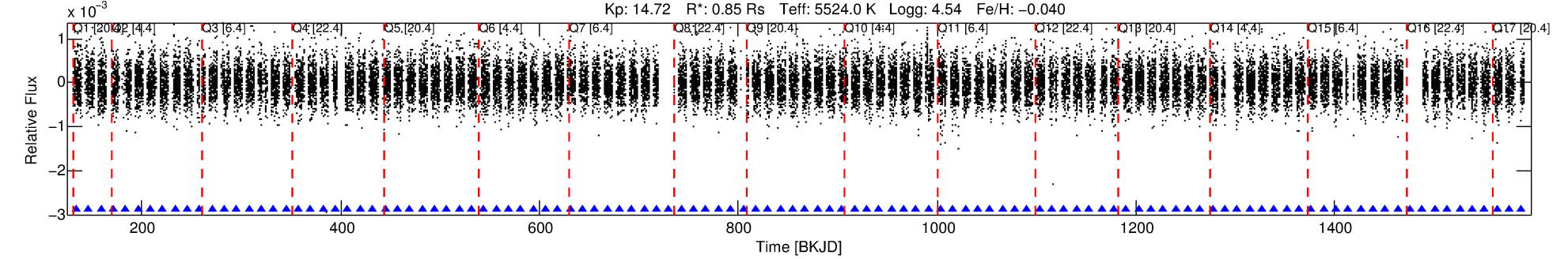
Notes: P₁:P₂ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m₂ and m₁ are the magnitudes of the parent and child. D₂/D₁ is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period 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: 5471059 Candidate: 4 of 4 Period: 12.425 d

KOI: K03956 Corr: No Ephemeris Match

Kp: 14.72 R*: 0.85 Rs Teff: 5524.0 K Logg: 4.54 Fe/H: -0.040



DV Fit Results:

Period = 12.42485 [0.00056] d
Epoch = 134.0011 [0.0367] BKJD
Rp/R* = 0.0137 [0.0007]
a/R* = 1.34 [0.09]
b = 0.97 [0.01]
Seff = 57.91 [18.84]
Teff = 703 [57] K
Rp = 1.27 [0.33] Re
a = 0.1017 [0.0211] AU
Ag = 30.22 [40.06] [0.73σ]
Teffp = 2550 [828] K [2.22σ]

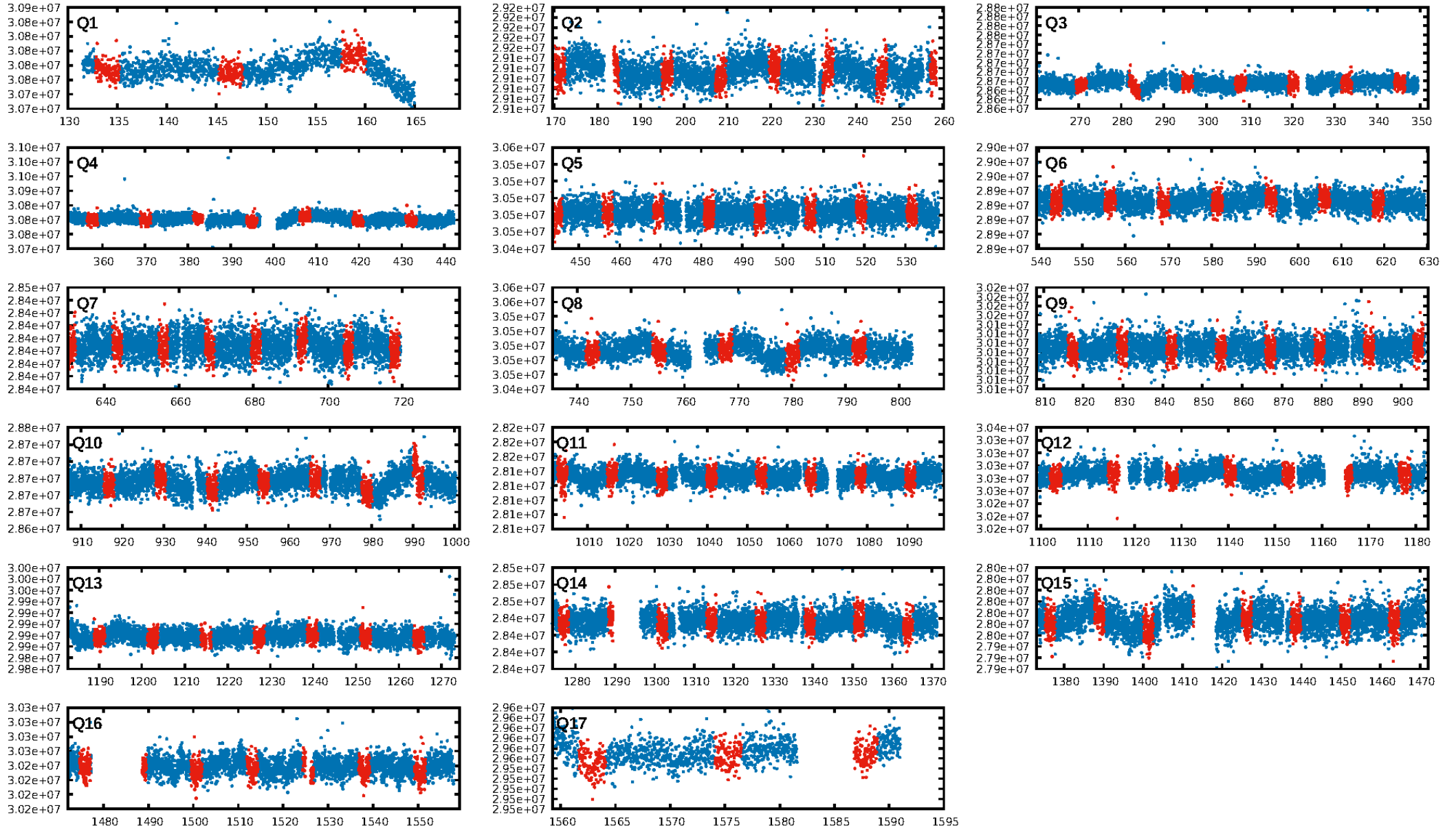
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 82.2%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 6.90e-28
RollingBand-fgt: 1.00 [107/107]
GhostDiagnostic-chr: 0.1868
Centroid-sig: 0.0%
Centroid-so: 2.275 arcsec [2.62σ]
OotOffset-rm: 3.286 arcsec [4.70σ]
KicOffset-rm: 2.794 arcsec [4.19σ]
OotOffset-st: 3/4/4/5 [16]
KicOffset-st: 3/4/4/5 [16]
DiffImageQuality-fgm: 0.00 [0/16]
DiffImageOverlap-fno: 0.00 [0/17]

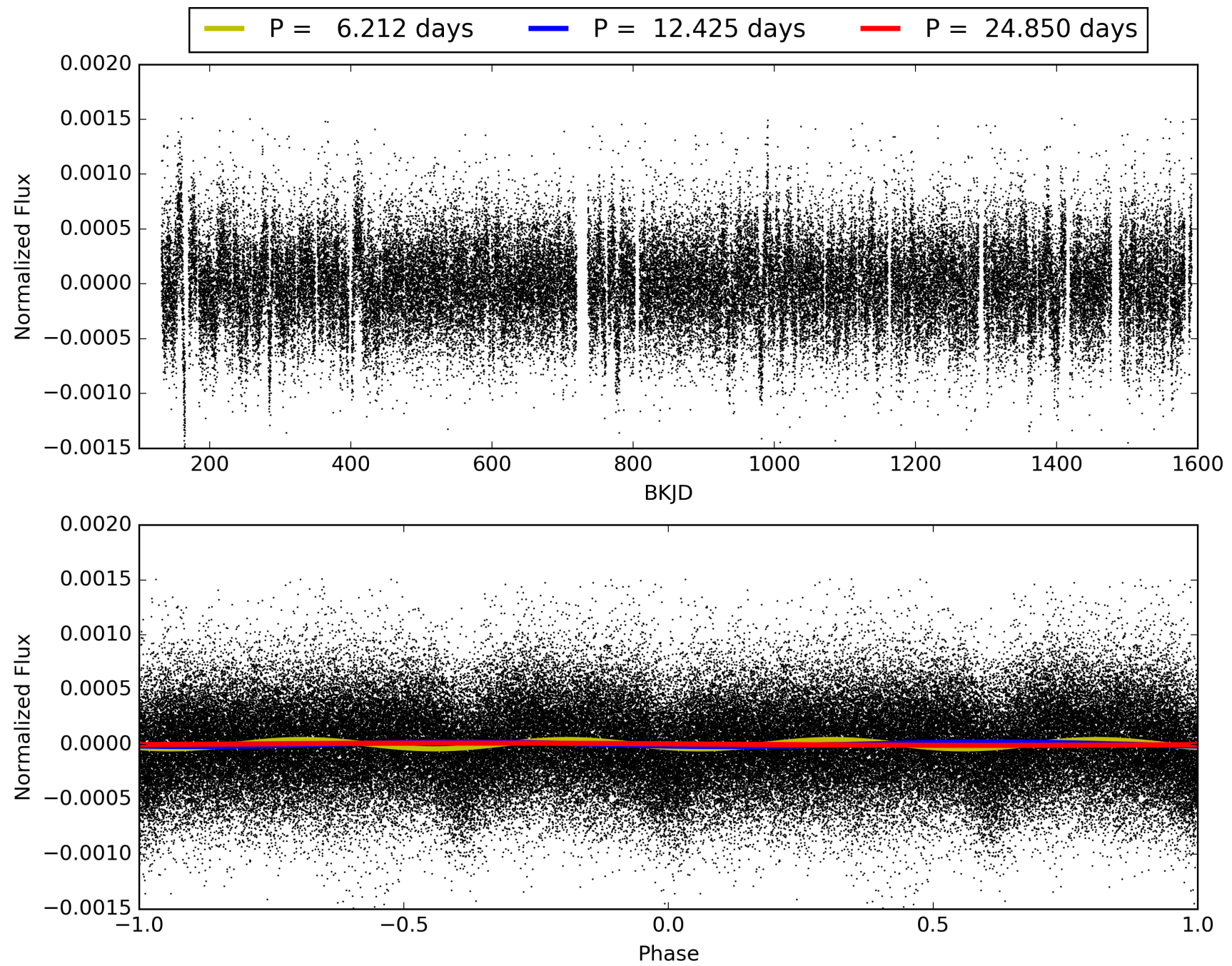
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:36:35 Z

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

TCE 005471059-04, PDC Light Curves

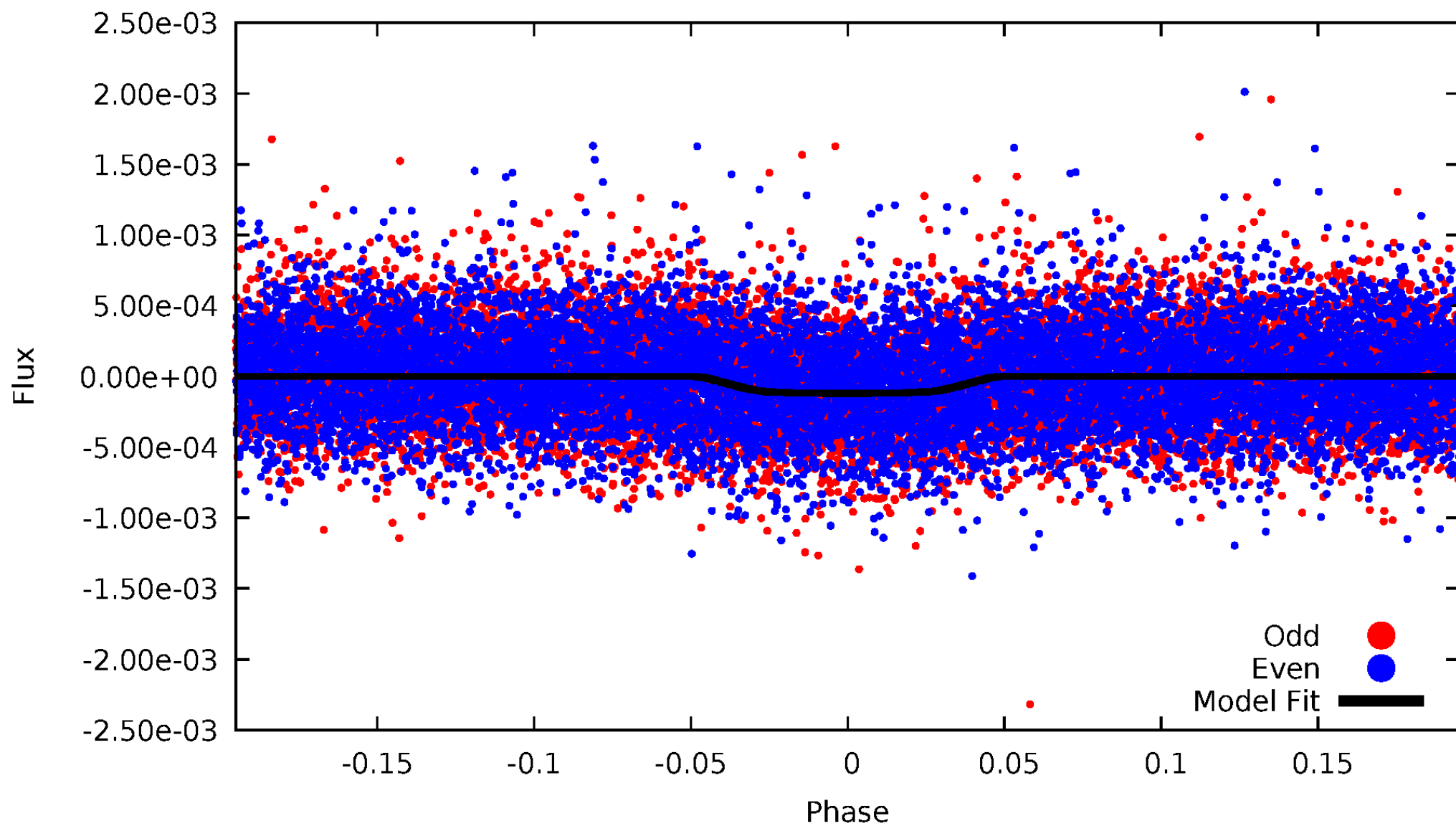


TCE 005471059-04



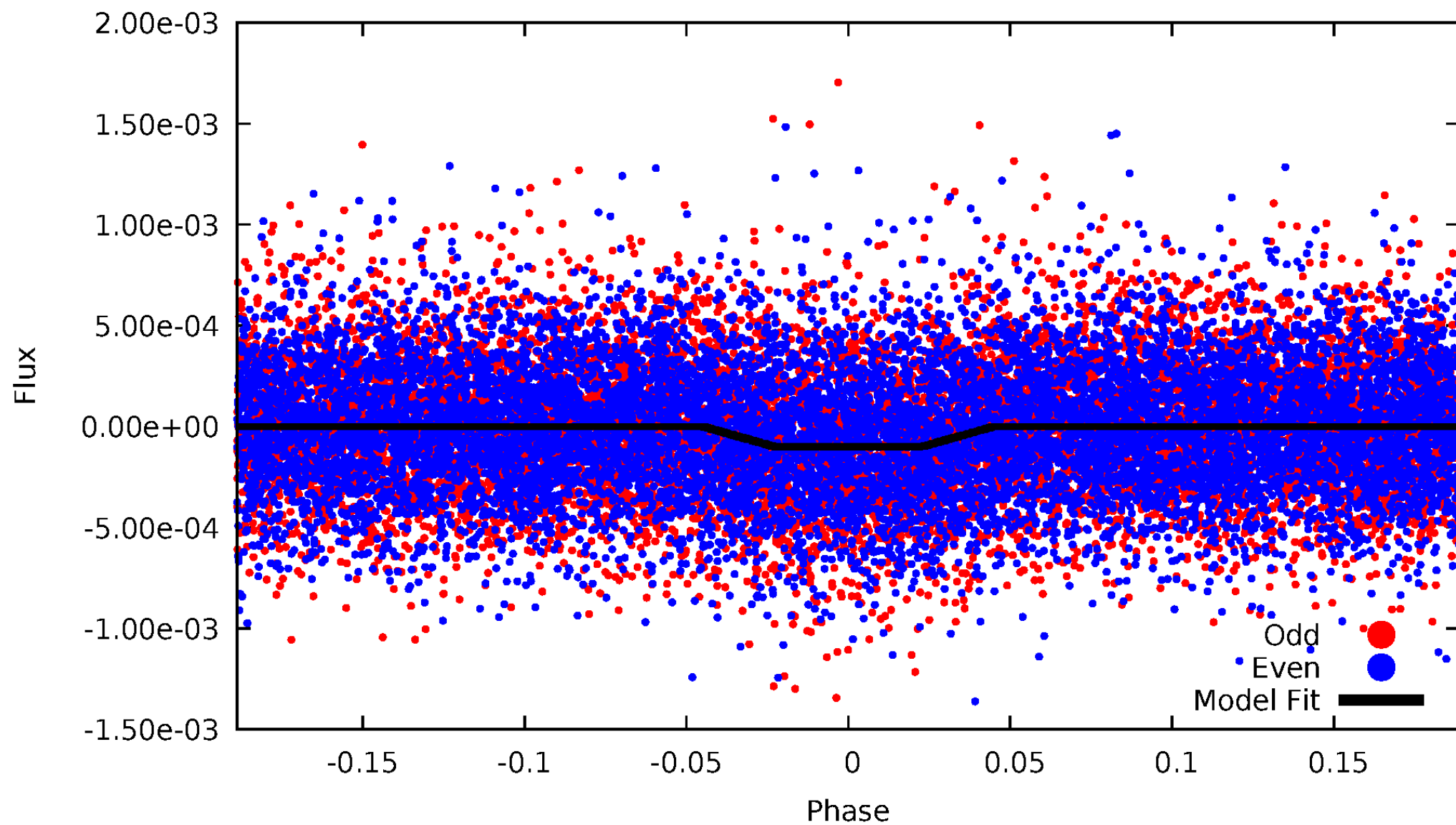
DV Odd/Even

TCE 005471059-04



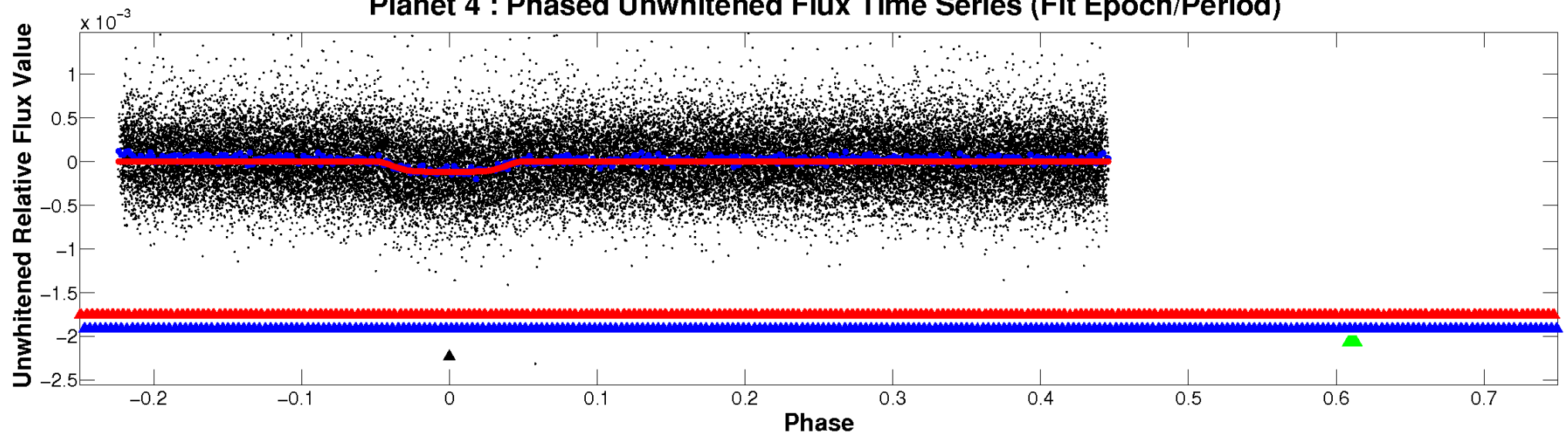
ALT Odd/Even

TCE 005471059-04

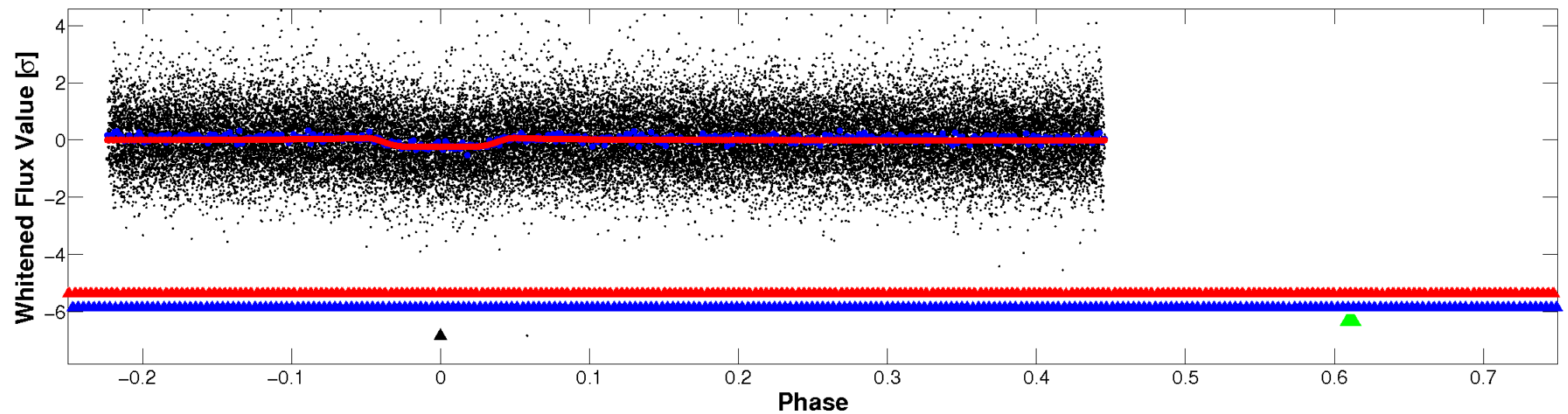


Non-Whitened Vs. Whitened Light Curve

Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

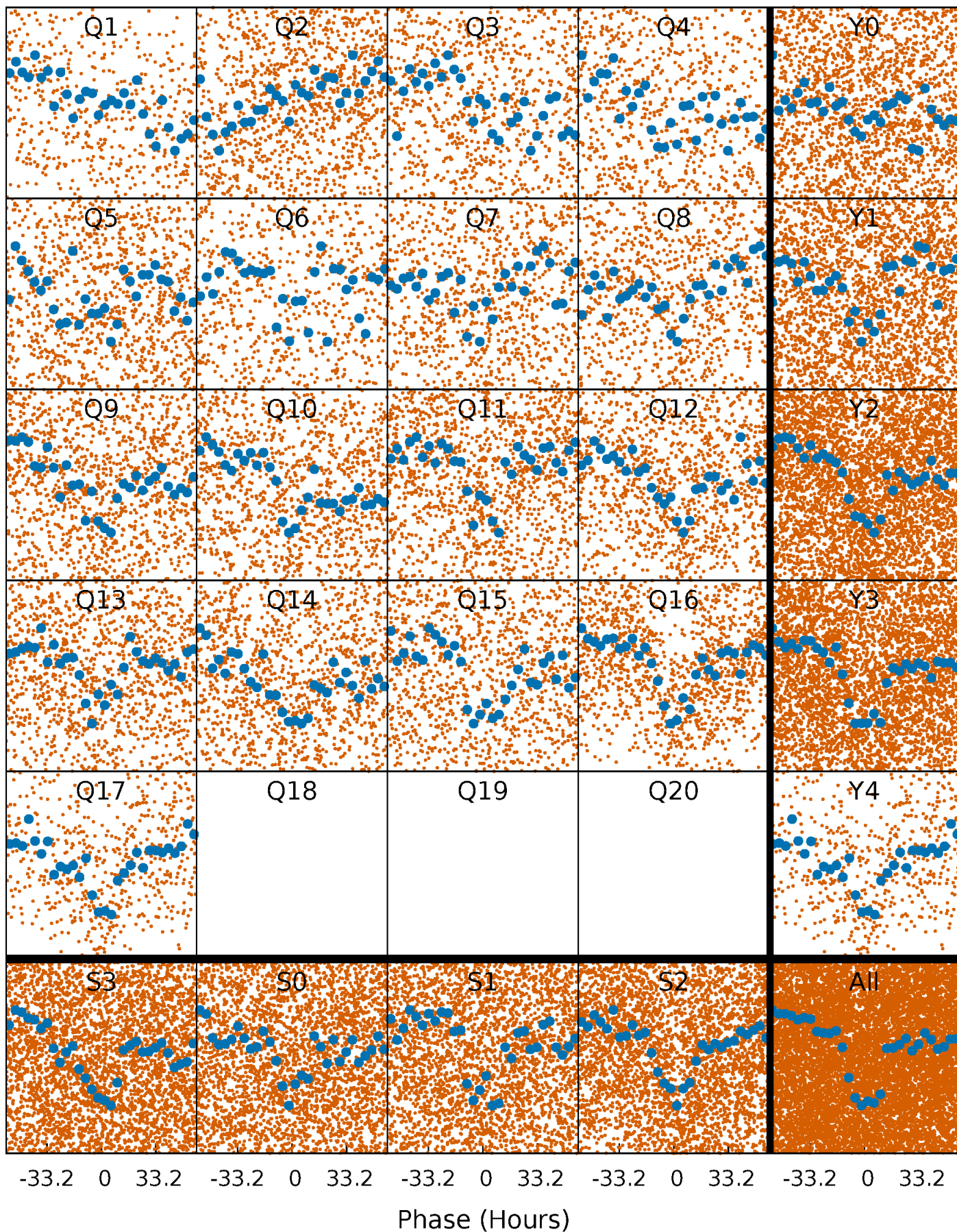


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



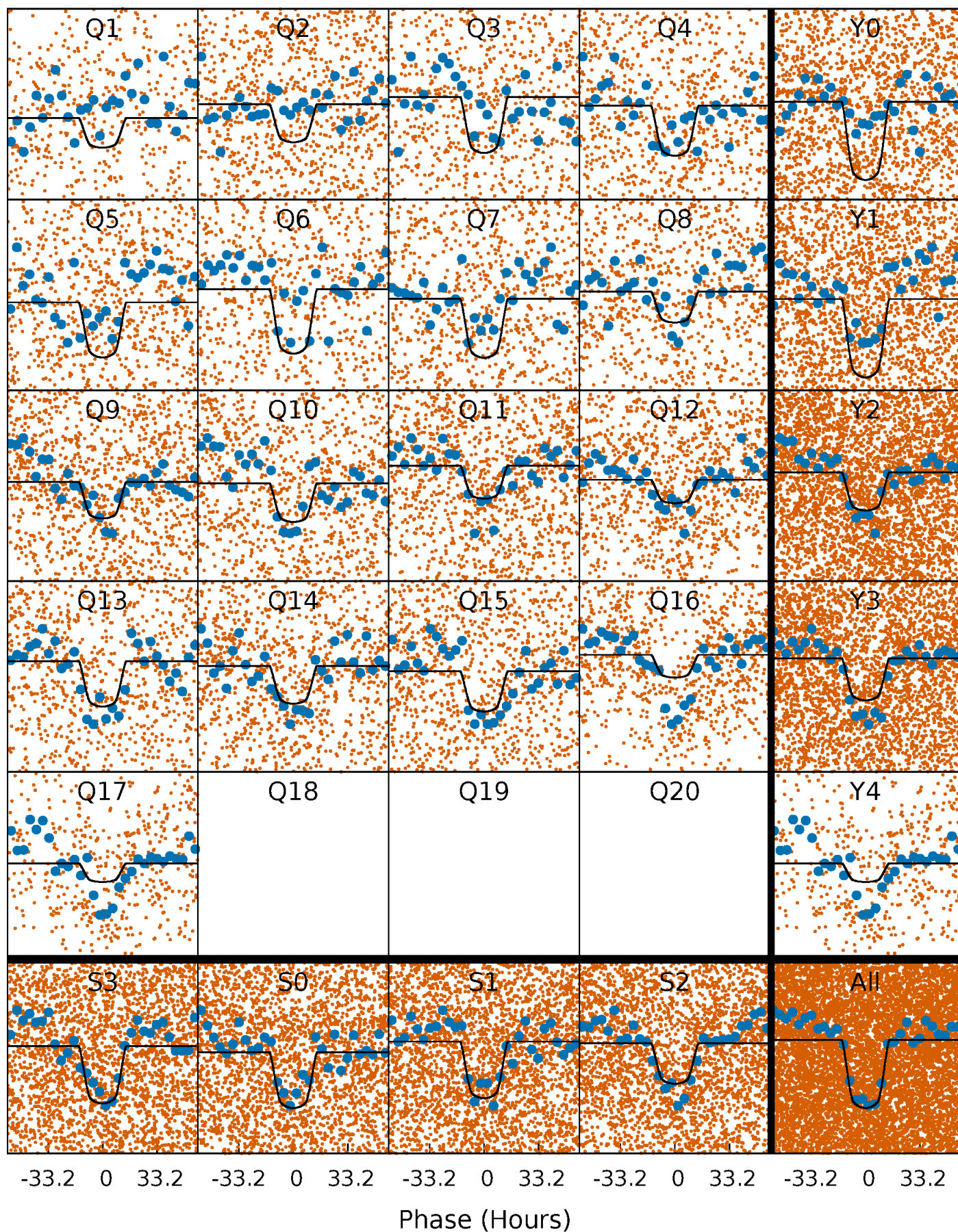
PDC Quarter-Phased Transit Curves

TCE 005471059-04 P= 12.424849 Days $T_0=134.001104$ (BKJD)



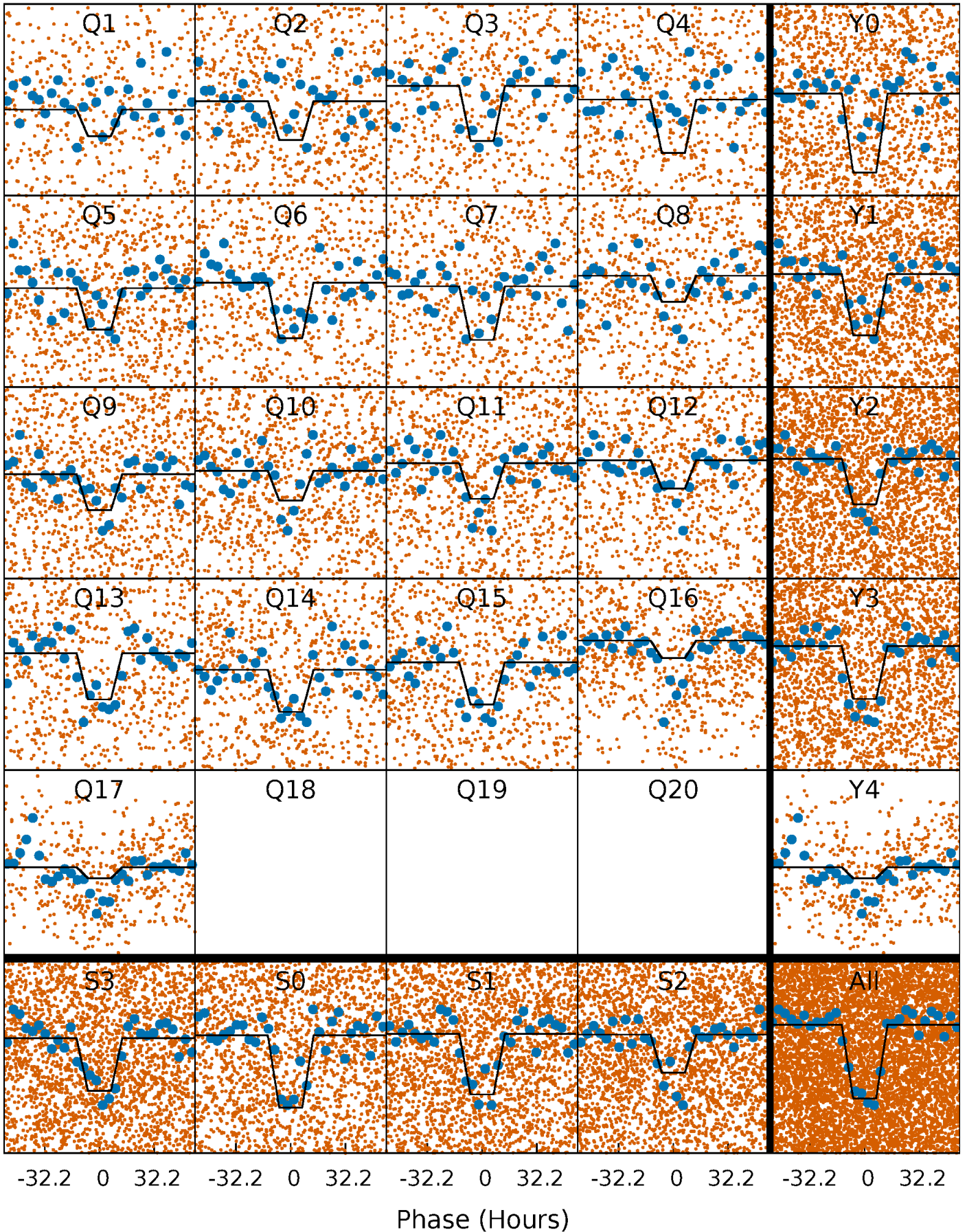
DV Quarter-Phased Transit Curves

TCE 005471059-04 P= 12.424849 Days $T_0=134.001104$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

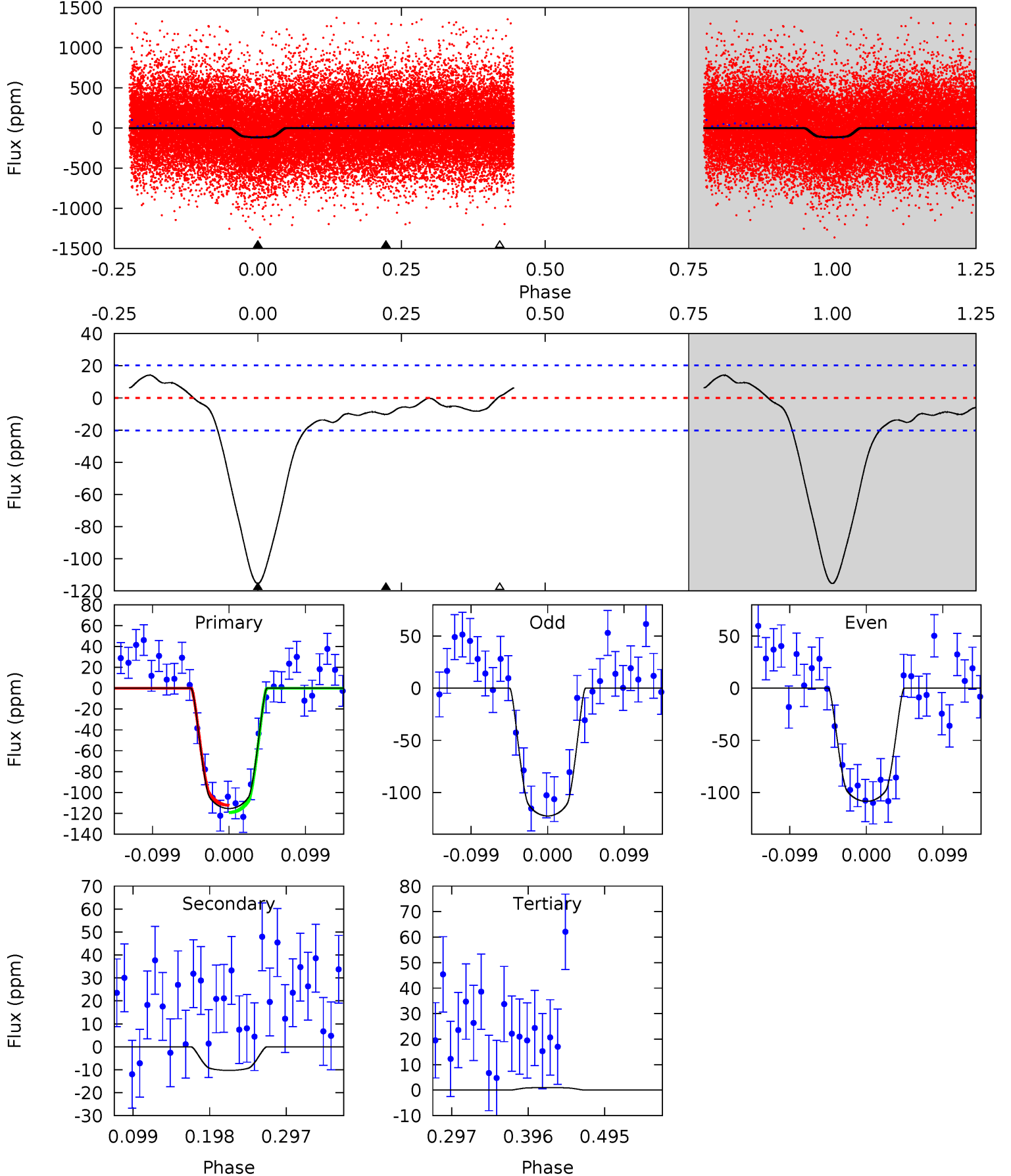
TCE 005471059-04 P= 12.426732 Days $T_0=133.875635$ (BKJD)



DV Model-Shift Uniqueness Test

005471059-04, P = 12.424849 Days, E = 121.576255 Days

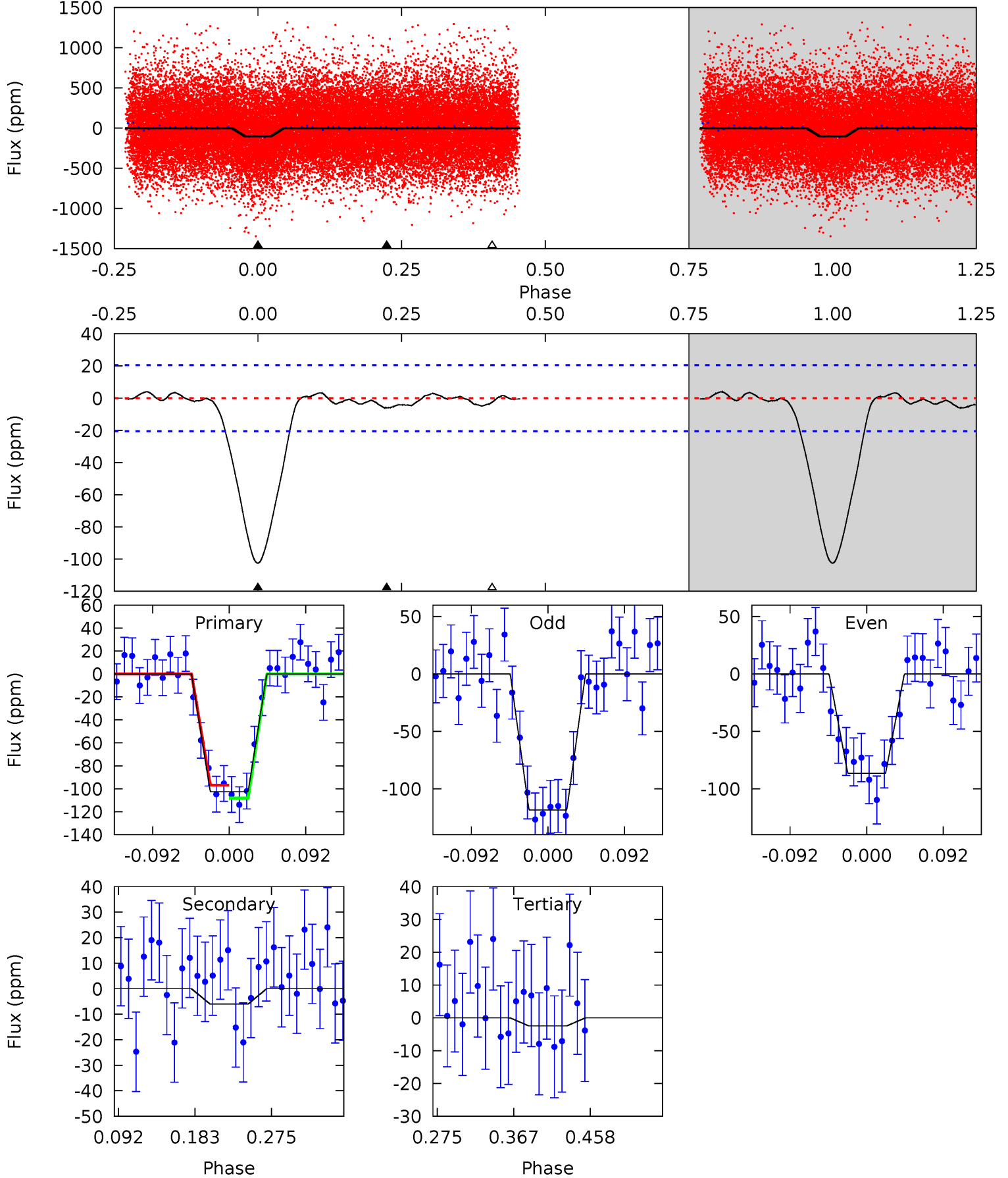
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.0	2.32	-0.22	0	4.57	1.65	1.90	26.2	26.0	2.54	2.32	1.60	1.00	0.11	0.79



Alt Model-Shift Uniqueness Test

005471059-04, P = 12.426732 Days, E = 121.448903 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.9	1.35	0.55	0	4.58	1.69	0.48	22.3	22.9	0.80	1.35	3.61	1.05	0.04	1.28



Stellar Parameters For KIC 005471059

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5524^{+166}_{-182}	$4.540^{+0.040}_{-0.160}$	$-0.040^{+0.300}_{-0.300}$	$0.847^{+0.213}_{-0.071}$	$0.908^{+0.092}_{-0.092}$	$2.102^{+0.449}_{-0.922}$
	+3%/-3%	+1%/-4%	+750%/-750%	+25%/-8%	+10%/-10%	+21%/-44%
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 005471059-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-10 ± 4	$1.30^{+0.17}_{-0.11}$	1005^{+50}_{-44}	3225^{+209}_{-253}	33^{+16}_{-14}
Alt.	-6 ± 4	$0.96^{+0.12}_{-0.09}$	1000^{+63}_{-42}	3271^{+331}_{-622}	36^{+29}_{-29}

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 $A_{obs} \gg 1.0$

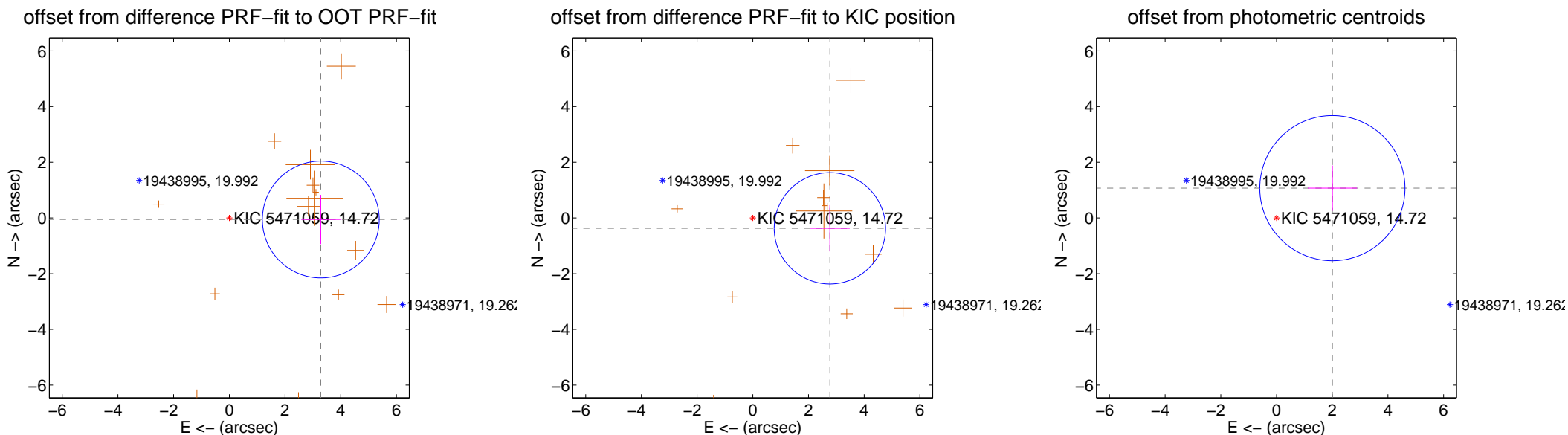
DV Centroid Data

Supplemental centroid analysis for 005471059-04. Kepler magnitude: 14.72. Transit SNR 14.28

There are 0 quarters with good PRF difference image offsets

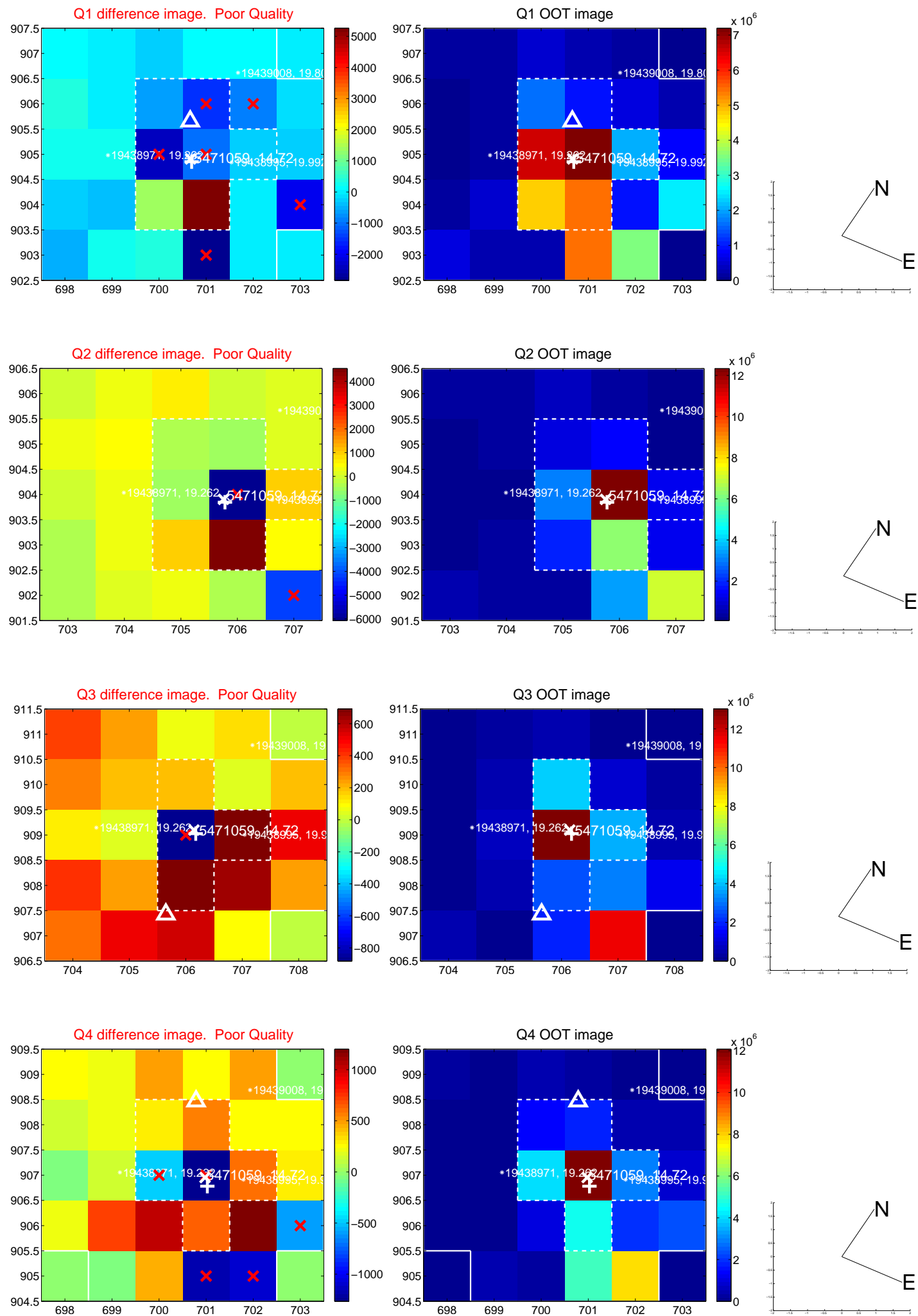
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	3.286 ± 0.699	4.70	-3.286 ± 0.705	-0.054 ± 0.884
PRF-fit source offset from KIC position	2.794 ± 0.667	4.19	-2.769 ± 0.712	-0.371 ± 0.833
photometric centroid source offset	2.27 ± 0.87	2.62	-2.01 ± 0.88	1.07 ± 0.81

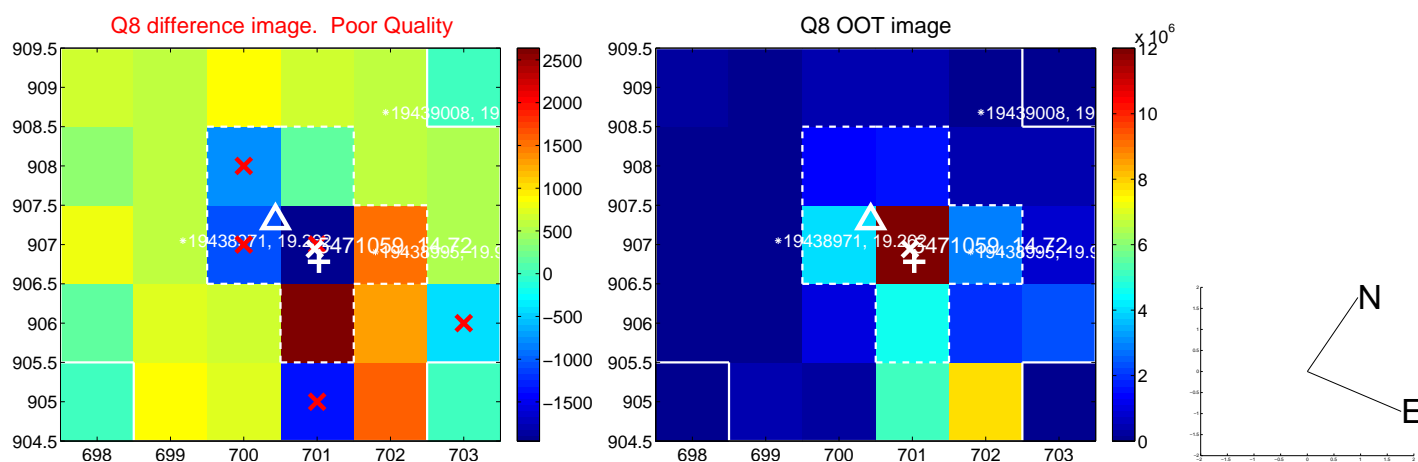
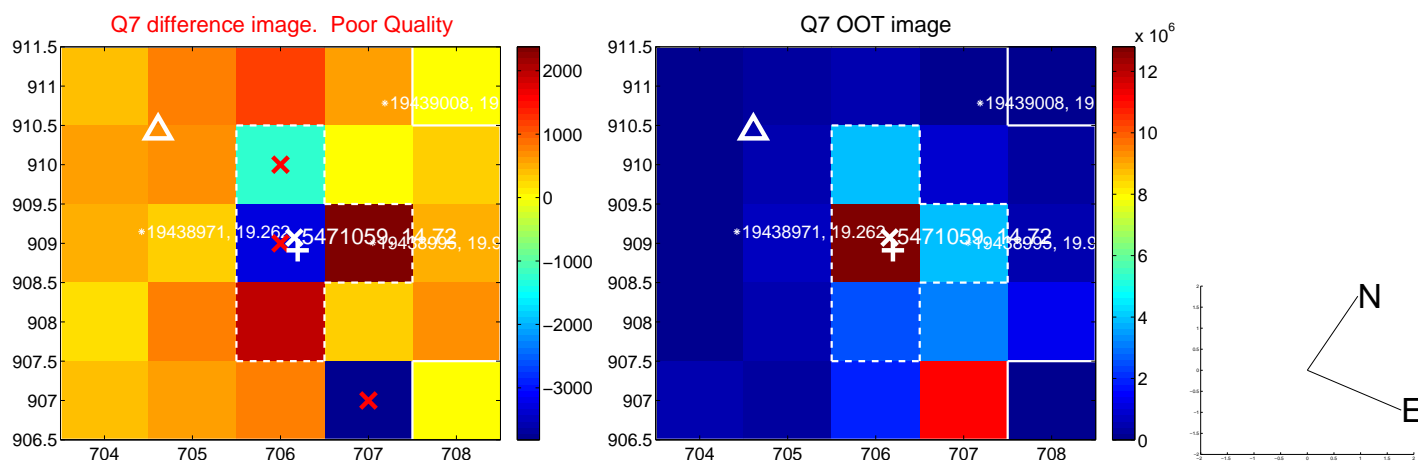
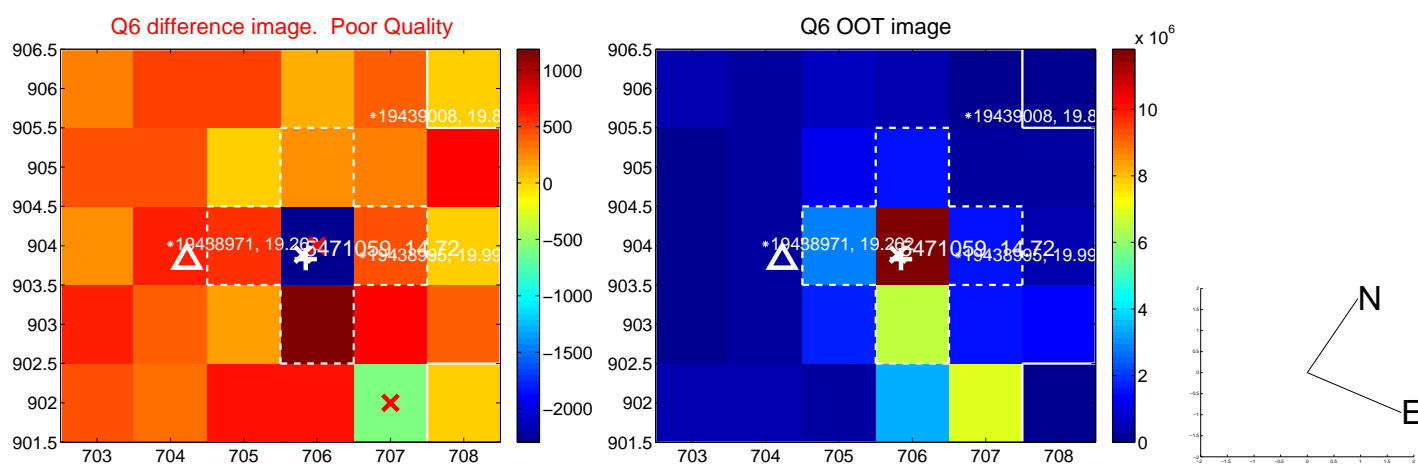
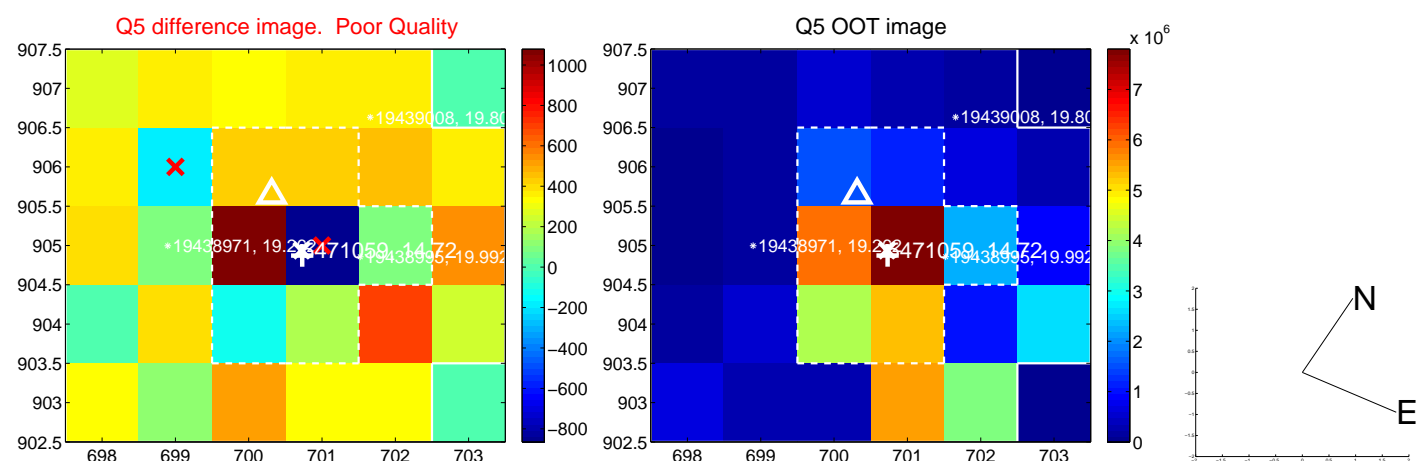


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

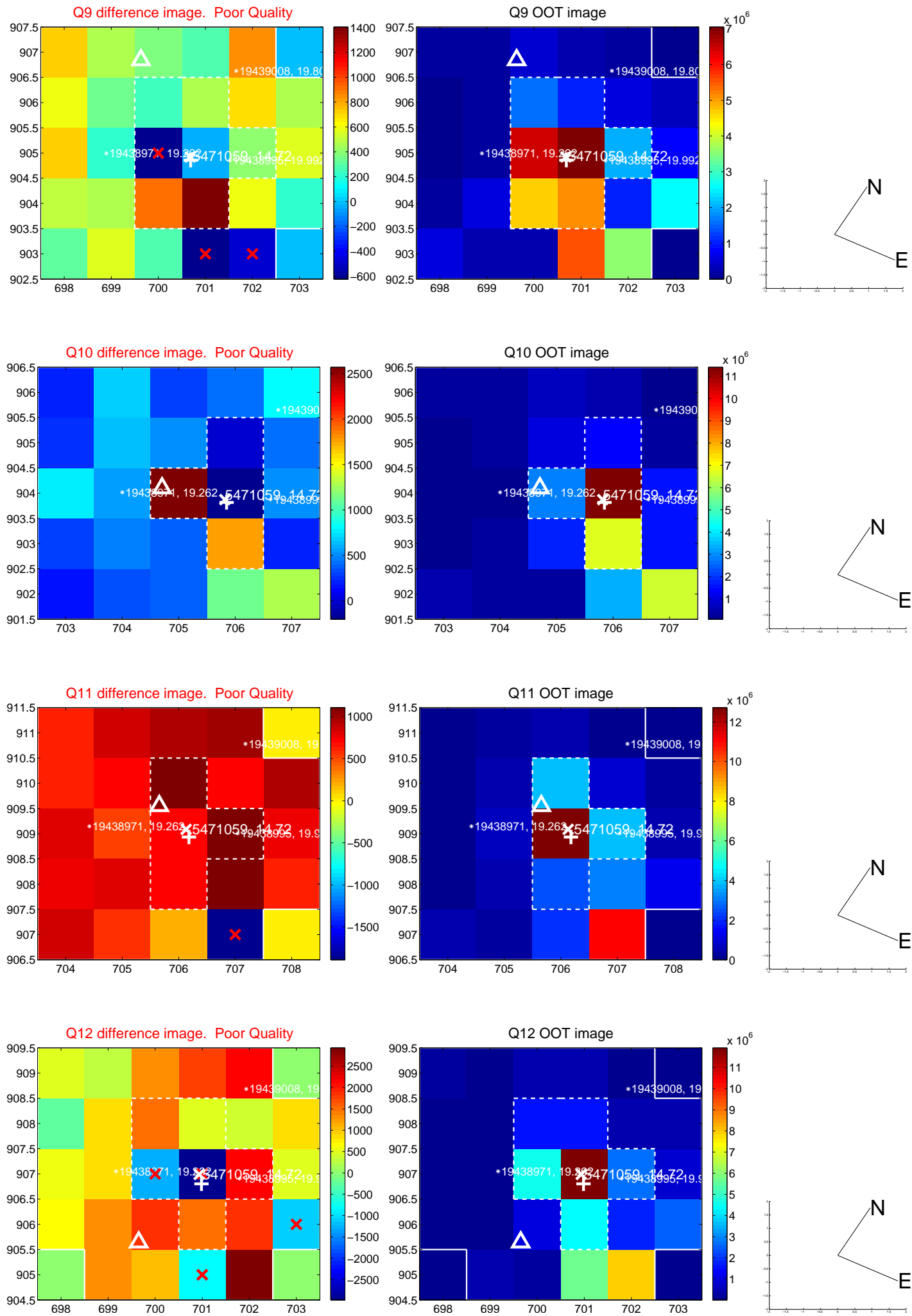
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



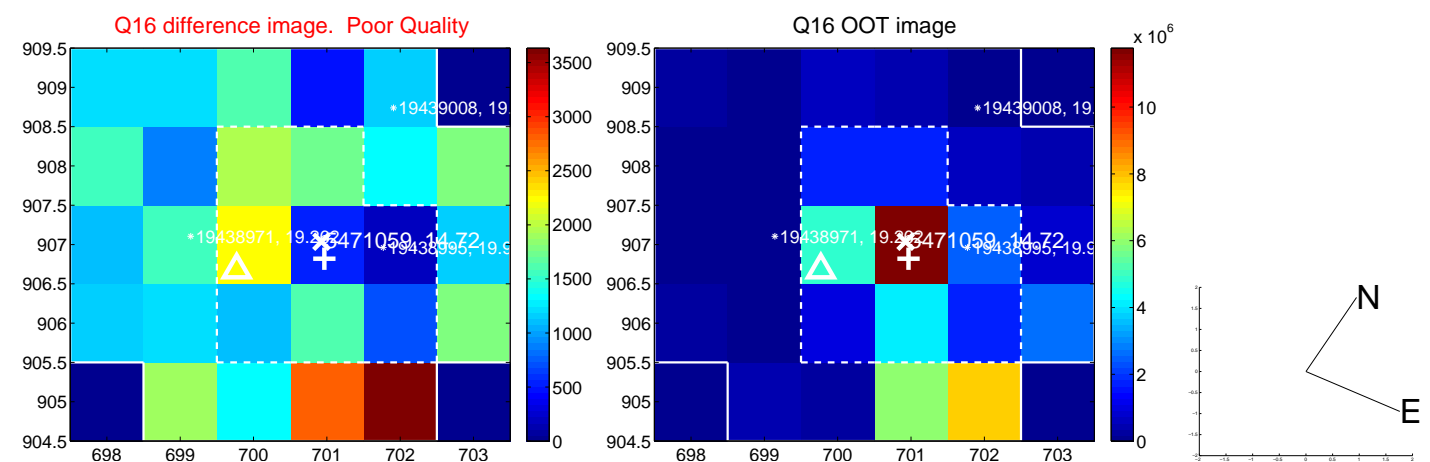
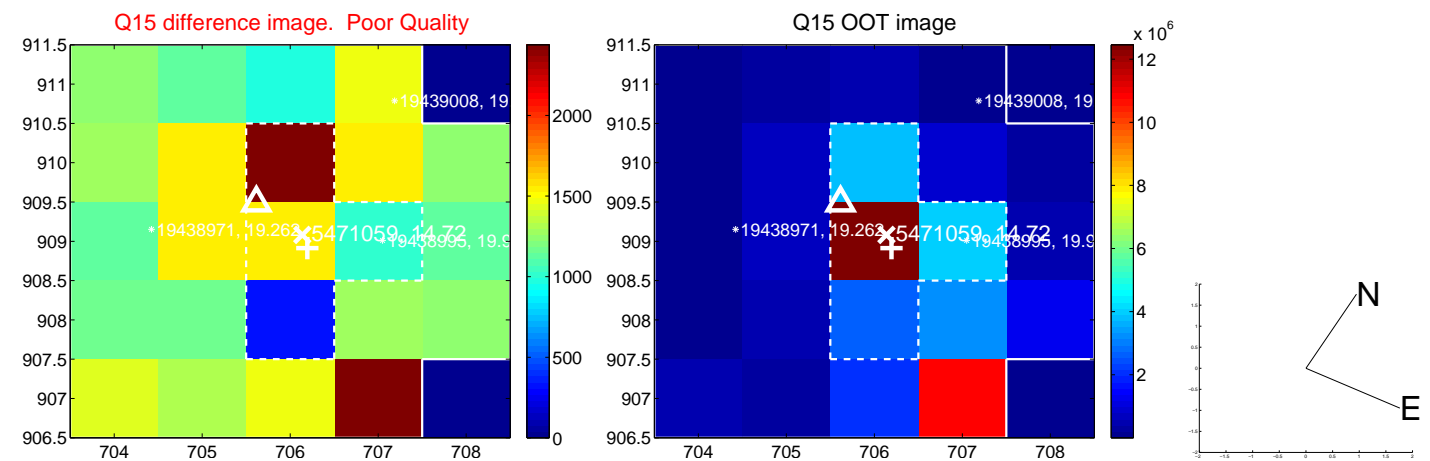
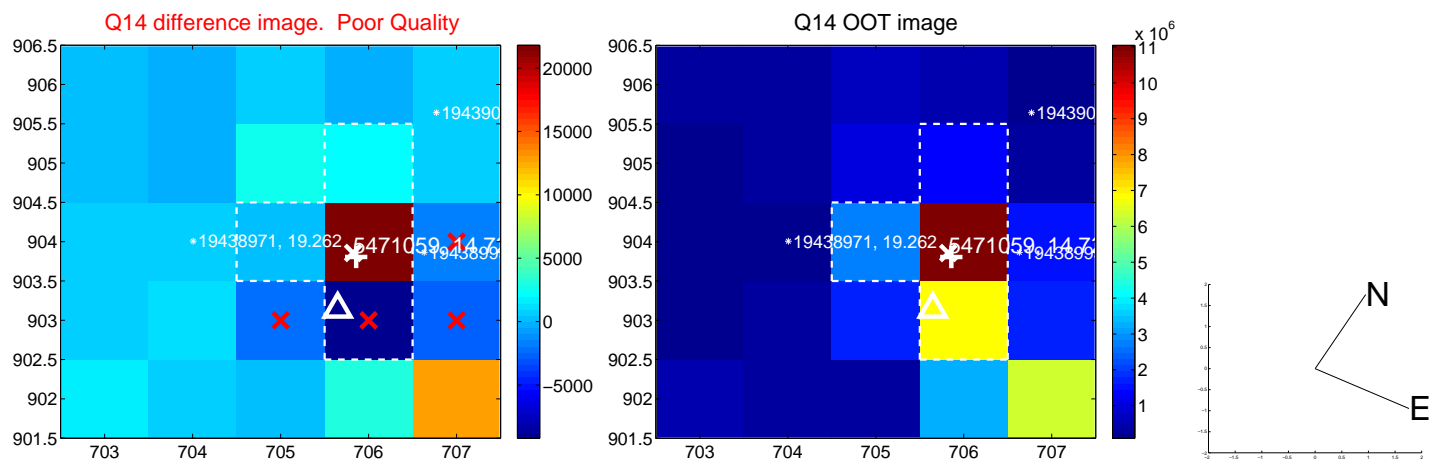
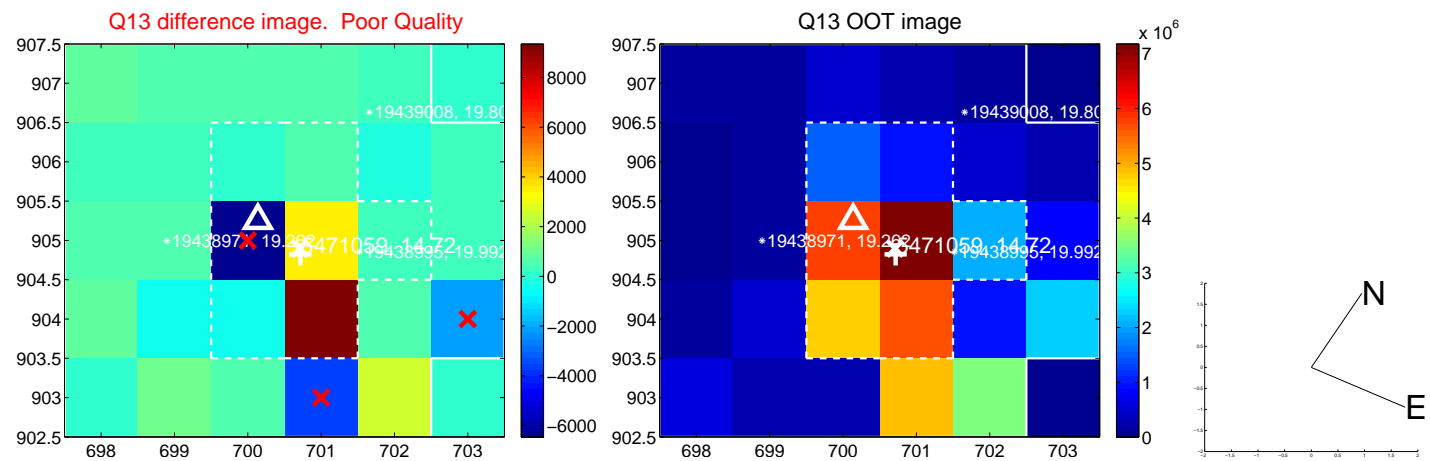
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



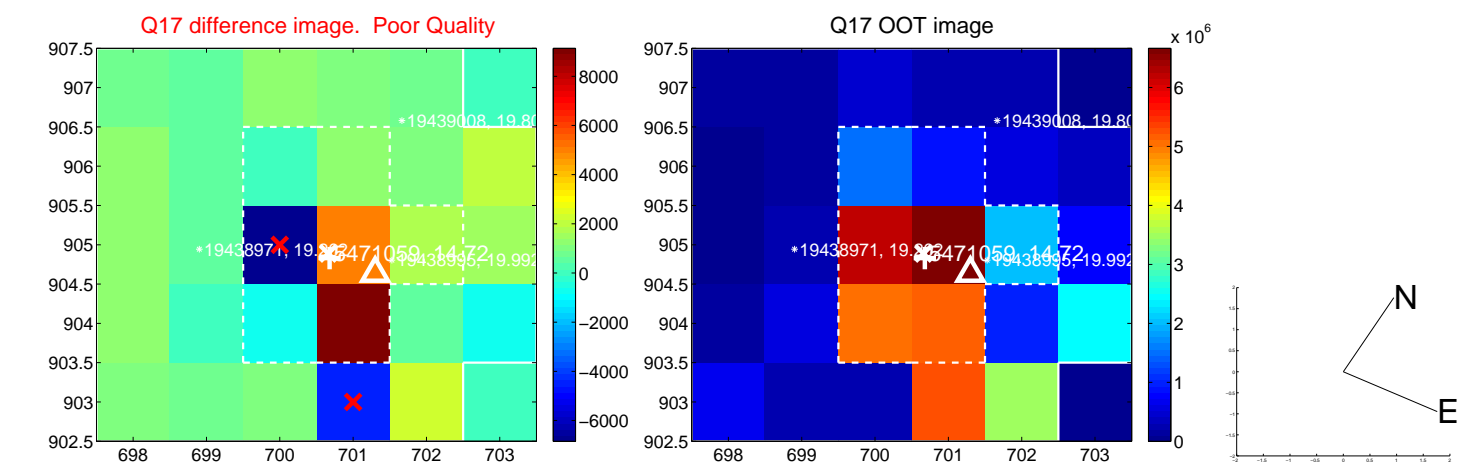
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



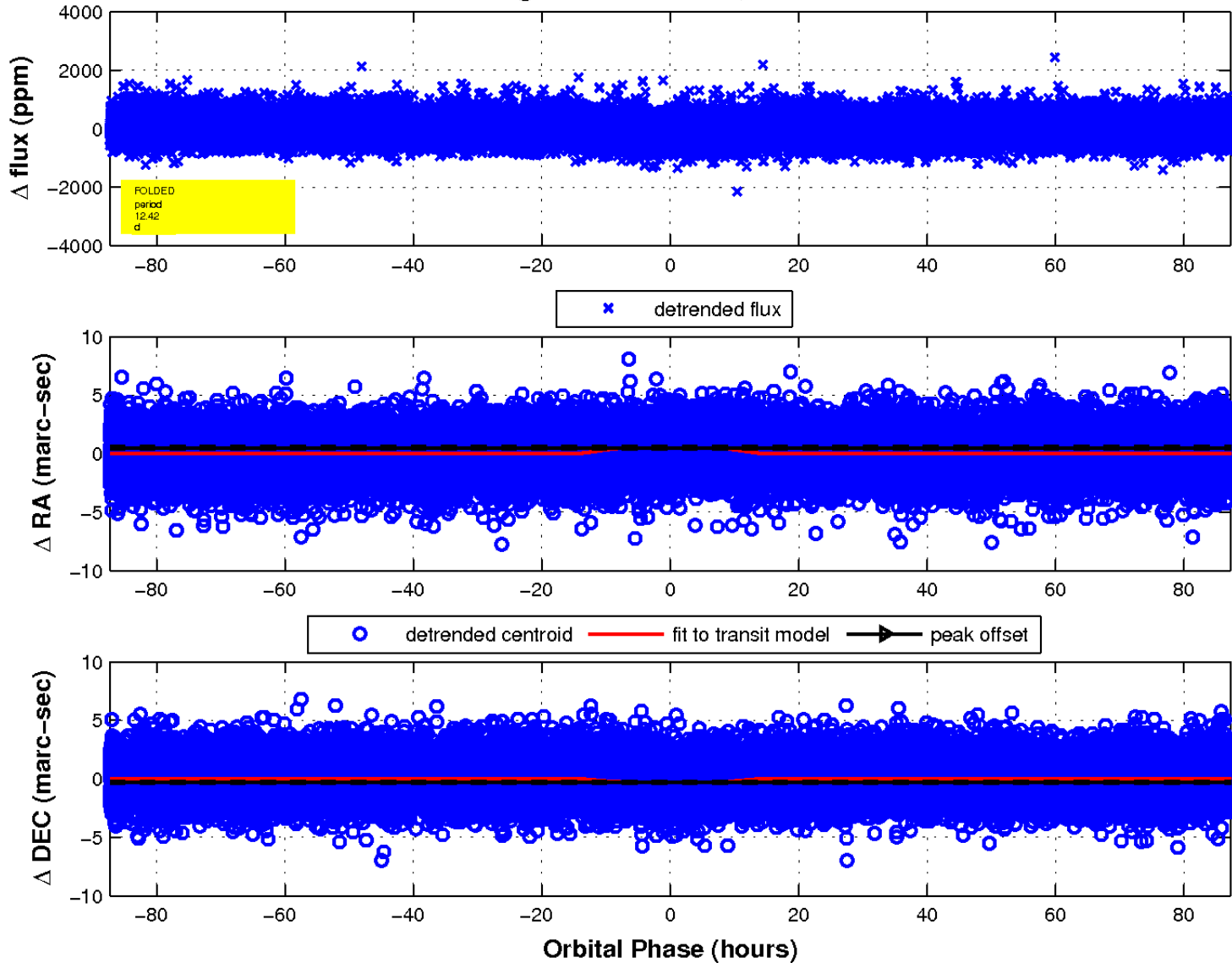
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

