

KIC 008709688

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})
008709688-01	OBS	3019.01	4.179374	133.848909	168.3	2.573	13.9	14.5	1.16	5633	1.72	480.67
008709688-02	OBS	3019.02	2.012106	131.565164	76.2	2.135	7.5	8.6	1.16	5633	1.08	1273.86

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008709688-01	OBS	PC	0.96	0	0	0	0	NO_COMMENT
008709688-02	OBS	PC	0.94	0	0	0	0	NO_COMMENT

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

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

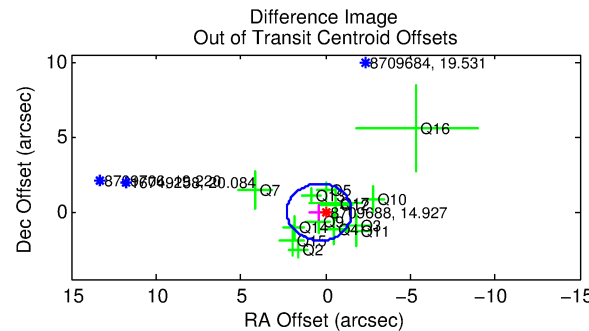
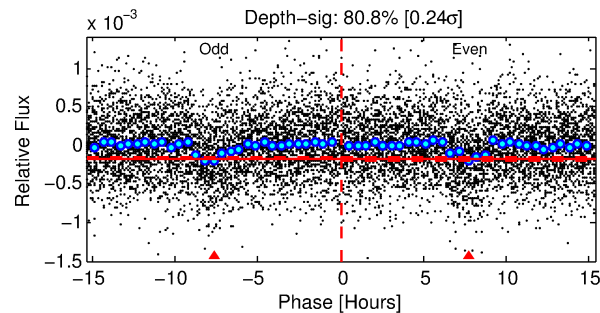
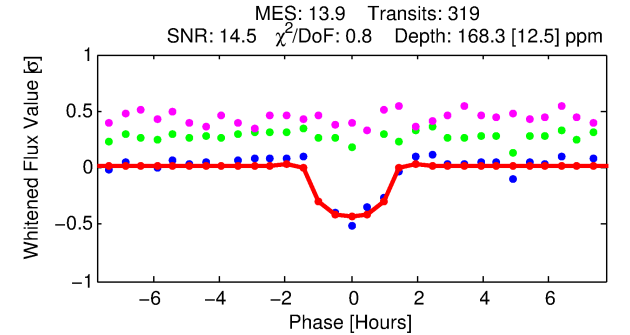
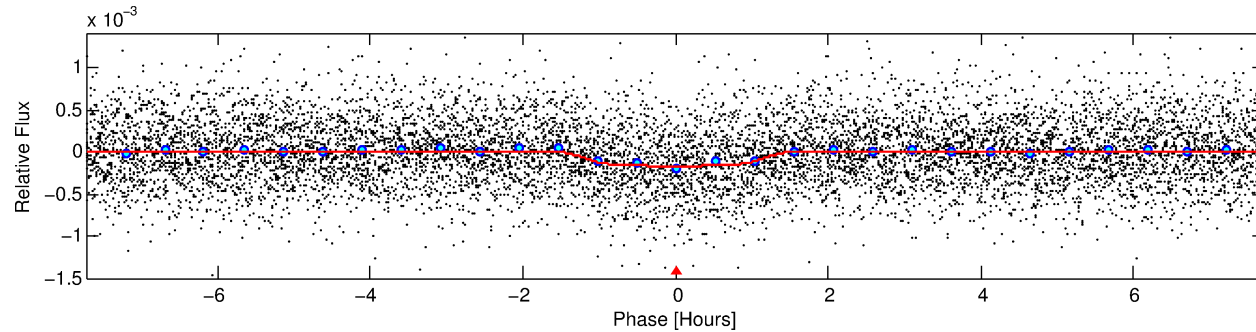
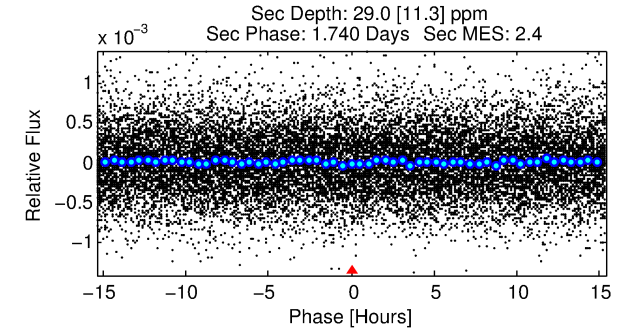
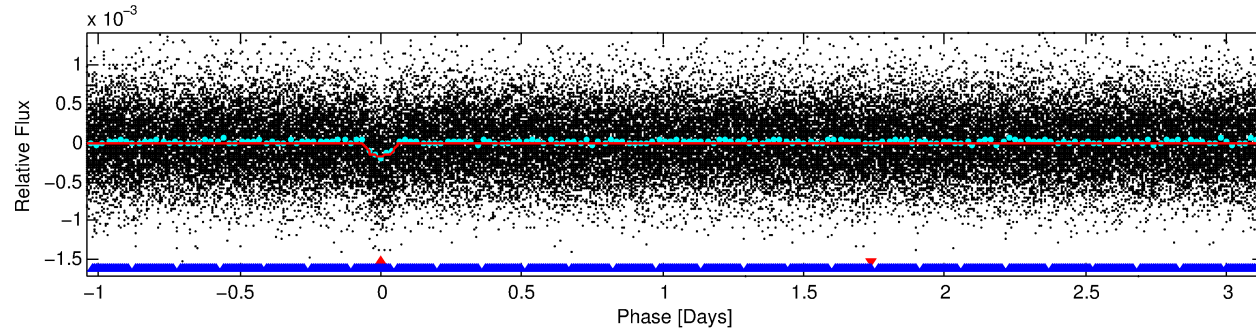
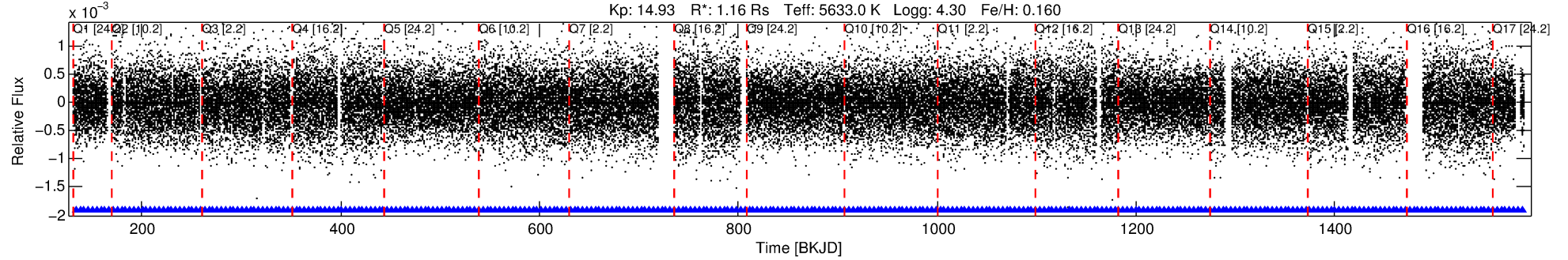
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008709688-01

No Significant Match Found

DV One-Page Summary

KIC: 8709688 Candidate: 1 of 2 Period: 4.179 d
KOI: K03019.01 Corr: 0.978



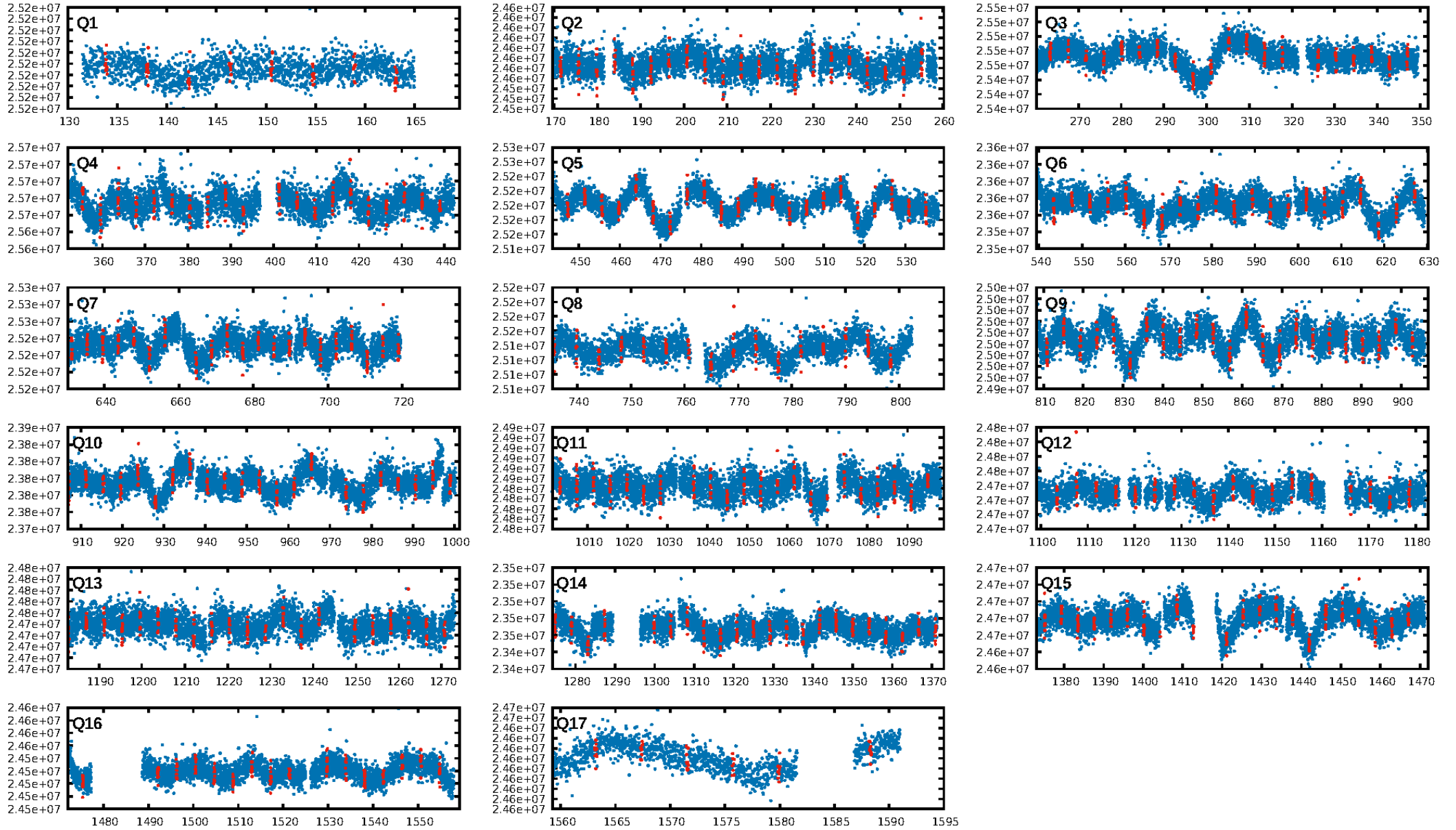
DV Fit Results:

Period = 4.17937 [0.00002] d
Epoch = 133.8489 [0.0031] BKJD
Rp/R* = 0.0136 [0.0092]
a/R* = 7.05 [20.38]
b = 0.84 [1.04]
Seff = 480.66 [123.93]
T_{eq} = 1194 [77] K
Rp = 1.72 [1.20] Re
a = 0.0503 [0.0078] AU
Ag = 13.63 [19.60] [0.64σ]
T_{eff} = 3547 [1256] K [1.87σ]

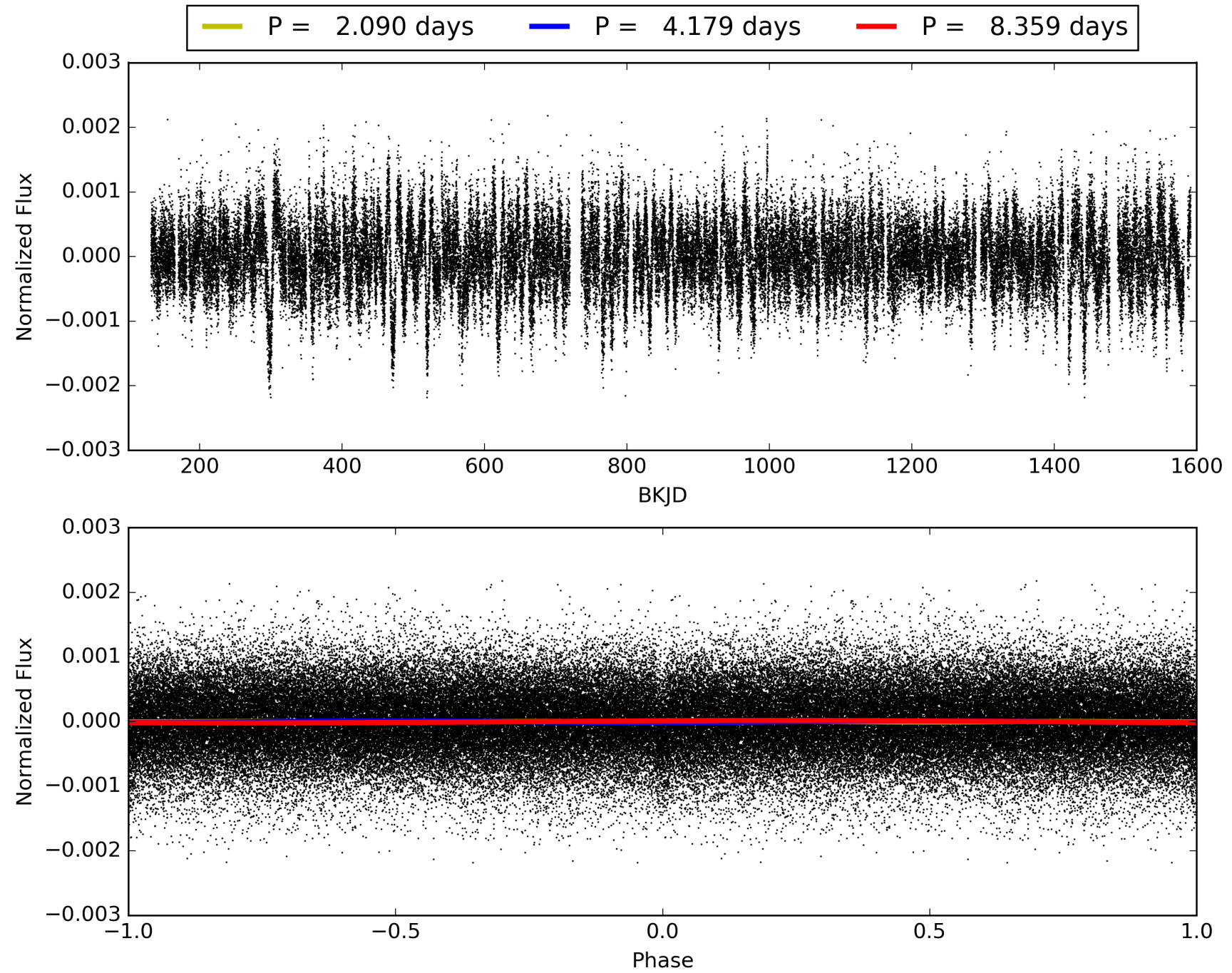
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [15.56σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.80e-43
RollingBand-fgt: 1.00 [305/305]
GhostDiagnostic-chr: 20.4
Centroid-sig: 0.0%
Centroid-so: 2.638 arcsec [2.90σ]
OotOffset-rm: 0.377 arcsec [0.59σ]
KicOffset-rm: 0.330 arcsec [0.53σ]
OotOffset-st: 3/4/3/4 [14]
KicOffset-st: 3/4/3/4 [14]
DiffImageQuality-fgm: 0.43 [6/14]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 008709688-01, PDC Light Curves

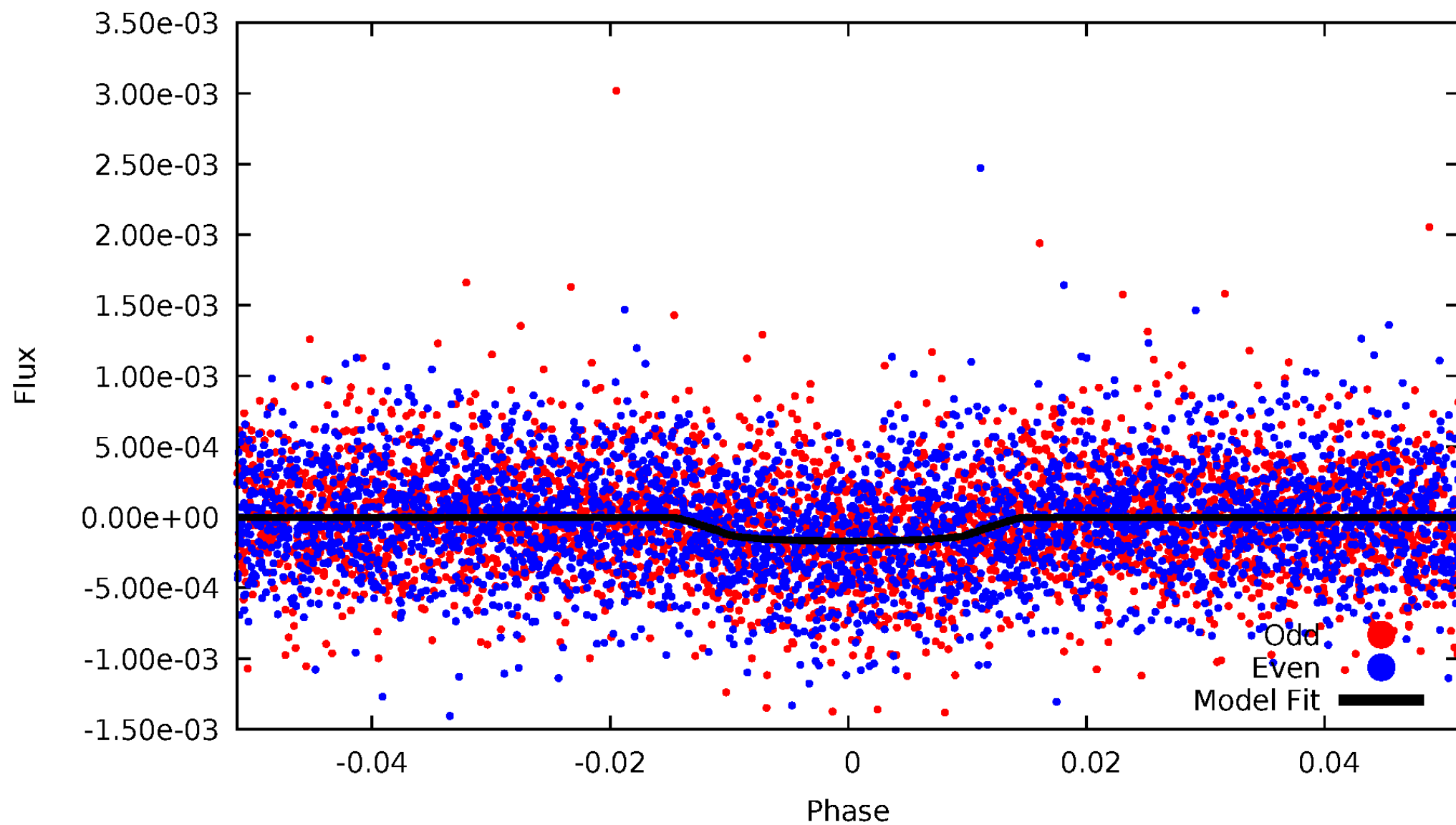


TCE 008709688-01



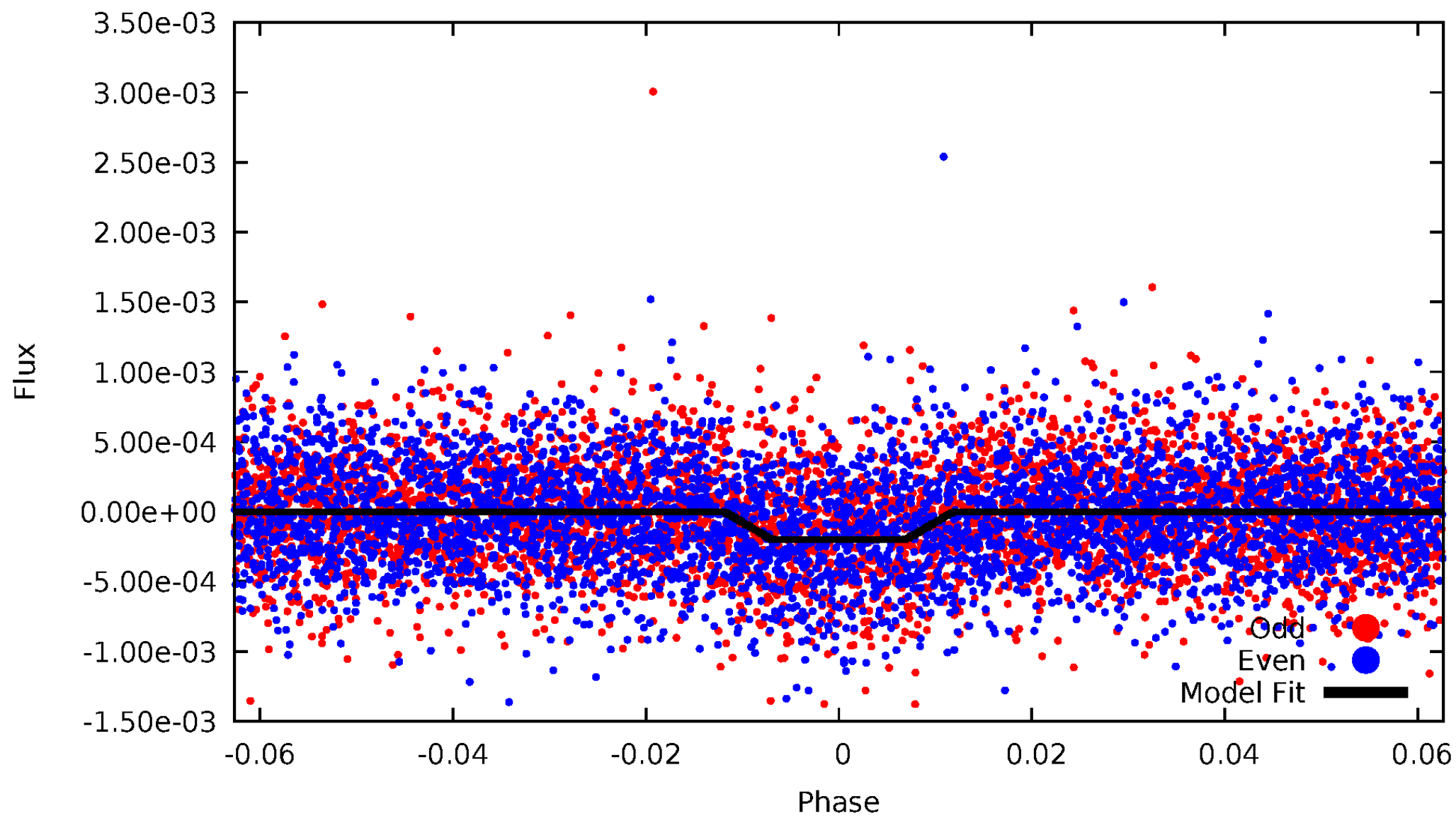
DV Odd/Even

TCE 008709688-01



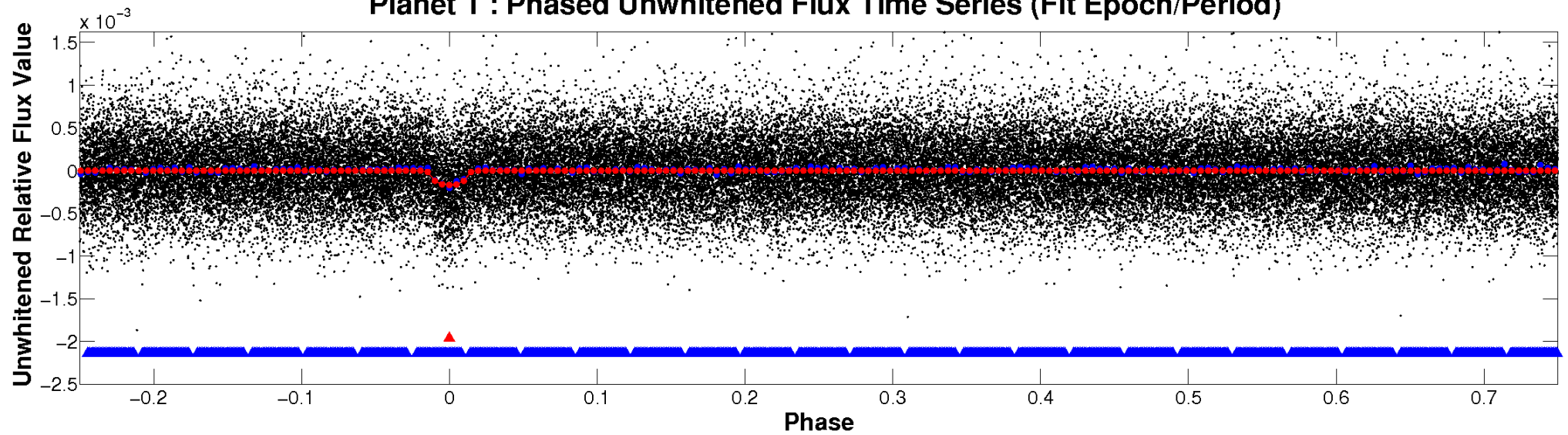
ALT Odd/Even

TCE 008709688-01

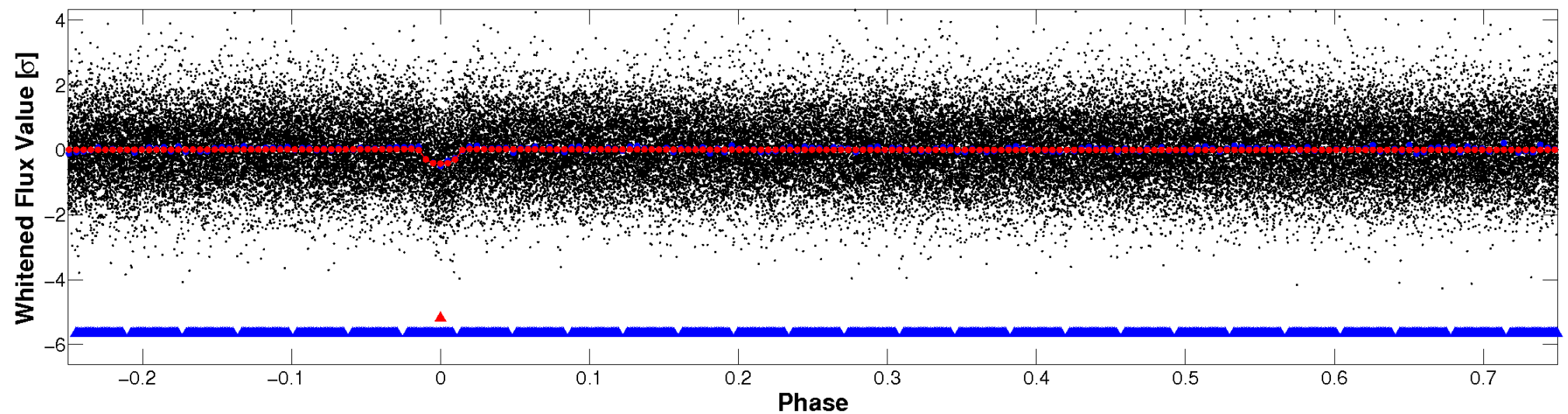


Non-Whitened Vs. Whitened Light Curve

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

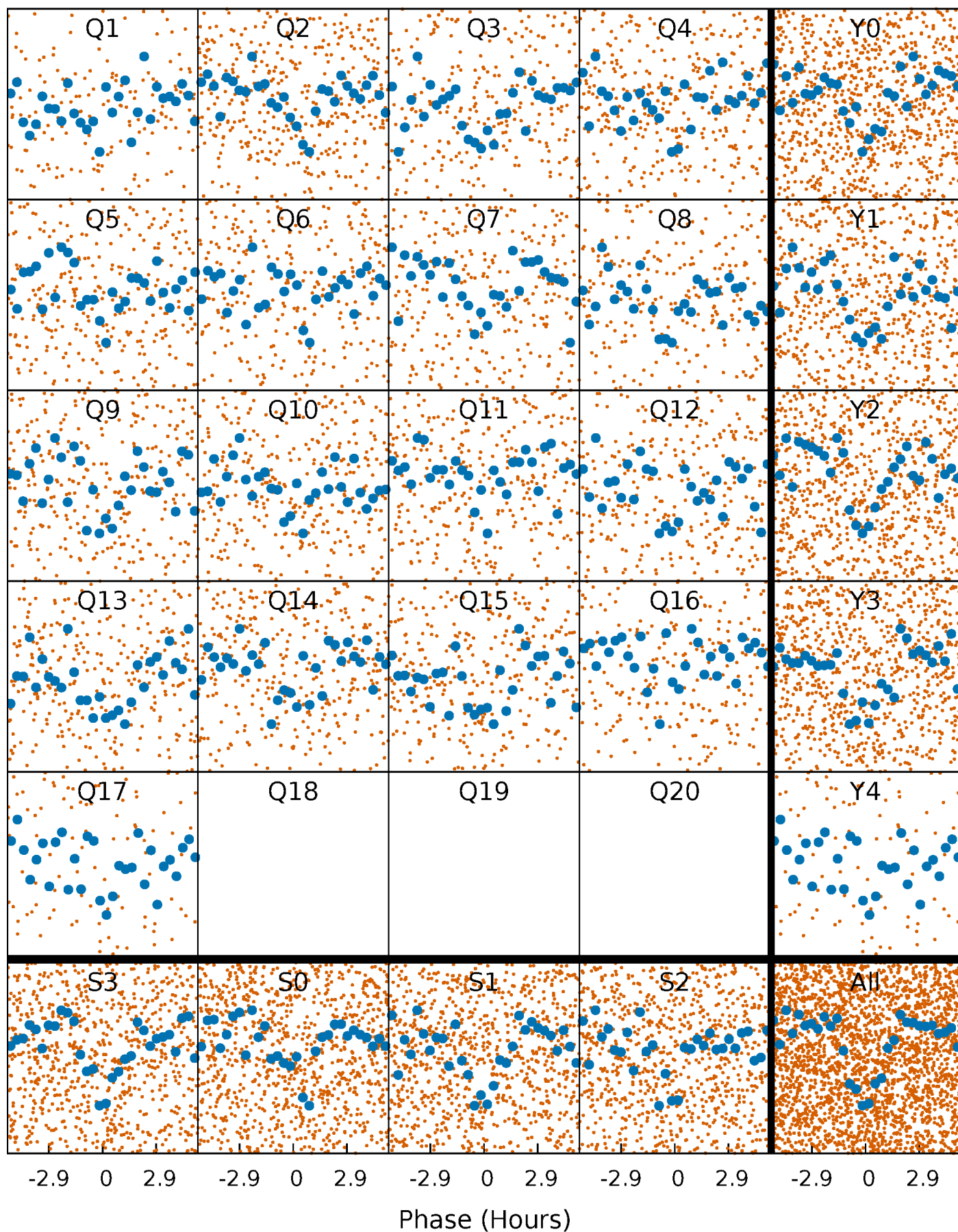


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



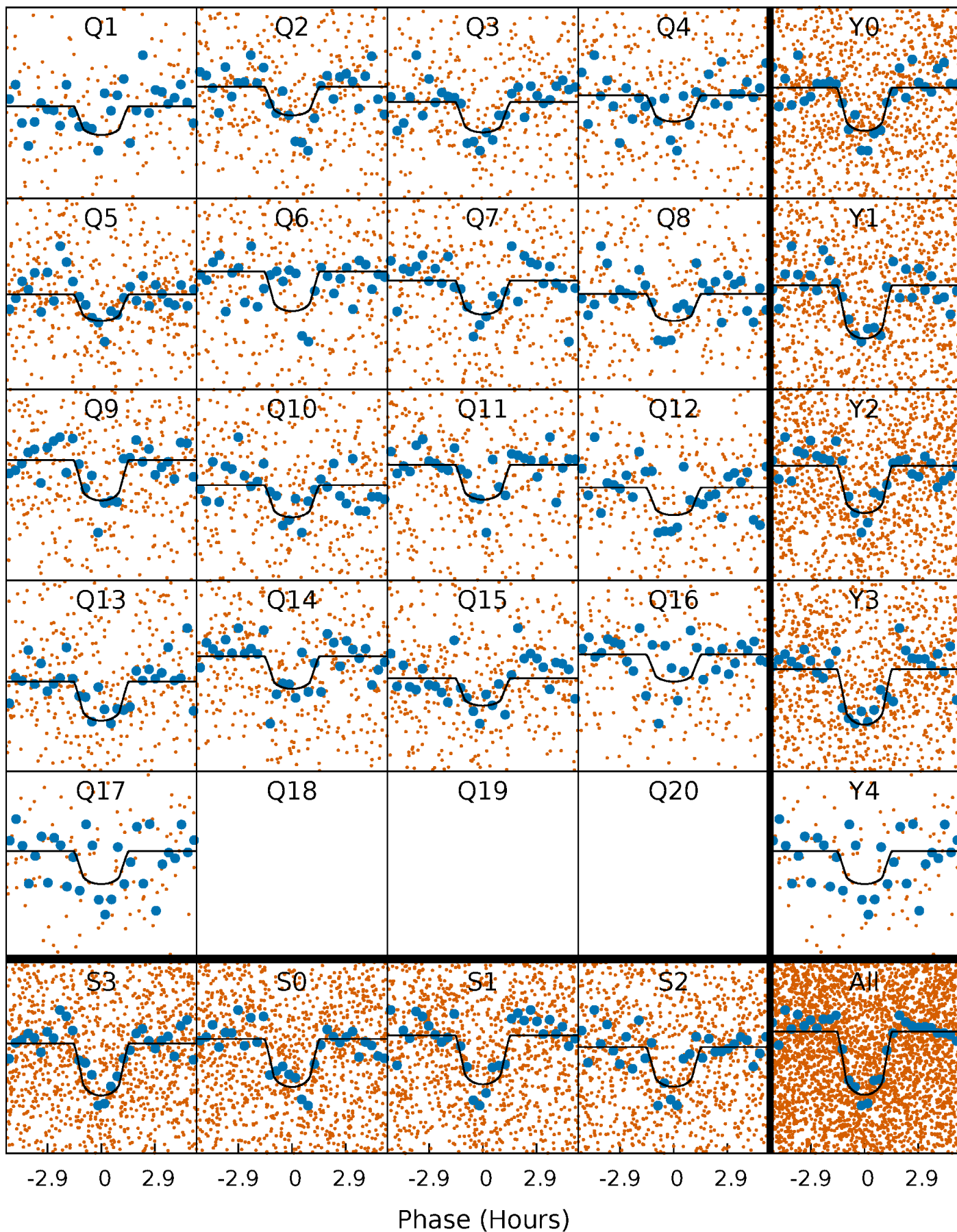
PDC Quarter-Phased Transit Curves

TCE 008709688-01 P= 4.179374 Days $T_0=133.848909$ (BKJD)



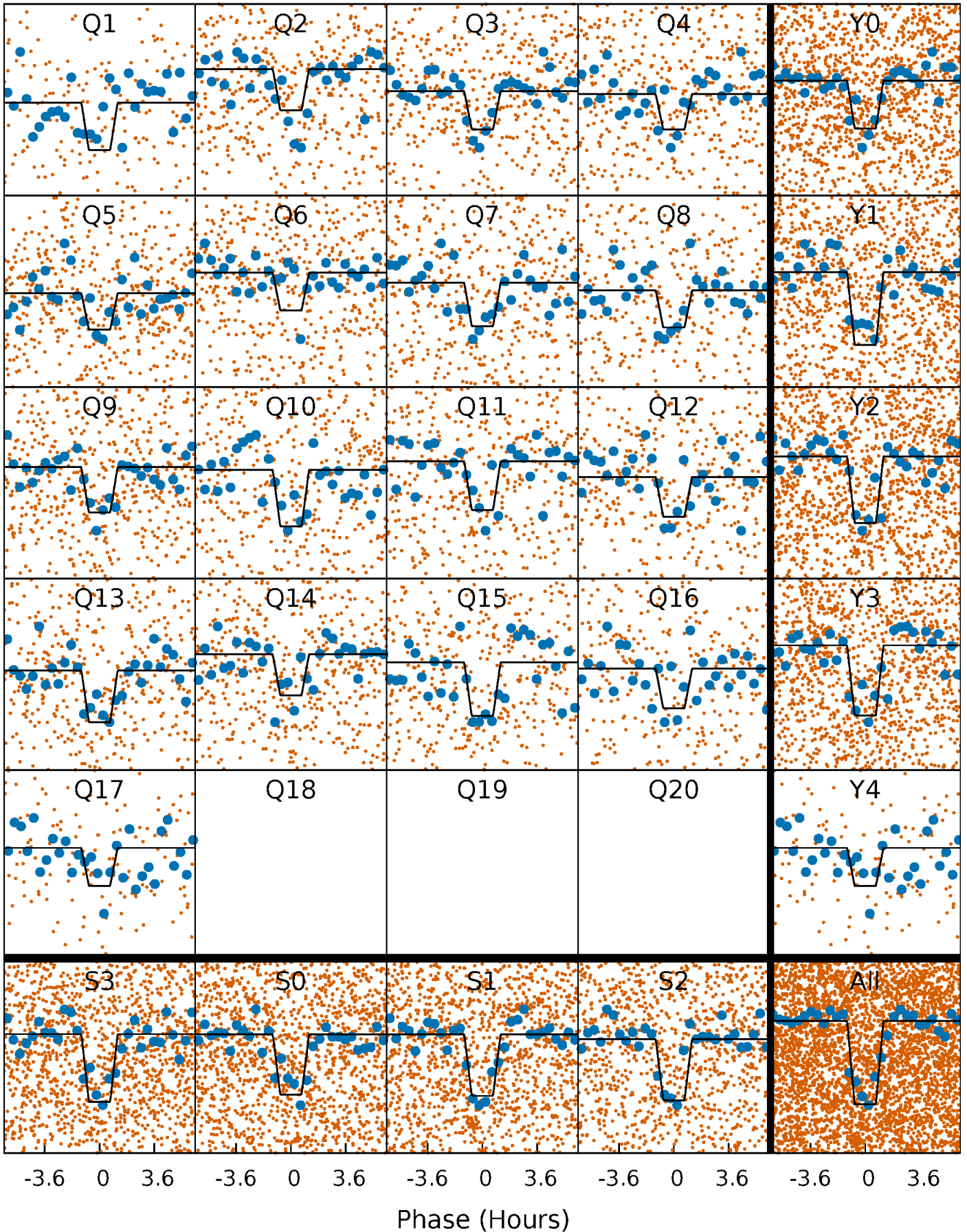
DV Quarter-Phased Transit Curves

TCE 008709688-01 P= 4.179374 Days $T_0=133.848909$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

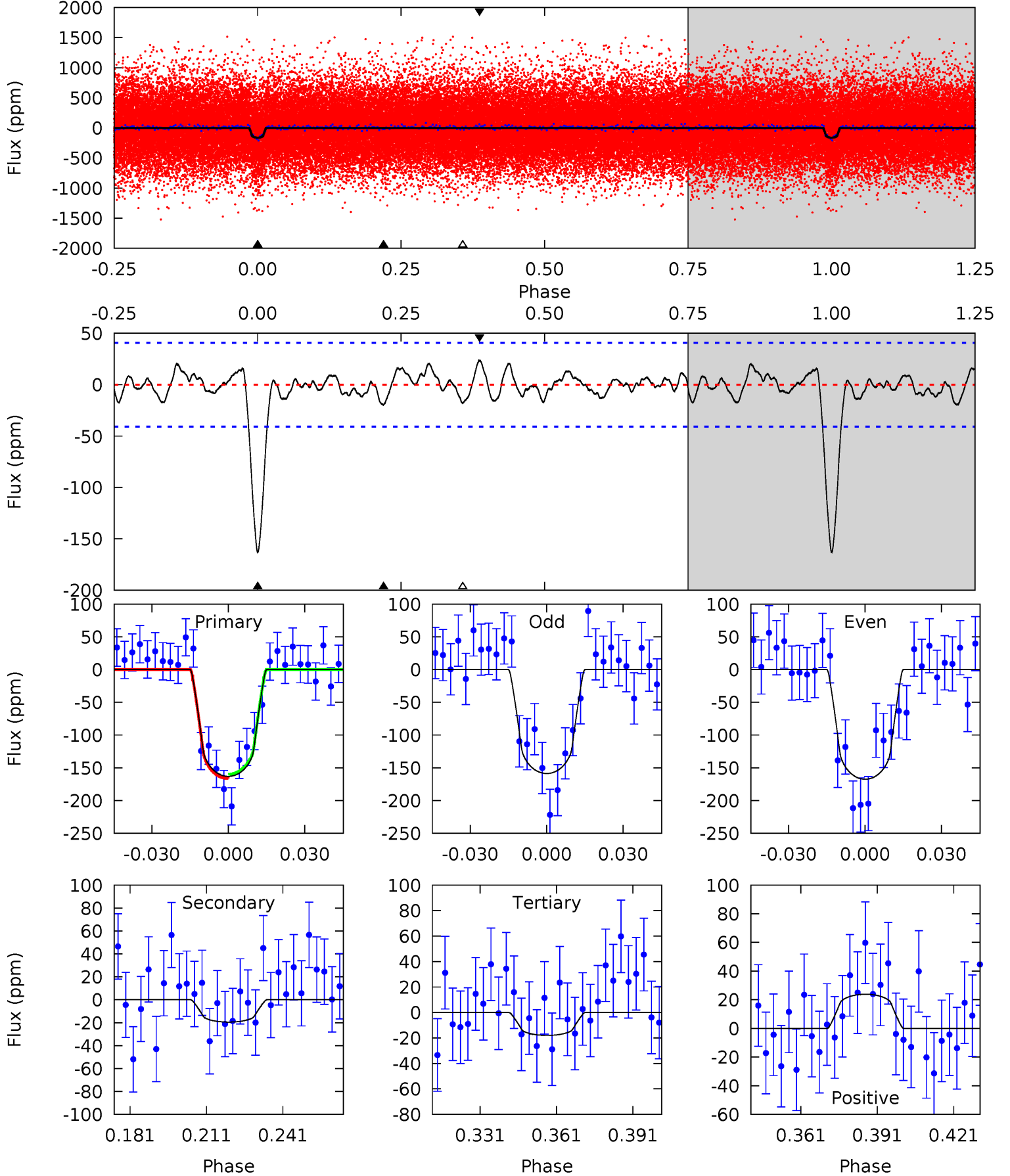
TCE 008709688-01 P= 4.179349 Days $T_0=133.853578$ (BKJD)



DV Model-Shift Uniqueness Test

008709688-01, P = 4.179374 Days, E = 129.669535 Days

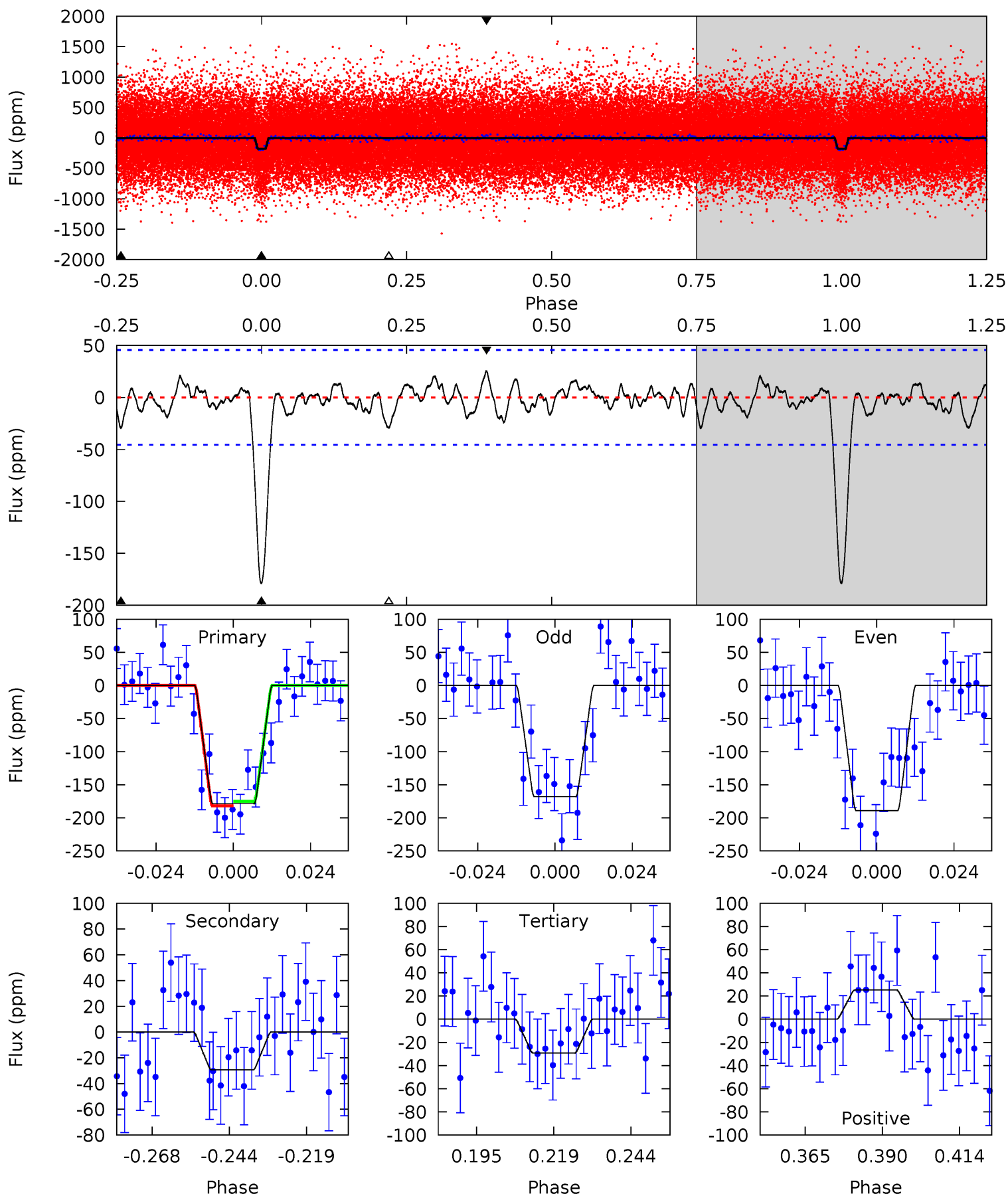
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.2	2.30	2.12	2.81	4.81	2.17	1.02	17.1	16.4	0.18	-0.51	0.52	0.99	0.13	0.37



Alt Model-Shift Uniqueness Test

008709688-01, P = 4.179349 Days, E = 129.674229 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.0	3.13	3.11	2.69	4.85	2.25	1.03	15.9	16.3	0.03	0.45	1.12	1.04	0.12	0.36



Stellar Parameters For KIC 008709688

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5633^{+76}_{-76}	$4.296^{+0.150}_{-0.113}$	$0.160^{+0.150}_{-0.150}$	$1.162^{+0.179}_{-0.179}$	$0.973^{+0.068}_{-0.056}$	$0.874^{+0.564}_{-0.293}$
	+1%/-1%	+3%/-3%	+94%/-94%	+15%/-15%	+7%/-6%	+65%/-34%
Source	SPE90	SPE90	SPE90	DSEP		

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

Secondary Eclipse Parameters for KIC 008709688-01 / KOI 3019.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-20 ± 8	$1.85^{+1.17}_{-0.99}$	1666^{+76}_{-83}	3496^{+1229}_{-591}	$7.513^{+30.367}_{-5.157}$
Alt.	-29 ± 9	$1.90^{+1.20}_{-1.09}$	1673^{+72}_{-82}	3756^{+1544}_{-586}	11^{+57}_{-8}

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 $A_{obs} \gg 1.0$

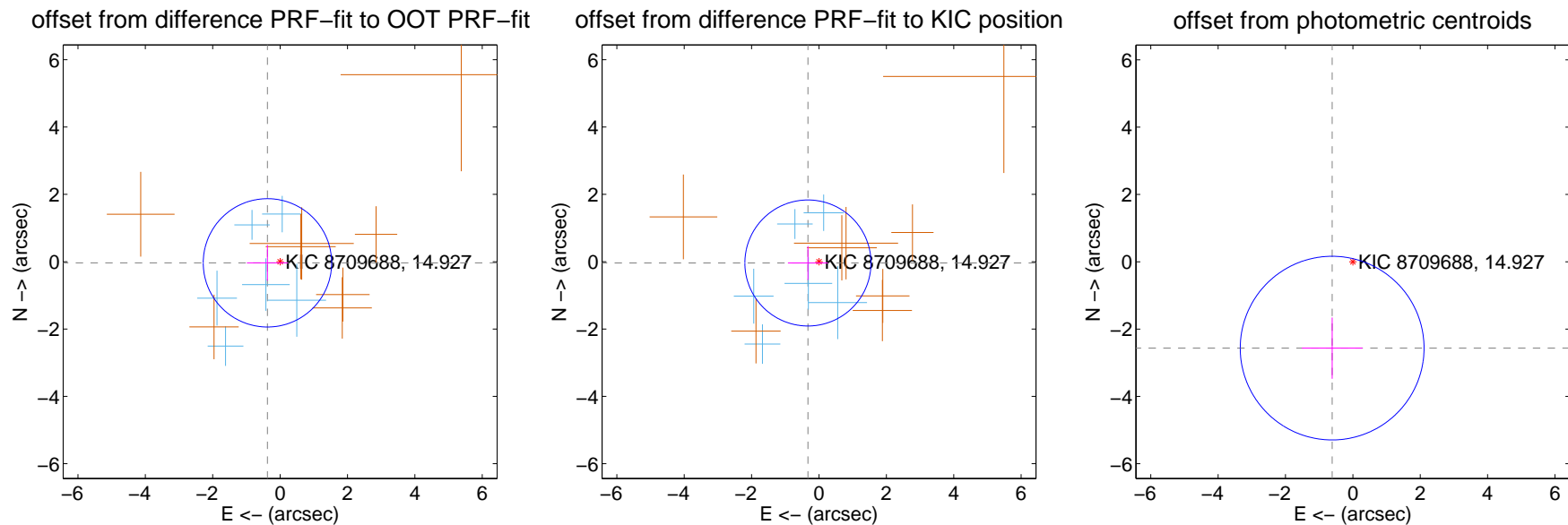
DV Centroid Data

Supplemental centroid analysis for 008709688-01. Kepler magnitude: 14.93. Transit SNR 14.48

There are 6 quarters with good PRF difference image offsets

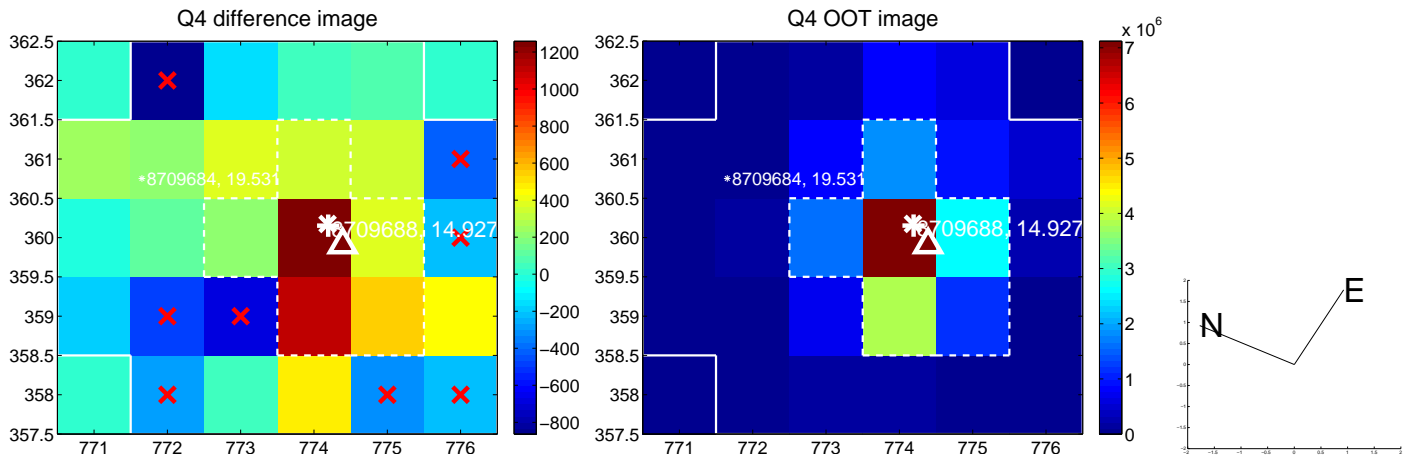
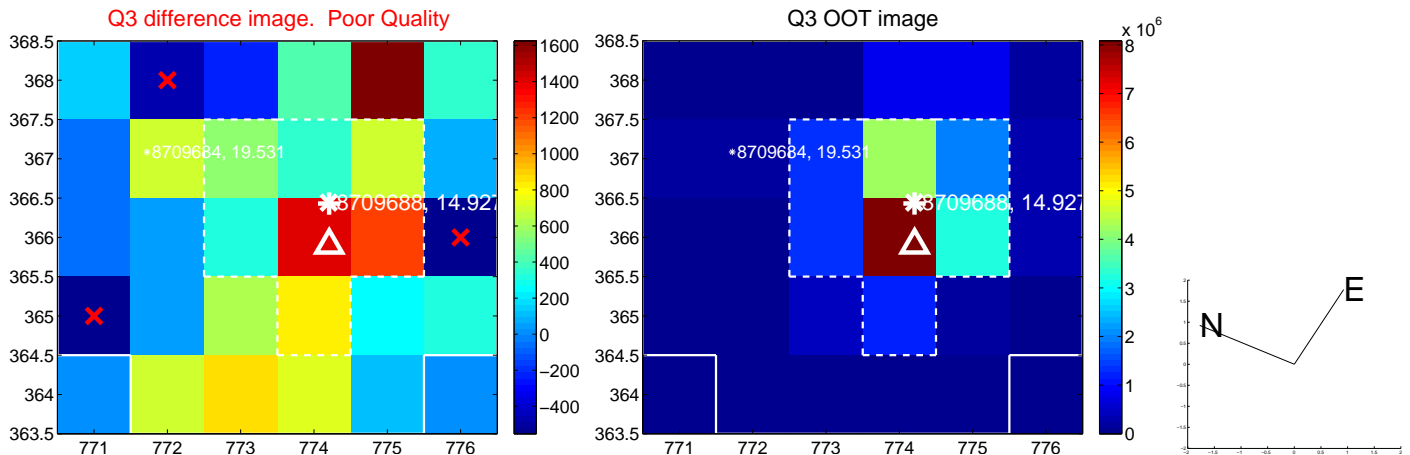
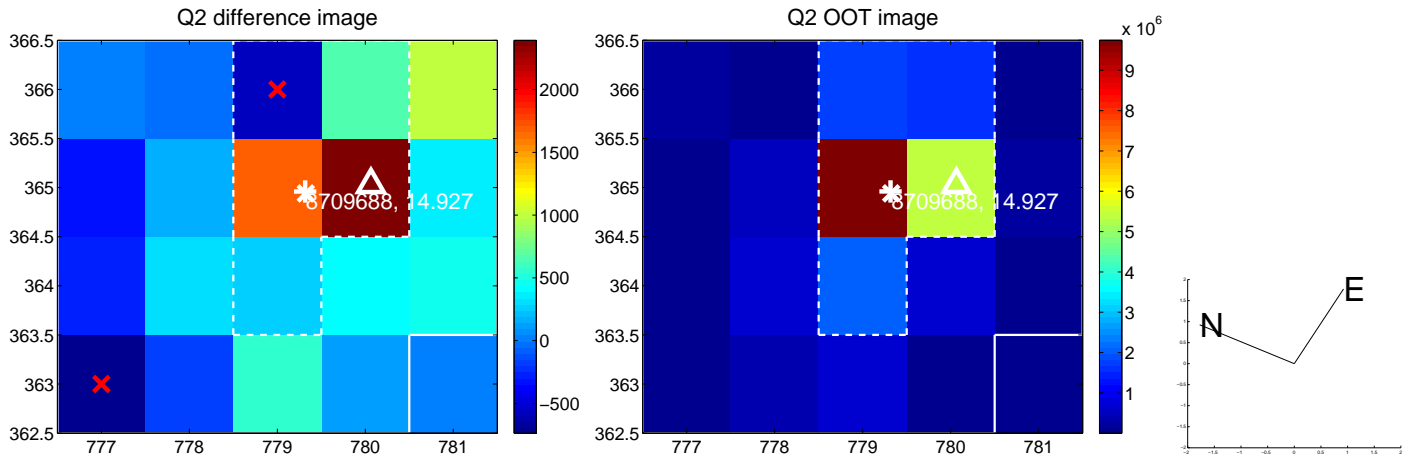
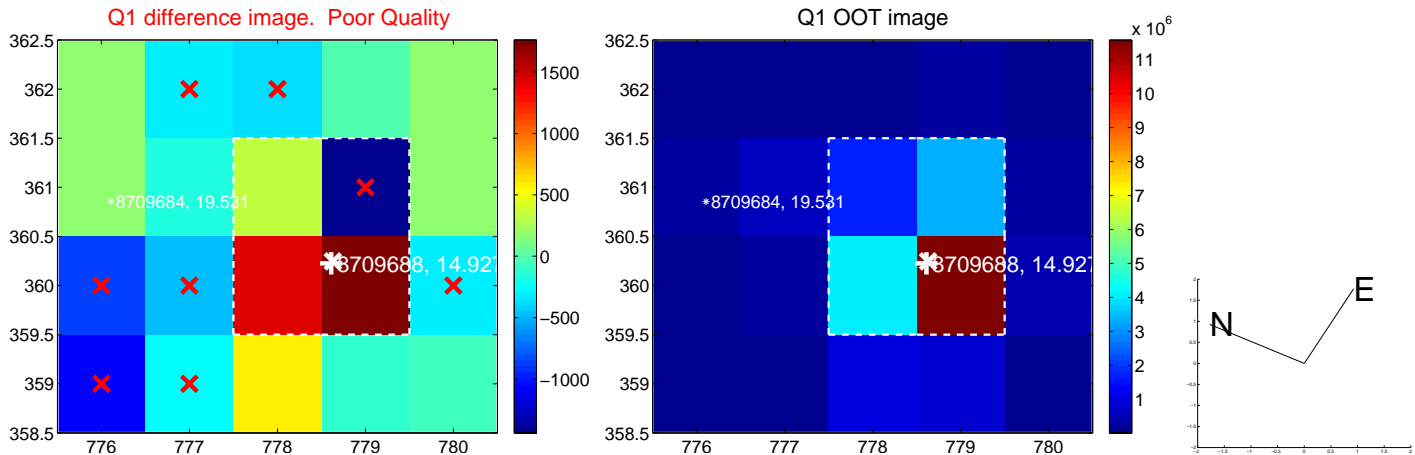
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.377 ± 0.635	0.59	0.375 ± 0.610	-0.034 ± 0.533
PRF-fit source offset from KIC position	0.330 ± 0.624	0.53	0.328 ± 0.594	-0.038 ± 0.501
photometric centroid source offset	2.64 ± 0.91	2.90	0.61 ± 0.90	-2.57 ± 0.91

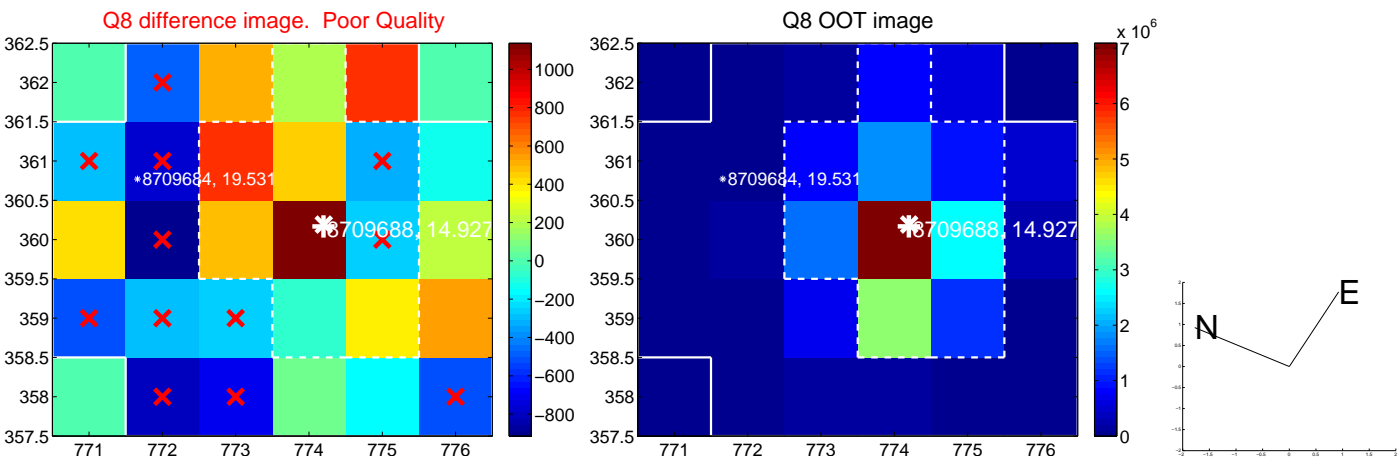
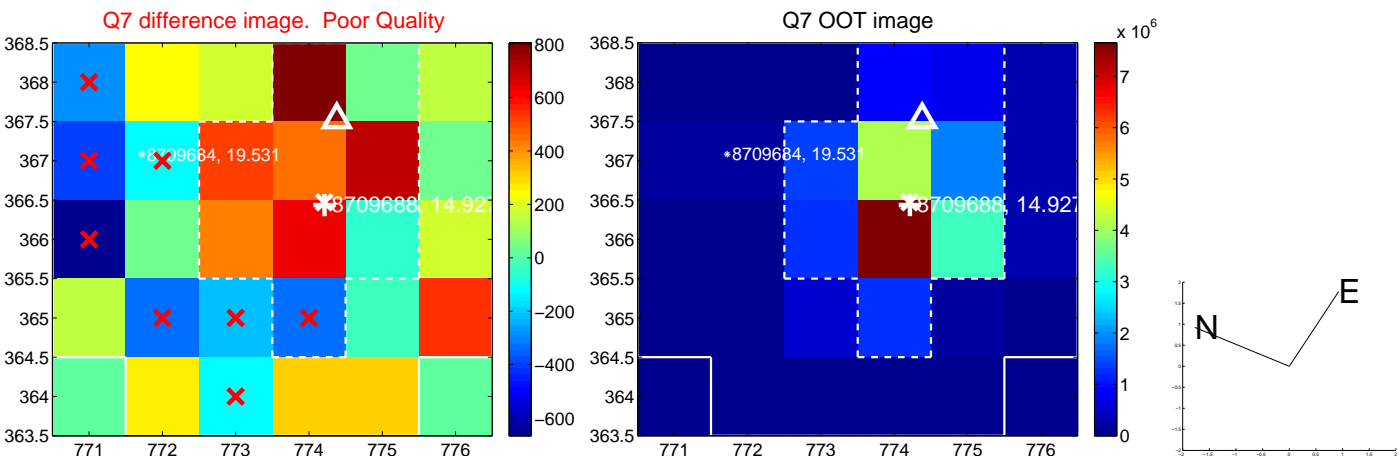
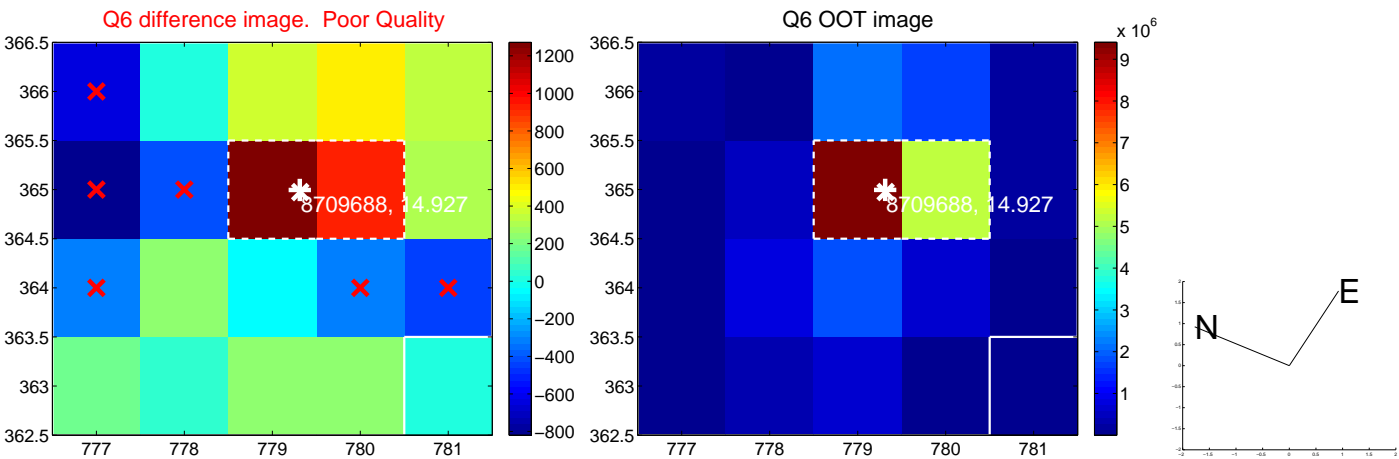
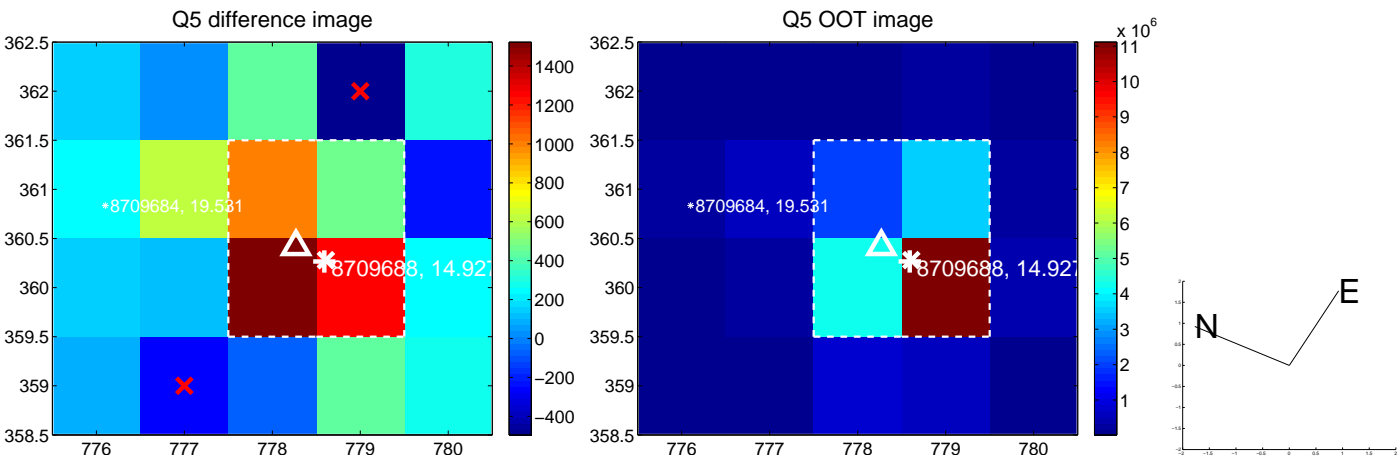


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

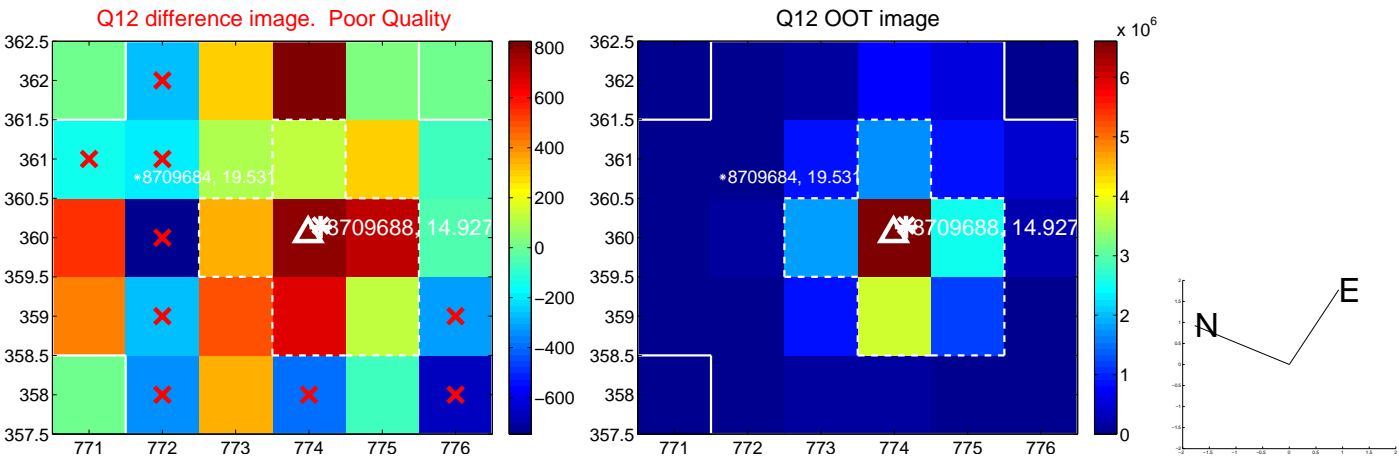
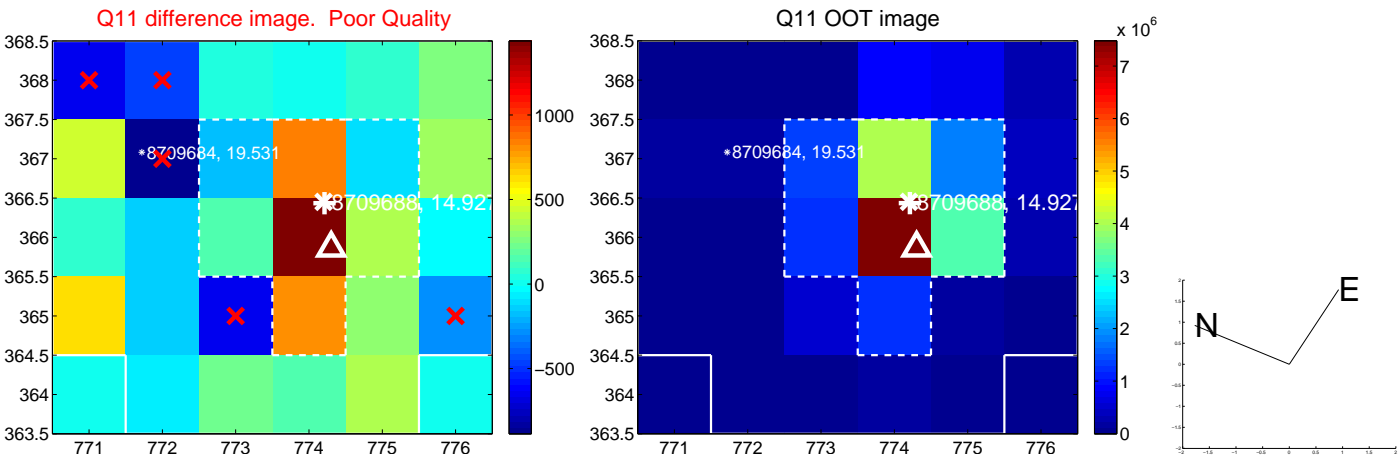
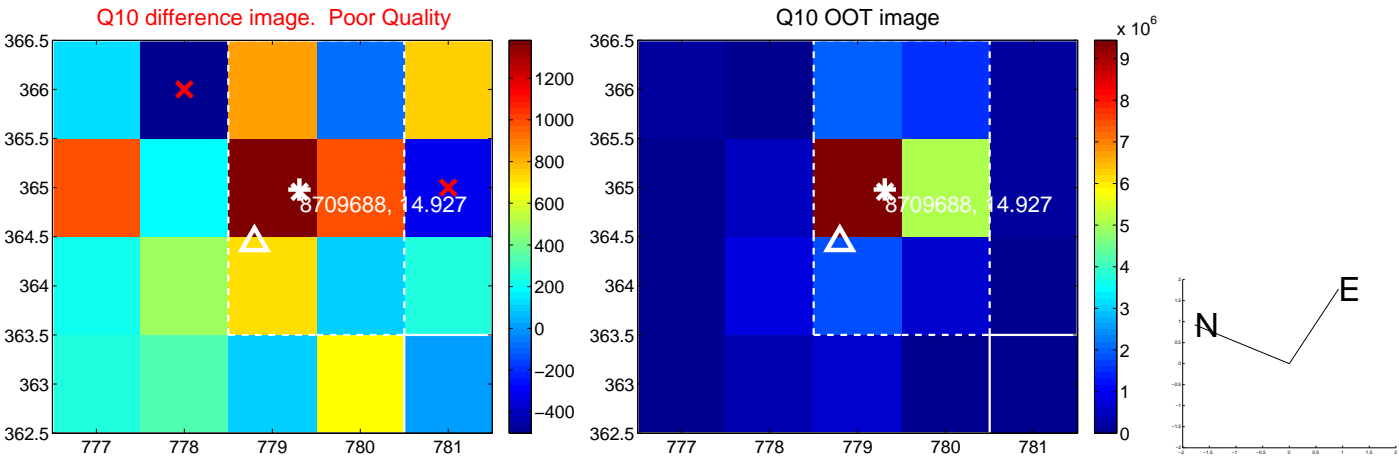
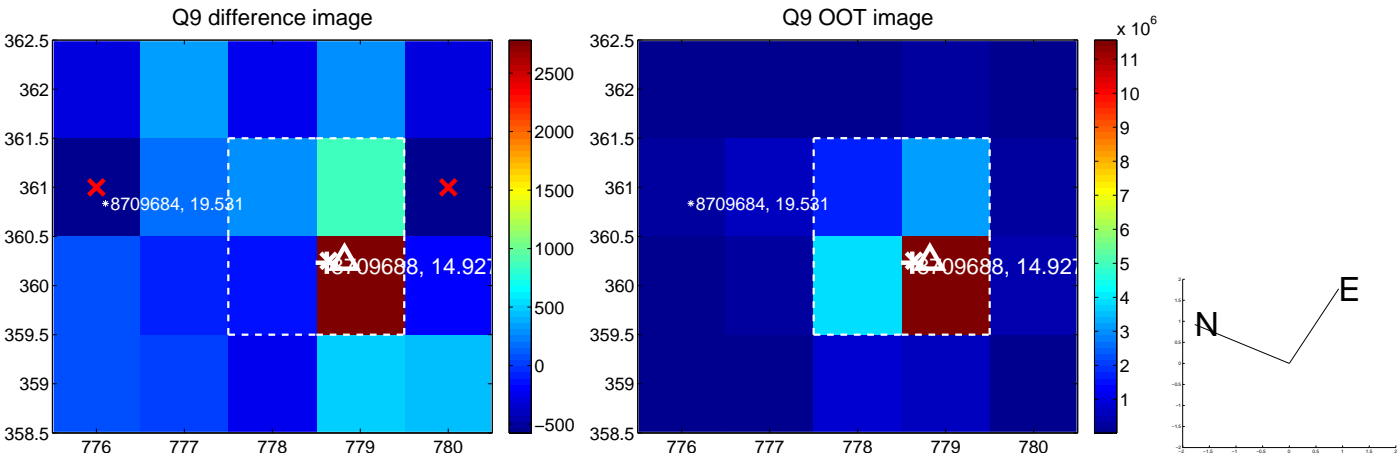
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



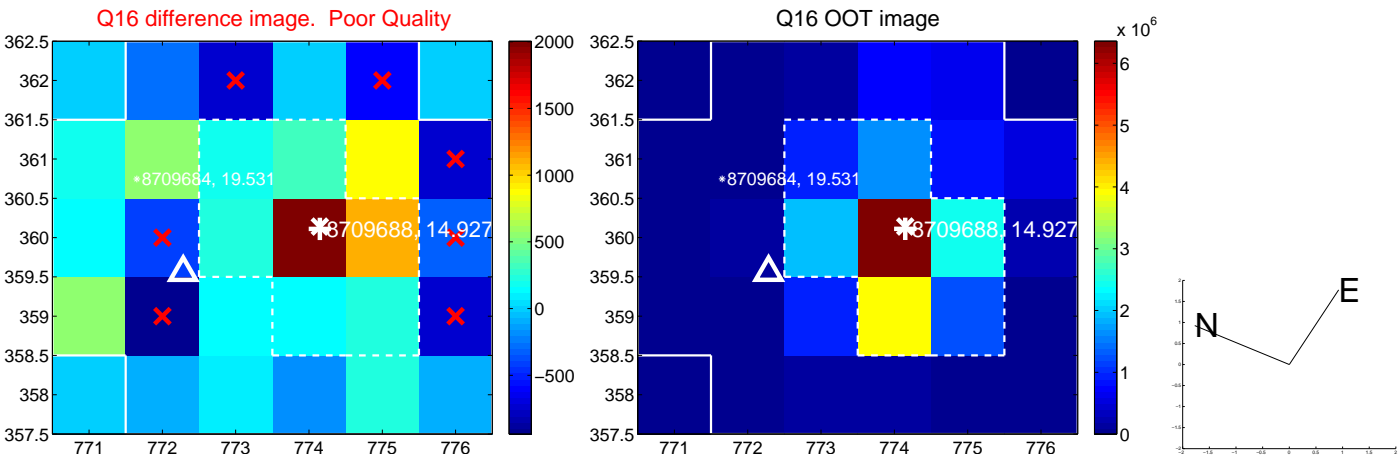
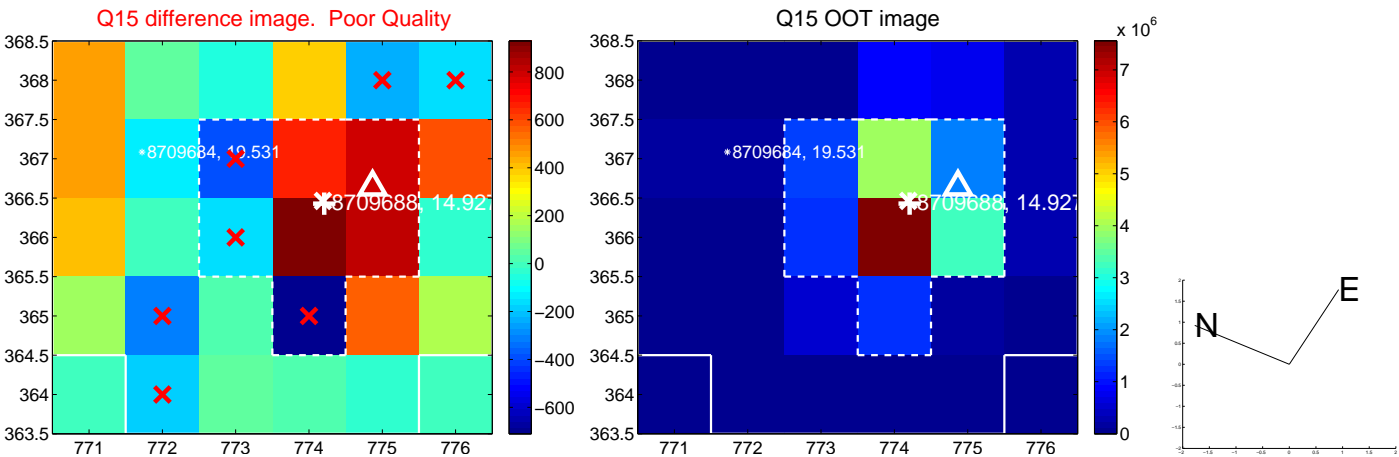
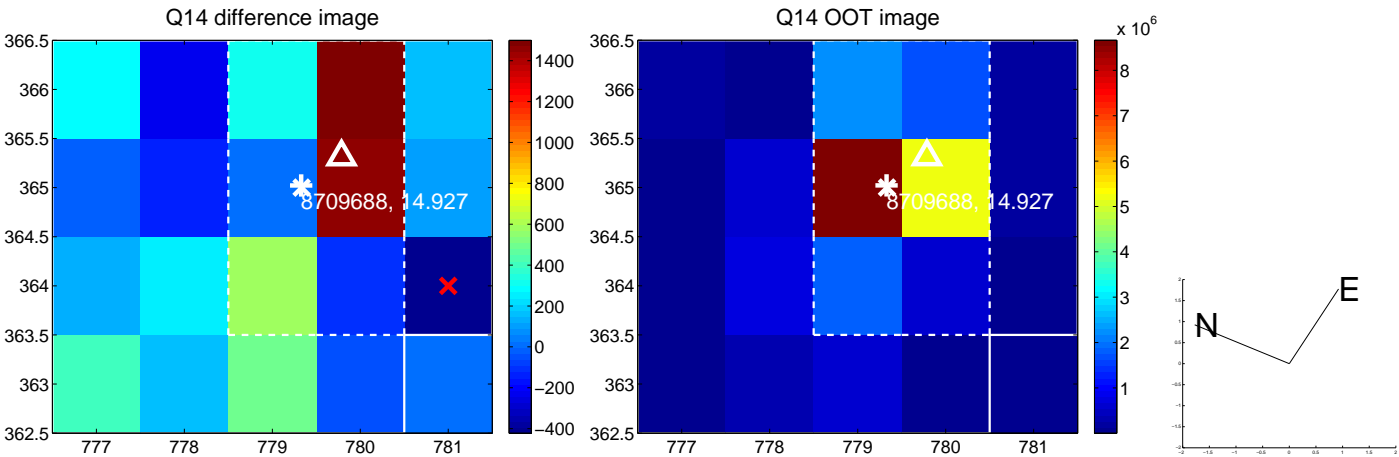
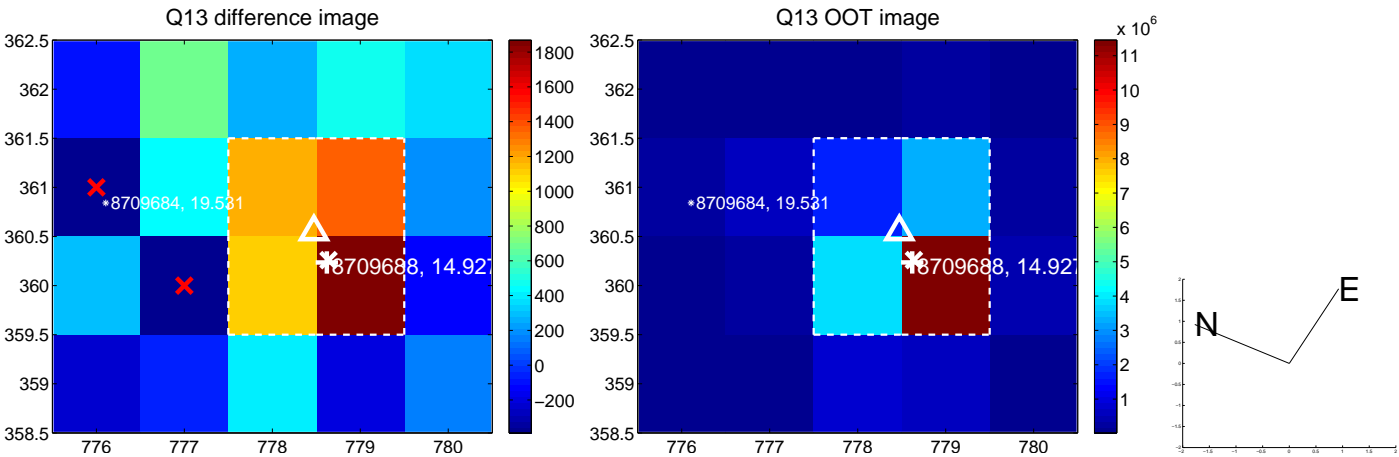
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



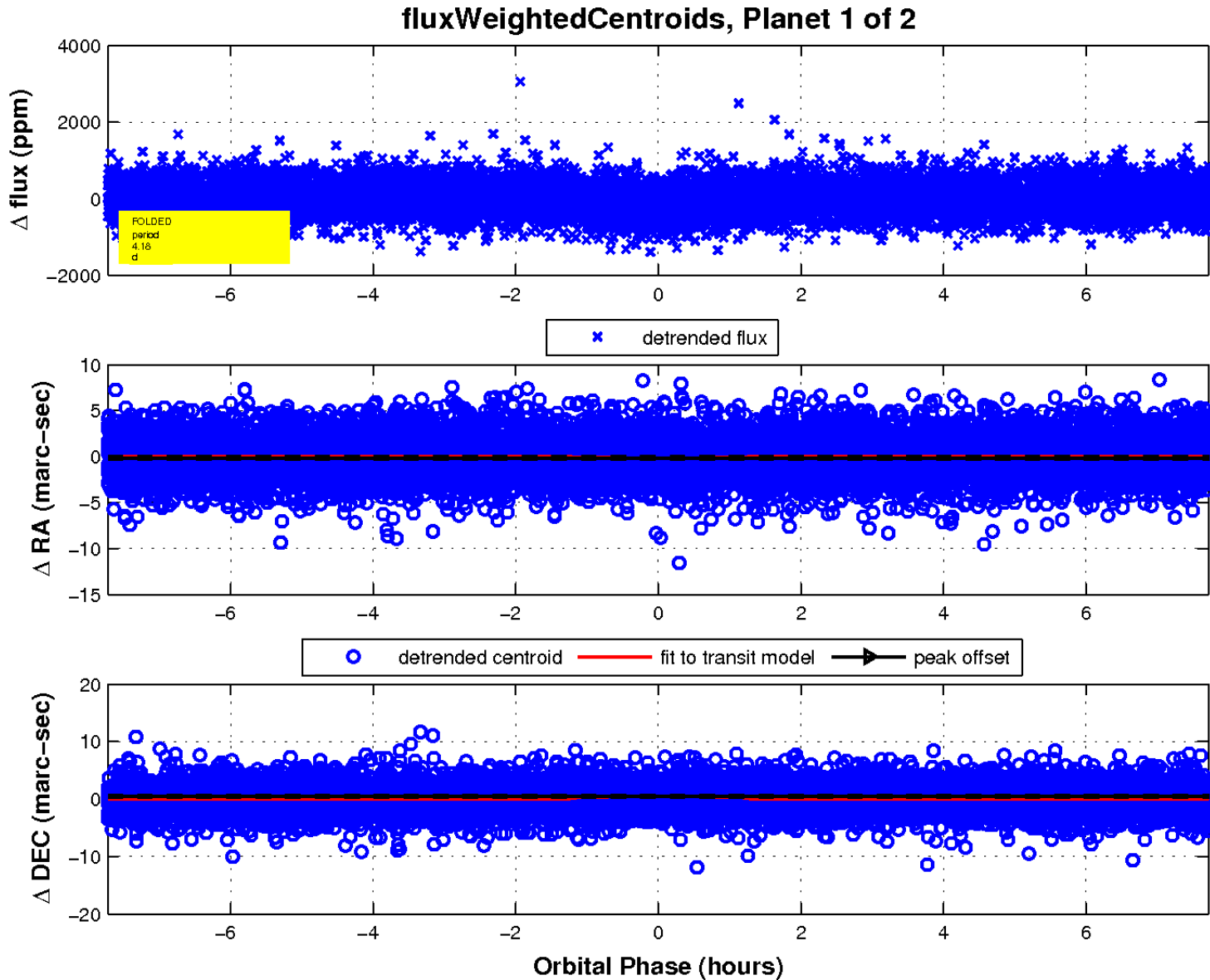
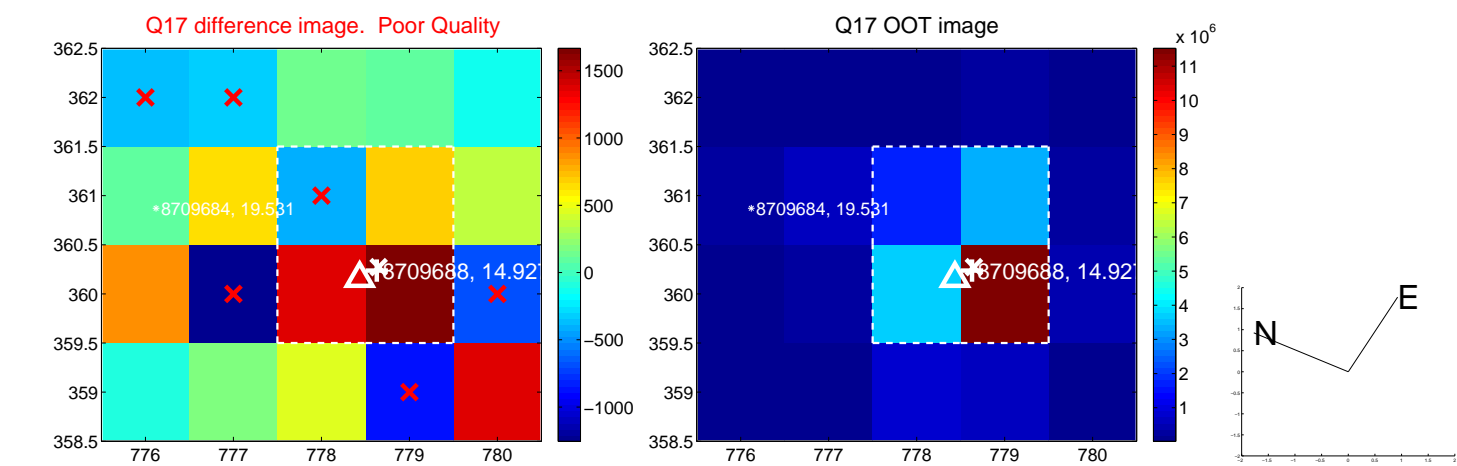
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

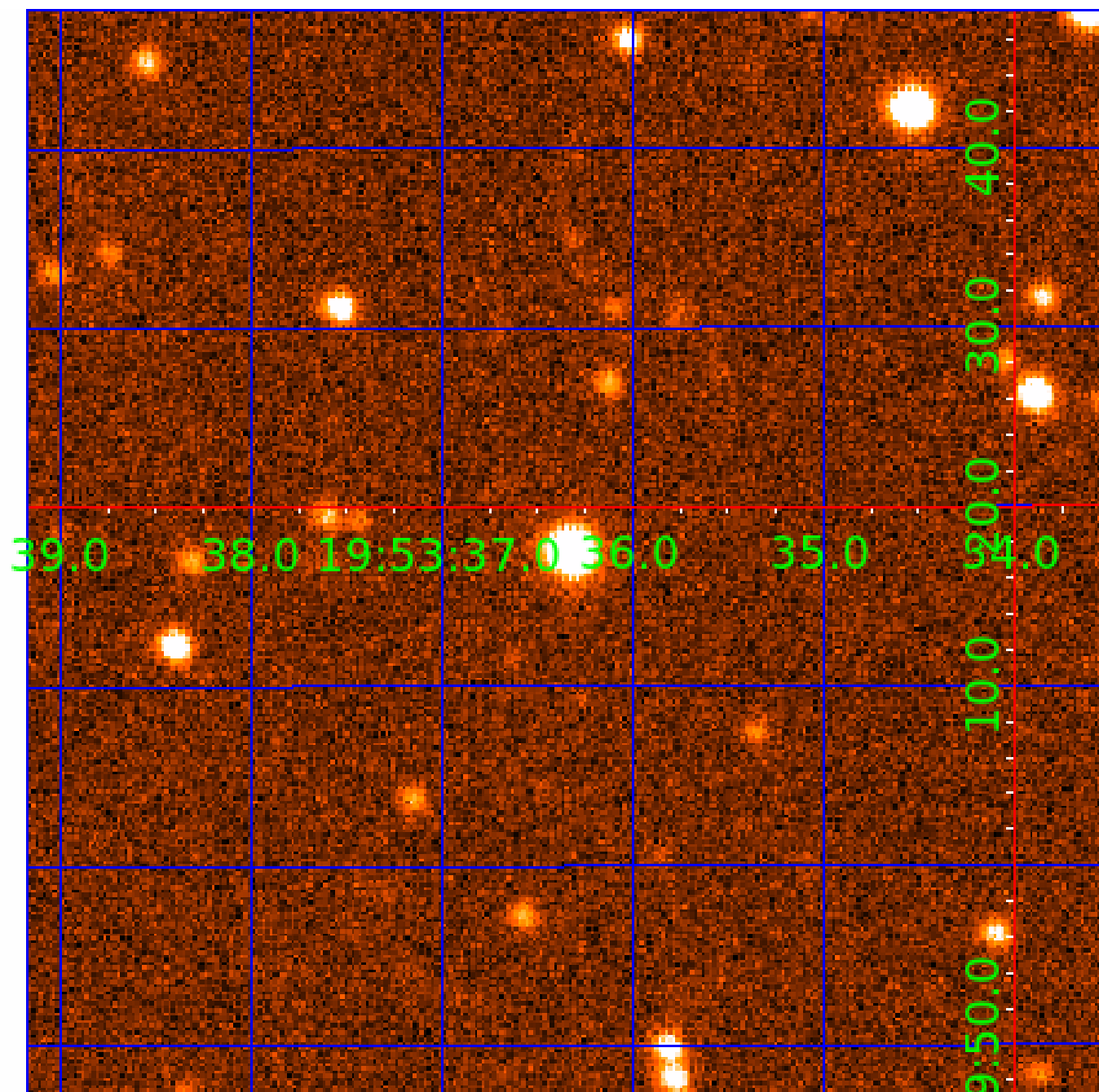


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008709688

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})
008709688-01	OBS	3019.01	4.179374	133.848909	168.3	2.573	13.9	14.5	1.16	5633	1.72	480.67
008709688-02	OBS	3019.02	2.012106	131.565164	76.2	2.135	7.5	8.6	1.16	5633	1.08	1273.86

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008709688-01	OBS	PC	0.96	0	0	0	0	NO_COMMENT
008709688-02	OBS	PC	0.94	0	0	0	0	NO_COMMENT

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.

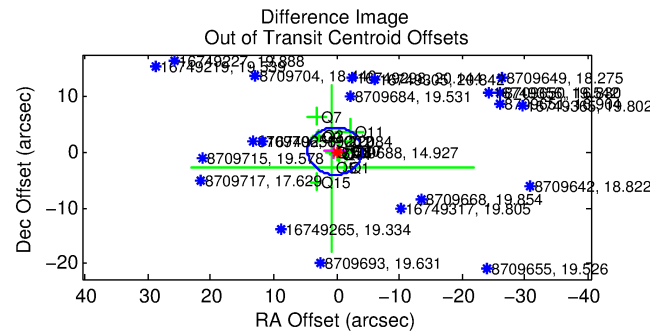
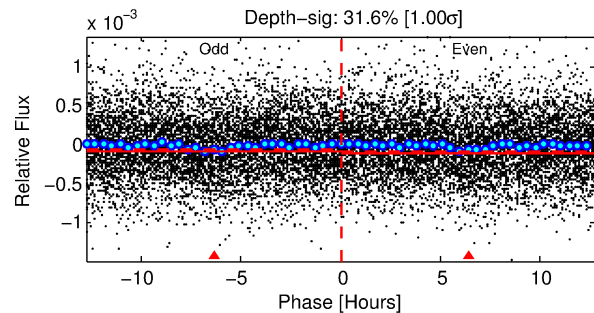
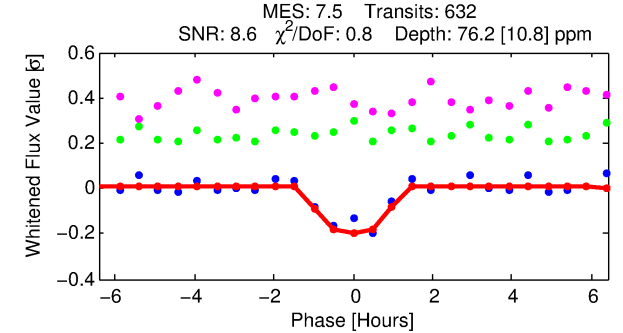
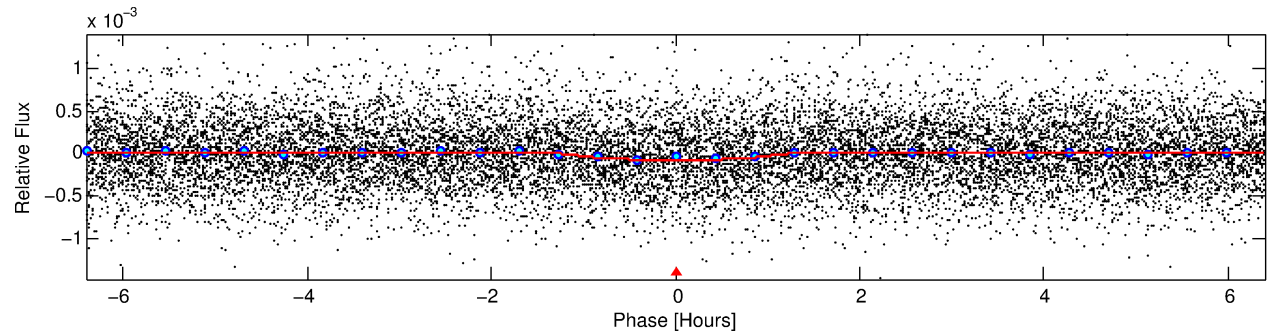
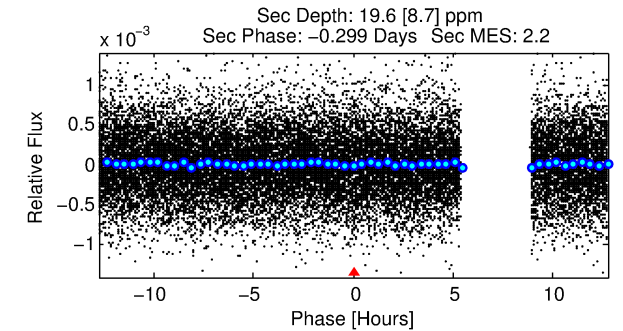
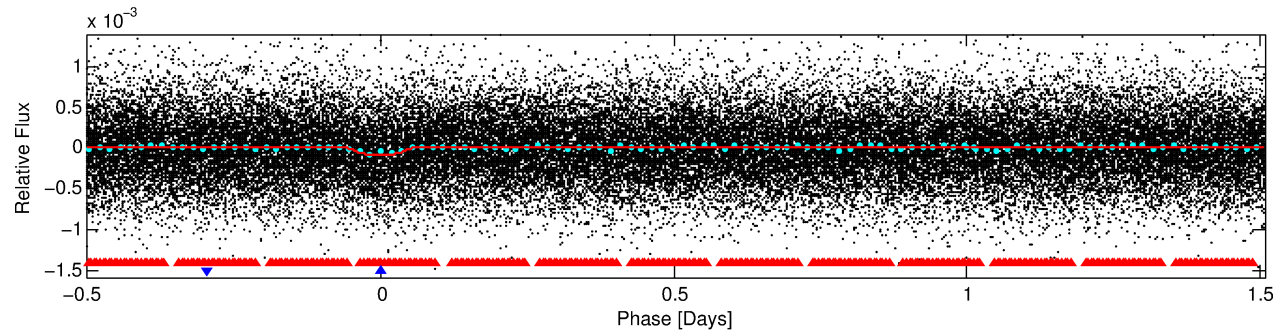
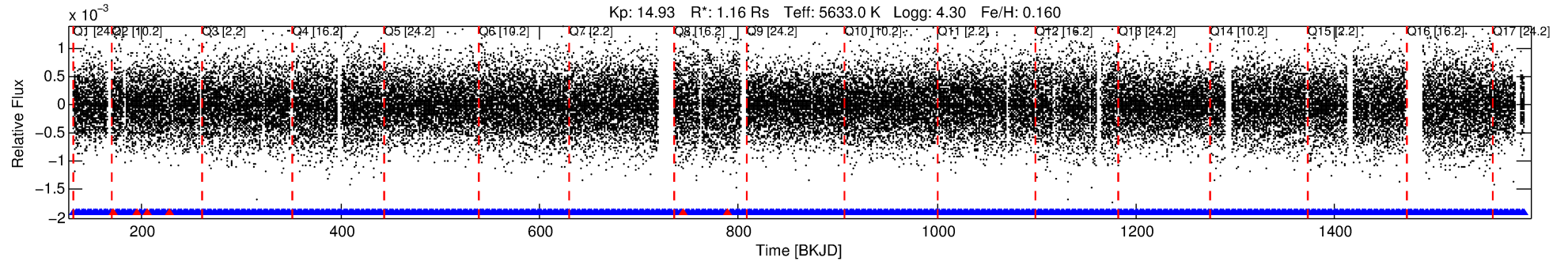
Ephemeris Match Information For 008709688-02

No Significant Match Found

DV One-Page Summary

KIC: 8709688 Candidate: 2 of 2 Period: 2.012 d

KOI: K03019.02 Corr: 0.941



DV Fit Results:

Period = 2.01211 [0.00002] d
Epoch = 131.5652 [0.0040] BKJD
Rp/R* = 0.0085 [0.0051]
a/R* = 5.38 [12.72]
b = 0.69 [1.92]
Seff = 1273.86 [328.44]
Teff = 1523 [98] K
Rp = 1.08 [0.67] Re
a = 0.0309 [0.0048] AU
Ag = 8.85 [11.48] [0.68σ]
Teffp = 4063 [1294] K [1.96σ]

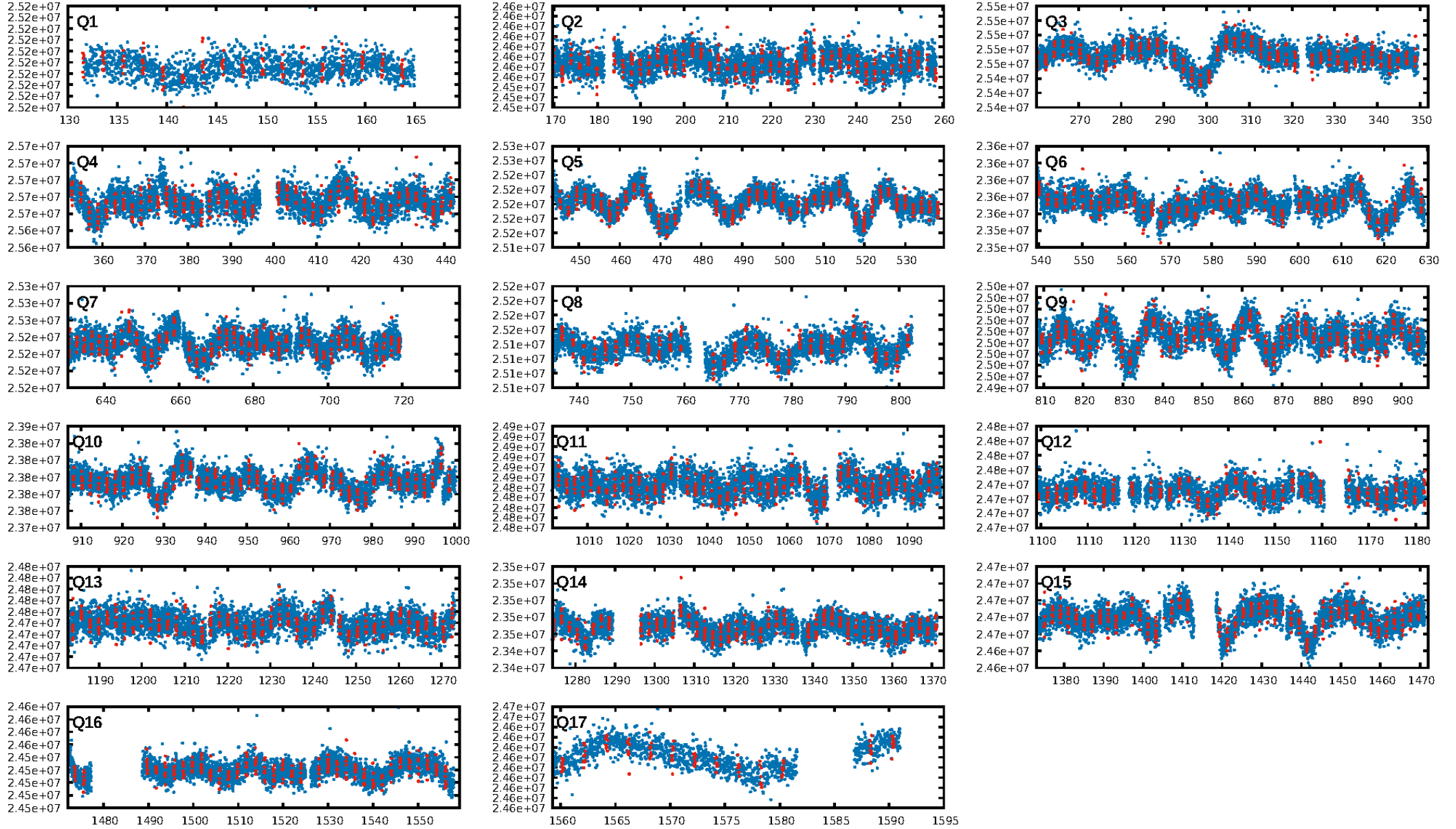
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [15.56σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.57e-14
RollingBand-fgt: 0.99 [597/603]
GhostDiagnostic-chr: 4.4
Centroid-sig: 0.3%
Centroid-so: 2.907 arcsec [1.92σ]
OotOffset-rm: 0.424 arcsec [0.30σ]
KicOffset-rm: 0.282 arcsec [0.19σ]
OotOffset-st: 2/4/3/5 [14]
KicOffset-st: 2/4/3/5 [14]
DiffImageQuality-fgm: 0.36 [5/14]
DiffImageOverlap-fno: 1.00 [17/17]

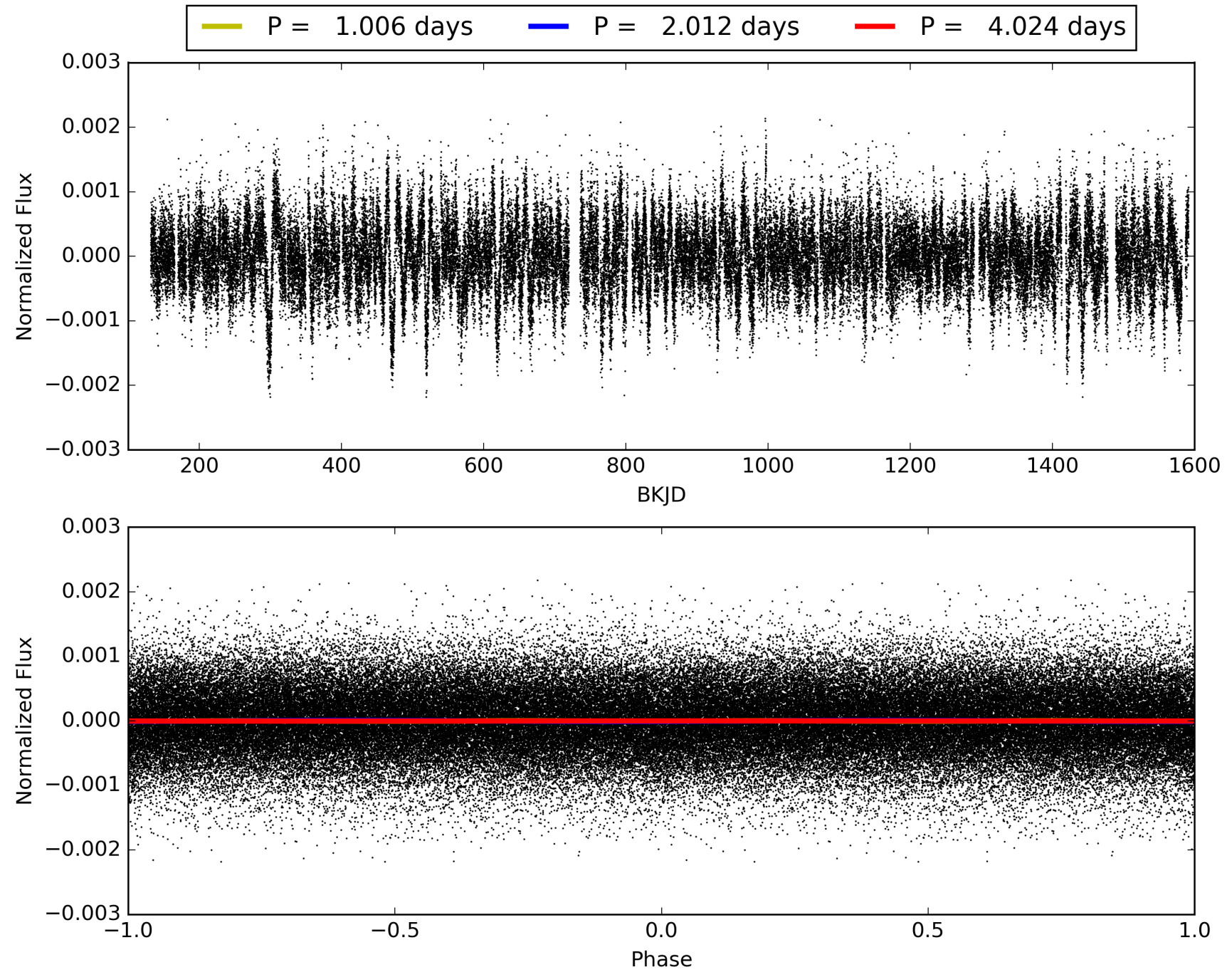
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:20:34 Z

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

TCE 008709688-02, PDC Light Curves

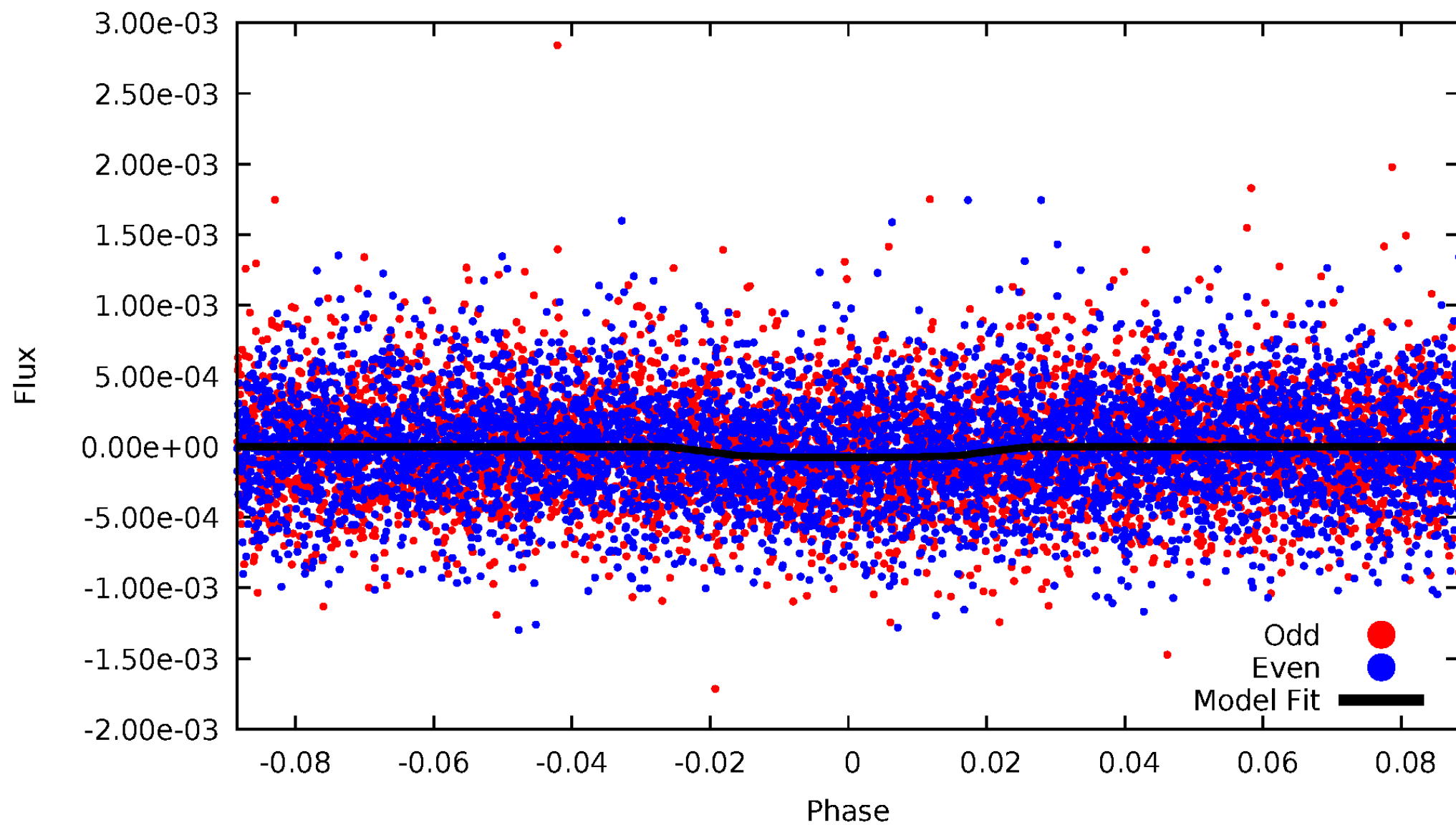


TCE 008709688-02



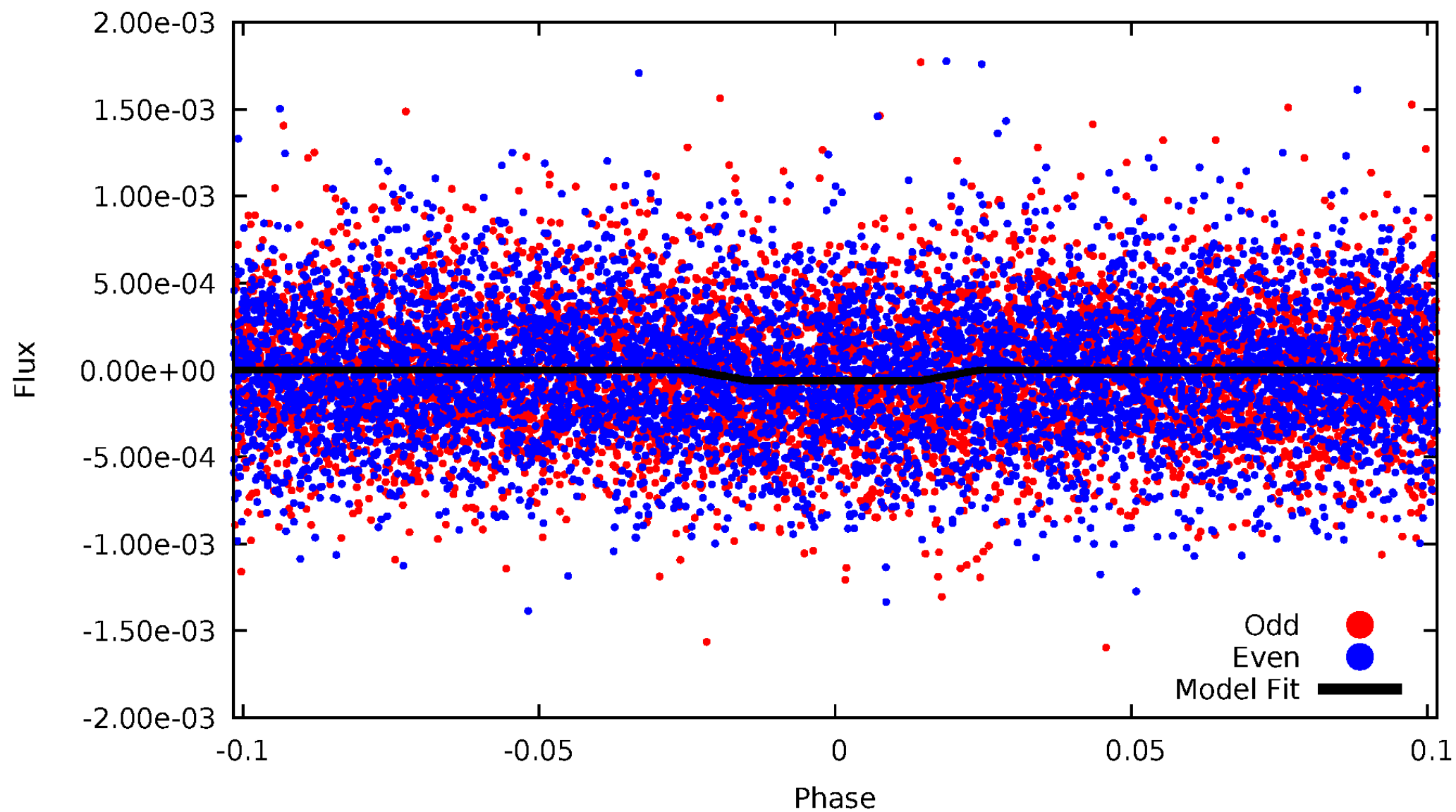
DV Odd/Even

TCE 008709688-02



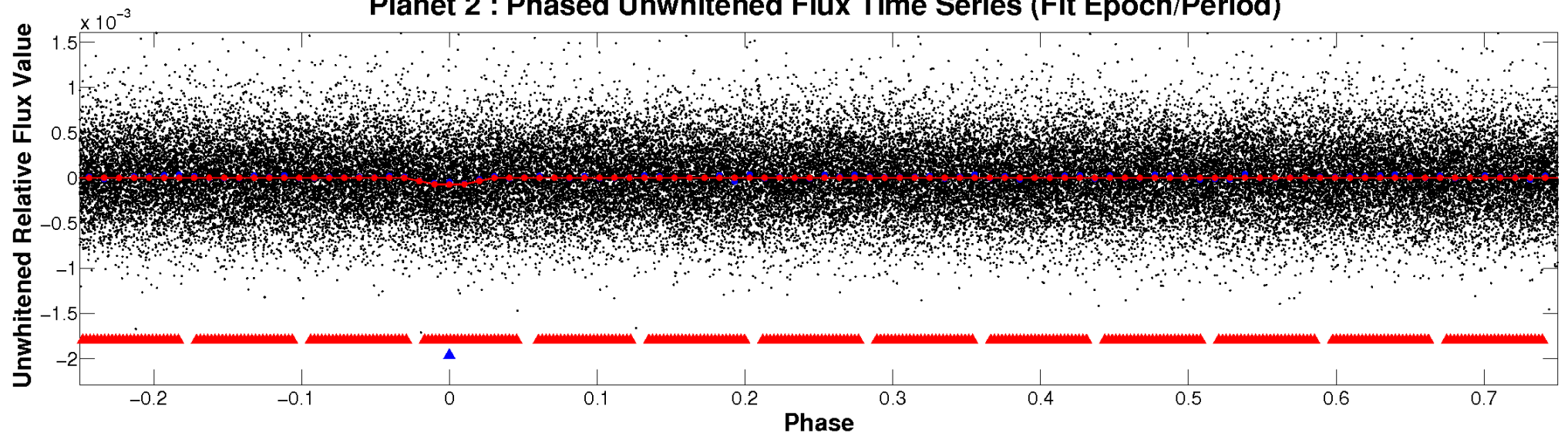
ALT Odd/Even

TCE 008709688-02

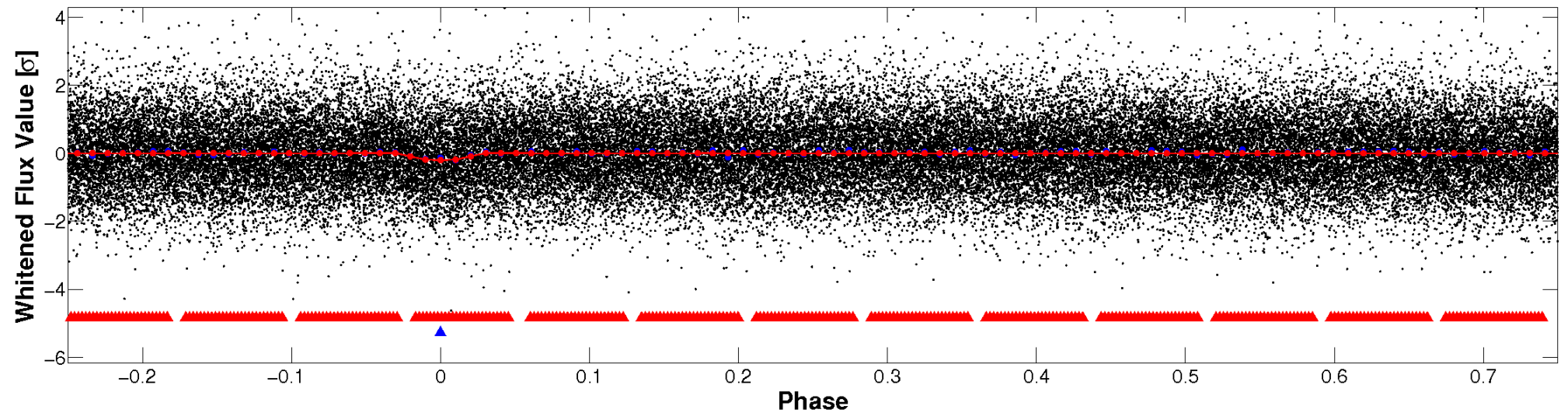


Non-Whitened Vs. Whitened Light Curve

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

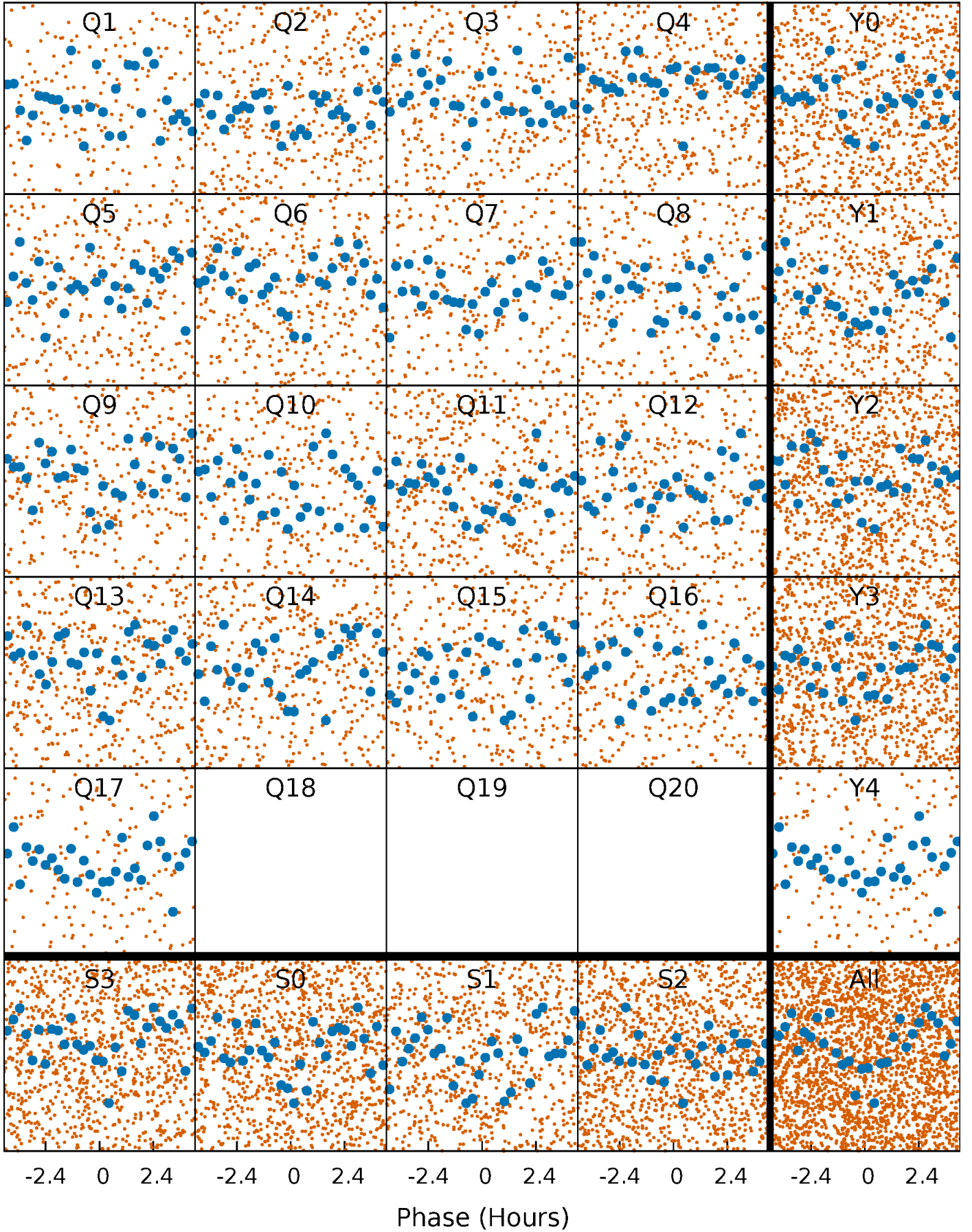


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



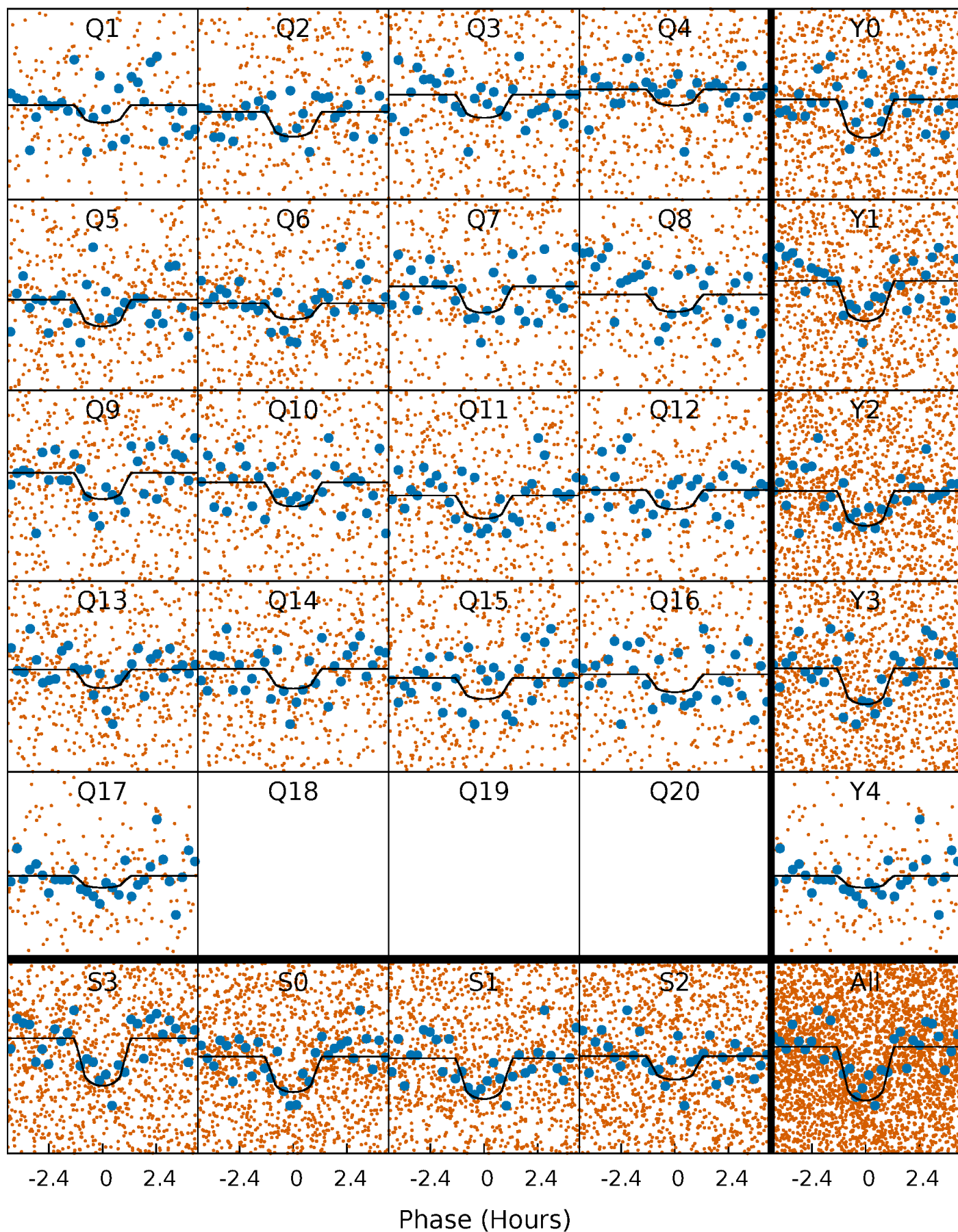
PDC Quarter-Phased Transit Curves

TCE 008709688-02 P= 2.012106 Days $T_0=131.565164$ (BKJD)



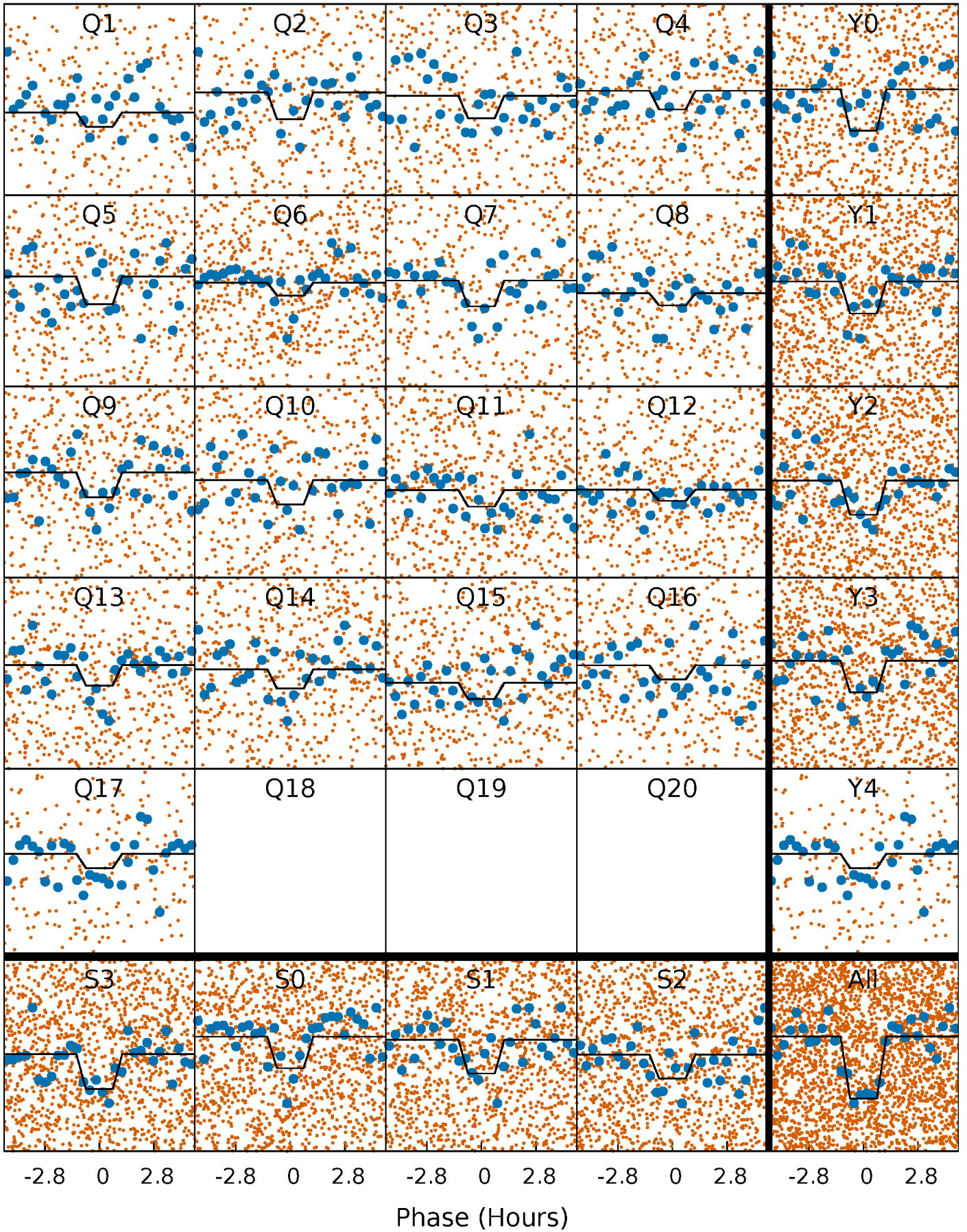
DV Quarter-Phased Transit Curves

TCE 008709688-02 P= 2.012106 Days $T_0=131.565164$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

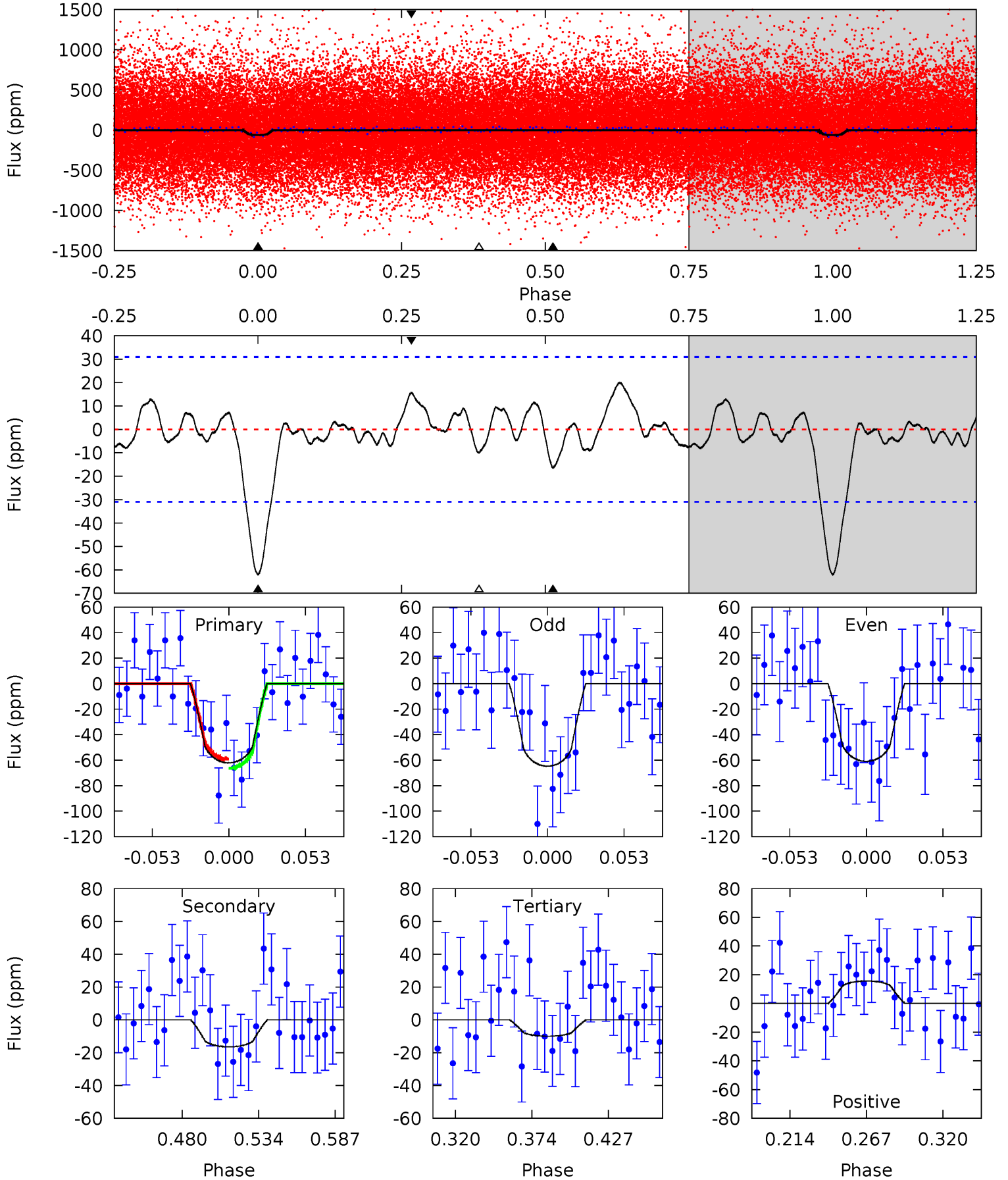
TCE 008709688-02 P= 2.012127 Days $T_0=131.558999$ (BKJD)



DV Model-Shift Uniqueness Test

008709688-02, P = 2.012106 Days, E = 129.553058 Days

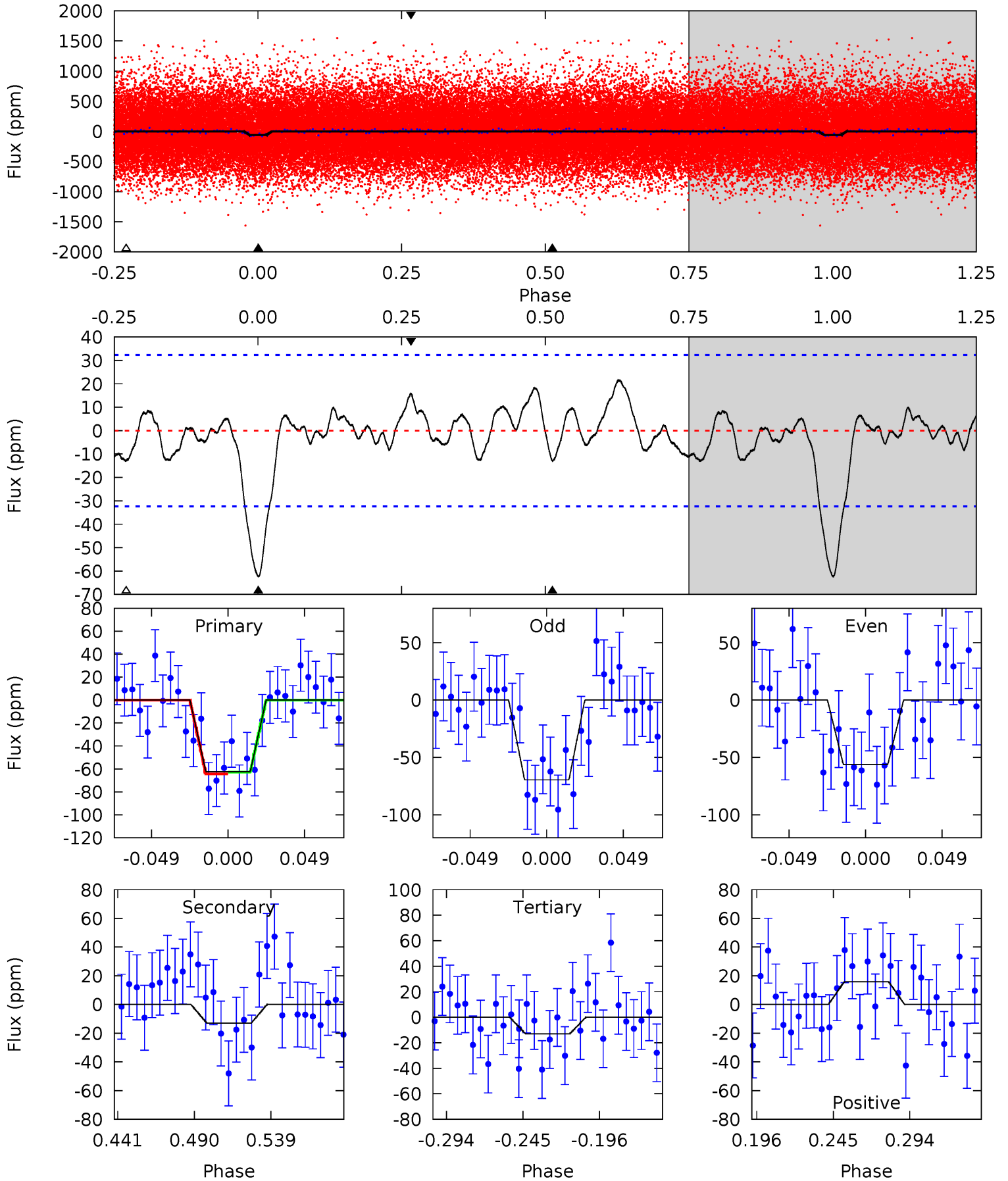
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.43	2.50	1.51	2.37	4.69	1.93	1.01	7.92	7.06	0.99	0.12	0.29	0.86	0.24	0.55



Alt Model-Shift Uniqueness Test

008709688-02, P = 2.012127 Days, E = 129.546872 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.07	1.89	1.88	2.31	4.71	1.97	1.05	7.19	6.75	0.01	-0.43	0.97	0.88	0.26	0.11



Stellar Parameters For KIC 008709688

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5633^{+76}_{-76}	$4.296^{+0.150}_{-0.113}$	$0.160^{+0.150}_{-0.150}$	$1.162^{+0.179}_{-0.179}$	$0.973^{+0.068}_{-0.056}$	$0.874^{+0.564}_{-0.293}$
	+1%/-1%	+3%/-3%	+94%/-94%	+15%/-15%	+7%/-6%	+65%/-34%
Source	SPE90	SPE90	SPE90	DSEP		

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

Secondary Eclipse Parameters for KIC 008709688-02 / KOI 3019.02

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-16 ± 7	$1.06^{+0.71}_{-0.56}$	2127^{+98}_{-100}	4087^{+1624}_{-733}	$7.234^{+29.491}_{-4.829}$
Alt.	-13 ± 7	$1.08^{+0.60}_{-0.61}$	2130^{+99}_{-95}	3875^{+1562}_{-704}	$5.220^{+21.843}_{-3.544}$

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

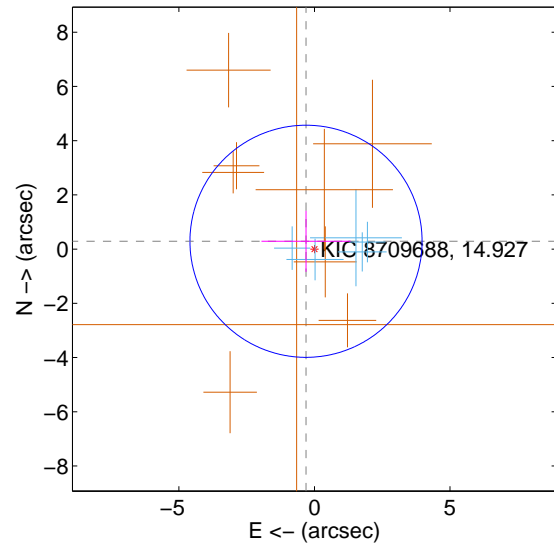
Supplemental centroid analysis for 008709688-02. Kepler magnitude: 14.93. Transit SNR 8.57

There are 5 quarters with good PRF difference image offsets

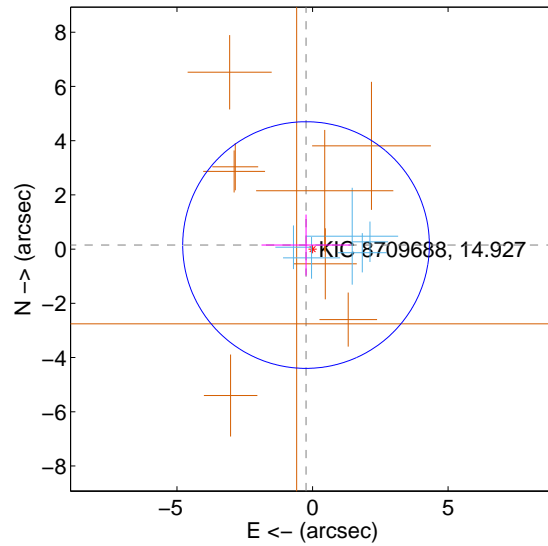
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.424 ± 1.427	0.30	0.311 ± 1.643	0.288 ± 1.125
PRF-fit source offset from KIC position	0.282 ± 1.516	0.19	0.239 ± 1.643	0.149 ± 1.125
photometric centroid source offset	2.91 ± 1.51	1.92	-0.43 ± 1.49	2.88 ± 1.51

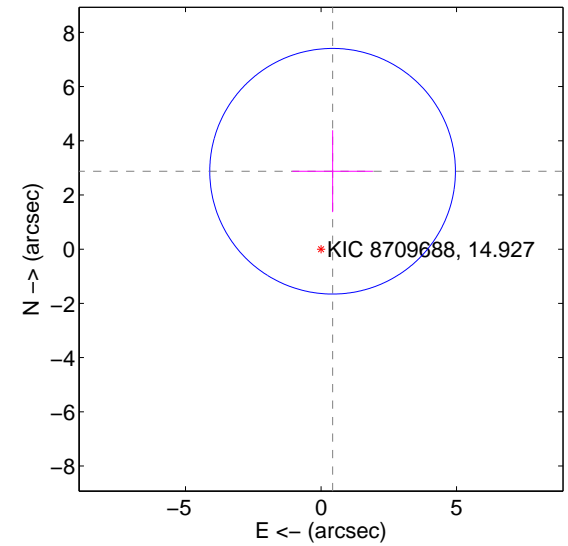
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

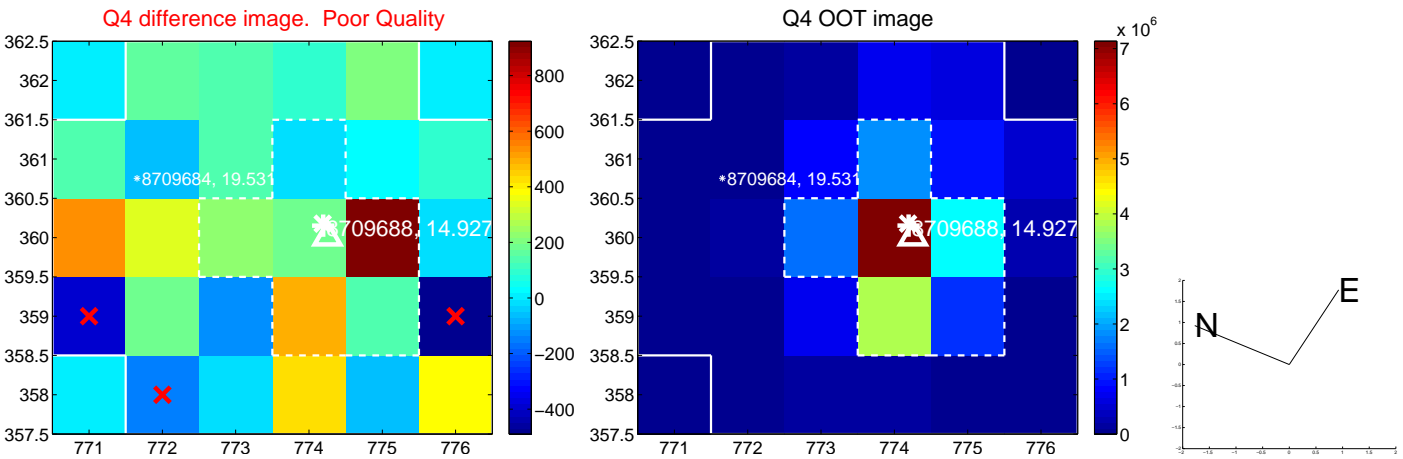
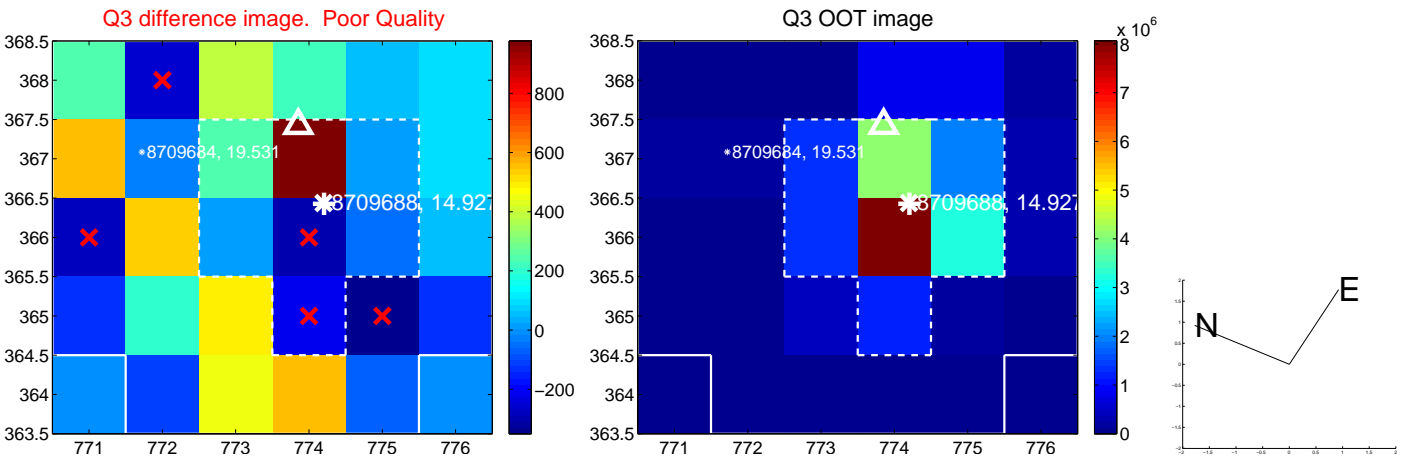
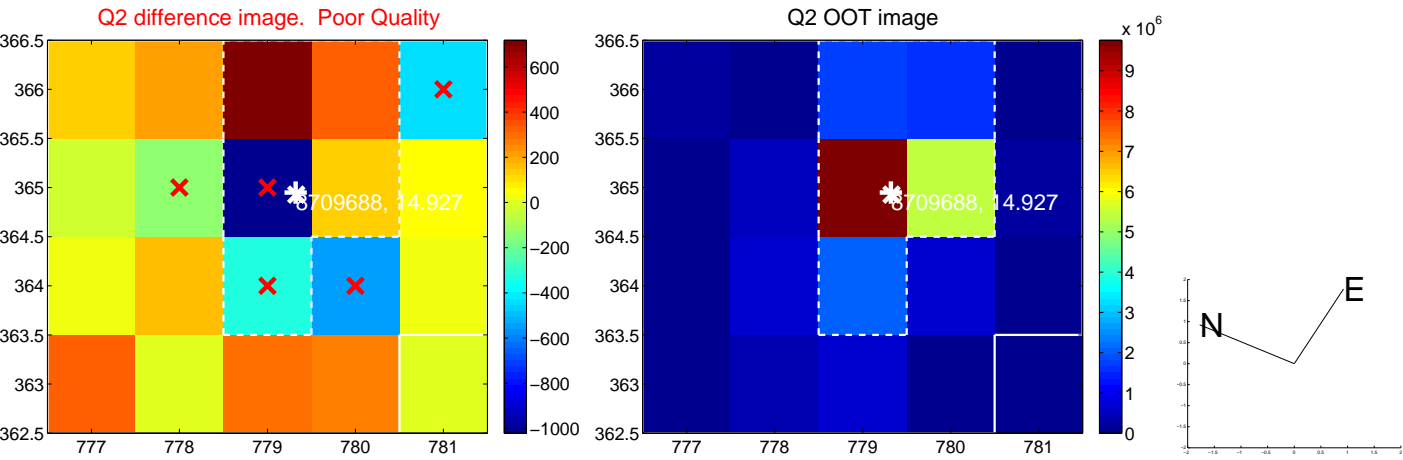
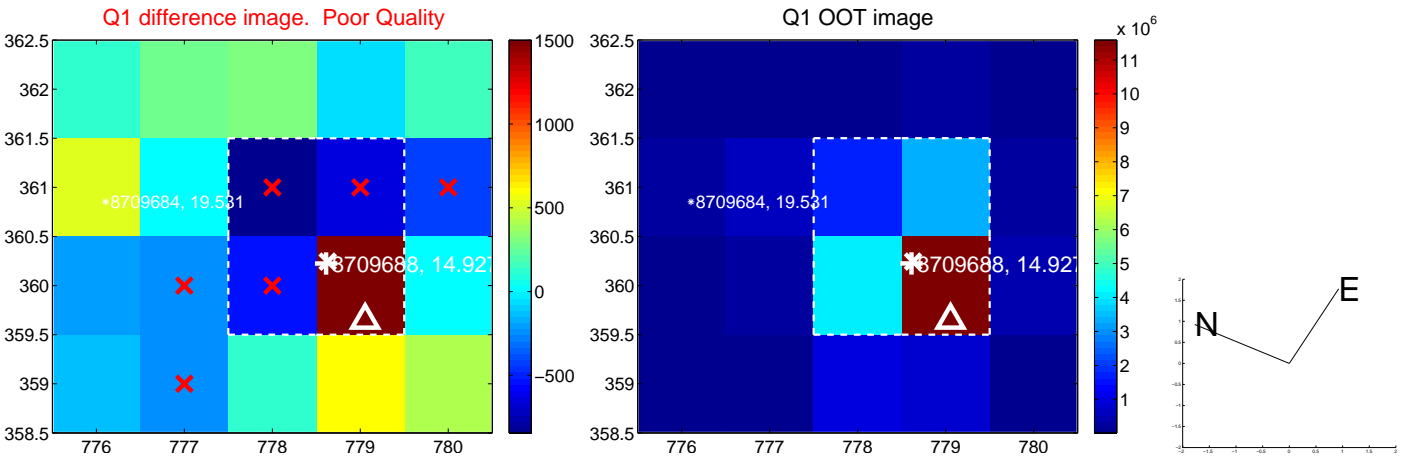


offset from photometric centroids

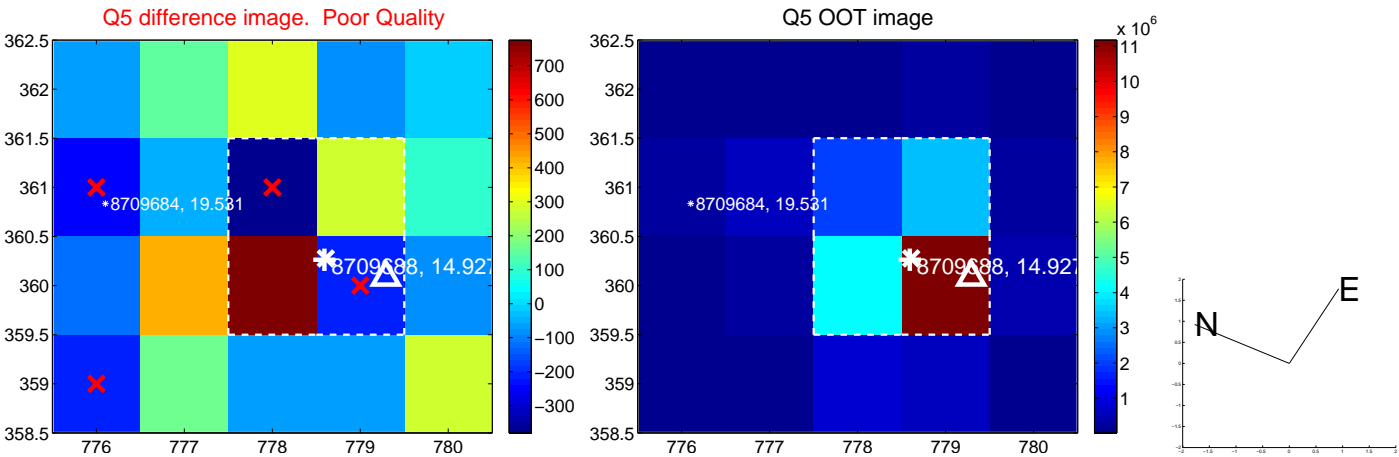


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

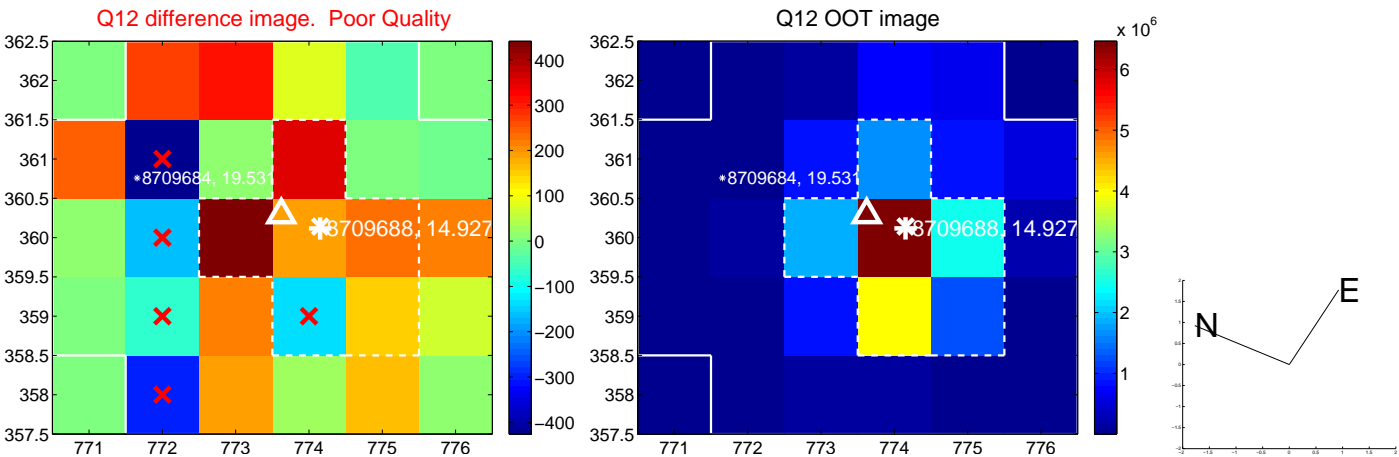
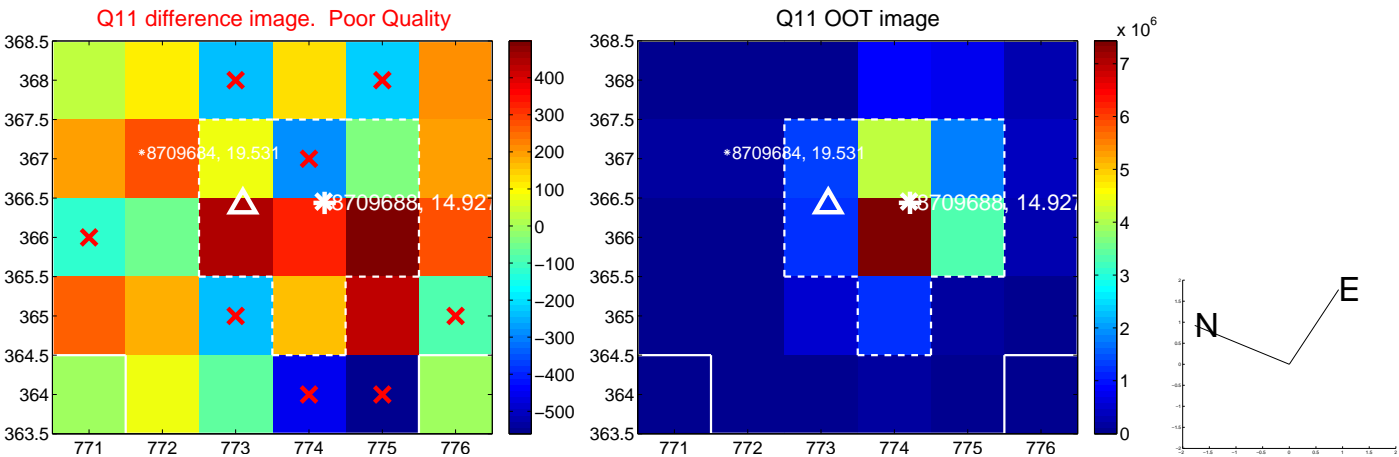
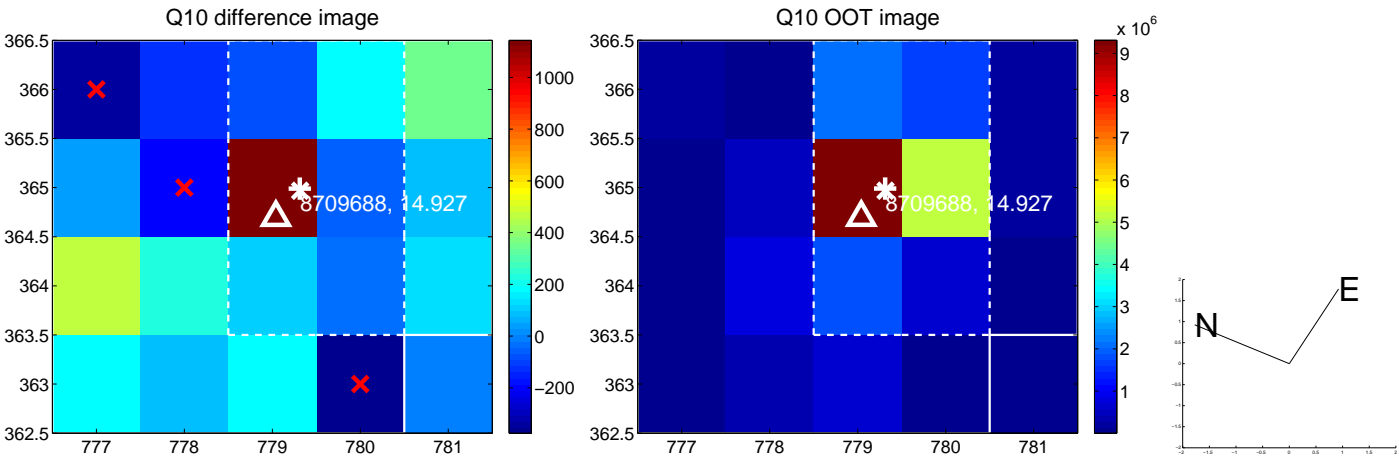
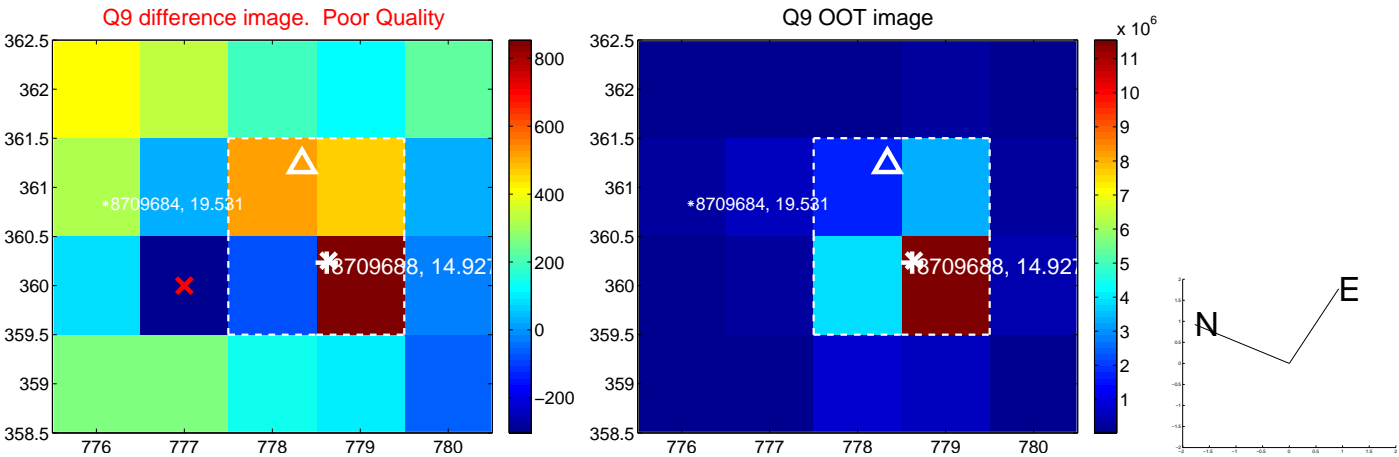
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



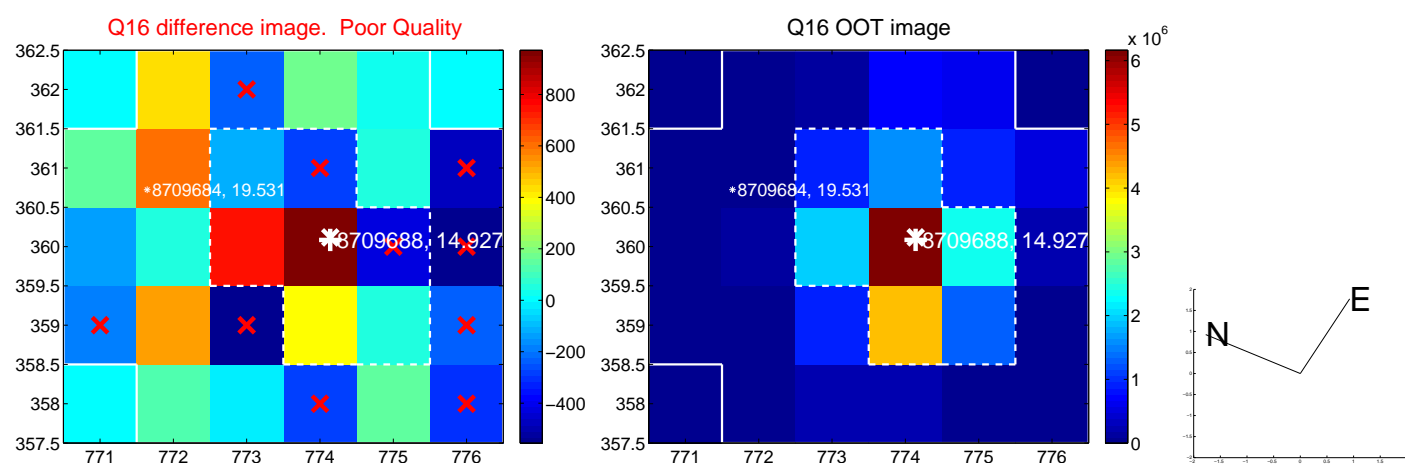
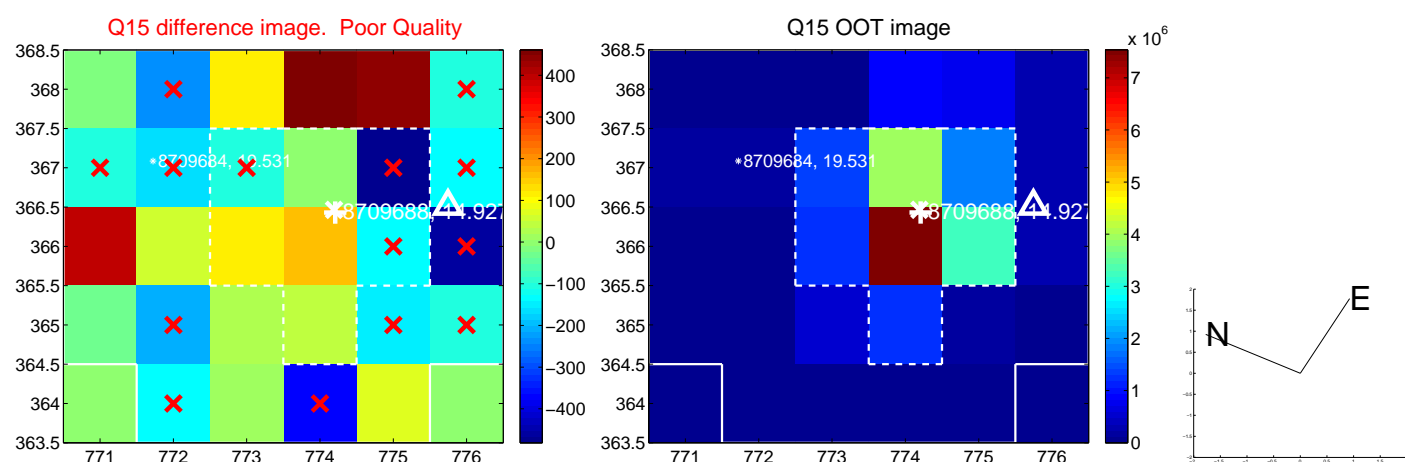
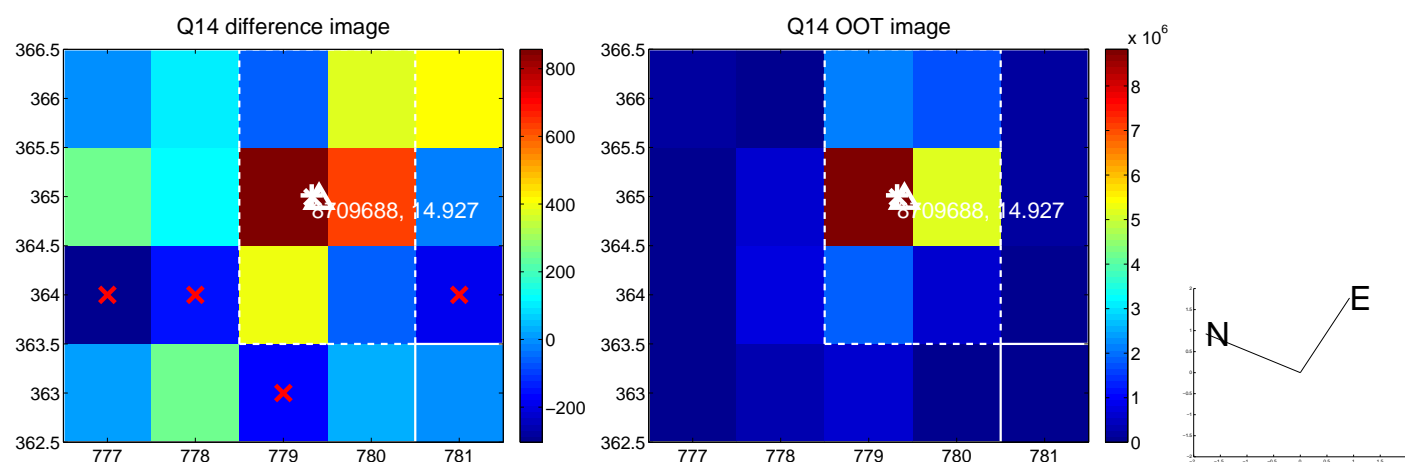
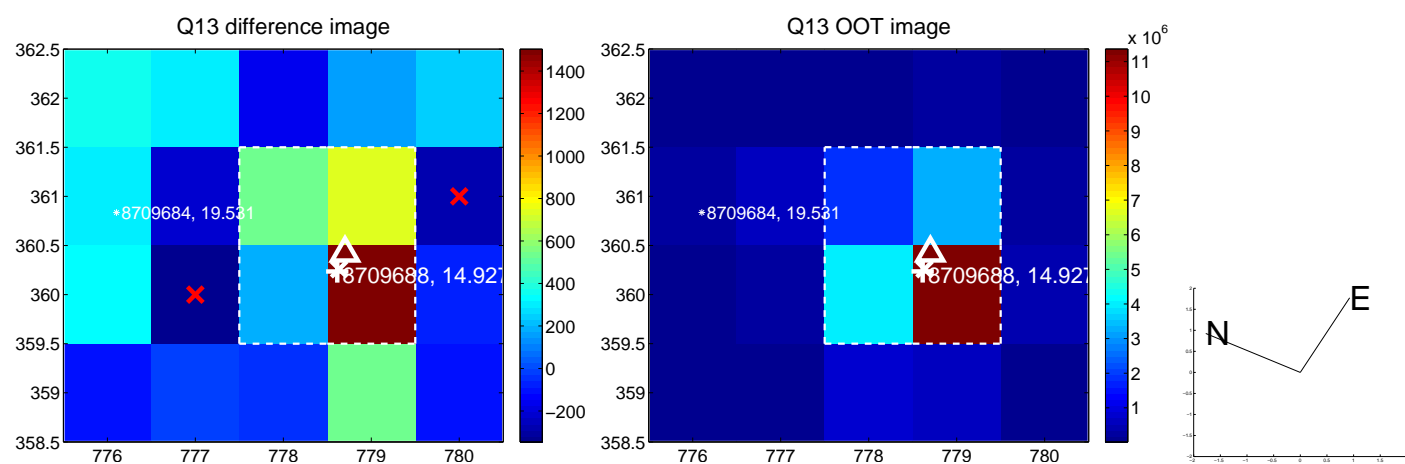
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



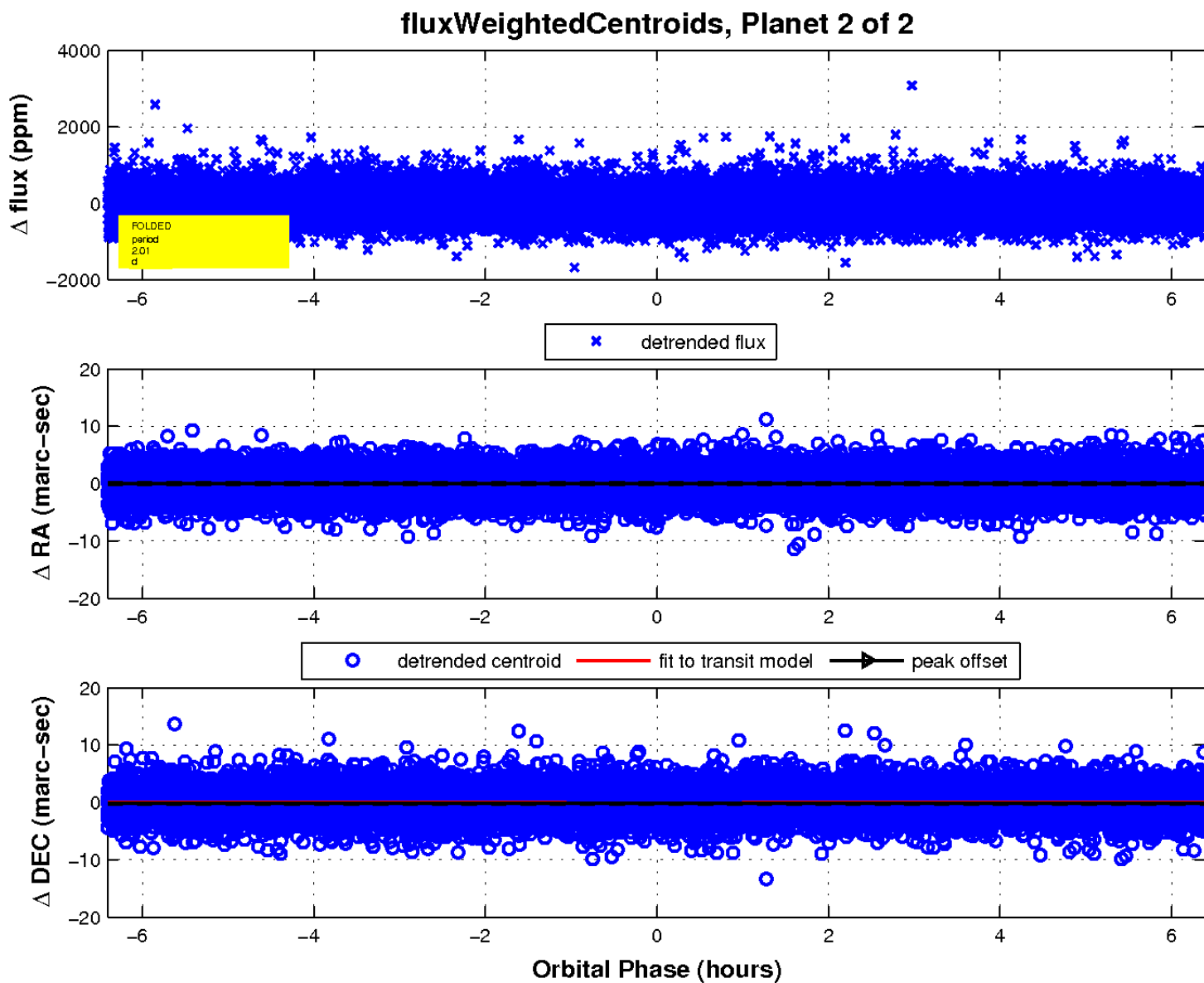
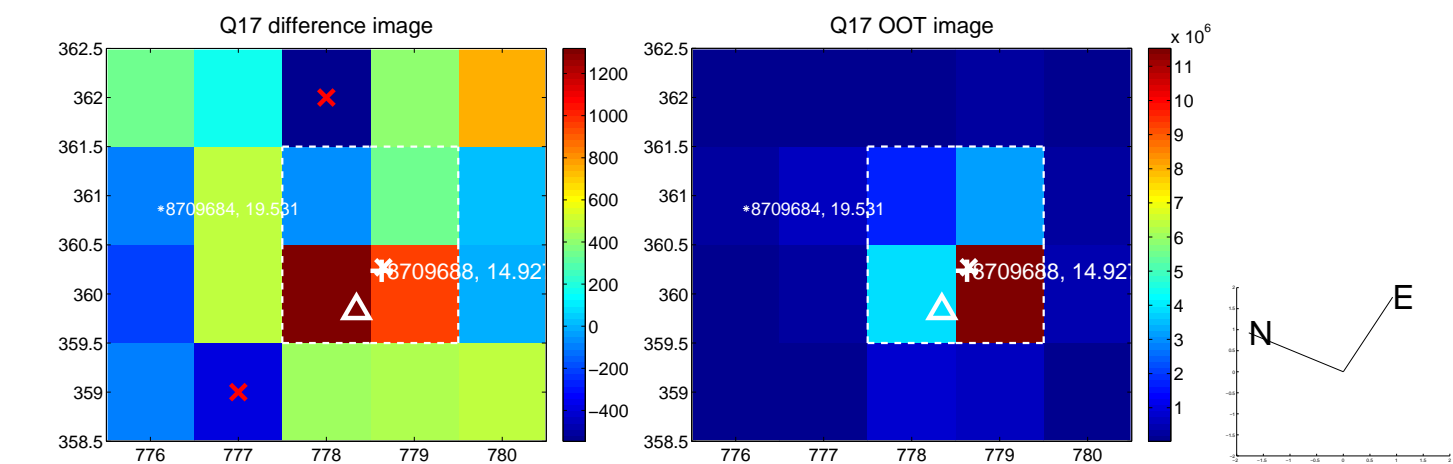
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

