

KIC 012170648

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})
012170648-01	OBS	2875.01	0.599391	132.019395	234.8	0.775	17.6	27.9	0.78	5180	1.48	2391.87
012170648-02	OBS	No	0.599394	131.716013	272.2	0.605	19.3	30.7	0.78	5180	1.31	2391.85

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012170648-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
012170648-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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.

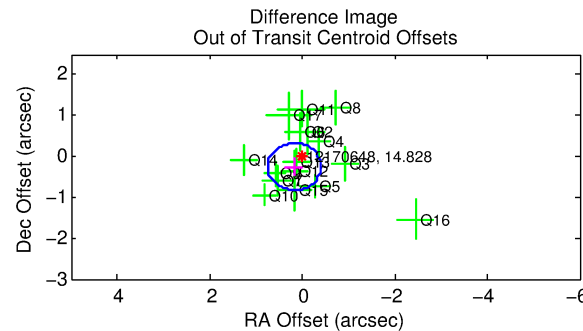
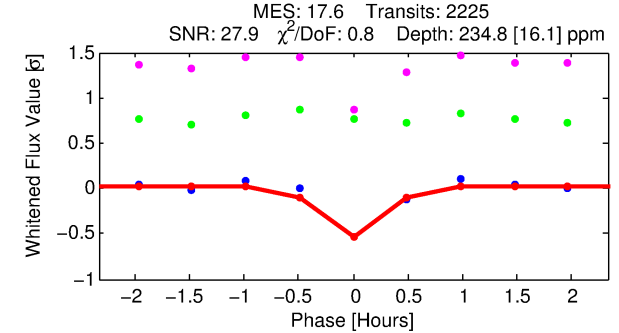
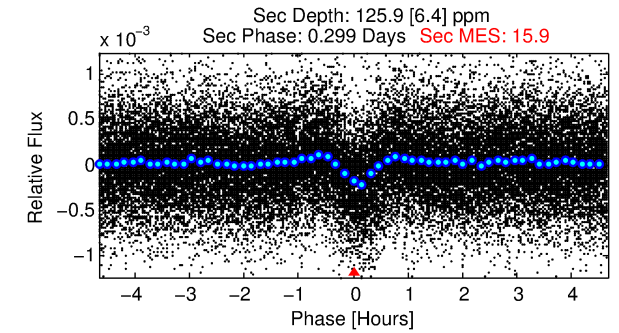
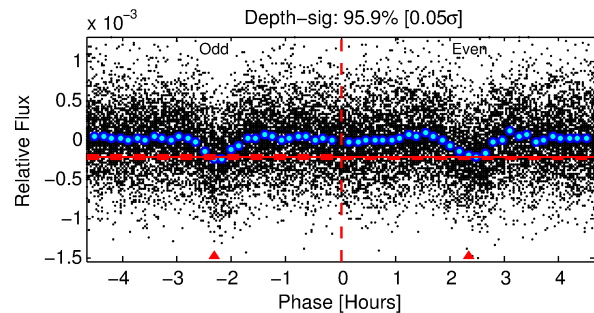
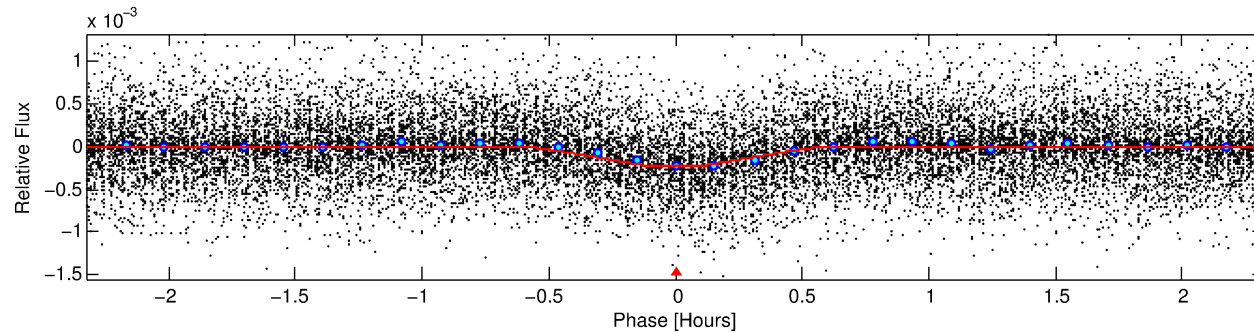
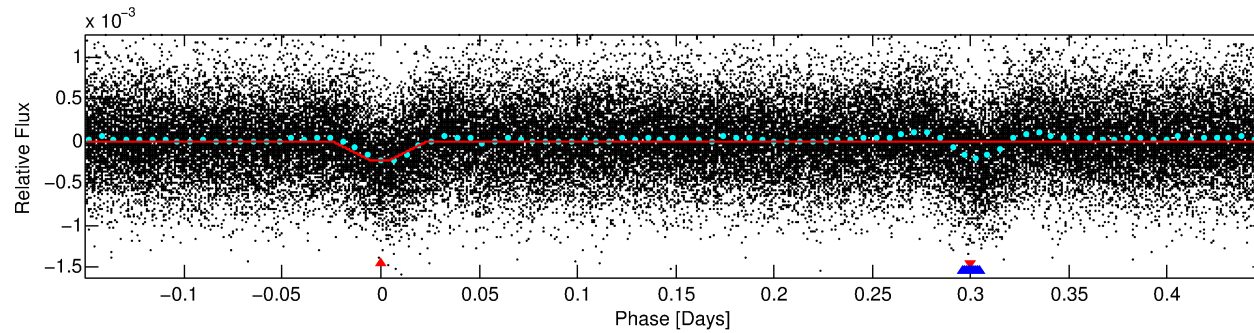
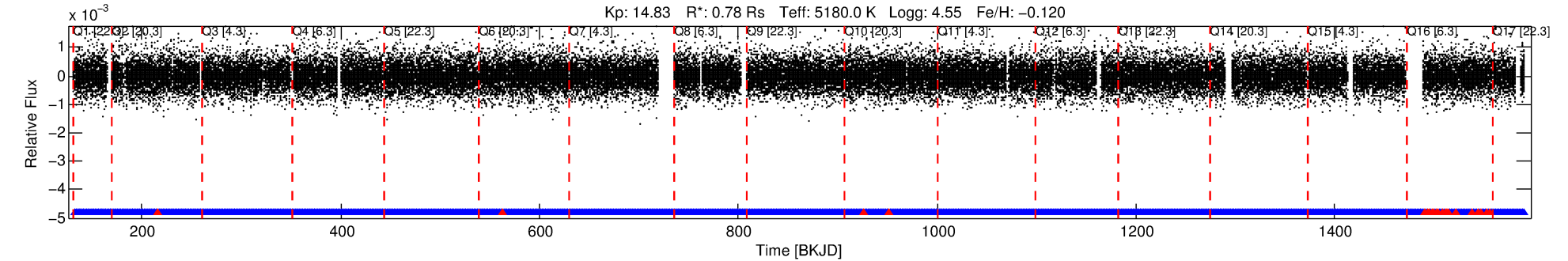
Ephemeris Match Information For 012170648-01

No Significant Match Found

DV One-Page Summary

KIC: 12170648 Candidate: 1 of 2 Period: 0.599 d

KOI: K02875 Corr: No Ephemeris Match



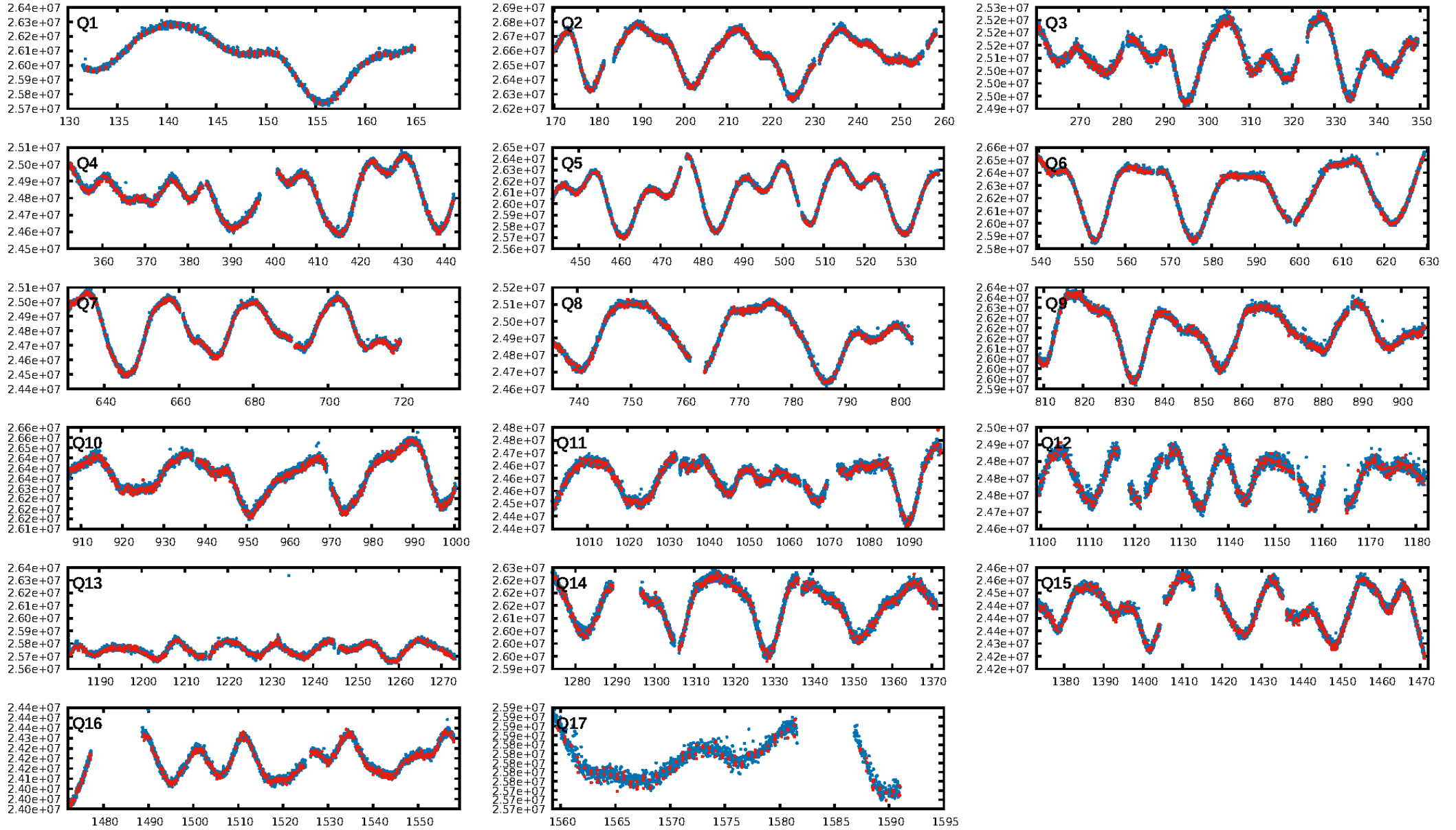
DV Fit Results:

Period = 0.59939 [0.00000] d
Epoch = 132.0194 [0.0005] BKJD
Rp/R* = 0.0173 [0.0062]
a/R* = 2.95 [3.85]
b = 0.90 [0.32]
Seff = 2391.87 [427.25]
Teff = 1783 [80] K
Rp = 1.48 [0.56] Re
a = 0.0128 [0.0012] AU
Ag = 5.21 [3.81] [1.11 σ]
Teffp = 4166 [758] K [3.13 σ]

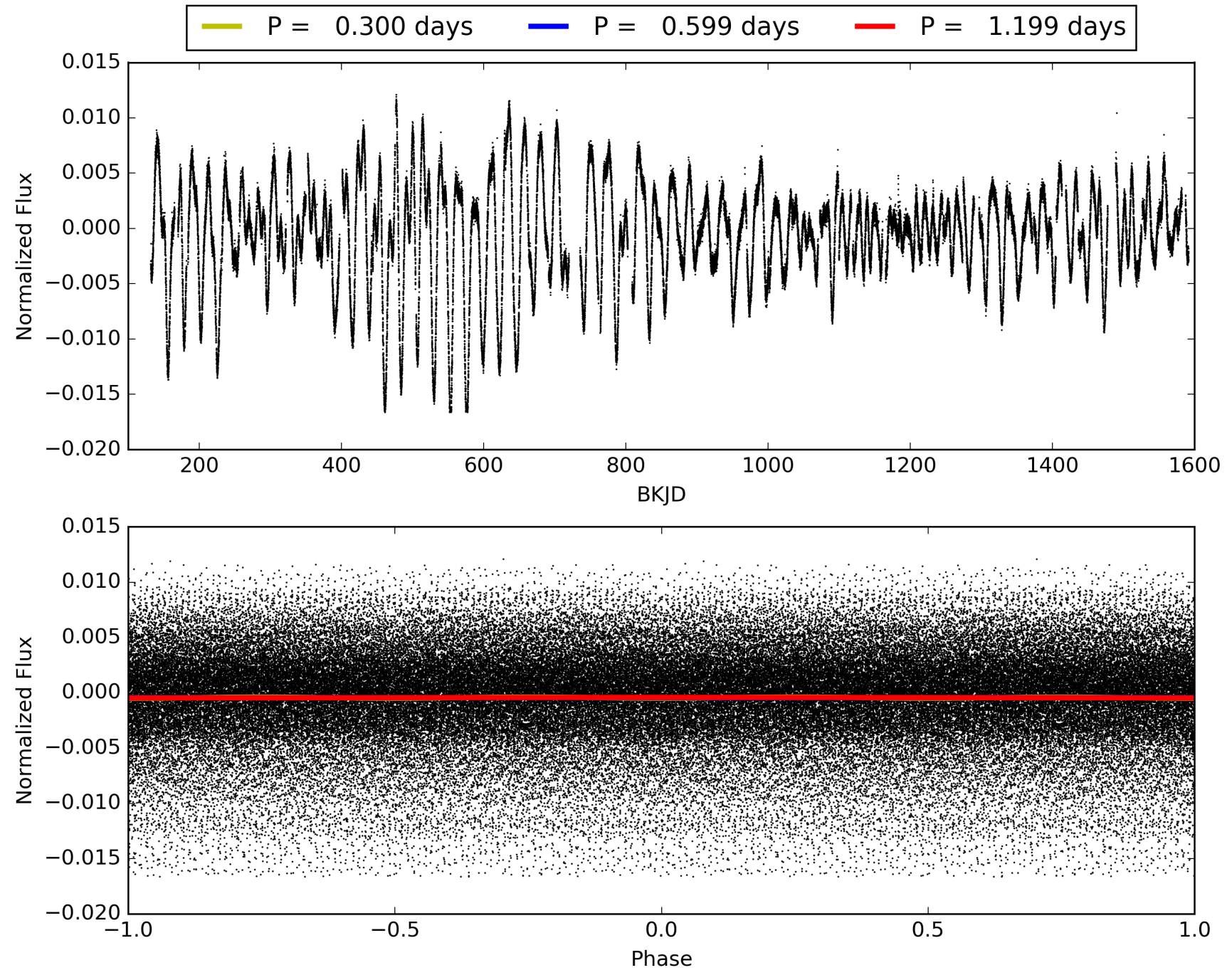
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.89e-78
RollingBand-fgt: 0.99 [2102/2125]
GhostDiagnostic-chr: 3.008
Centroid-sig: N/A
Centroid-so: 2.442 arcsec [4.81 σ]
OotOffset-rm: 0.305 arcsec [1.59 σ]
KicOffset-rm: 0.129 arcsec [0.67 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 012170648-01, PDC Light Curves

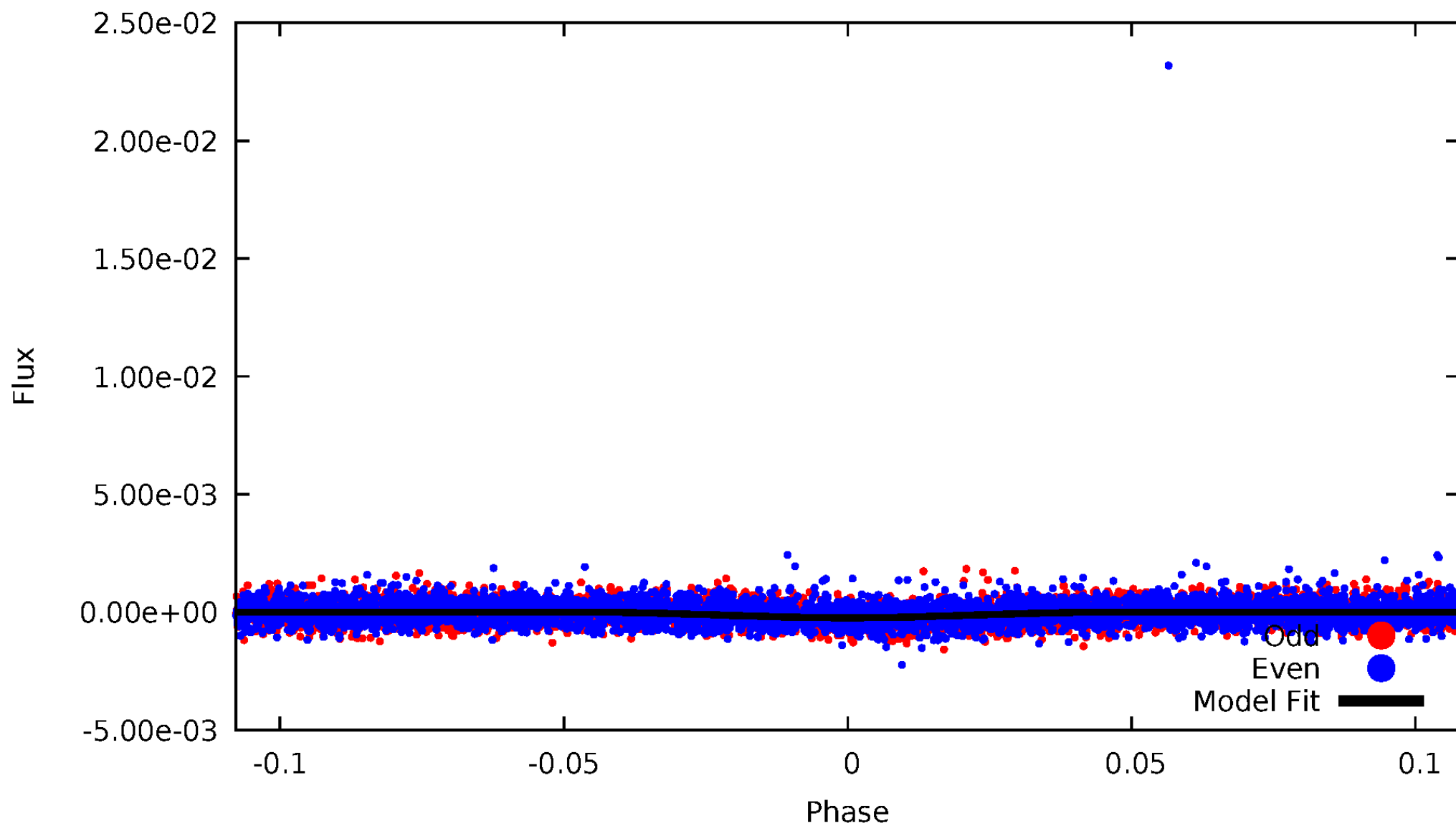


TCE 012170648-01



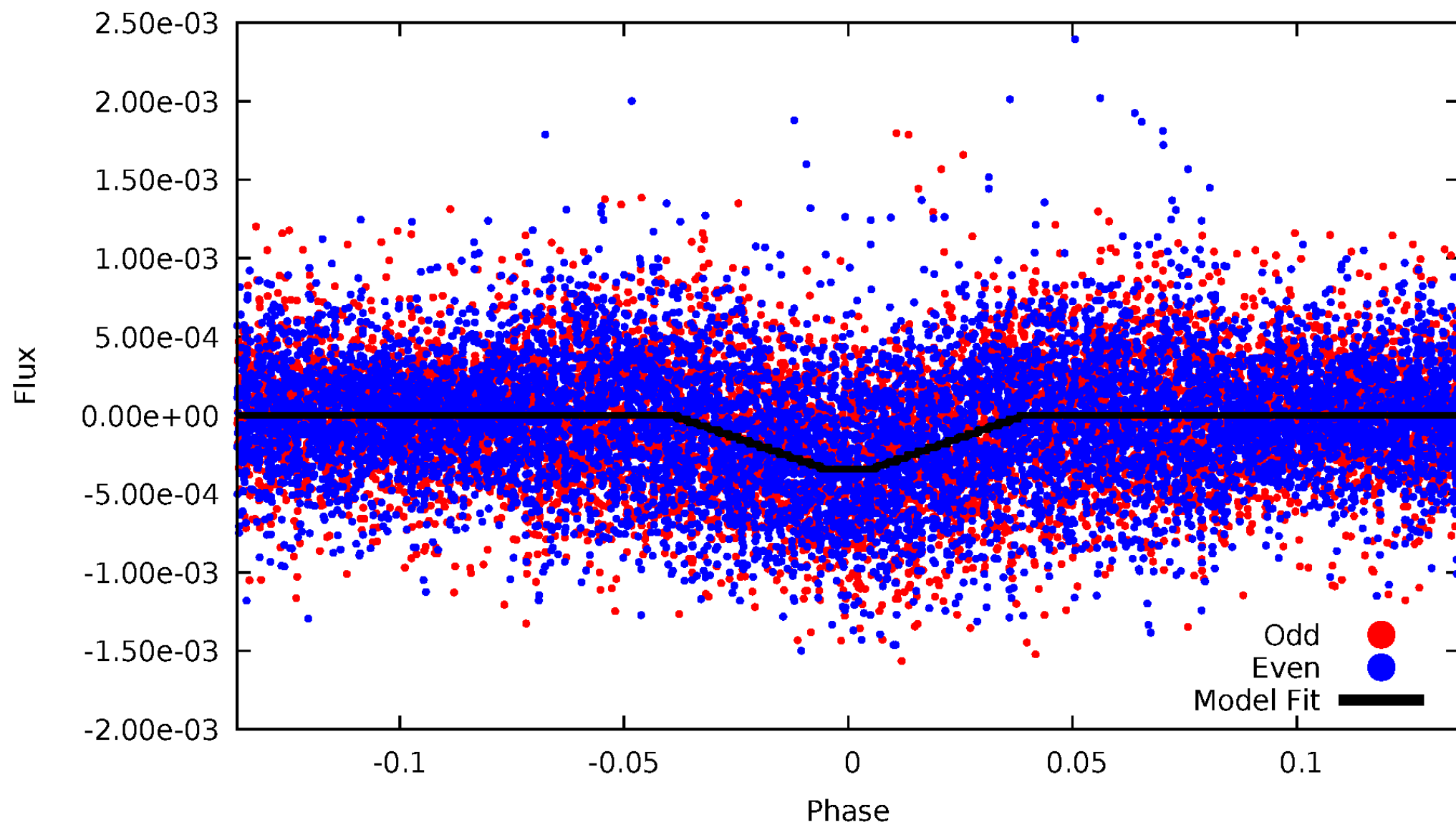
DV Odd/Even

TCE 012170648-01

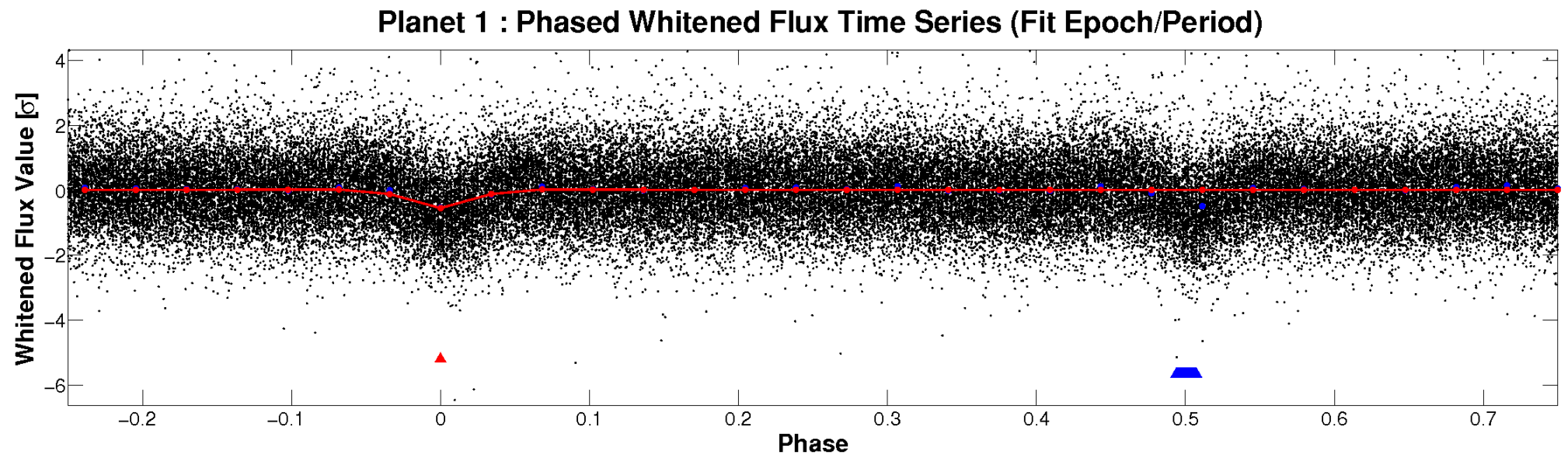
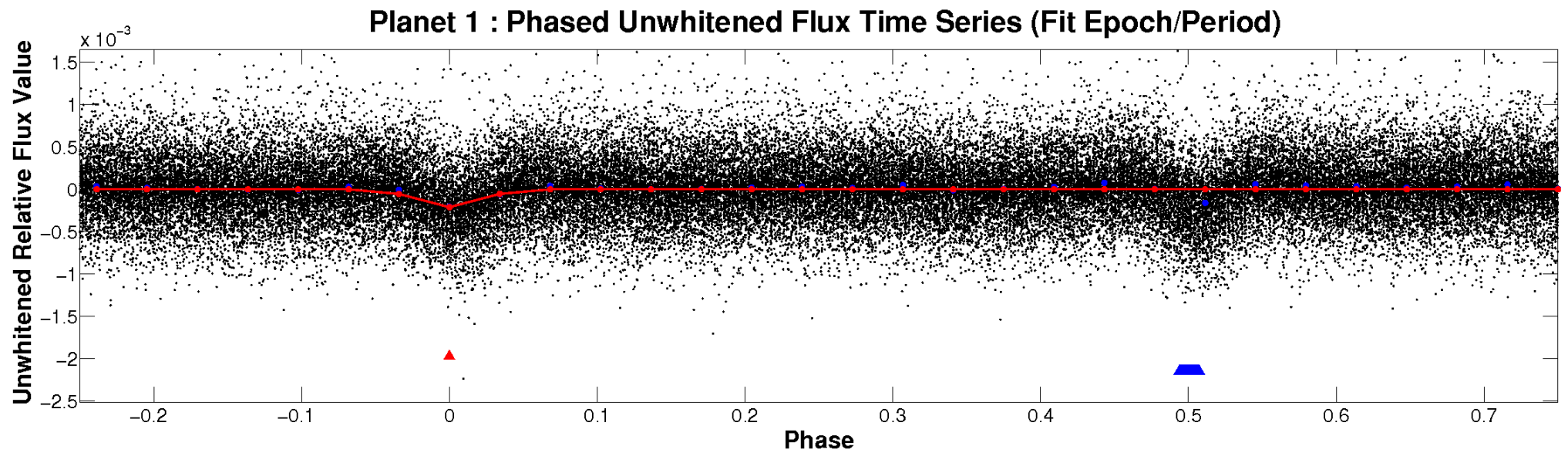


ALT Odd/Even

TCE 012170648-01

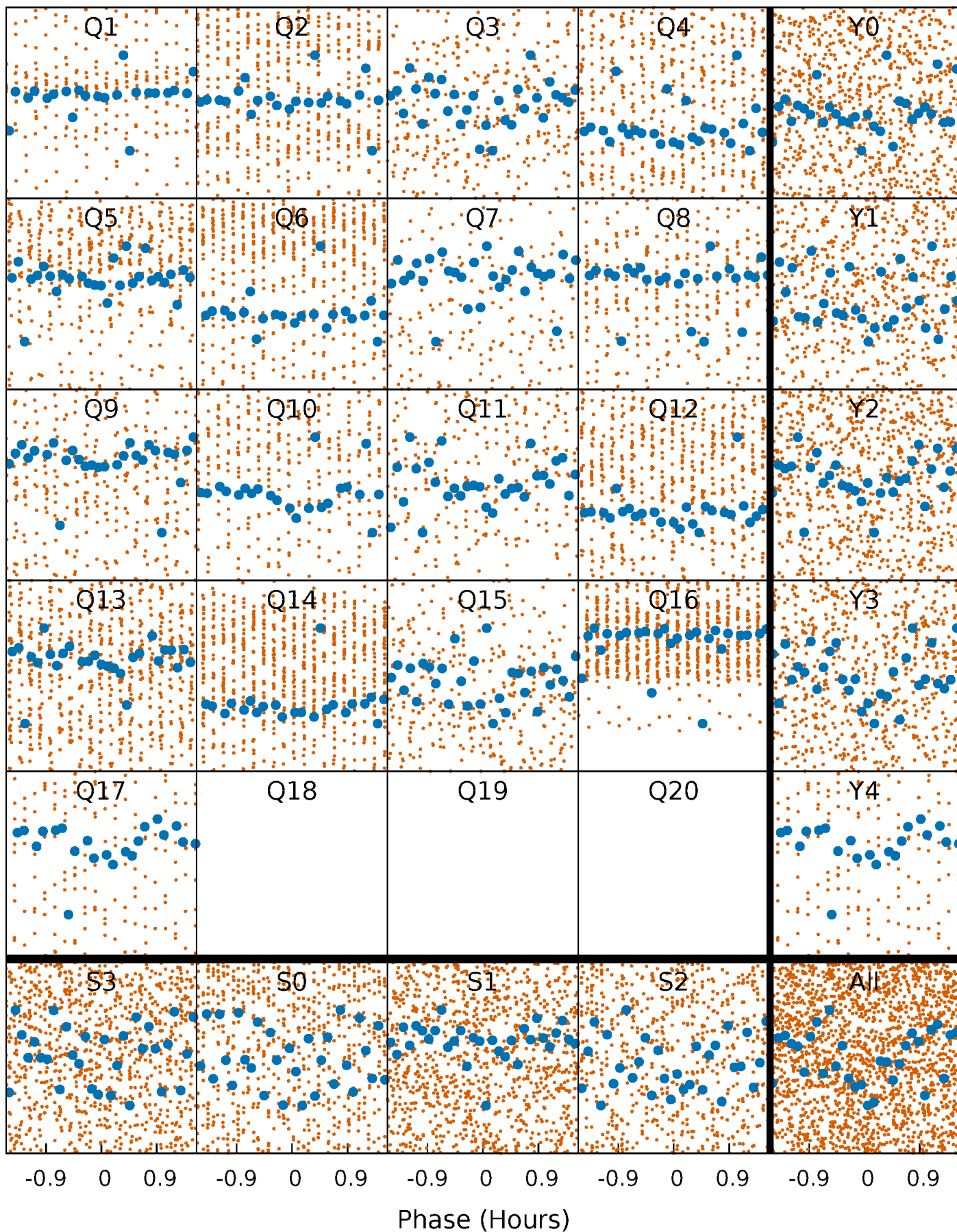


Non-Whitened Vs. Whitened Light Curve



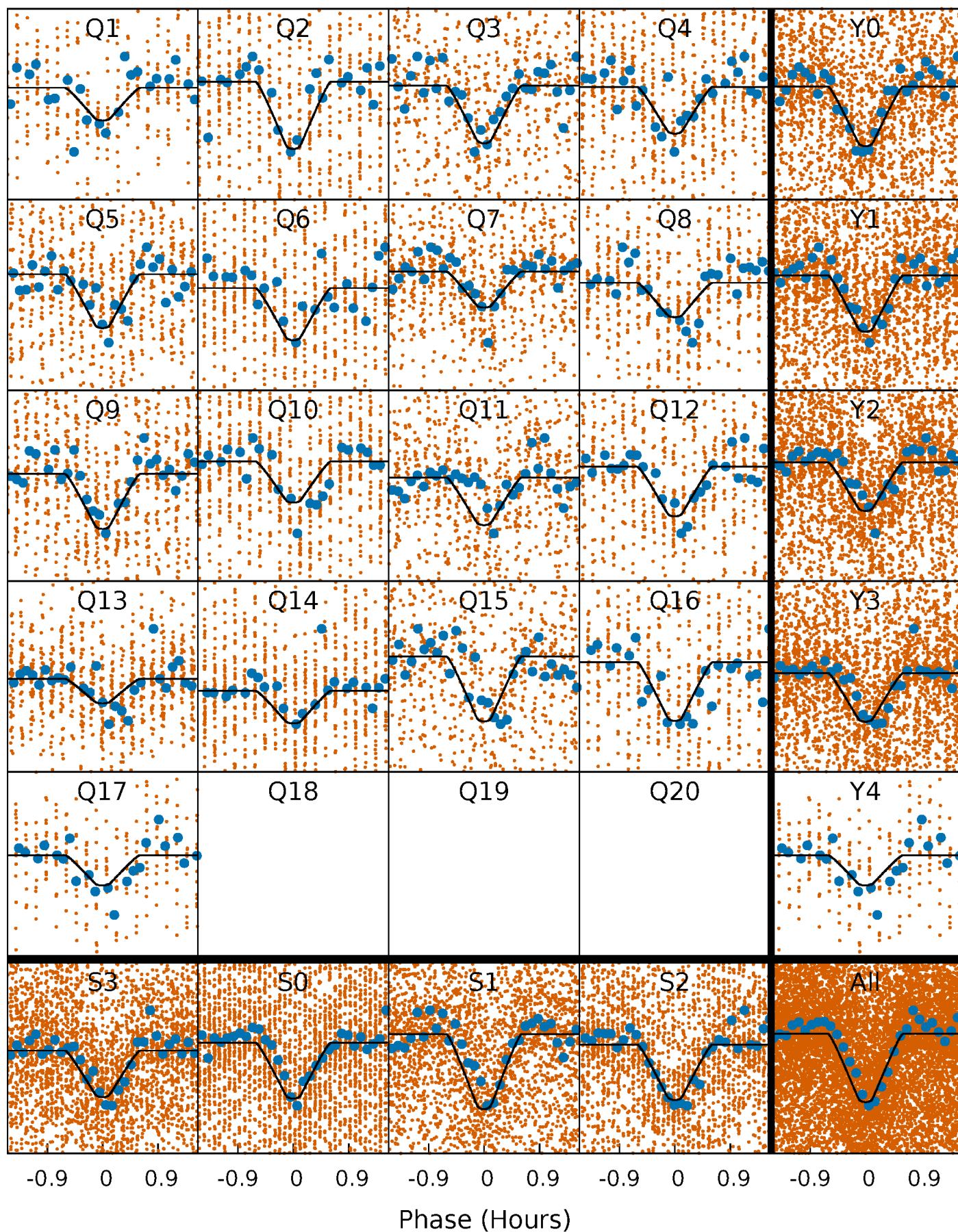
PDC Quarter-Phased Transit Curves

TCE 012170648-01 P= 0.599391 Days $T_0=132.019395$ (BKJD)



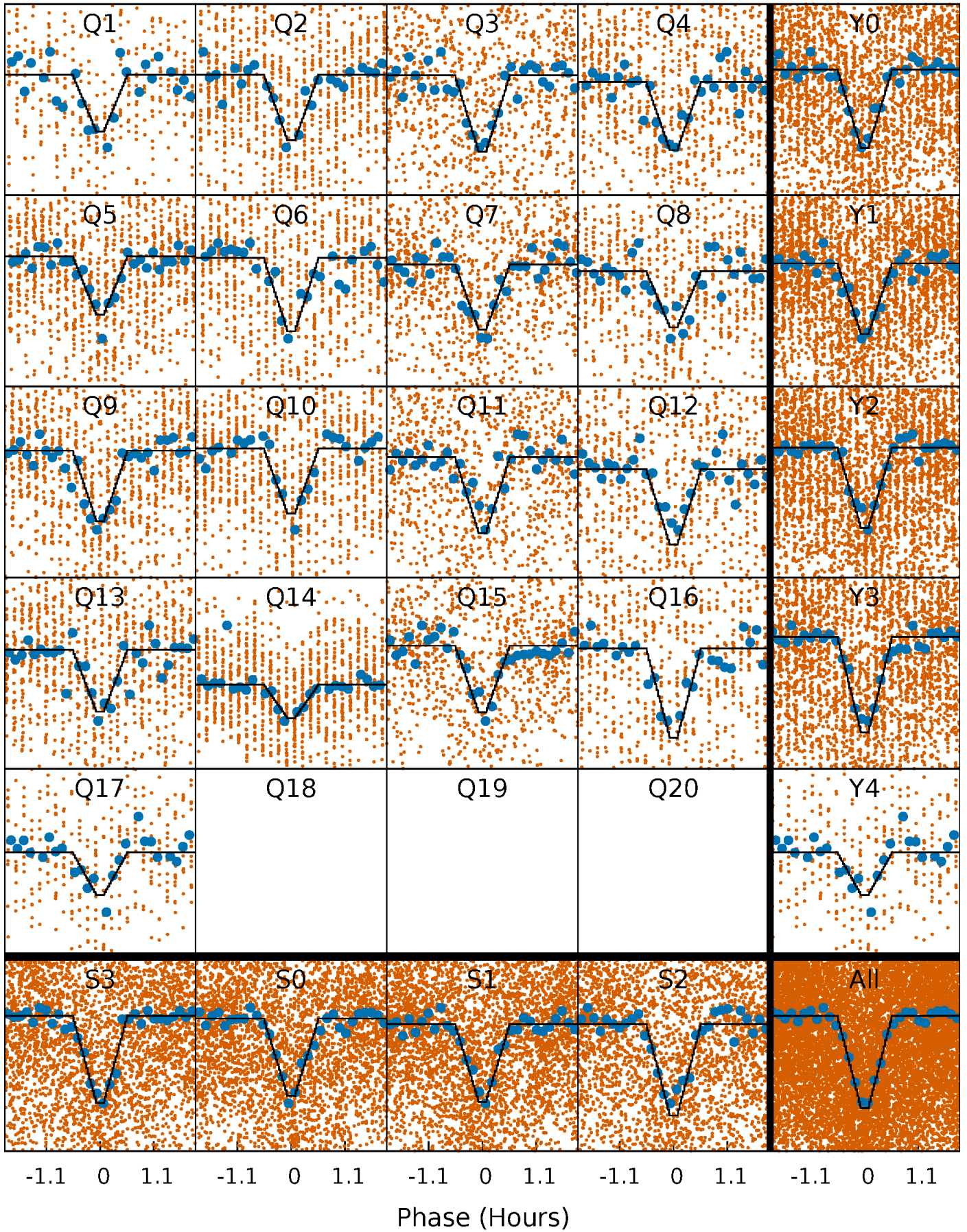
DV Quarter-Phased Transit Curves

TCE 012170648-01 P= 0.599391 Days $T_0=132.019395$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

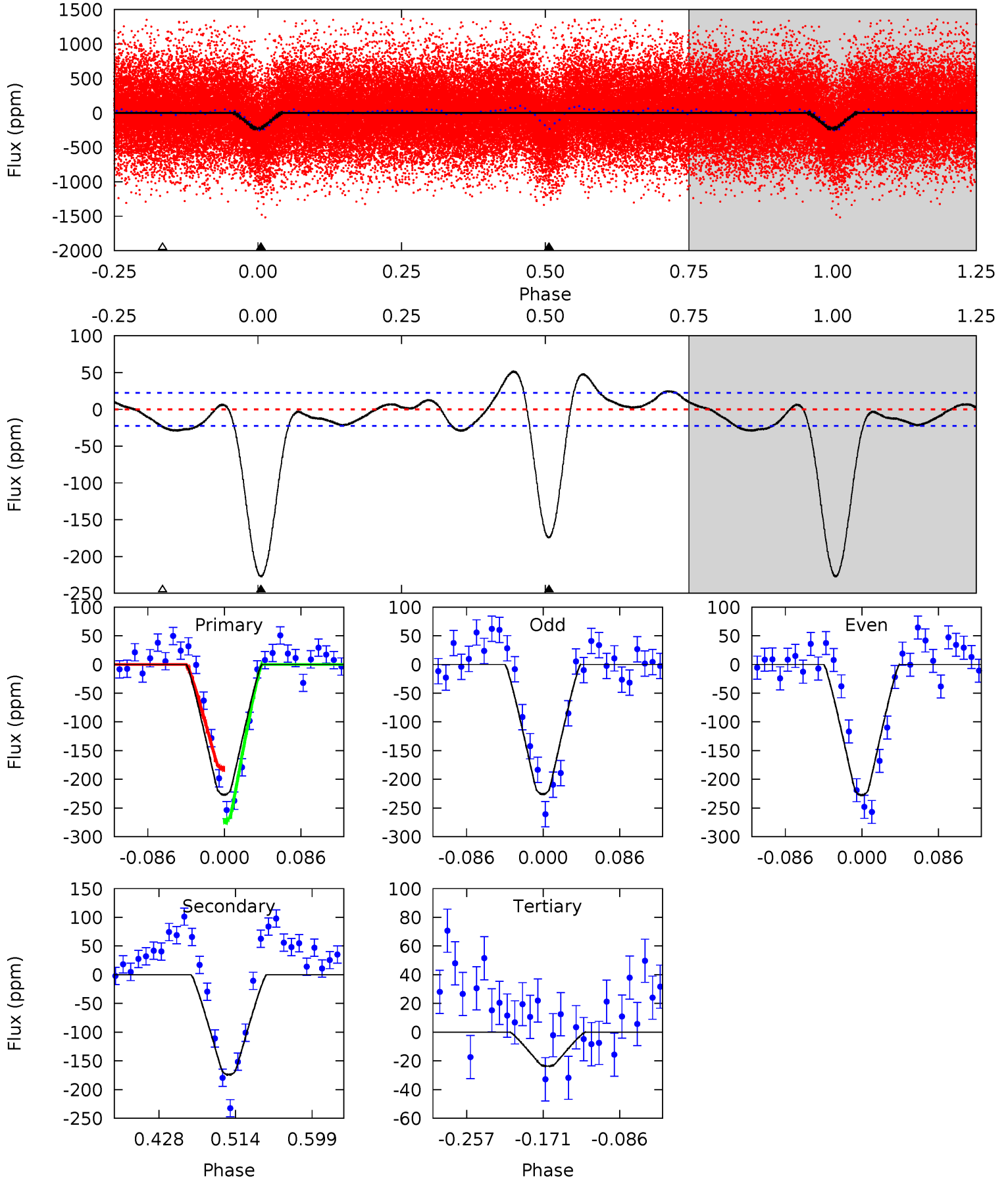
TCE 012170648-01 P= 0.599394 Days $T_0=132.018844$ (BKJD)



DV Model-Shift Uniqueness Test

012170648-01, P = 0.599391 Days, E = 131.420004 Days

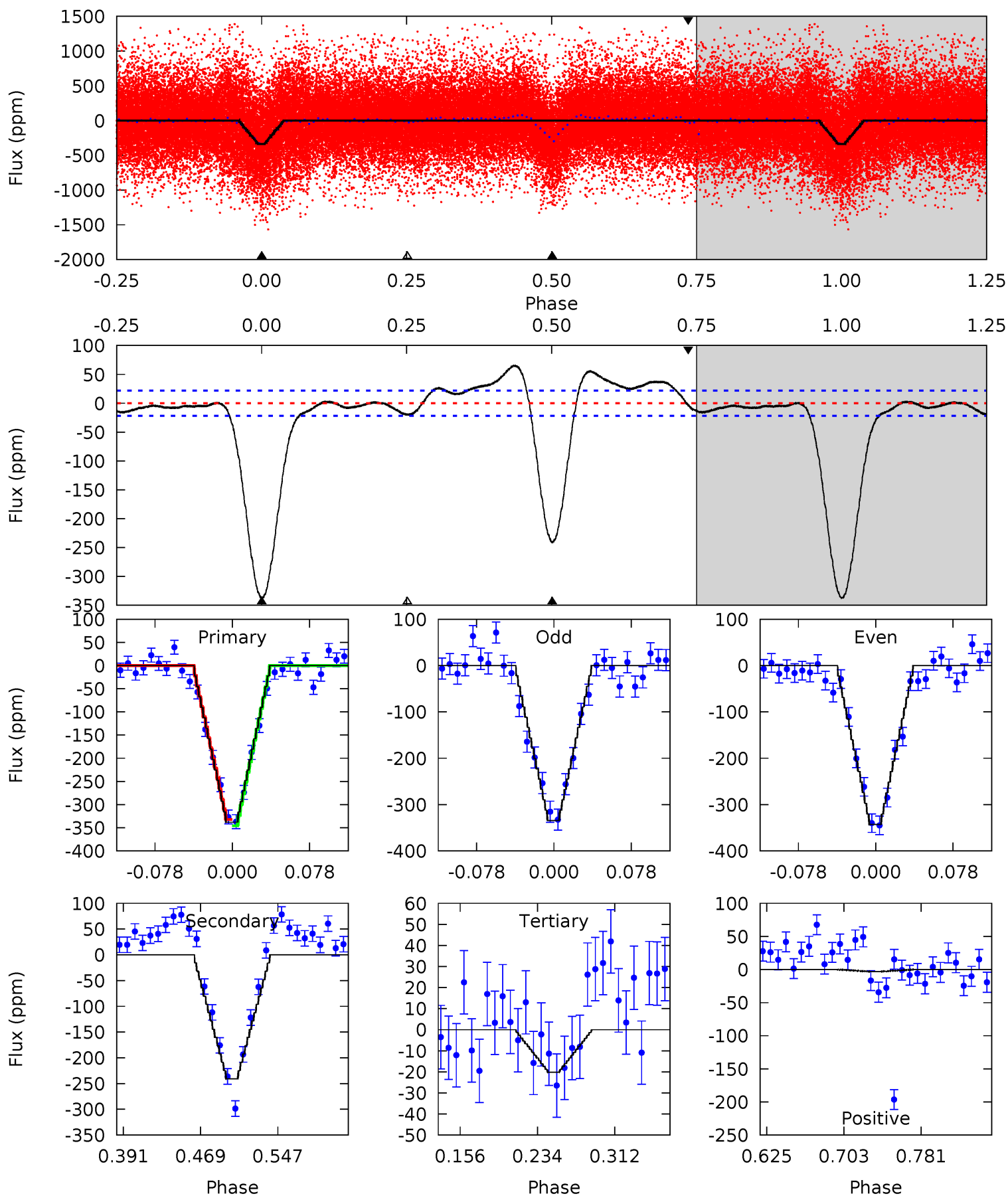
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
46.4	35.6	4.84	0	4.60	1.72	3.11	41.6	46.4	30.8	35.6	0.17	0.98	0.18	9.38



Alt Model-Shift Uniqueness Test

012170648-01, P = 0.599394 Days, E = 131.419450 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
71.7	51.1	4.27	-0.67	4.62	1.76	4.02	67.4	72.4	46.8	51.7	0.94	0.96	0.16	1.41



Stellar Parameters For KIC 012170648

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5180^{+154}_{-154}	$4.547^{+0.058}_{-0.071}$	$-0.120^{+0.300}_{-0.300}$	$0.782^{+0.090}_{-0.074}$	$0.787^{+0.089}_{-0.067}$	$2.313^{+0.595}_{-0.565}$
	+3%/-3%	+1%/-2%	+250%/-250%	+12%/-9%	+11%/-9%	+26%/-24%
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 012170648-01 / KOI 2875.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-174 ± 5	$1.47^{+0.55}_{-0.51}$	2498^{+95}_{-91}	4598^{+964}_{-526}	$7.324^{+10.038}_{-3.438}$
Alt.	-241 ± 5	$1.59^{+0.54}_{-0.53}$	2498^{+98}_{-97}	4775^{+987}_{-534}	$8.675^{+10.585}_{-3.769}$

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

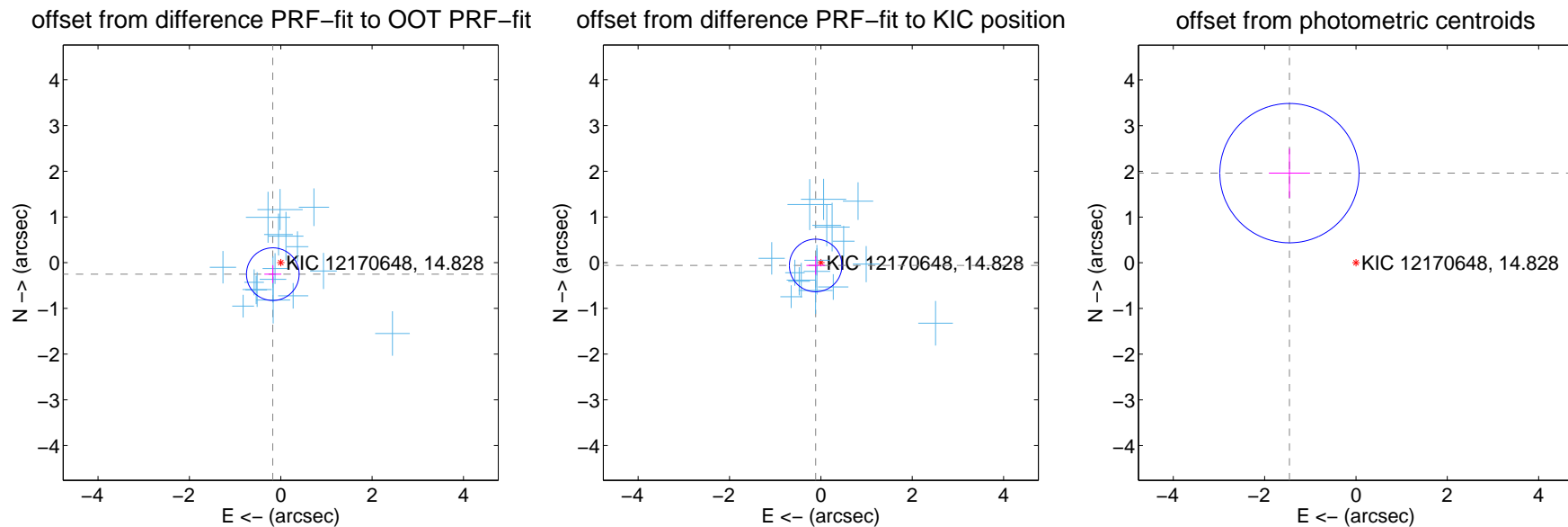
DV Centroid Data

Supplemental centroid analysis for 012170648-01. Kepler magnitude: 14.83. Transit SNR 27.92

There are 17 quarters with good PRF difference image offsets

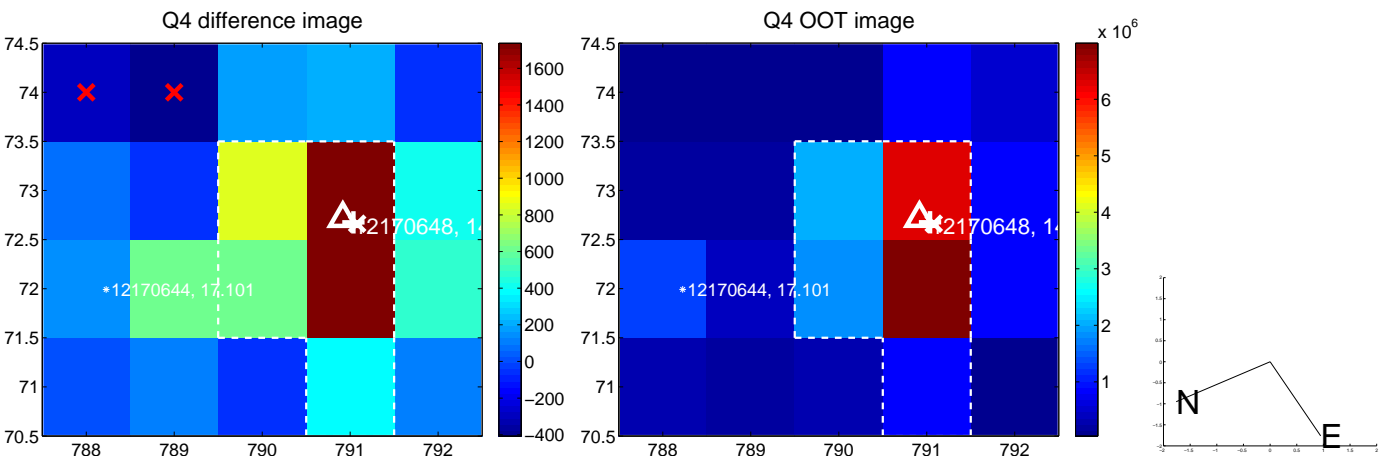
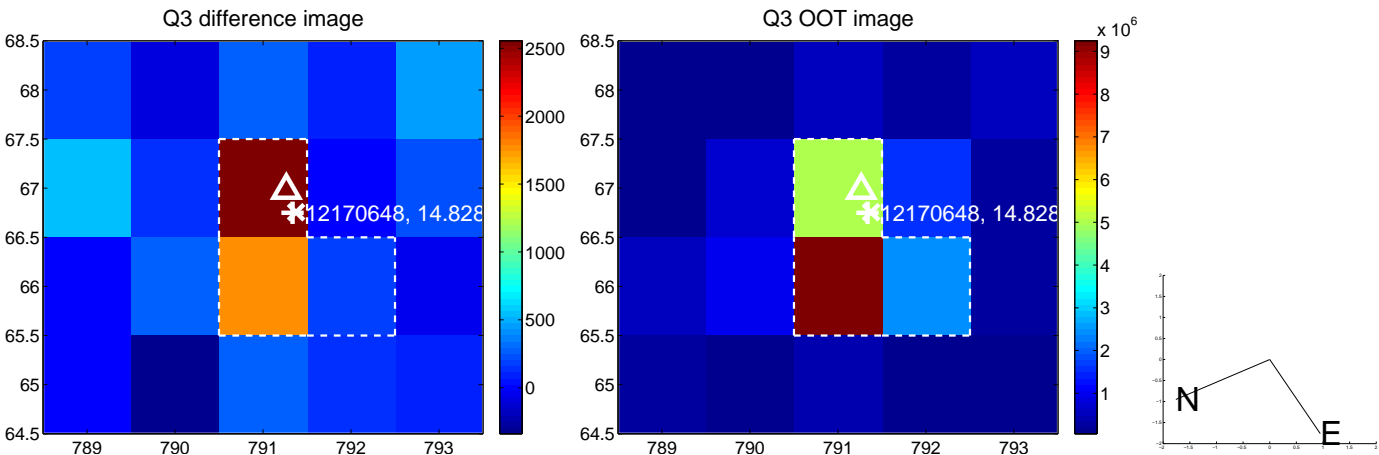
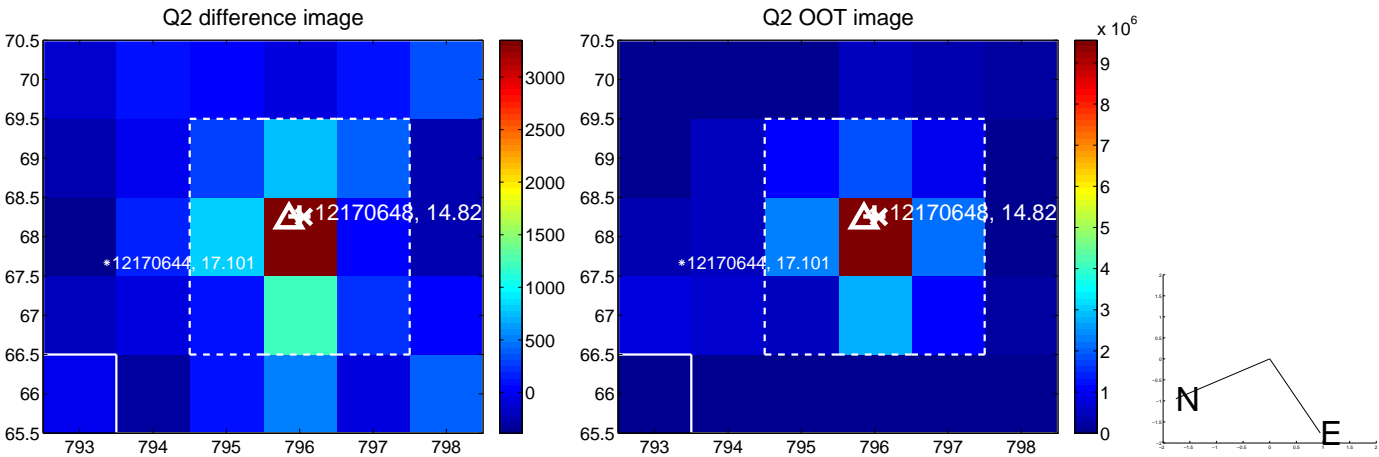
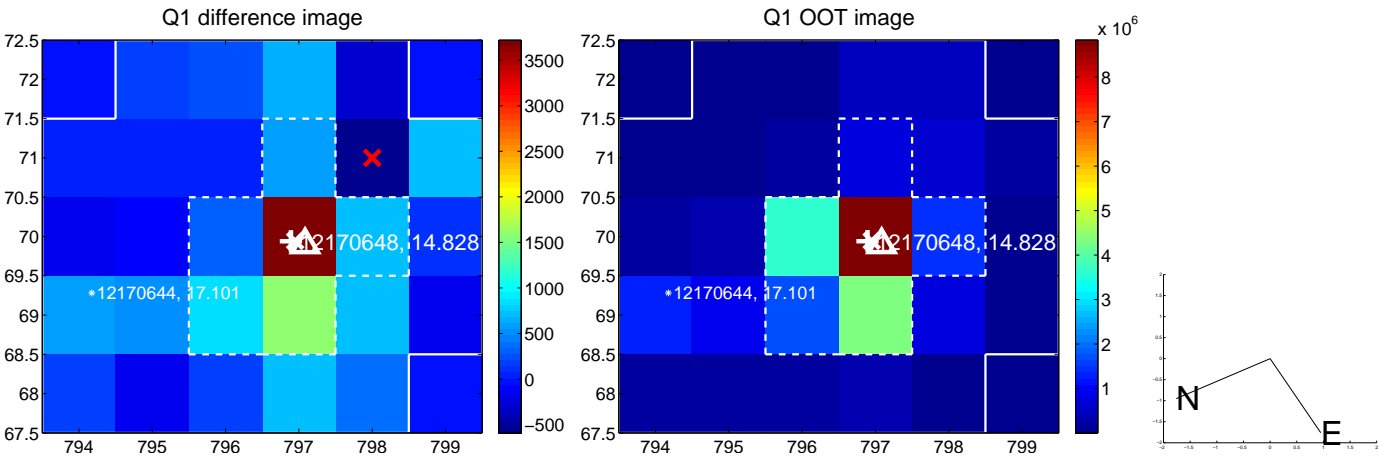
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.305 ± 0.192	1.59	0.174 ± 0.185	-0.251 ± 0.195
PRF-fit source offset from KIC position	0.129 ± 0.192	0.67	0.114 ± 0.203	-0.060 ± 0.201
photometric centroid source offset	2.44 ± 0.51	4.81	1.46 ± 0.45	1.96 ± 0.54

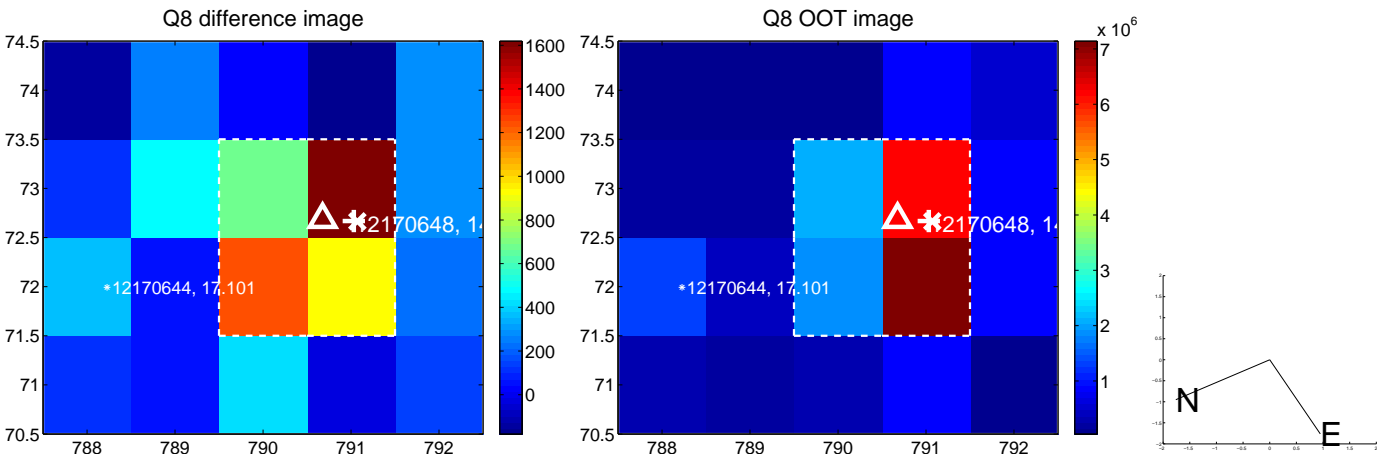
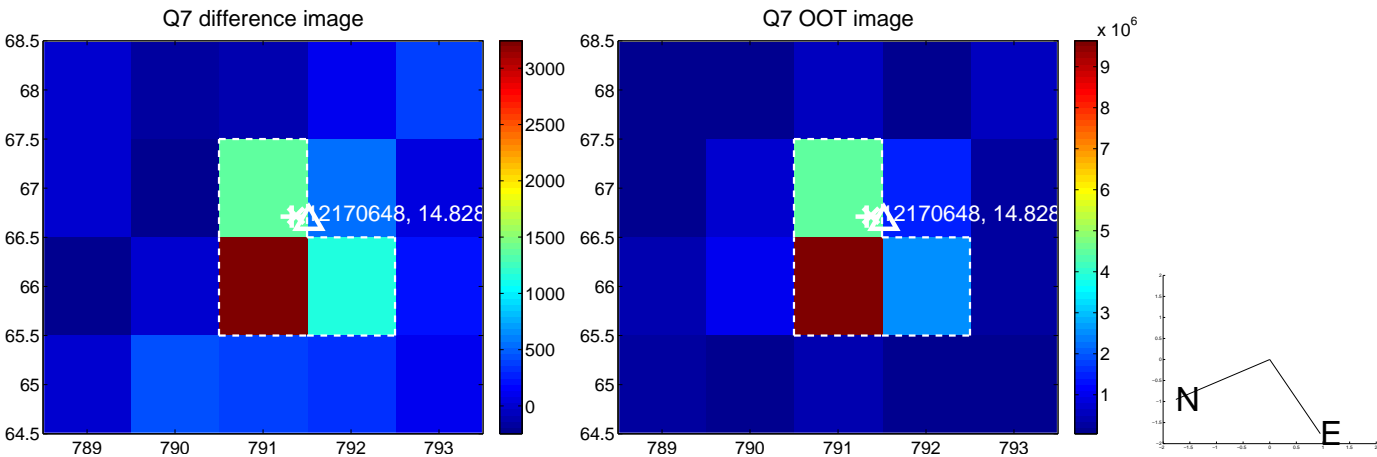
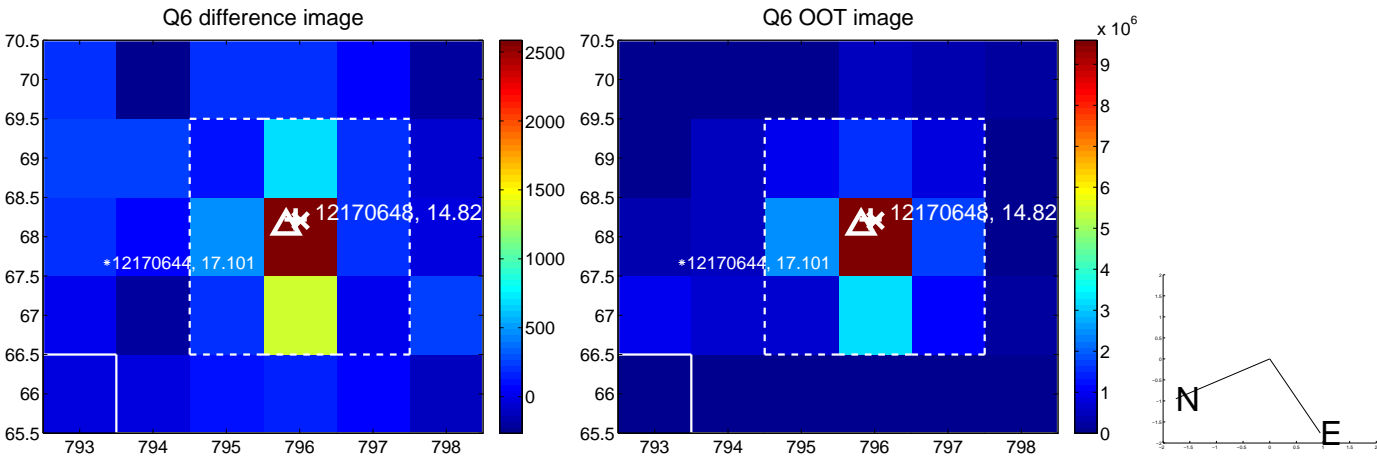
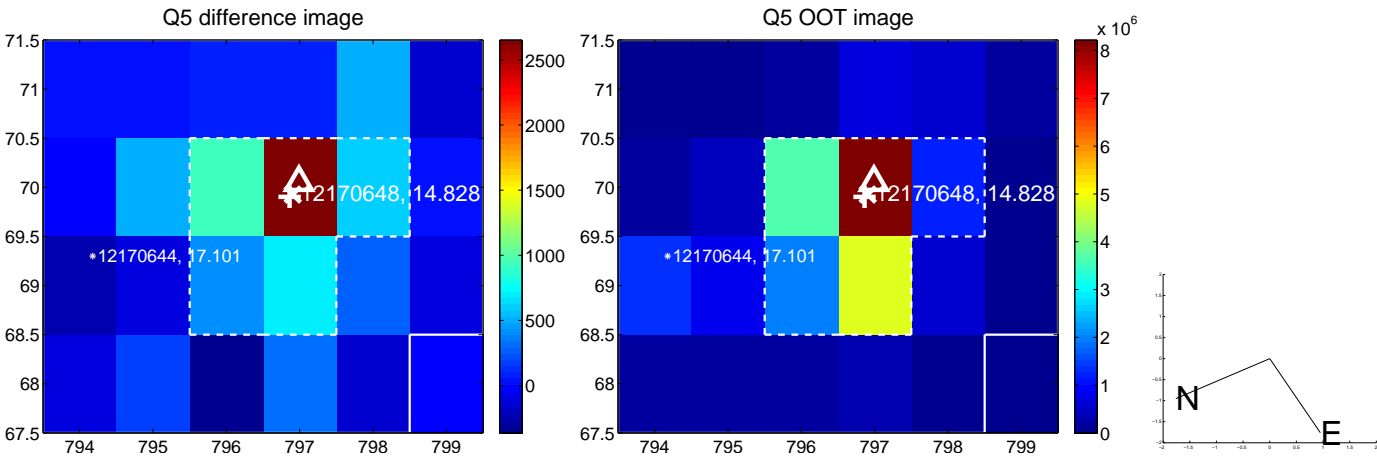


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

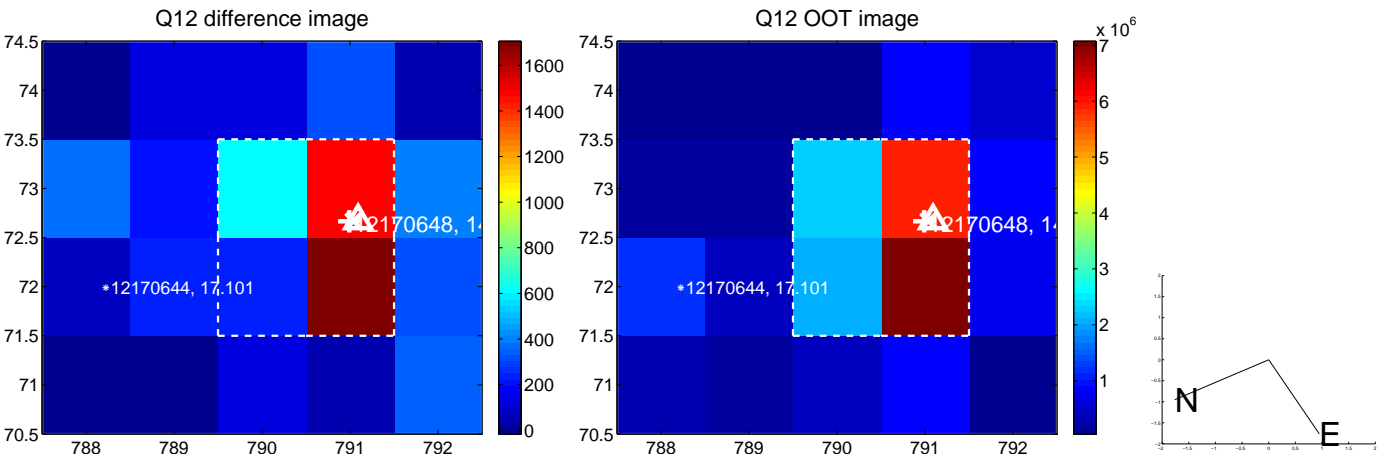
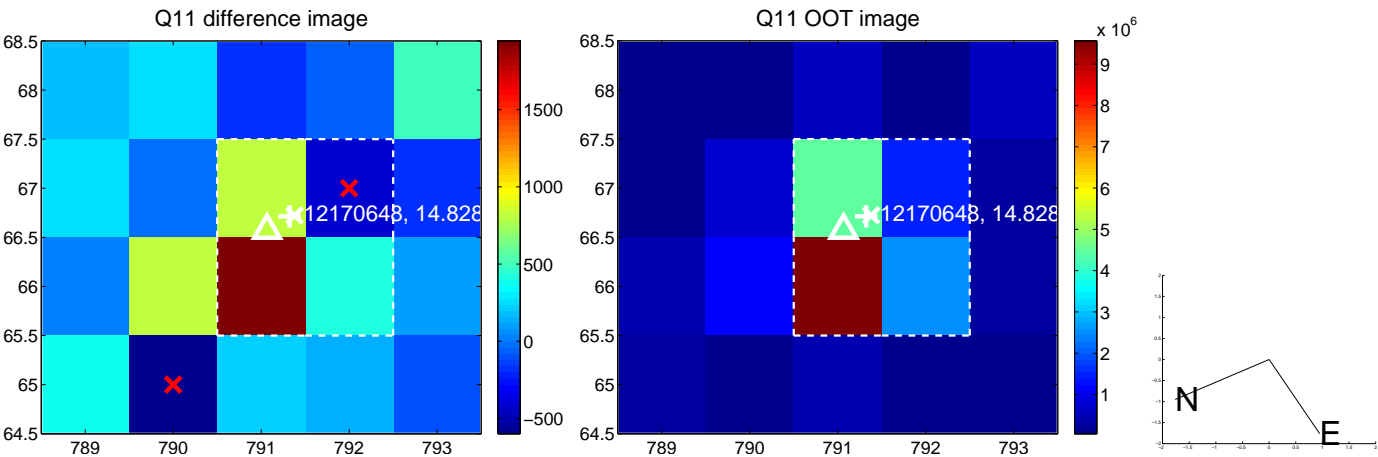
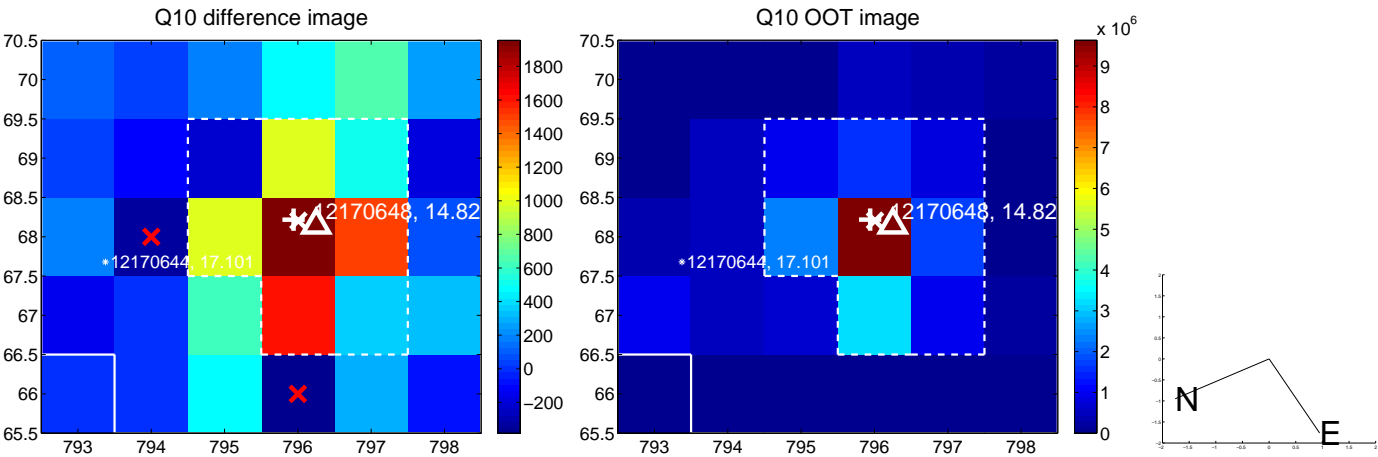
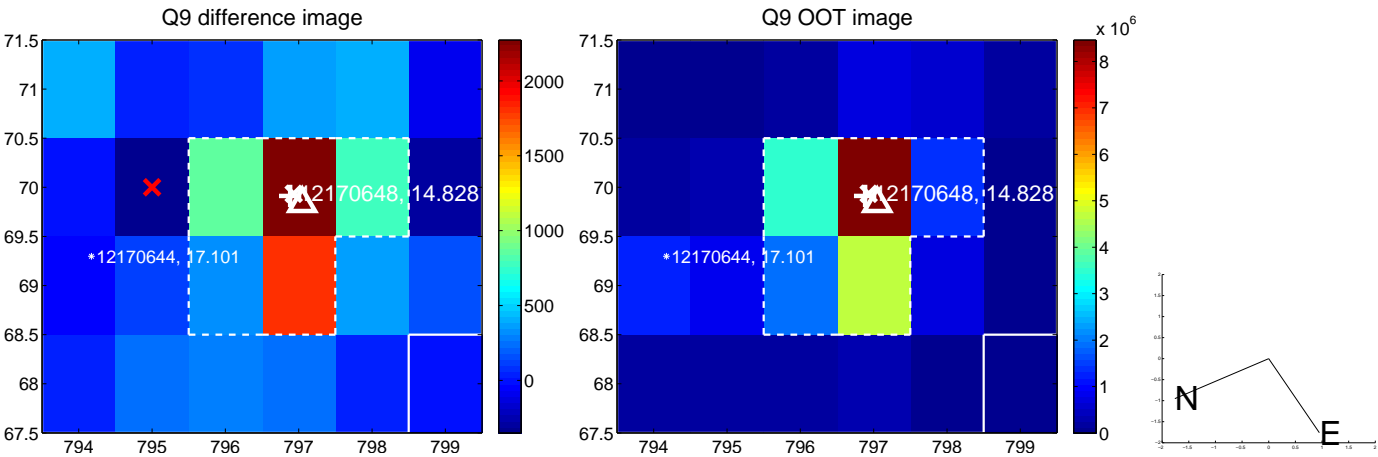
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



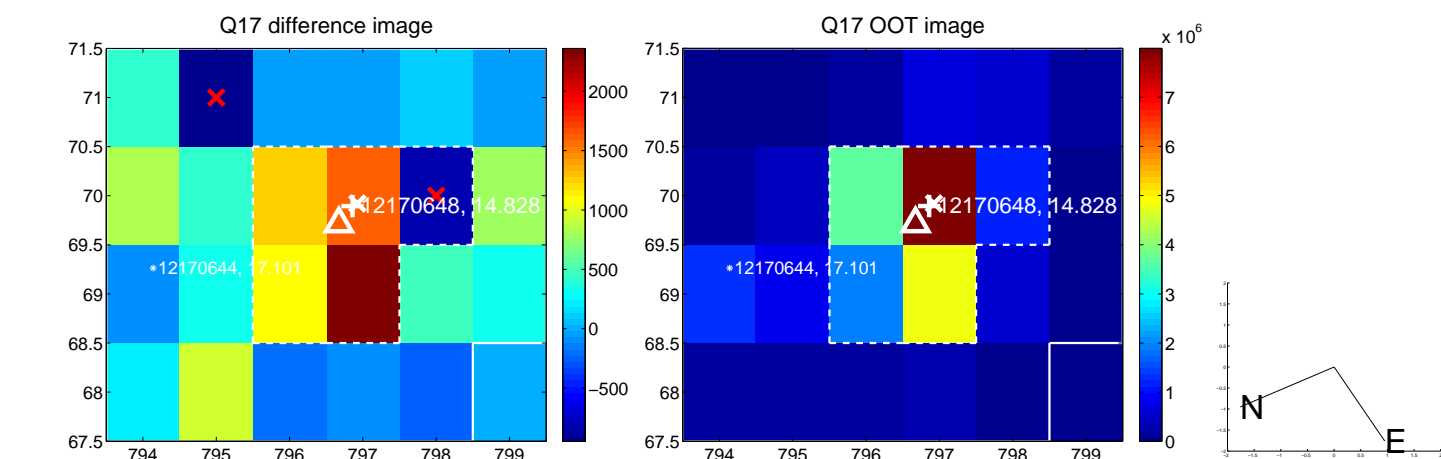
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



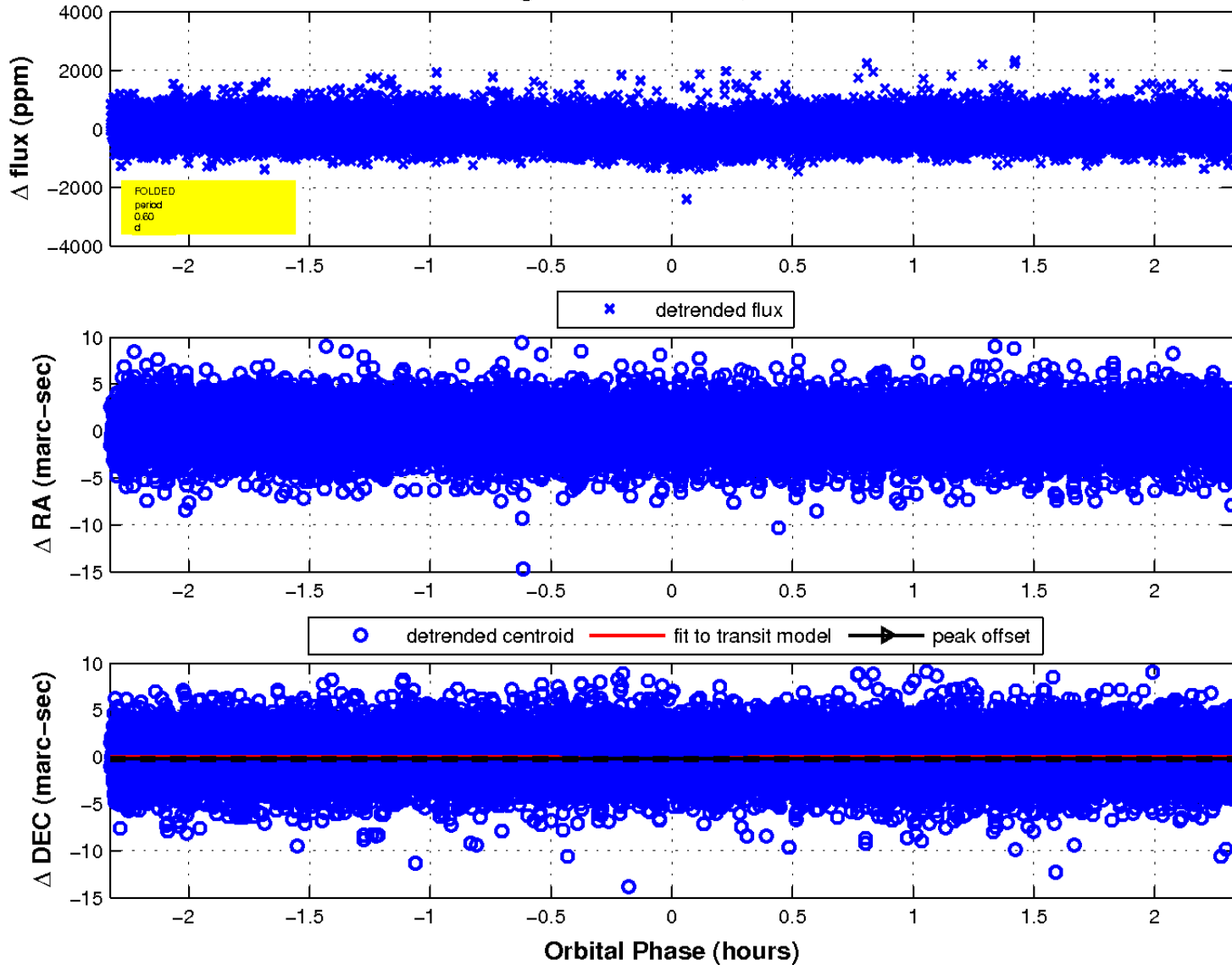
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

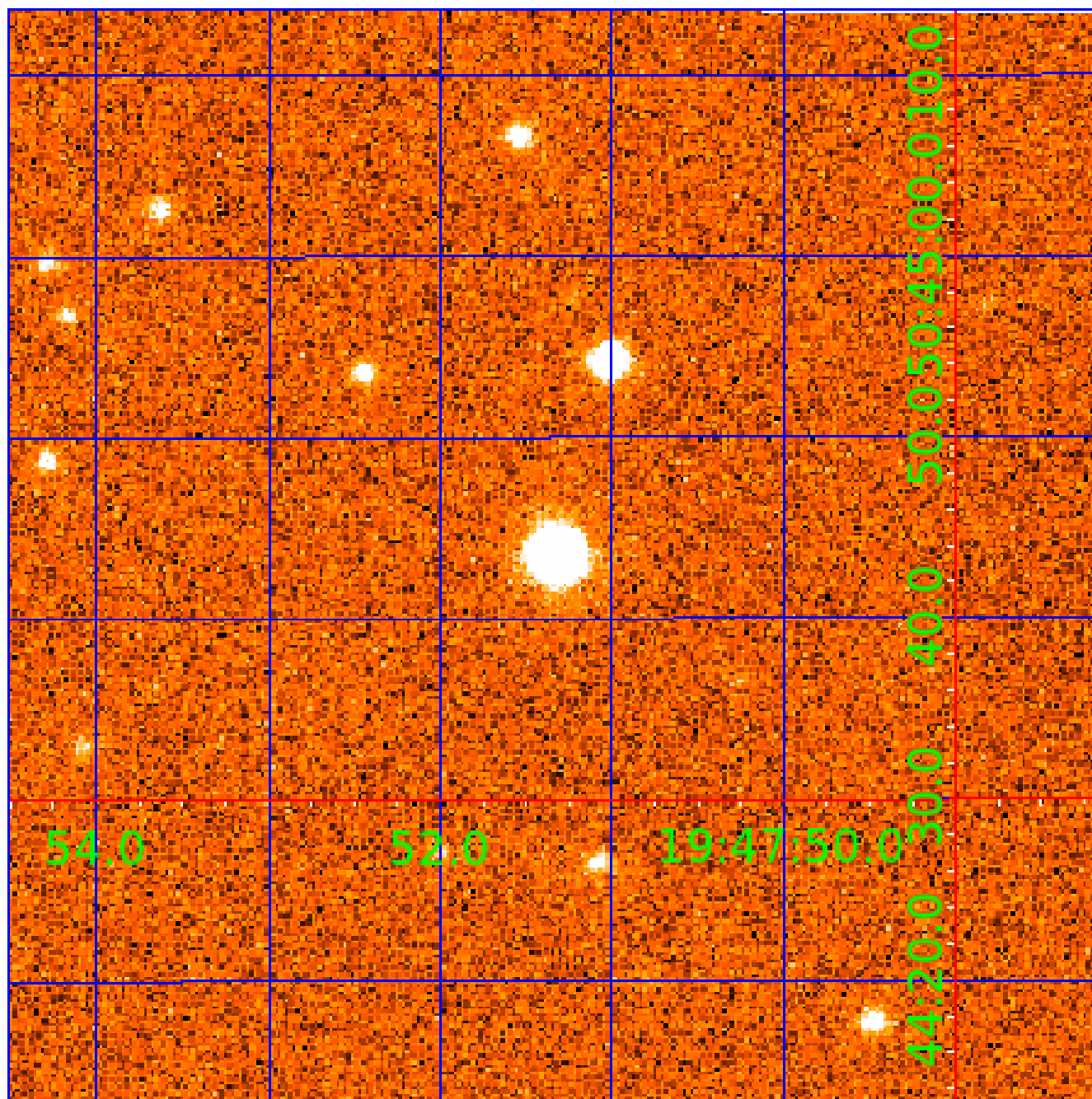


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 012170648

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})
012170648-01	OBS	2875.01	0.599391	132.019395	234.8	0.775	17.6	27.9	0.78	5180	1.48	2391.87
012170648-02	OBS	No	0.599394	131.716013	272.2	0.605	19.3	30.7	0.78	5180	1.31	2391.85

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012170648-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
012170648-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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 012170648-02

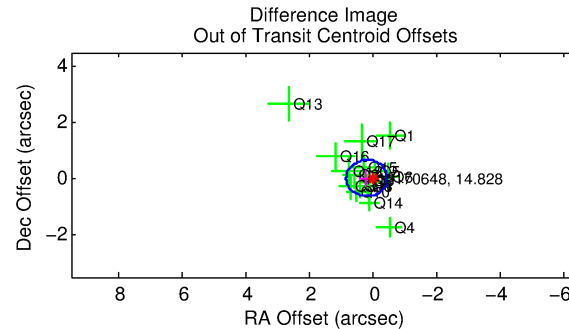
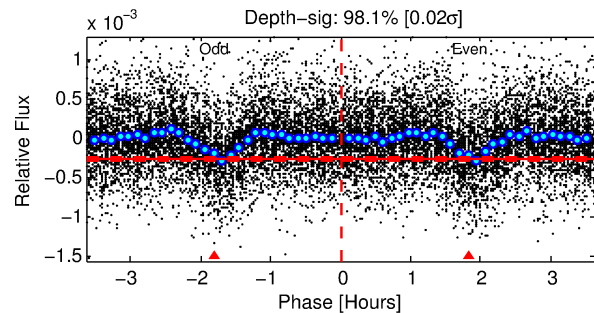
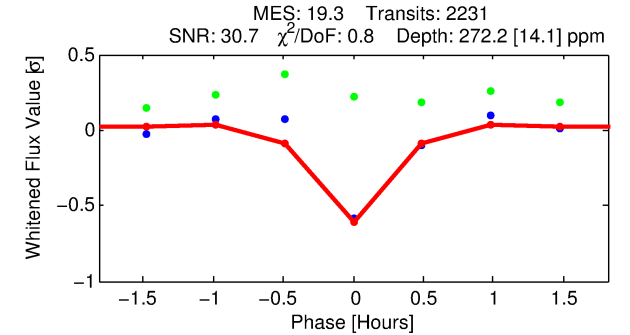
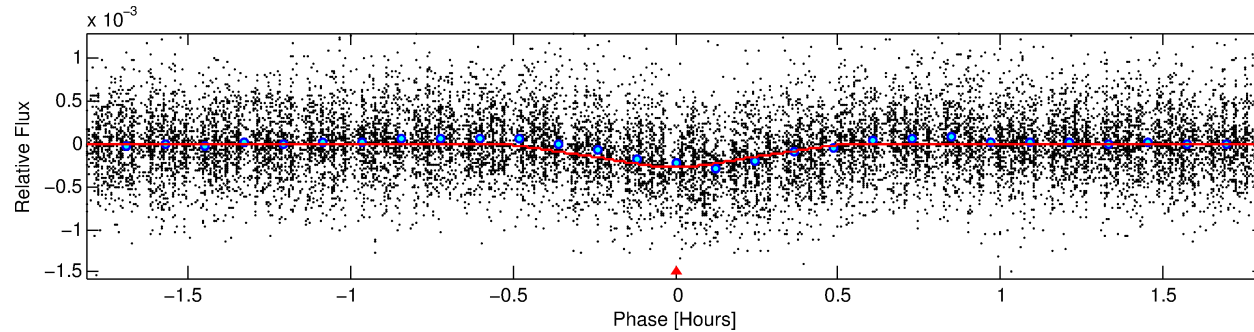
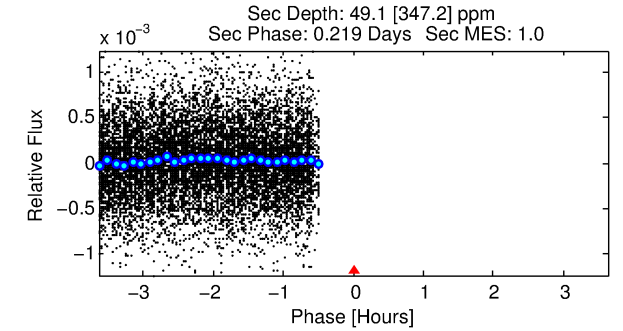
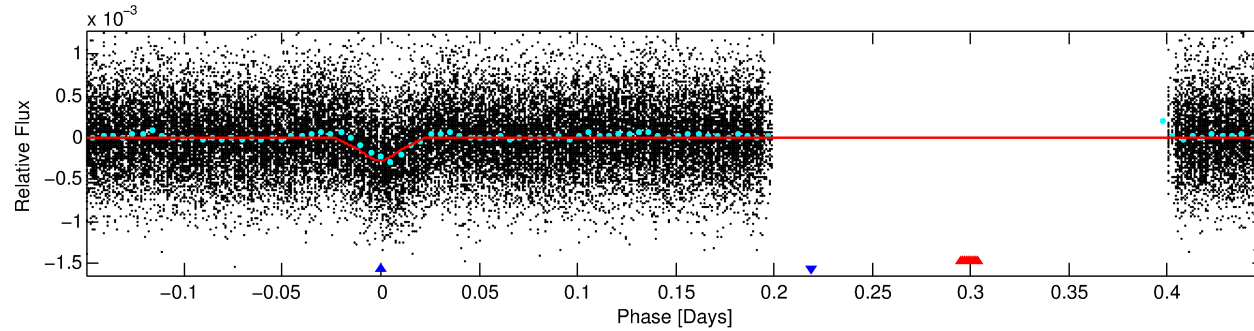
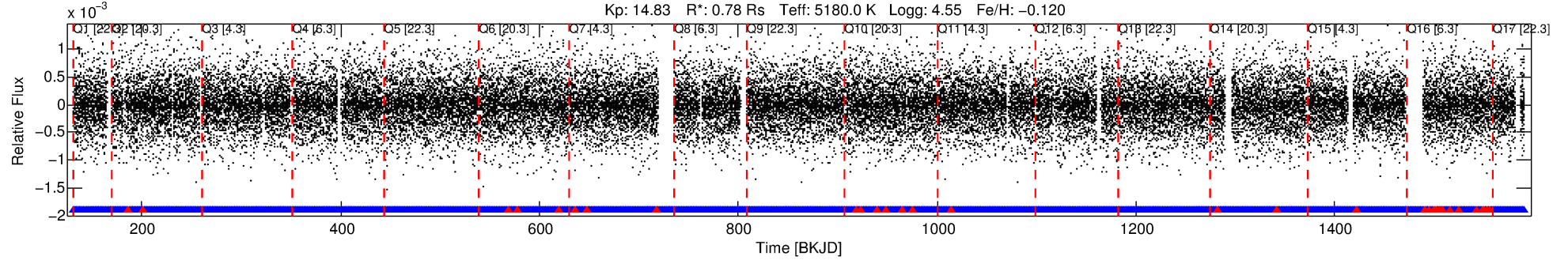
No Significant Match Found

DV One-Page Summary

KIC: 12170648 Candidate: 2 of 2 Period: 0.599 d

KOI: K02875 Corr: No Ephemeris Match

Kp: 14.83 R*: 0.78 Rs Teff: 5180.0 K Logg: 4.55 Fe/H: -0.120



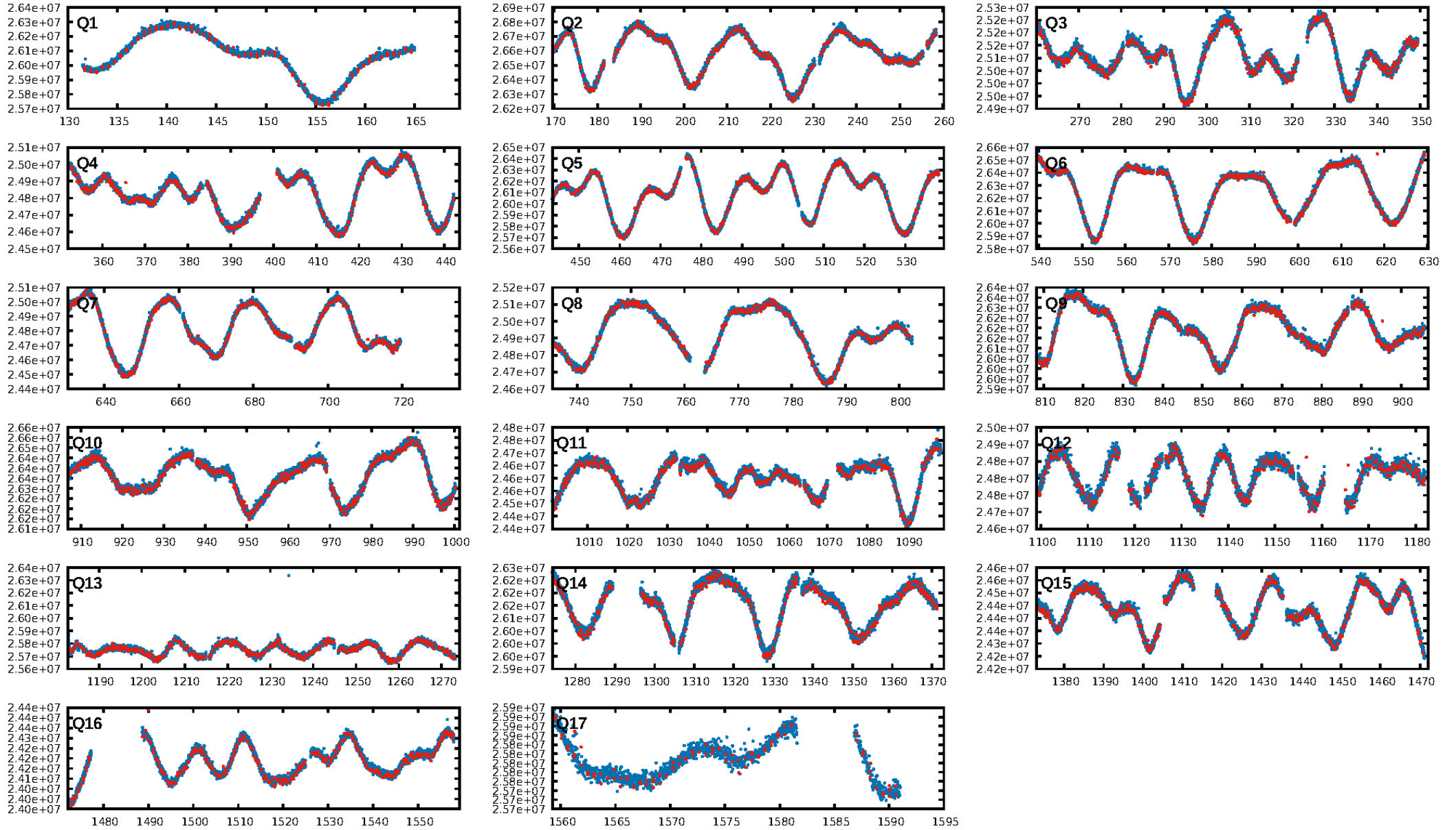
DV Fit Results:

Period = 0.59939 [0.00000] d
Epoch = 131.7160 [0.0004] BKJD
Rp/R* = 0.0153 [0.0095]
a/R* = 7.63 [17.34]
b = 0.14 [15.94]
Seff = 2391.85 [427.25]
Teq = 1783 [80] K
Rp = 1.31 [0.82] Re
a = 0.0128 [0.0012] AU
Ag = 2.60 [18.70] [0.09σ]
Teffp = 3502 [6286] K [0.27σ]

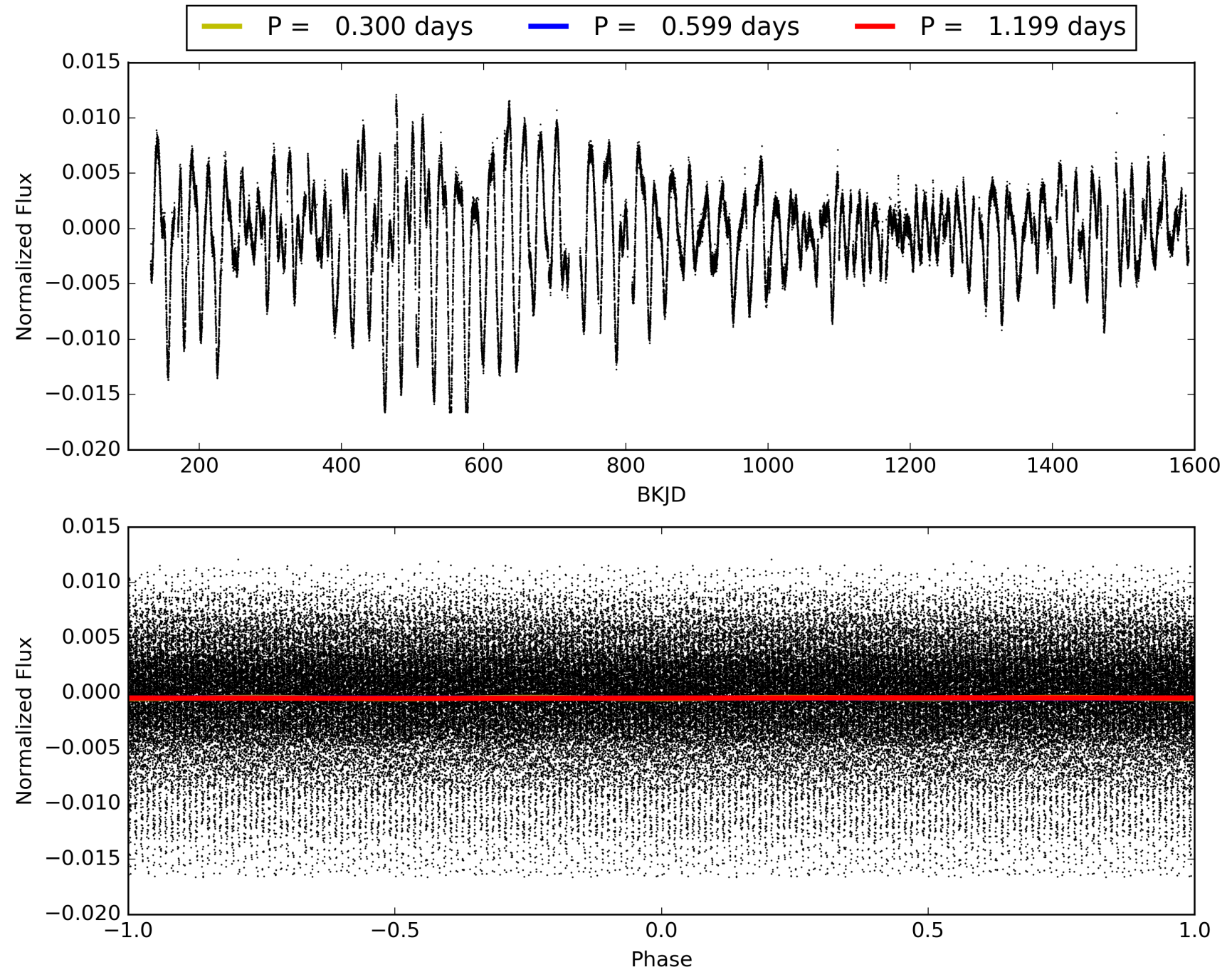
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.34e-91
RollingBand-fgt: 0.98 [2098/2131]
GhostDiagnostic-chr: 4.828
Centroid-sig: N/A
Centroid-so: 2.160 arcsec [4.90σ]
OotOffset-rm: 0.209 arcsec [0.97σ]
KicOffset-rm: 0.244 arcsec [0.85σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.94 [16/17]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 012170648-02, PDC Light Curves

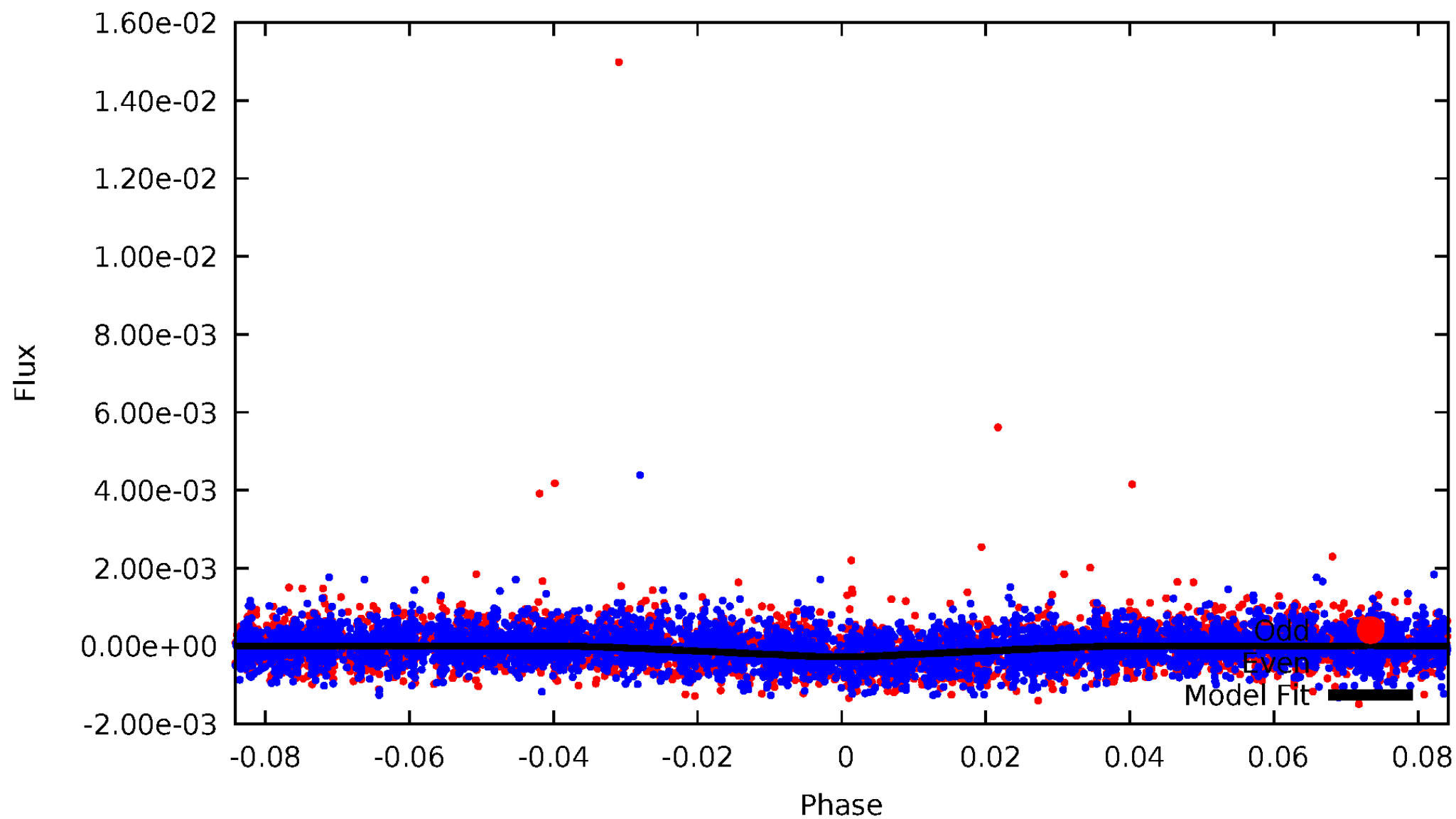


TCE 012170648-02



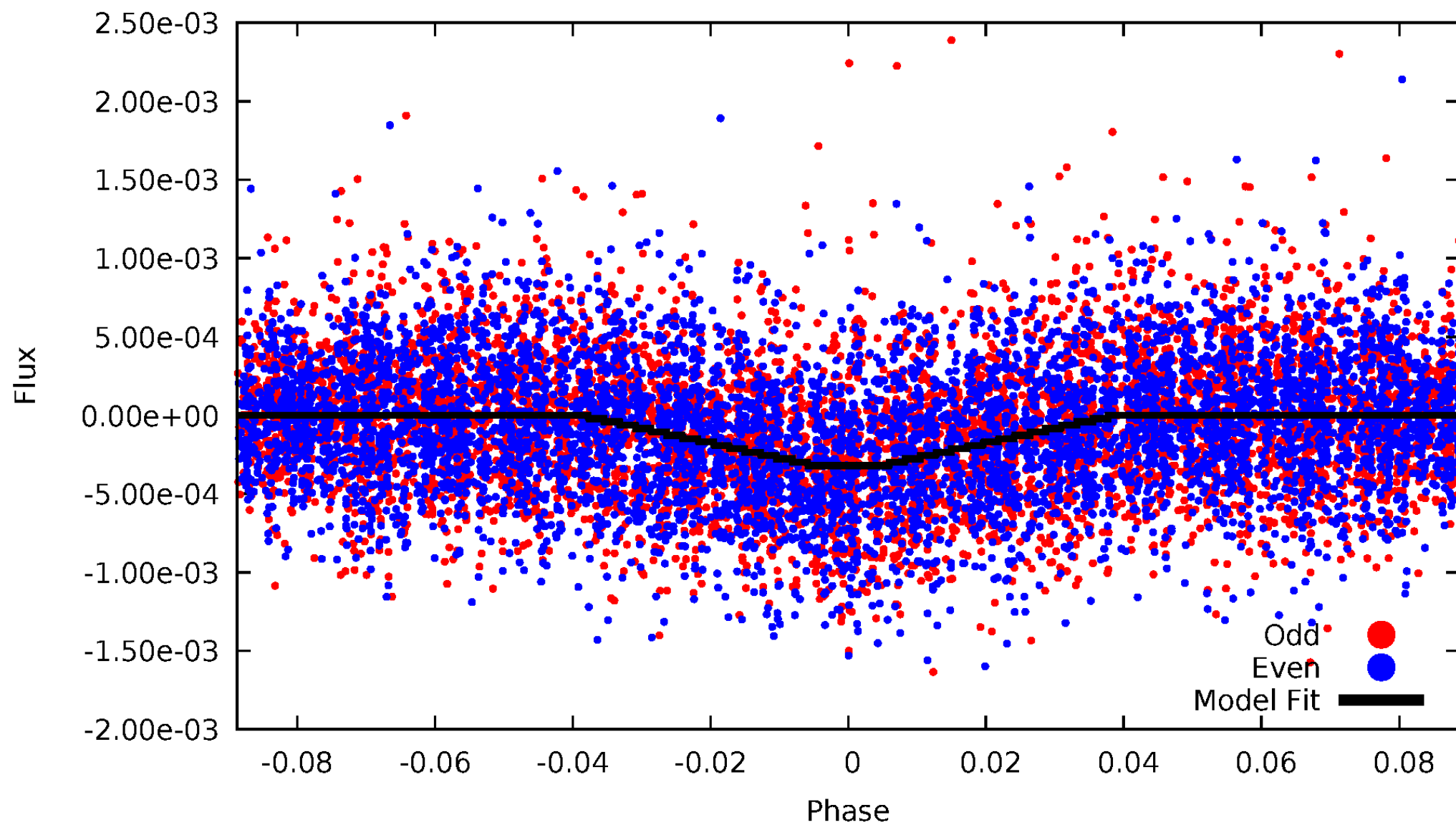
DV Odd/Even

TCE 012170648-02



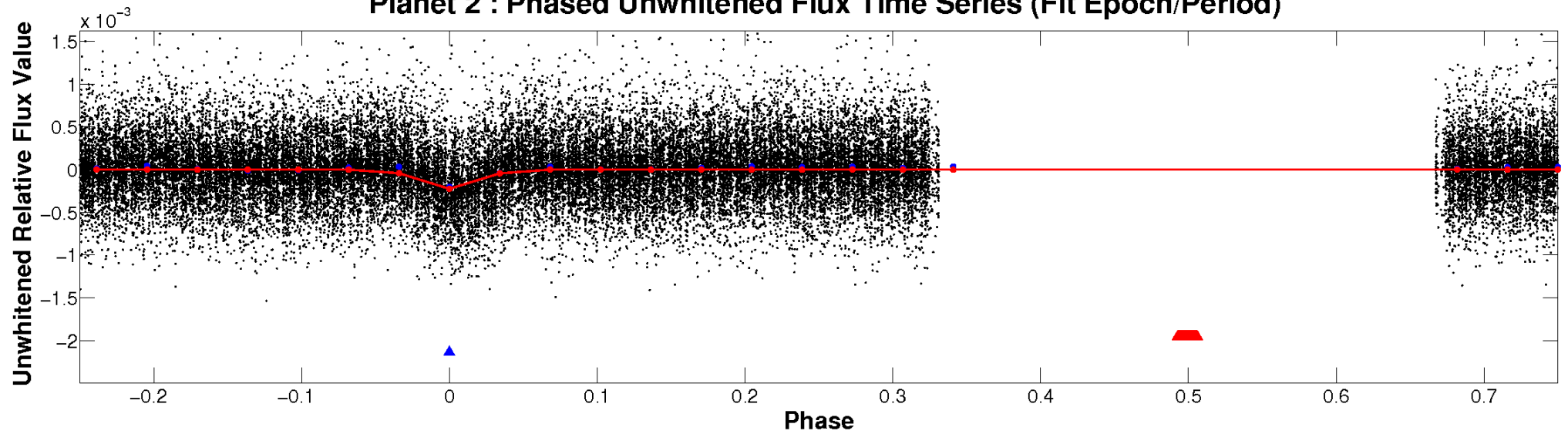
ALT Odd/Even

TCE 012170648-02

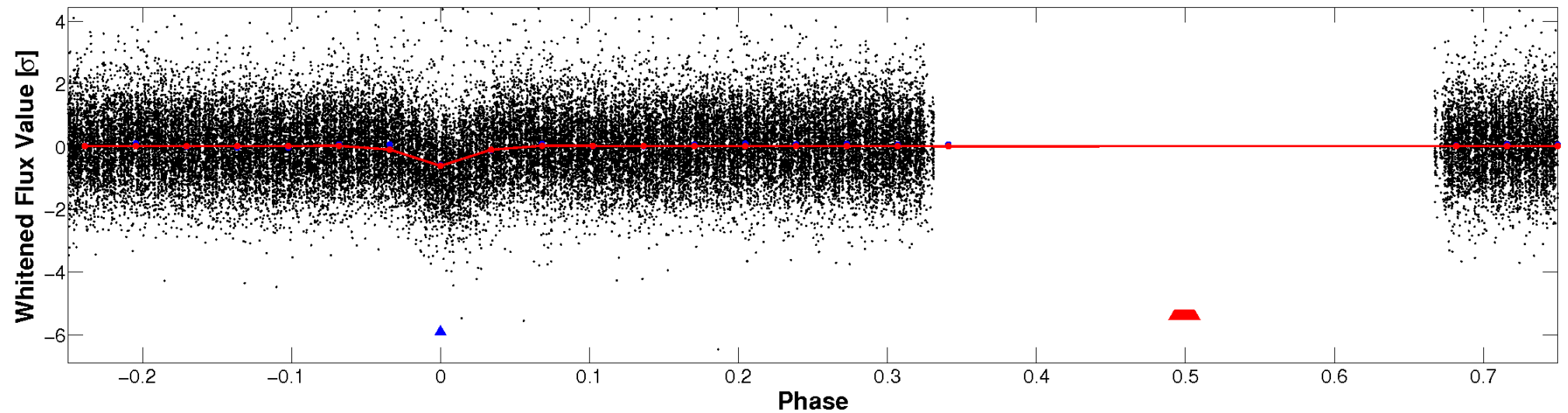


Non-Whitened Vs. Whitened Light Curve

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

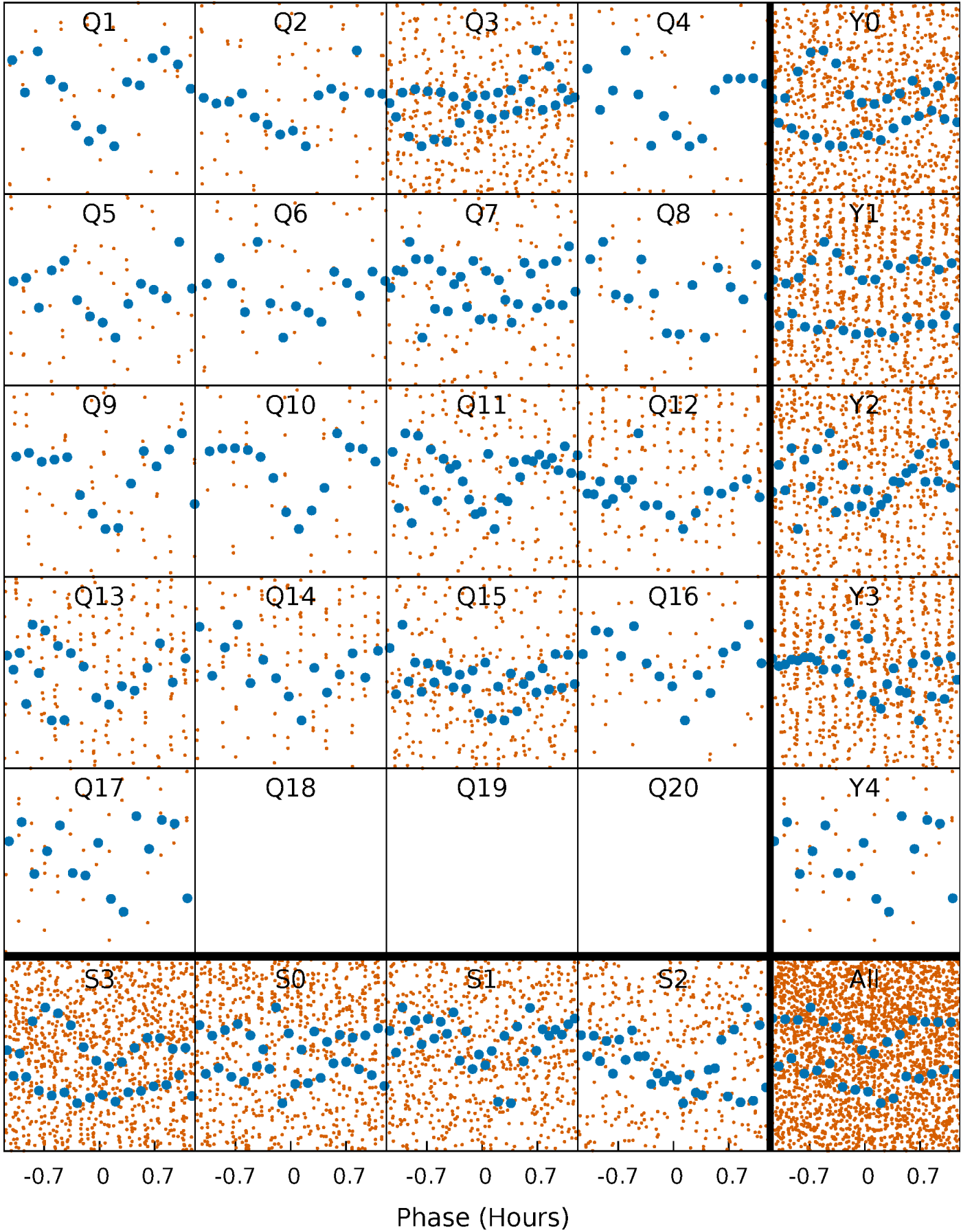


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



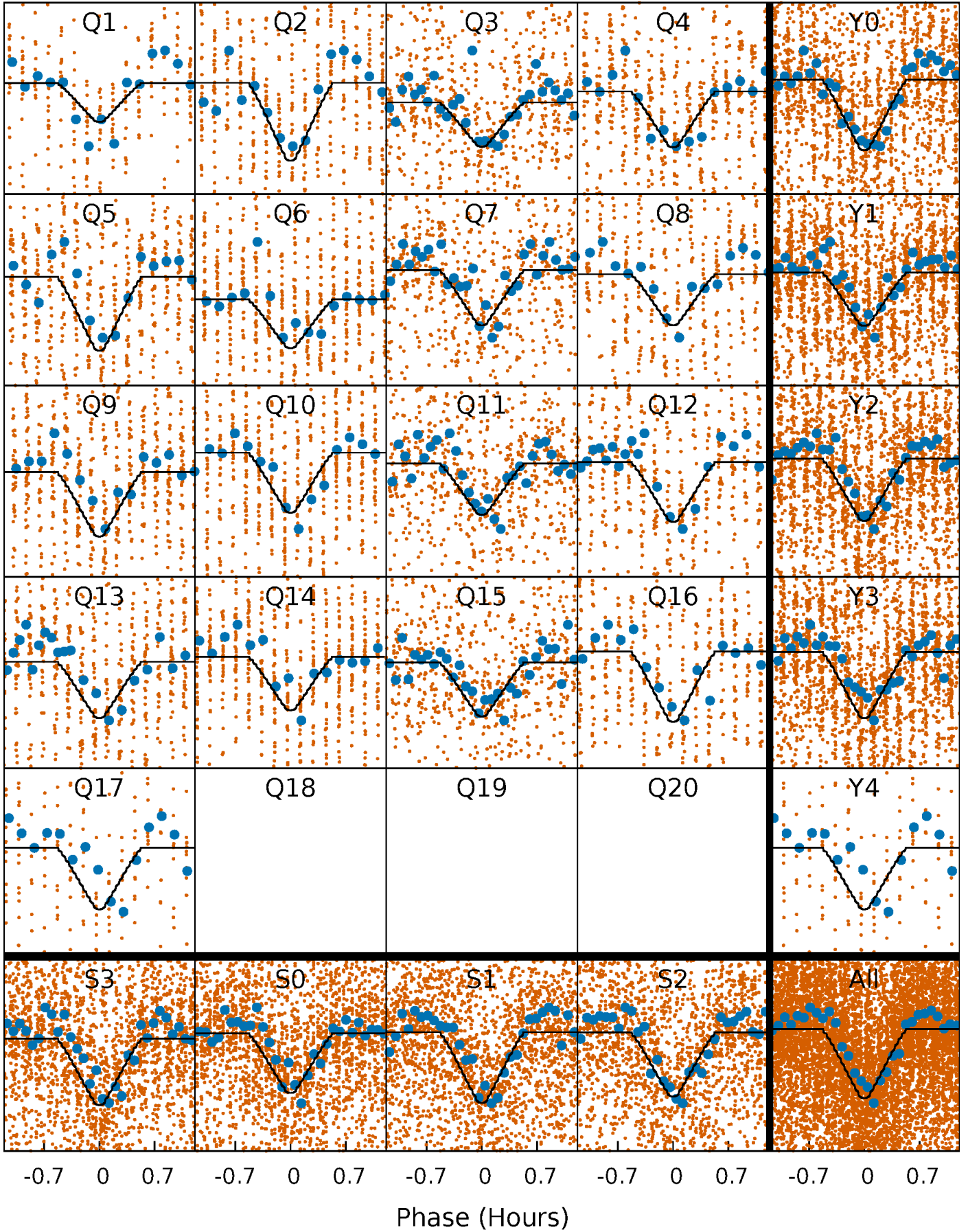
PDC Quarter-Phased Transit Curves

TCE 012170648-02 P= 0.599394 Days $T_0=131.716013$ (BKJD)



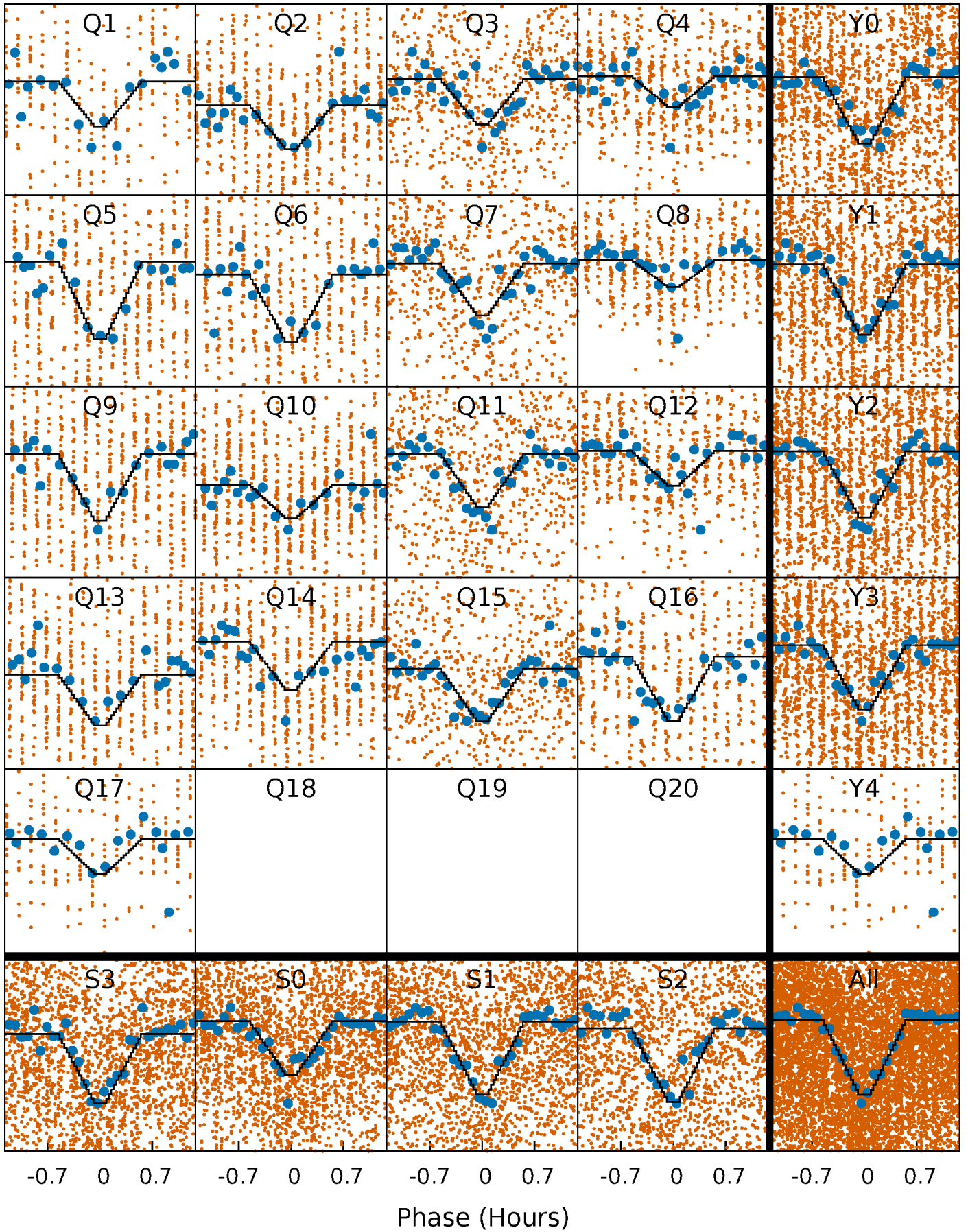
DV Quarter-Phased Transit Curves

TCE 012170648-02 P= 0.599394 Days $T_0=131.716013$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

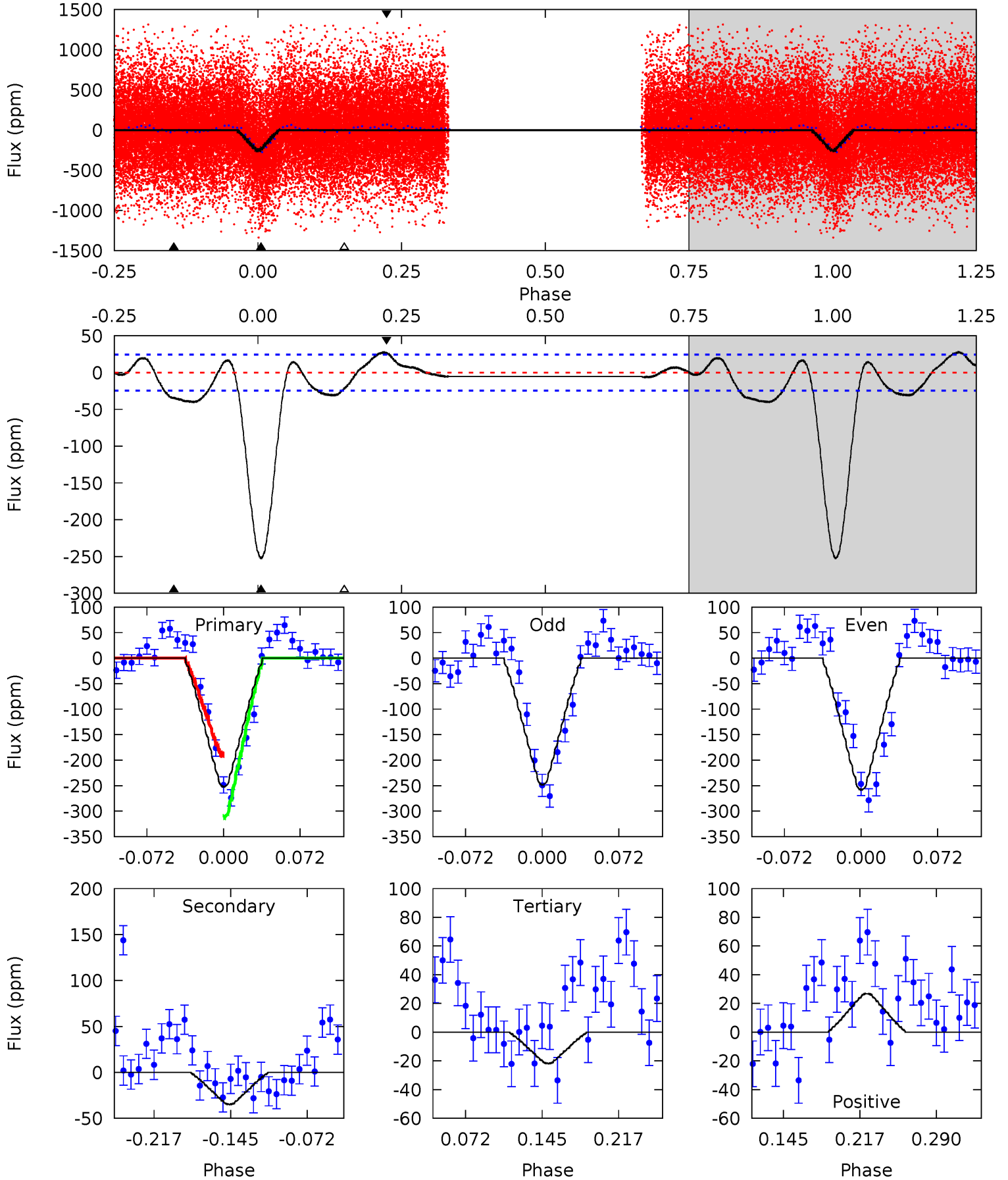
TCE 012170648-02 P= 0.599399 Days $T_0=131.714130$ (BKJD)



DV Model-Shift Uniqueness Test

012170648-02, P = 0.599394 Days, E = 131.116619 Days

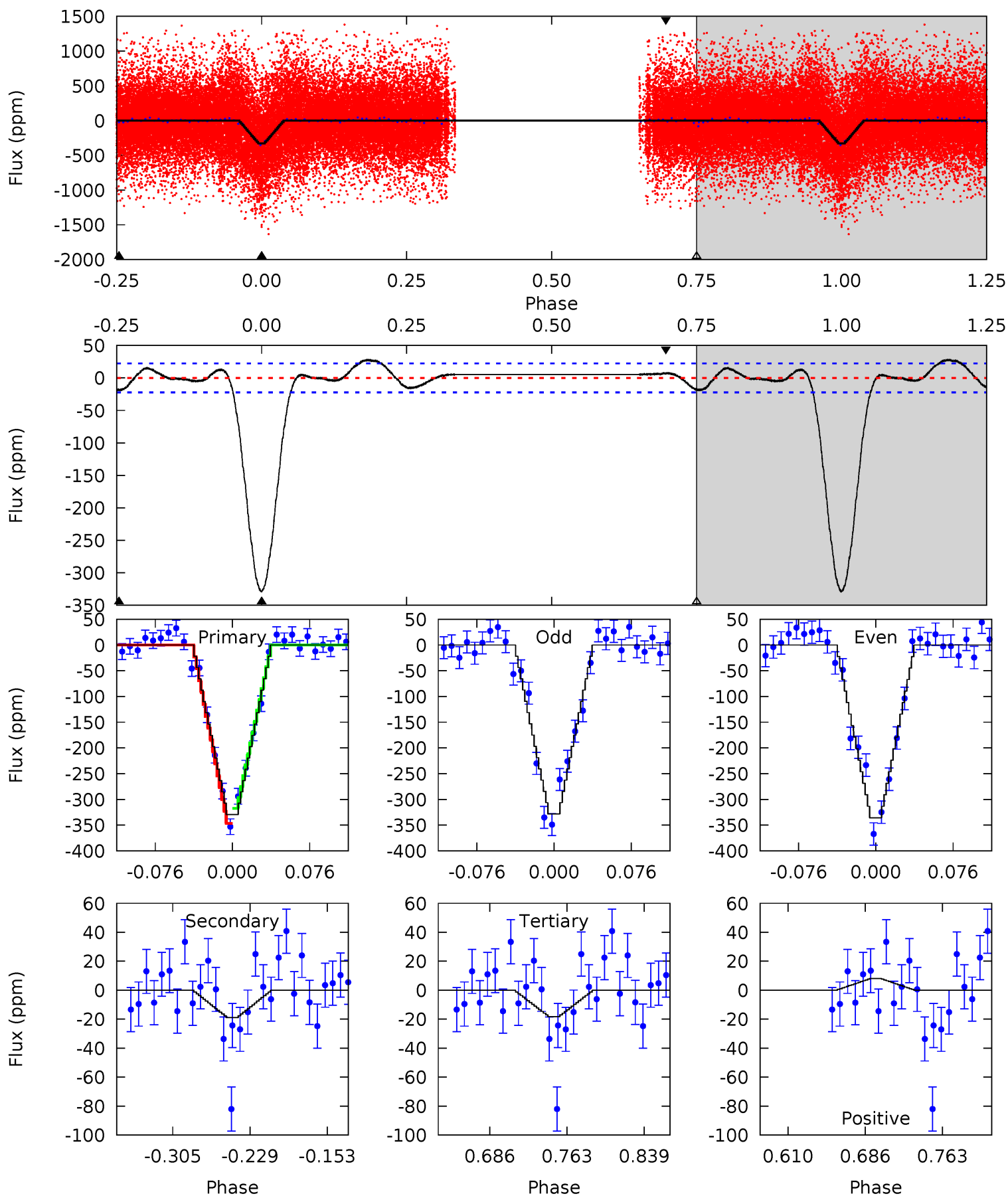
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
47.9	6.60	4.13	5.09	4.63	1.80	2.82	43.8	42.8	2.47	1.51	0.94	0.94	0.10	11.6



Alt Model-Shift Uniqueness Test

012170648-02, P = 0.599399 Days, E = 131.114731 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
68.0	3.91	3.78	1.68	4.62	1.77	2.22	64.2	66.3	0.13	2.23	0.77	0.92	0.08	3.04



Stellar Parameters For KIC 012170648

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5180^{+154}_{-154}	$4.547^{+0.058}_{-0.071}$	$-0.120^{+0.300}_{-0.300}$	$0.782^{+0.090}_{-0.074}$	$0.787^{+0.089}_{-0.067}$	$2.313^{+0.595}_{-0.565}$
	+3%/-3%	+1%/-2%	+250%/-250%	+12%/-9%	+11%/-9%	+26%/-24%
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 012170648-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-35 ± 5	$1.41^{+0.80}_{-0.79}$	2505^{+101}_{-95}	3432^{+1283}_{-602}	$1.608^{+6.680}_{-0.968}$
Alt.	-19 ± 5	$1.53^{+0.90}_{-0.74}$	2487^{+110}_{-91}	2861^{+911}_{-4817}	$0.689^{+2.094}_{-0.404}$

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 $A_{obs} \gg 1.0$

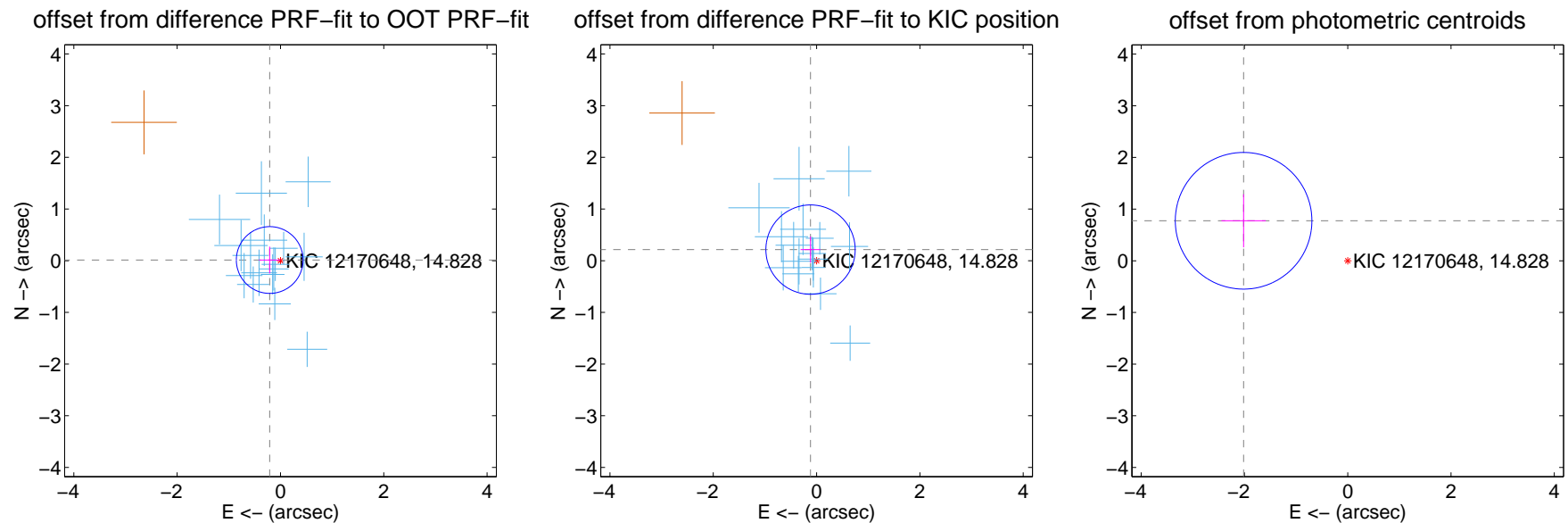
DV Centroid Data

Supplemental centroid analysis for 012170648-02. Kepler magnitude: 14.83. Transit SNR 30.66

There are 16 quarters with good PRF difference image offsets

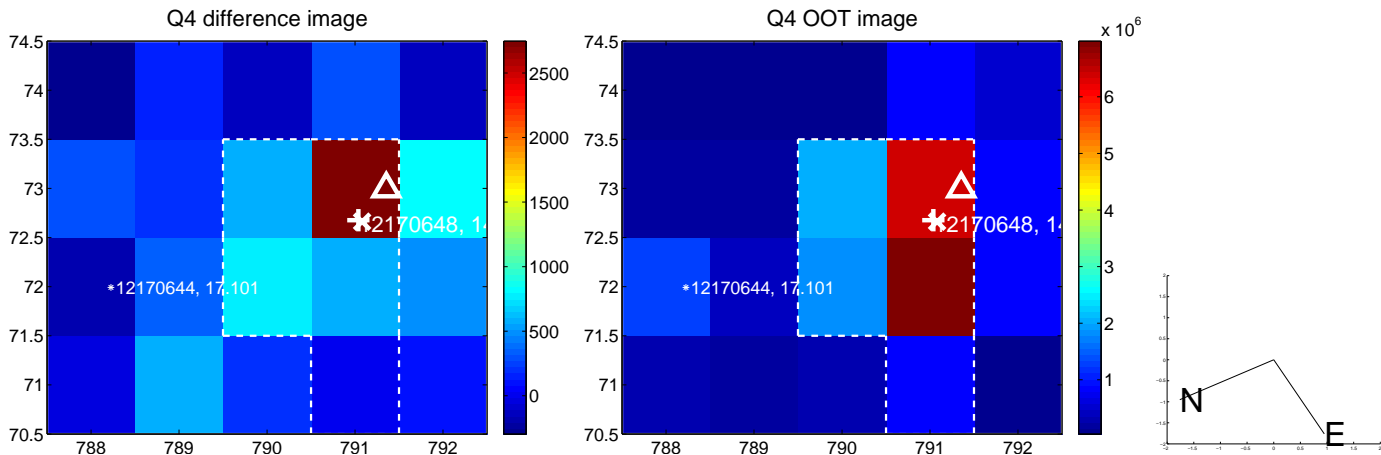
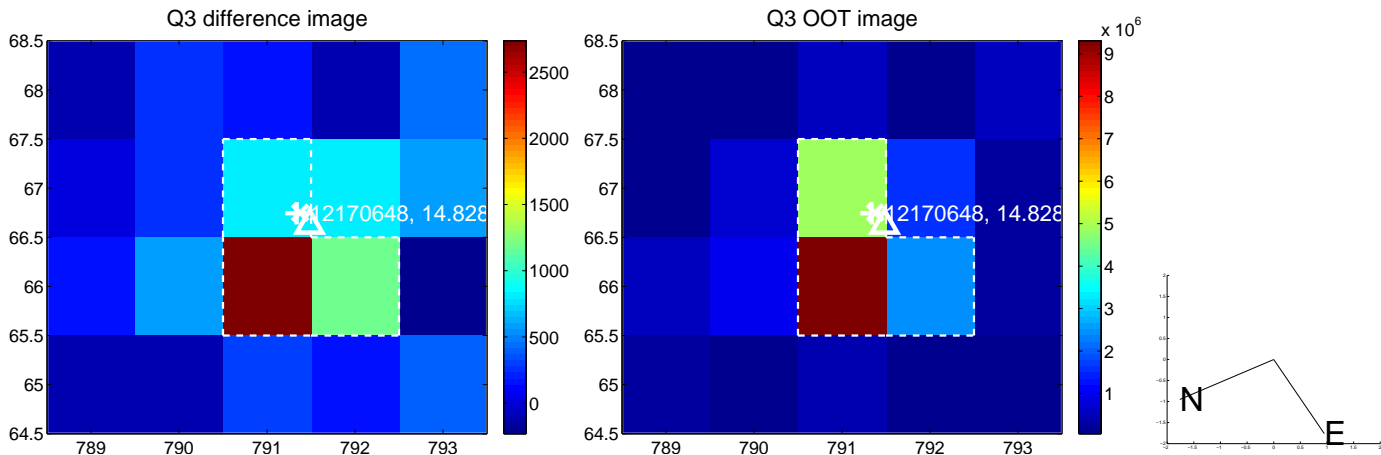
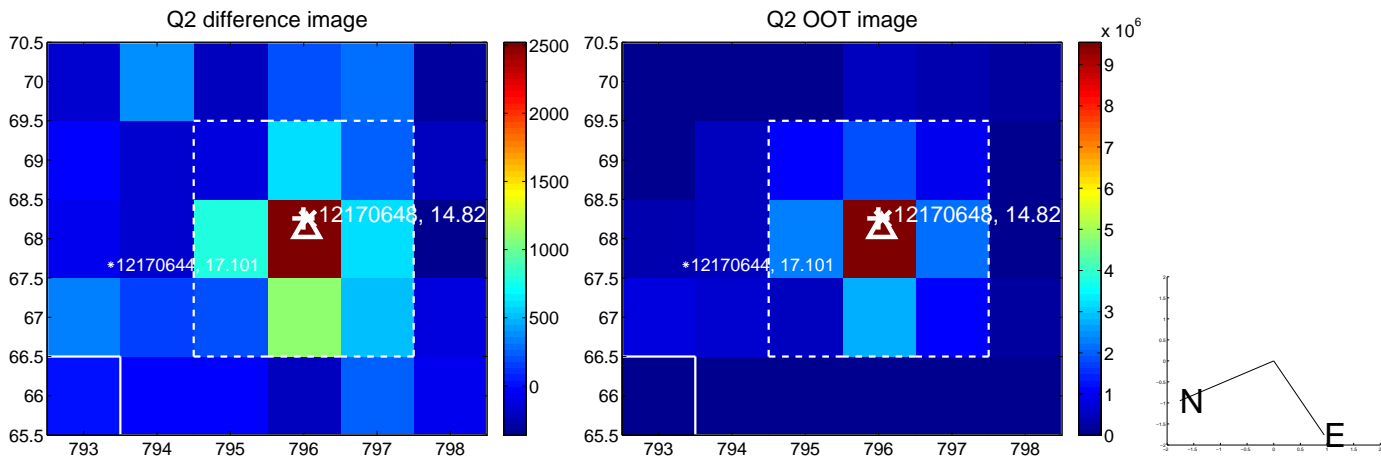
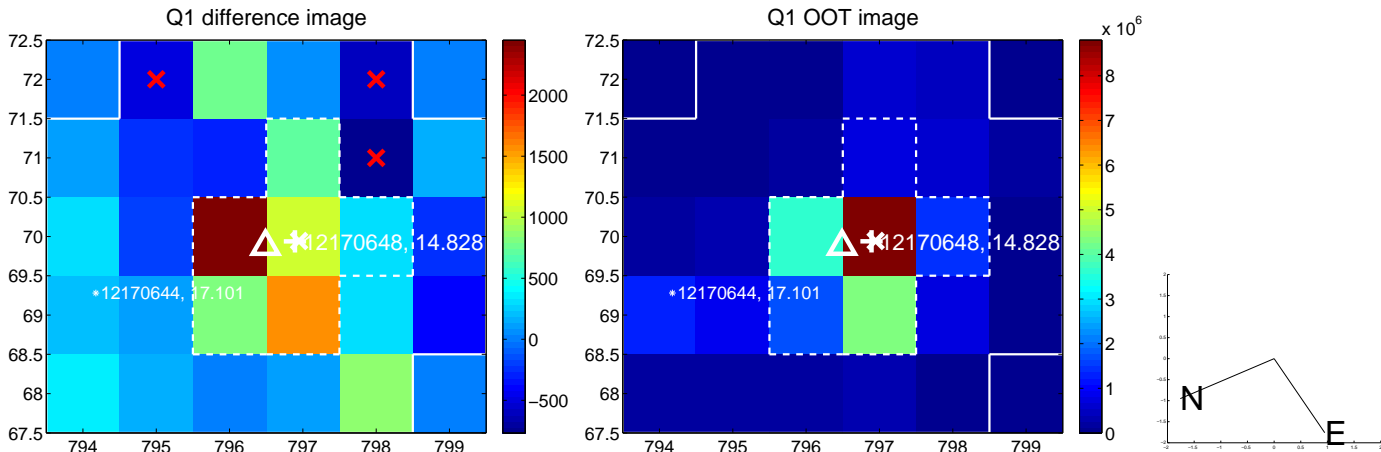
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.209 ± 0.215	0.97	0.208 ± 0.206	0.013 ± 0.260
PRF-fit source offset from KIC position	0.244 ± 0.288	0.85	0.117 ± 0.192	0.215 ± 0.256
photometric centroid source offset	2.16 ± 0.44	4.90	2.02 ± 0.43	0.77 ± 0.51

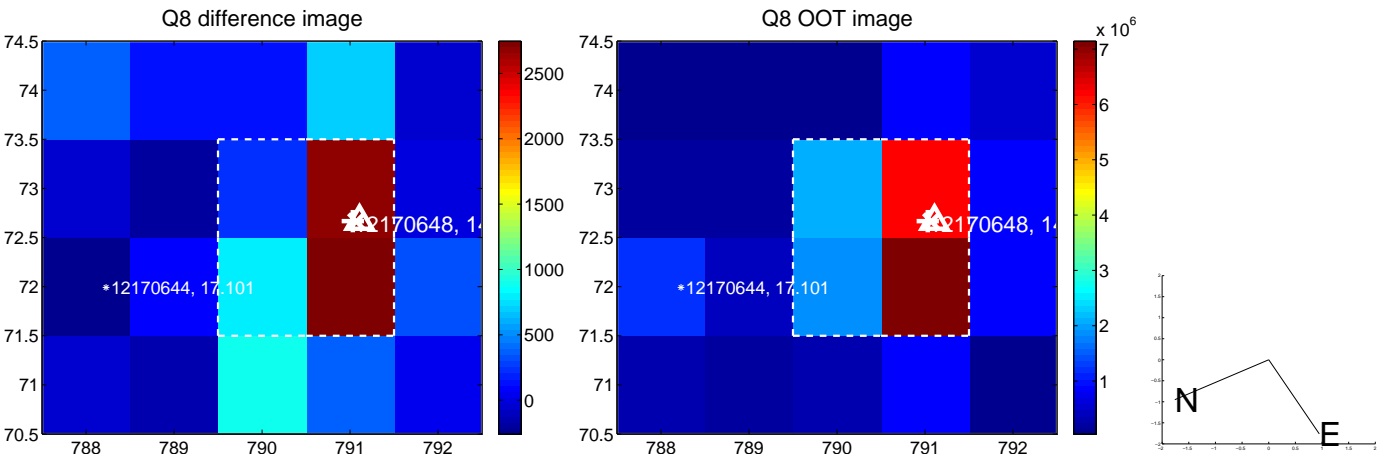
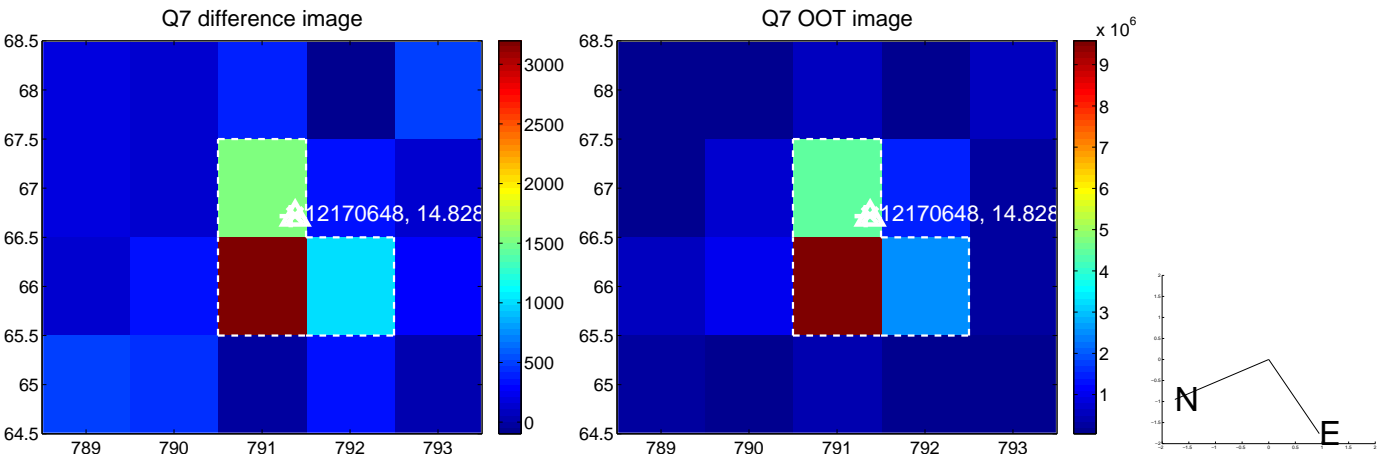
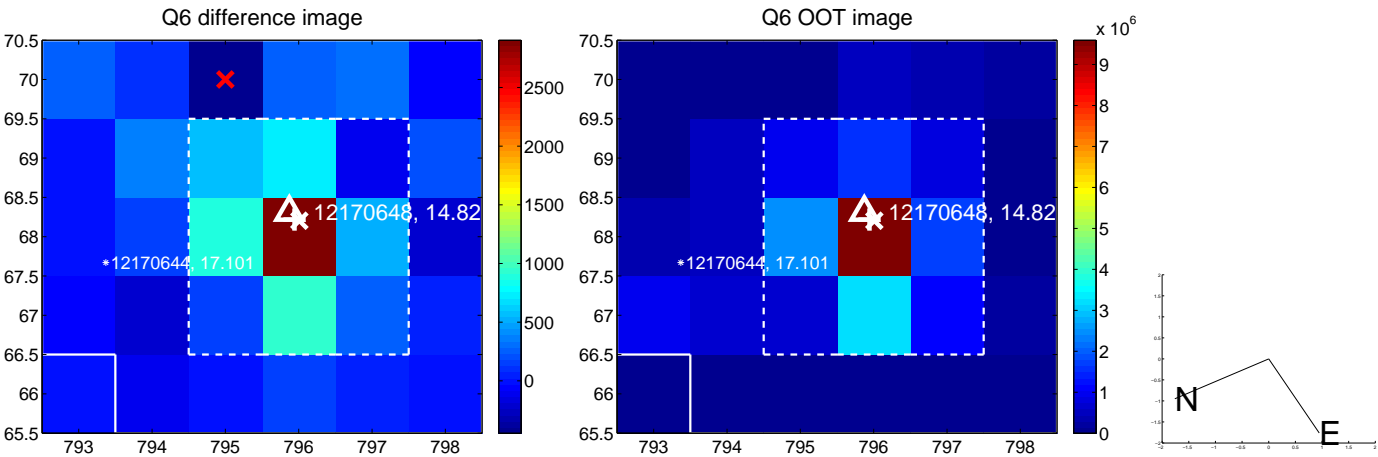
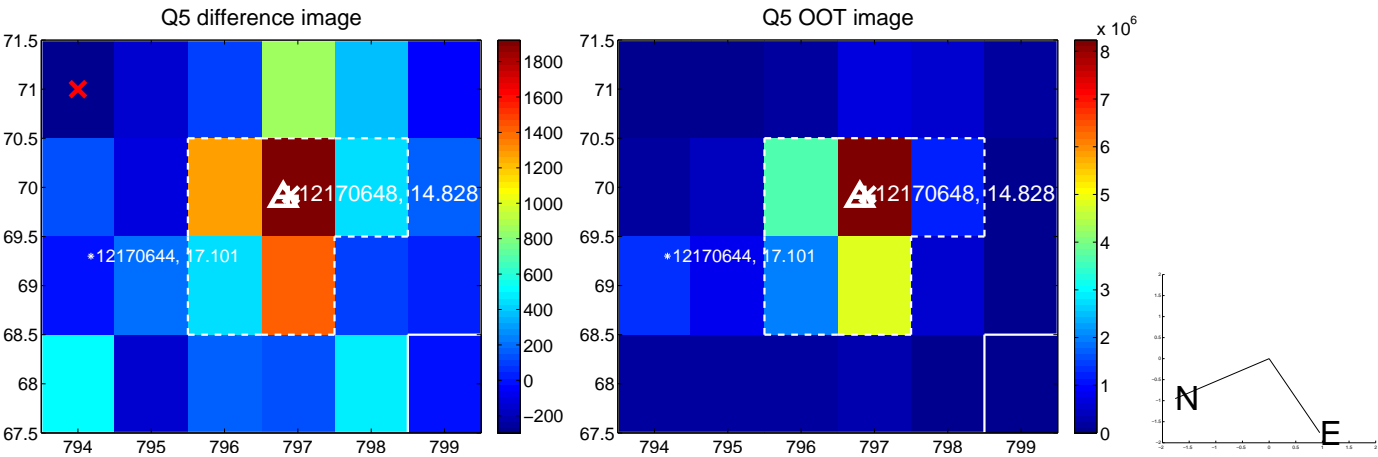


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

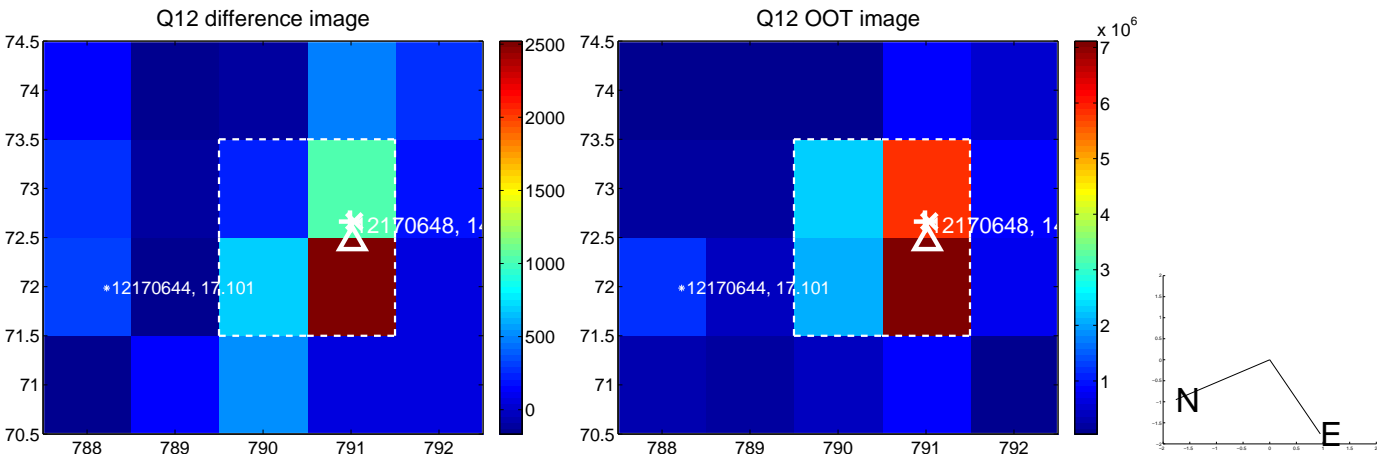
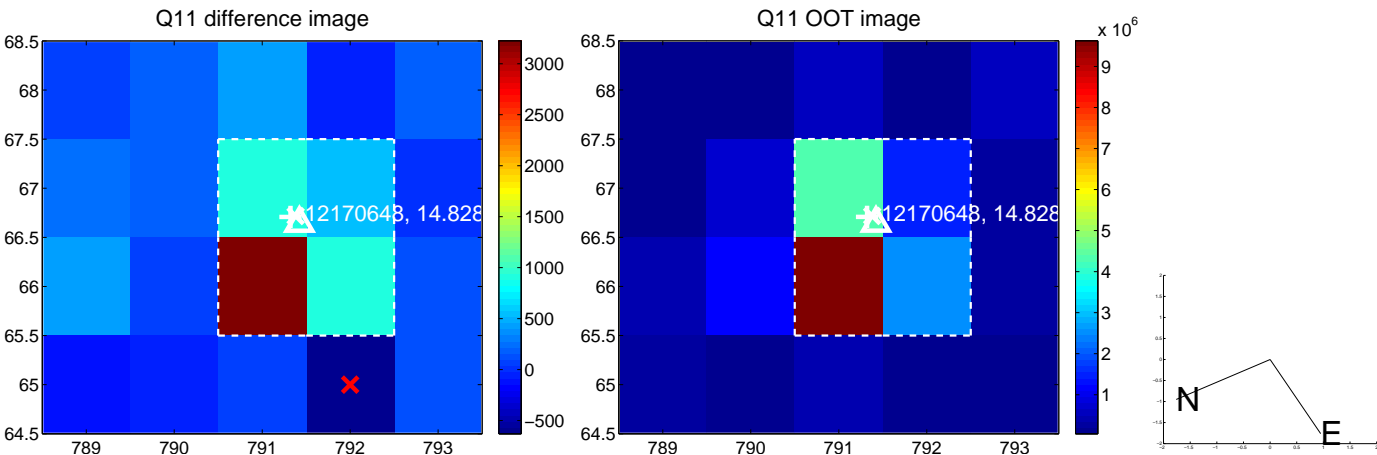
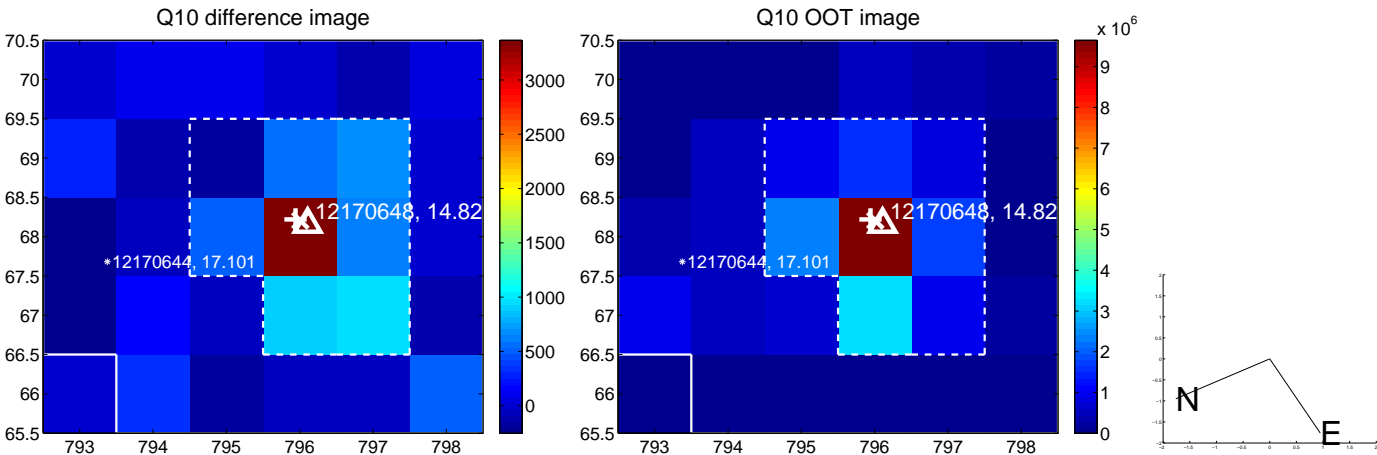
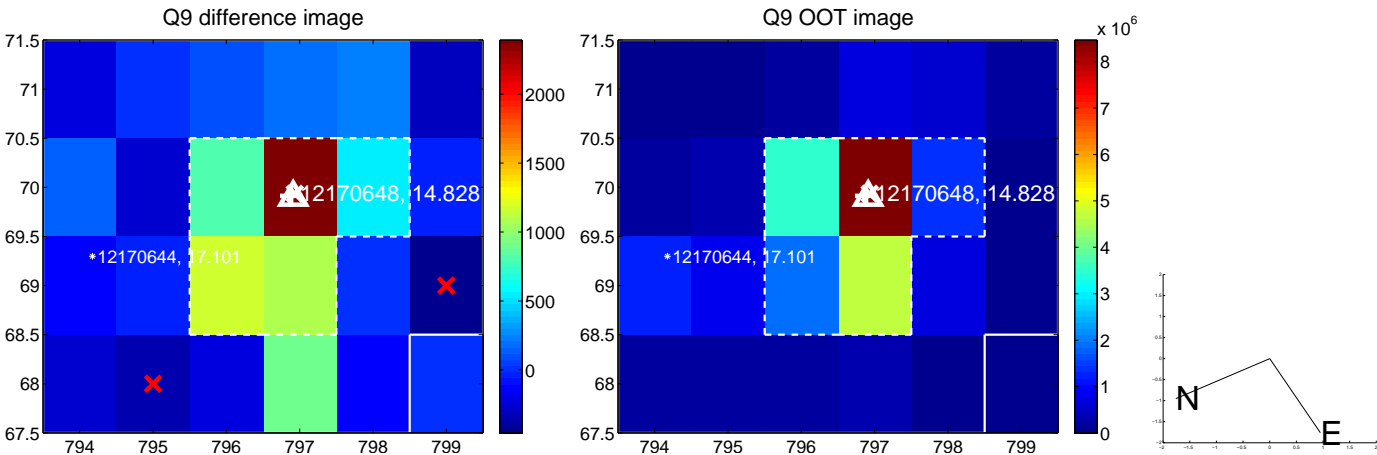
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



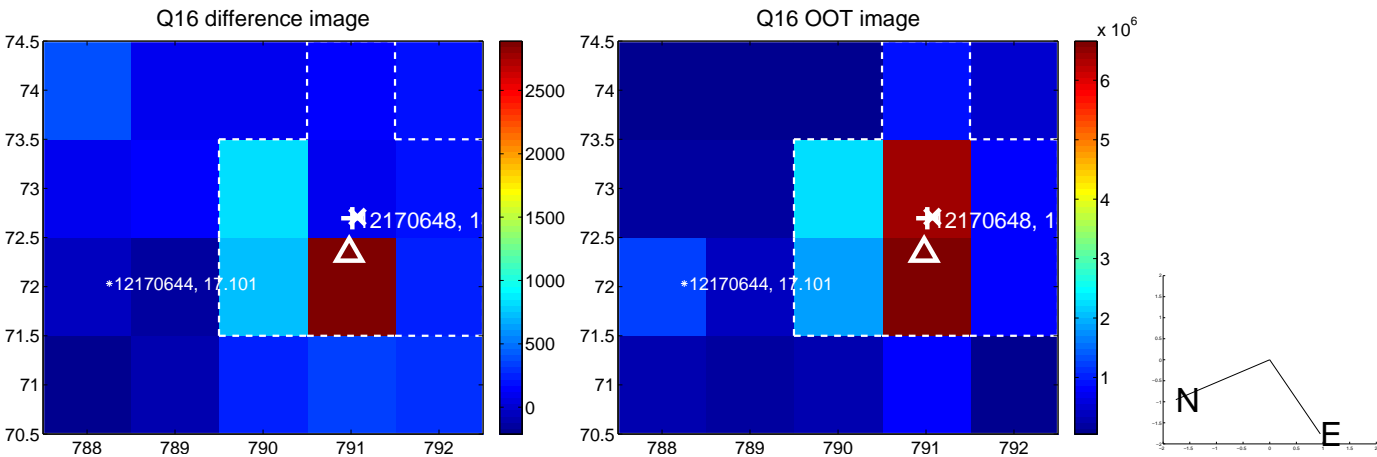
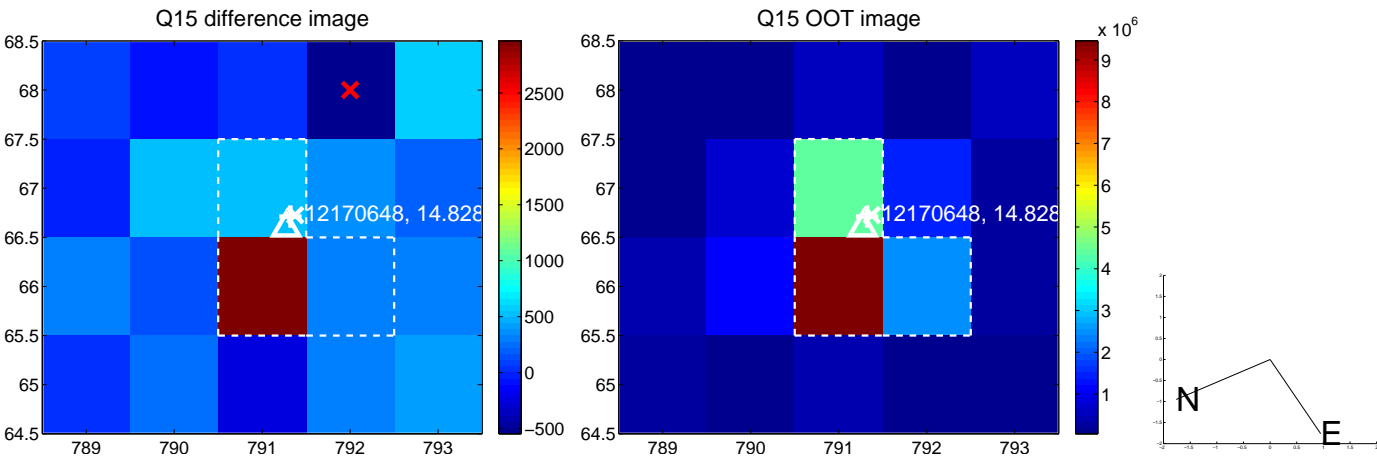
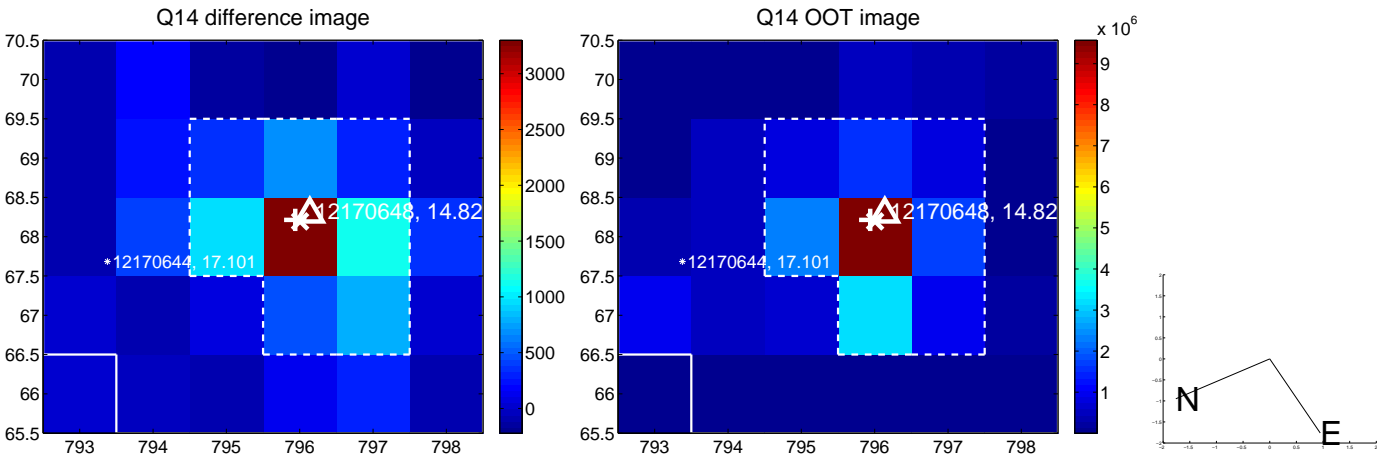
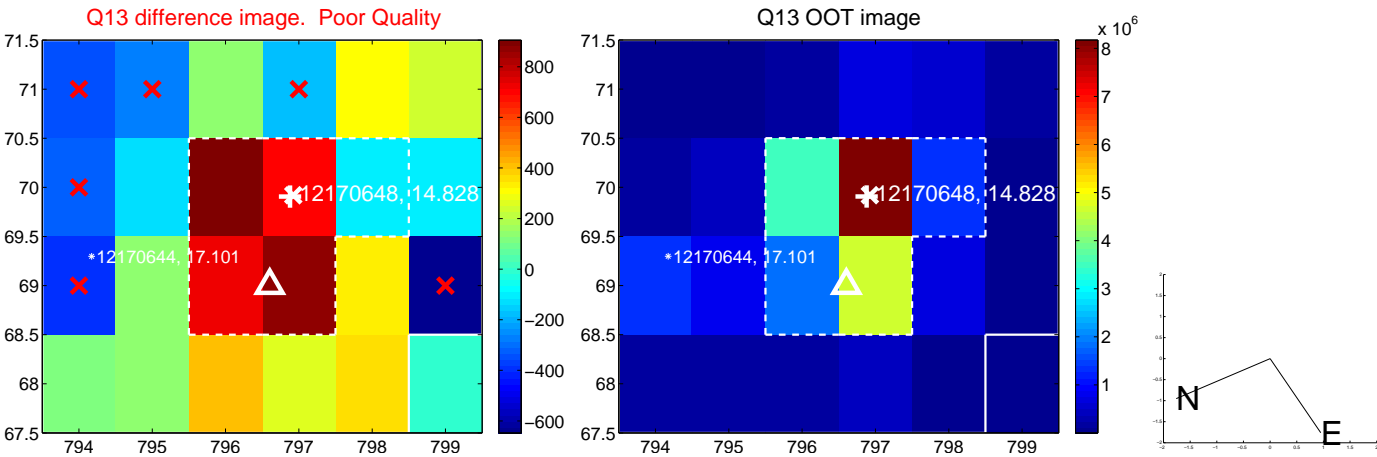
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



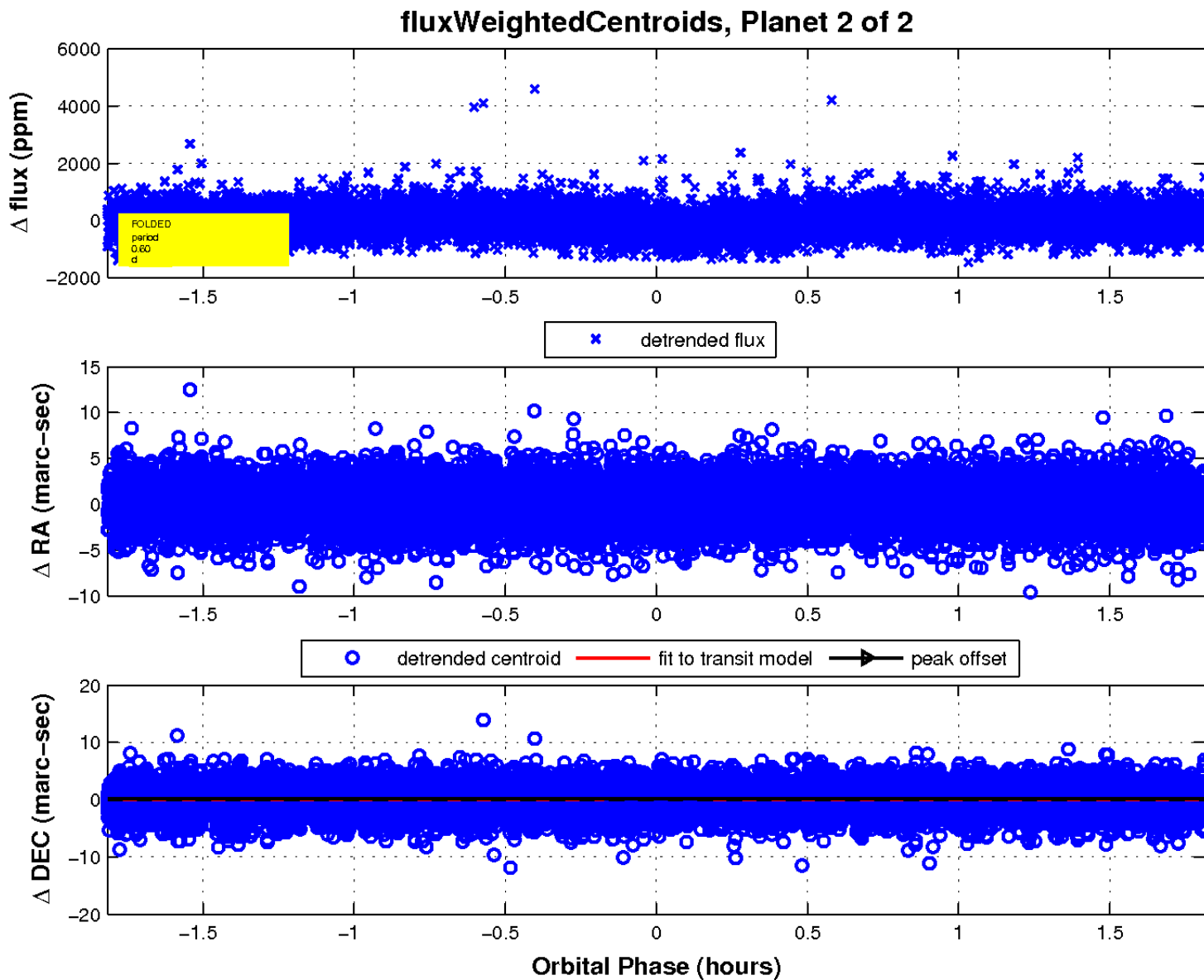
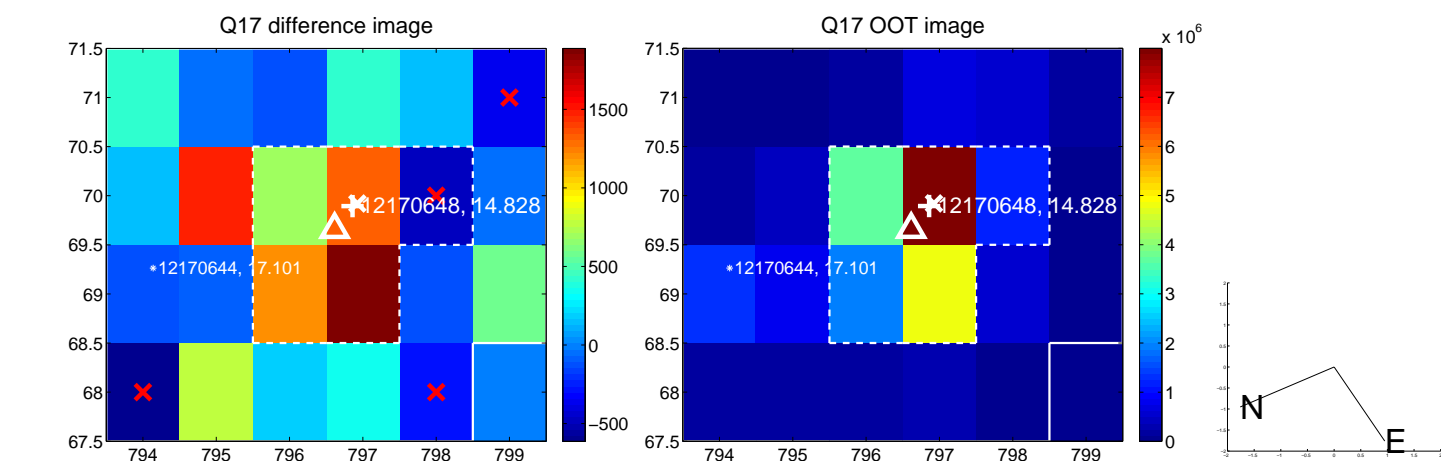
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white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination

