

KIC 009820789

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})
009820789-01	OBS	No	541.759589	372.817738	1790.2	5.405	11.5	6.7	0.61	4426	2.60	0.11
009820789-02	OBS	No	421.037250	389.773901	2002.3	6.147	8.8	7.1	0.61	4426	2.69	0.15

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009820789-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—CENT_FEW_DIFFS
009820789-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

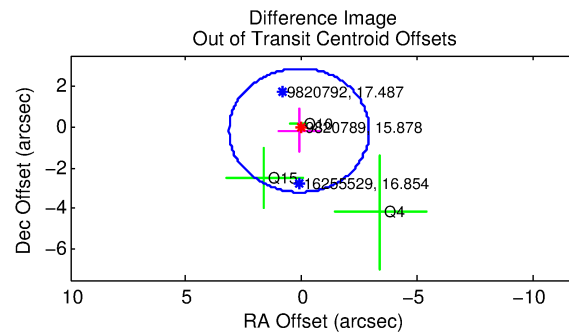
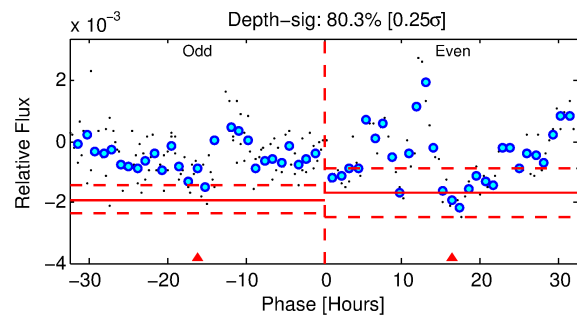
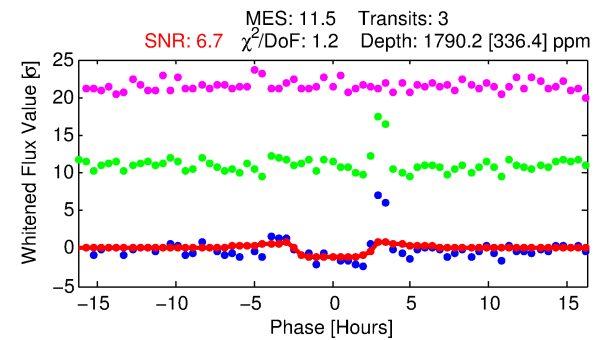
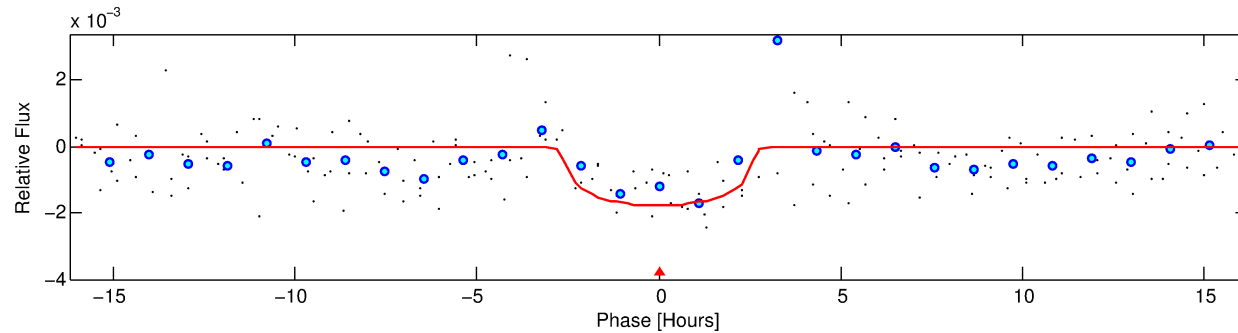
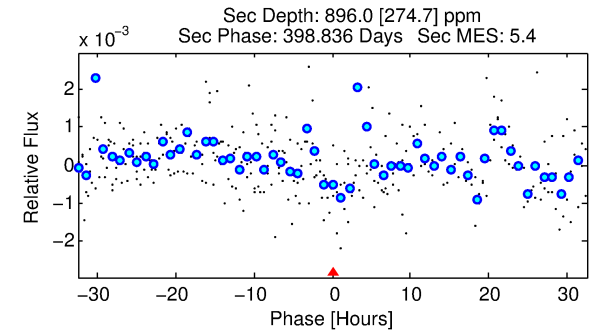
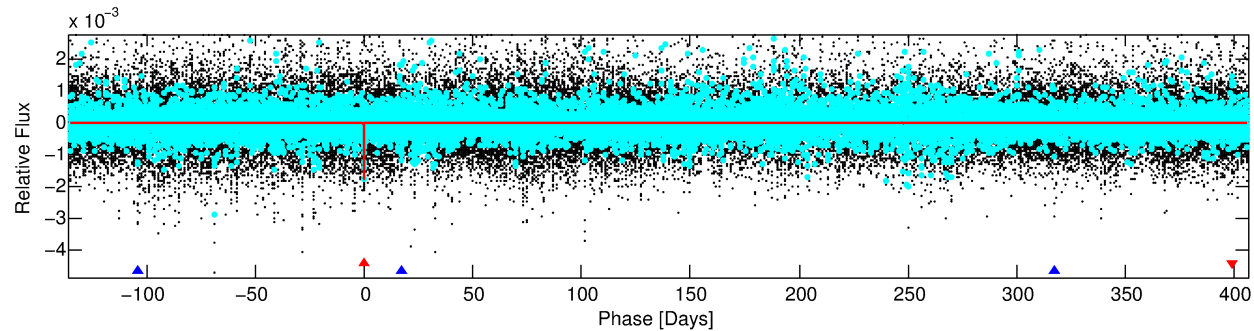
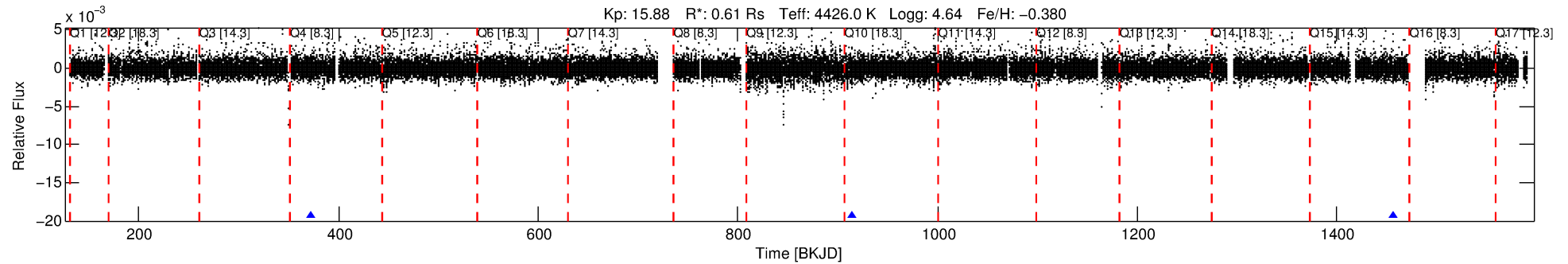
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009820789-01

No Significant Match Found

DV One-Page Summary

KIC: 9820789 Candidate: 1 of 2 Period: 541.760 d



DV Fit Results:

Period = 541.75959 [0.00889] d
Epoch = 372.8177 [0.0121] BKJD
Rp/R* = 0.0389 [0.0479]
a/R* = 708.61 [2816.97]
b = 0.47 [6.68]
Seff = 0.11 [0.02]
Teq = 146 [6] K
Rp = 2.60 [3.22] Re
a = 1.0974 [0.0798] AU
Ag = 87555.74 [217593.26] [0.40σ]
Teffp = 3884 [2414] K [1.55σ]

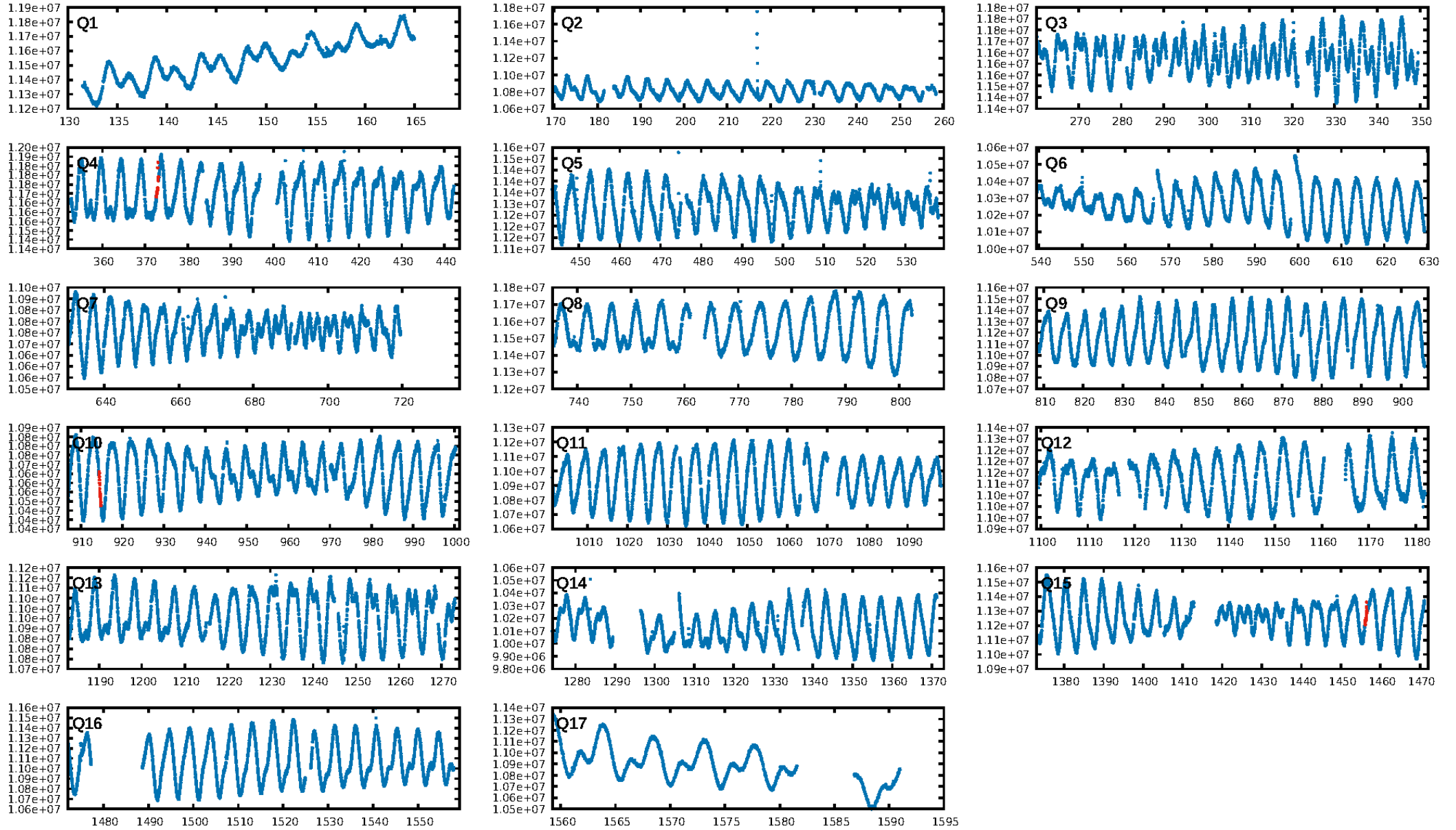
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [353.98σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 74.6%
ModelChiSquareGof-sig: 99.4%
Bootstrap-pfa: 6.14e-10
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -10.29
Centroid-sig: N/A
Centroid-so: 1.767 arcsec [1.82σ]
OotOffset-rm: 0.201 arcsec [0.20σ]
KicOffset-rm: 0.444 arcsec [0.47σ]
OotOffset-st: 1/1/1/0 [3]
KicOffset-st: 1/1/1/0 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 1.00 [3/3]

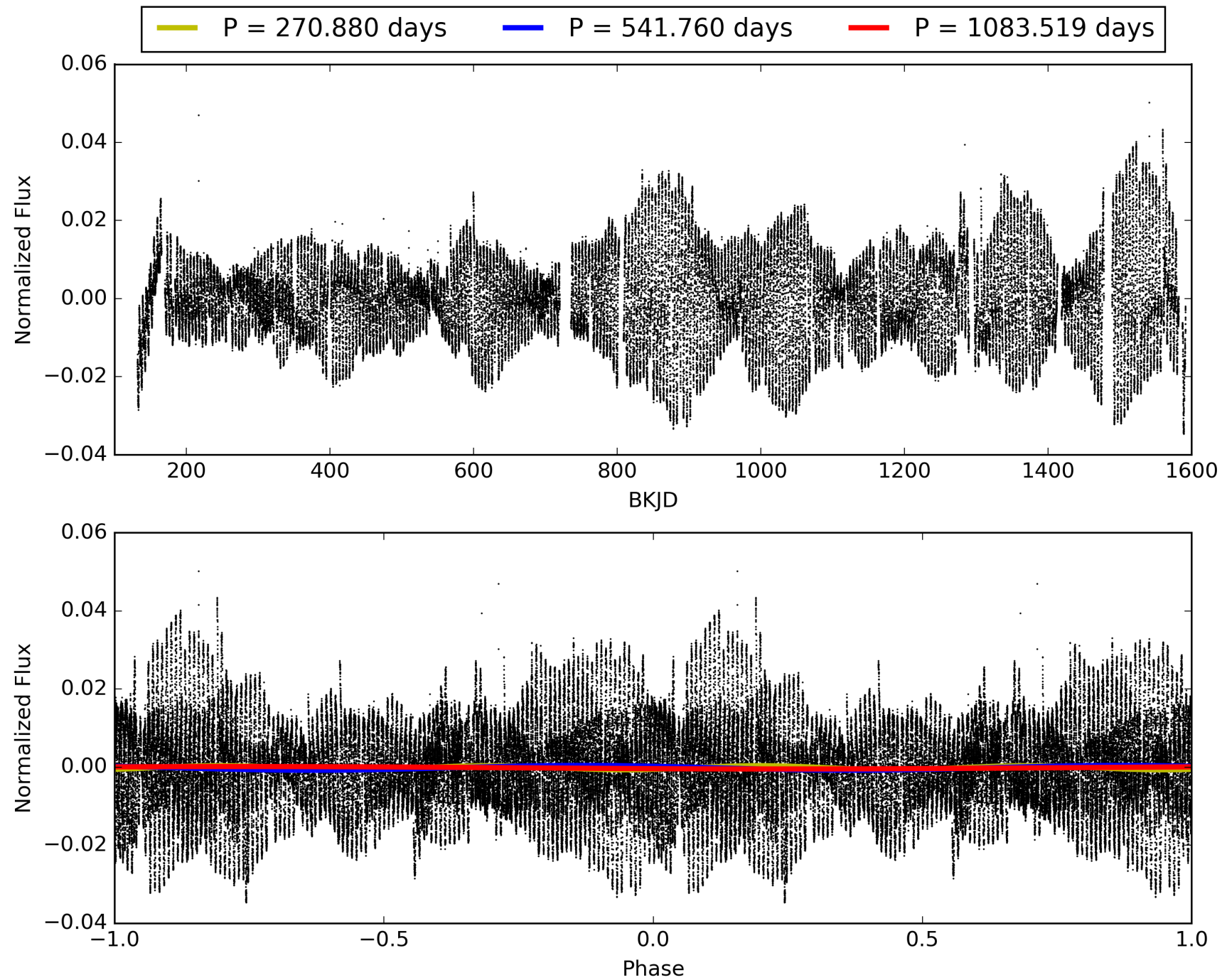
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 07:35:44 Z

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

TCE 009820789-01, PDC Light Curves

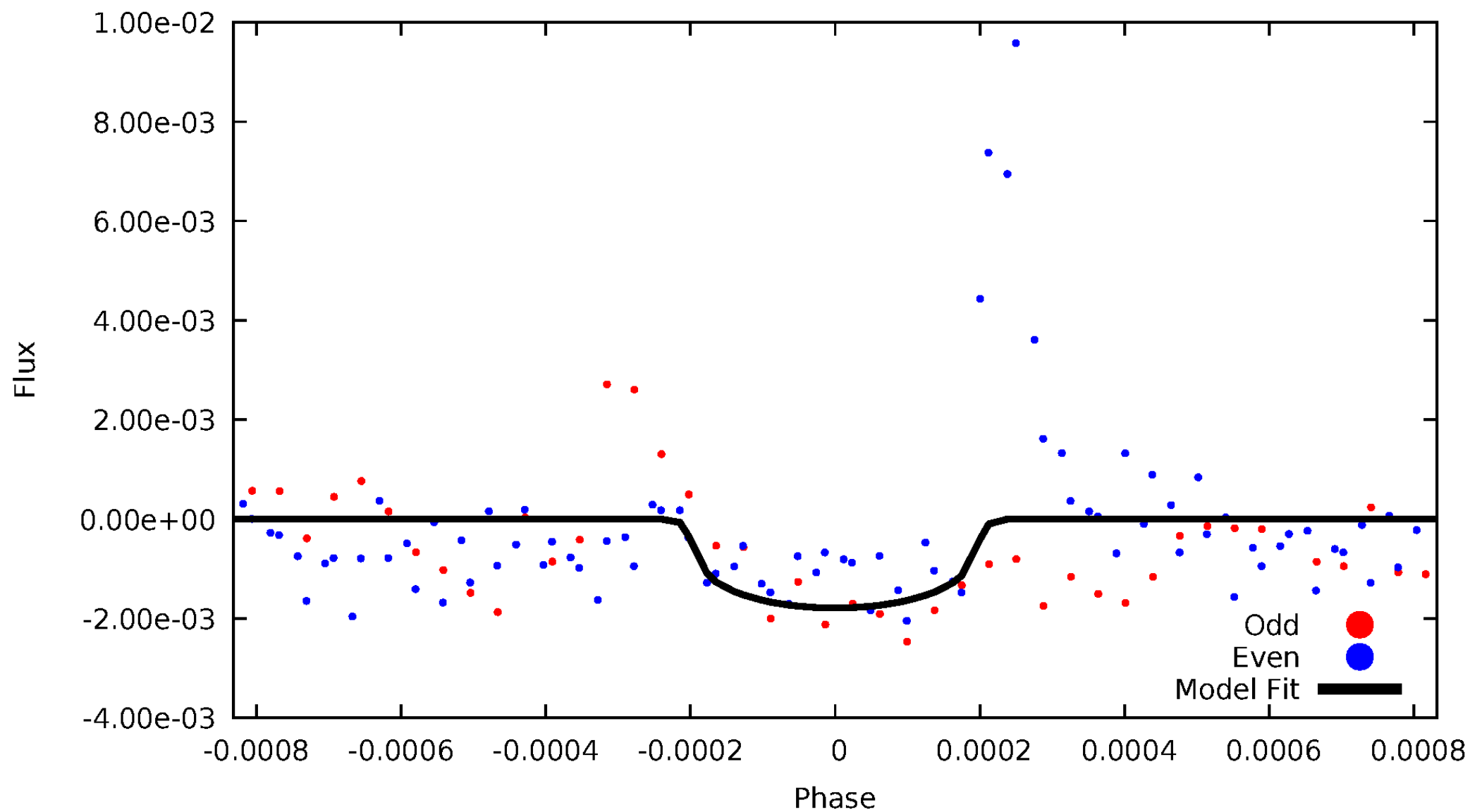


TCE 009820789-01



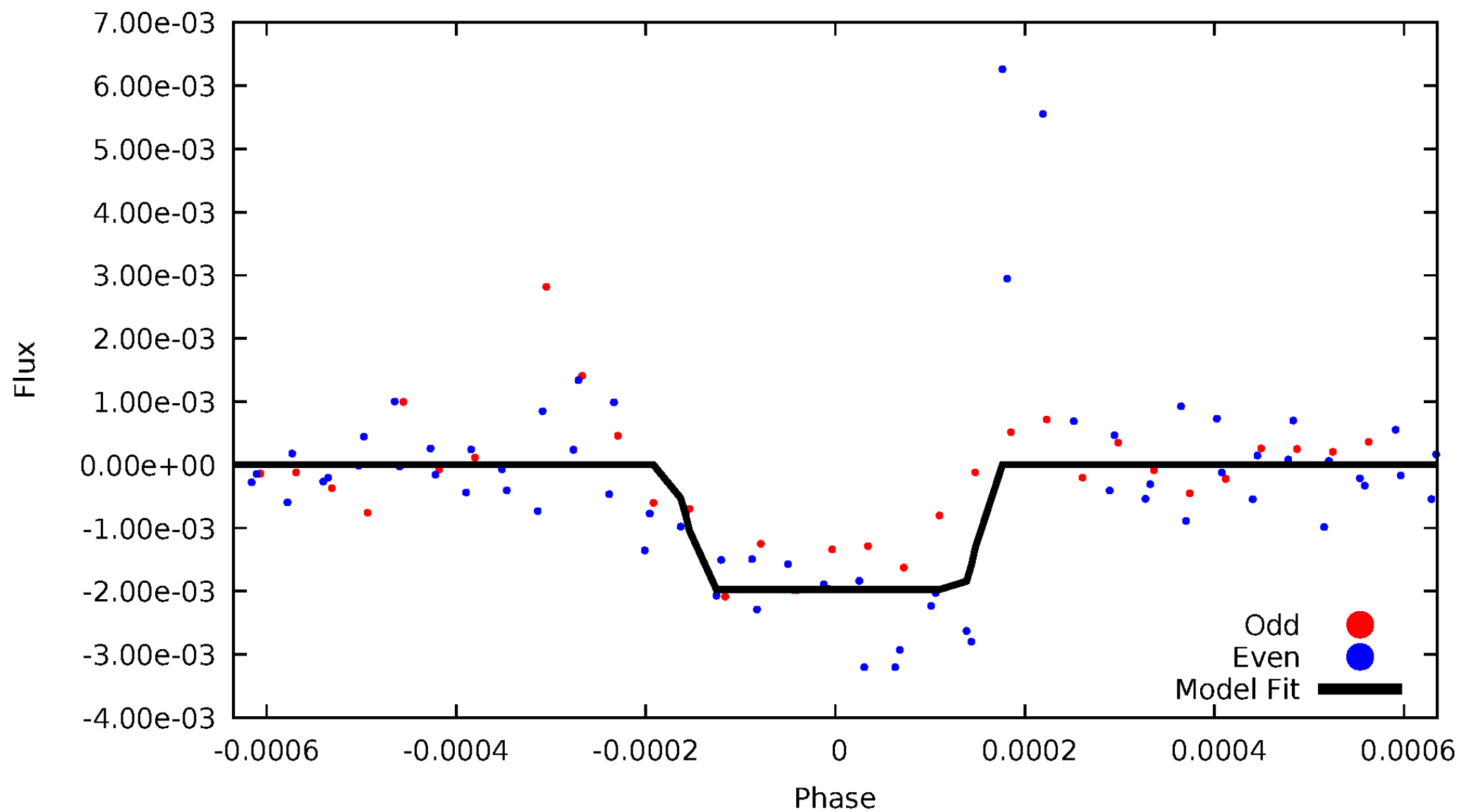
DV Odd/Even

TCE 009820789-01



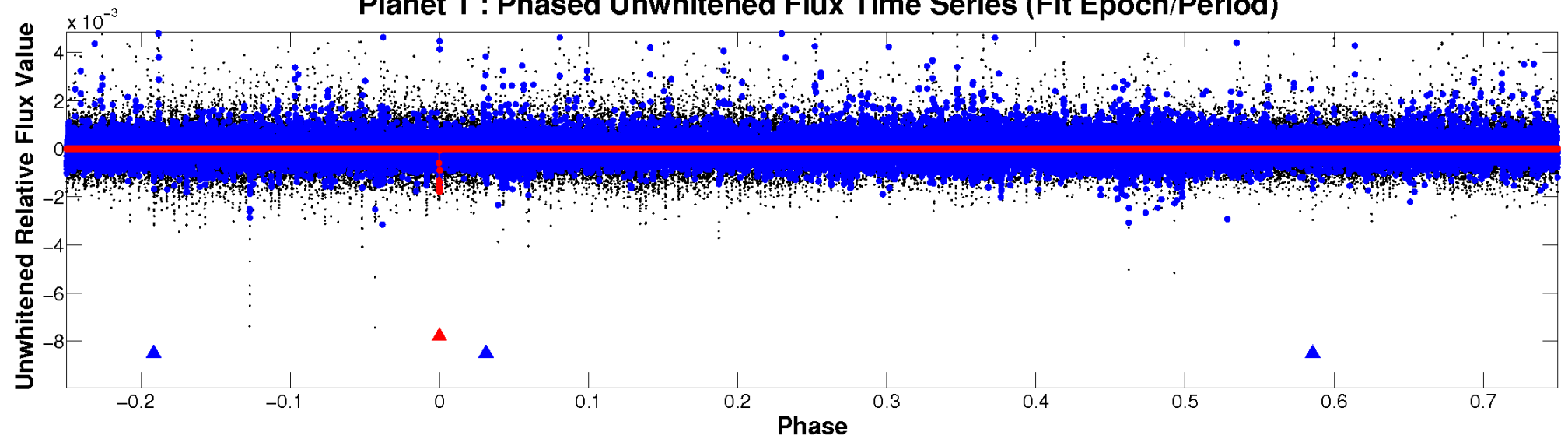
ALT Odd/Even

TCE 009820789-01

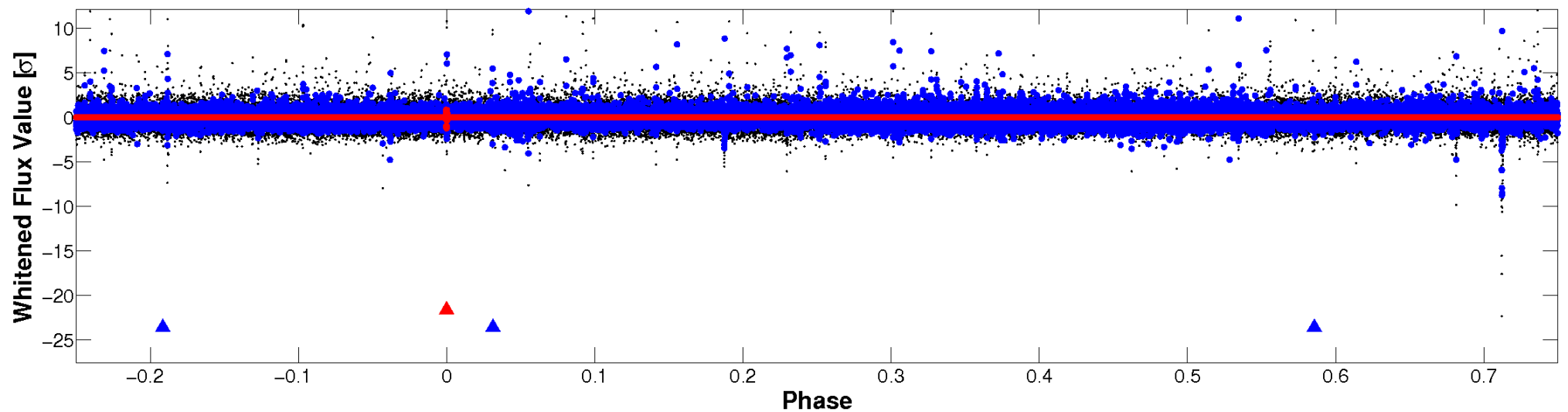


Non-Whitened Vs. Whitened Light Curve

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

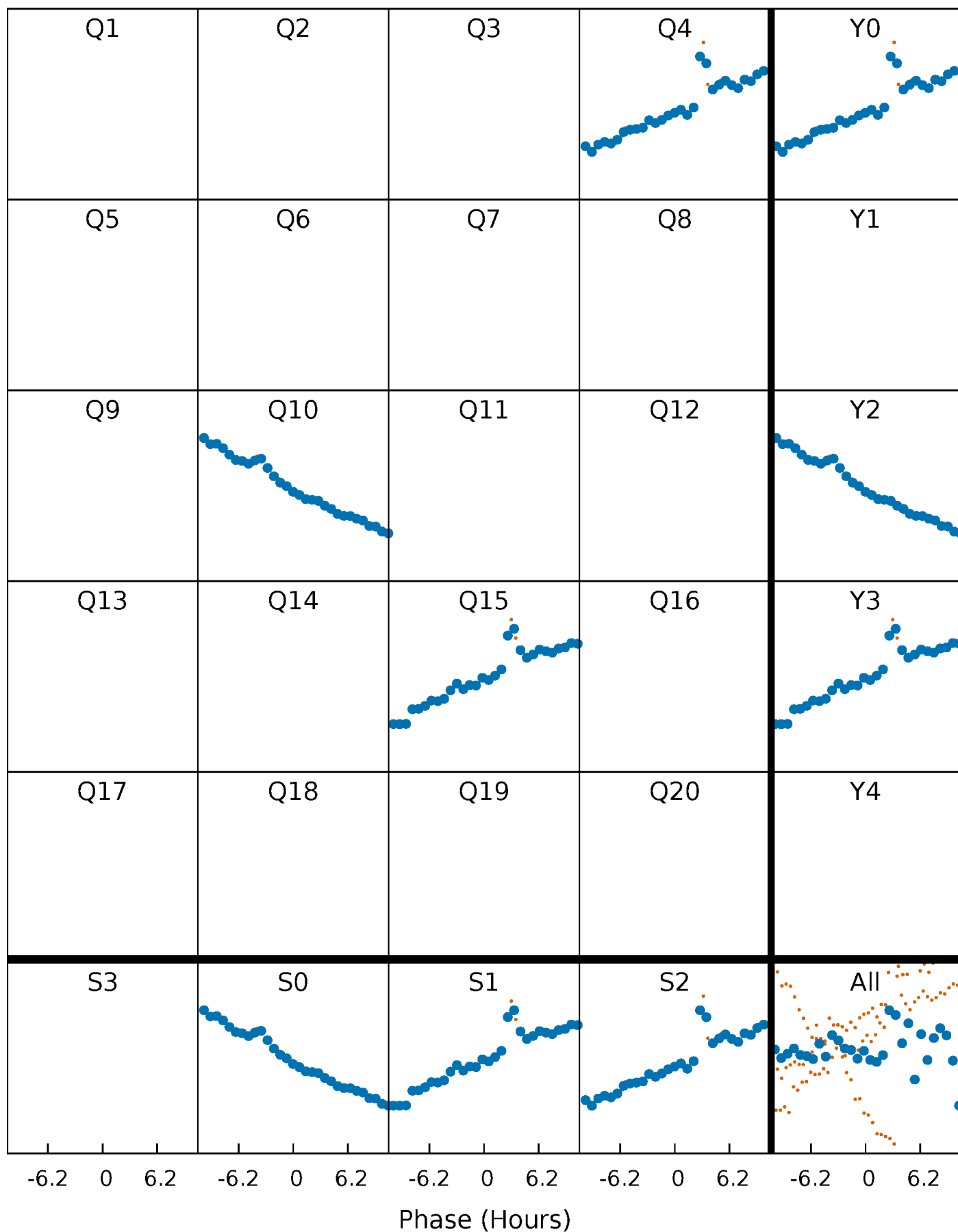


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



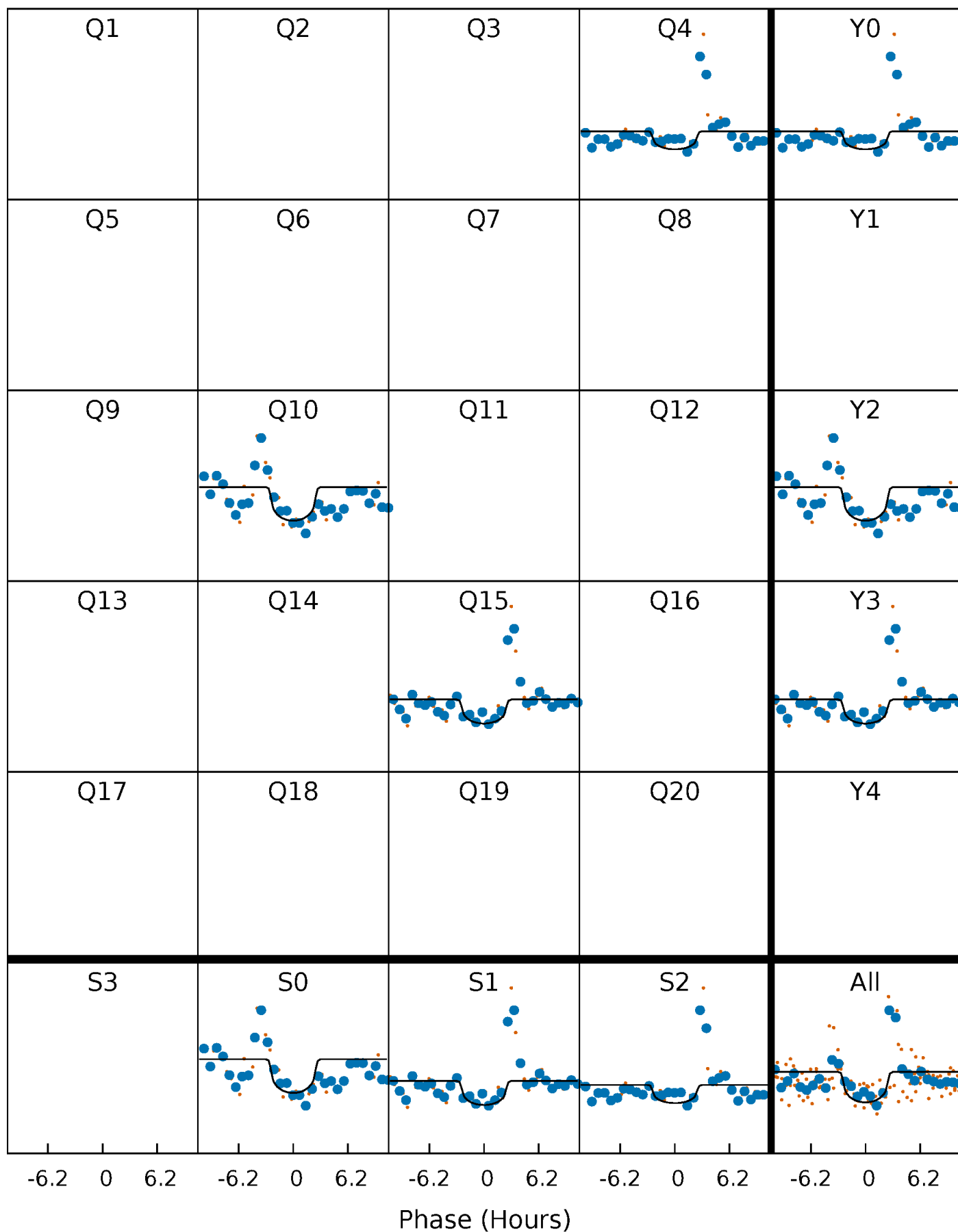
PDC Quarter-Phased Transit Curves

TCE 009820789-01 P=541.759589 Days $T_0=372.817738$ (BKJD)



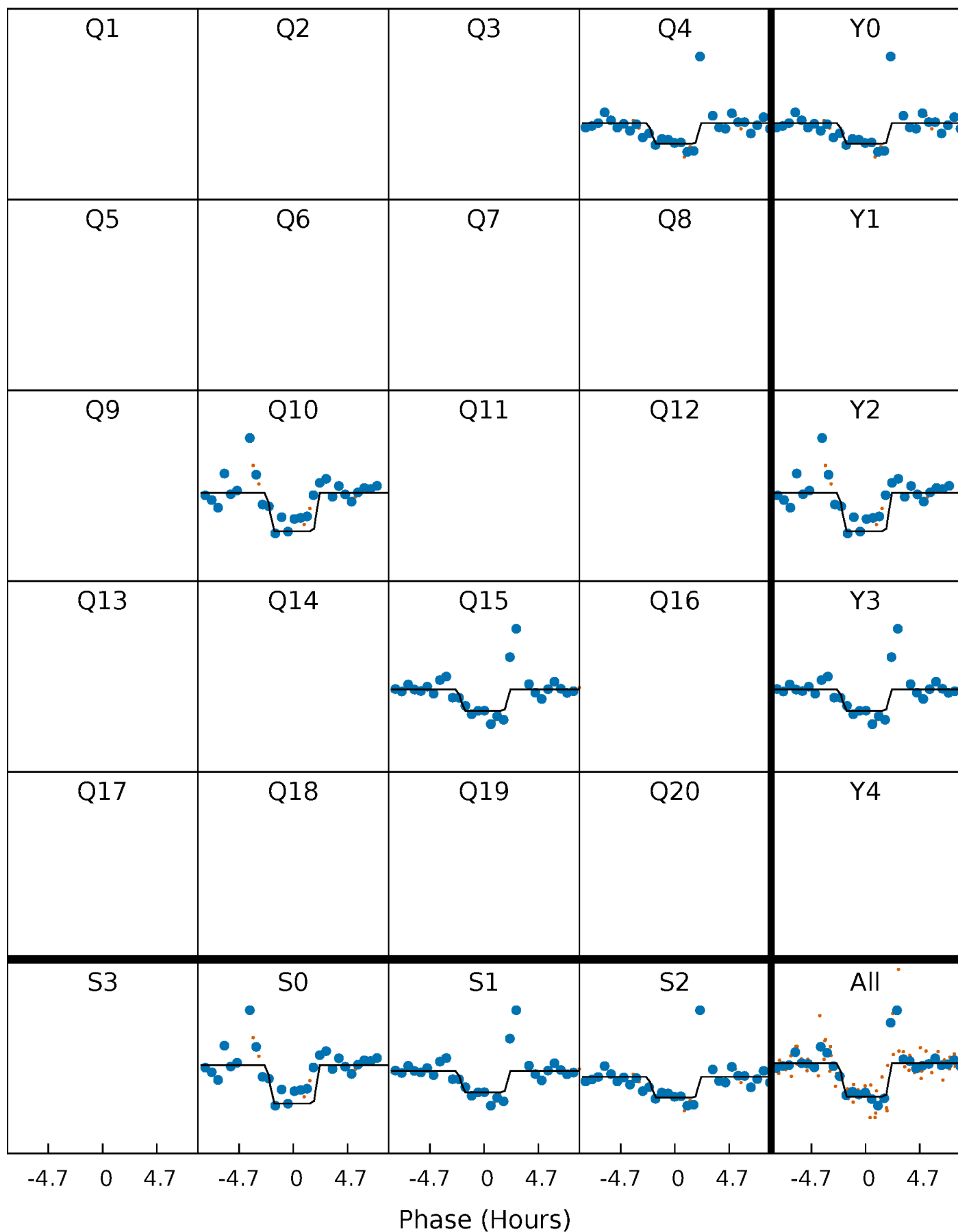
DV Quarter-Phased Transit Curves

TCE 009820789-01 P=541.759589 Days $T_0=372.817738$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

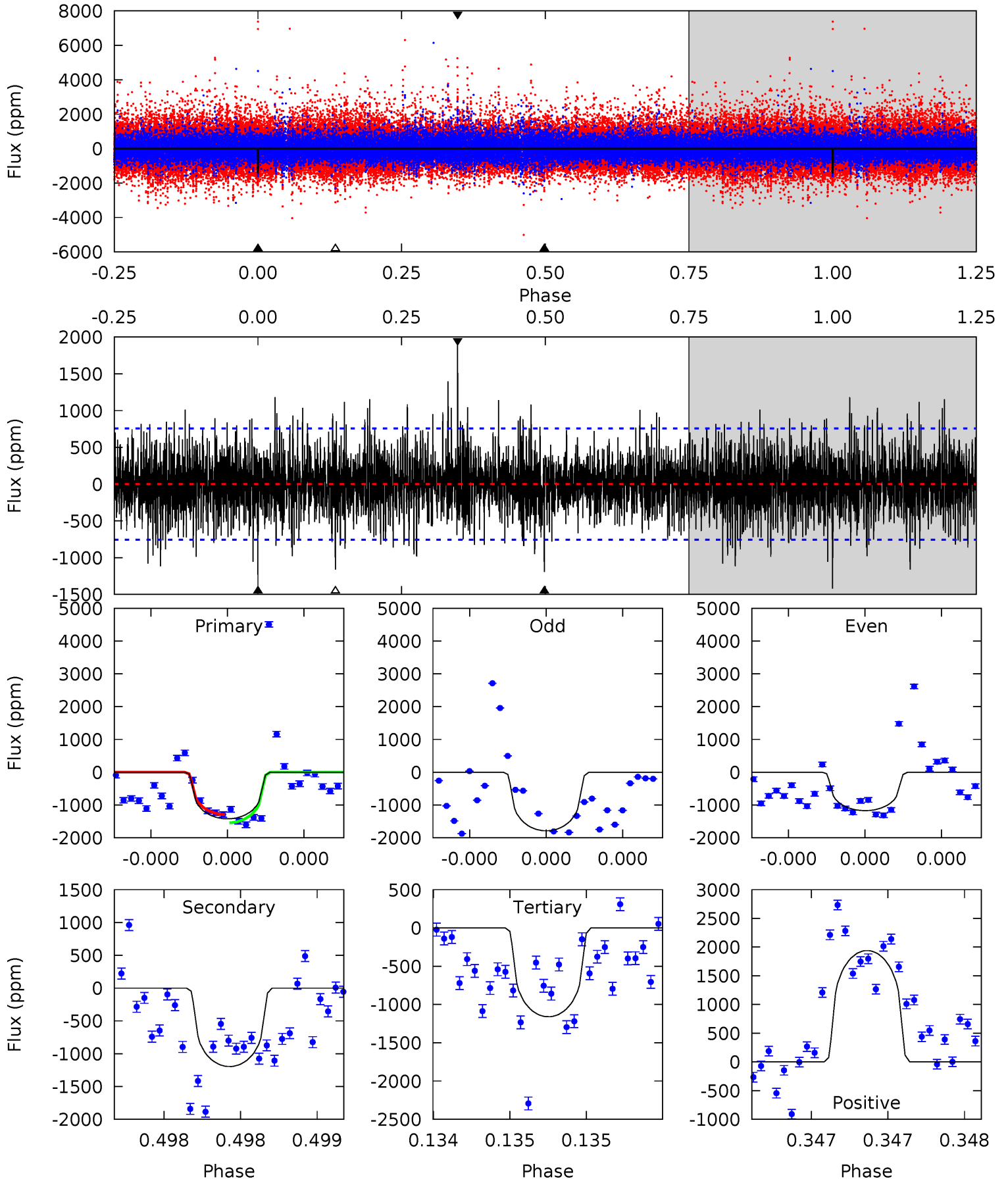
TCE 009820789-01 P=541.754976 Days $T_0=372.837143$ (BKJD)



DV Model-Shift Uniqueness Test

009820789-01, P = 541.759589 Days, E = 372.817738 Days

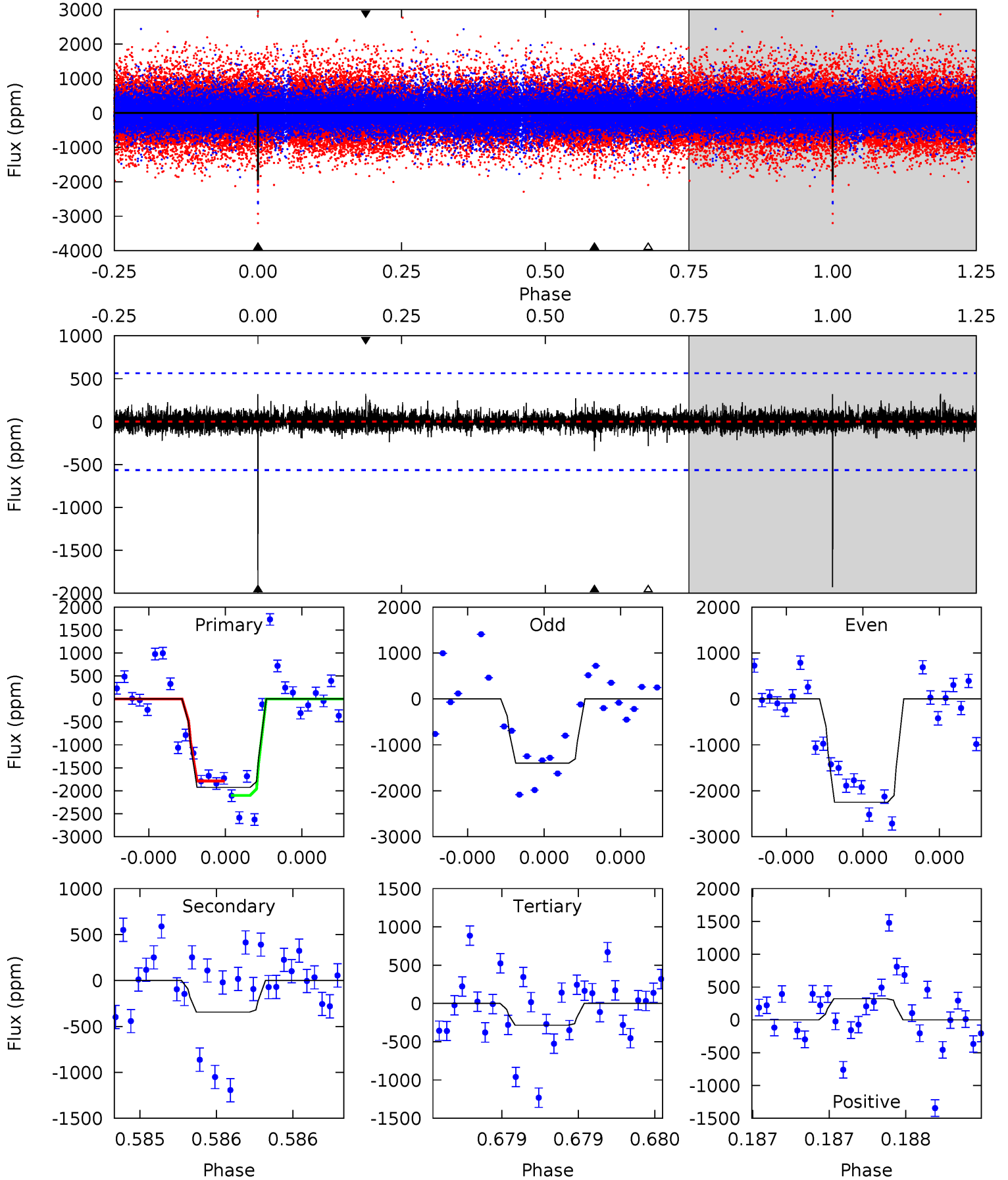
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	8.84	8.58	14.3	5.60	3.52	2.23	1.93	-3.83	0.26	-5.50	2.02	1.13	0.58	0.92



Alt Model-Shift Uniqueness Test

009820789-01, P = 541.754976 Days, E = 372.837143 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.3	3.44	2.84	3.21	5.64	3.58	0.53	16.4	16.0	0.60	0.23	4.20	0.92	0.14	1.56



Stellar Parameters For KIC 009820789

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4426^{+118}_{-131}	$4.640^{+0.052}_{-0.028}$	$-0.380^{+0.300}_{-0.300}$	$0.614^{+0.050}_{-0.056}$	$0.601^{+0.070}_{-0.041}$	$3.654^{+0.770}_{-0.475}$
	+3%/-3%	+1%/-1%	+79%/-79%	+8%/-9%	+12%/-7%	+21%/-13%
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 009820789-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-1195 ± 135	$3.36^{+2.88}_{-2.04}$	203^{+7}_{-7}	3862^{+1783}_{-699}	$69998^{+388457}_{-49601}$
Alt.	-344 ± 100	$3.65^{+2.97}_{-2.36}$	203^{+7}_{-7}	3093^{+1200}_{-493}	$17619^{+109364}_{-12791}$

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

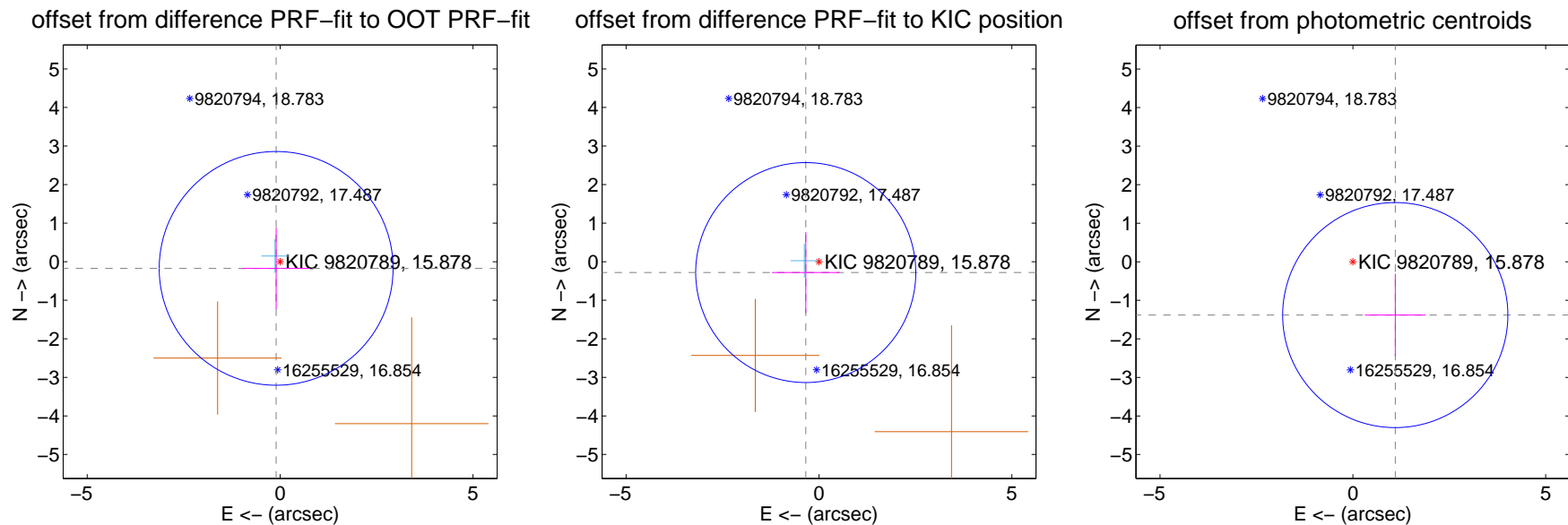
DV Centroid Data

Supplemental centroid analysis for 009820789-01. Kepler magnitude: 15.88. Transit SNR 6.72

There are 1 quarters with good PRF difference image offsets

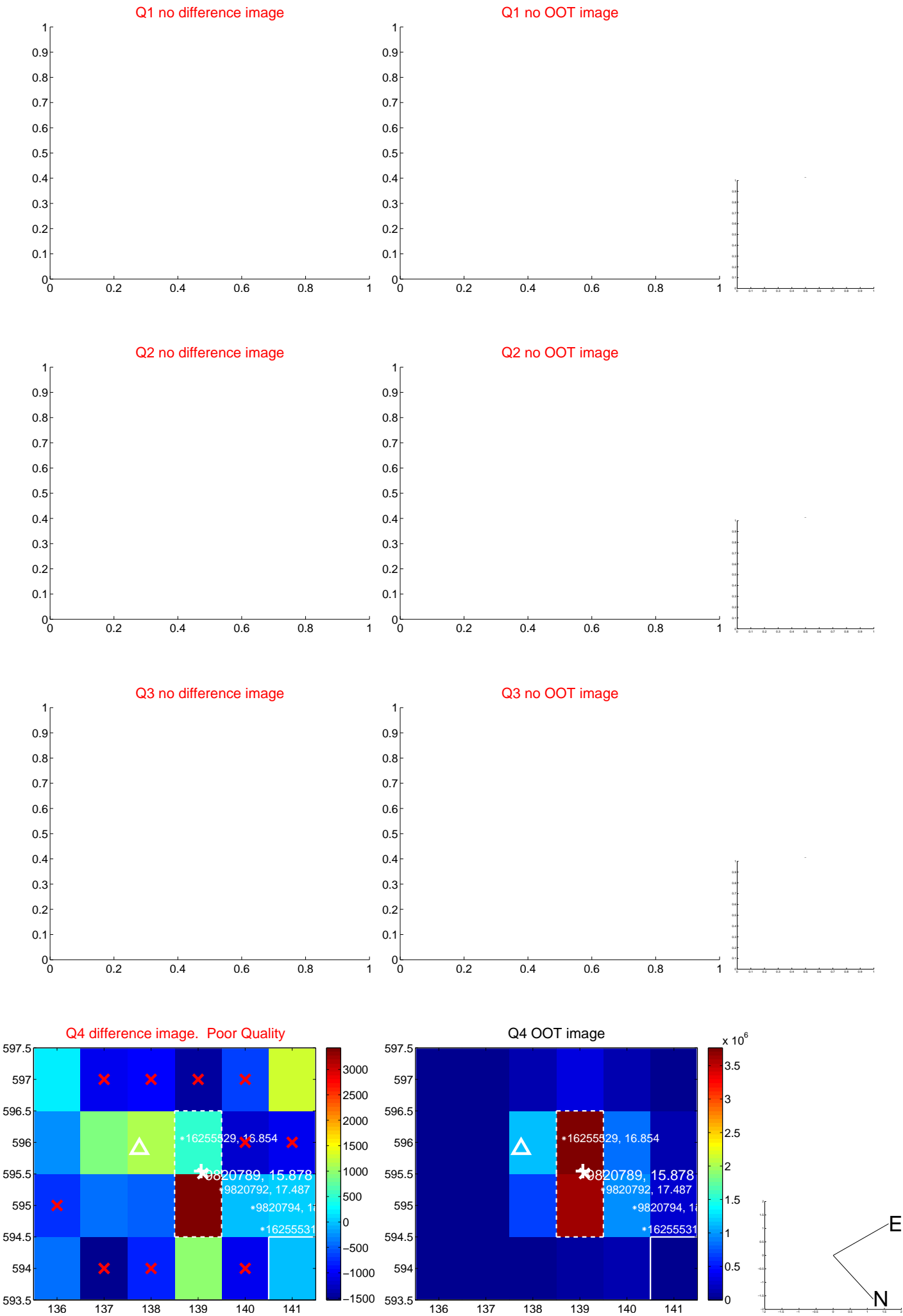
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.201 ± 1.010	0.20	0.102 ± 0.874	-0.173 ± 1.054
PRF-fit source offset from KIC position	0.444 ± 0.951	0.47	0.343 ± 0.874	-0.282 ± 1.054
photometric centroid source offset	1.77 ± 0.97	1.82	-1.10 ± 0.79	-1.38 ± 1.07



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.

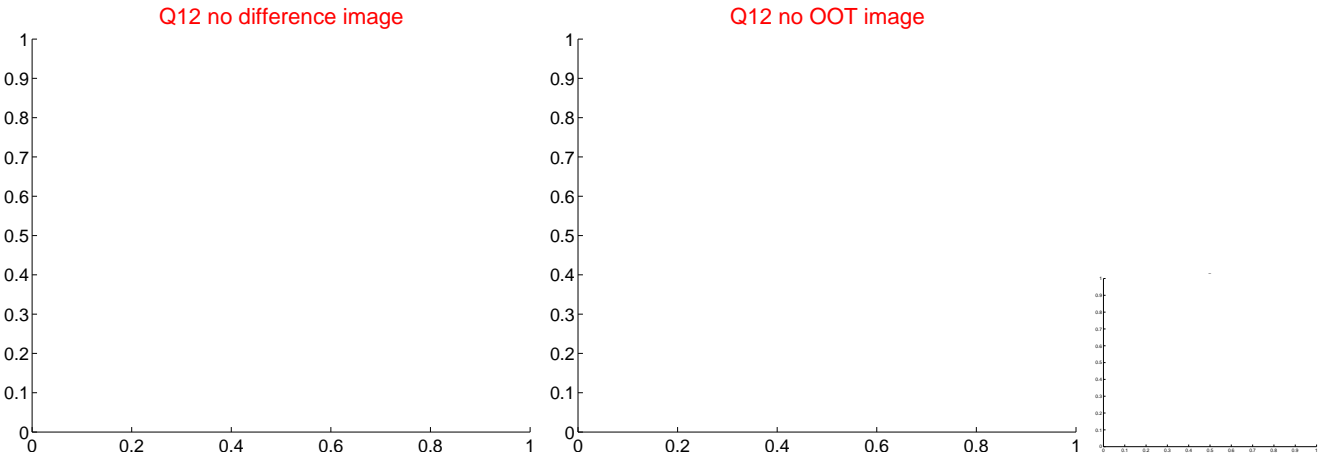
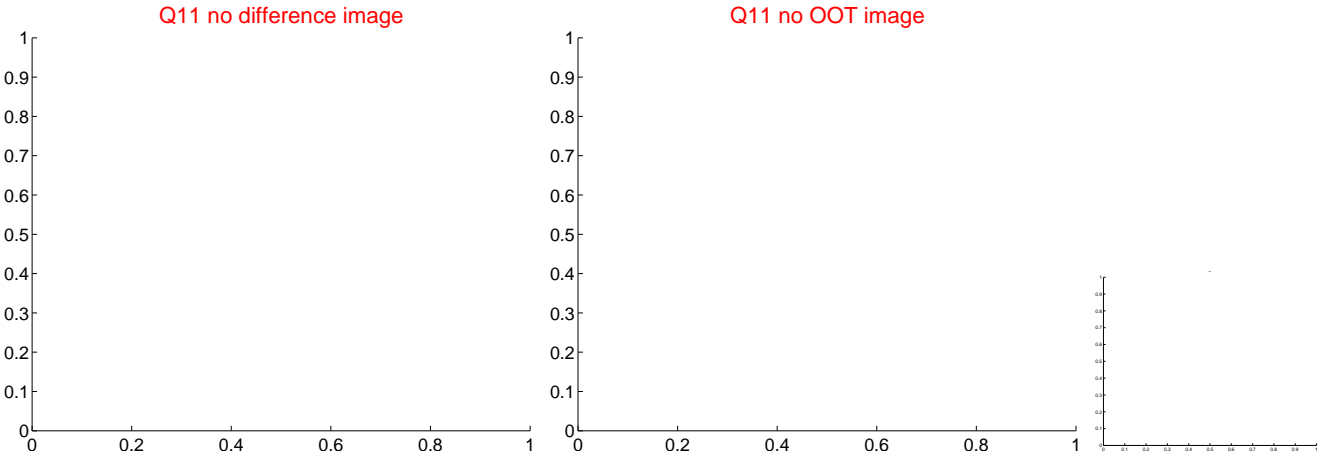
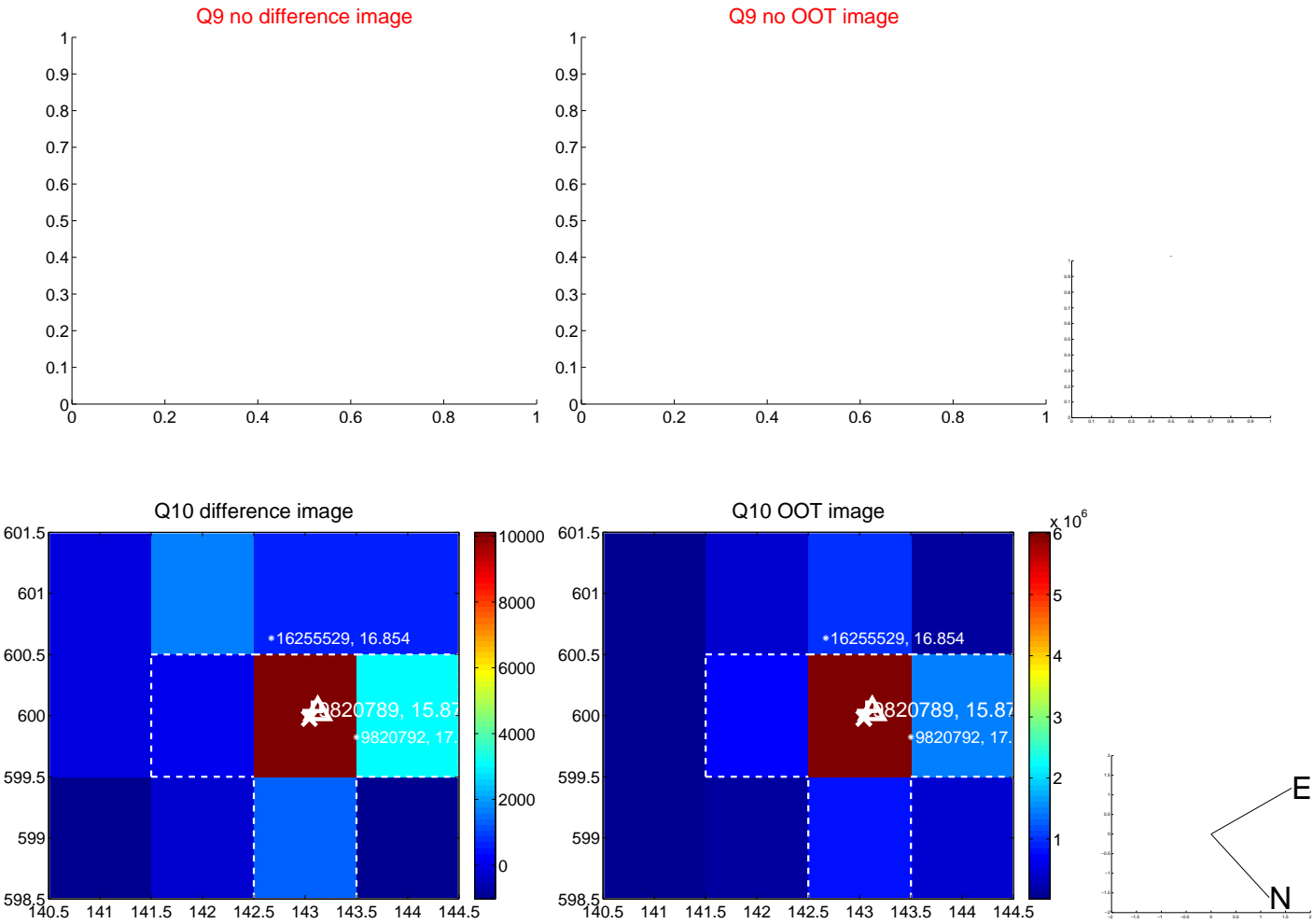
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



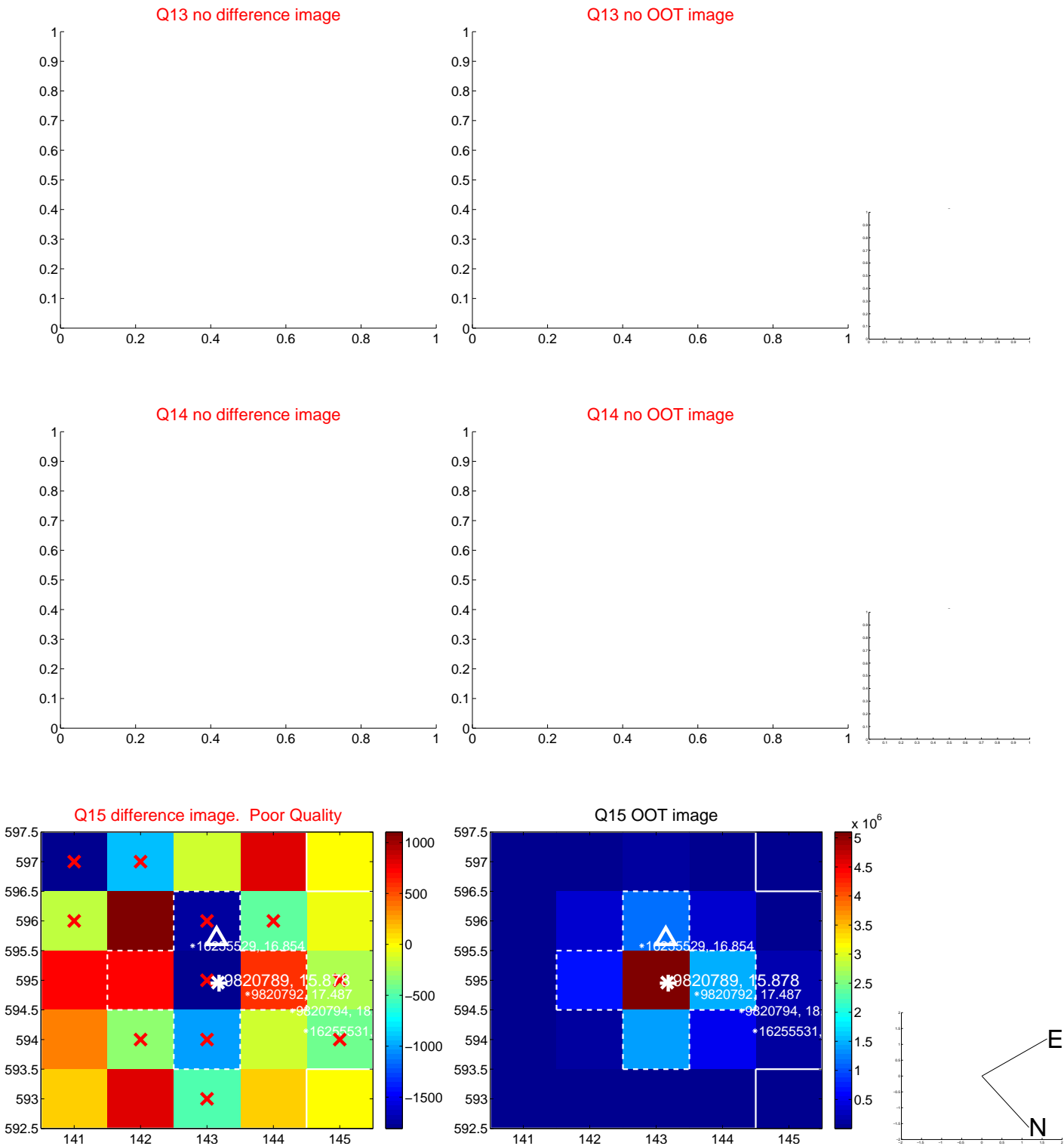
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



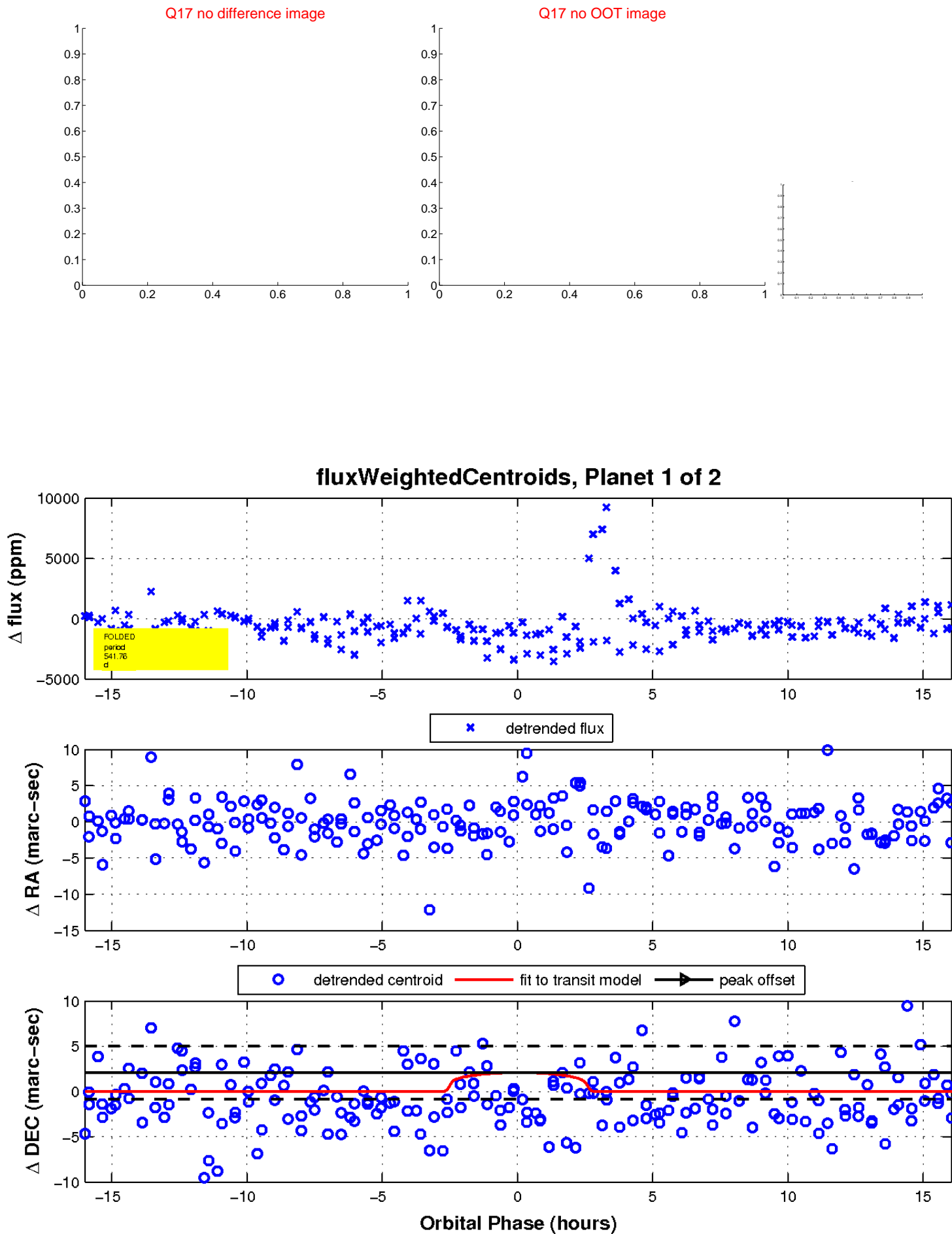
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

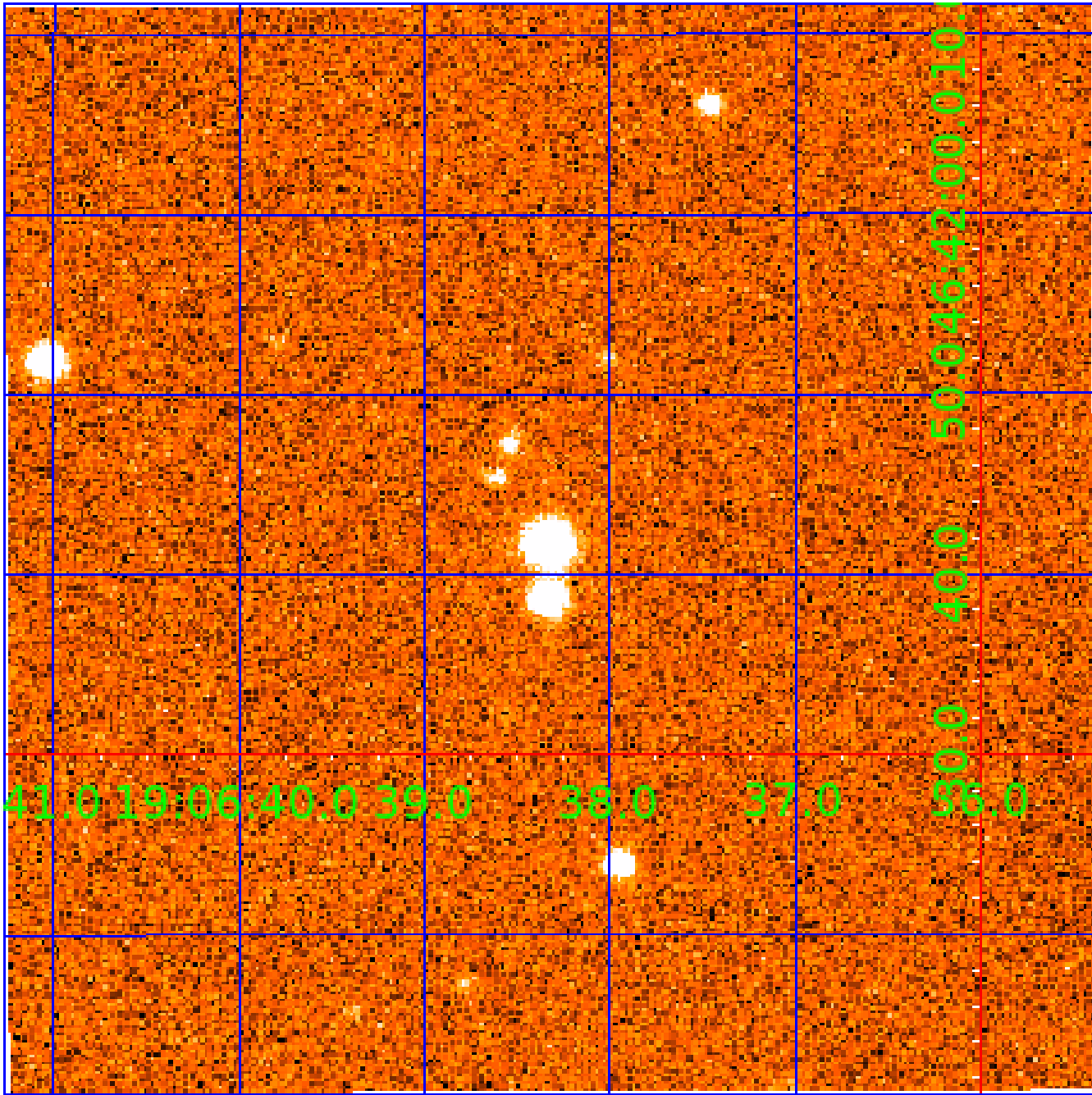


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009820789

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})
009820789-01	OBS	No	541.759589	372.817738	1790.2	5.405	11.5	6.7	0.61	4426	2.60	0.11
009820789-02	OBS	No	421.037250	389.773901	2002.3	6.147	8.8	7.1	0.61	4426	2.69	0.15

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009820789-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—CENT_FEW_DIFFS
009820789-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

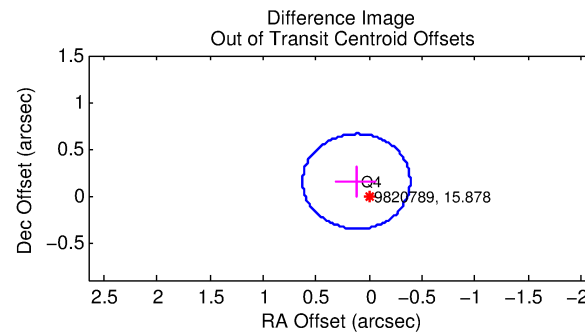
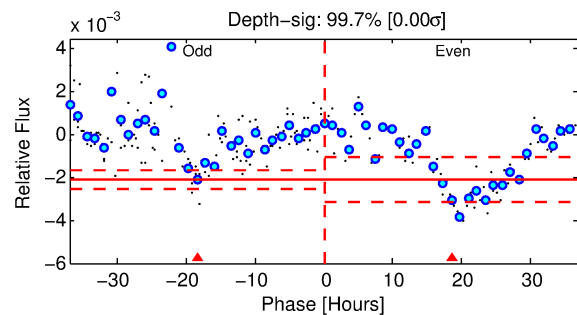
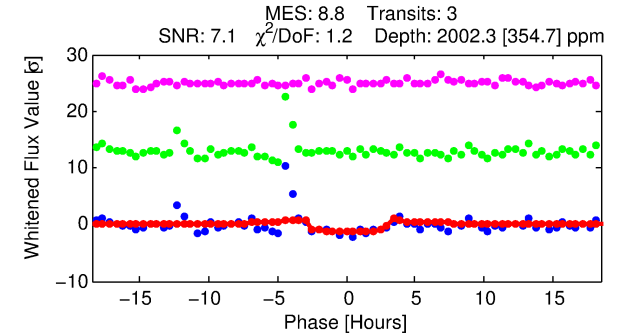
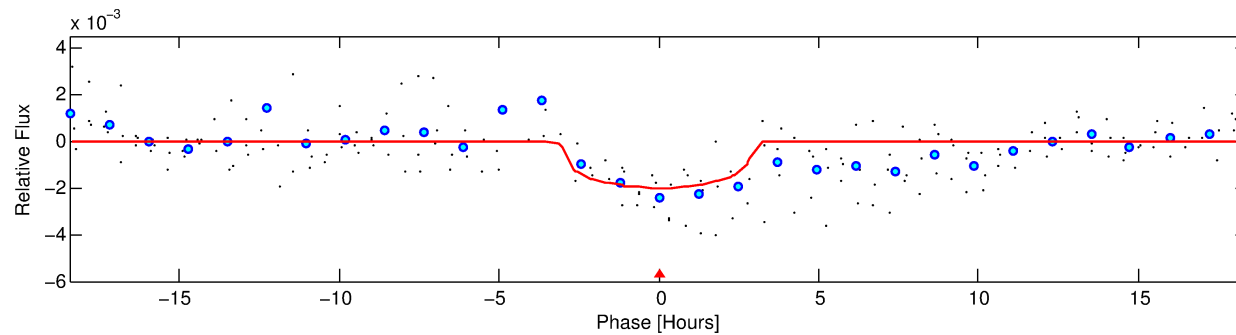
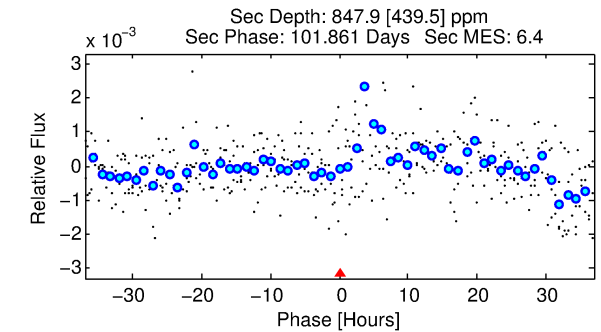
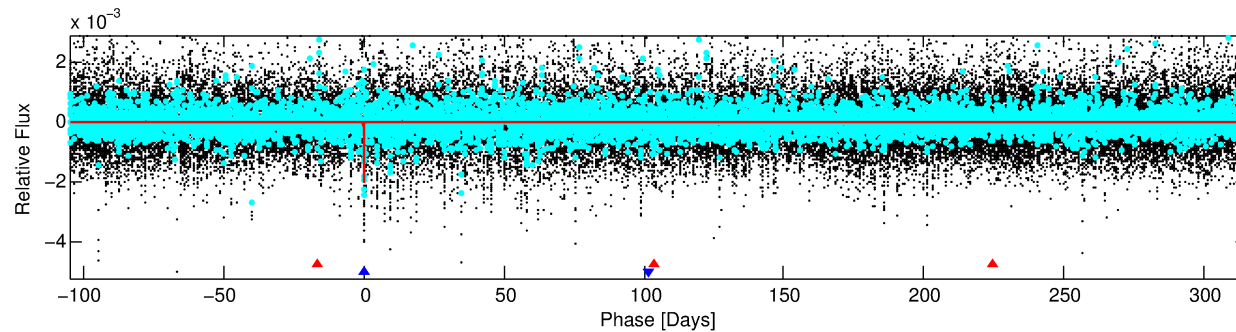
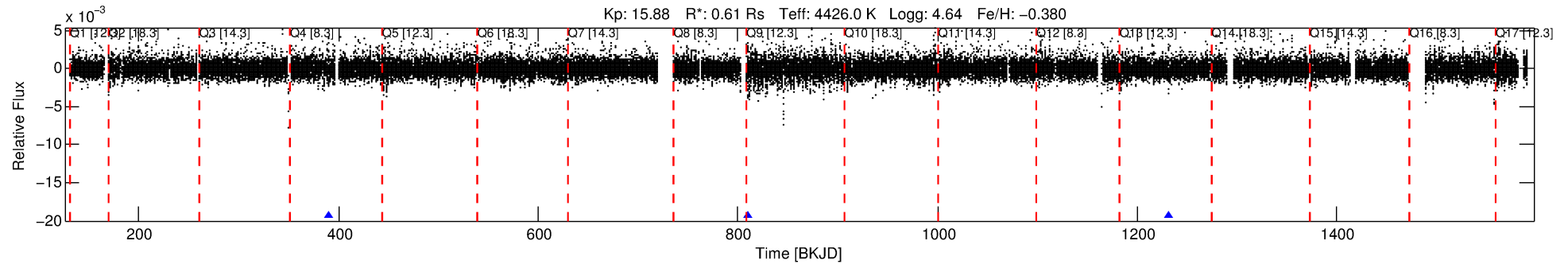
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009820789-02

No Significant Match Found

DV One-Page Summary

KIC: 9820789 Candidate: 2 of 2 Period: 421.037 d



DV Fit Results:

Period = 421.03725 [0.00935] d
Epoch = 389.7739 [0.0100] BKJD
Rp/R* = 0.0402 [0.0687]
a/R* = 517.60 [2848.38]
b = 0.32 [15.61]
Seff = 0.15 [0.02]
Teq = 159 [6] K
Rp = 2.69 [4.61] Re
a = 0.9276 [0.0675] AU
Ag = 55361.35 [191503.74] [0.29 σ]
Teffp = 3768 [3259] K [1.11 σ]

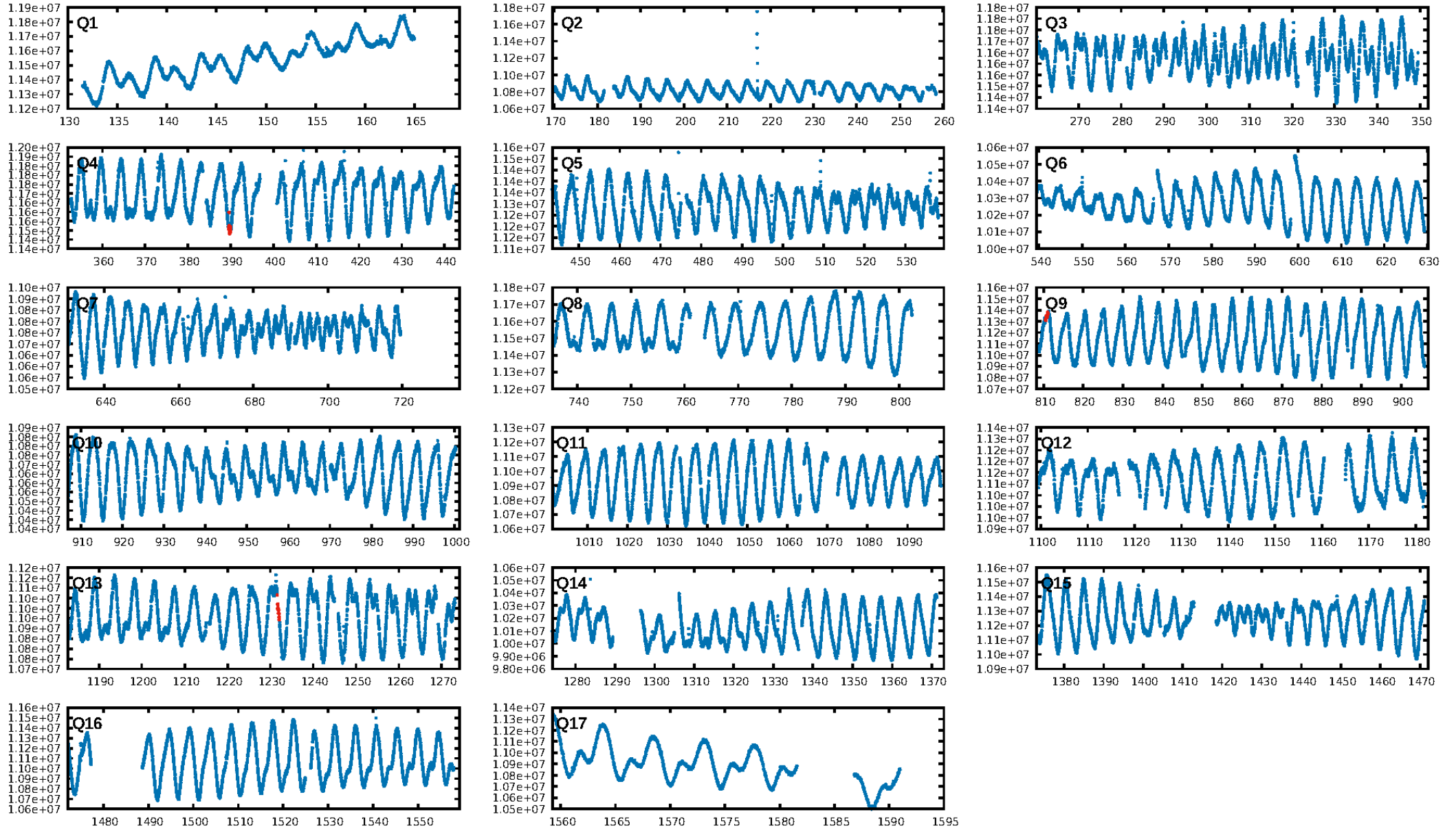
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [353.98 σ]
ModelChiSquare2-sig: 81.1%
ModelChiSquareGof-sig: 98.9%
Bootstrap-pfa: 1.60e-07
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 1.446
Centroid-sig: N/A
Centroid-so: 1.552 arcsec [1.73 σ]
OotOffset-rm: 0.194 arcsec [1.15 σ]
OotOffset-st: 0/0/1/0 [1]
KicOffset-rm: 0.089 arcsec [0.51 σ]
KicOffset-st: 0/0/1/0 [1]
DiffImageQuality-fgm: 1.00 [1/1]
DiffImageOverlap-fno: 1.00 [2/2]

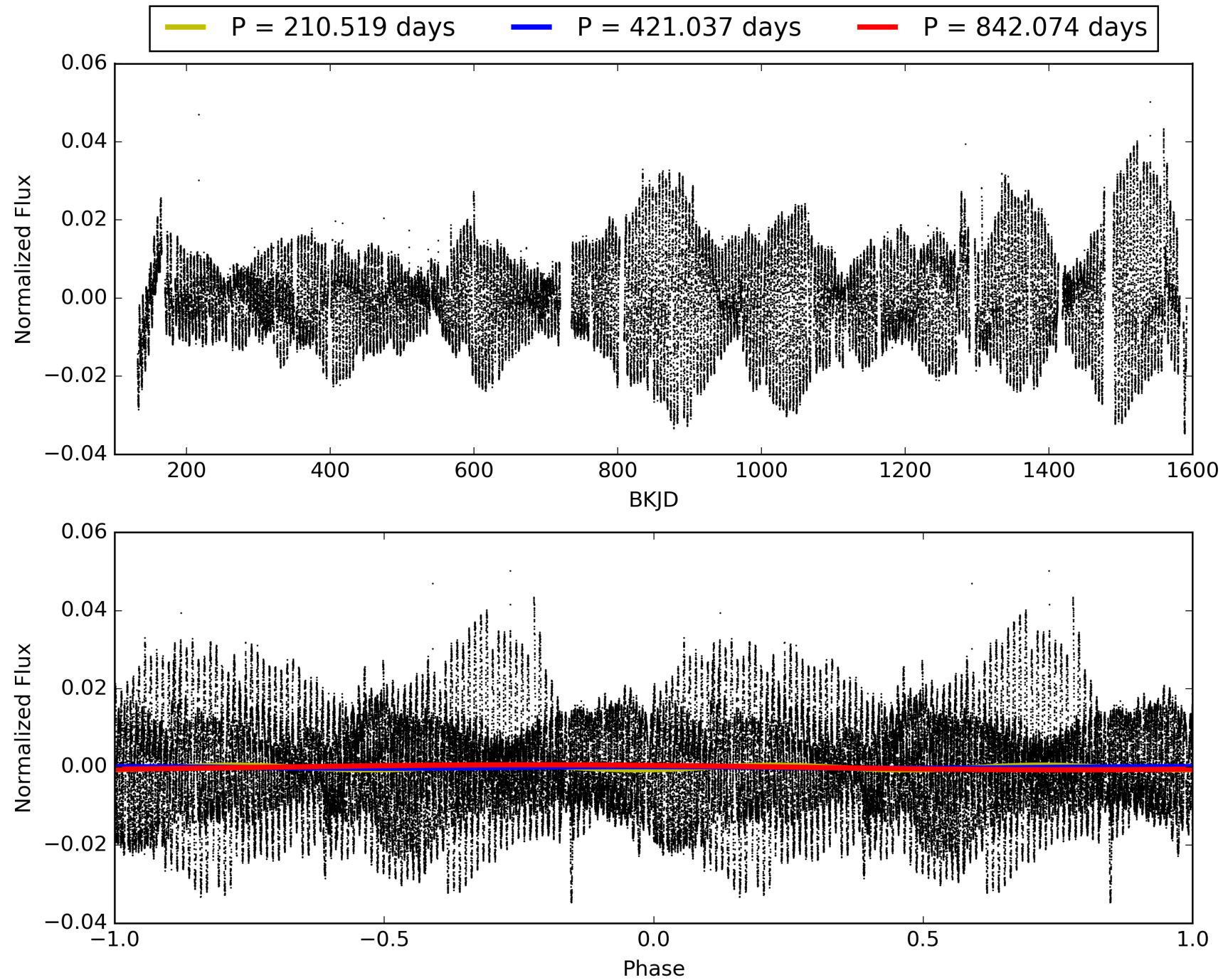
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 07:35:57 Z

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

TCE 009820789-02, PDC Light Curves

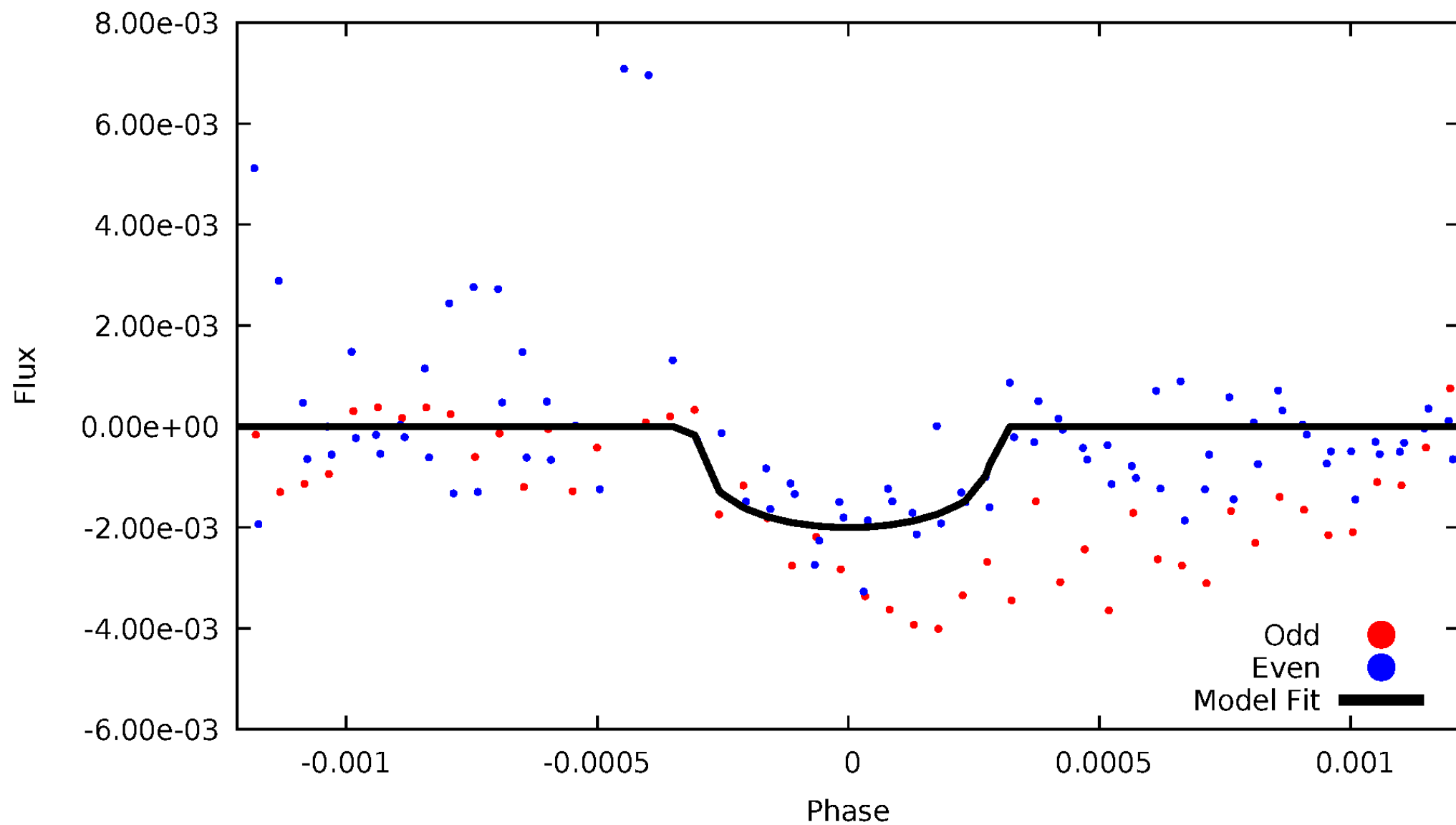


TCE 009820789-02



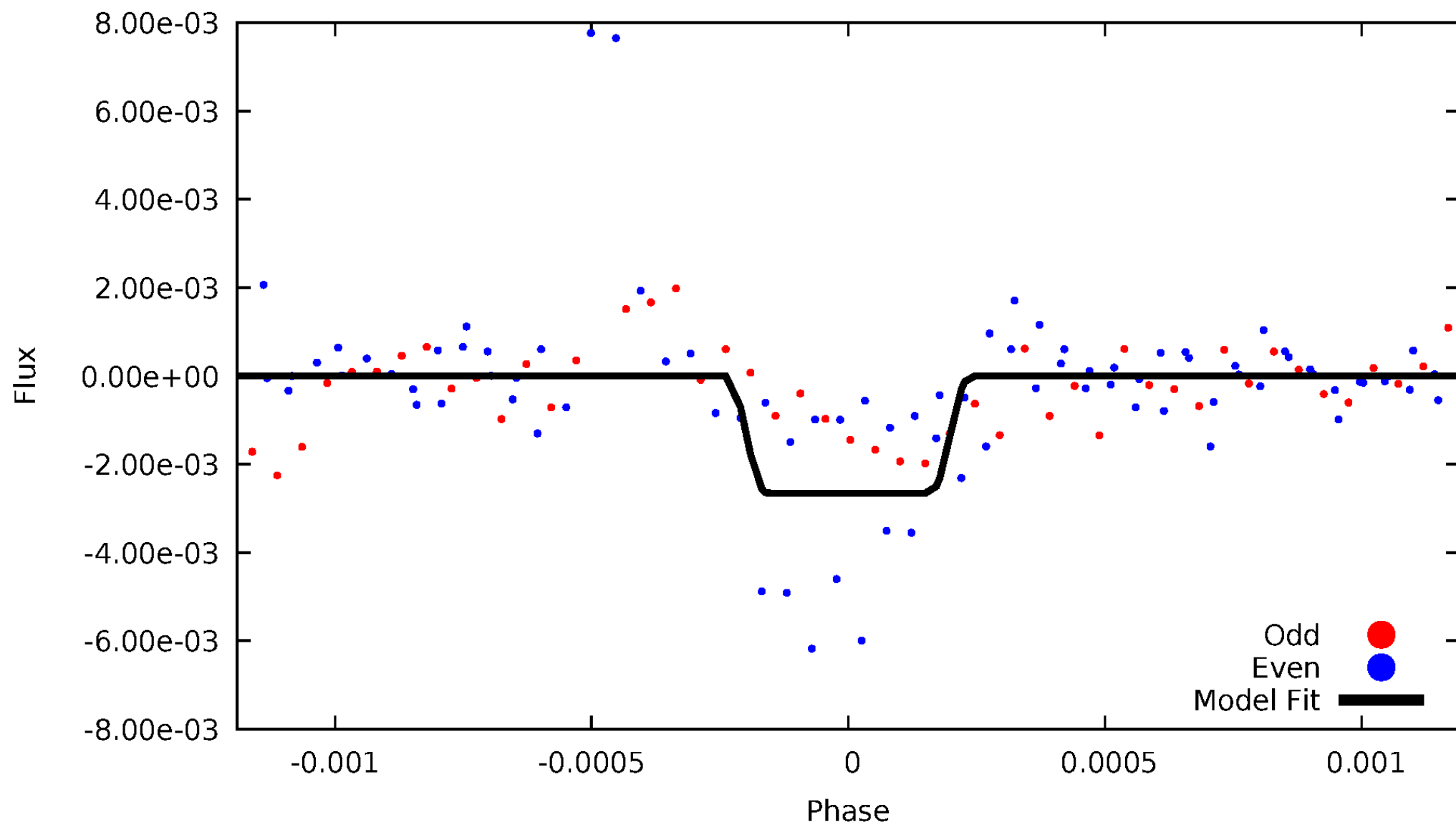
DV Odd/Even

TCE 009820789-02



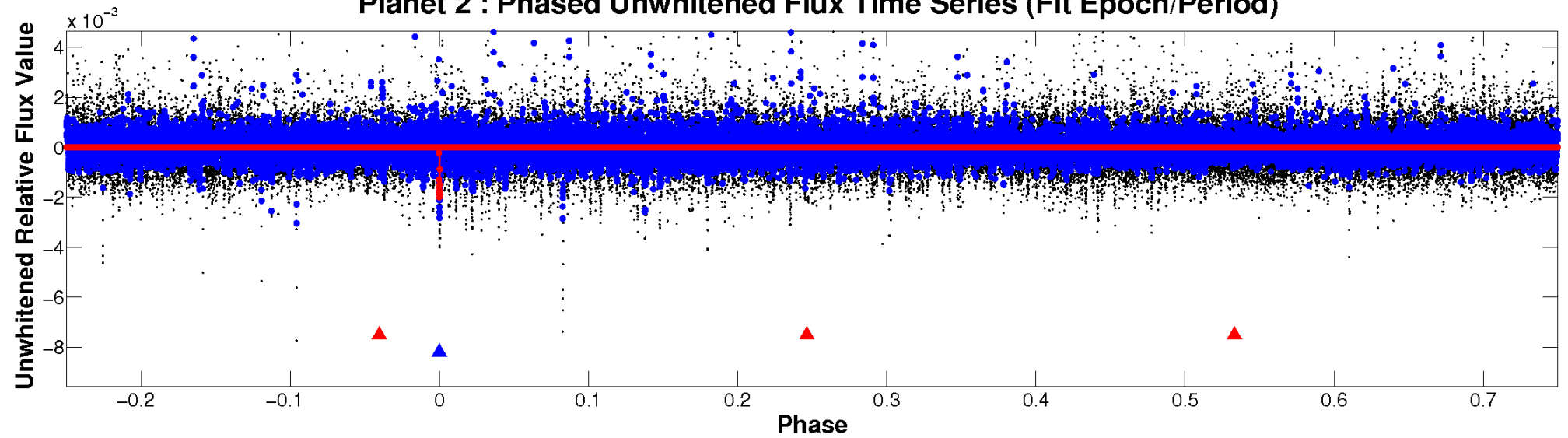
ALT Odd/Even

TCE 009820789-02

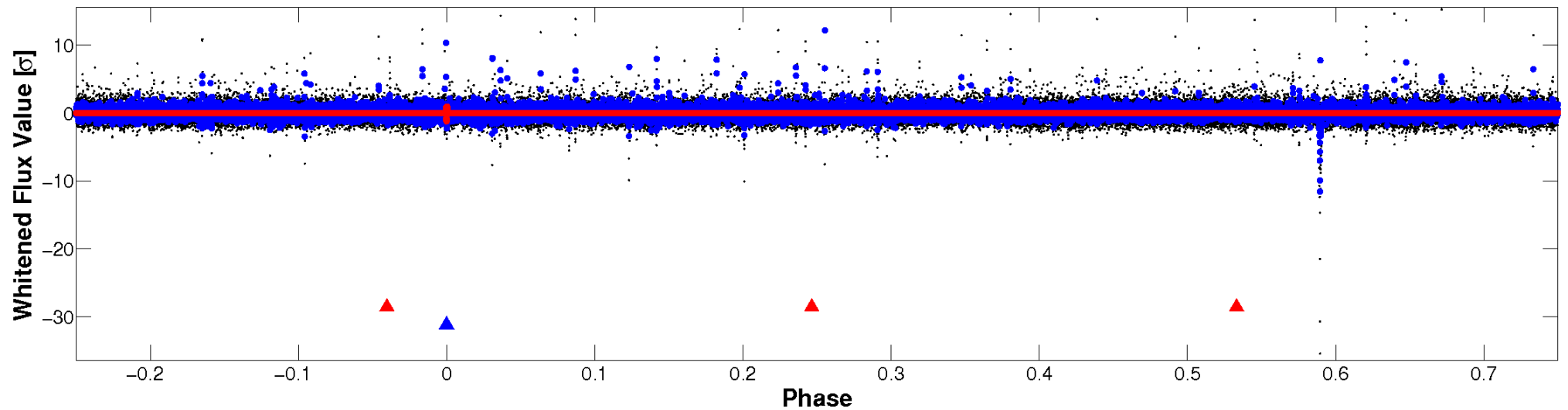


Non-Whitened Vs. Whitened Light Curve

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

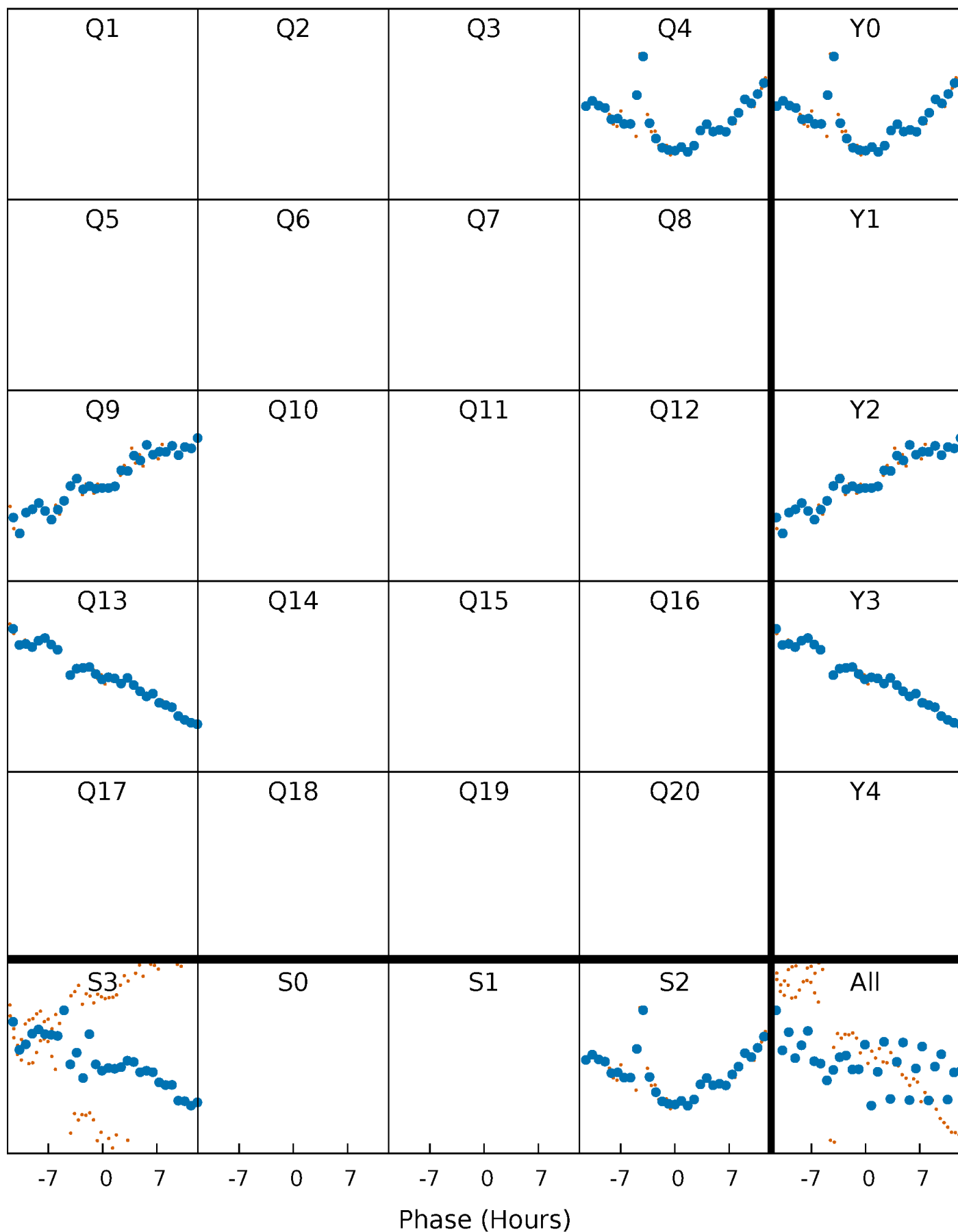


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



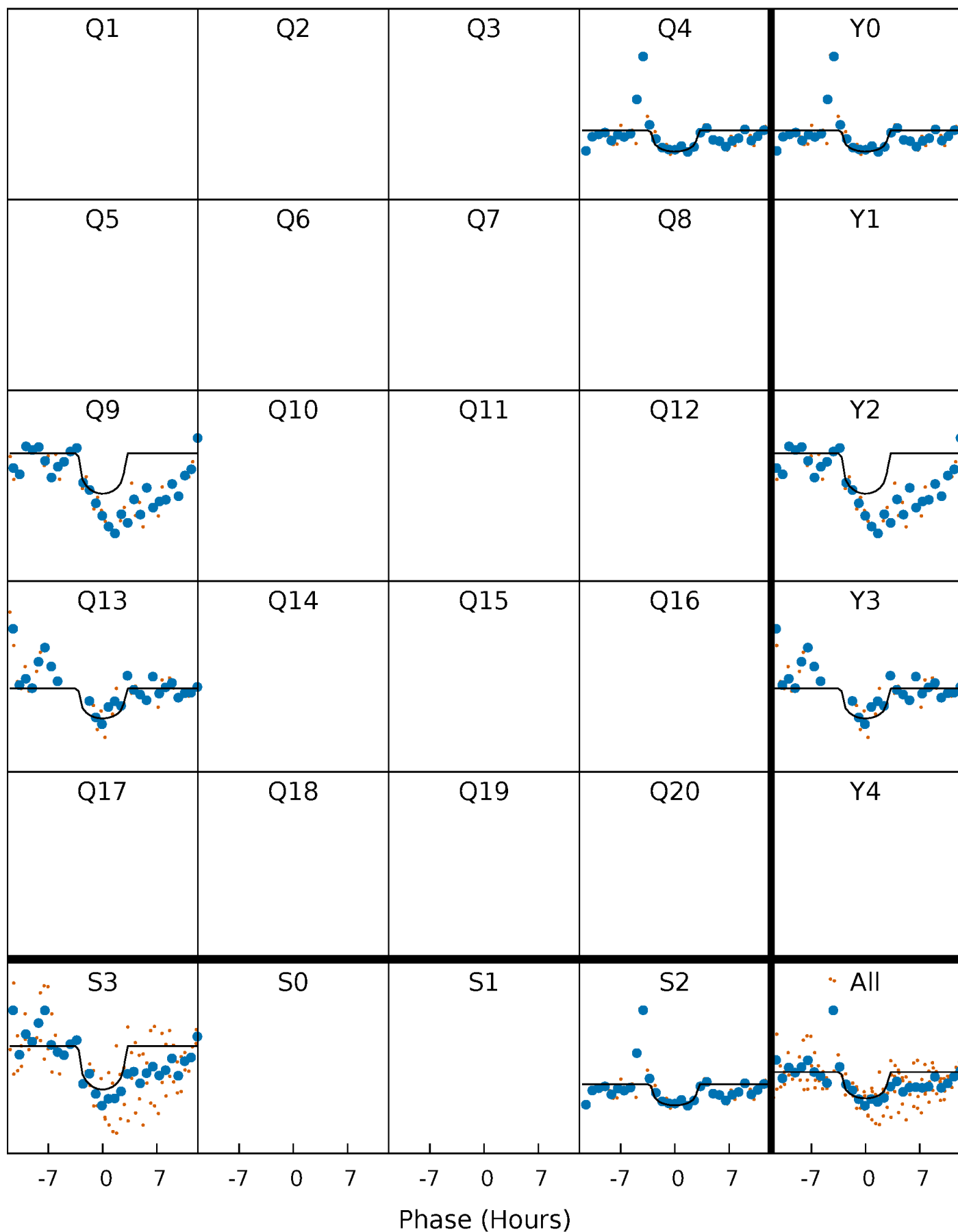
PDC Quarter-Phased Transit Curves

TCE 009820789-02 P=421.037250 Days $T_0=389.773901$ (BKJD)



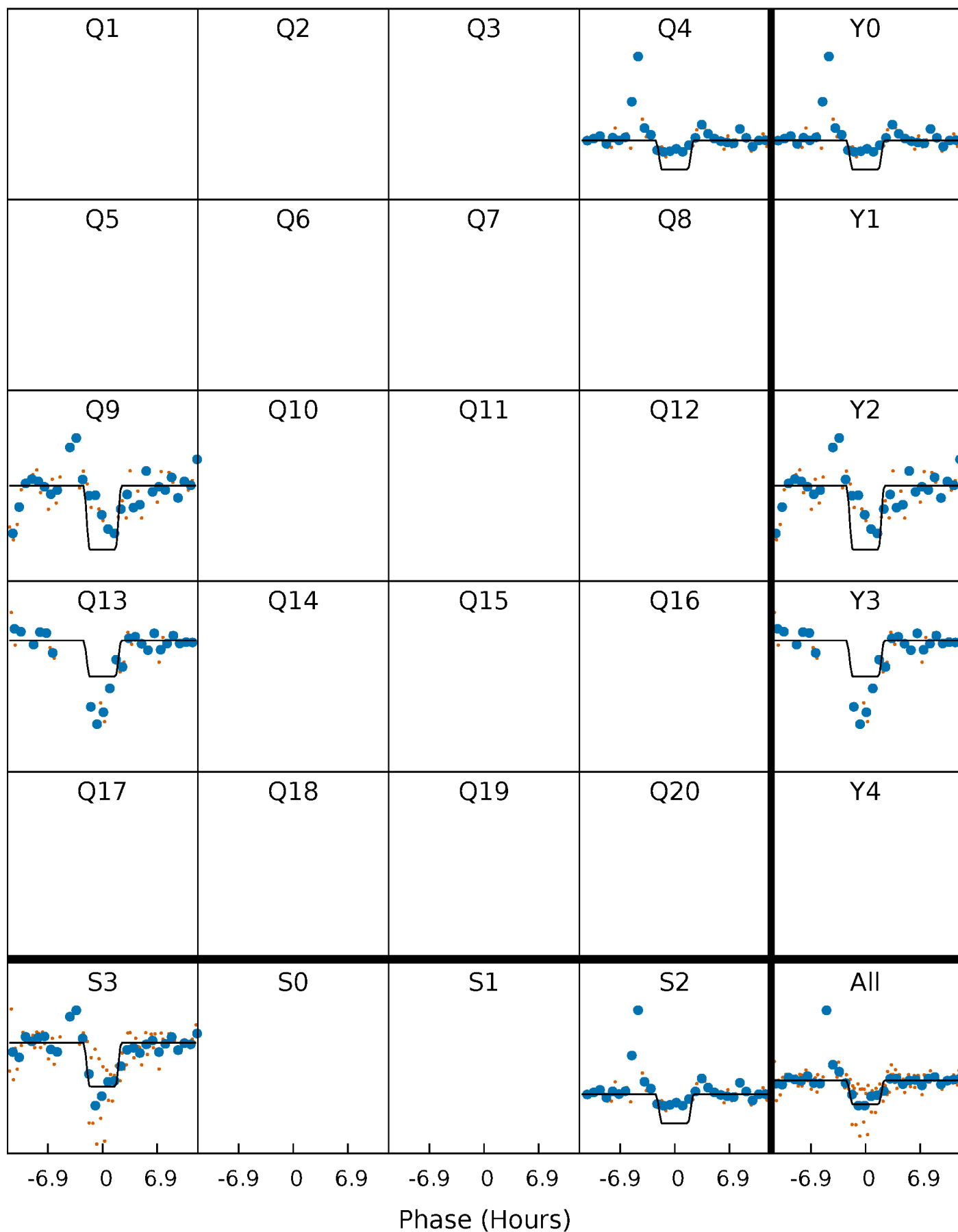
DV Quarter-Phased Transit Curves

TCE 009820789-02 $P=421.037250$ Days $T_0=389.773901$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

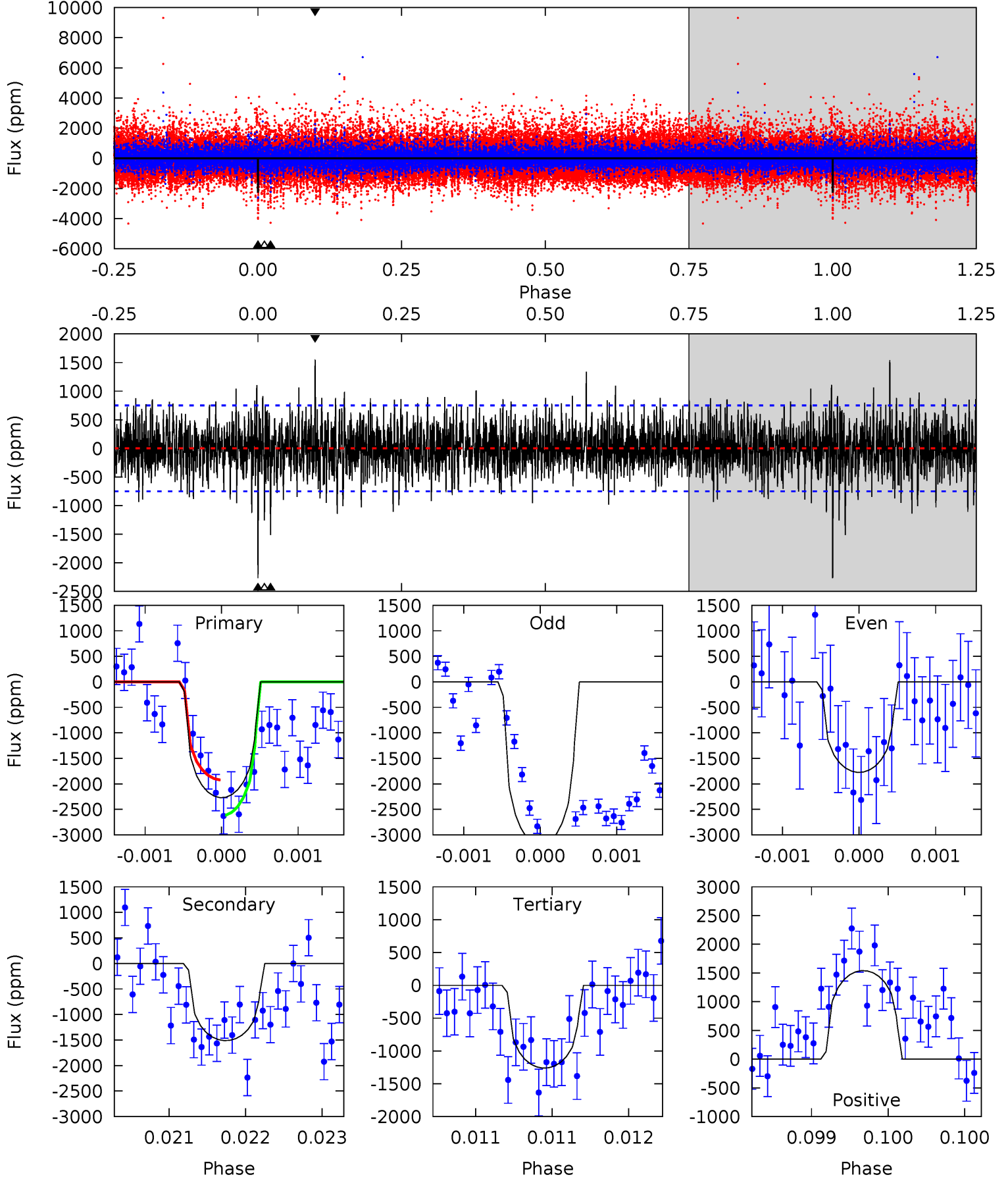
TCE 009820789-02 P=421.026693 Days $T_0=389.797001$ (BKJD)



DV Model-Shift Uniqueness Test

009820789-02, P = 421.037250 Days, E = 389.773901 Days

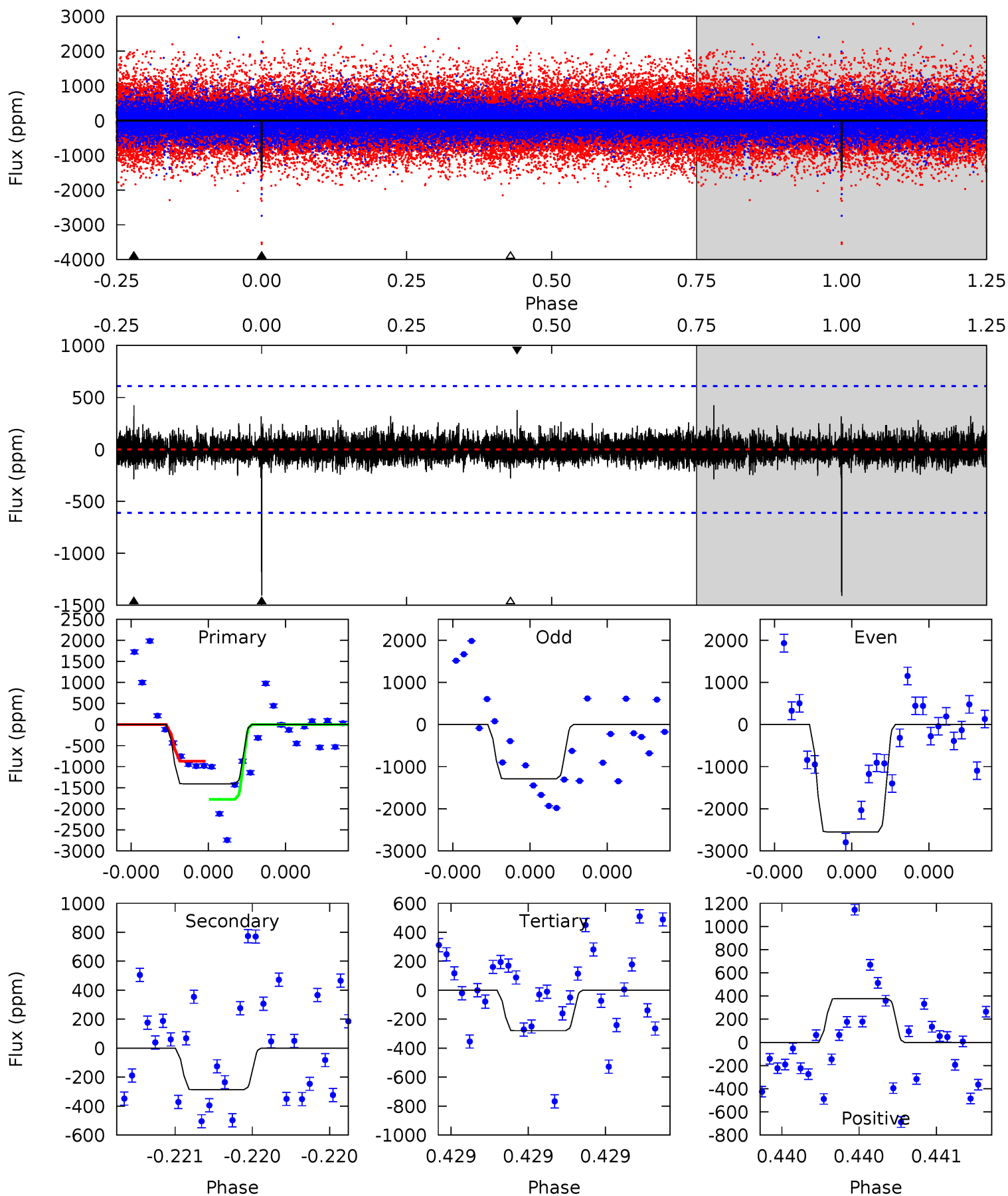
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.7	11.1	9.30	11.4	5.53	3.42	2.28	7.44	5.37	1.84	-0.22	4.71	1.21	0.40	2.56



Alt Model-Shift Uniqueness Test

009820789-02, P = 421.026693 Days, E = 389.797001 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.9	2.63	2.56	3.46	5.60	3.52	0.60	10.4	9.46	0.07	-0.83	5.80	1.74	0.23	3.94



Stellar Parameters For KIC 009820789

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4426^{+118}_{-131}	$4.640^{+0.052}_{-0.028}$	$-0.380^{+0.300}_{-0.300}$	$0.614^{+0.050}_{-0.056}$	$0.601^{+0.070}_{-0.041}$	$3.654^{+0.770}_{-0.475}$
	+3%/-3%	+1%/-1%	+79%/-79%	+8%/-9%	+12%/-7%	+21%/-13%
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 009820789-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-1511 ± 136	$4.25^{+3.97}_{-2.81}$	221^{+7}_{-8}	3724^{+1959}_{-697}	$39749^{+307472}_{-29205}$
Alt.	-286 ± 109	$5.03^{+3.71}_{-3.35}$	221^{+8}_{-8}	2759^{+1046}_{-411}	5379^{+39296}_{-3830}

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

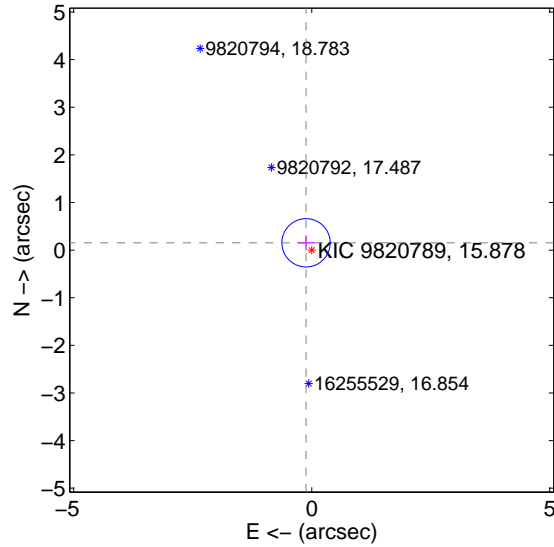
Supplemental centroid analysis for 009820789-02. Kepler magnitude: 15.88. Transit SNR 7.13

There are 1 quarters with good PRF difference image offsets

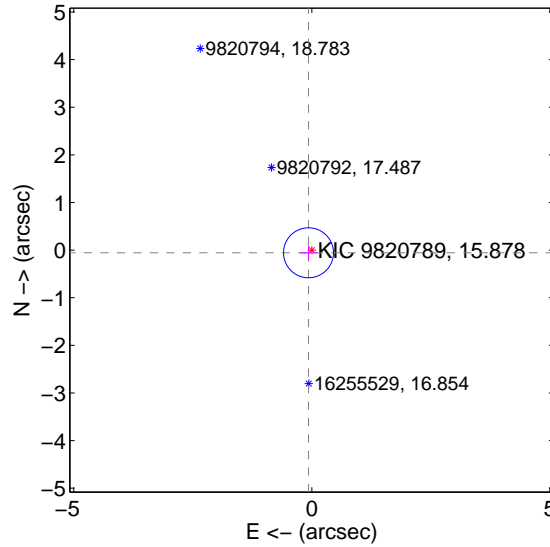
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.194 ± 0.169	1.15	0.119 ± 0.185	0.153 ± 0.159
PRF-fit source offset from KIC position	0.089 ± 0.175	0.51	0.069 ± 0.185	-0.056 ± 0.159
photometric centroid source offset	1.55 ± 0.89	1.73	-0.23 ± 0.66	1.53 ± 0.90

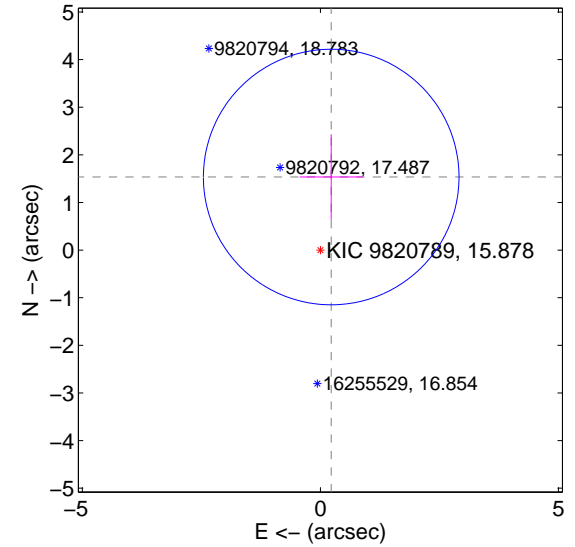
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

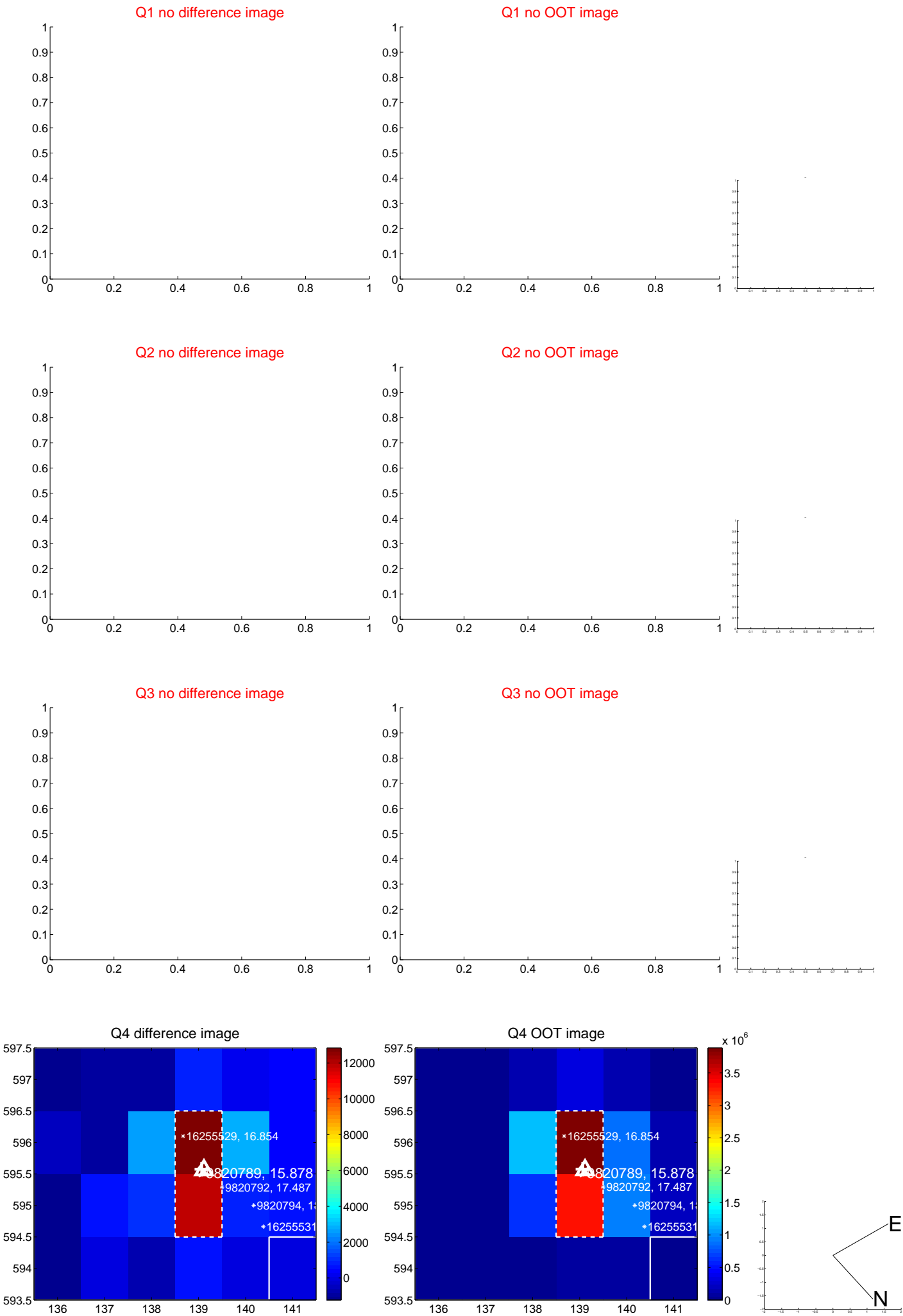


offset from photometric centroids



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.

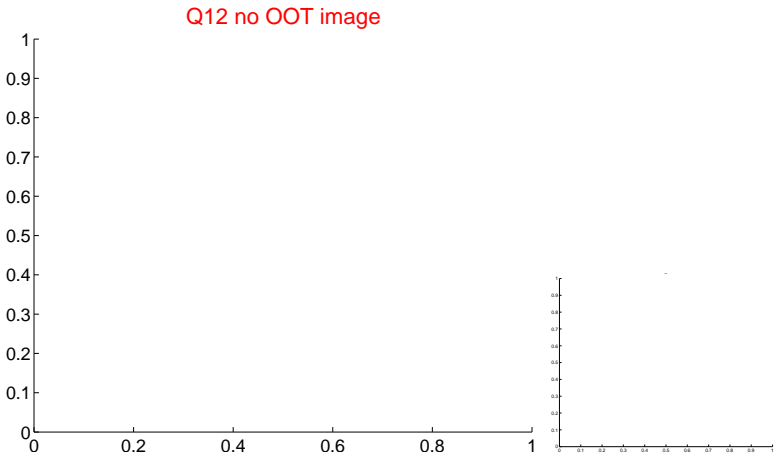
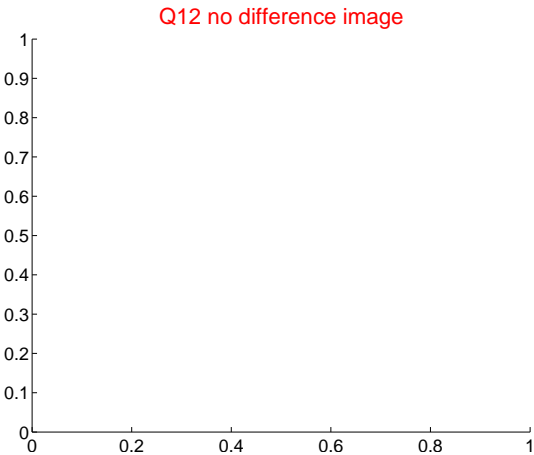
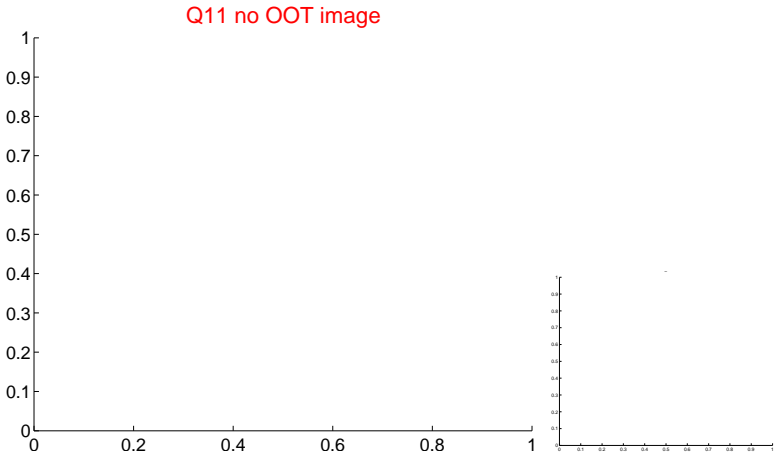
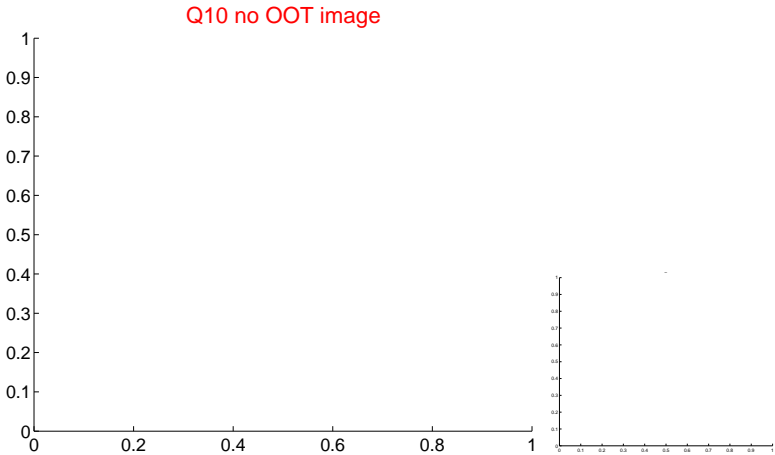
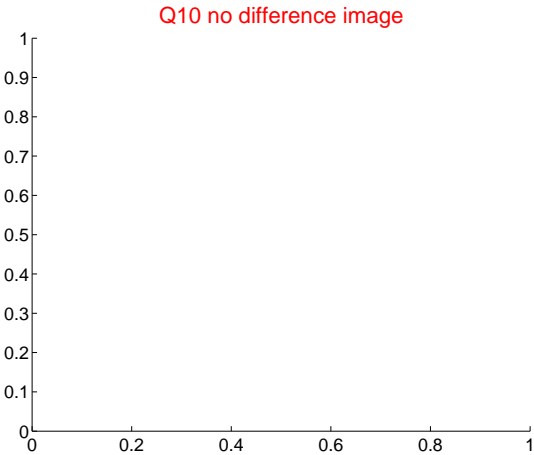
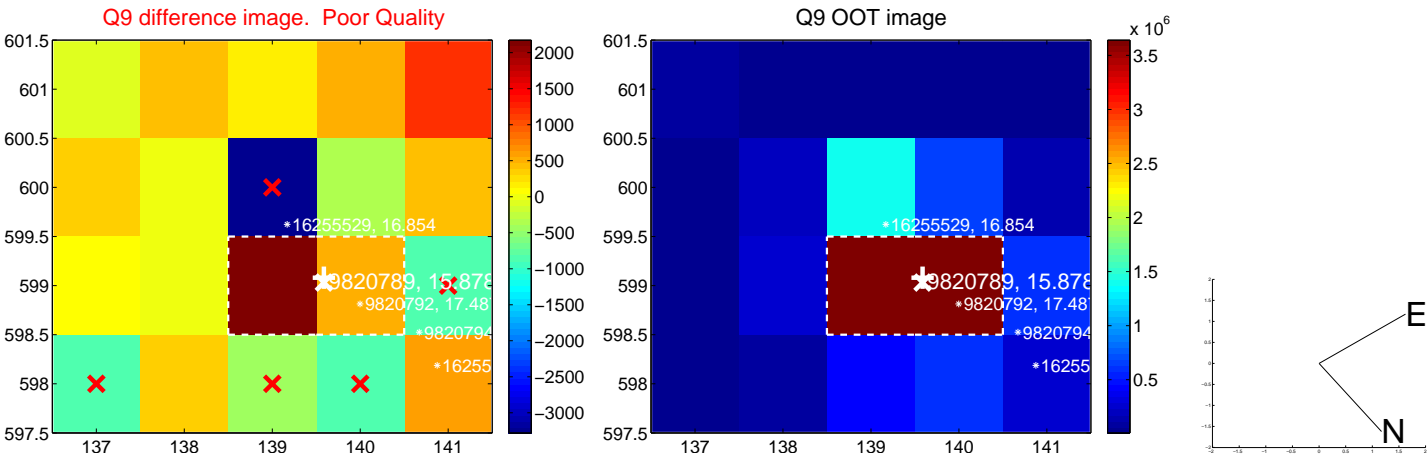
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



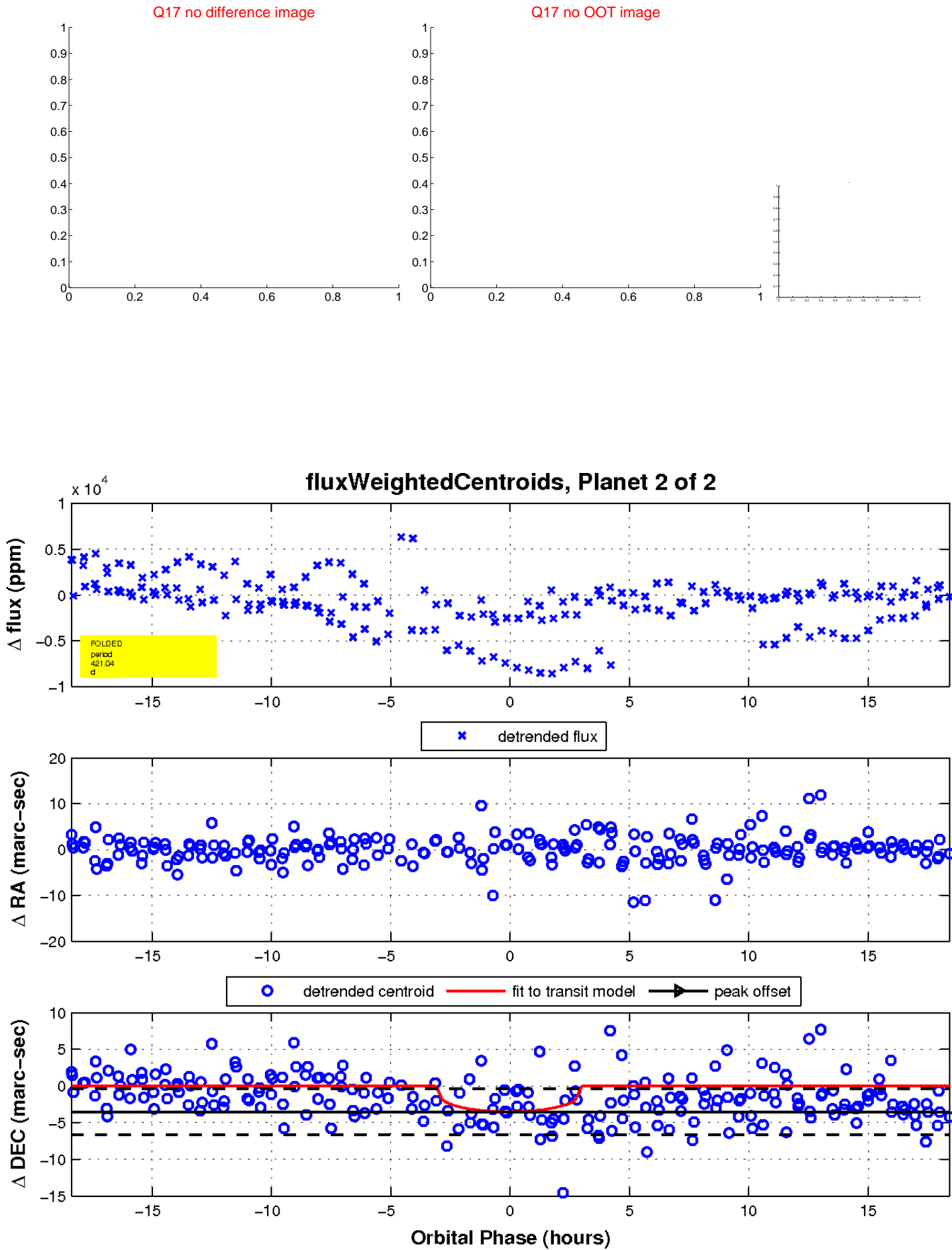
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

