

KIC 008162789

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})
008162789-01	OBS	0521.01	10.161015	141.518107	1627.9	3.232	102.0	102.7	1.06	6032	4.76	158.13
008162789-02	OBS	0521.02	5.410380	135.085998	119.8	2.671	8.7	9.7	1.06	6032	1.30	366.42

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008162789-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
008162789-02	OBS	PC	0.98	0	0	0	0	CENT_KIC_POS

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

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

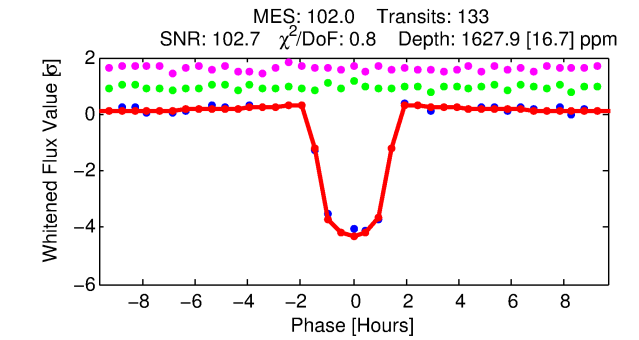
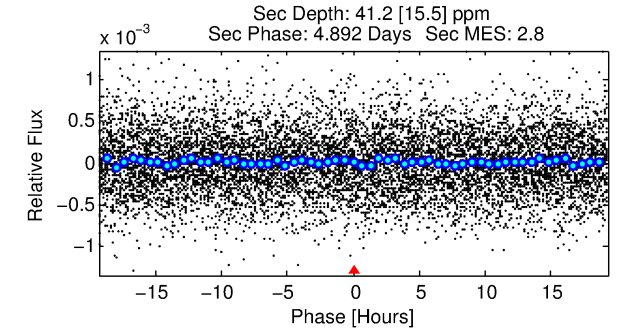
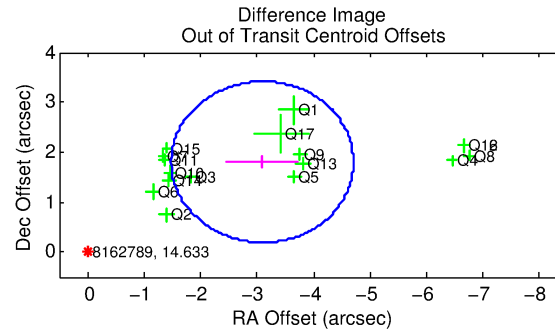
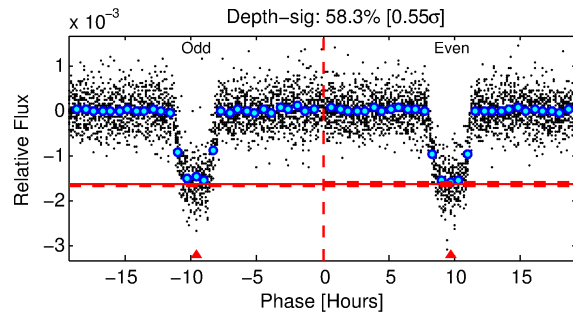
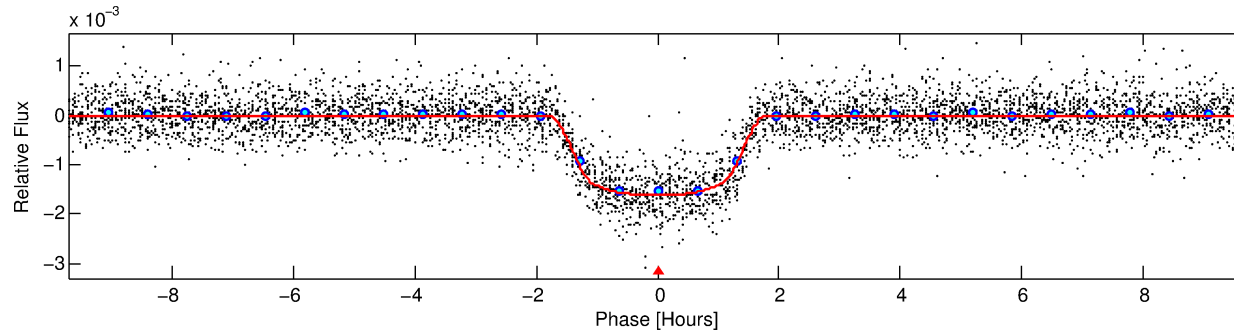
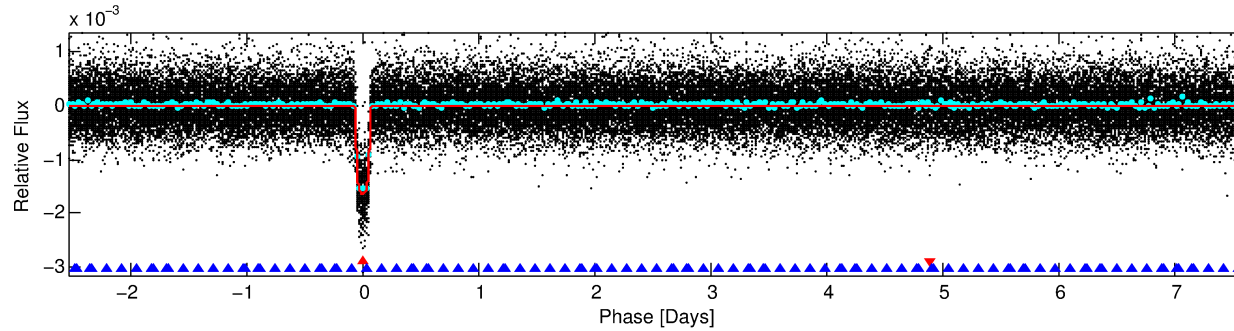
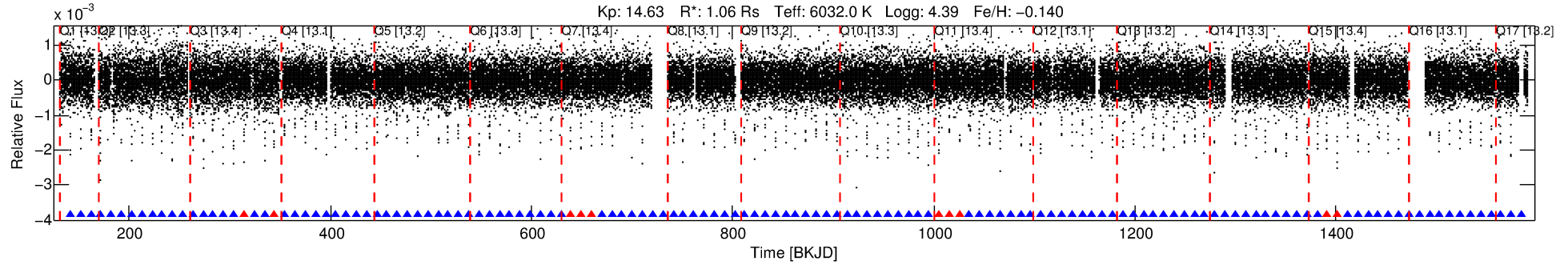
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008162789-01

No Significant Match Found

DV One-Page Summary

KIC: 8162789 Candidate: 1 of 2 Period: 10.161 d
KOI: K00521.01 Corr: 0.974



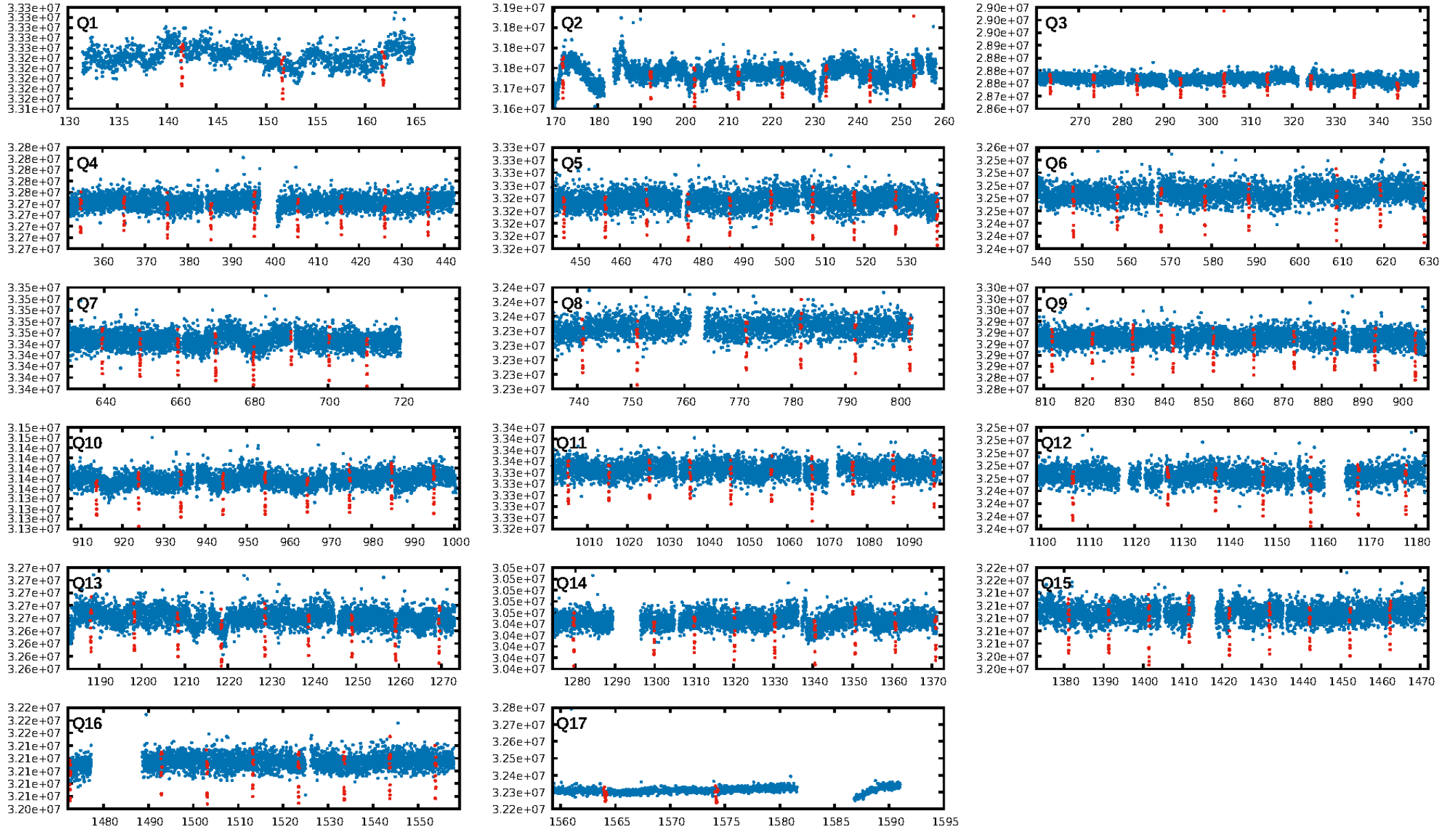
DV Fit Results:

Period = 10.16102 [0.00001] d
Epoch = 141.5181 [0.0007] BKJD
Rp/R* = 0.0412 [0.0013]
a/R* = 15.76 [2.34]
b = 0.81 [0.06]
Seff = 158.13 [62.73]
Teq = 904 [90] K
Rp = 4.76 [1.41] Re
a = 0.0918 [0.0229] AU
Ag = 8.43 [4.46] [1.67 σ]
Teffp = 2382 [245] K [5.66 σ]

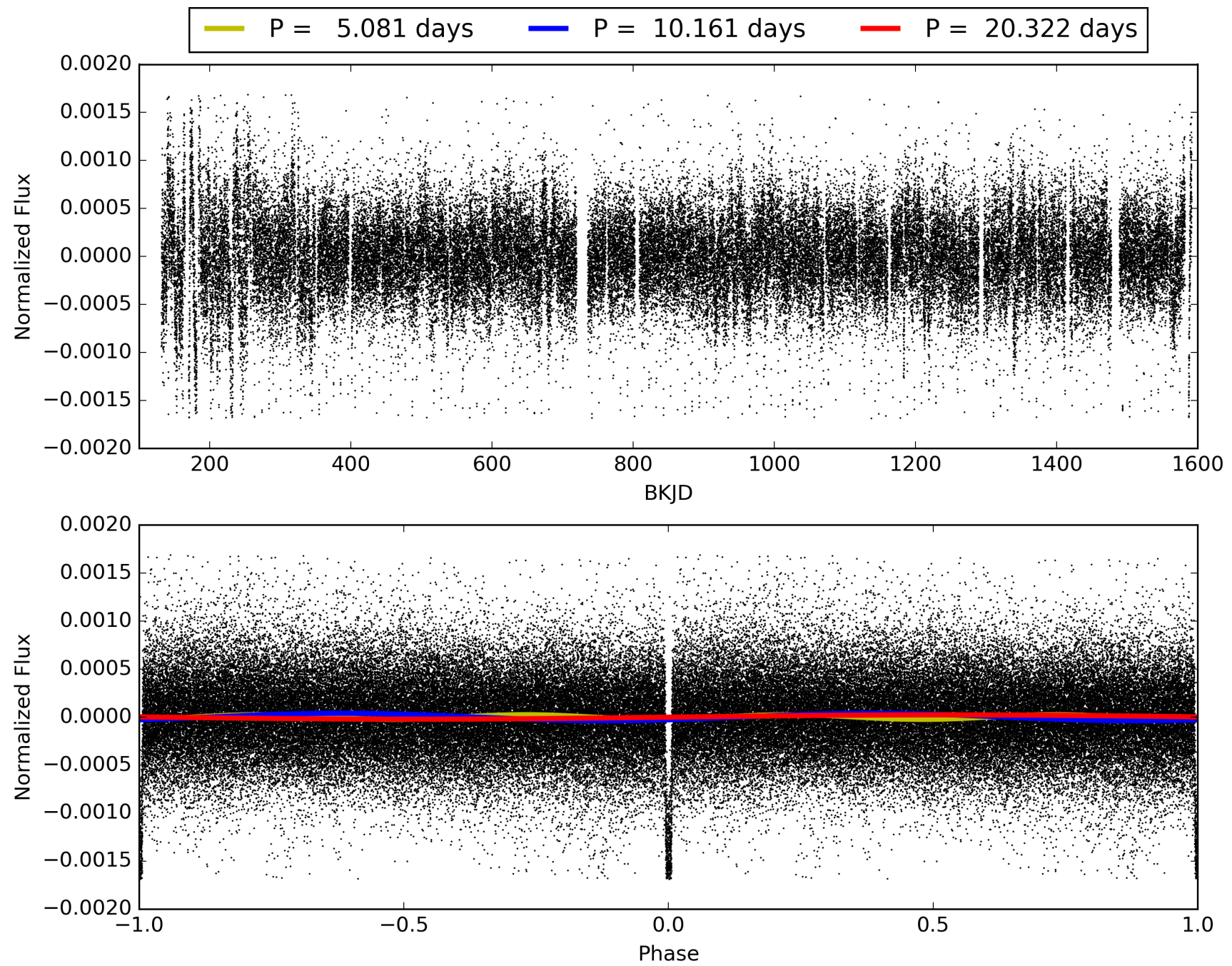
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [27.19 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 68.6%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 0.92 [118/128]
GhostDiagnostic-chr: 5.037
Centroid-sig: 0.0%
Centroid-so: 1.866 arcsec [26.44 σ]
OotOffset-rm: 3.581 arcsec [6.66 σ]
KicOffset-rm: 0.111 arcsec [1.24 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 008162789-01, PDC Light Curves

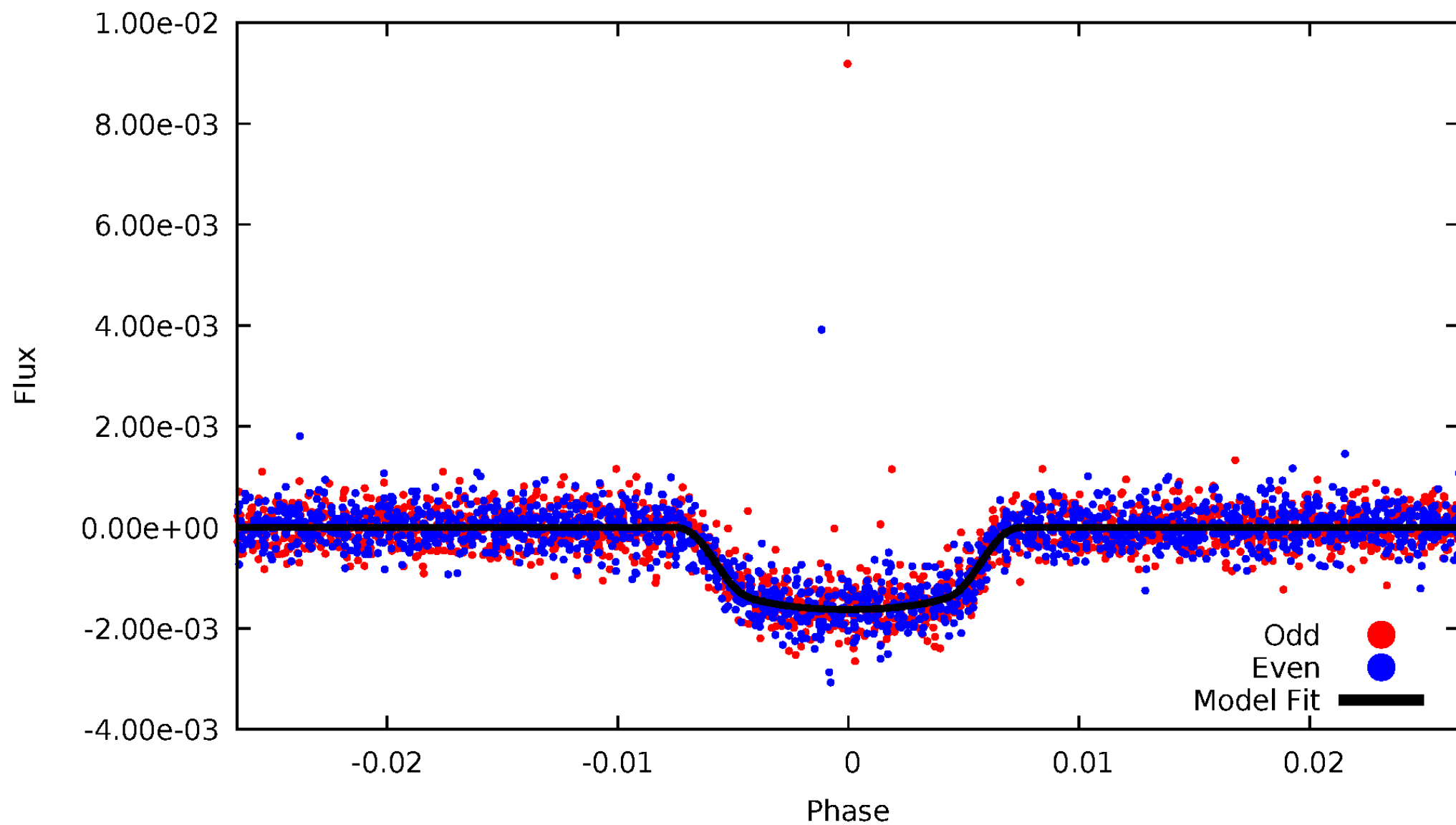


TCE 008162789-01



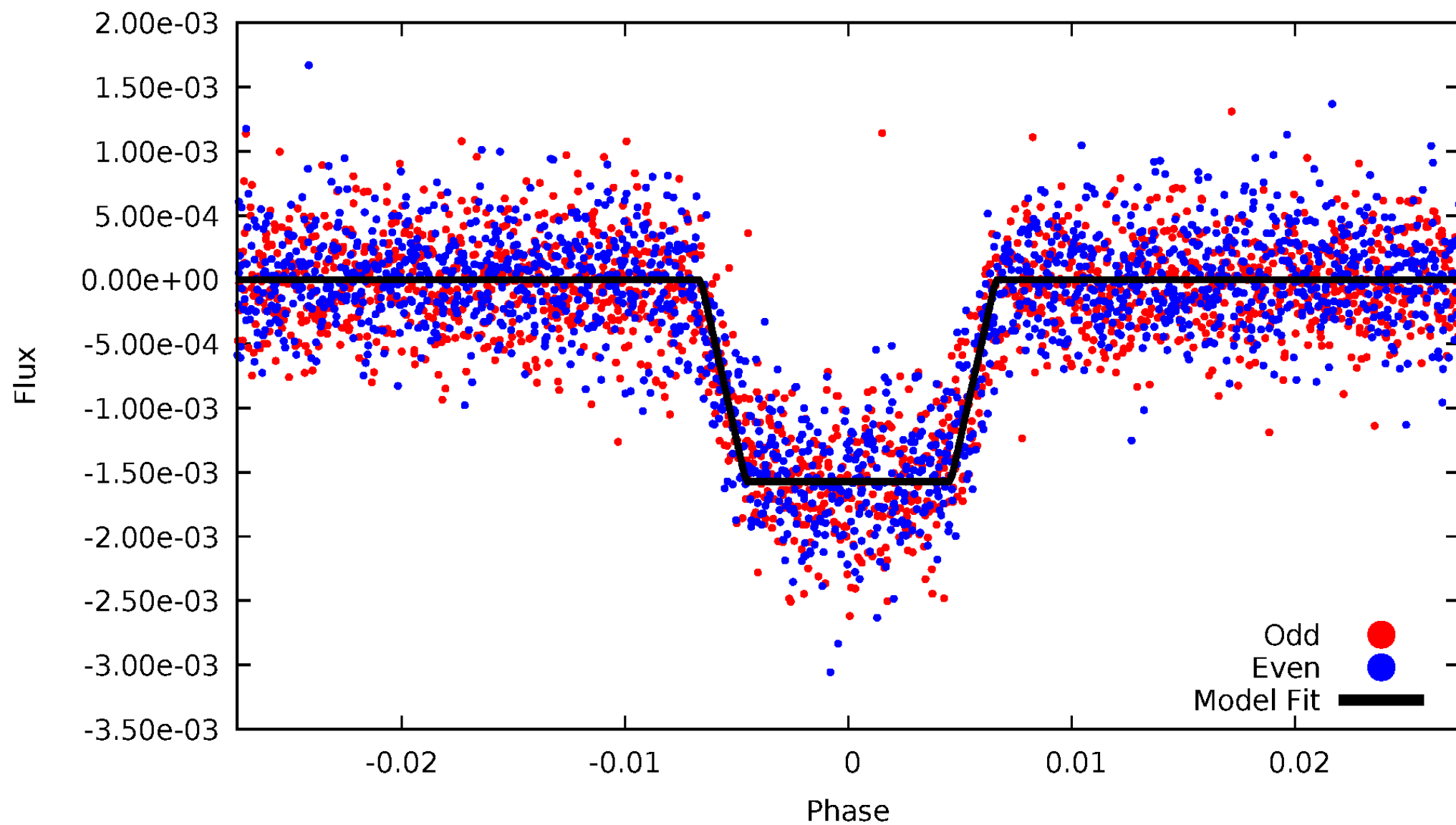
DV Odd/Even

TCE 008162789-01



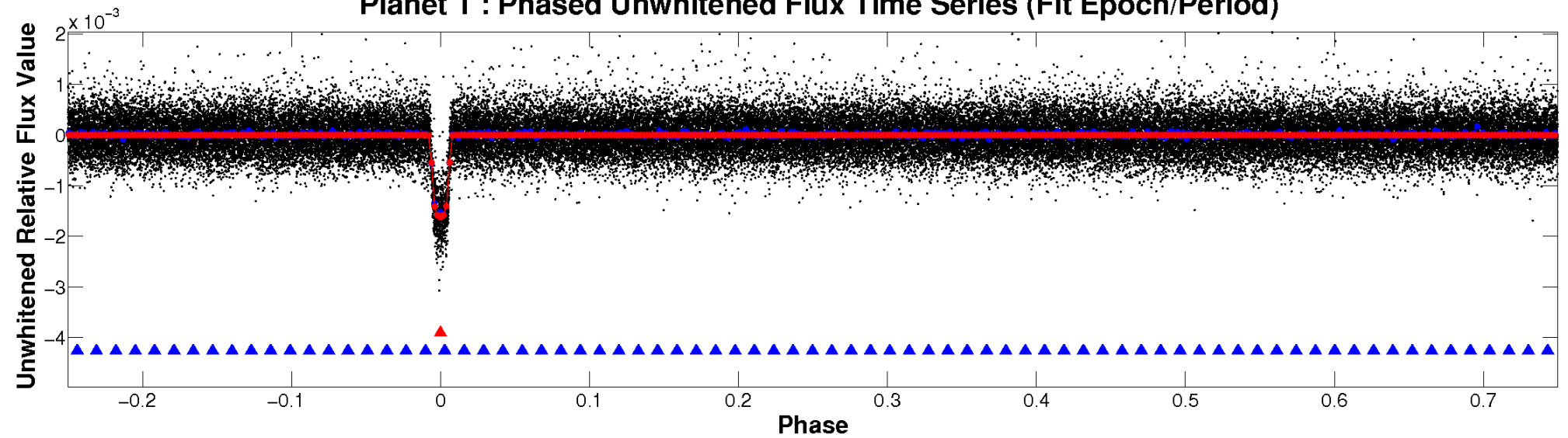
ALT Odd/Even

TCE 008162789-01

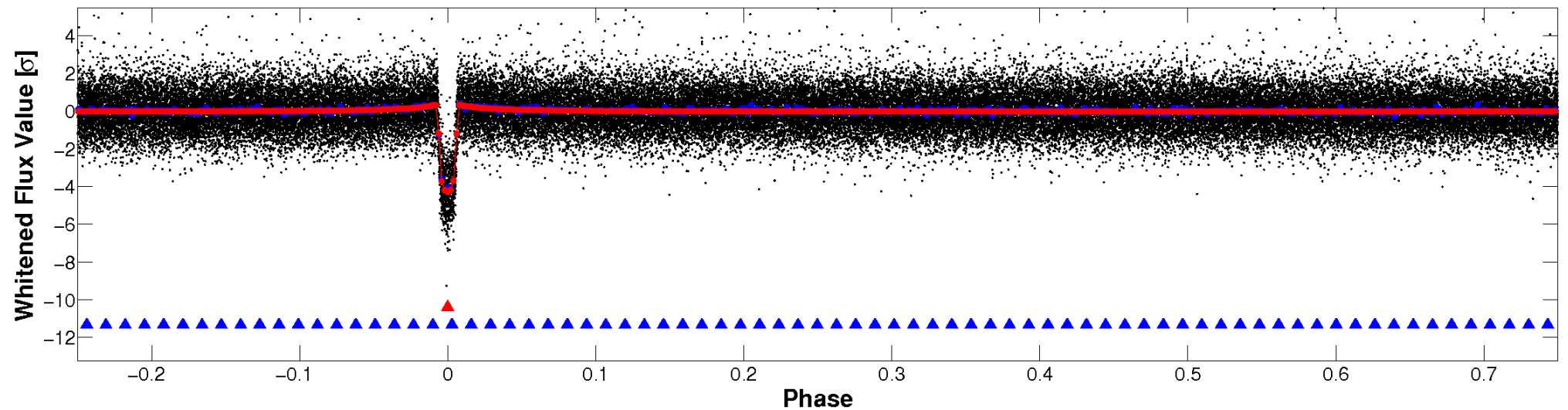


Non-Whitened Vs. Whitened Light Curve

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

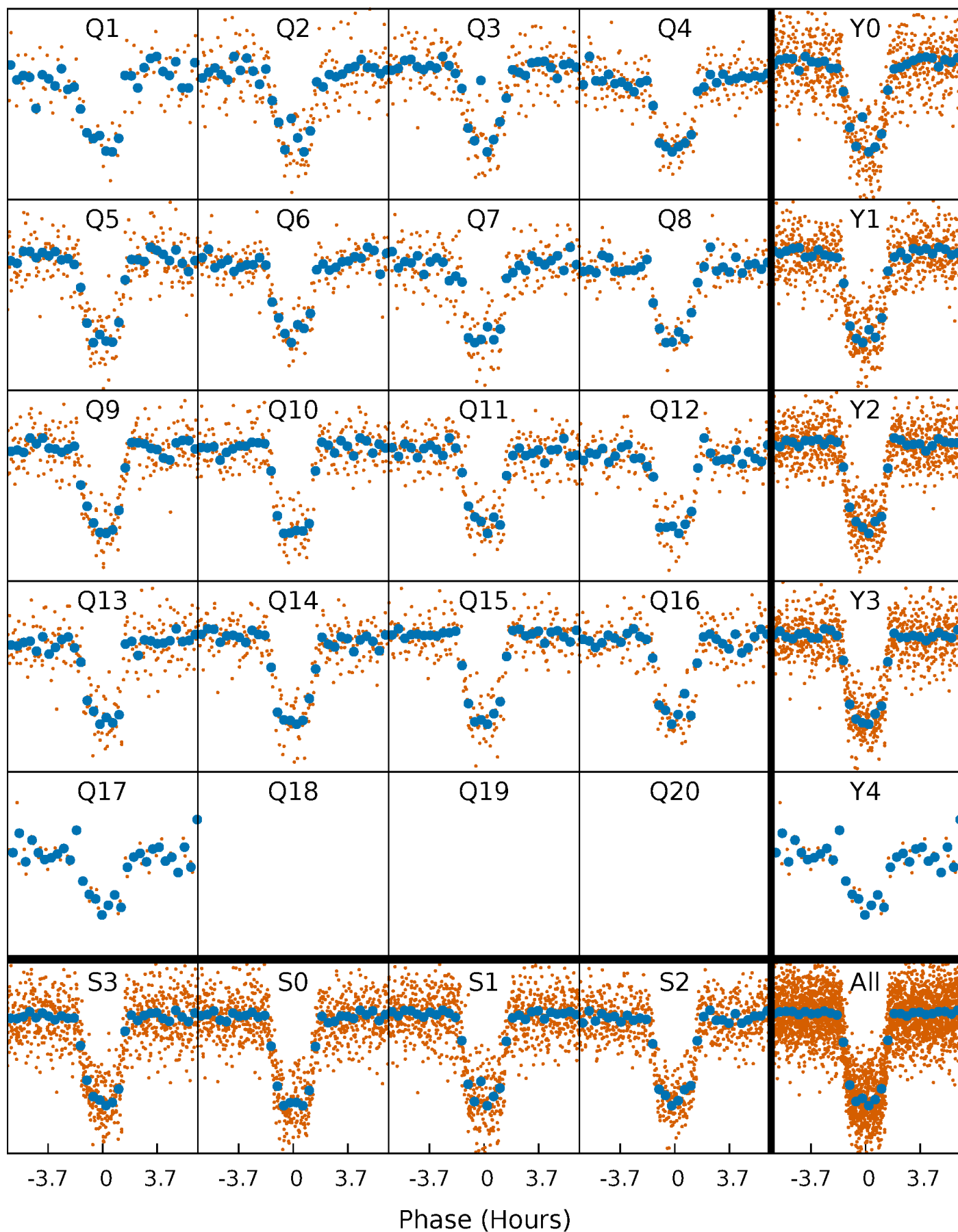


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



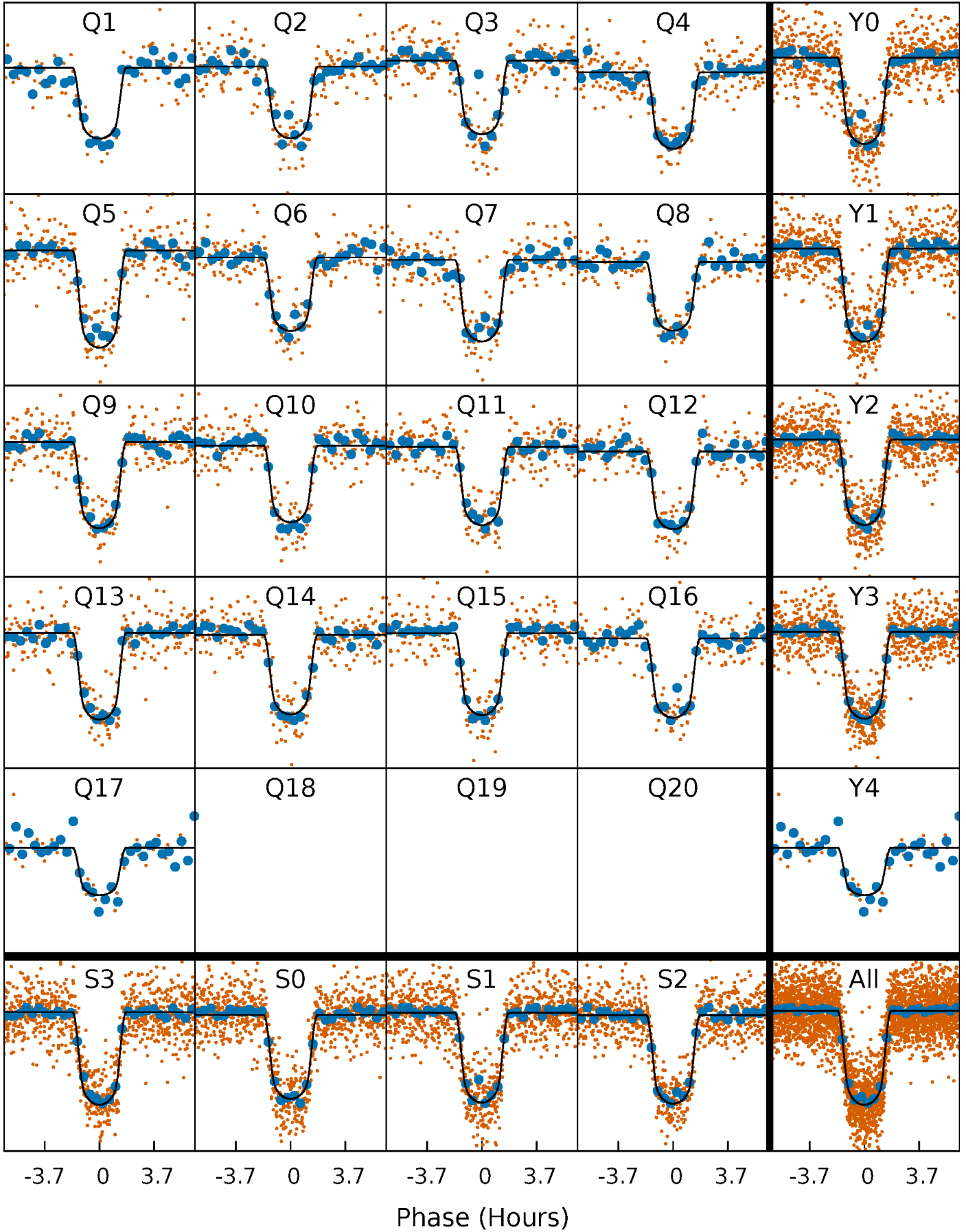
PDC Quarter-Phased Transit Curves

TCE 008162789-01 P= 10.161015 Days $T_0=141.518107$ (BKJD)



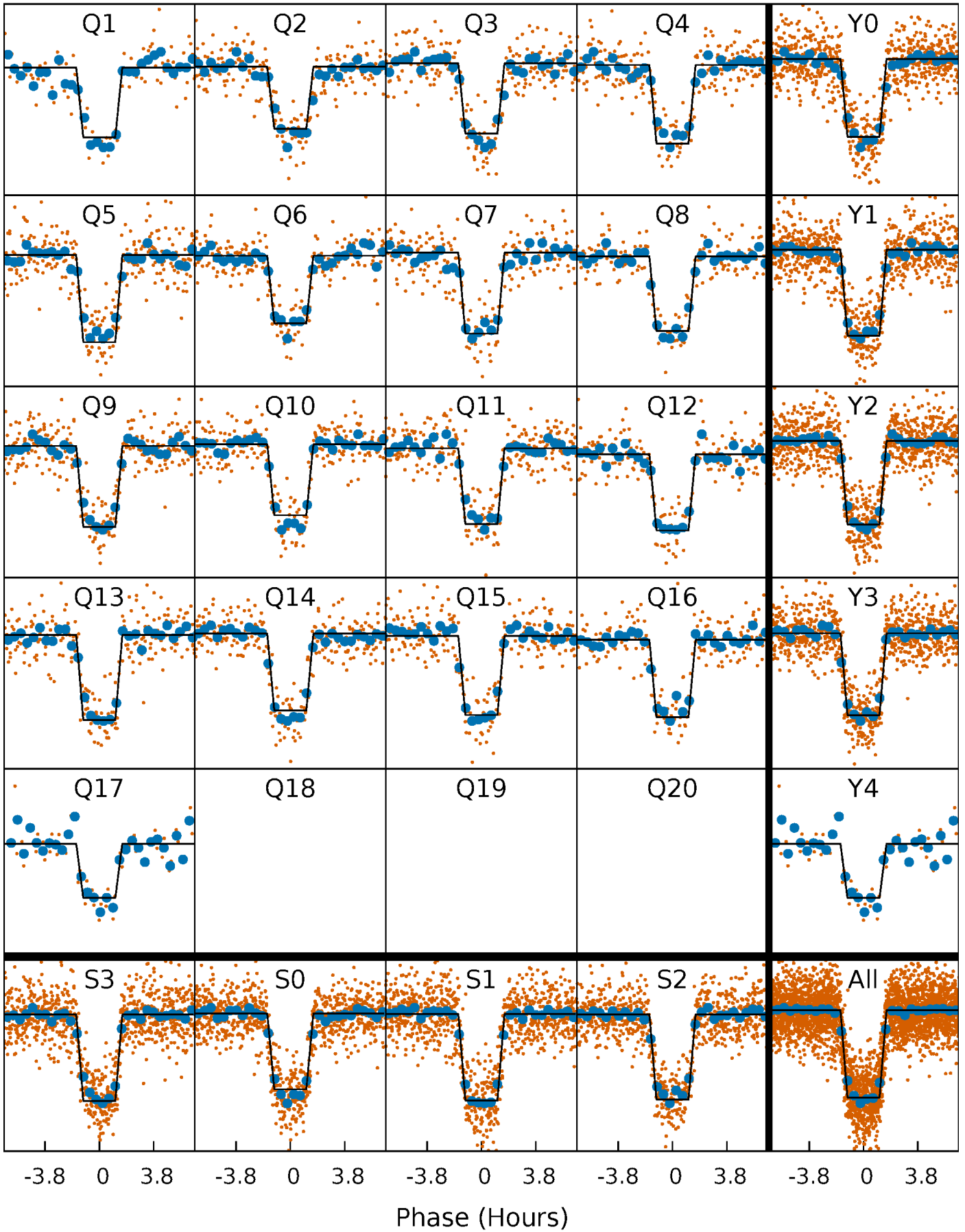
DV Quarter-Phased Transit Curves

TCE 008162789-01 P= 10.161015 Days $T_0=141.518107$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

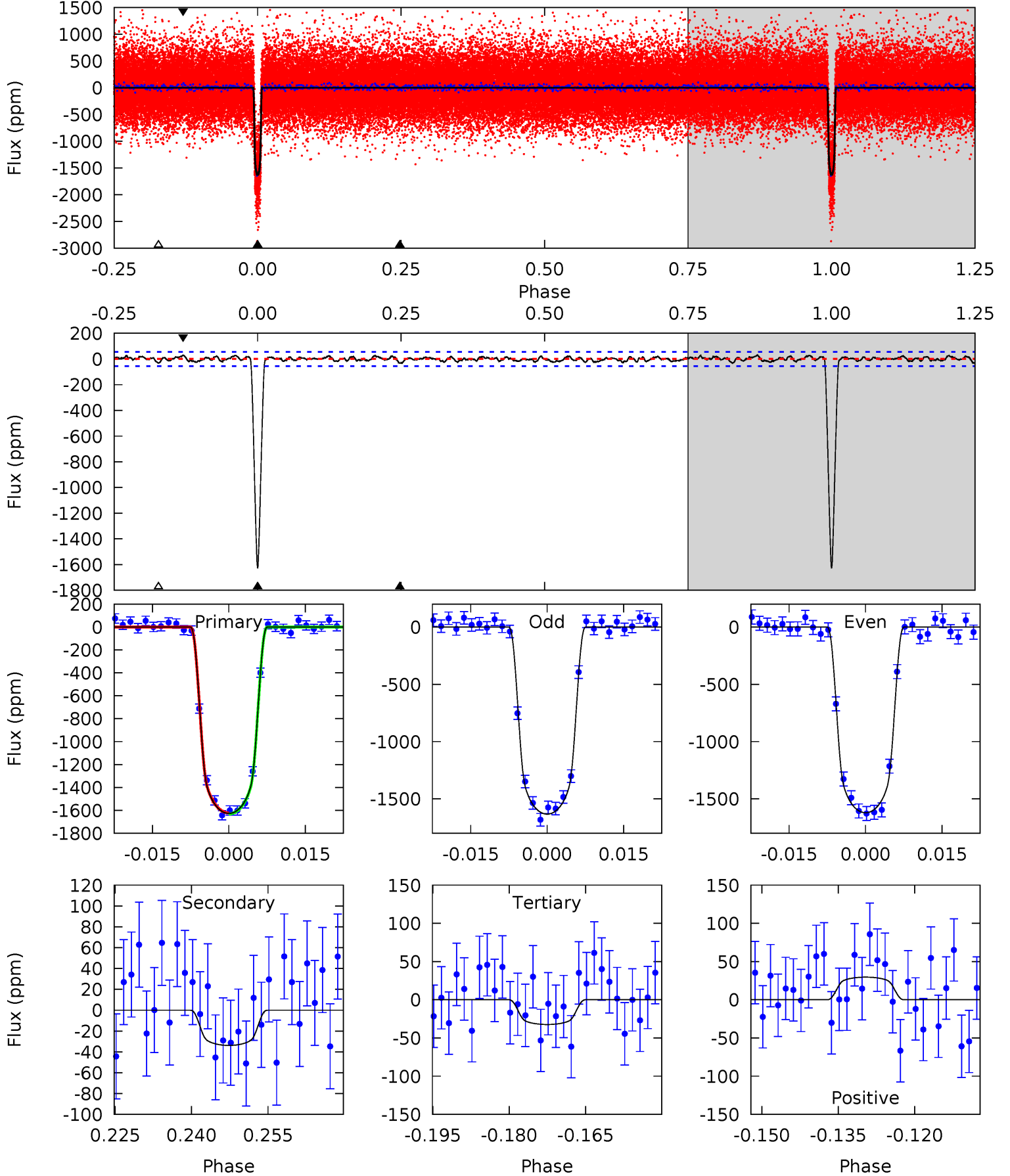
TCE 008162789-01 P= 10.161071 Days $T_0=141.514200$ (BKJD)



DV Model-Shift Uniqueness Test

008162789-01, P = 10.161015 Days, E = 131.357092 Days

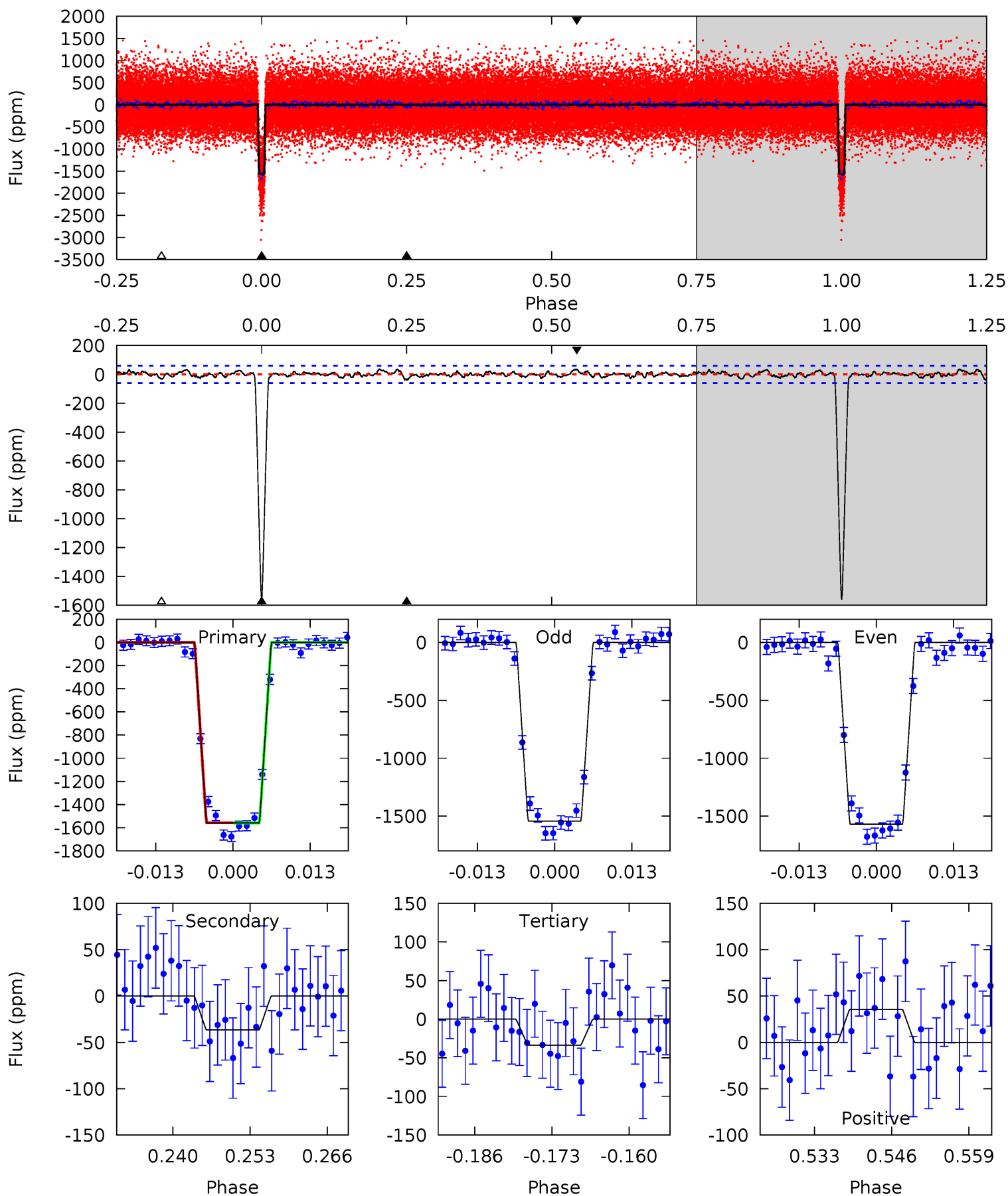
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
144.8	3.01	2.88	2.63	4.95	2.43	1.06	141.9	142.2	0.13	0.38	0.55	0.99	0.02	0.36



Alt Model-Shift Uniqueness Test

008162789-01, P = 10.161071 Days, E = 131.353129 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
130.2	3.06	2.82	2.97	4.97	2.48	1.04	127.4	127.3	0.24	0.08	1.10	1.01	0.02	0.06



Stellar Parameters For KIC 008162789

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6032^{+189}_{-232}	$4.387^{+0.108}_{-0.201}$	$-0.140^{+0.300}_{-0.300}$	$1.060^{+0.312}_{-0.168}$	$0.999^{+0.153}_{-0.126}$	$1.180^{+0.575}_{-0.617}$
	+3%/-4%	+2%/-5%	+214%/-214%	+29%/-16%	+15%/-13%	+49%/-52%
Source	KIC0	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 008162789-01 / KOI 0521.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-34 ± 11	$4.87^{+0.80}_{-0.54}$	1281^{+91}_{-82}	2927^{+143}_{-170}	$6.257^{+3.090}_{-2.360}$
Alt.	-37 ± 12	$4.67^{+0.78}_{-0.44}$	1274^{+98}_{-75}	2994^{+149}_{-177}	$7.454^{+3.376}_{-2.815}$

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

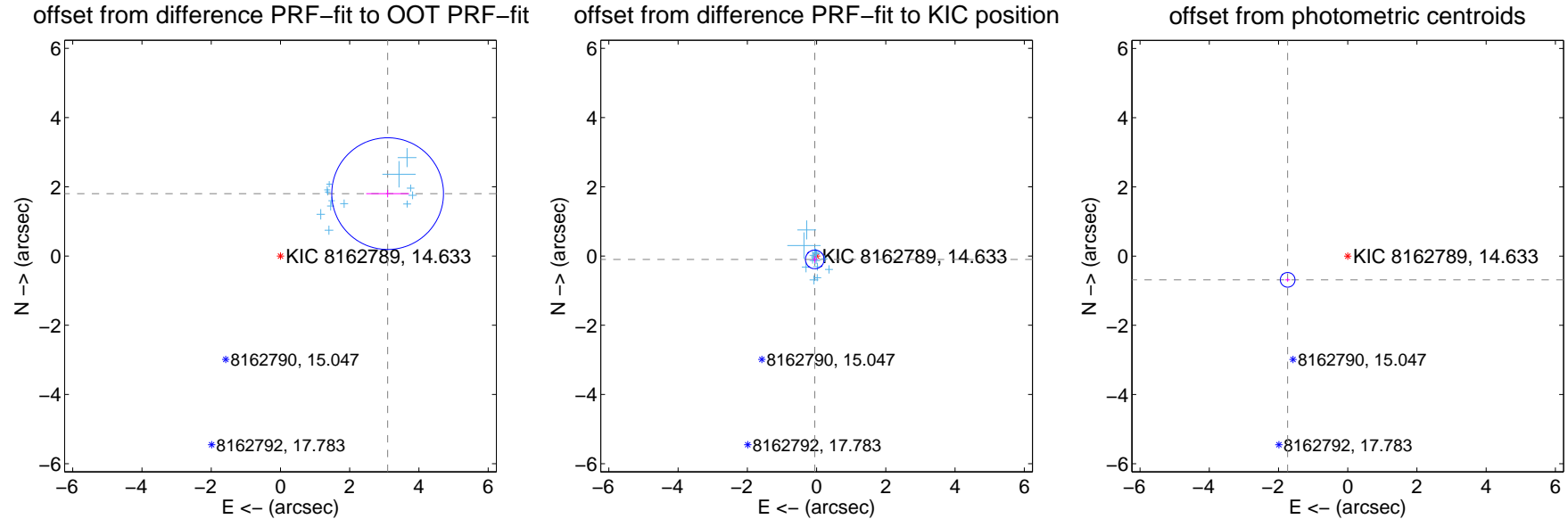
DV Centroid Data

Supplemental centroid analysis for 008162789-01. Kepler magnitude: 14.63. Transit SNR 102.73

There are 17 quarters with good PRF difference image offsets

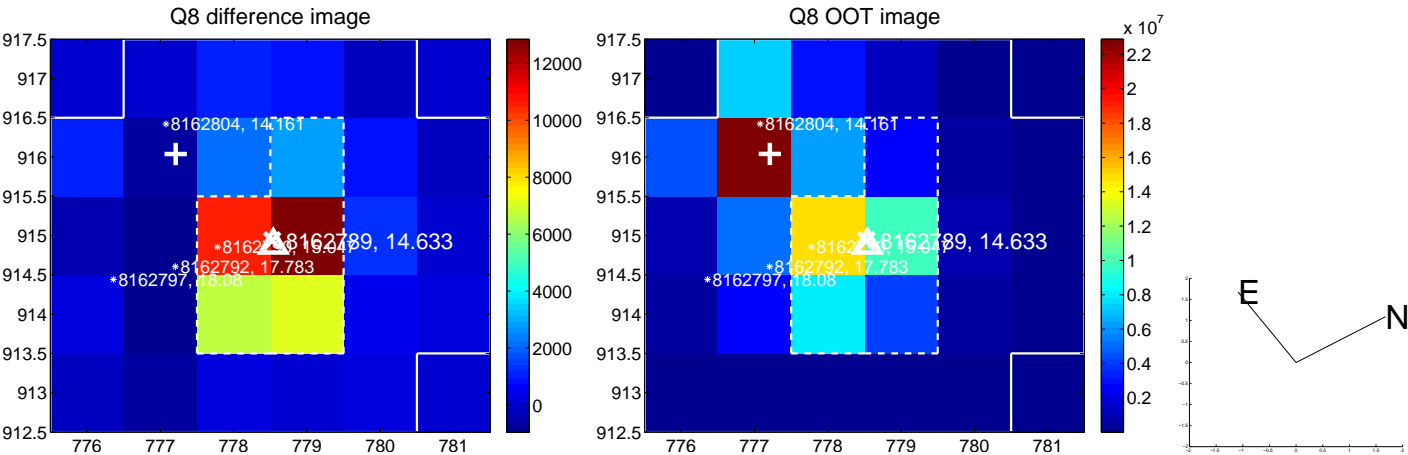
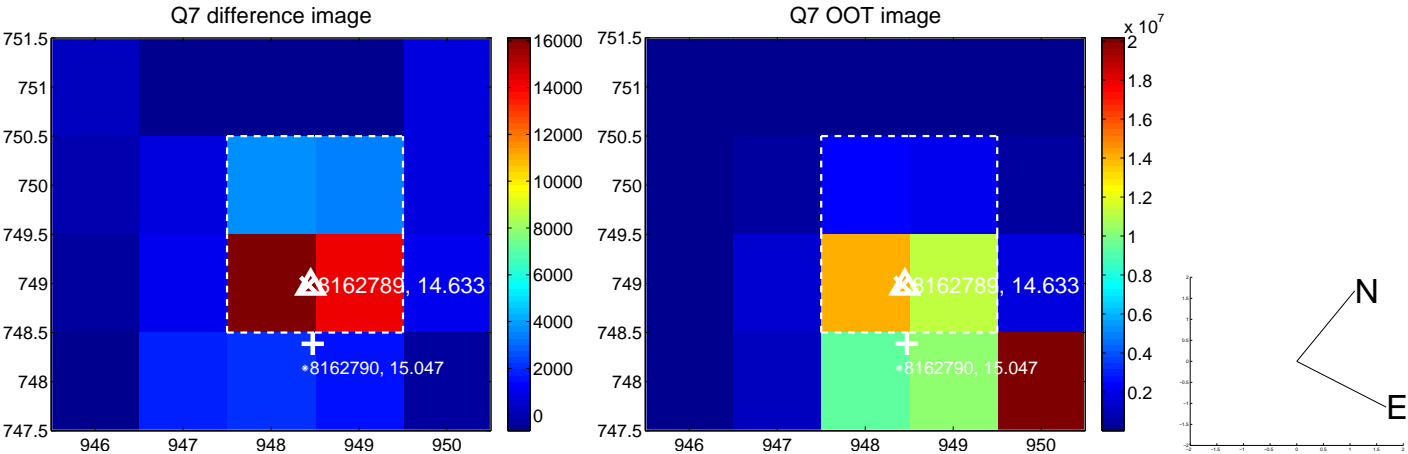
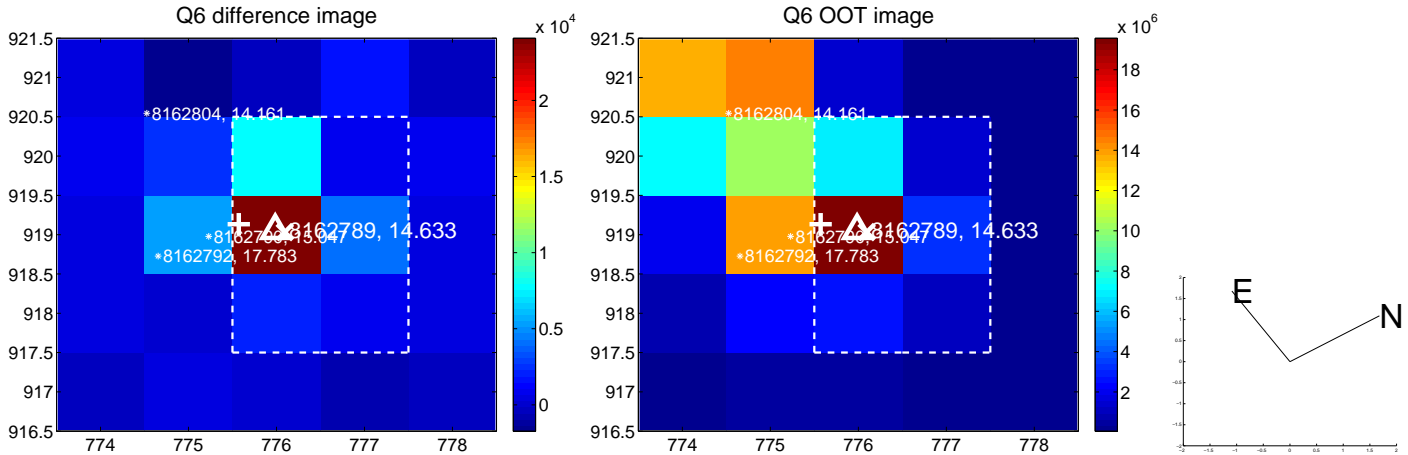
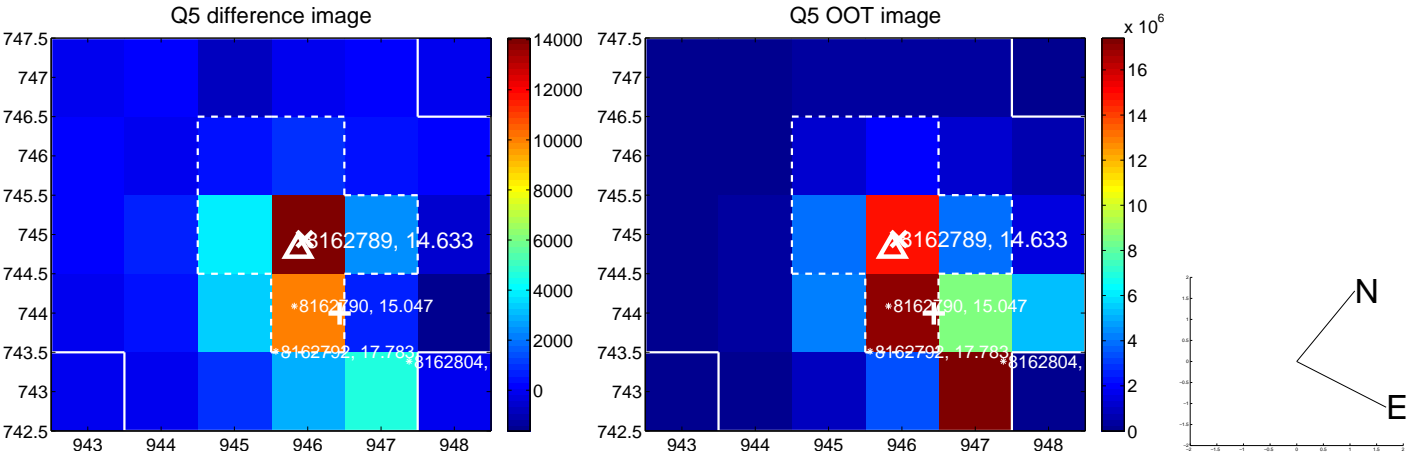
The OOT PRF centroid is offset from the target star catalog position by about 4.31 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	3.581 ± 0.538	6.66	-3.095 ± 0.619	1.802 ± 0.108
PRF-fit source offset from KIC position	0.111 ± 0.090	1.24	0.052 ± 0.071	-0.099 ± 0.094
photometric centroid source offset	1.87 ± 0.07	26.44	1.74 ± 0.07	-0.69 ± 0.05

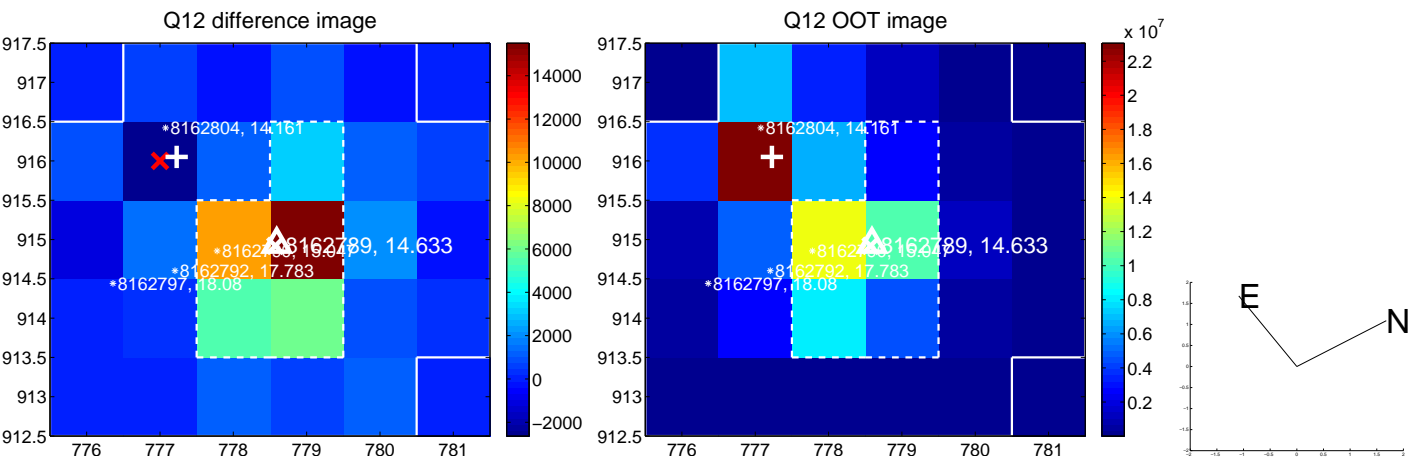
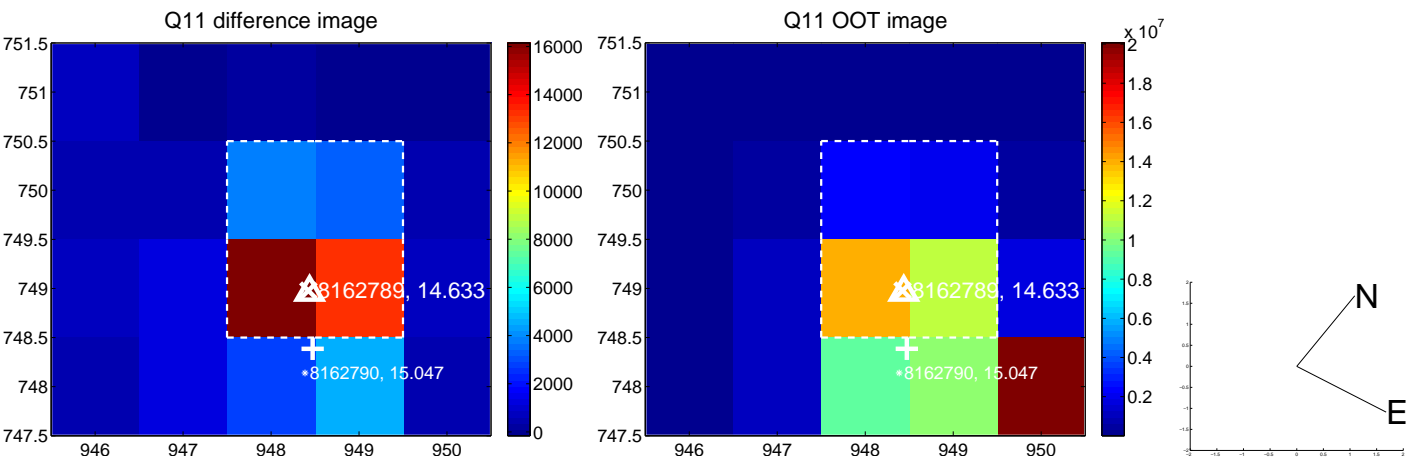
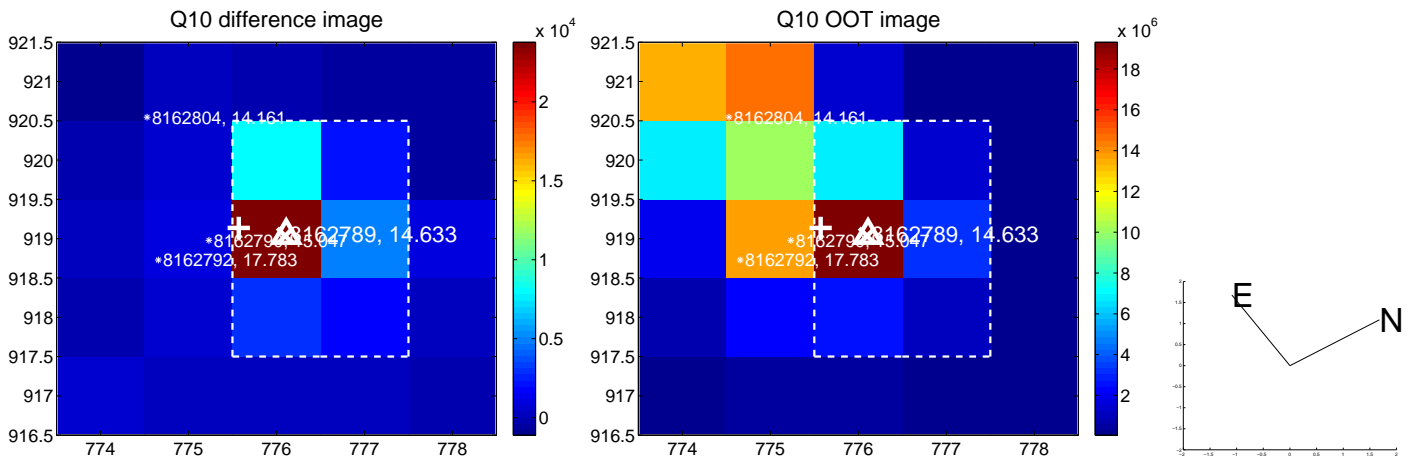
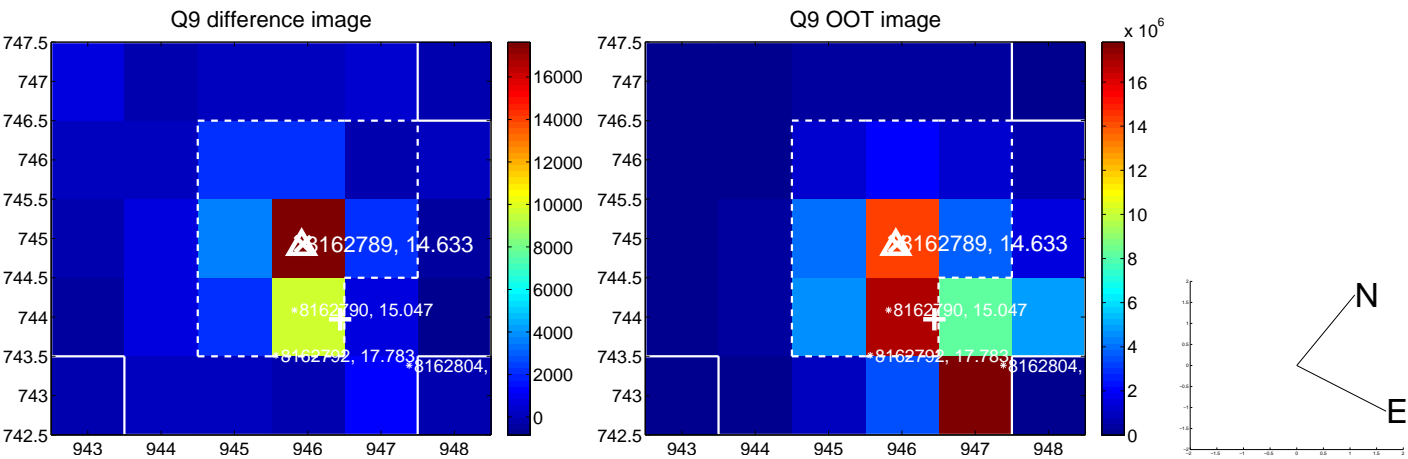


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

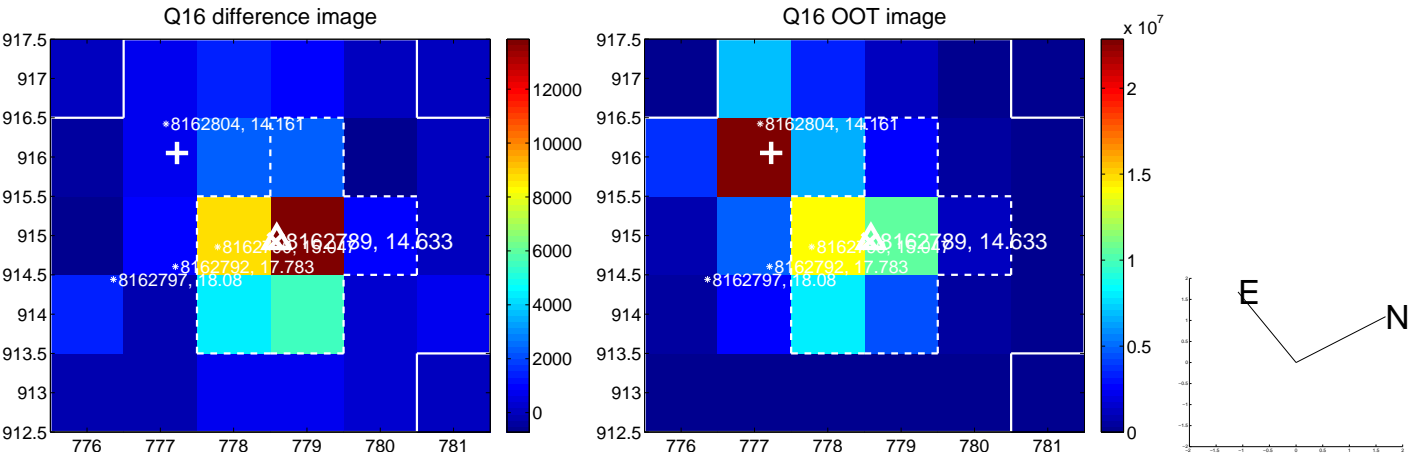
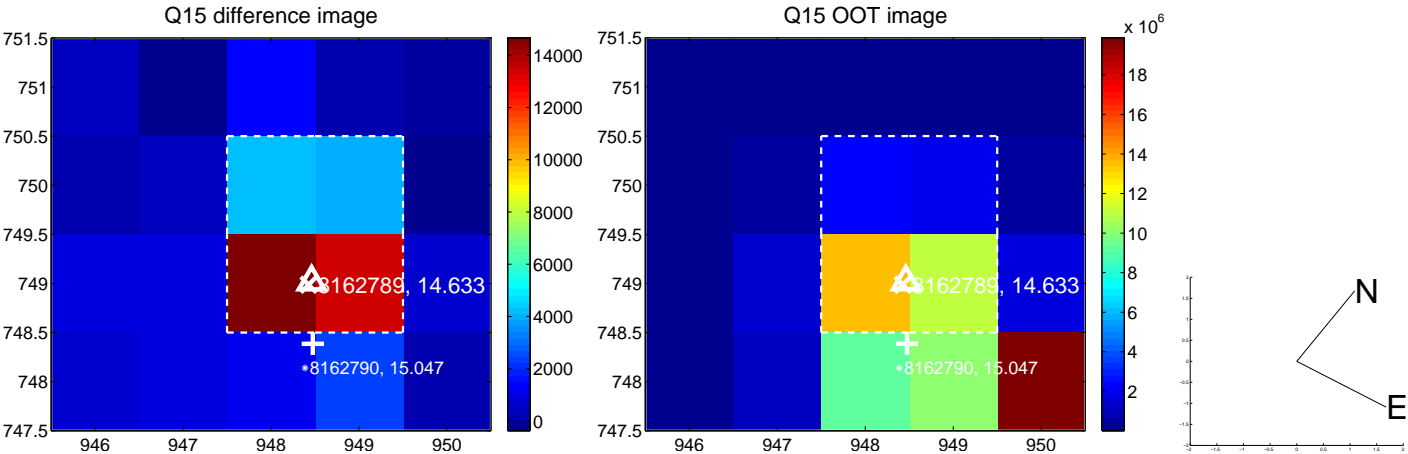
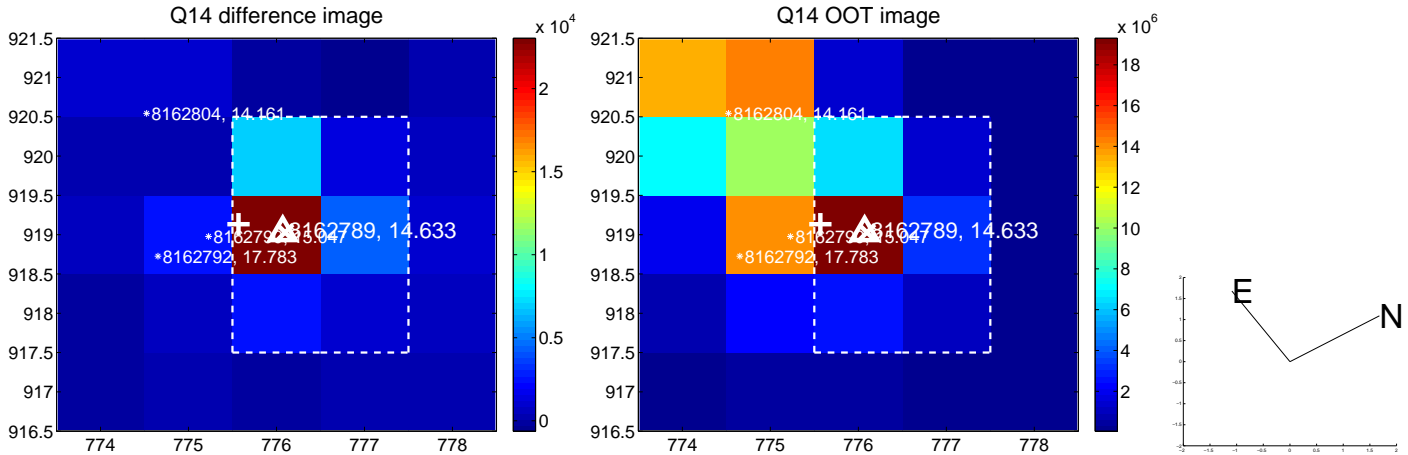
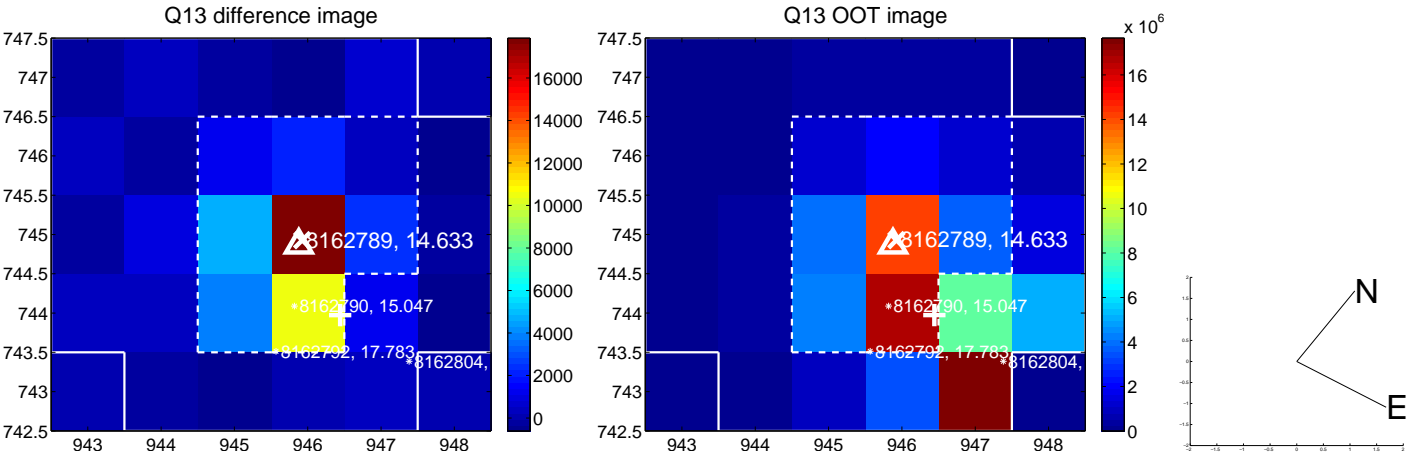
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



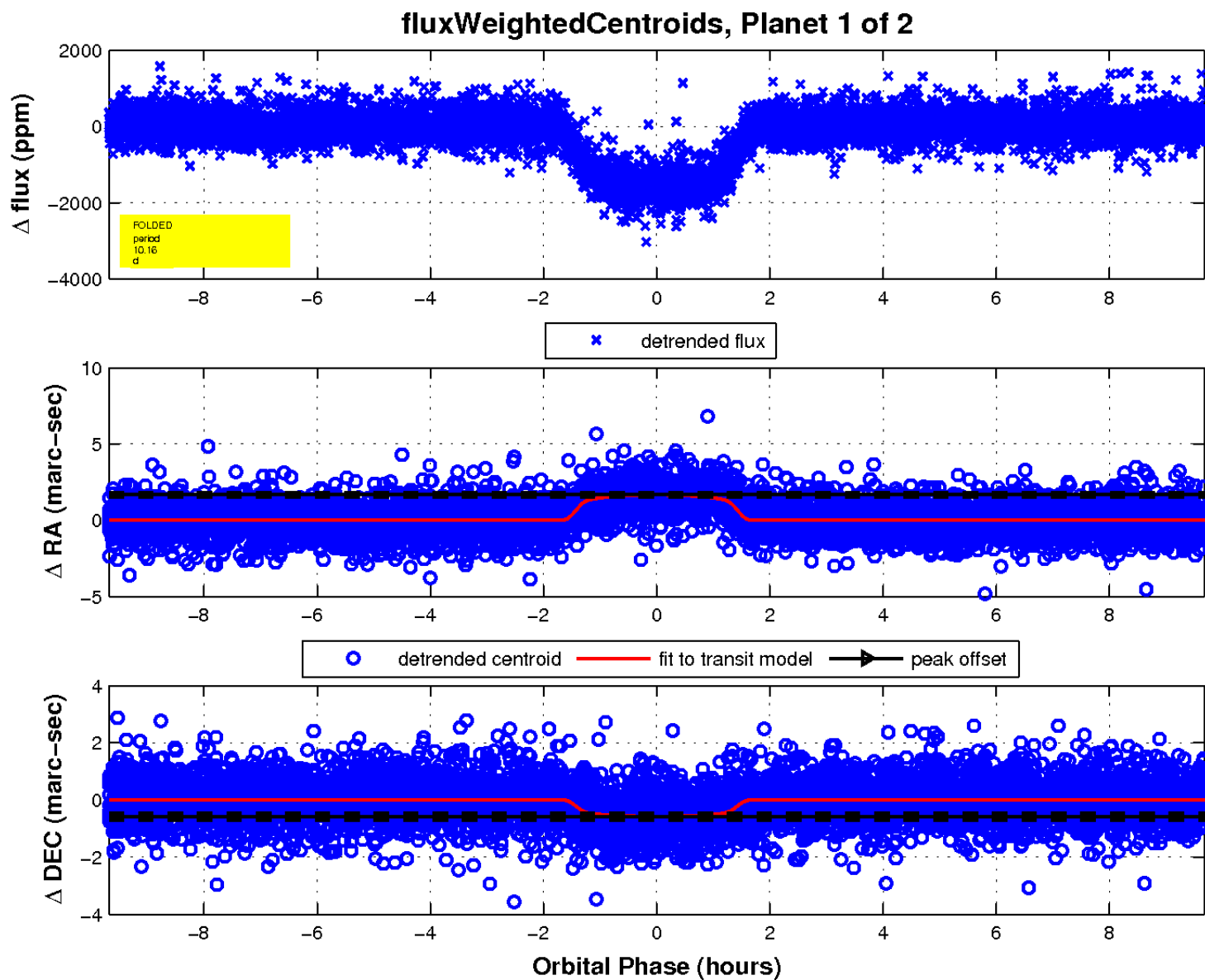
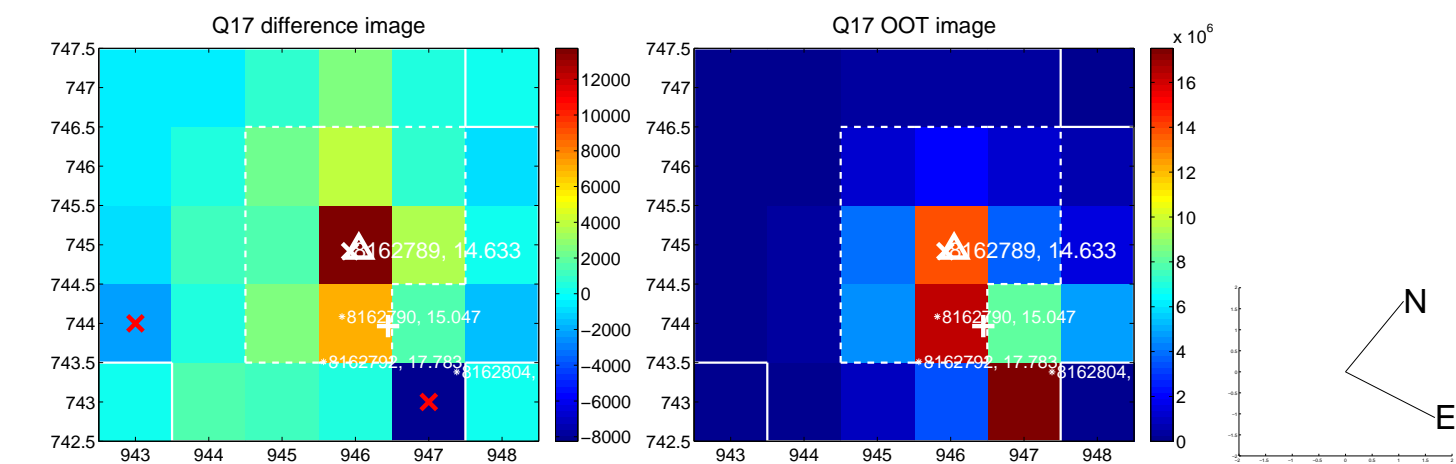
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

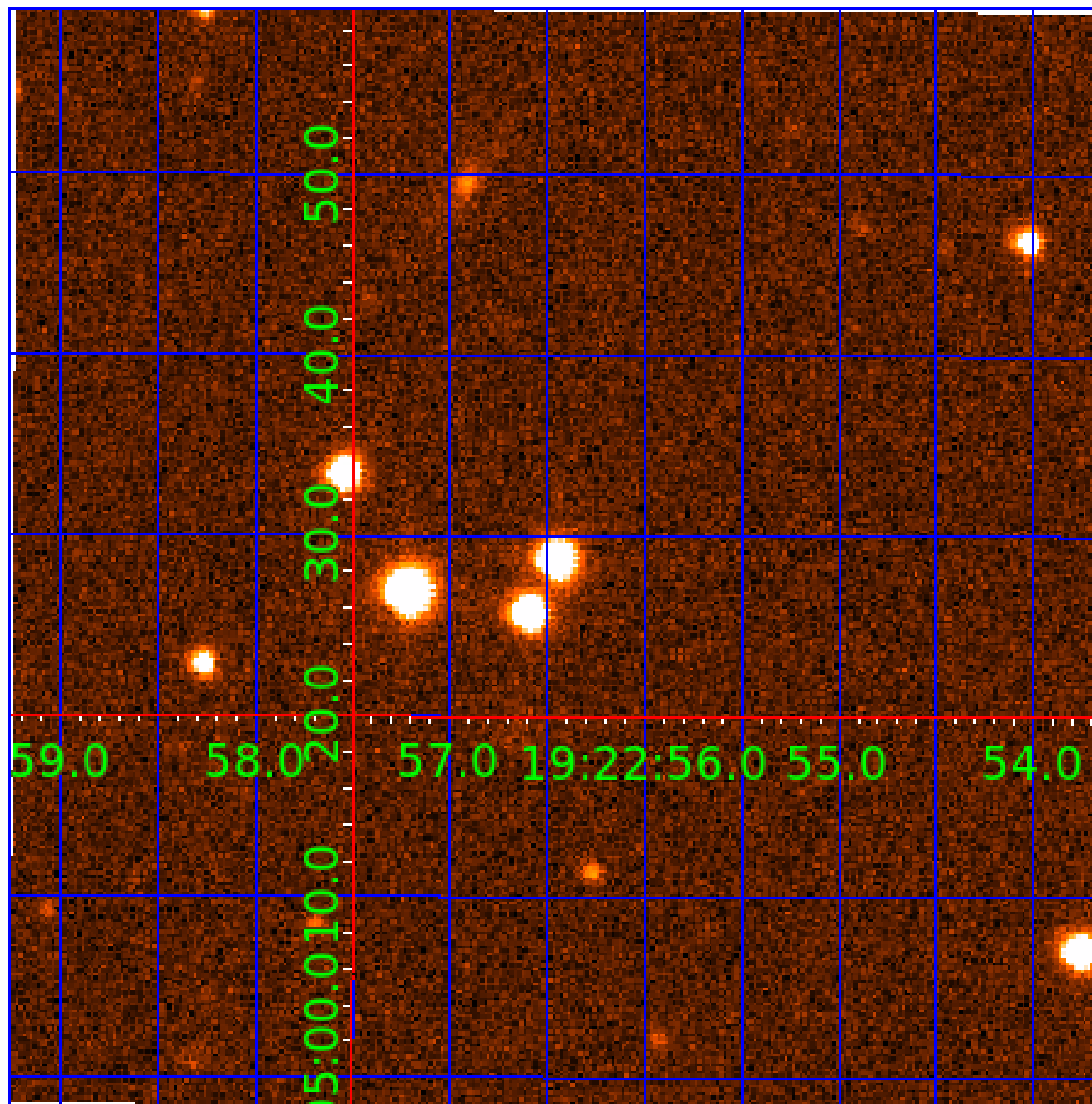


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008162789

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})
008162789-01	OBS	0521.01	10.161015	141.518107	1627.9	3.232	102.0	102.7	1.06	6032	4.76	158.13
008162789-02	OBS	0521.02	5.410380	135.085998	119.8	2.671	8.7	9.7	1.06	6032	1.30	366.42

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008162789-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
008162789-02	OBS	PC	0.98	0	0	0	0	CENT_KIC_POS

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

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

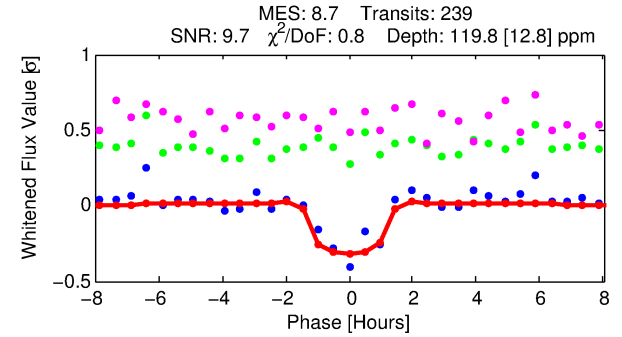
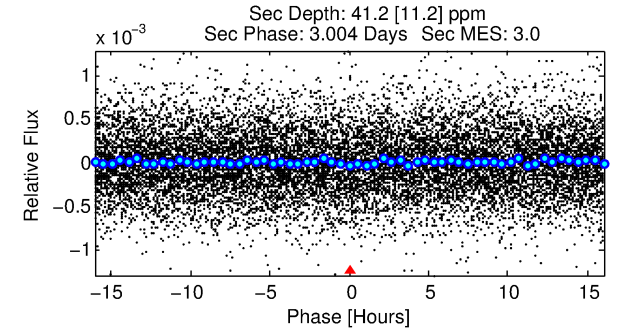
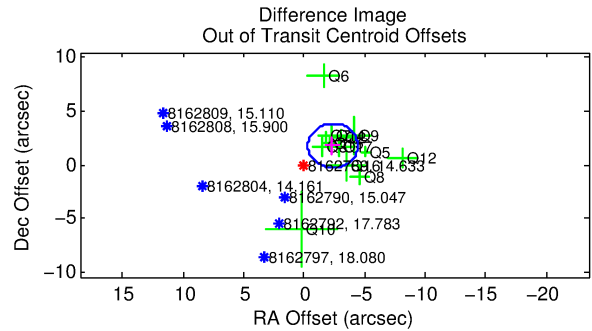
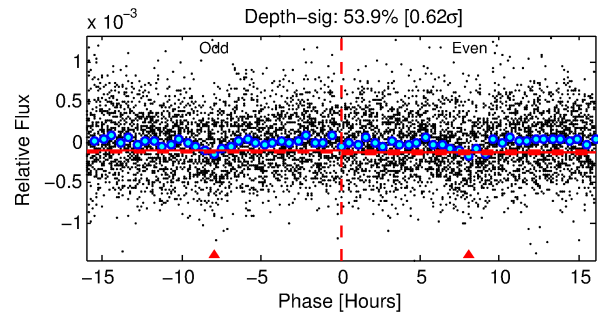
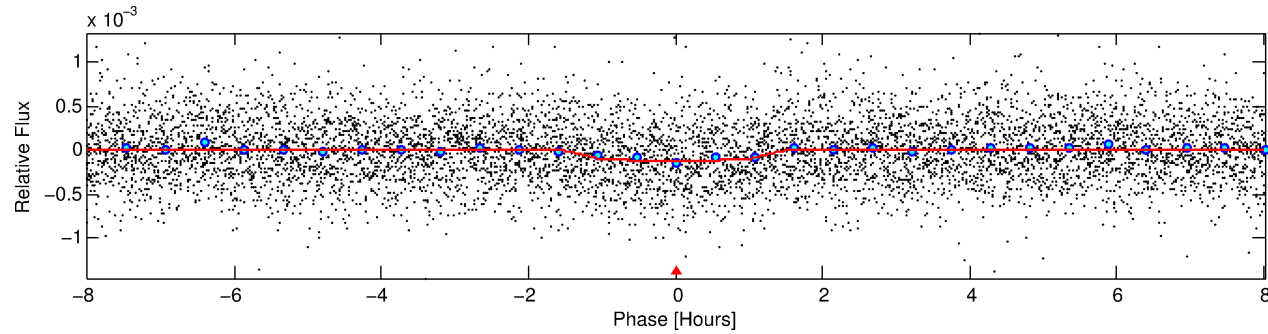
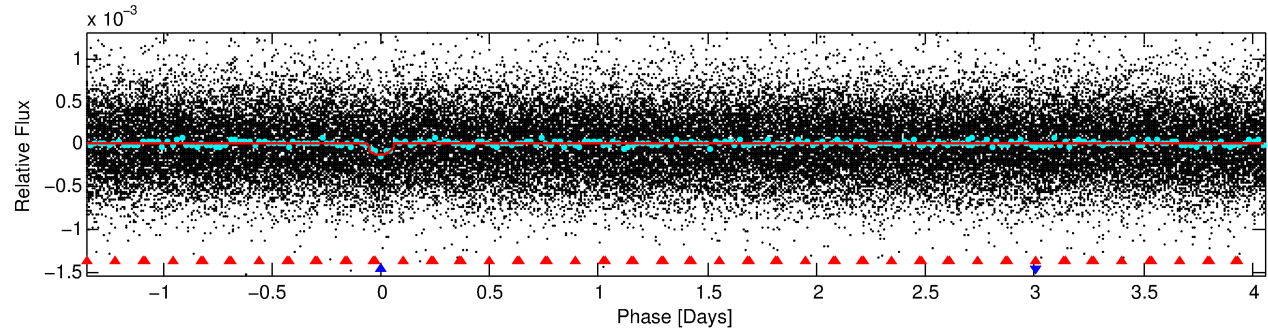
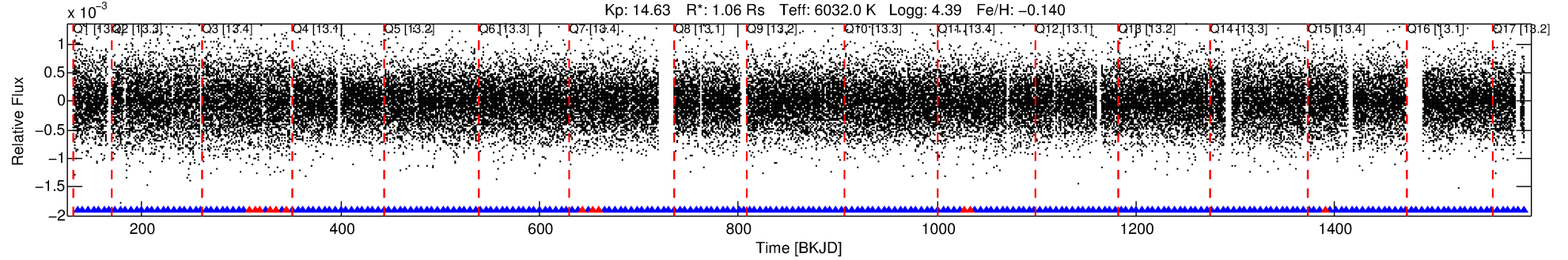
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008162789-02

No Significant Match Found

DV One-Page Summary

KIC: 8162789 Candidate: 2 of 2 Period: 5.410 d
KOI: K00521 Corr: No Ephemeris Match



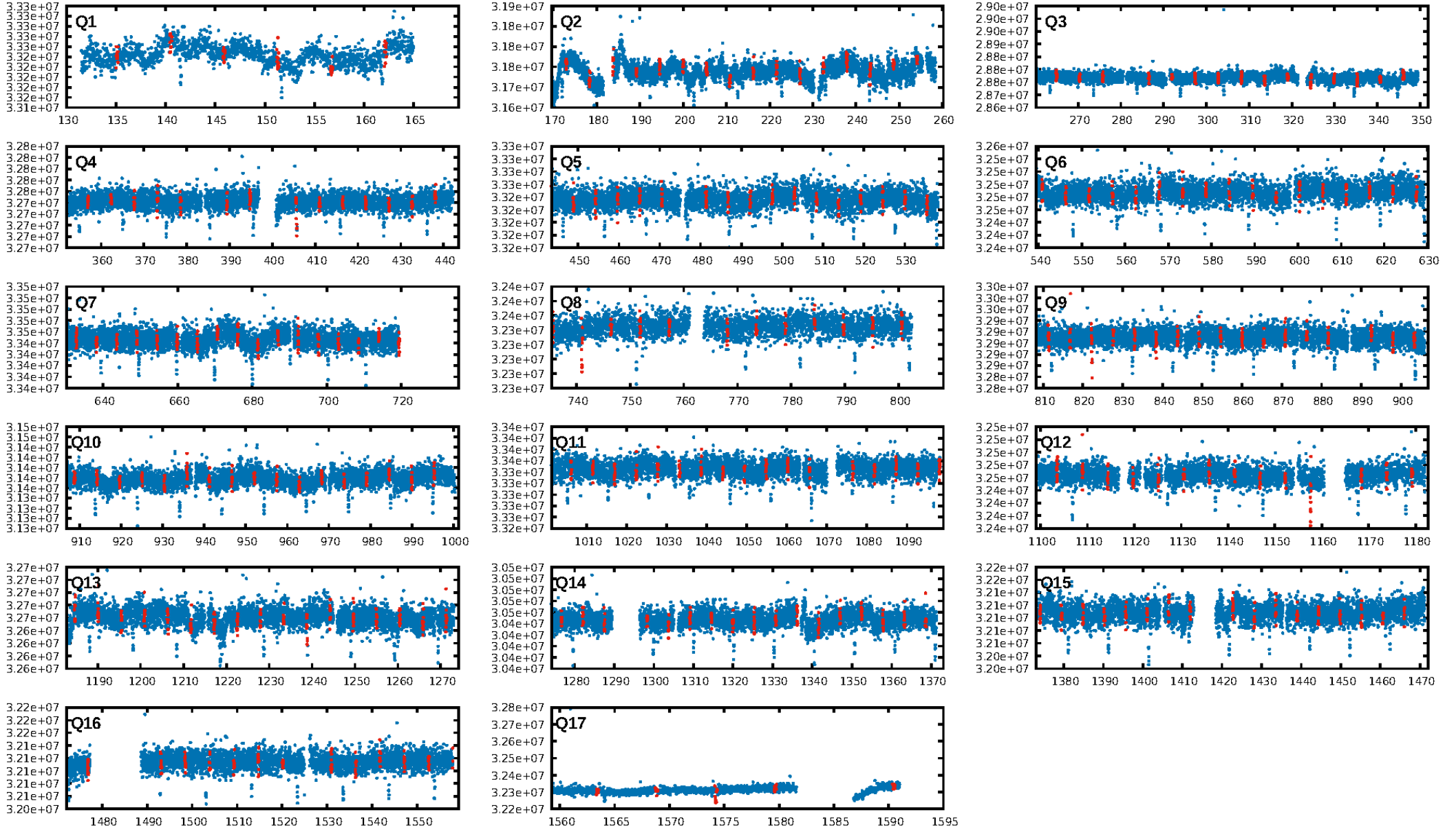
DV Fit Results:

Period = 5.41038 [0.00004] d
Epoch = 135.0860 [0.0051] BKJD
Rp/R* = 0.0112 [0.0066]
a/R* = 9.22 [26.91]
b = 0.82 [1.20]
Seff = 366.42 [145.36]
Teff = 1116 [111] K
Rp = 1.30 [0.86] Re
a = 0.0603 [0.0151] AU
Ag = 48.96 [61.99] [0.77 σ]
Teffp = 4563 [1394] K [2.47 σ]

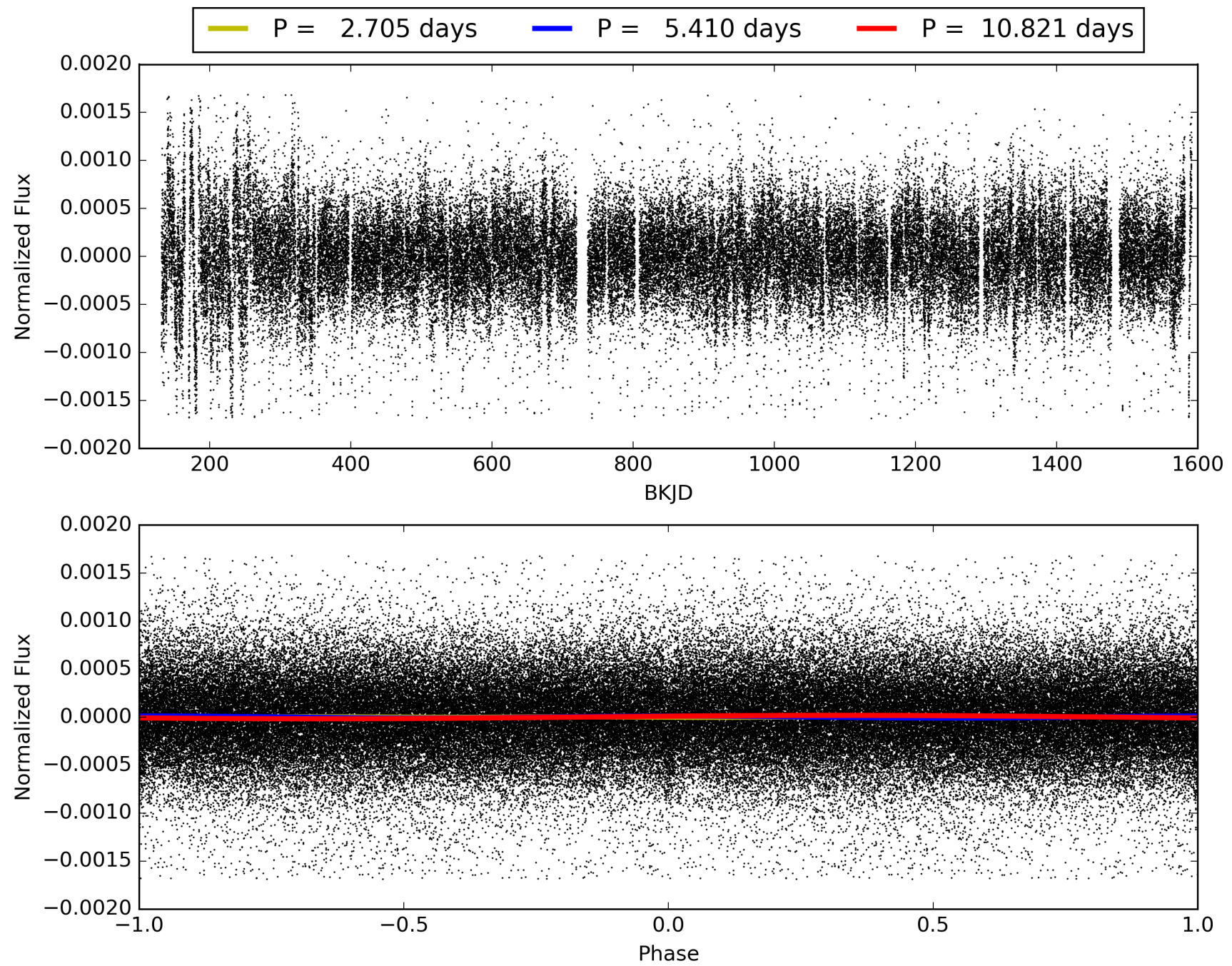
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [27.19 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.15e-17
RollingBand-fgt: 0.95 [217/229]
GhostDiagnostic-chr: 5.582
Centroid-sig: 11.3%
Centroid-so: 2.051 arcsec [2.74 σ]
OotOffset-rm: 2.938 arcsec [4.27 σ]
KicOffset-rm: 0.518 arcsec [1.43 σ]
OotOffset-st: 4/3/3/3 [13]
KicOffset-st: 4/3/3/3 [13]
DiffImageQuality-fgm: 0.15 [2/13]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 008162789-02, PDC Light Curves

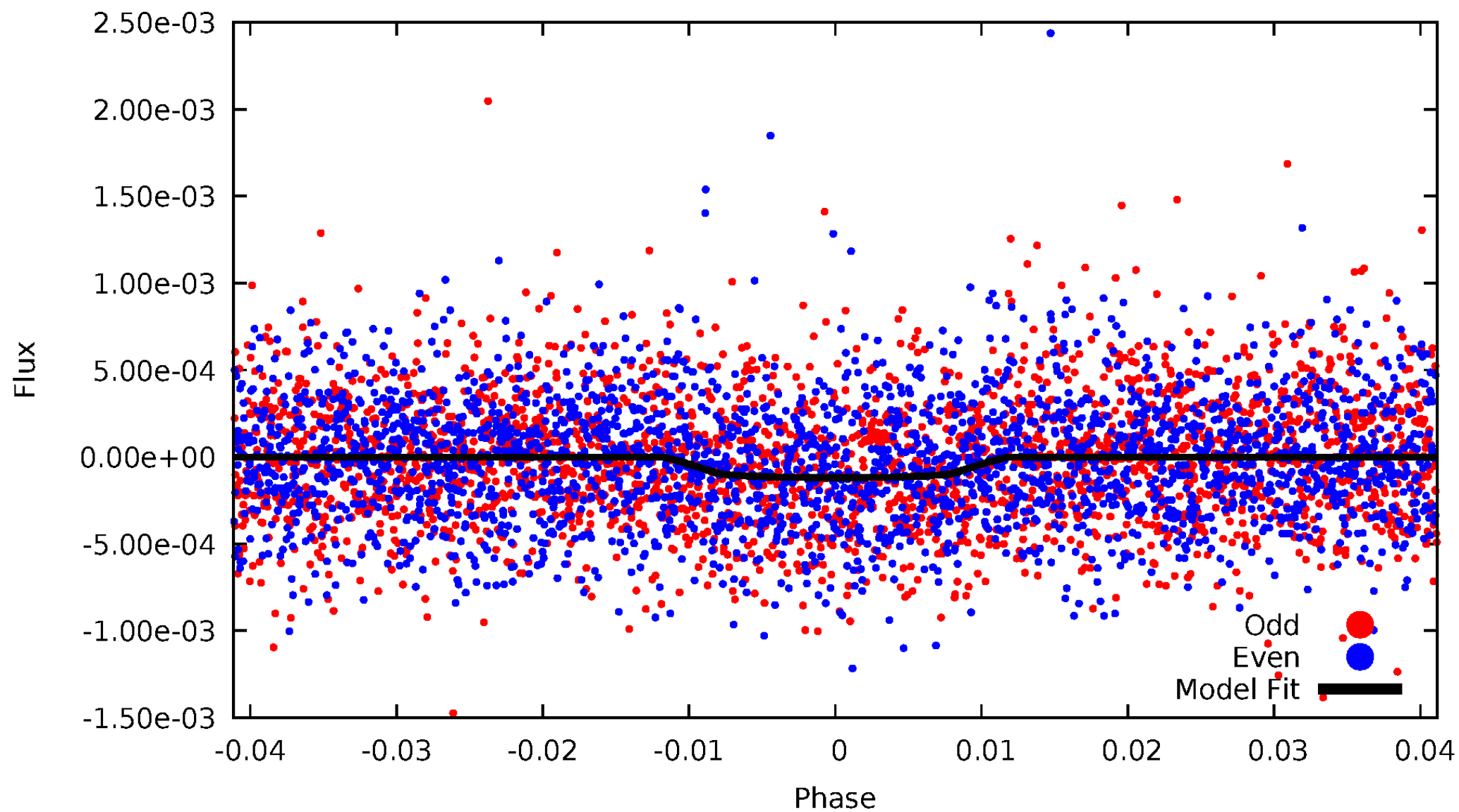


TCE 008162789-02



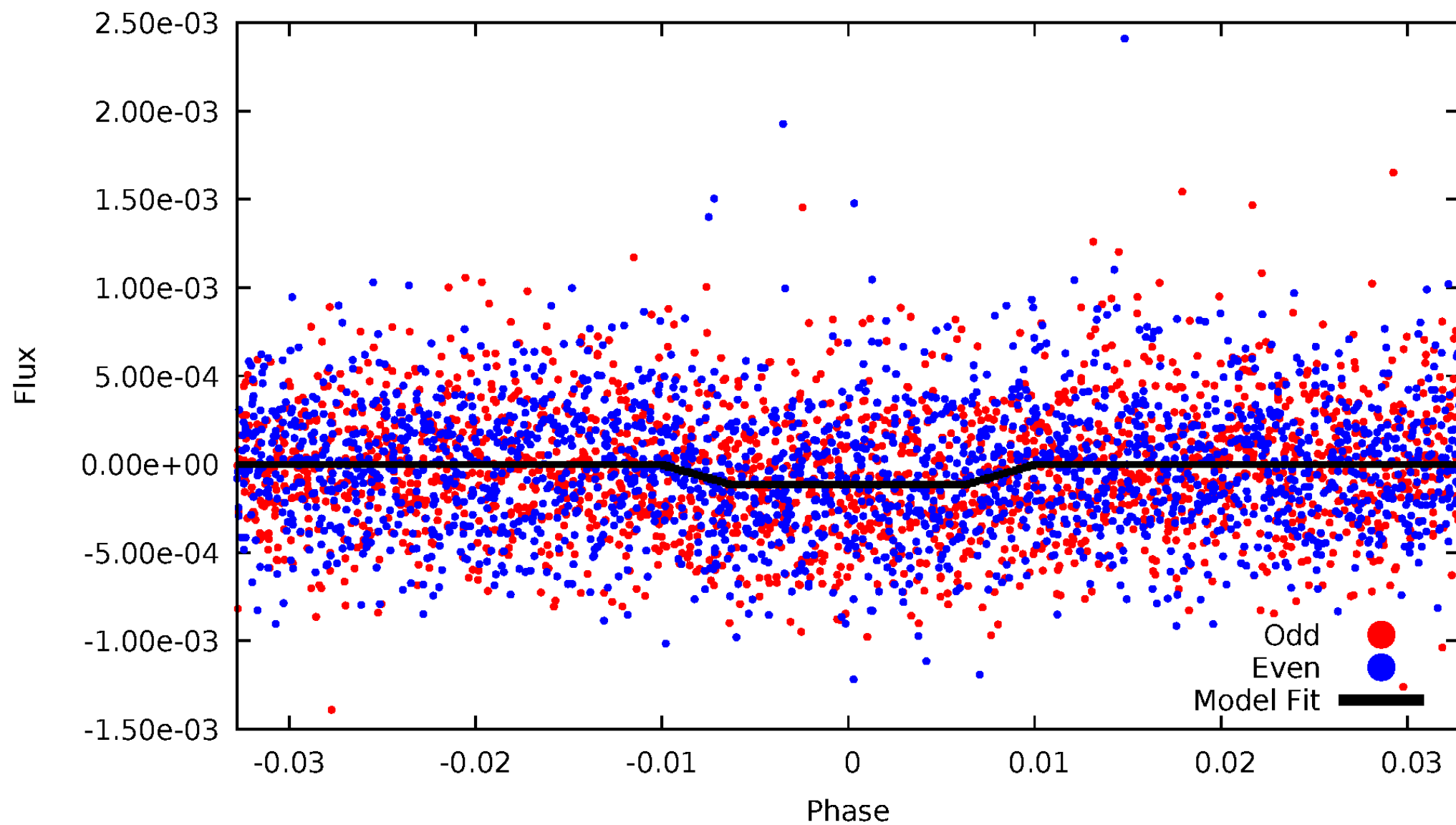
DV Odd/Even

TCE 008162789-02



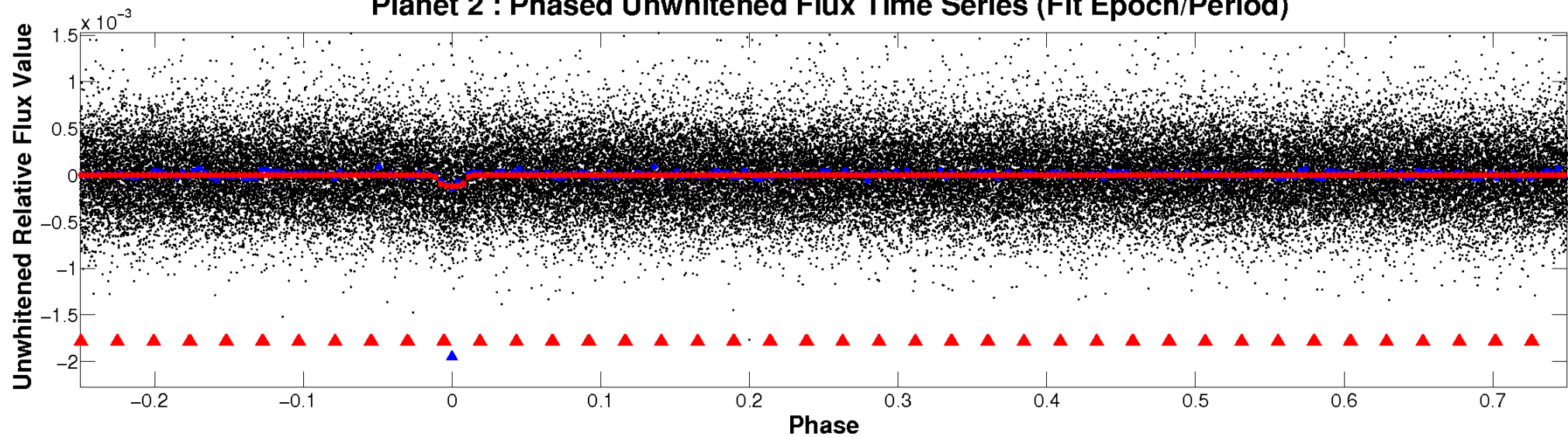
ALT Odd/Even

TCE 008162789-02

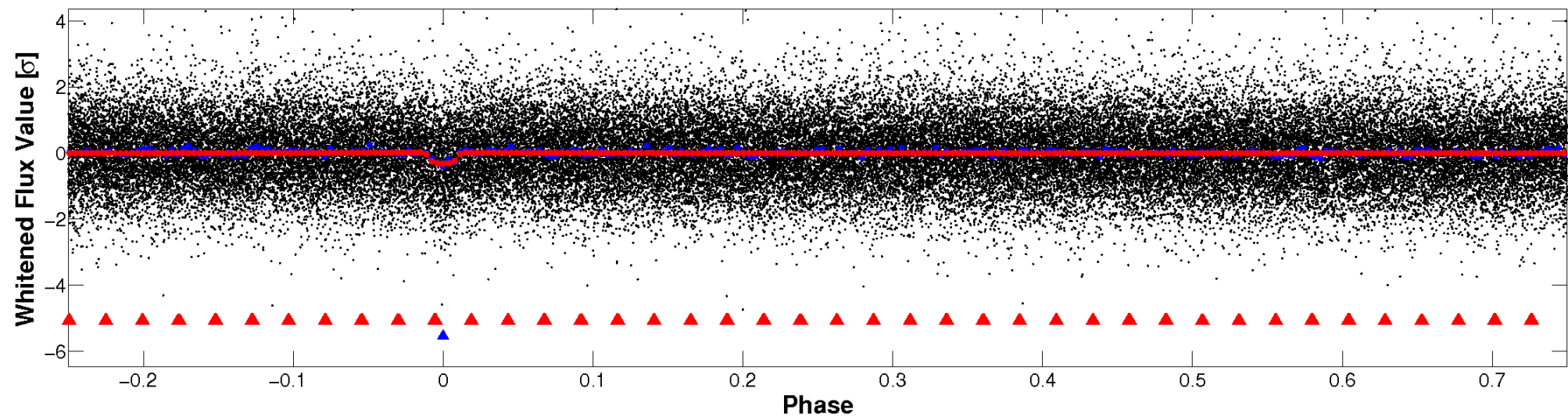


Non-Whitened Vs. Whitened Light Curve

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

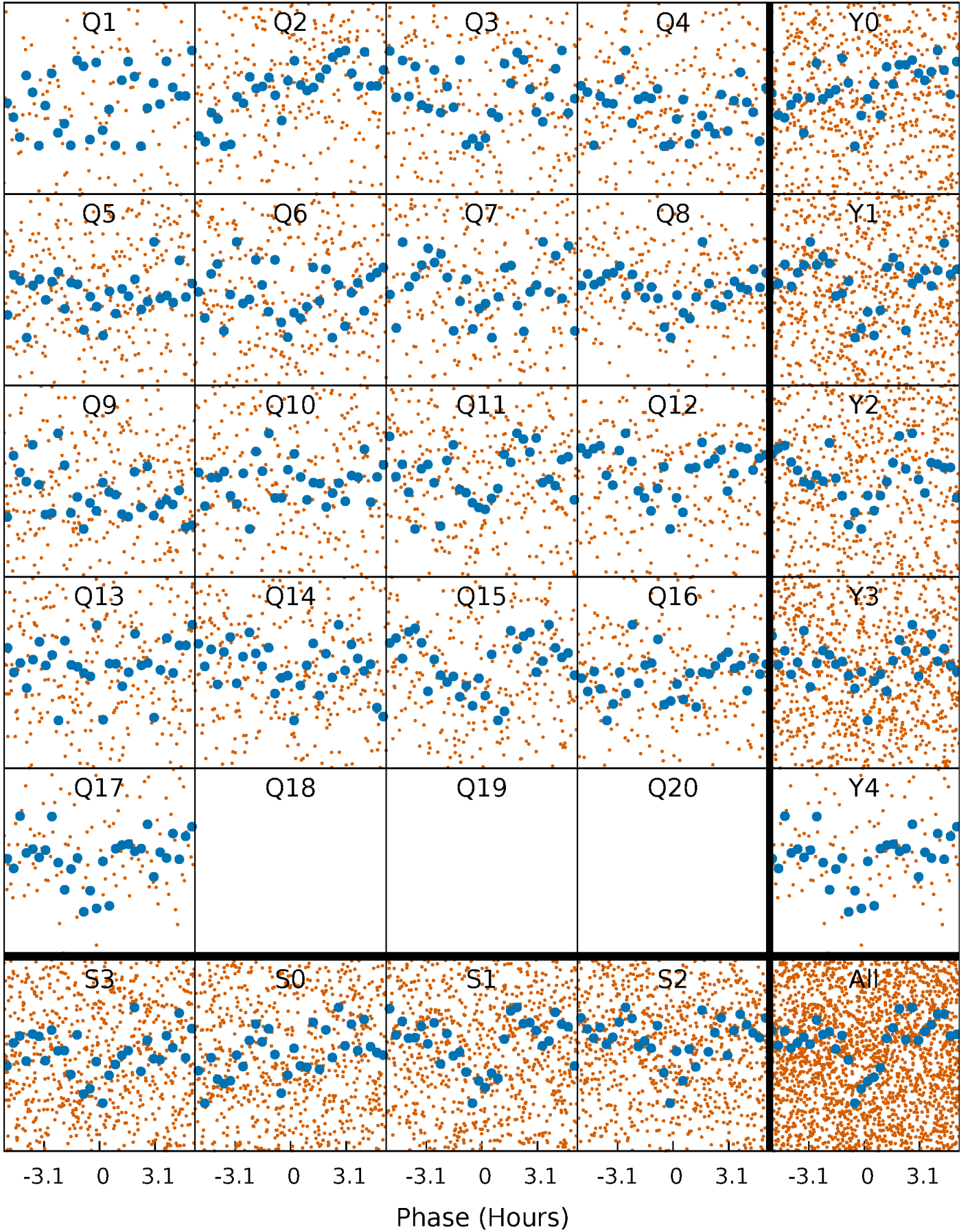


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



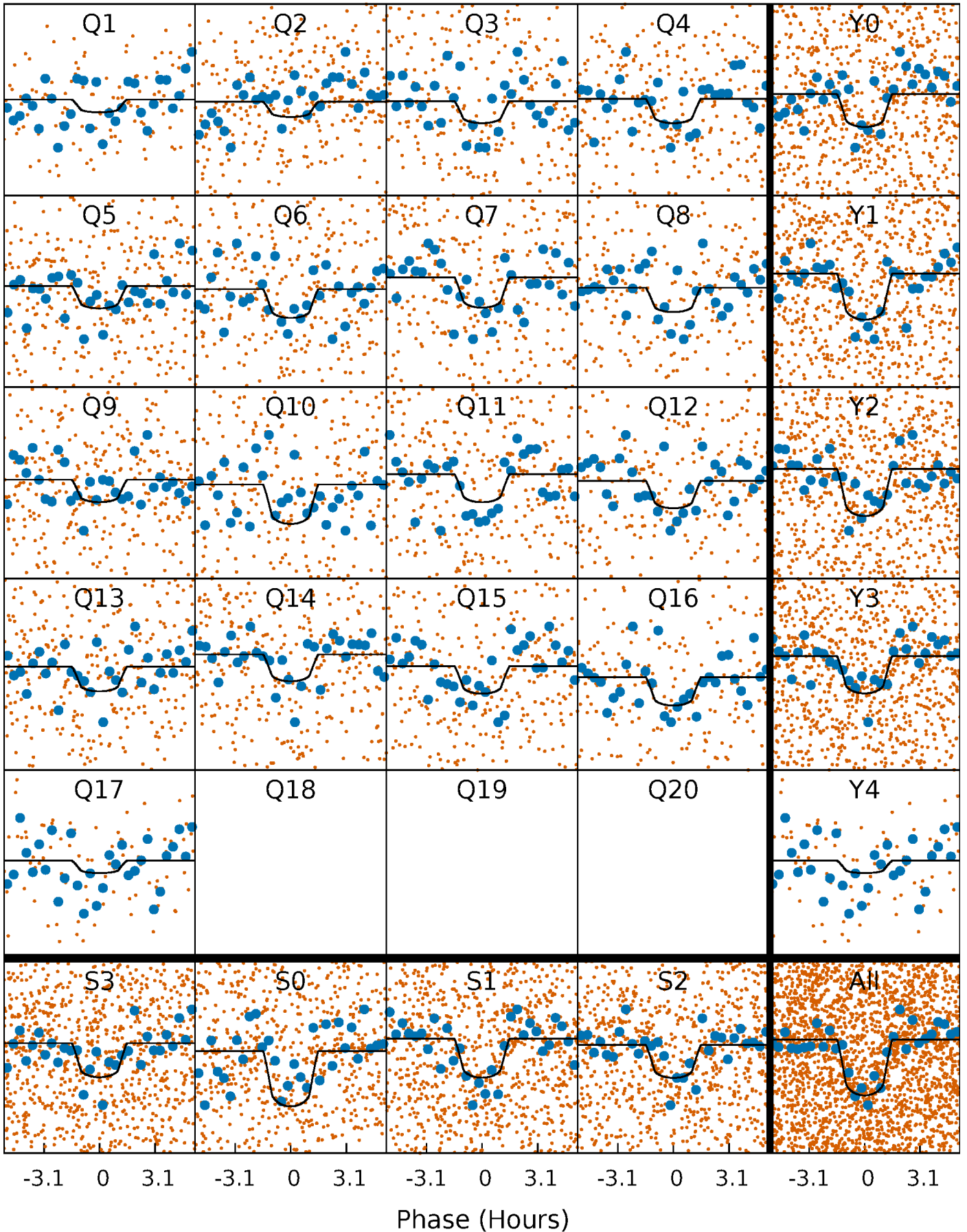
PDC Quarter-Phased Transit Curves

TCE 008162789-02 $P = 5.410380$ Days $T_0 = 135.085998$ (BKJD)



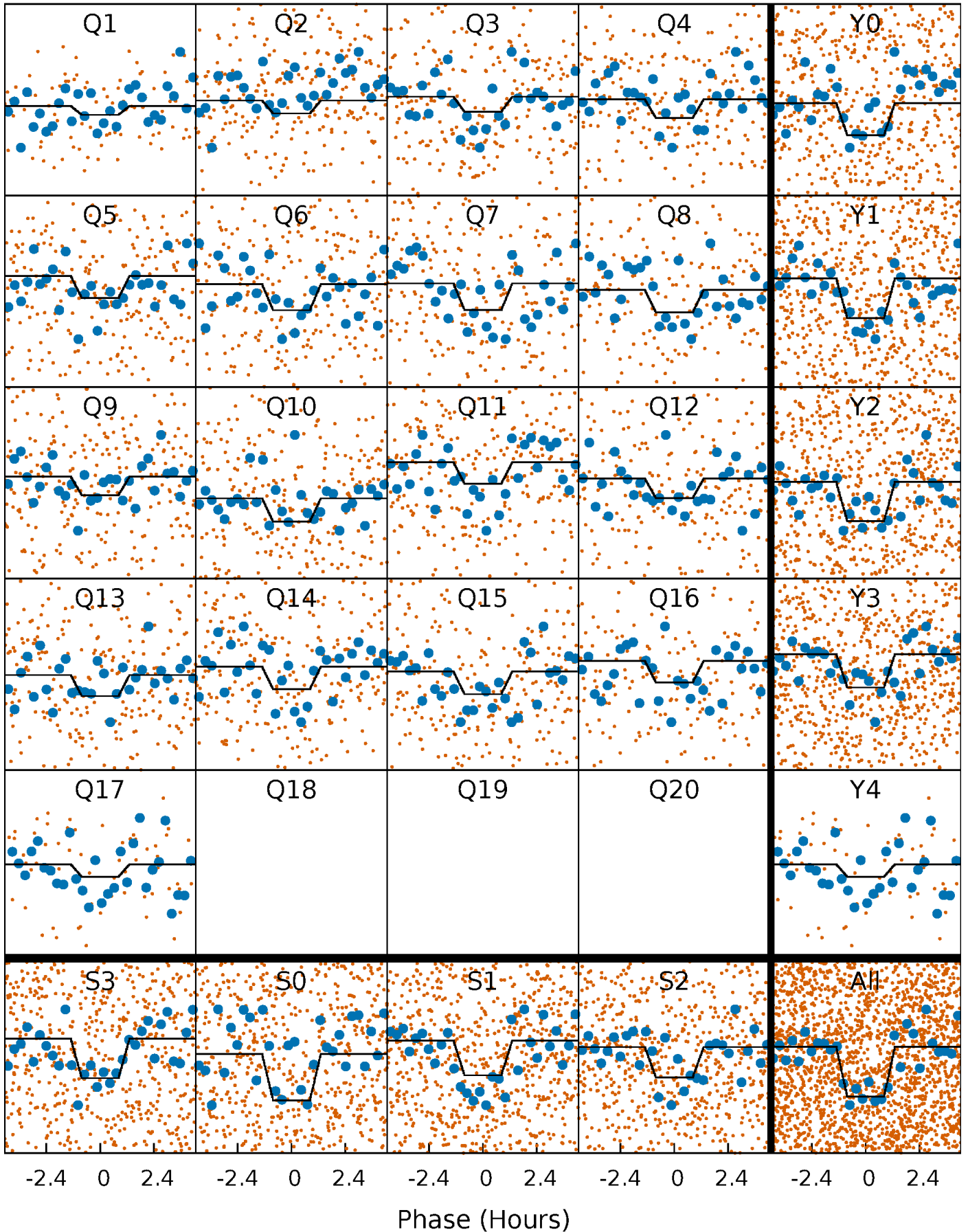
DV Quarter-Phased Transit Curves

TCE 008162789-02 P= 5.410380 Days $T_0=135.085998$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

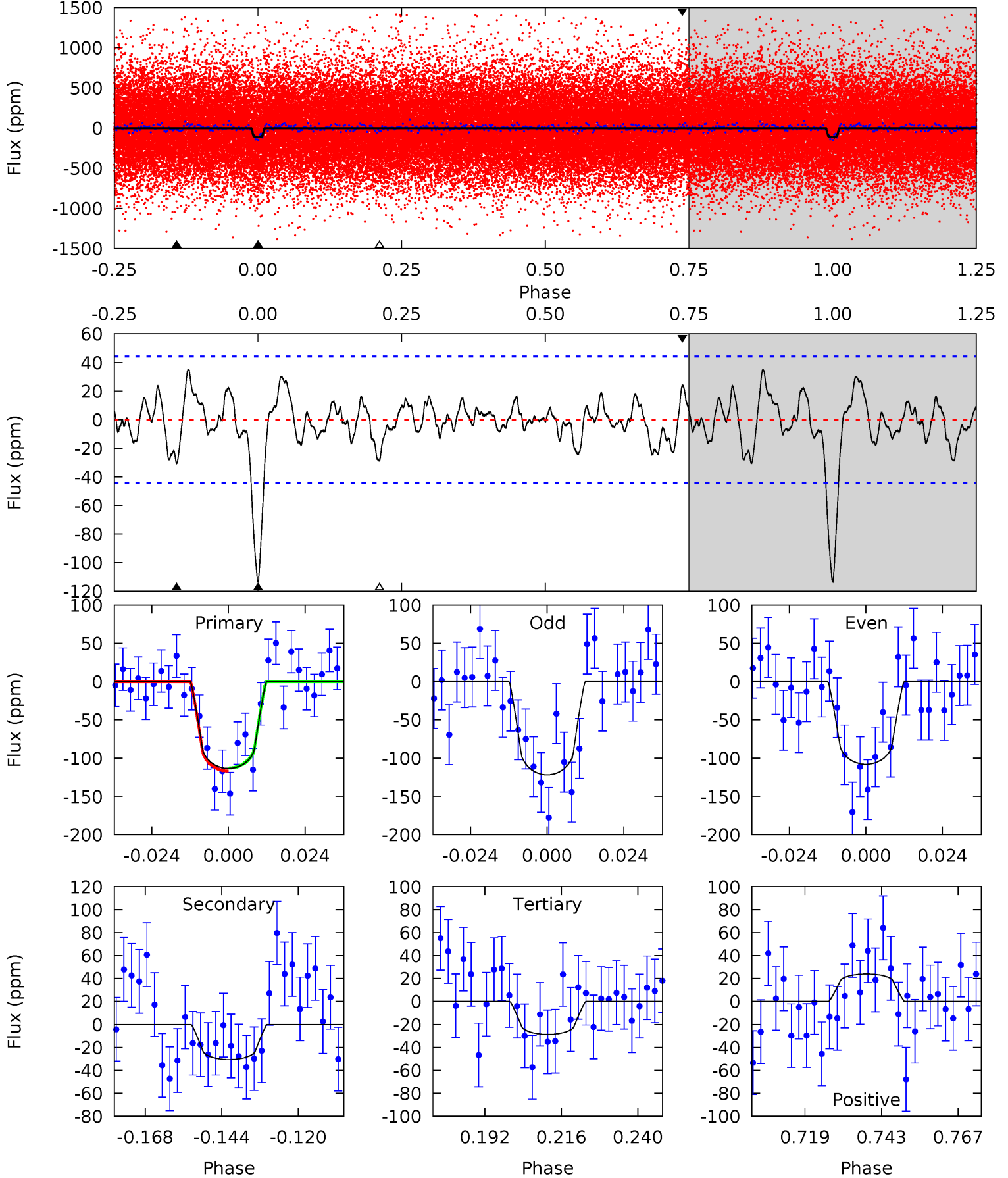
TCE 008162789-02 P= 5.410298 Days $T_0=135.095688$ (BKJD)



DV Model-Shift Uniqueness Test

008162789-02, P = 5.410380 Days, E = 129.675618 Days

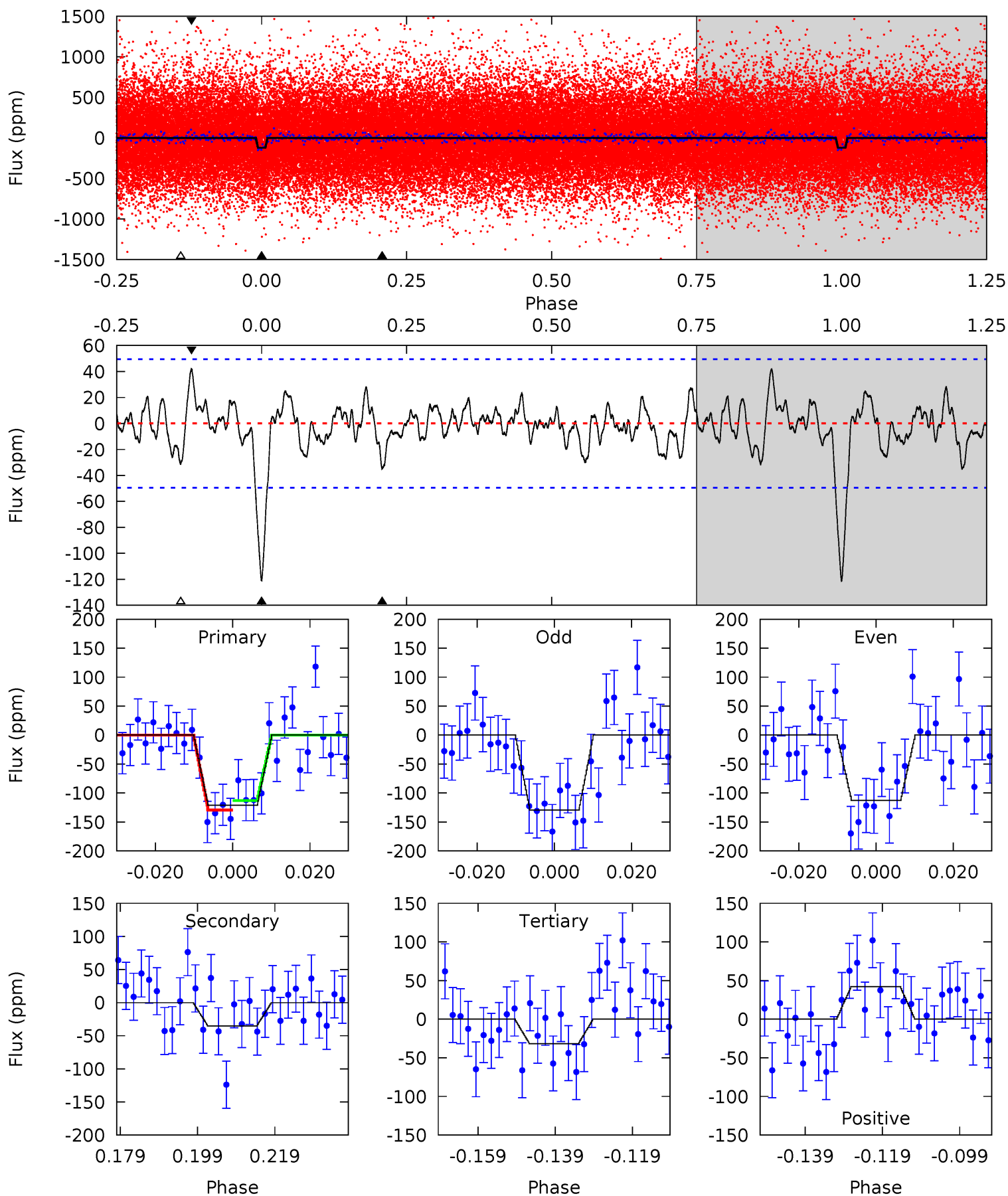
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.5	3.36	3.16	2.63	4.86	2.26	1.21	9.31	9.84	0.20	0.73	0.76	0.87	0.24	0.21



Alt Model-Shift Uniqueness Test

008162789-02, P = 5.410298 Days, E = 129.685390 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.0	3.48	3.14	4.18	4.89	2.33	1.21	8.85	7.81	0.35	-0.69	0.81	0.74	0.26	0.81



Stellar Parameters For KIC 008162789

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6032^{+189}_{-232}	$4.387^{+0.108}_{-0.201}$	$-0.140^{+0.300}_{-0.300}$	$1.060^{+0.312}_{-0.168}$	$0.999^{+0.153}_{-0.126}$	$1.180^{+0.575}_{-0.617}$
	+3%/-4%	+2%/-5%	+214%/-214%	+29%/-16%	+15%/-13%	+49%/-52%
Source	KIC0	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 008162789-02 / KOI 0521.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-31 ± 9	$1.37^{+0.87}_{-0.74}$	1576^{+124}_{-92}	4341^{+1766}_{-701}	32^{+110}_{-20}
Alt.	-35 ± 10	$1.32^{+0.75}_{-0.74}$	1575^{+109}_{-96}	4607^{+1999}_{-768}	40^{+179}_{-24}

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming A=0.3)

A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

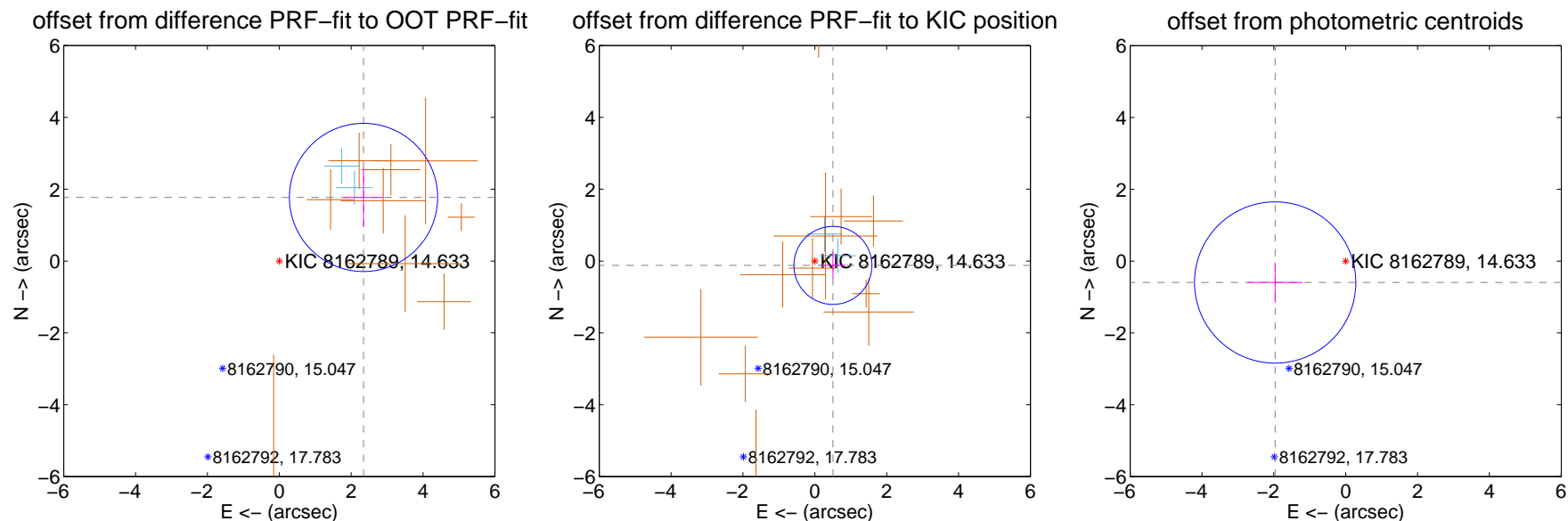
DV Centroid Data

Supplemental centroid analysis for 008162789-02. Kepler magnitude: 14.63. Transit SNR 9.71

There are 2 quarters with good PRF difference image offsets

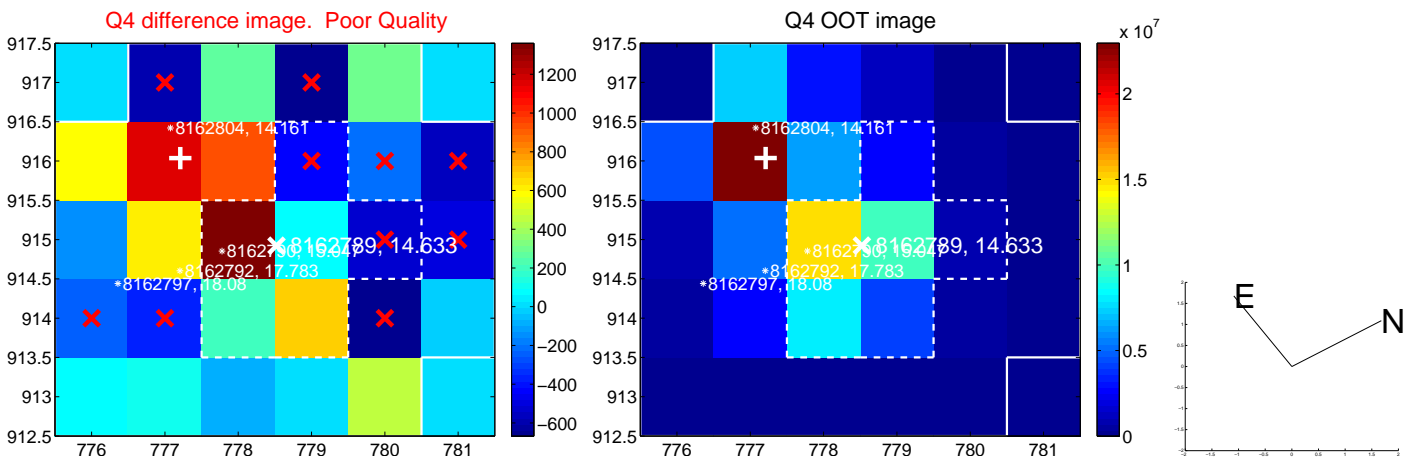
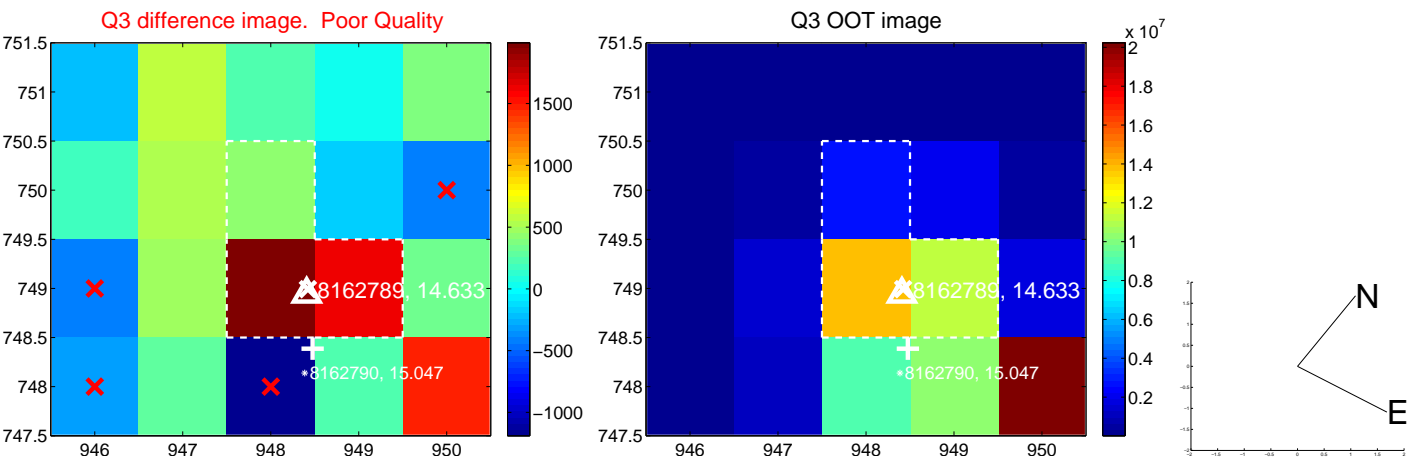
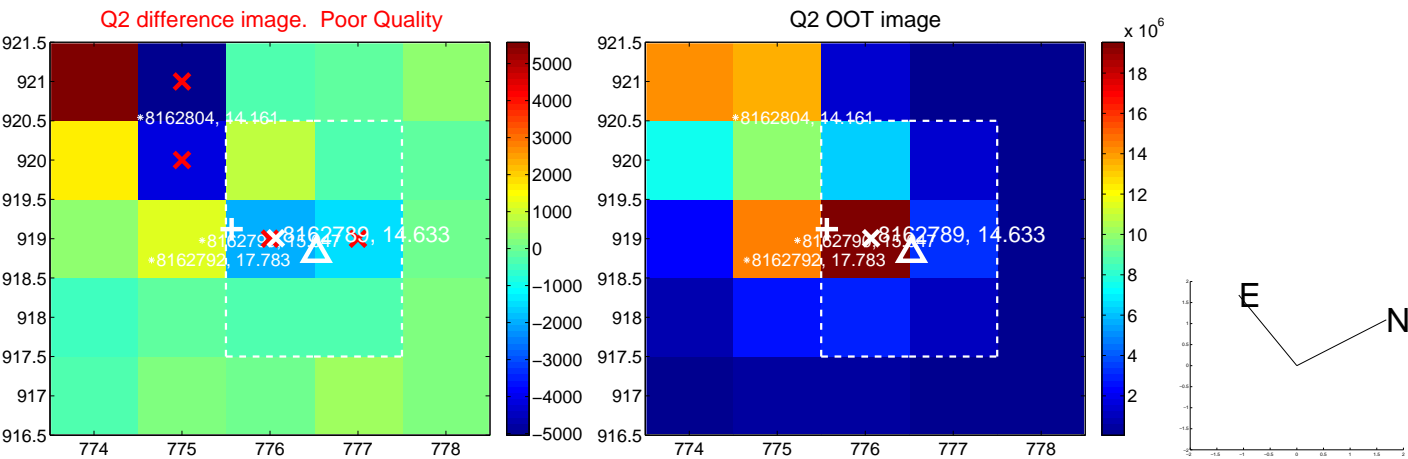
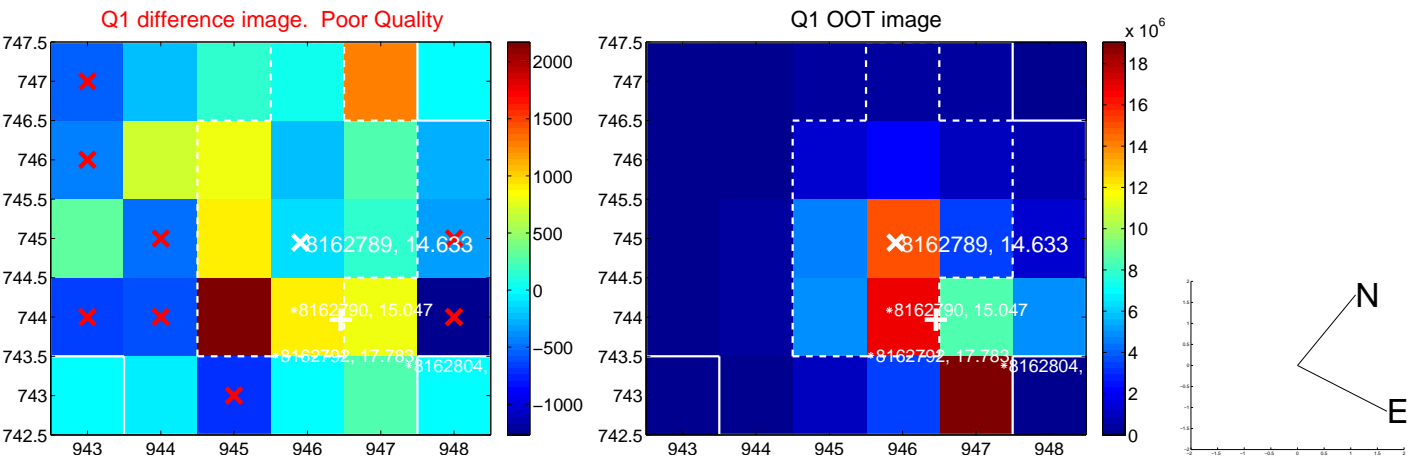
The OOT PRF centroid is offset from the target star catalog position by about 4.31 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.938 ± 0.687	4.27	-2.344 ± 0.551	1.771 ± 0.819
PRF-fit source offset from KIC position	0.518 ± 0.362	1.43	-0.504 ± 0.361	-0.122 ± 0.373
photometric centroid source offset	2.05 ± 0.75	2.74	1.96 ± 0.76	-0.60 ± 0.56

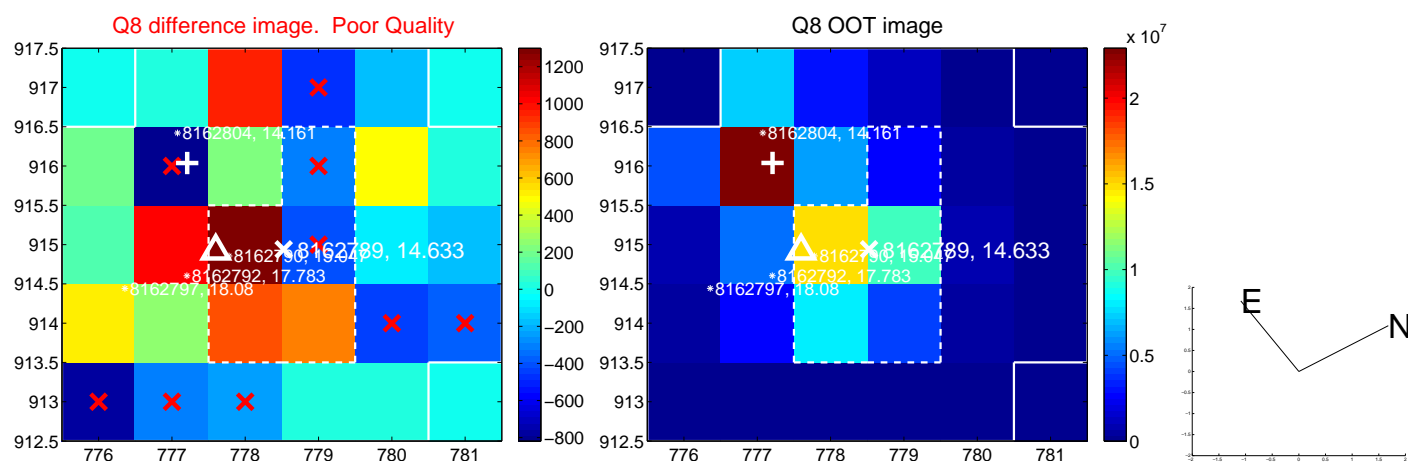
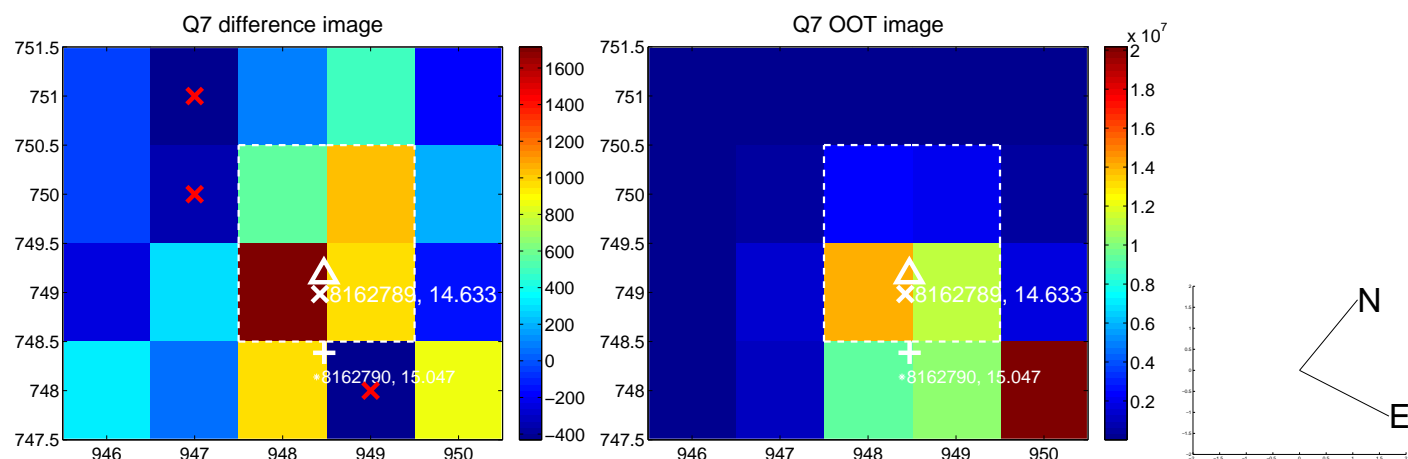
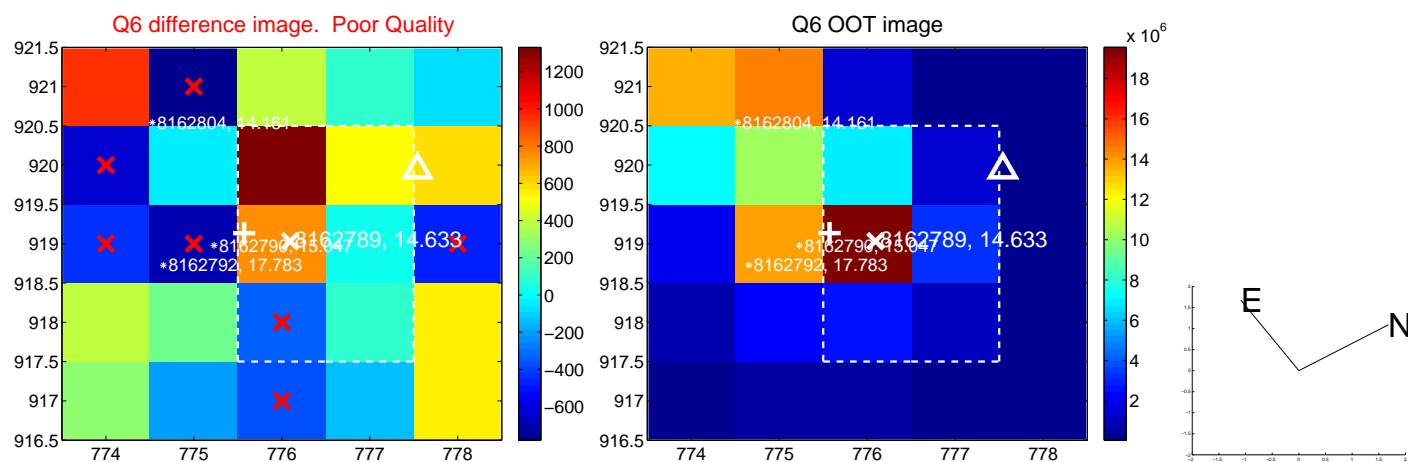
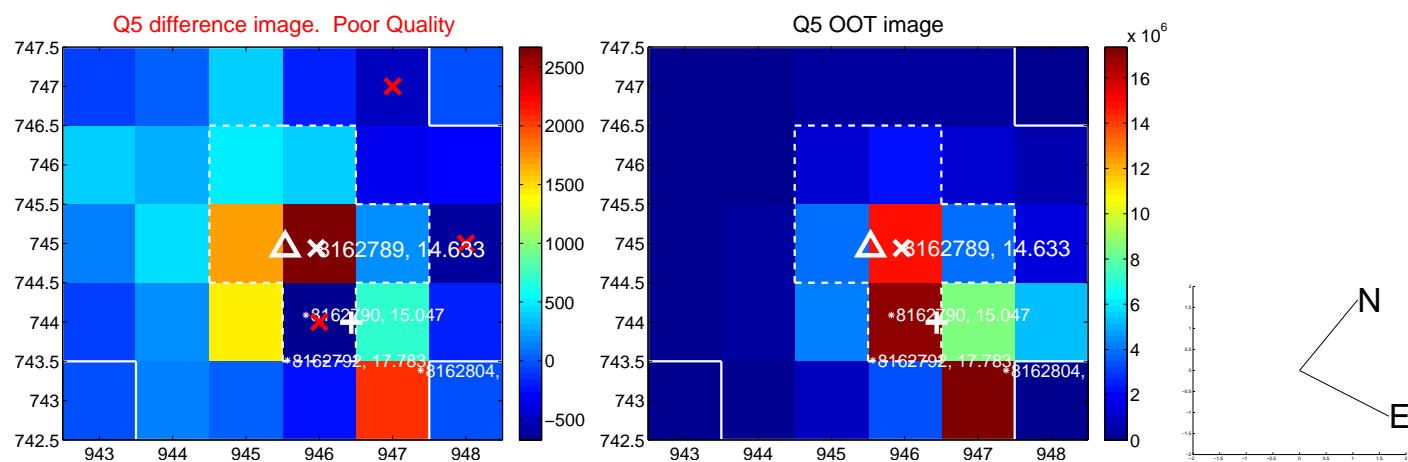


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

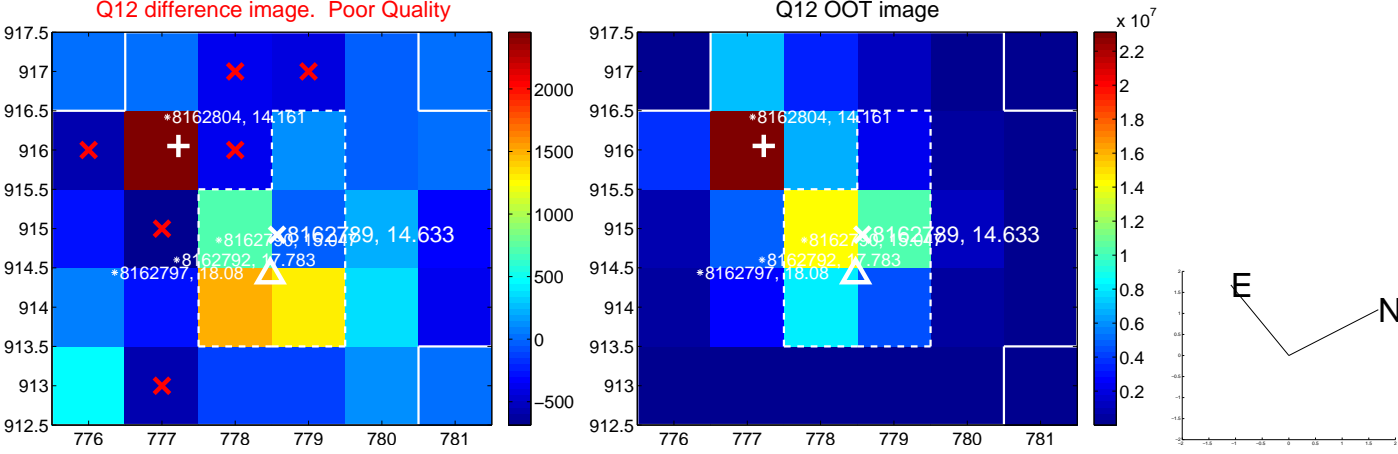
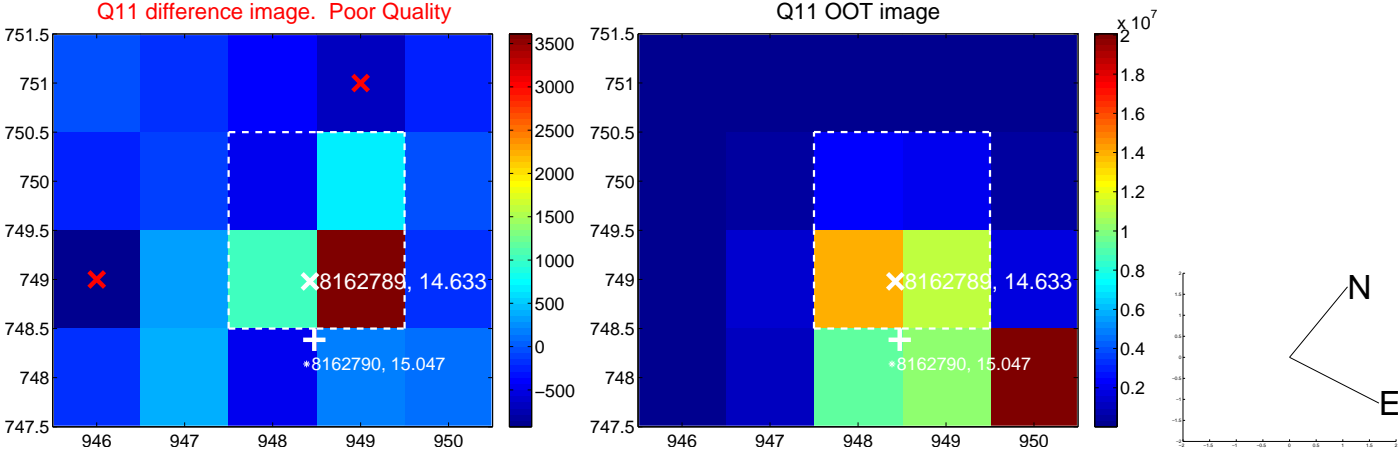
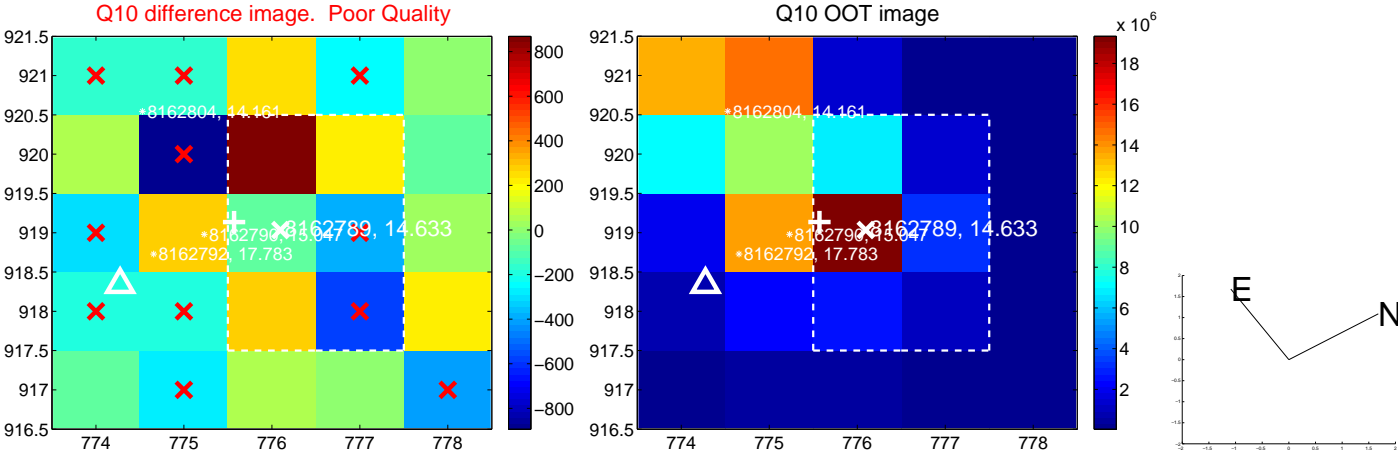
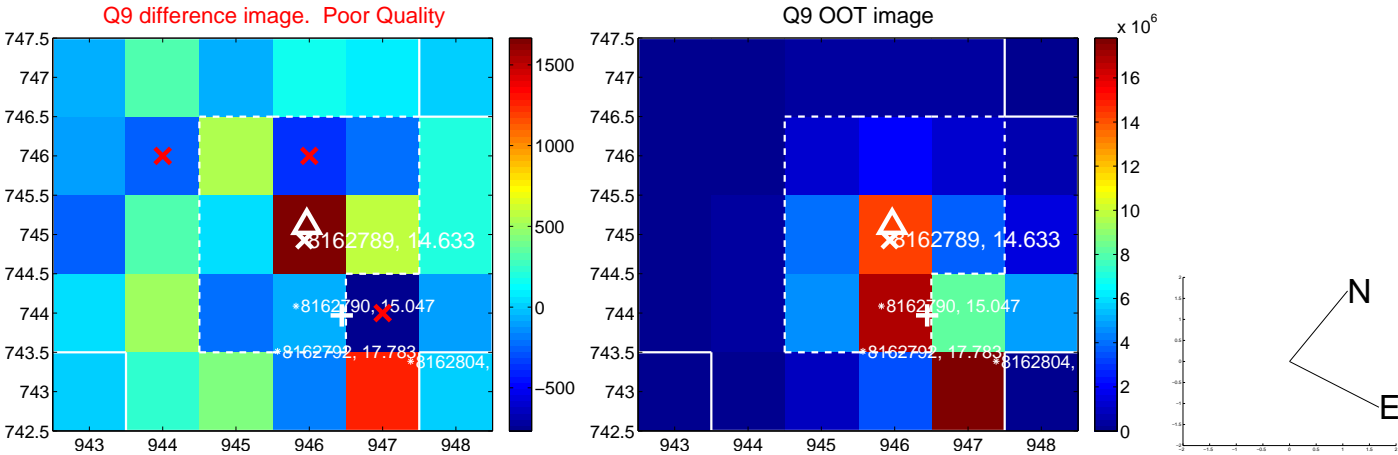
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



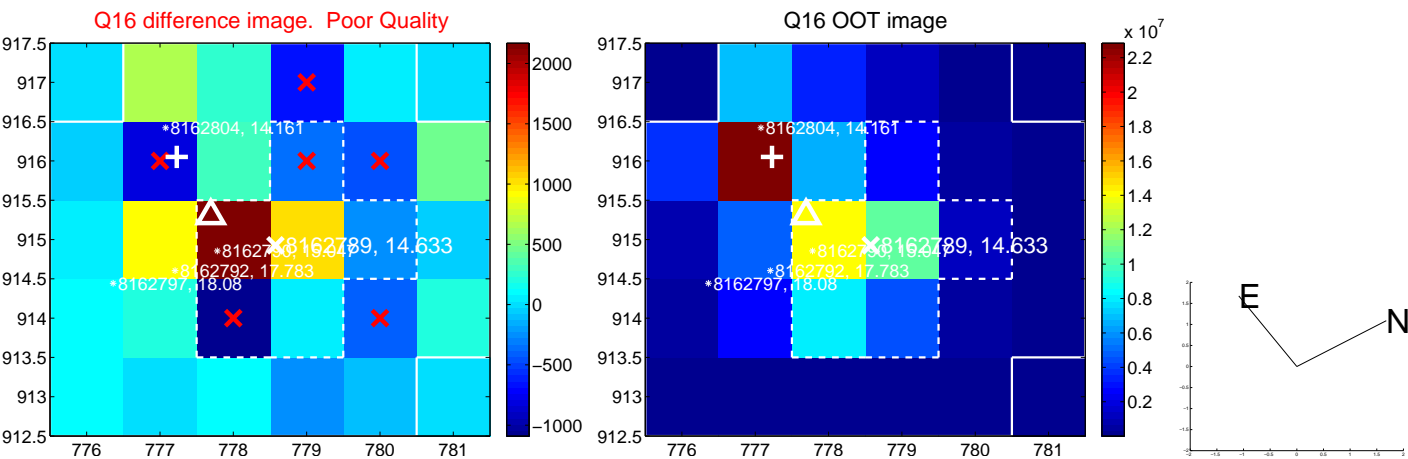
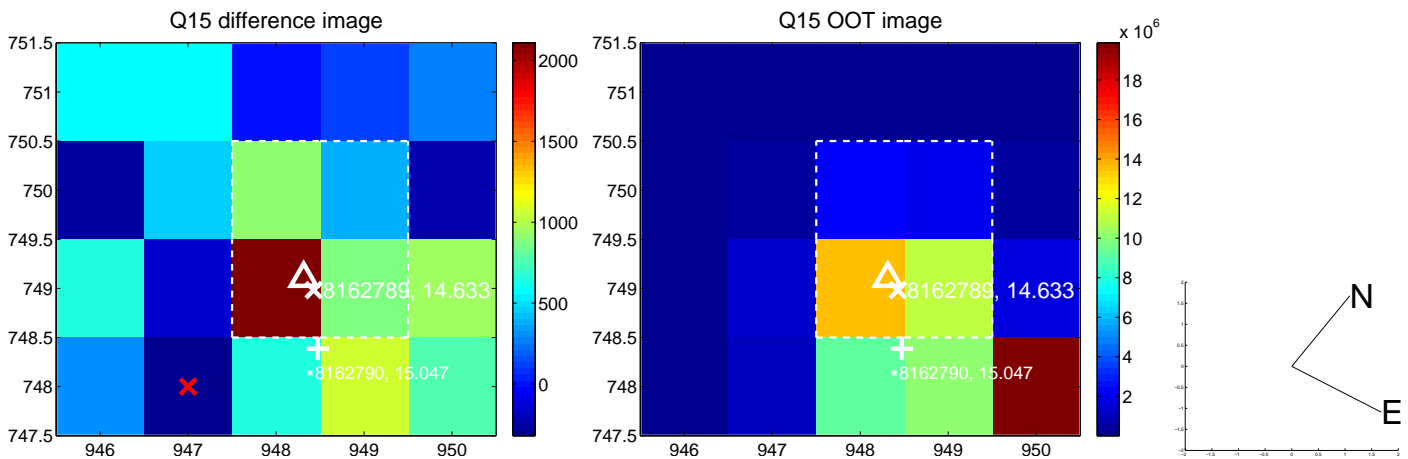
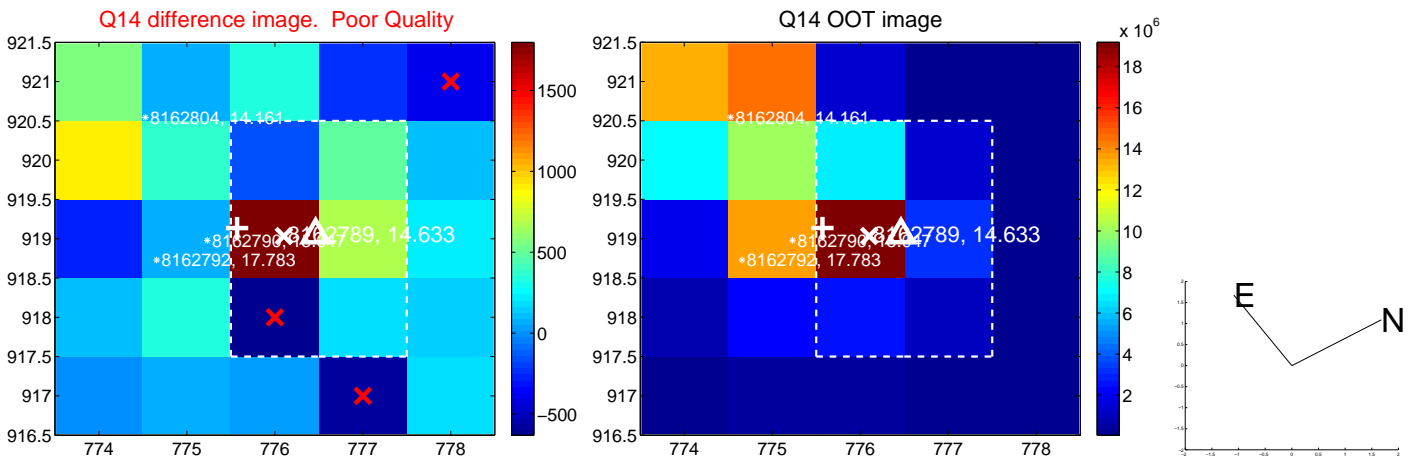
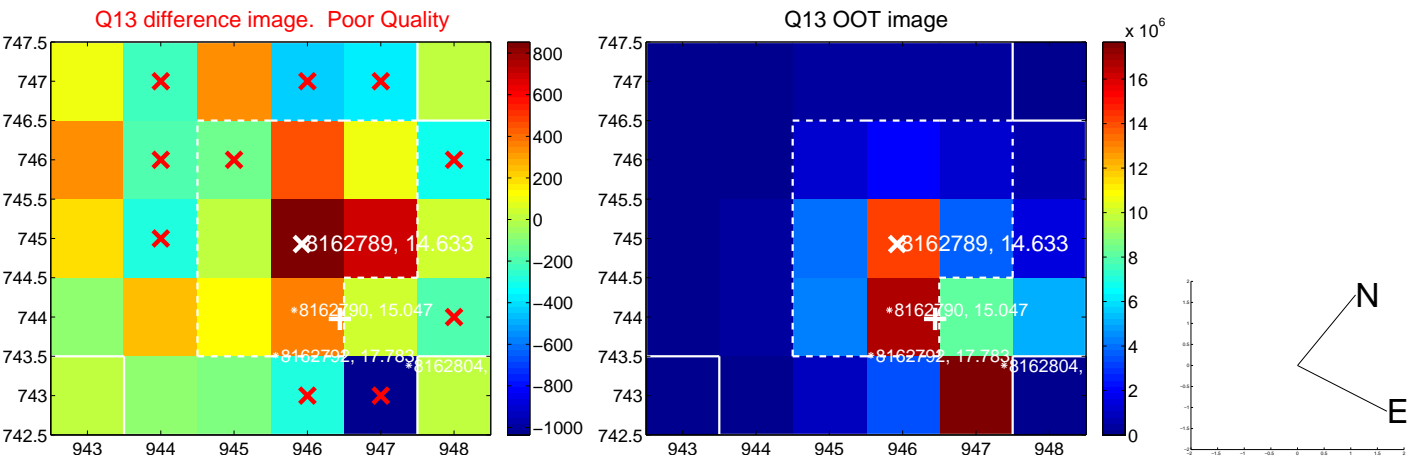
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



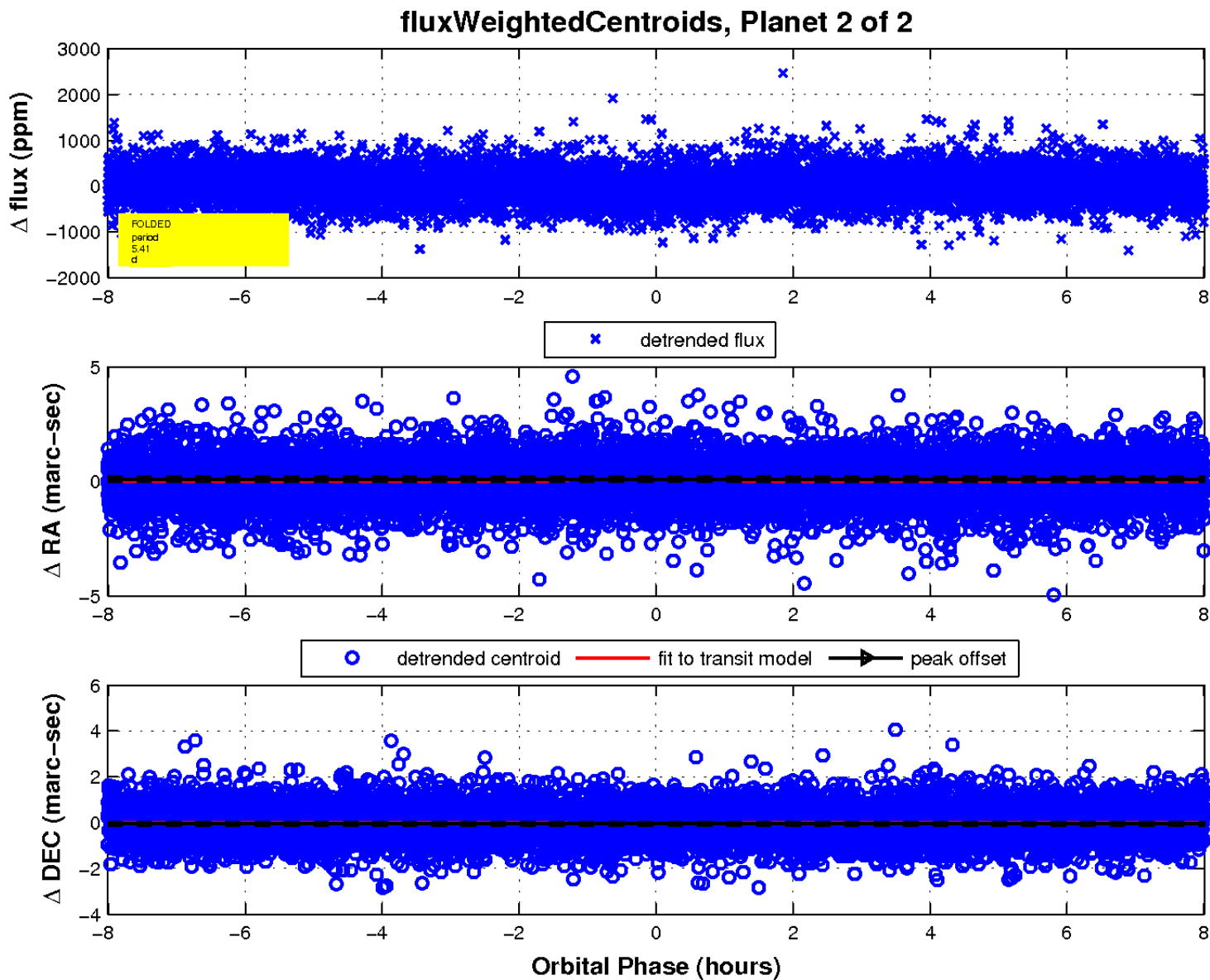
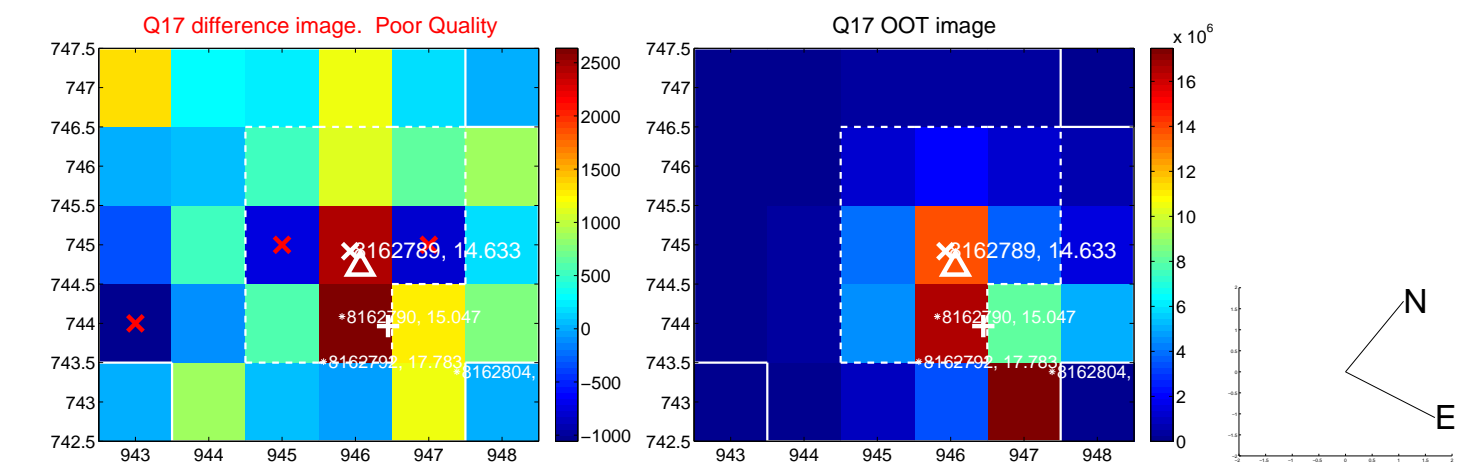
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

