

KIC 009785921

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})
009785921-01	OBS	3372.01	26.757474	137.286526	446.6	5.889	11.1	11.3	1.05	6215	2.44	44.95
009785921-02	OBS	3372.02	73.503310	163.588254	487.0	7.128	7.3	7.6	1.05	6215	2.77	11.68

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009785921-01	OBS	PC	0.99	0	0	0	0	NO_COMMENT
009785921-02	OBS	FP	0.26	0	1	0	0	DEPTH_ODDEVEN_DV—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 009785921-01

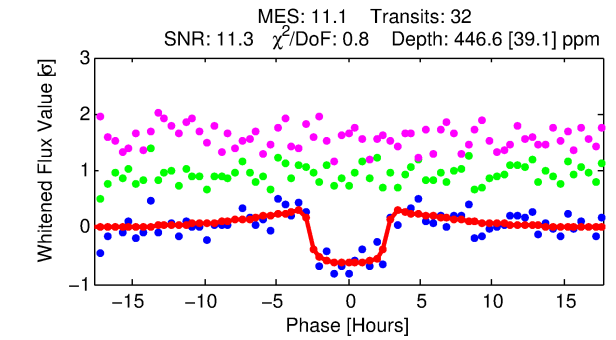
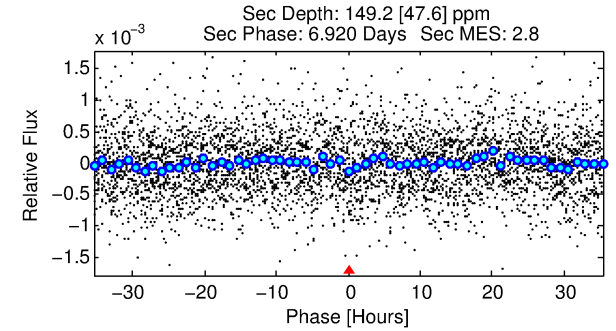
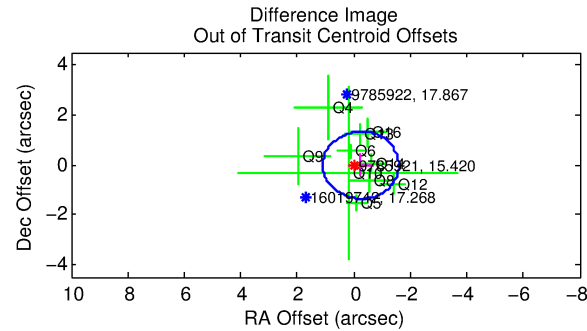
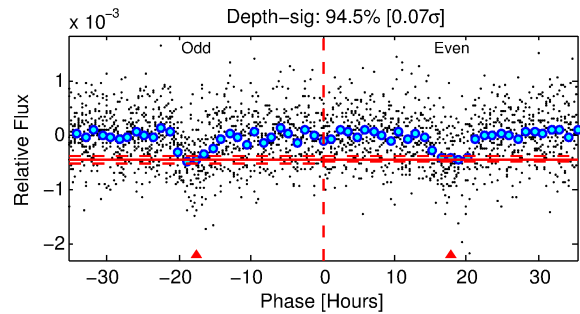
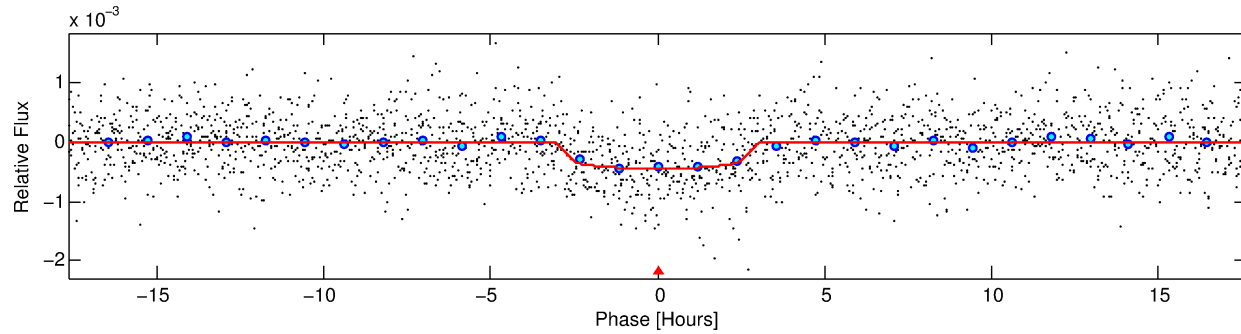
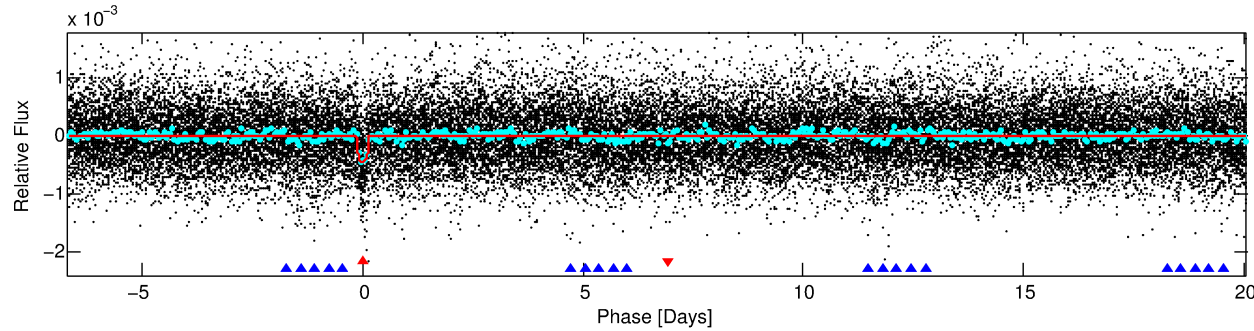
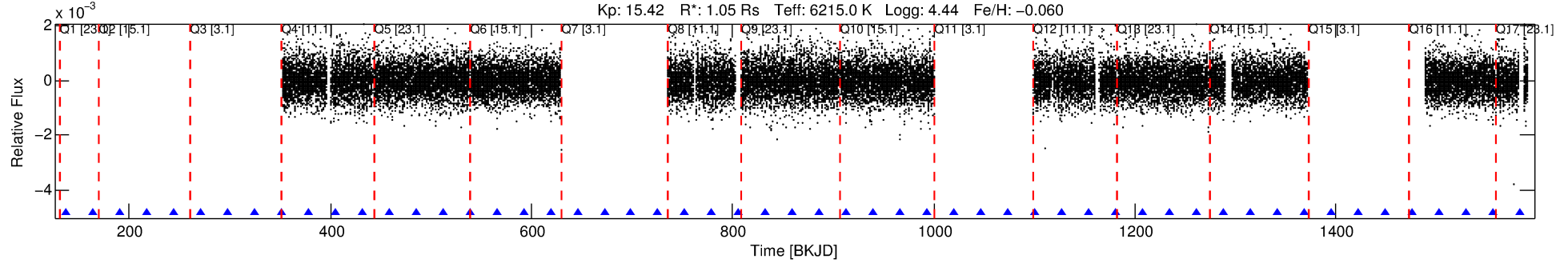
No Significant Match Found

DV One-Page Summary

KIC: 9785921 Candidate: 1 of 2 Period: 26.757 d

KOI: K03372.01 Corr: 0.979

Kp: 15.42 R*: 1.05 Rs Teff: 6215.0 K Logg: 4.44 Fe/H: -0.060



DV Fit Results:

Period = 26.75747 [0.00028] d
Epoch = 137.2865 [0.0093] BKJD
Rp/R* = 0.0213 [0.0067]
a/R* = 22.77 [35.55]
b = 0.78 [0.78]
Seff = 44.95 [18.75]
Teq = 660 [69] K
Rp = 2.44 [1.09] Re
a = 0.1814 [0.0479] AU
Ag = 452.90 [362.90] [1.25σ]
Teffp = 4709 [852] K [4.74σ]

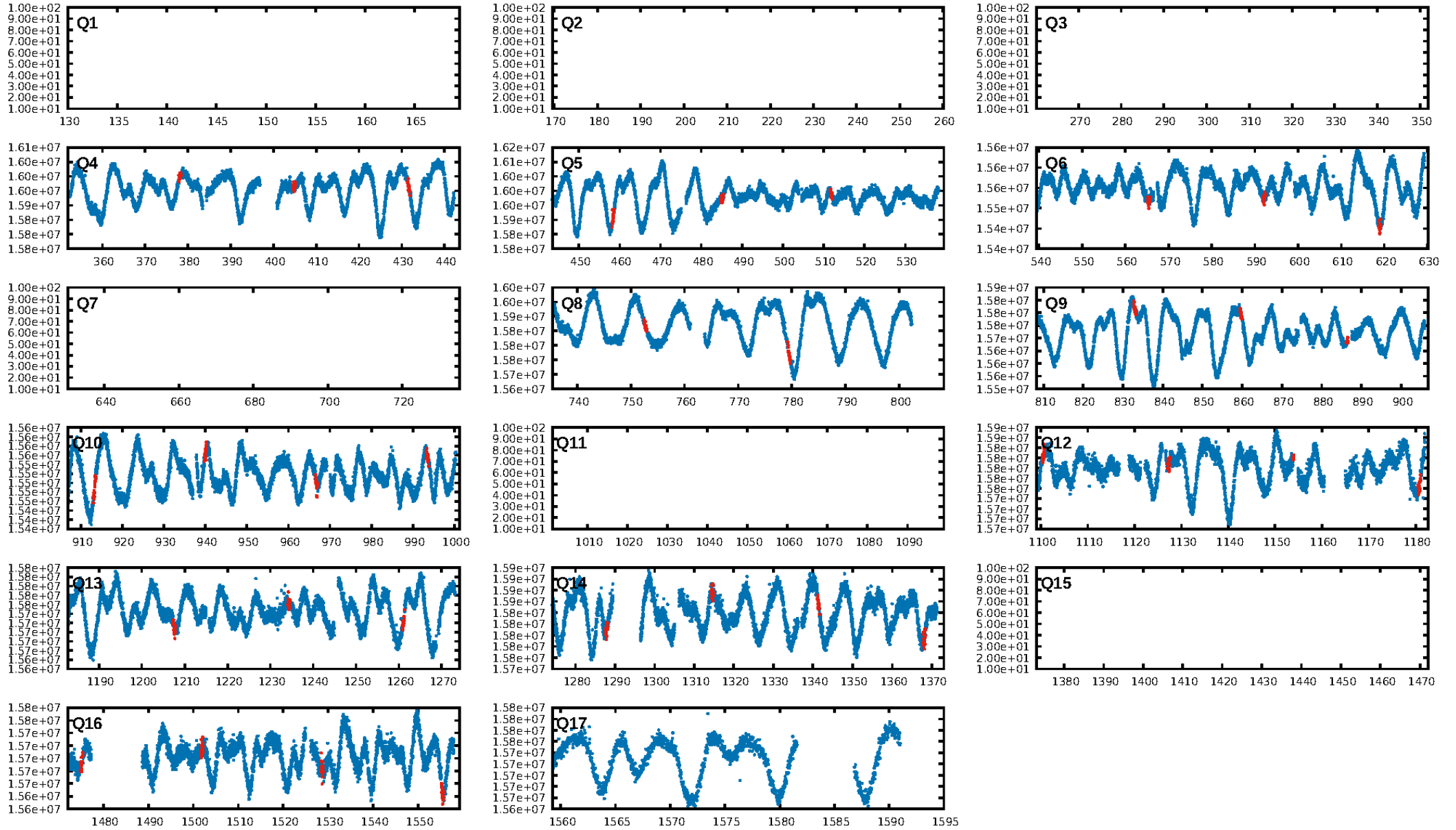
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [121.34σ]
ModelChiSquare2-sig: 98.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 4.66e-29
RollingBand-fgt: 1.00 [32/32]
GhostDiagnostic-chr: -9.887
Centroid-sig: 22.9%
Centroid-so: 0.664 arcsec [0.72σ]
OotOffset-rm: 0.244 arcsec [0.54σ]
KicOffset-rm: 0.292 arcsec [0.66σ]
OotOffset-st: 3/0/4/3 [10]
KicOffset-st: 3/0/4/3 [10]
DiffImageQuality-fgm: 0.80 [8/10]
DiffImageOverlap-fno: 1.00 [10/10]

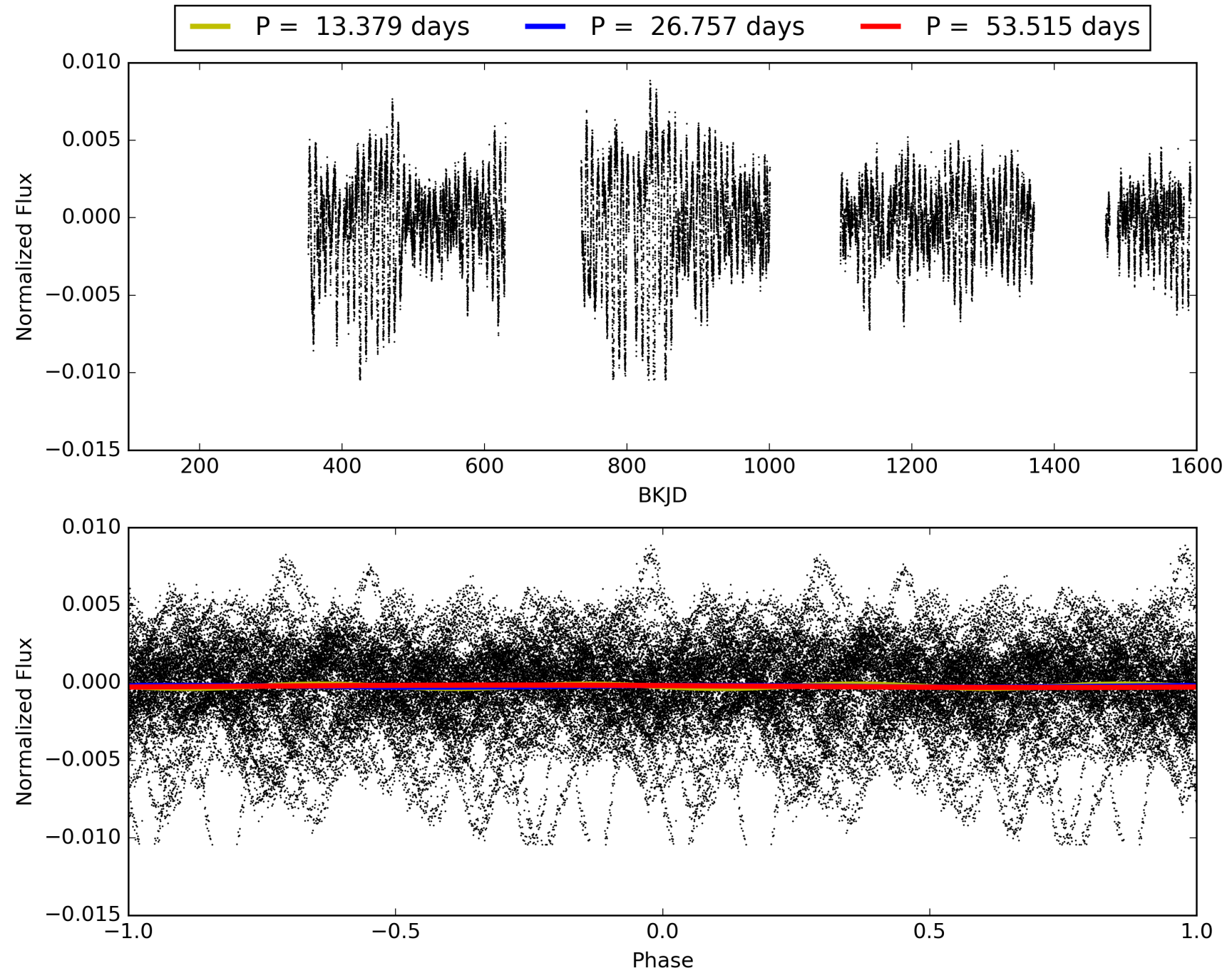
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 10:54:28 Z

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

TCE 009785921-01, PDC Light Curves

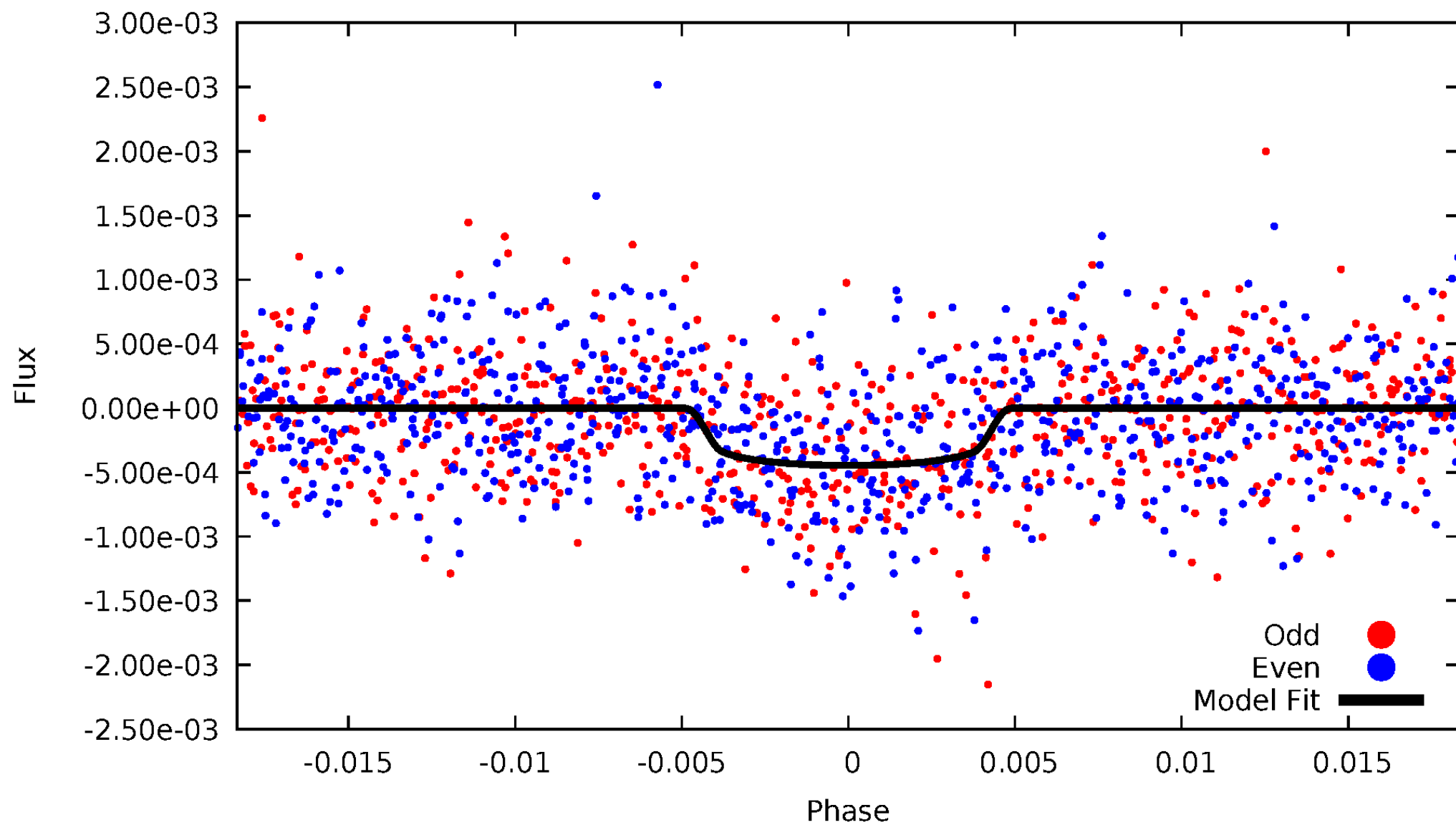


TCE 009785921-01



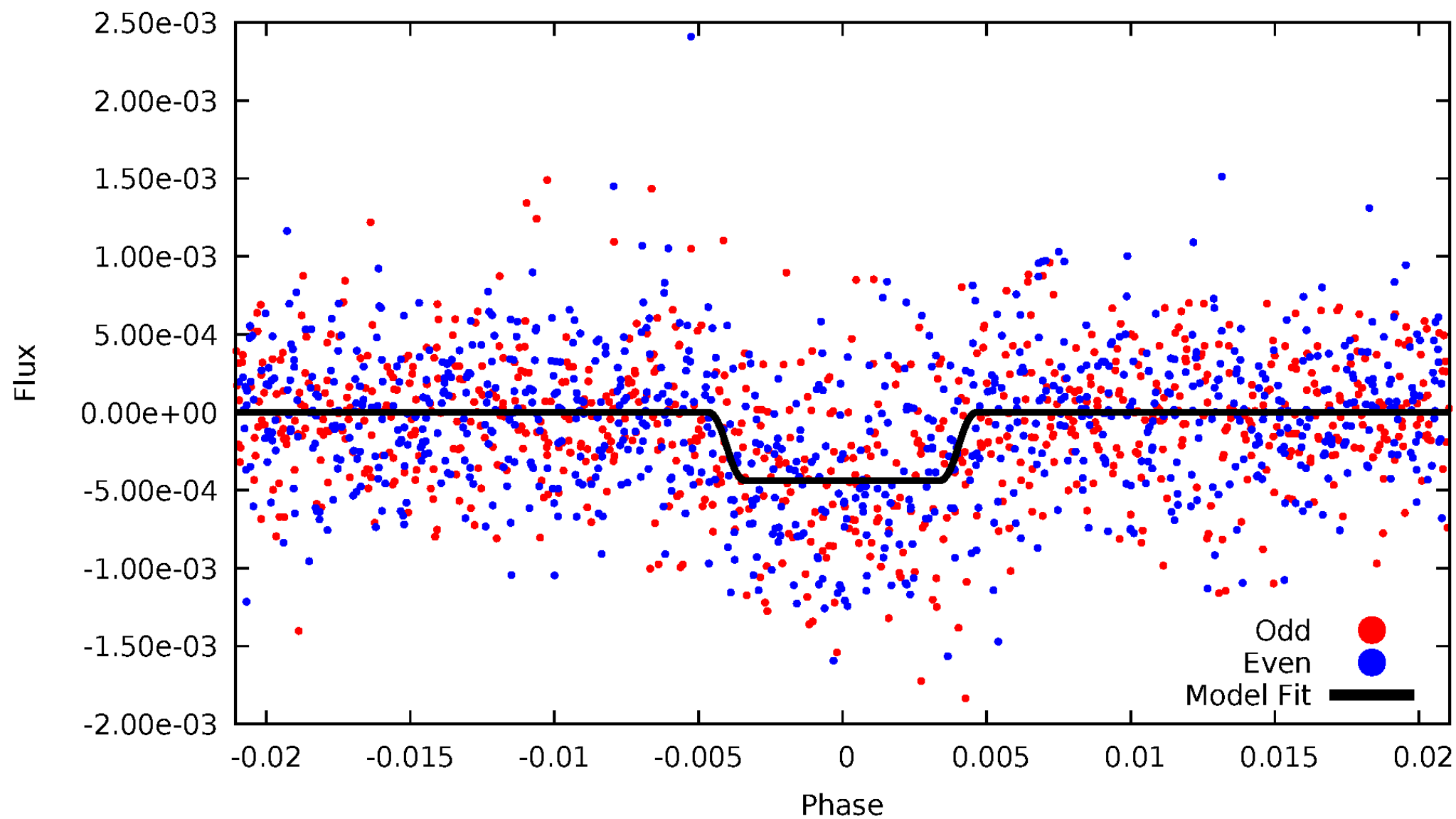
DV Odd/Even

TCE 009785921-01



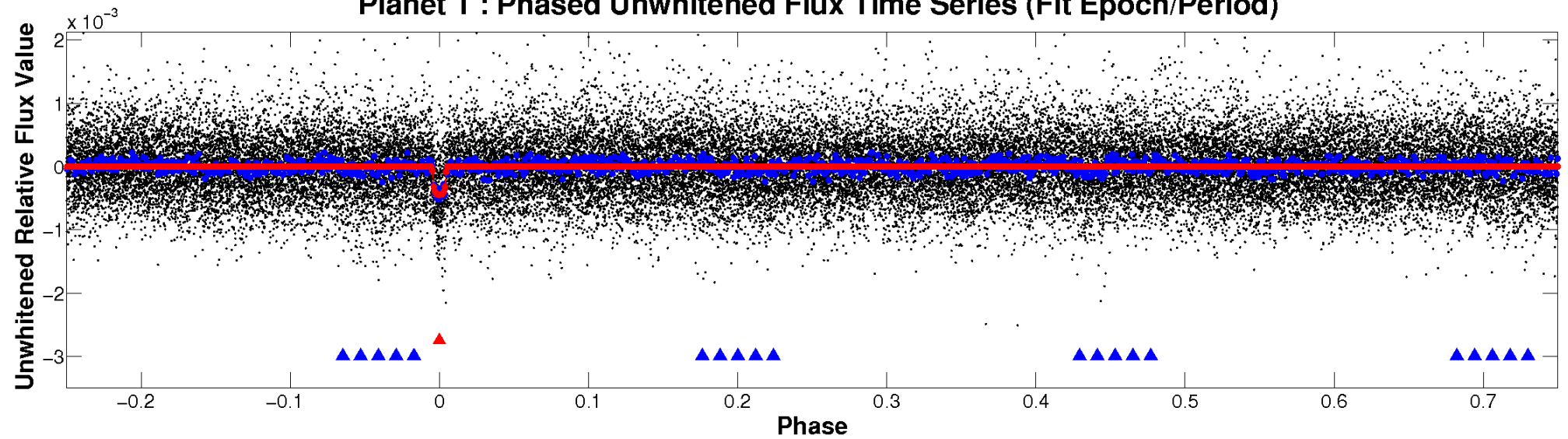
ALT Odd/Even

TCE 009785921-01

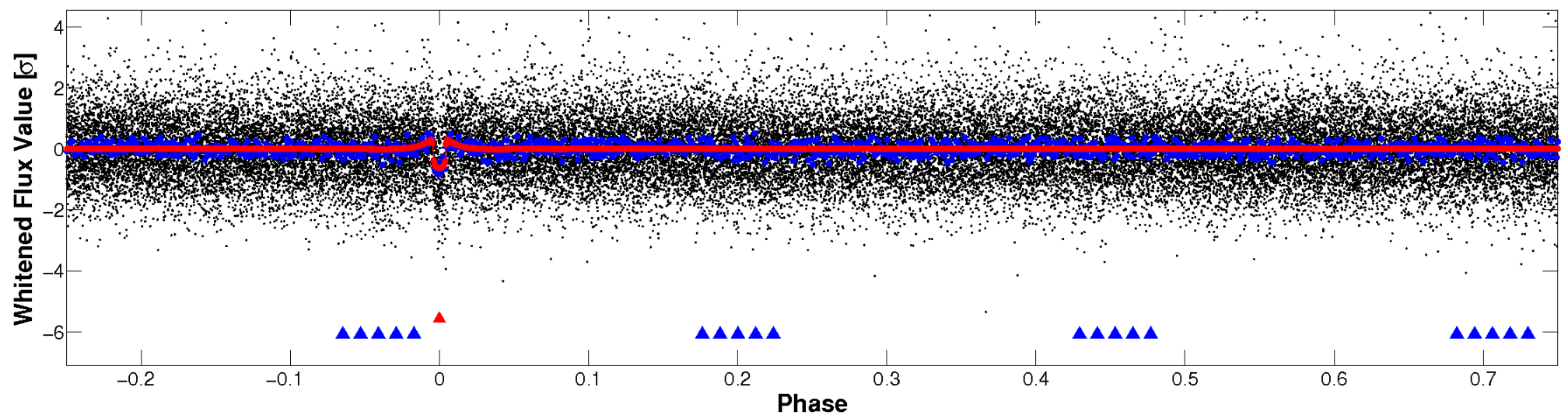


Non-Whitened Vs. Whitened Light Curve

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

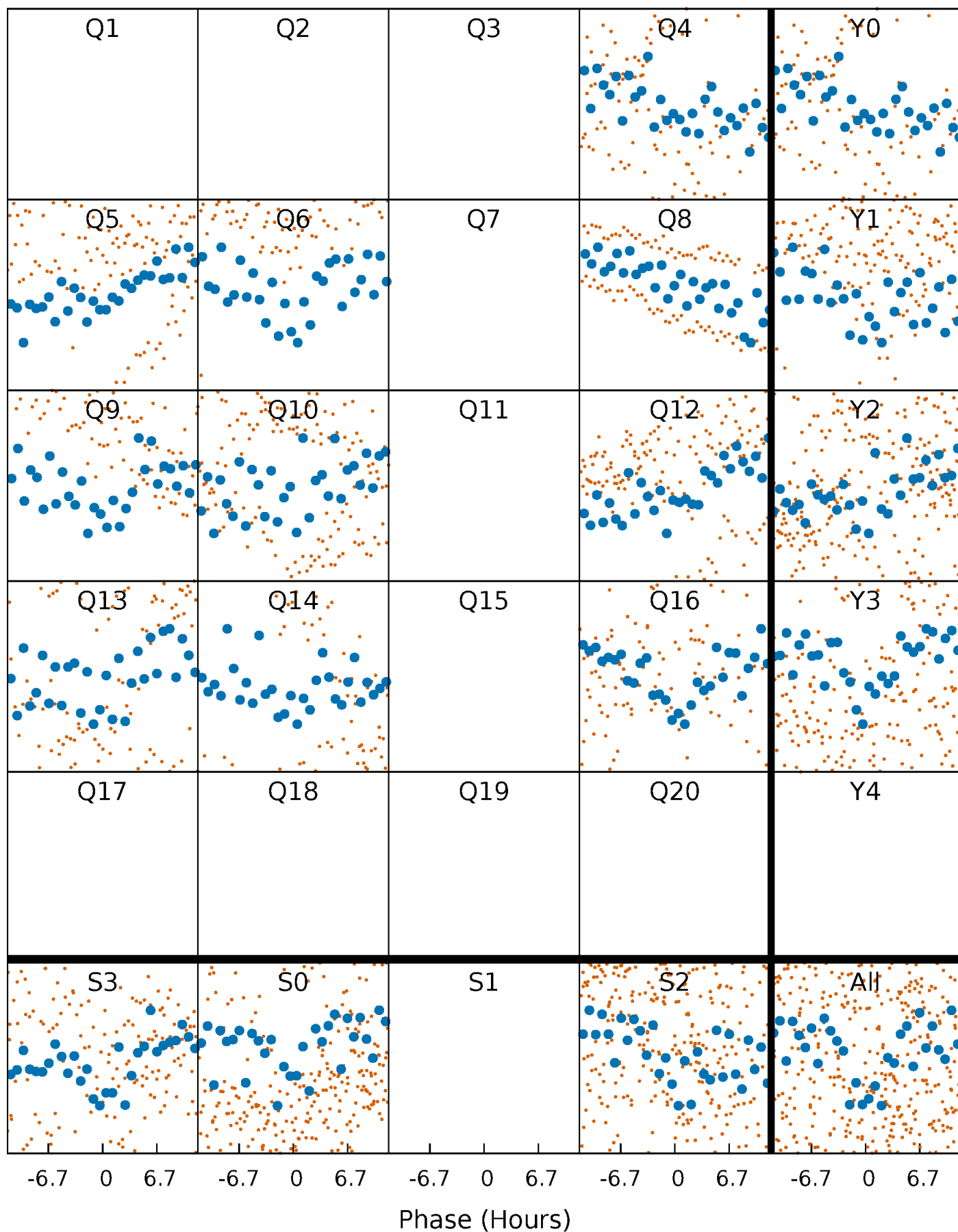


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



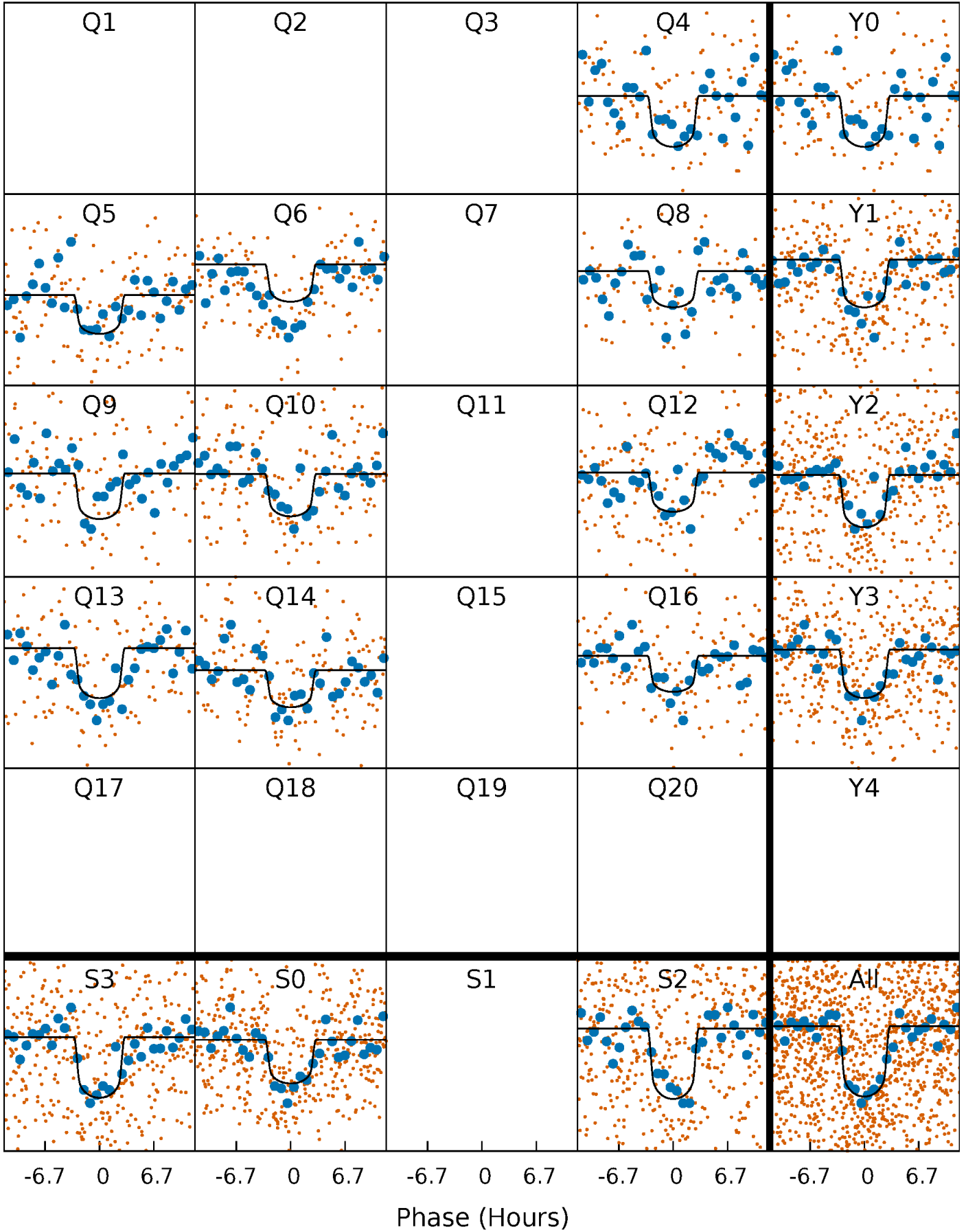
PDC Quarter-Phased Transit Curves

TCE 009785921-01 P= 26.757474 Days $T_0=137.286526$ (BKJD)



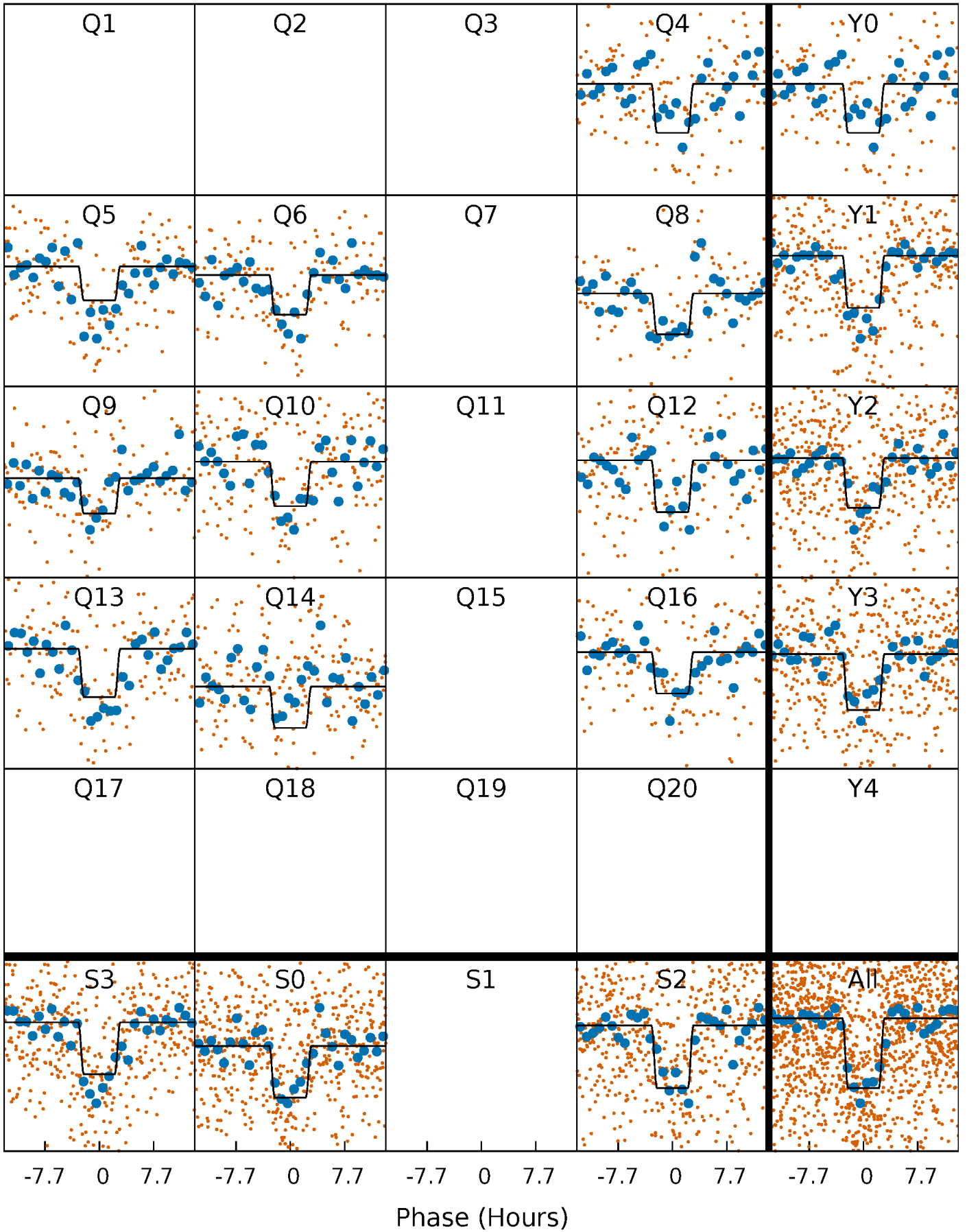
DV Quarter-Phased Transit Curves

TCE 009785921-01 P= 26.757474 Days $T_0=137.286526$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

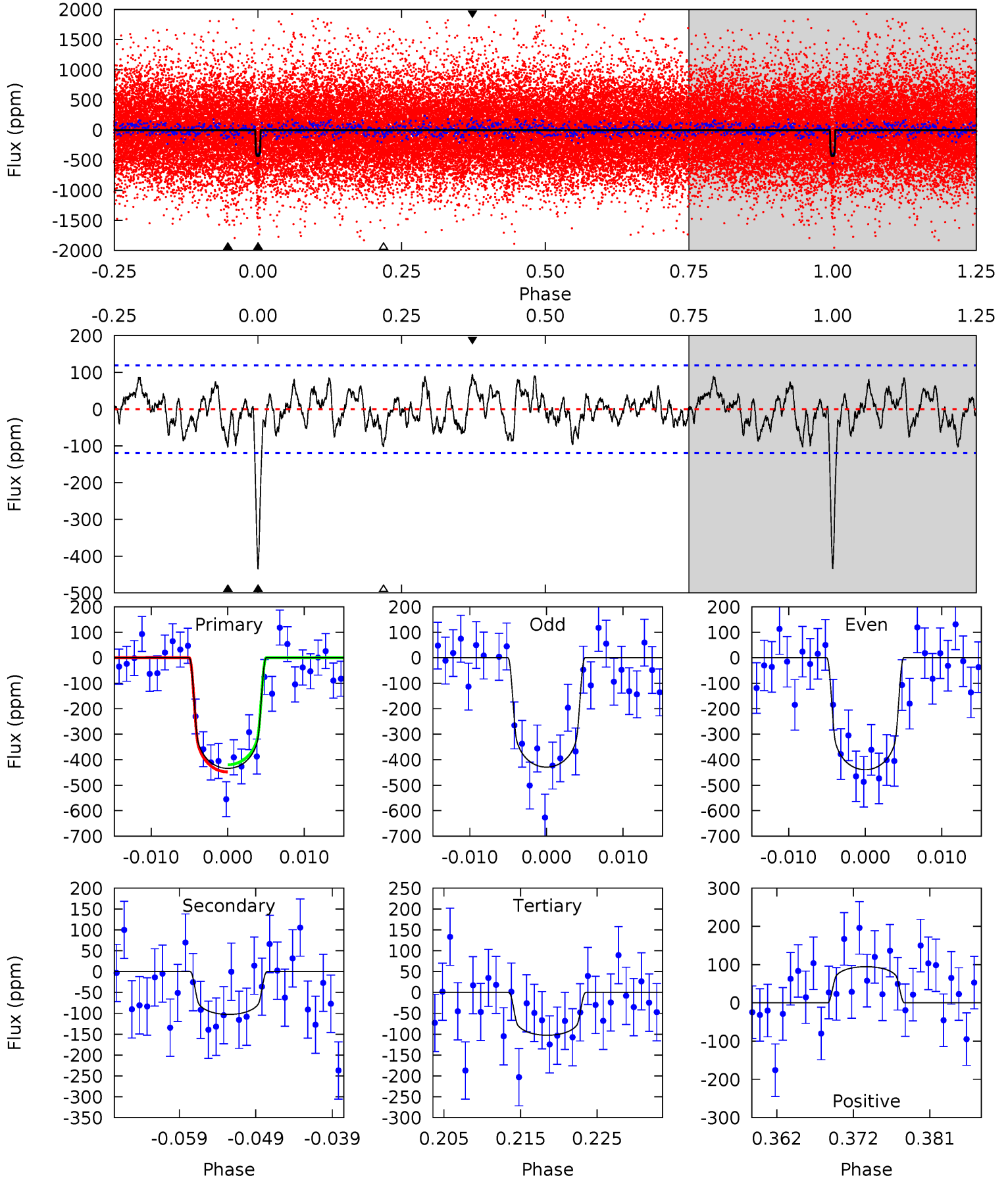
TCE 009785921-01 P= 26.758037 Days $T_0=137.267429$ (BKJD)



DV Model-Shift Uniqueness Test

009785921-01, $P = 26.757474$ Days, $E = 137.286526$ Days

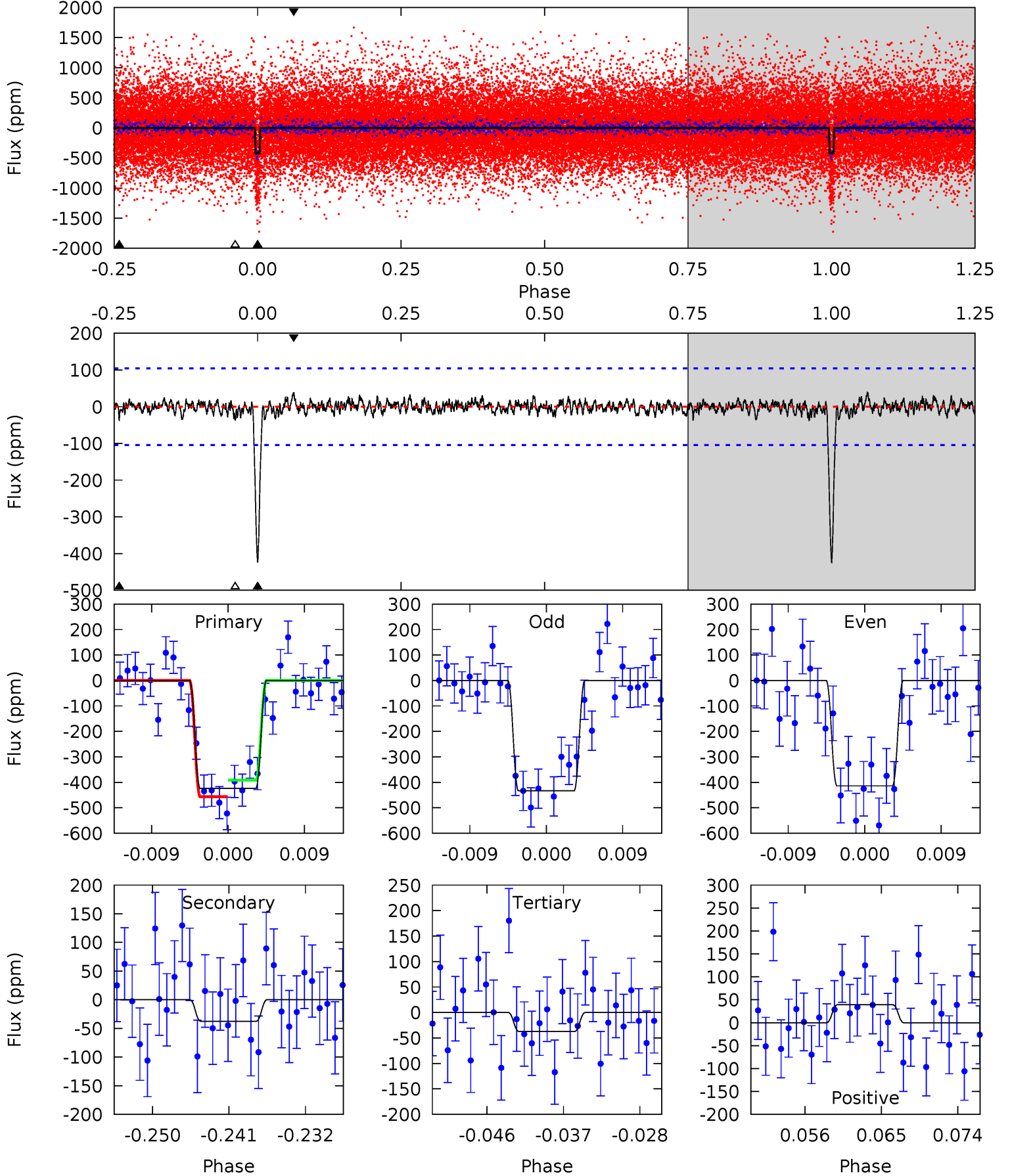
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.4	4.35	4.34	4.00	5.03	2.58	1.62	14.0	14.4	0.01	0.34	0.21	1.07	0.18	0.60



Alt Model-Shift Uniqueness Test

009785921-01, $P = 26.758037$ Days, $E = 137.267429$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.5	1.81	1.80	1.88	5.04	2.60	0.58	18.7	18.6	0.01	-0.07	0.48	0.89	0.08	1.55



Stellar Parameters For KIC 009785921

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6215^{+194}_{-259}	$4.440^{+0.065}_{-0.208}$	$-0.060^{+0.250}_{-0.350}$	$1.052^{+0.332}_{-0.133}$	$1.111^{+0.153}_{-0.153}$	$1.345^{+0.458}_{-0.661}$
	+3%/-4%	+1%/-5%	+417%/-583%	+32%/-13%	+14%/-14%	+34%/-49%
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 009785921-01 / KOI 3372.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-103 ± 24	$2.54^{+0.85}_{-0.86}$	940^{+70}_{-46}	4507^{+826}_{-521}	284^{+372}_{-131}
Alt.	-38 ± 21	$2.50^{+0.95}_{-0.82}$	940^{+72}_{-53}	3702^{+660}_{-533}	97^{+145}_{-63}

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 $A_{obs} \gg 1.0$

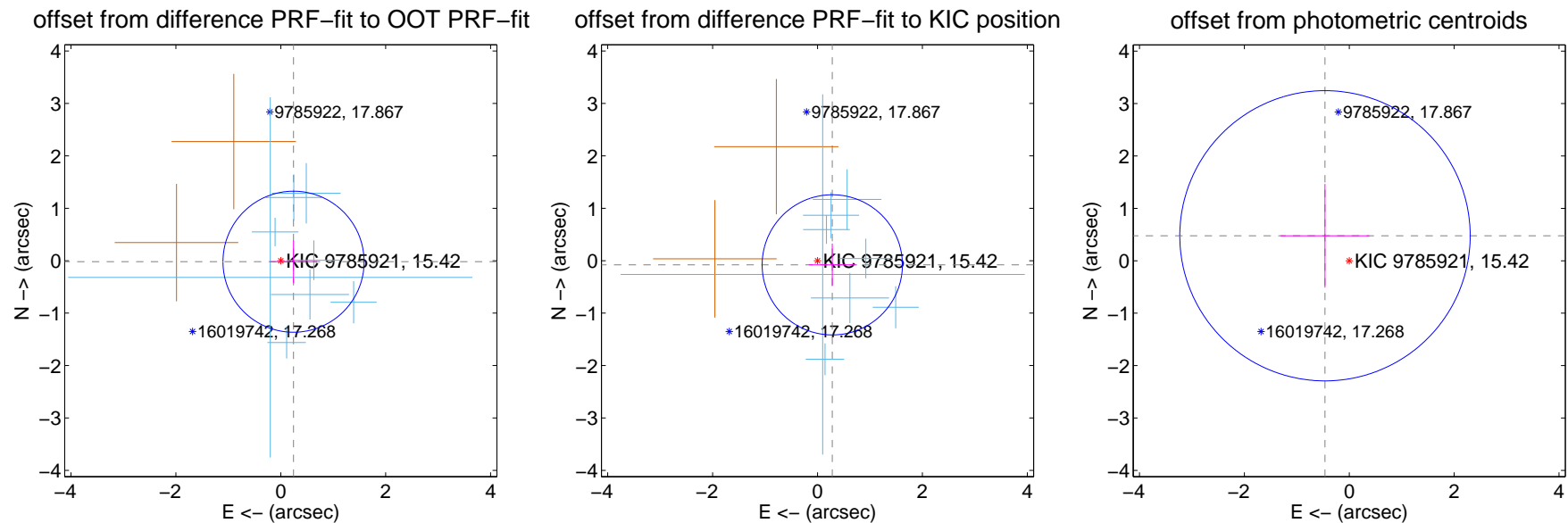
DV Centroid Data

Supplemental centroid analysis for 009785921-01. Kepler magnitude: 15.42. Transit SNR 11.30

There are 8 quarters with good PRF difference image offsets

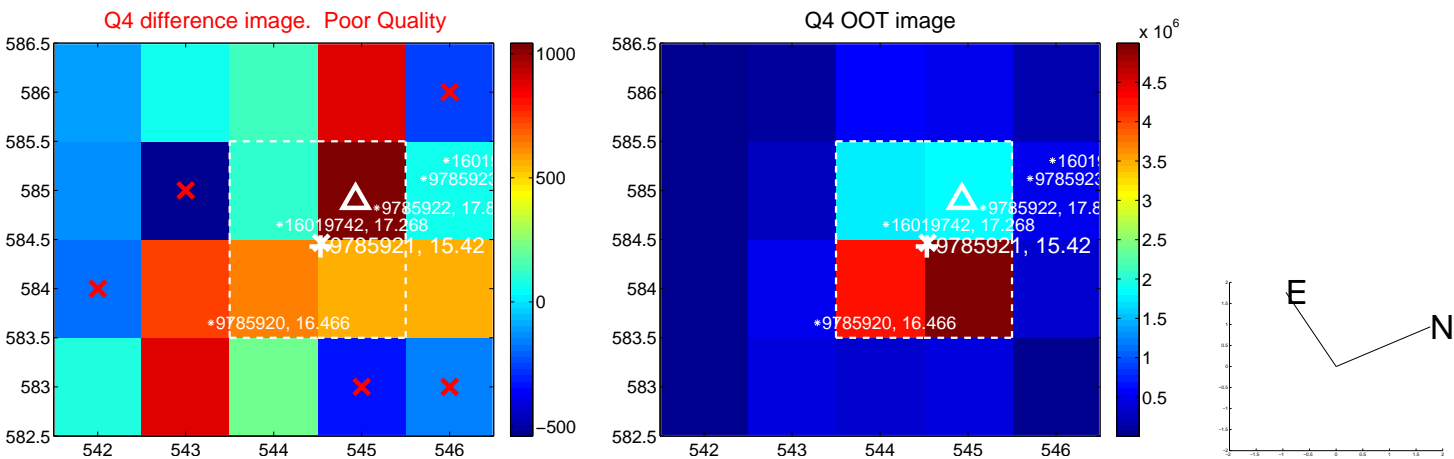
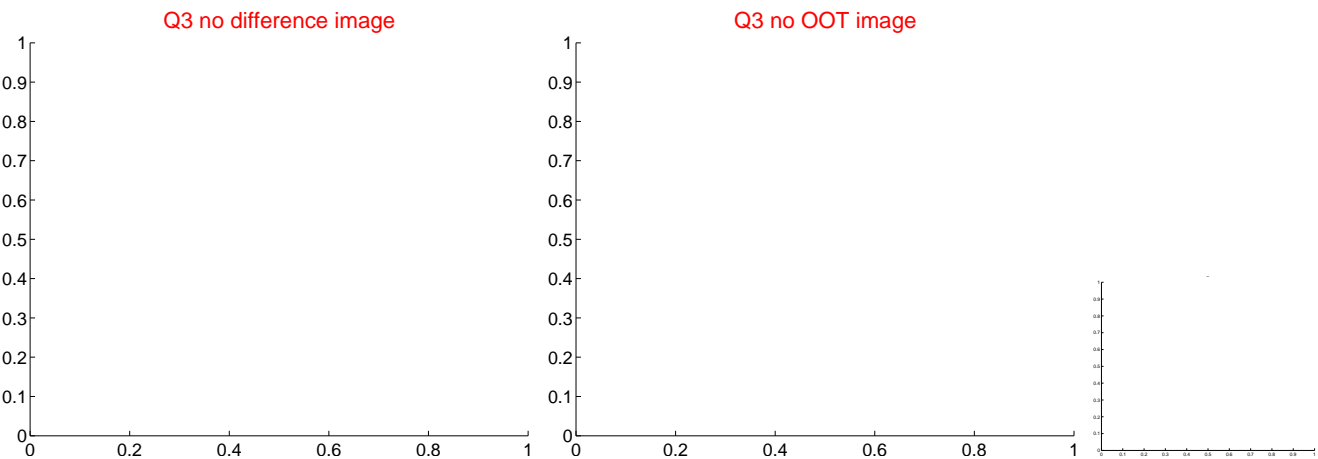
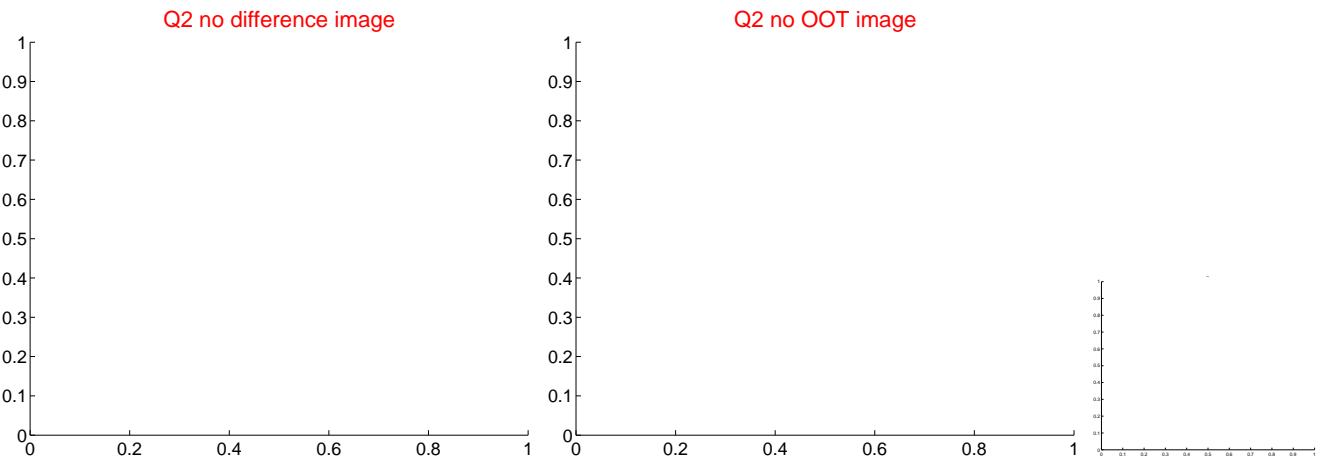
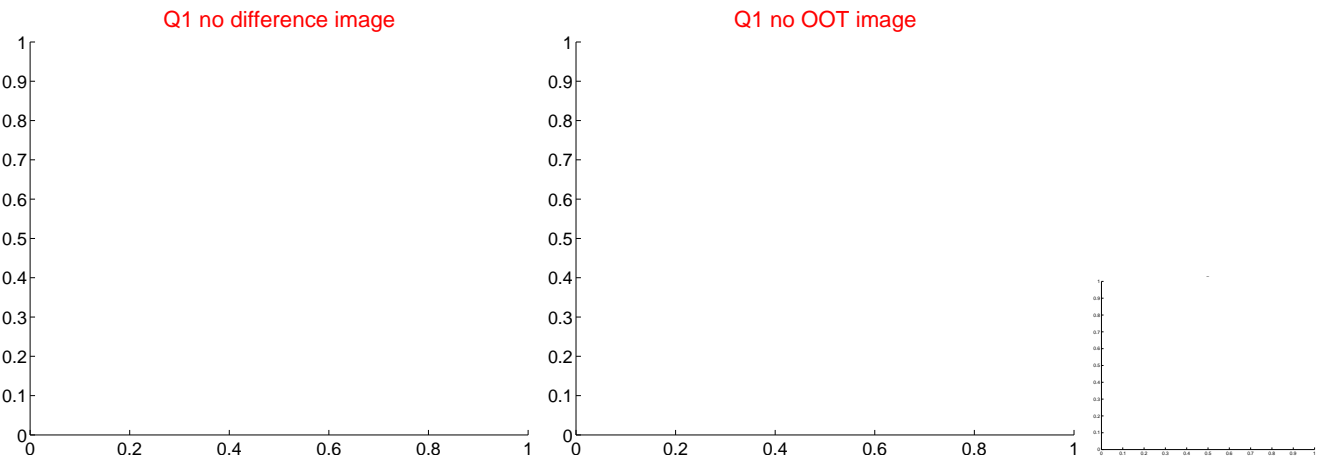
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.244 ± 0.448	0.54	-0.243 ± 0.449	-0.019 ± 0.405
PRF-fit source offset from KIC position	0.292 ± 0.446	0.66	-0.282 ± 0.449	-0.079 ± 0.405
photometric centroid source offset	0.66 ± 0.92	0.72	0.46 ± 0.85	0.48 ± 0.99

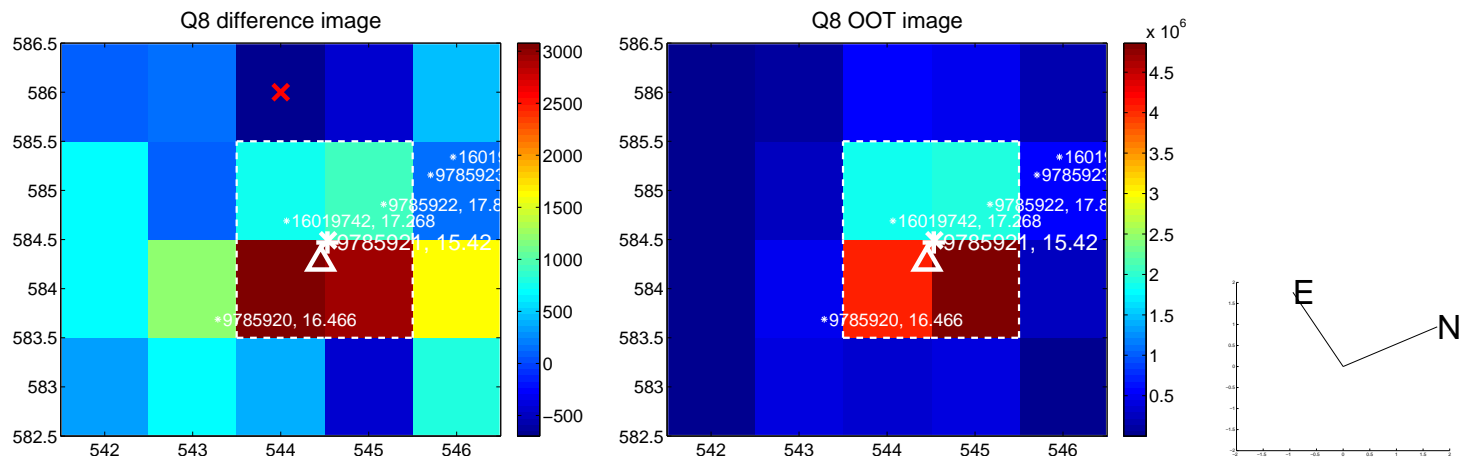
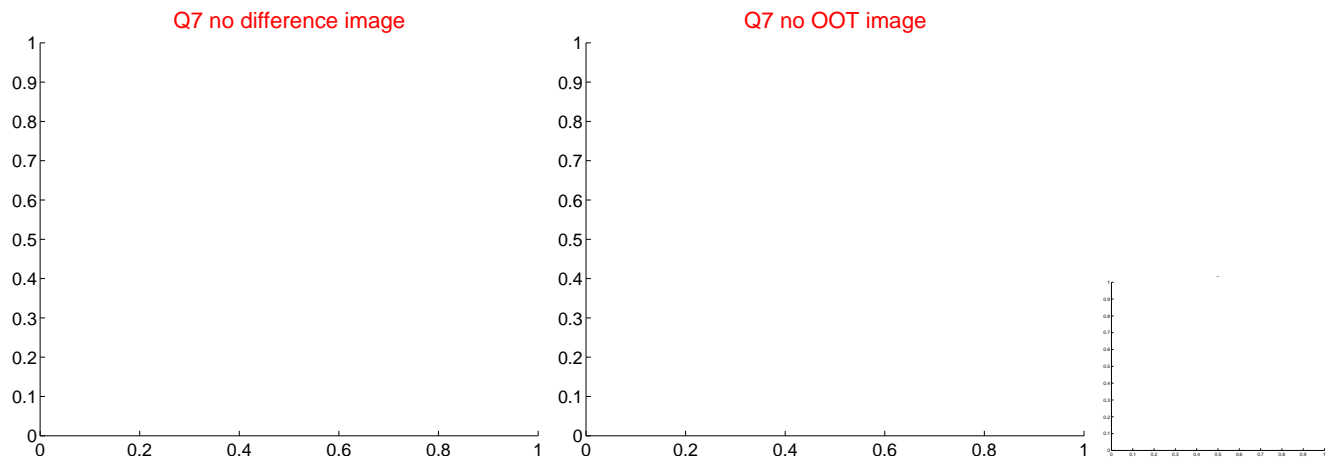
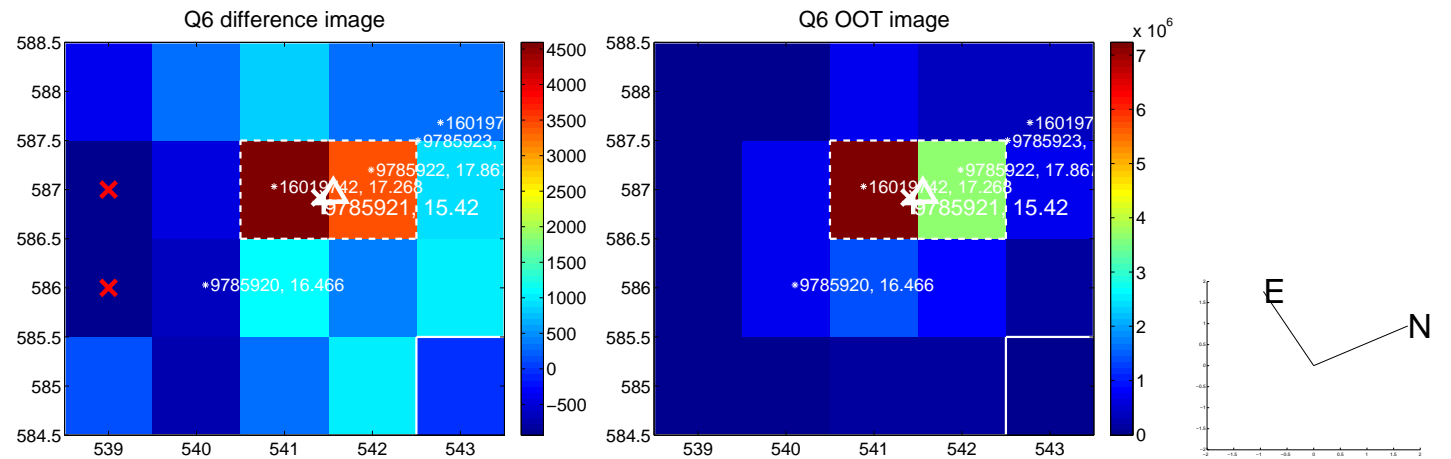
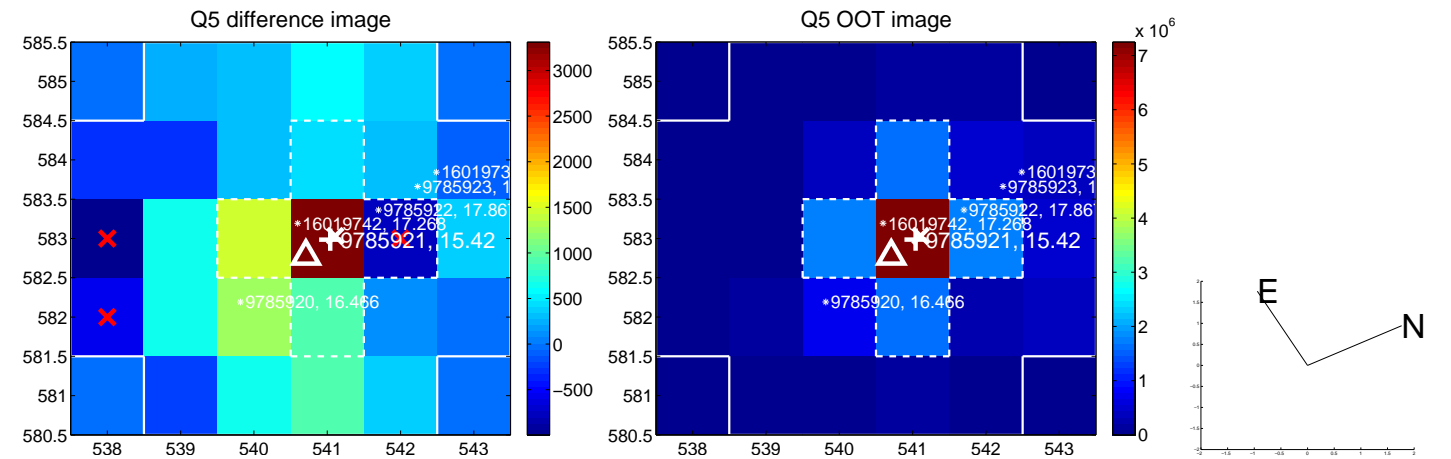


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

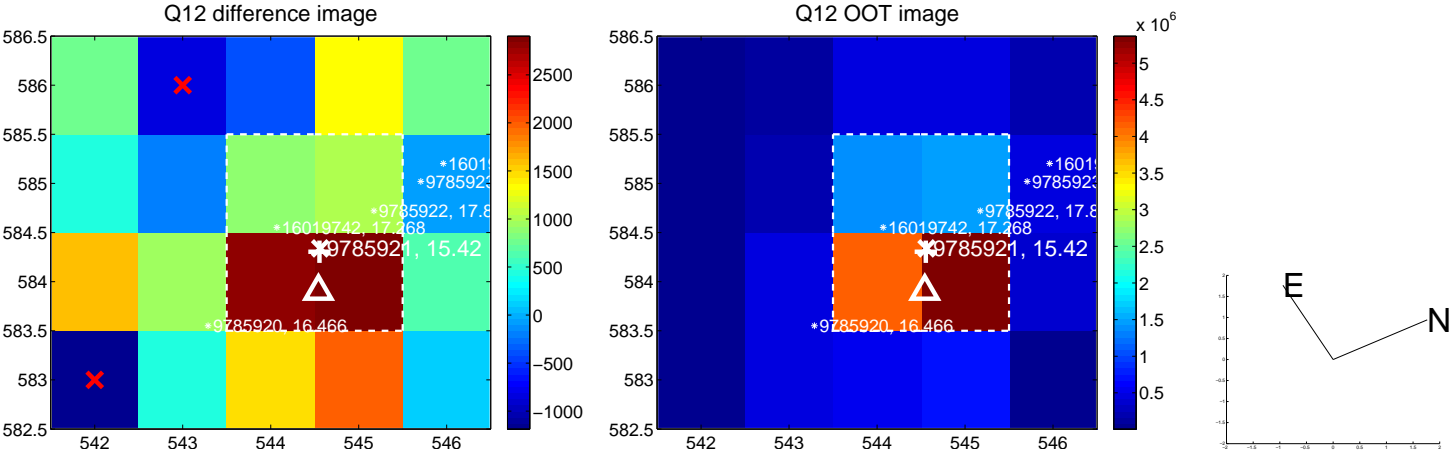
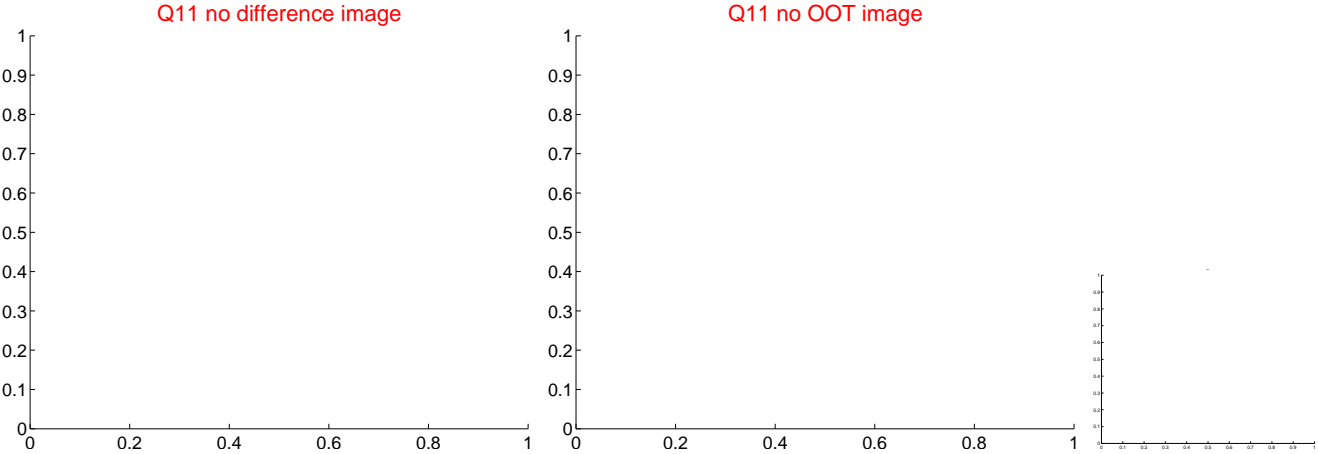
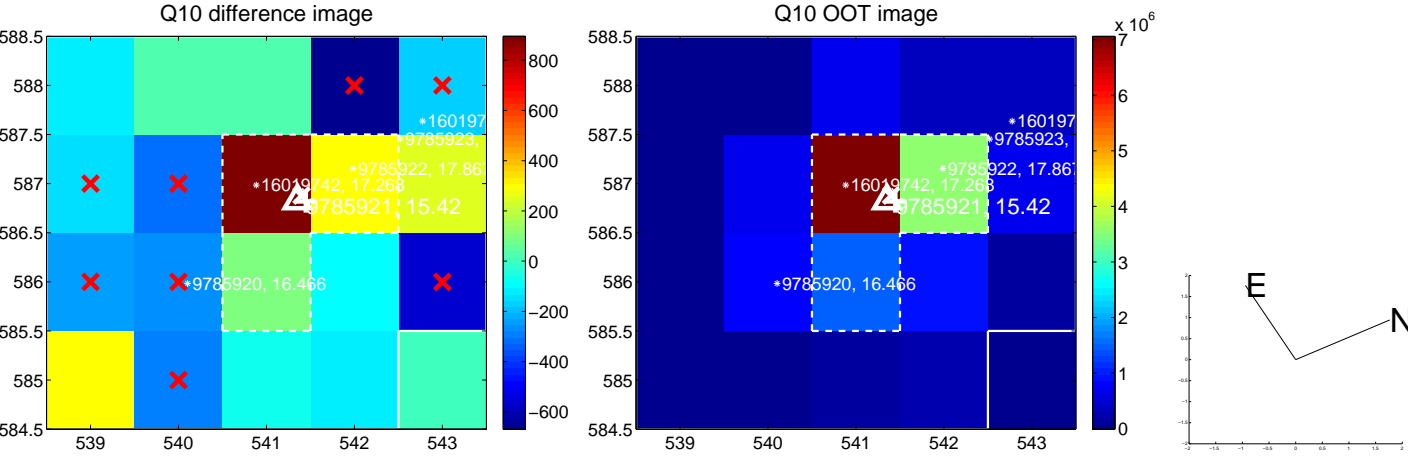
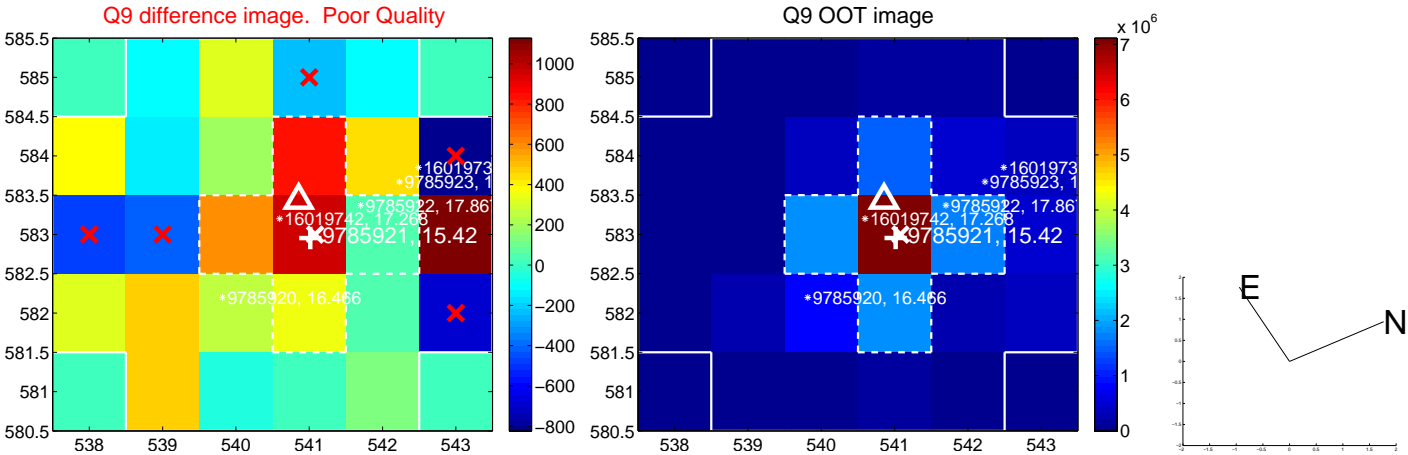
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



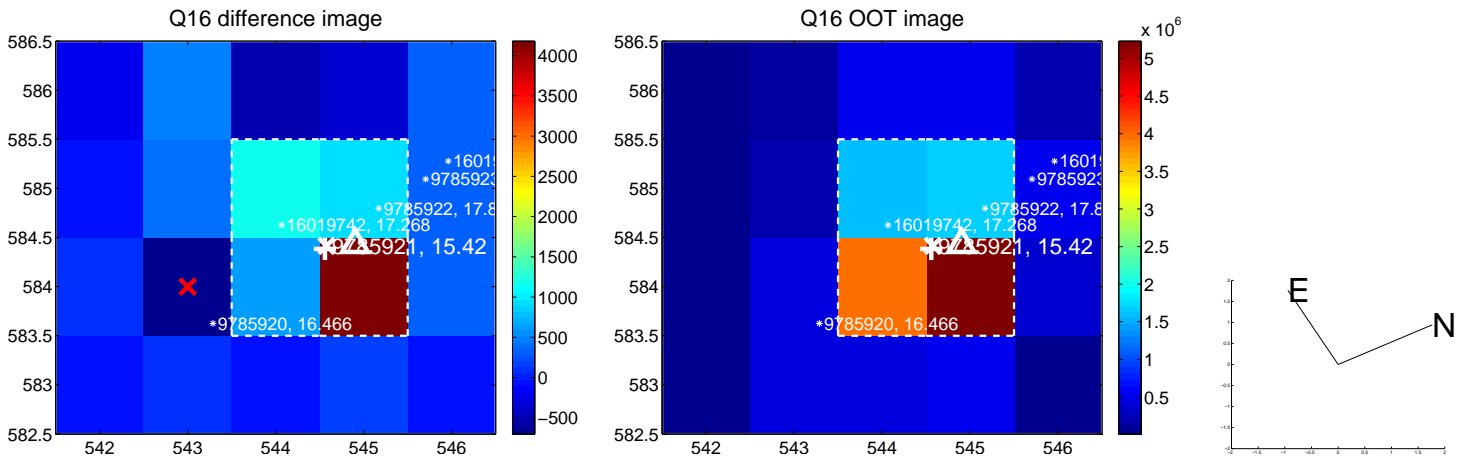
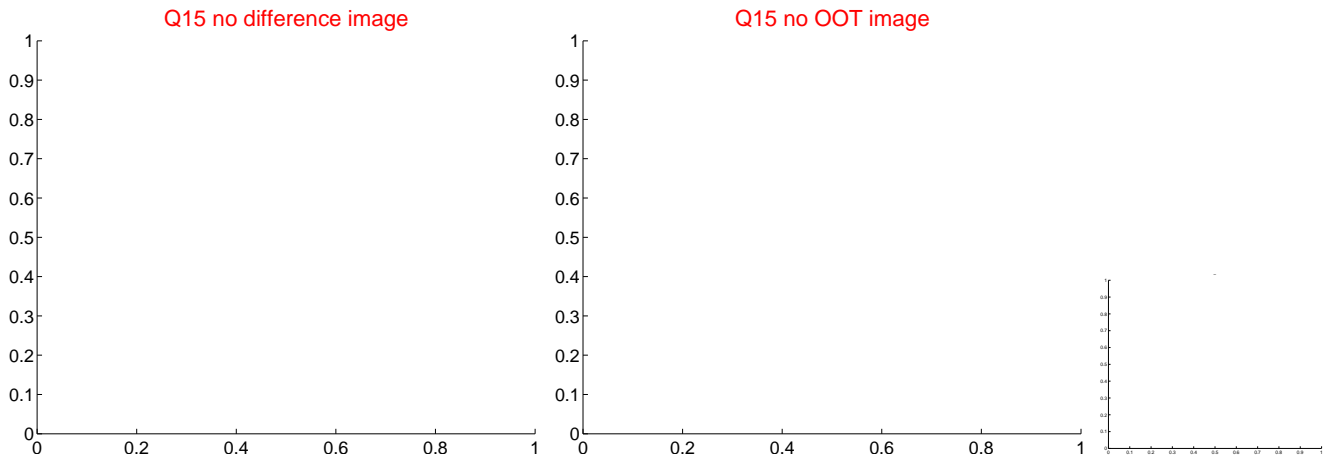
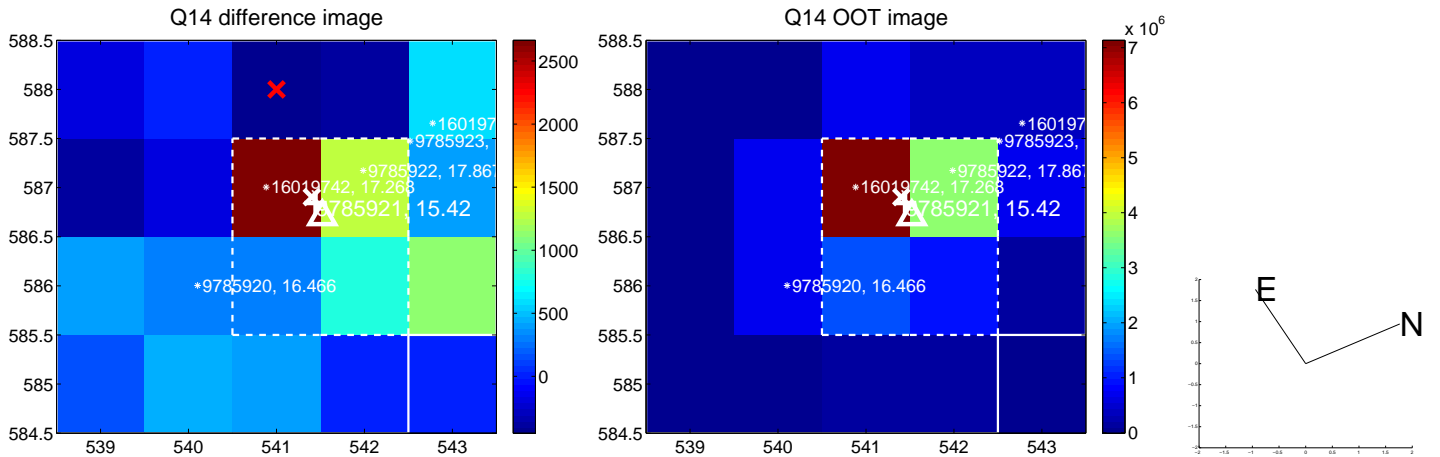
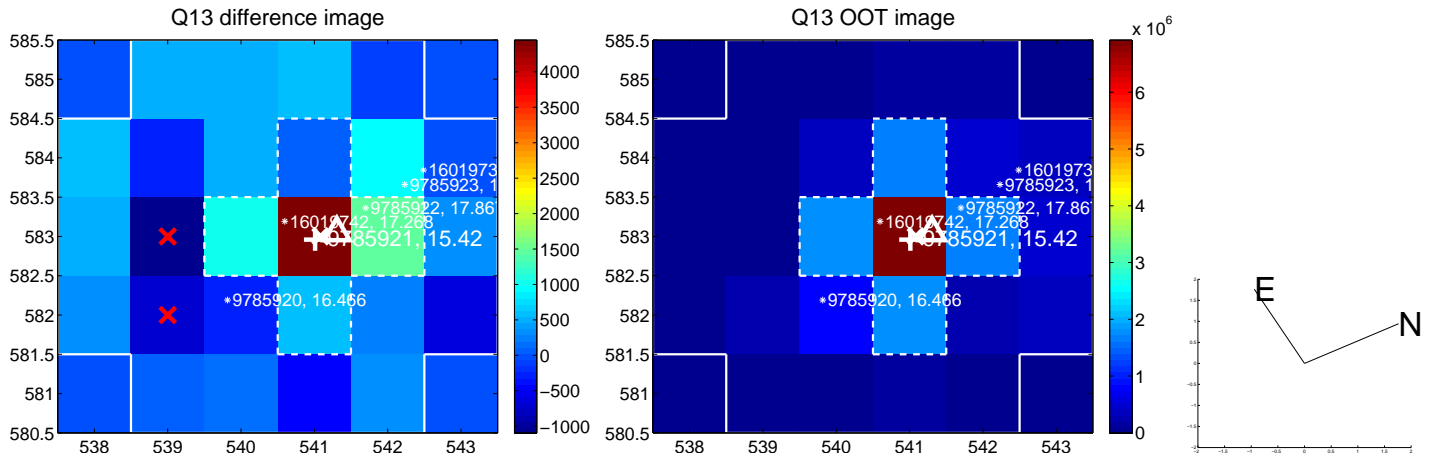
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



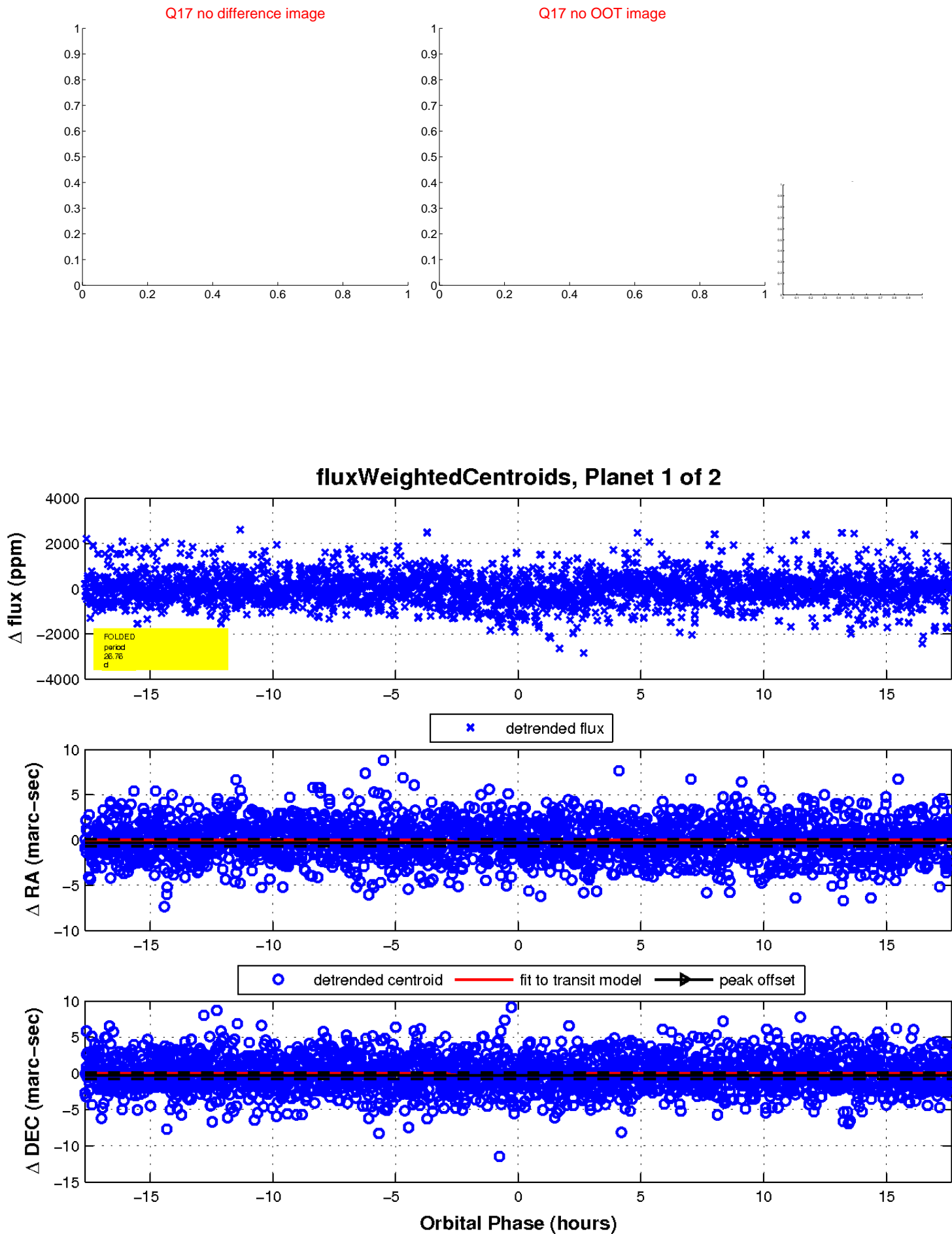
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

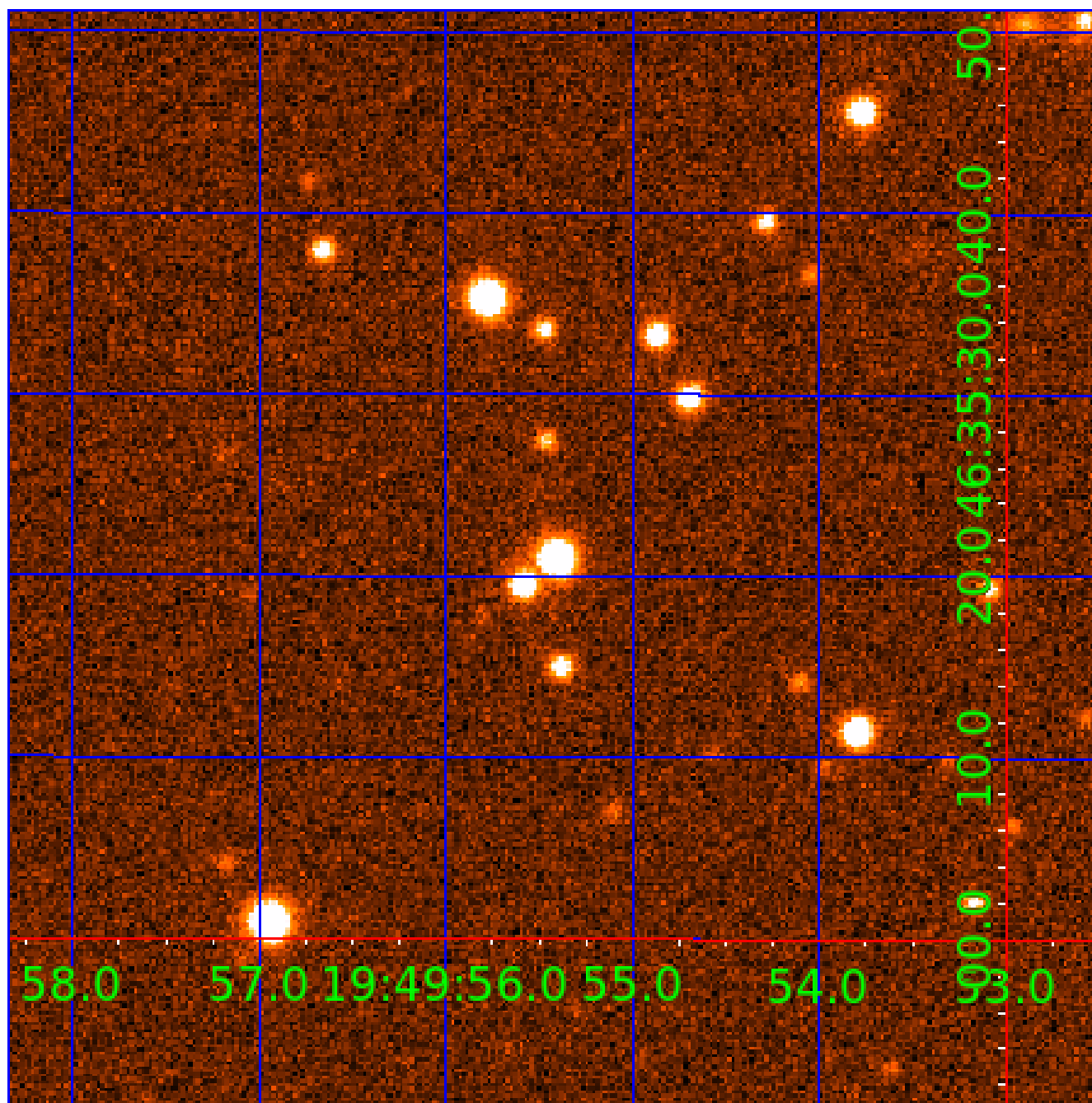


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009785921

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})
009785921-01	OBS	3372.01	26.757474	137.286526	446.6	5.889	11.1	11.3	1.05	6215	2.44	44.95
009785921-02	OBS	3372.02	73.503310	163.588254	487.0	7.128	7.3	7.6	1.05	6215	2.77	11.68

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009785921-01	OBS	PC	0.99	0	0	0	0	NO_COMMENT
009785921-02	OBS	FP	0.26	0	1	0	0	DEPTH_ODDEVEN_DV—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 009785921-02

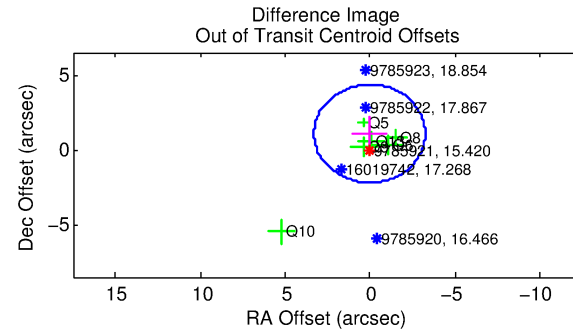
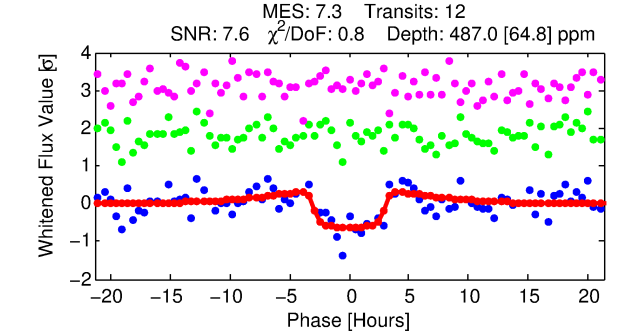
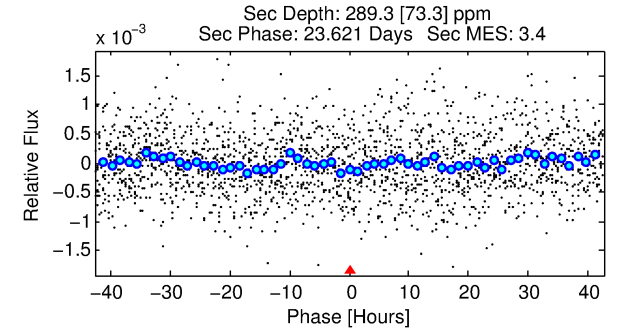
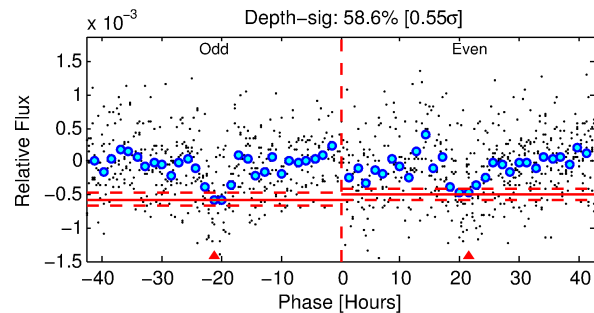
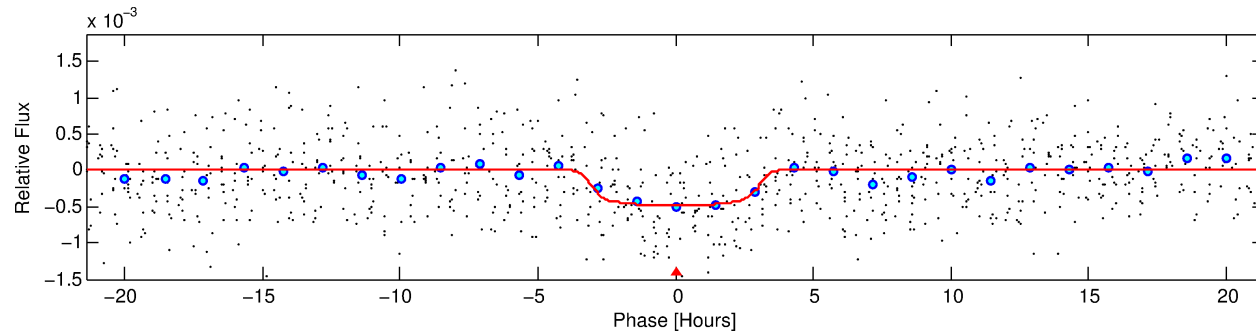
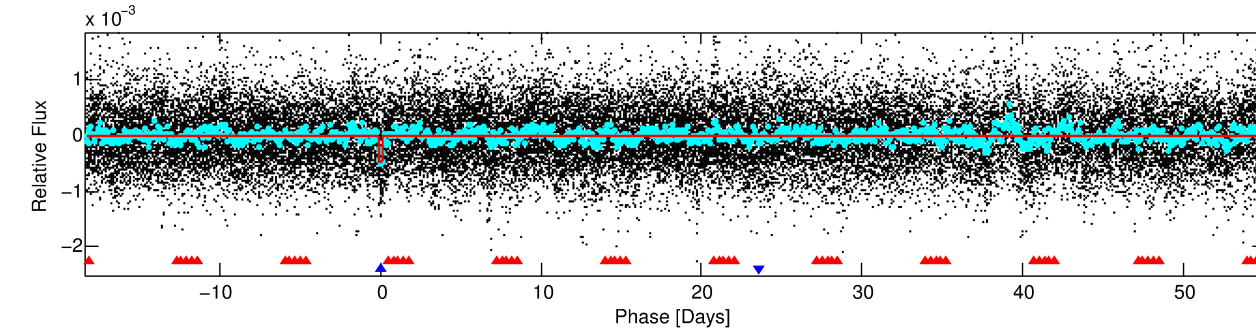
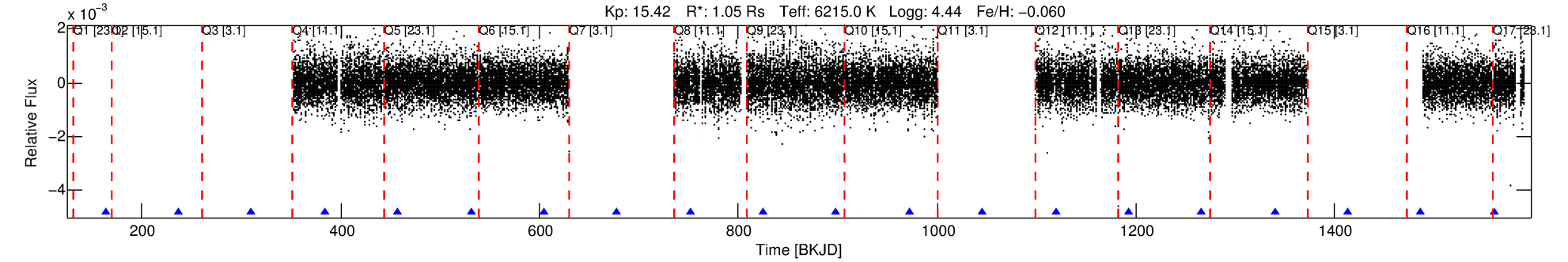
No Significant Match Found

DV One-Page Summary

KIC: 9785921 Candidate: 2 of 2 Period: 73.503 d

KOI: K03372 Corr: No Ephemeris Match

Kp: 15.42 R*: 1.05 Rs Teff: 6215.0 K Logg: 4.44 Fe/H: -0.060



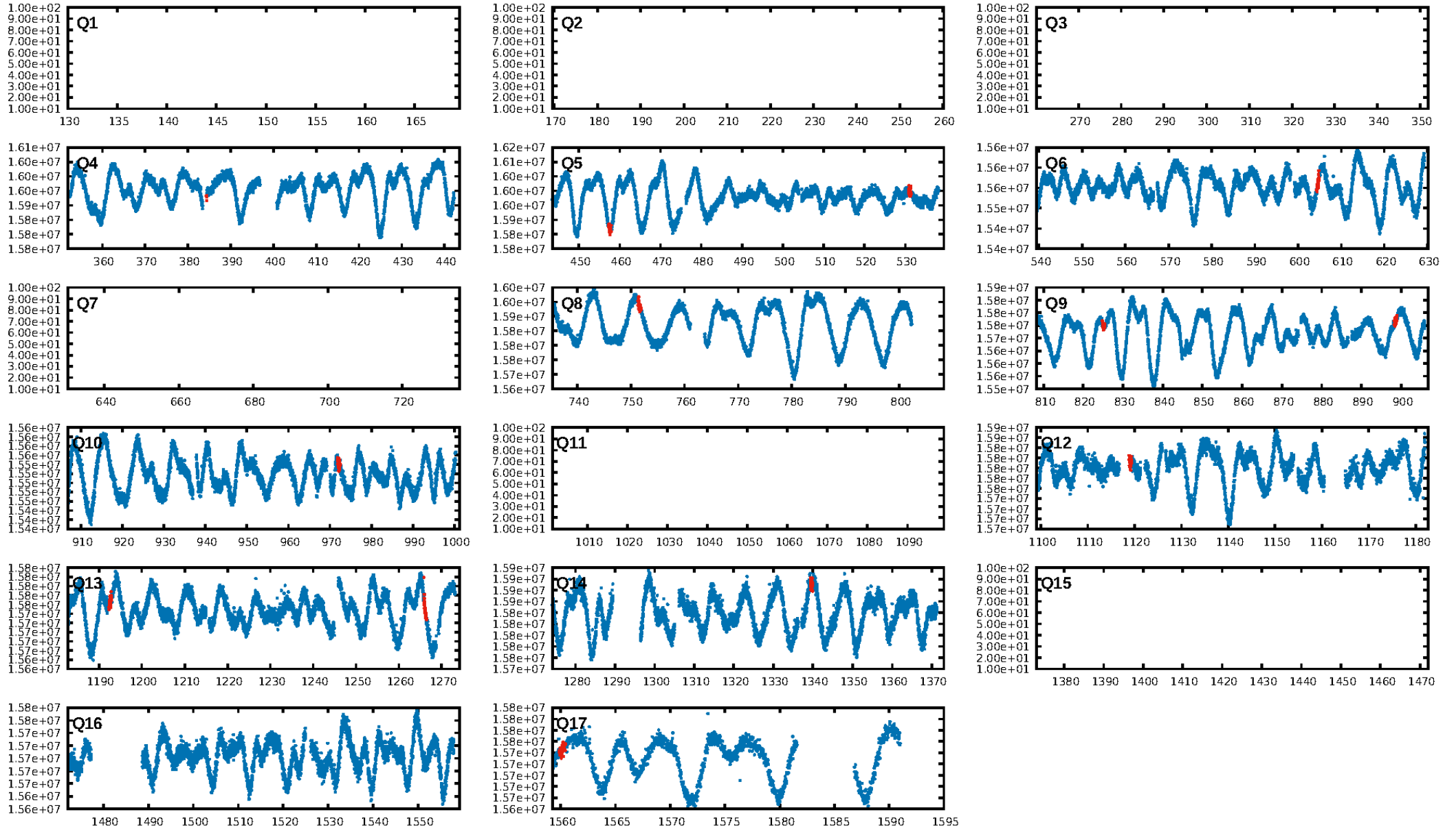
DV Fit Results:

Period = 73.50331 [0.00158] d
Epoch = 163.5883 [0.0189] BKJD
Rp/R* = 0.0242 [0.0030]
a/R* = 35.84 [18.25]
b = 0.92 [0.09]
Seff = 11.68 [4.87]
Teq = 471 [49] K
Rp = 2.78 [0.94] Re
a = 0.3558 [0.0940] AU
Ag = 2616.92 [1369.27] [1.91σ]
Teff = 5213 [514] K [9.19σ]

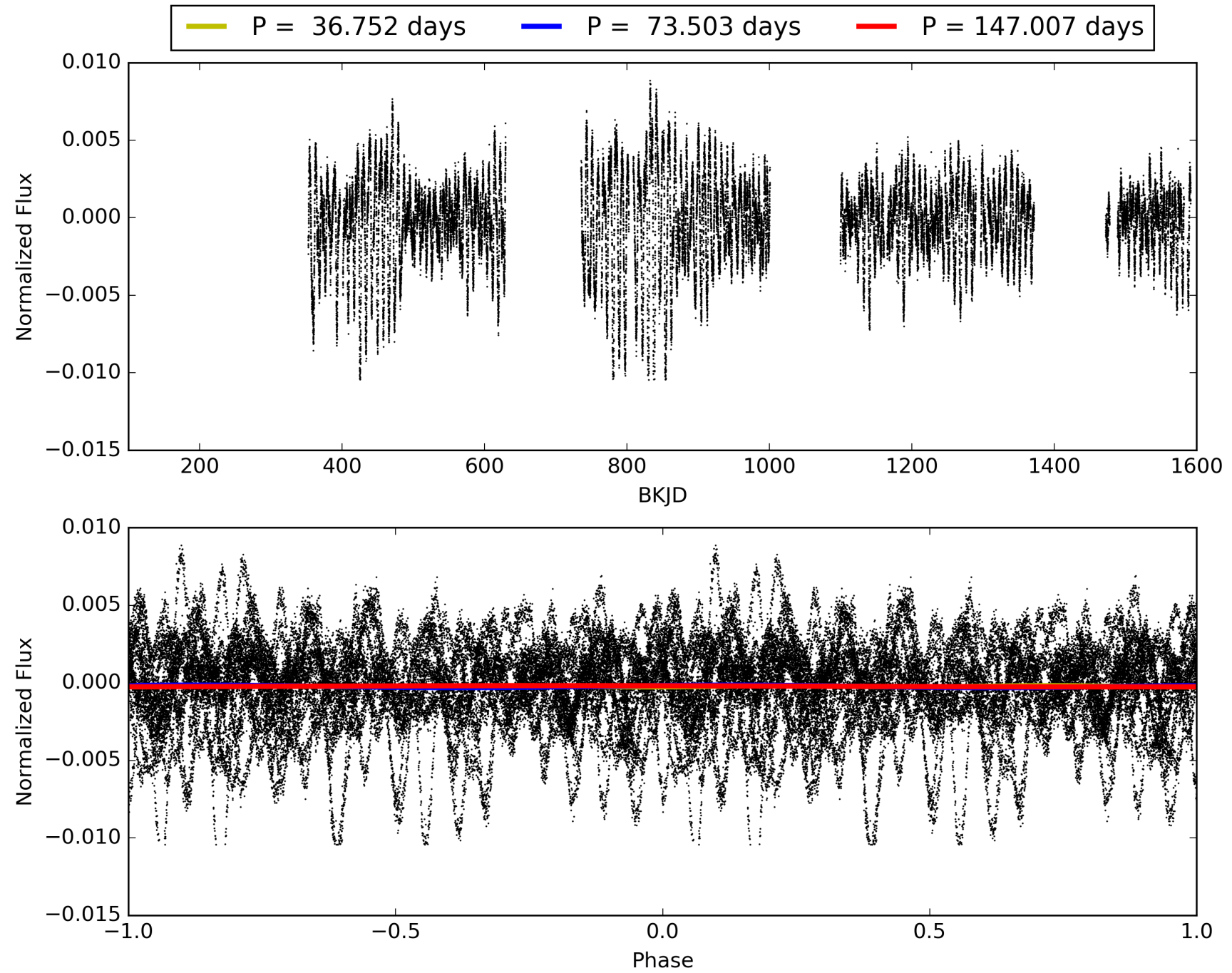
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [121.34σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 93.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.61e-13
RollingBand-fgt: 1.00 [11/11]
GhostDiagnostic-chr: 16.63
Centroid-sig: 49.5%
Centroid-so: 1.069 arcsec [0.85σ]
OotOffset-rm: 1.071 arcsec [0.98σ]
KicOffset-rm: 0.844 arcsec [0.80σ]
OotOffset-st: 2/0/1/3 [6]
KicOffset-st: 2/0/1/3 [6]
DiffImageQuality-fgm: 0.67 [4/6]
DiffImageOverlap-fno: 1.00 [7/7]

TCE 009785921-02, PDC Light Curves

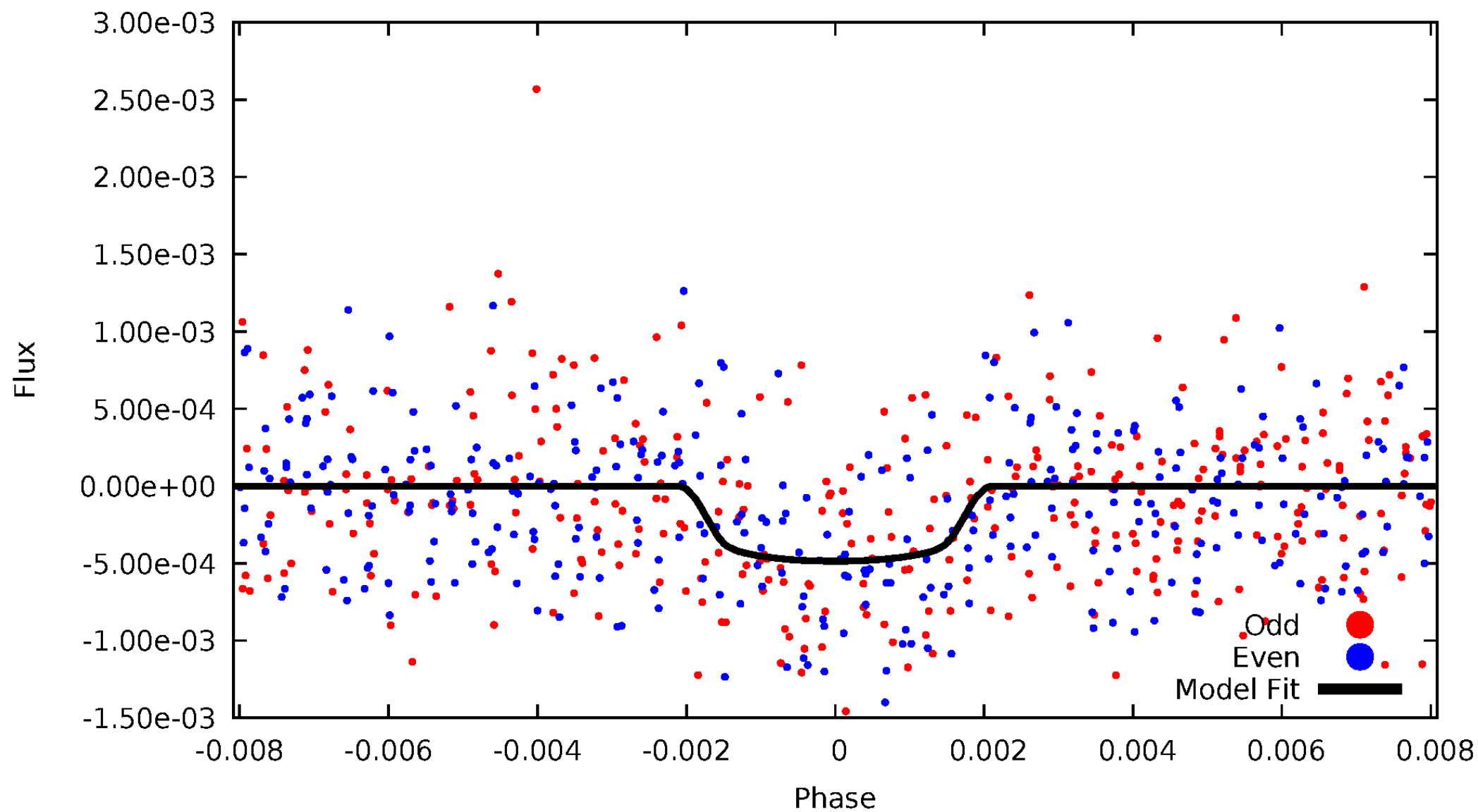


TCE 009785921-02



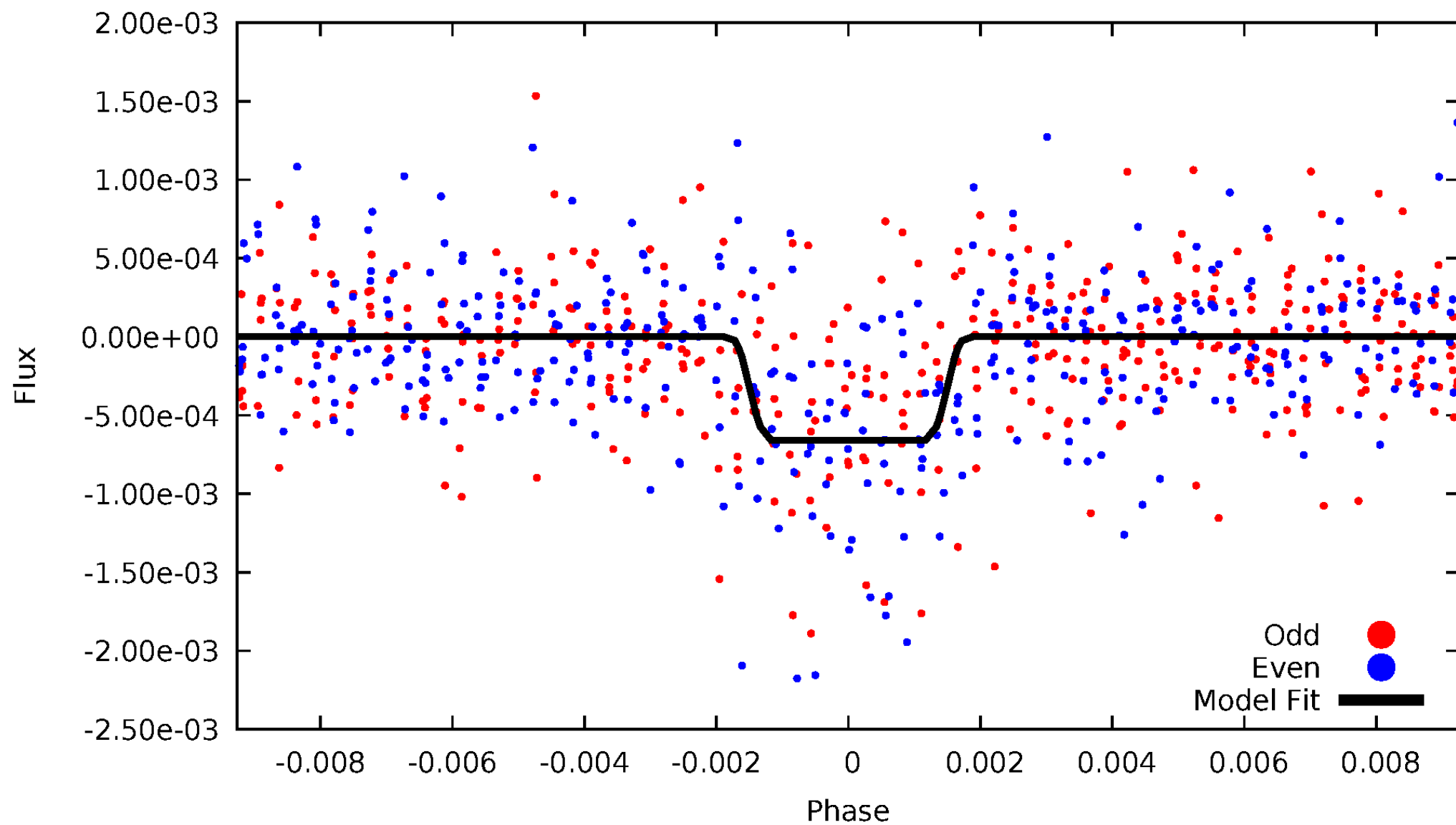
DV Odd/Even

TCE 009785921-02



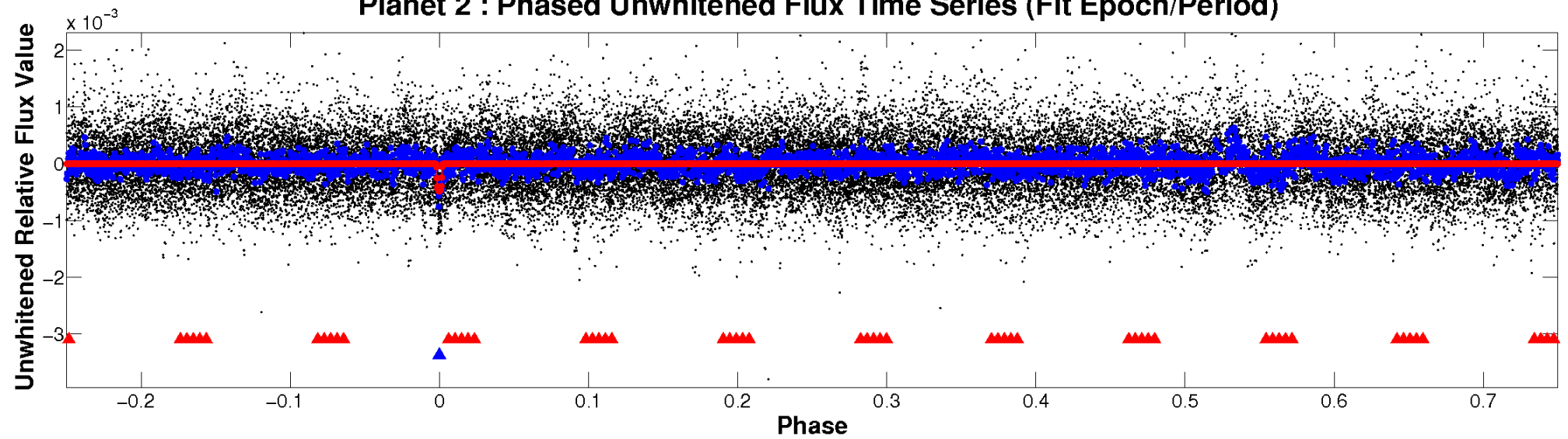
ALT Odd/Even

TCE 009785921-02

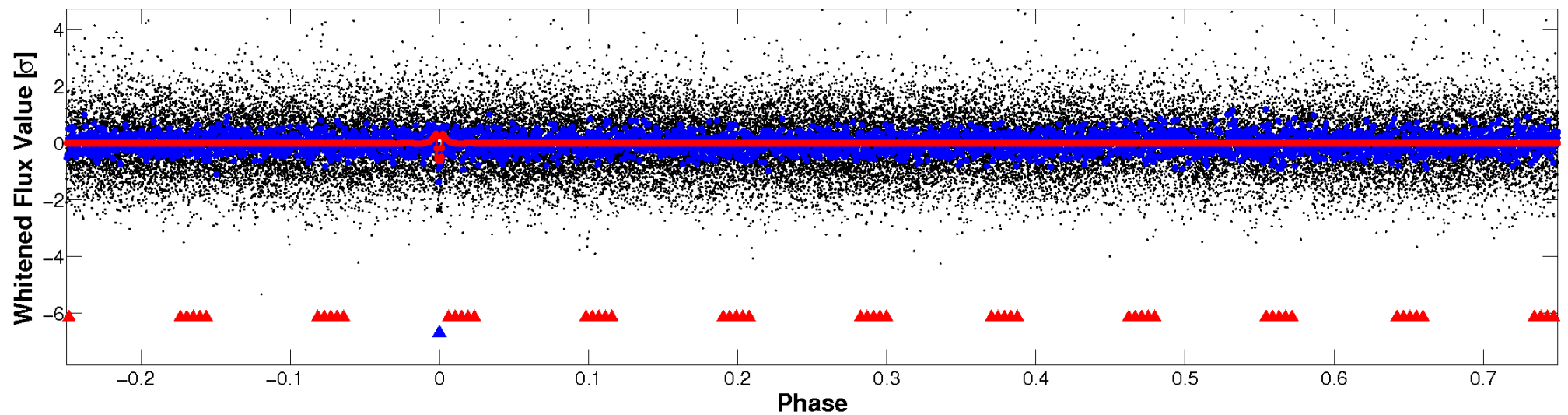


Non-Whitened Vs. Whitened Light Curve

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

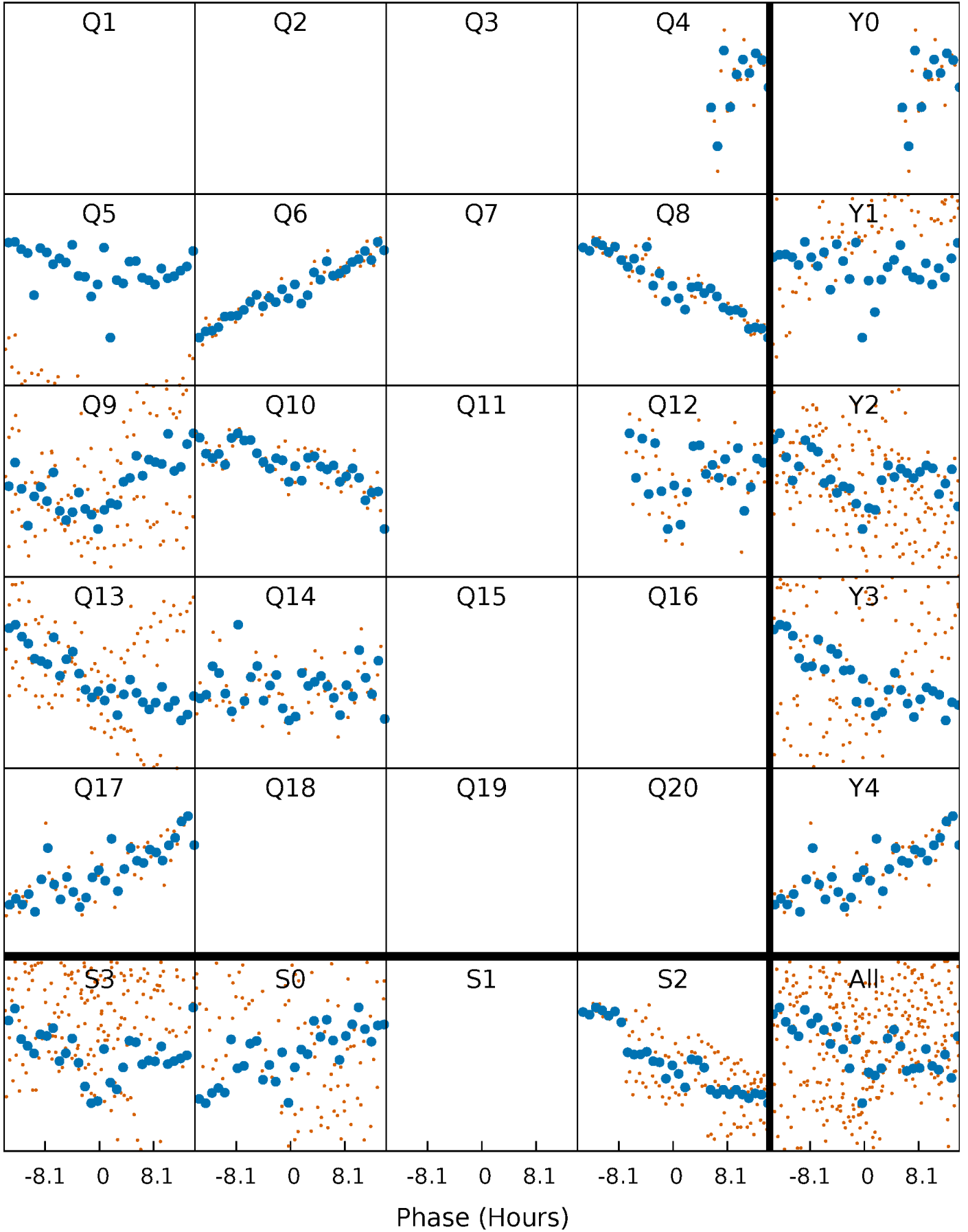


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



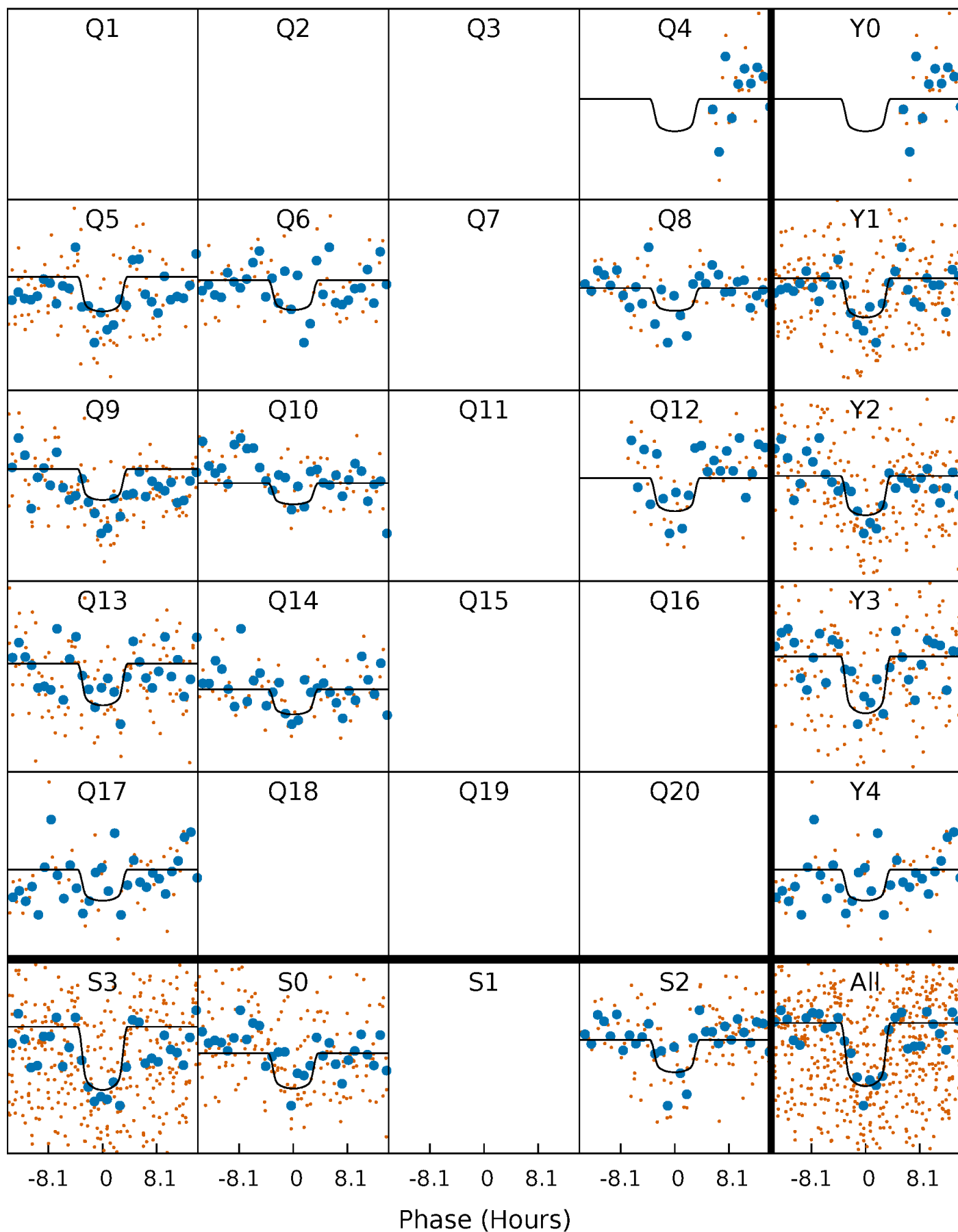
PDC Quarter-Phased Transit Curves

TCE 009785921-02 P= 73.503310 Days $T_0=163.588254$ (BKJD)



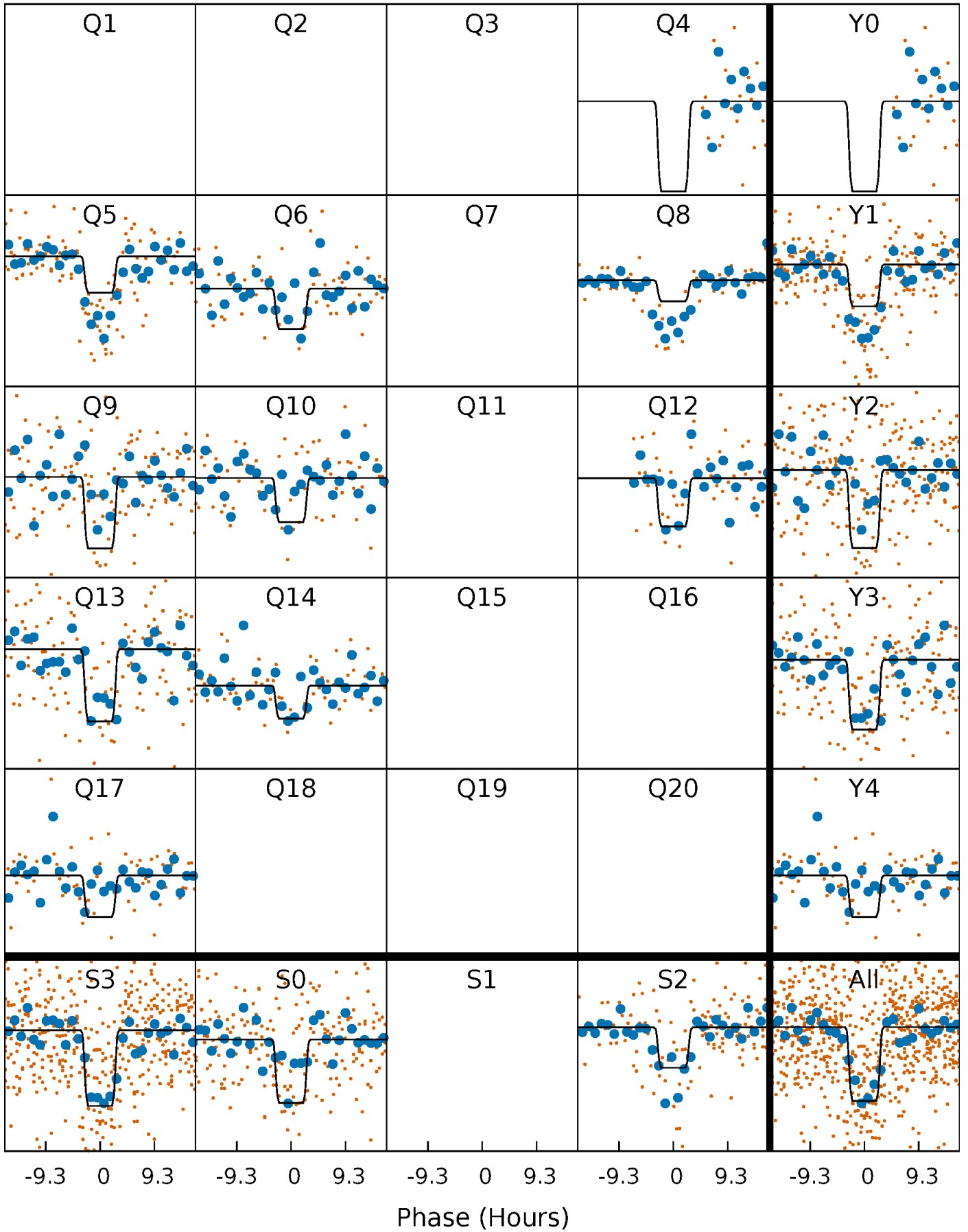
DV Quarter-Phased Transit Curves

TCE 009785921-02 P= 73.503310 Days $T_0=163.588254$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

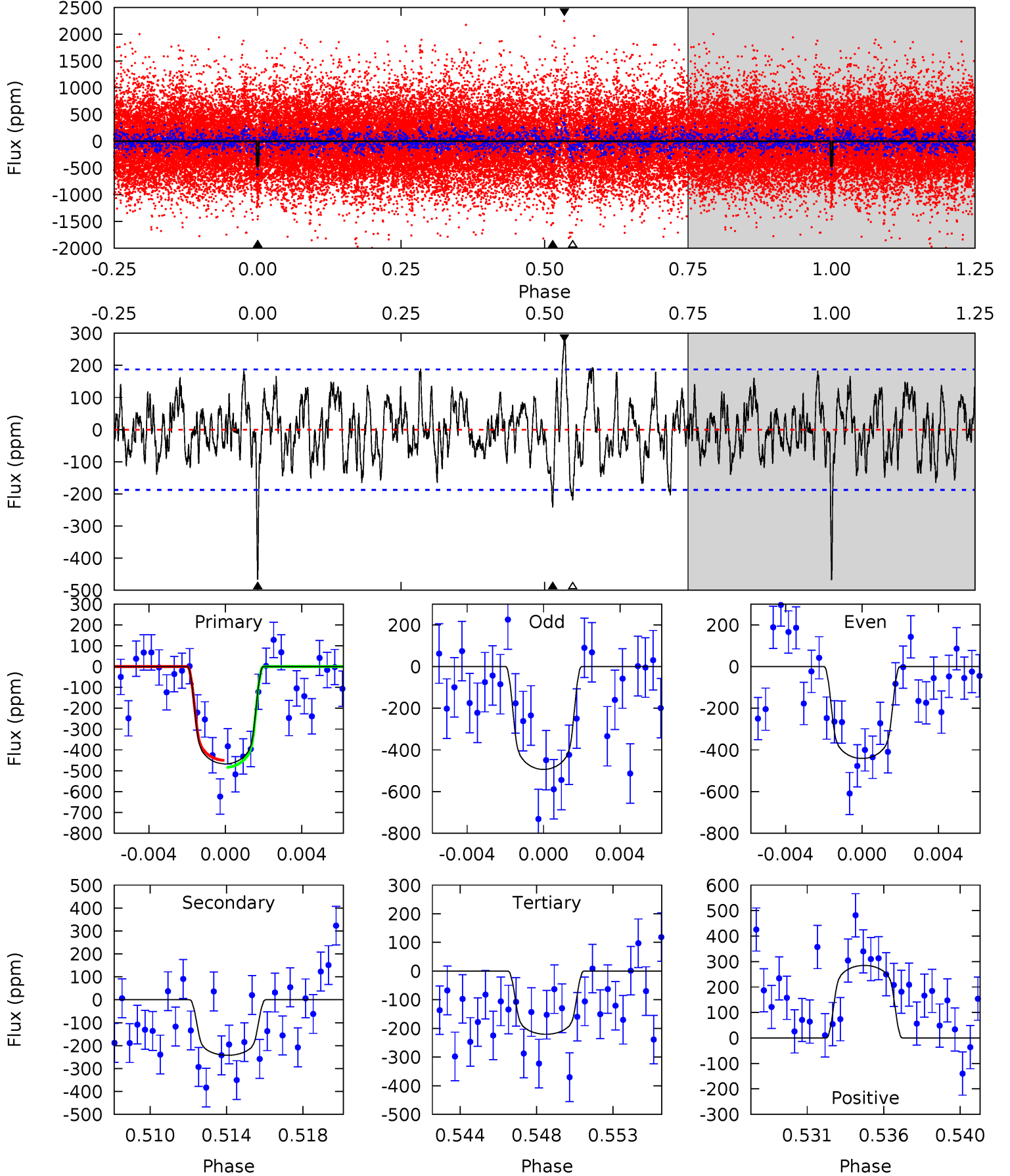
TCE 009785921-02 P= 73.503825 Days $T_0=163.593785$ (BKJD)



DV Model-Shift Uniqueness Test

009785921-02, P = 73.503310 Days, E = 163.588254 Days

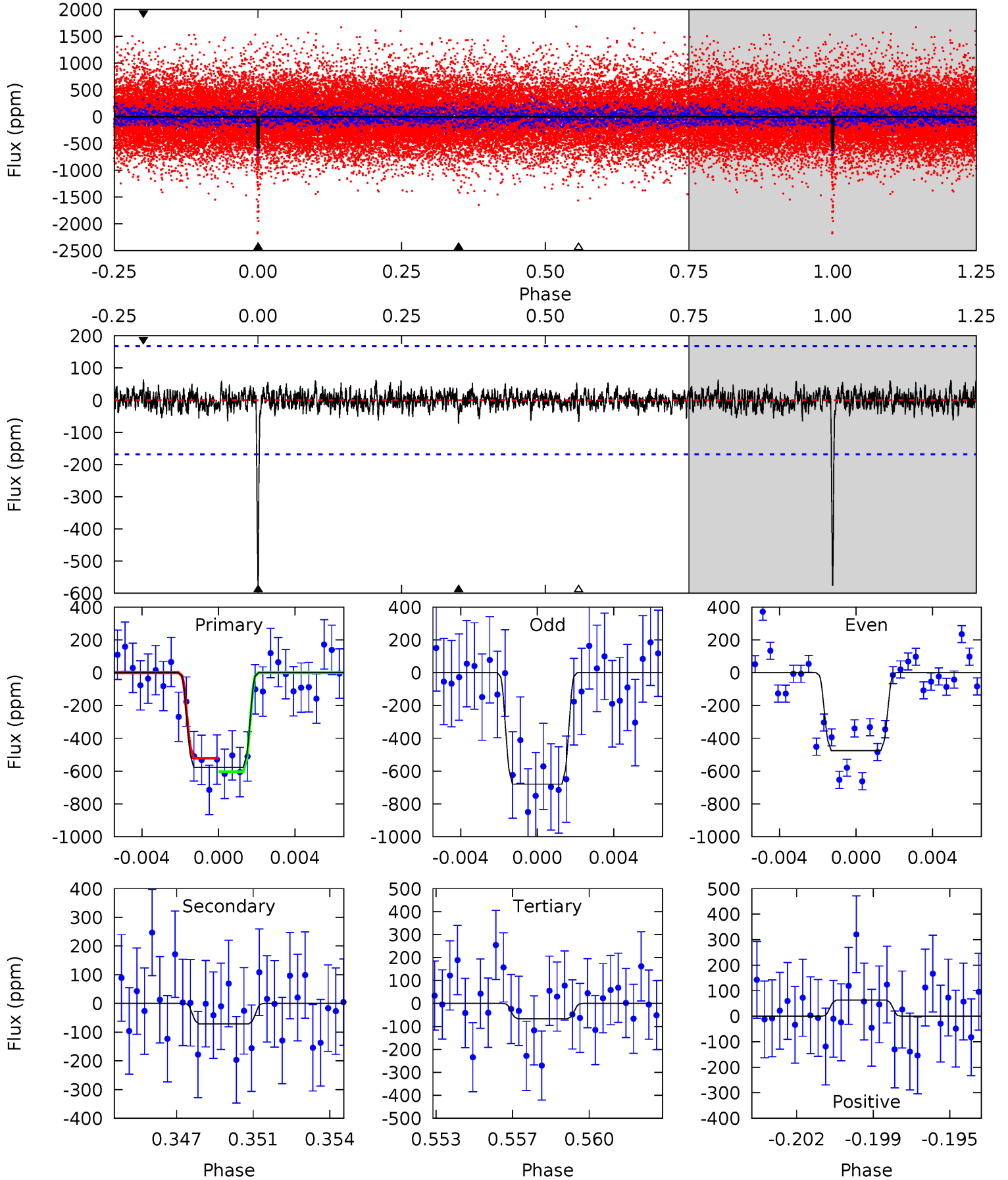
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.9	6.69	6.10	7.87	5.19	2.86	2.06	6.82	5.04	0.60	-1.18	0.73	1.07	0.38	0.46



Alt Model-Shift Uniqueness Test

009785921-02, P = 73.503825 Days, E = 163.593785 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.9	2.21	2.08	1.97	5.22	2.91	0.59	15.8	15.9	0.13	0.24	3.17	1.59	0.10	1.28



Stellar Parameters For KIC 009785921

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6215^{+194}_{-259}	$4.440^{+0.065}_{-0.208}$	$-0.060^{+0.250}_{-0.350}$	$1.052^{+0.332}_{-0.133}$	$1.111^{+0.153}_{-0.153}$	$1.345^{+0.458}_{-0.661}$
	+3%/-4%	+1%/-5%	+417%/-583%	+32%/-13%	+14%/-14%	+34%/-49%
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 009785921-02 / KOI 3372.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-242 ± 36	$2.87^{+0.59}_{-0.42}$	673^{+51}_{-39}	5045^{+400}_{-325}	1973^{+855}_{-607}
Alt.	-71 ± 32	$3.08^{+0.59}_{-0.46}$	671^{+48}_{-38}	3880^{+360}_{-429}	492^{+321}_{-258}

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

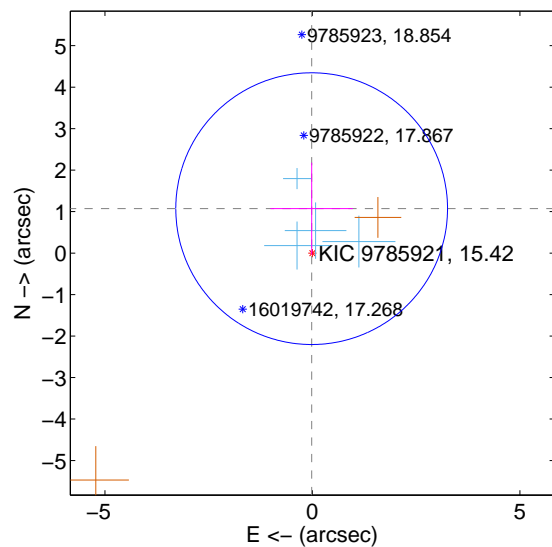
Supplemental centroid analysis for 009785921-02. Kepler magnitude: 15.42. Transit SNR 7.57

There are 4 quarters with good PRF difference image offsets

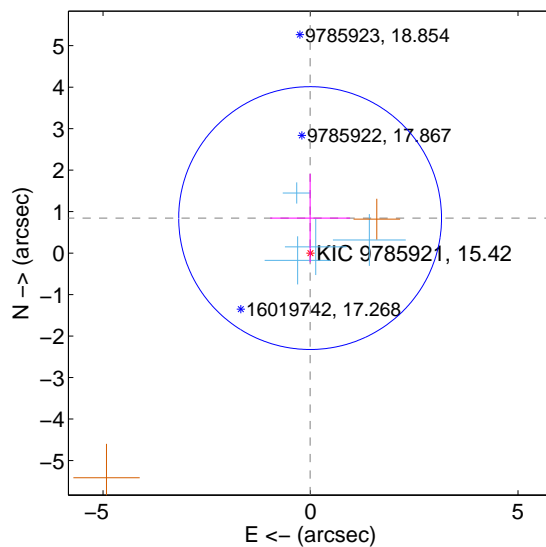
The direct PRF centroid is offset from the target star catalog position by about 0.40 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.071 ± 1.092	0.98	0.019 ± 0.992	1.071 ± 1.108
PRF-fit source offset from KIC position	0.844 ± 1.056	0.80	0.010 ± 0.963	0.844 ± 1.067
photometric centroid source offset	1.07 ± 1.26	0.85	0.98 ± 1.22	-0.44 ± 1.45

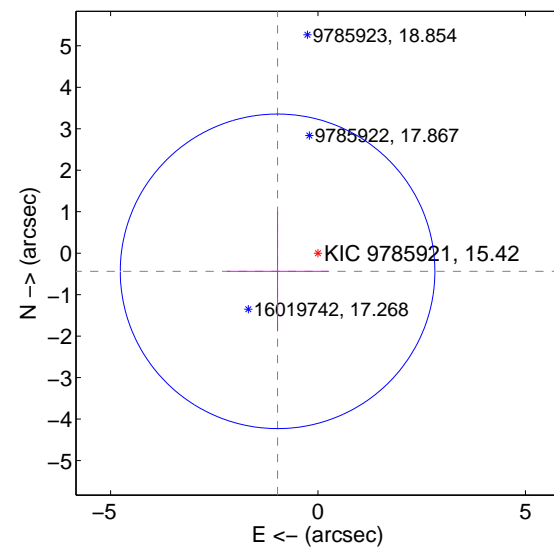
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

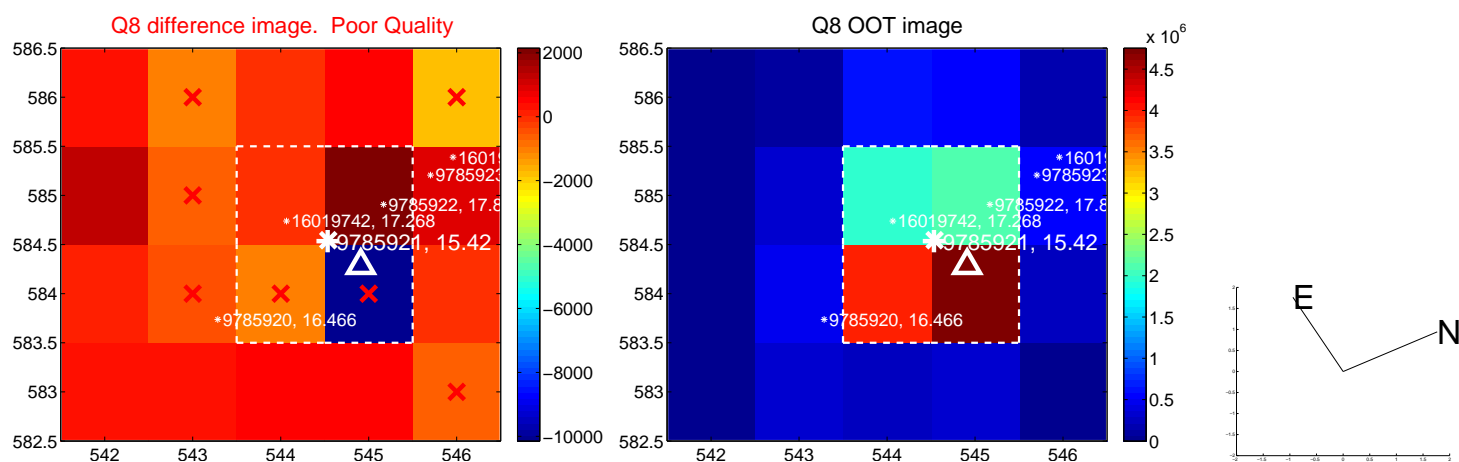
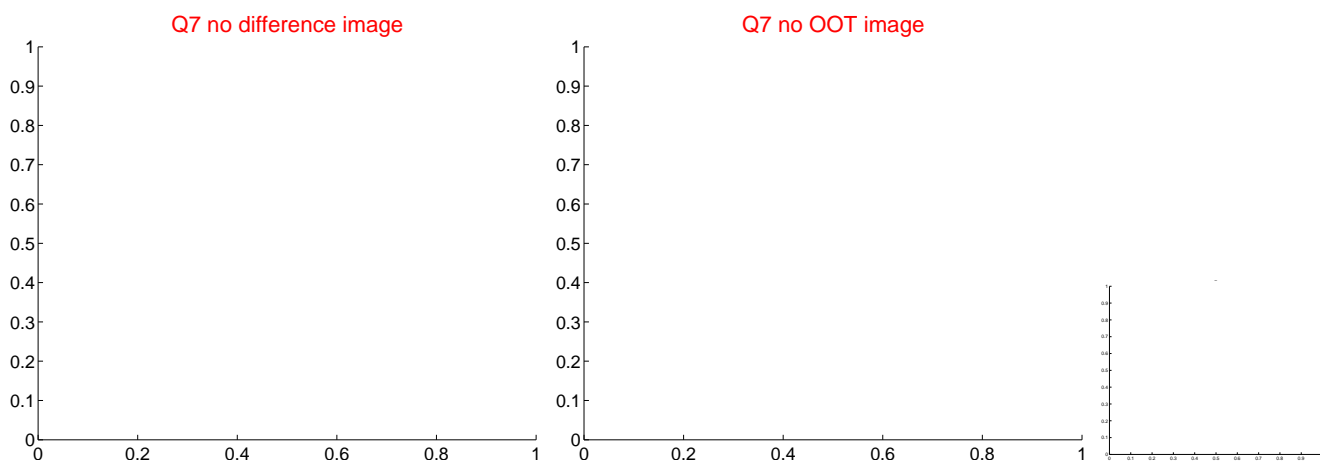
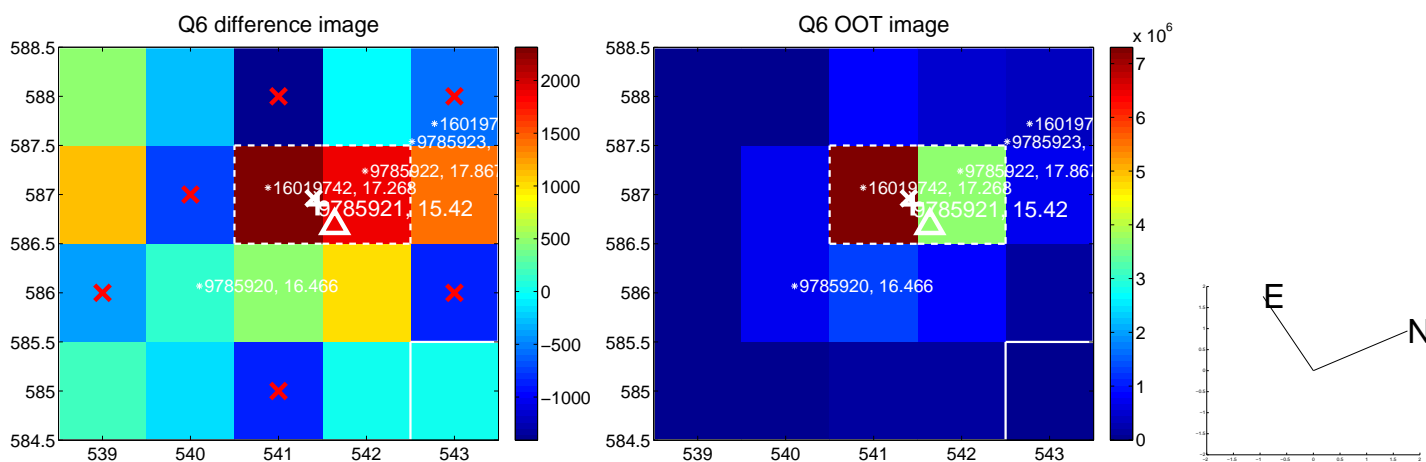
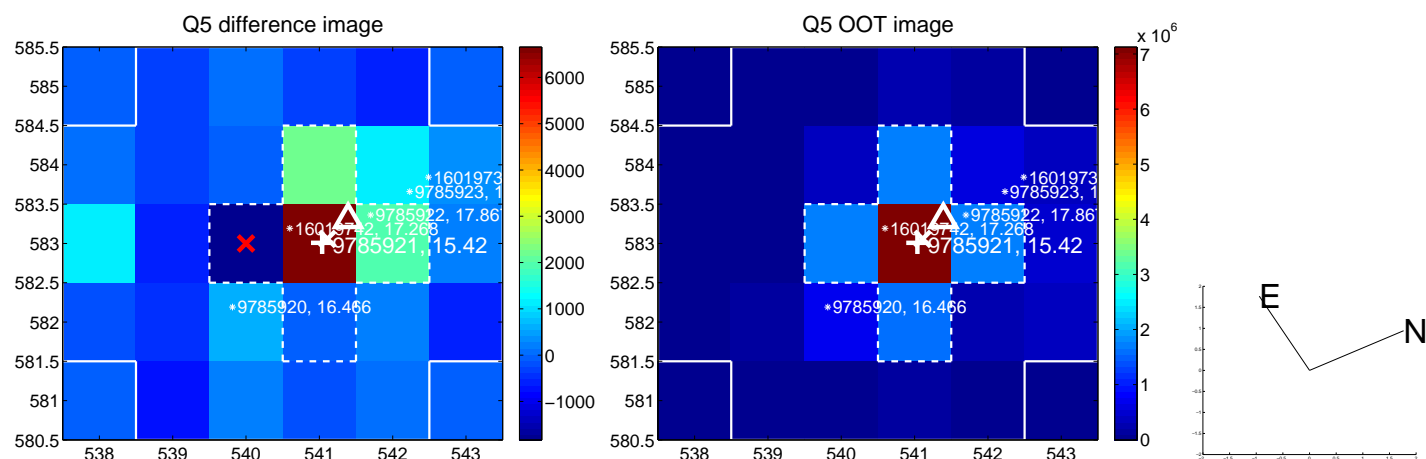


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

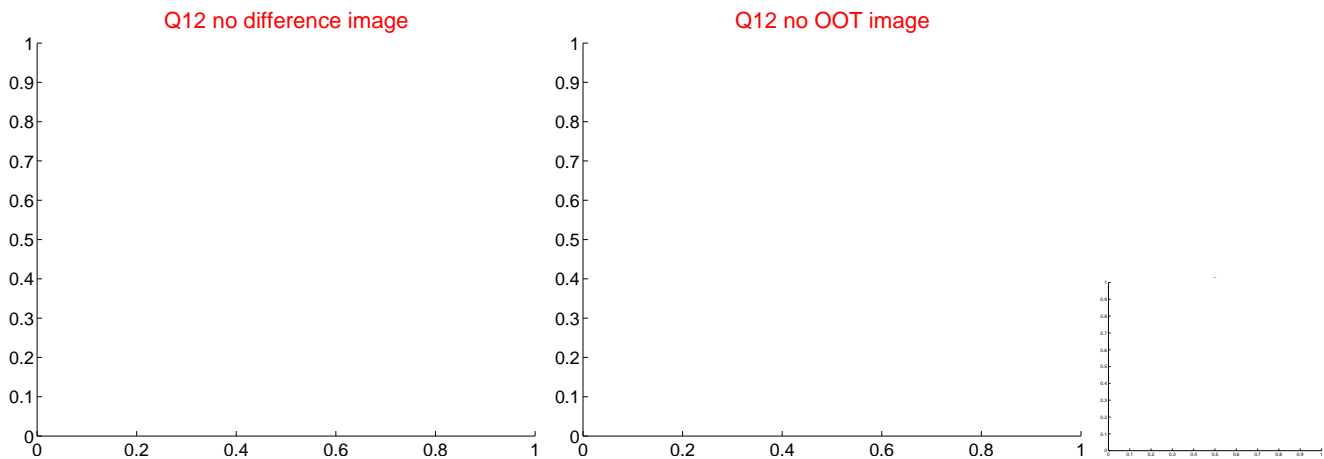
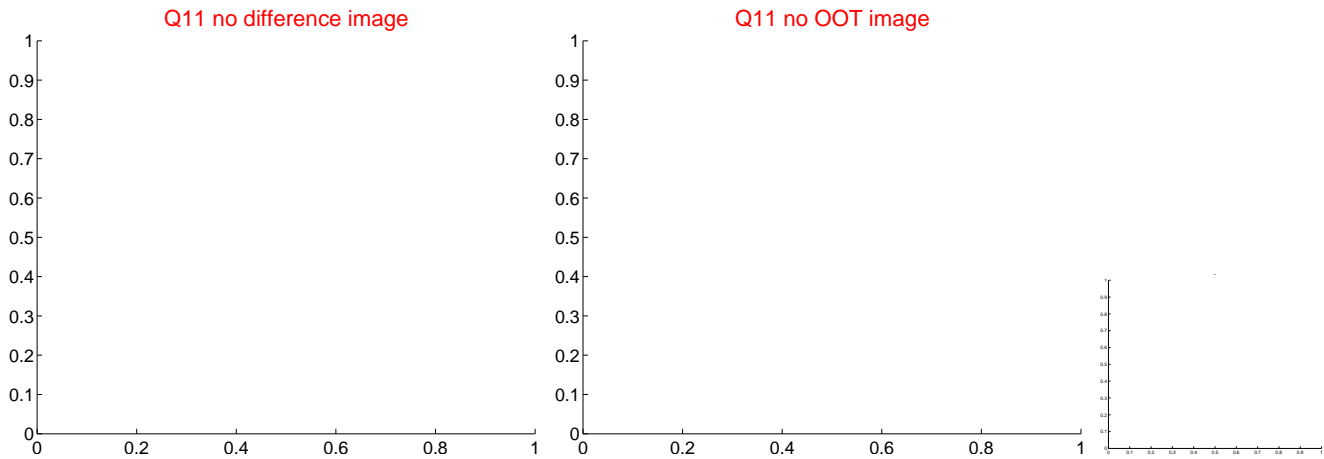
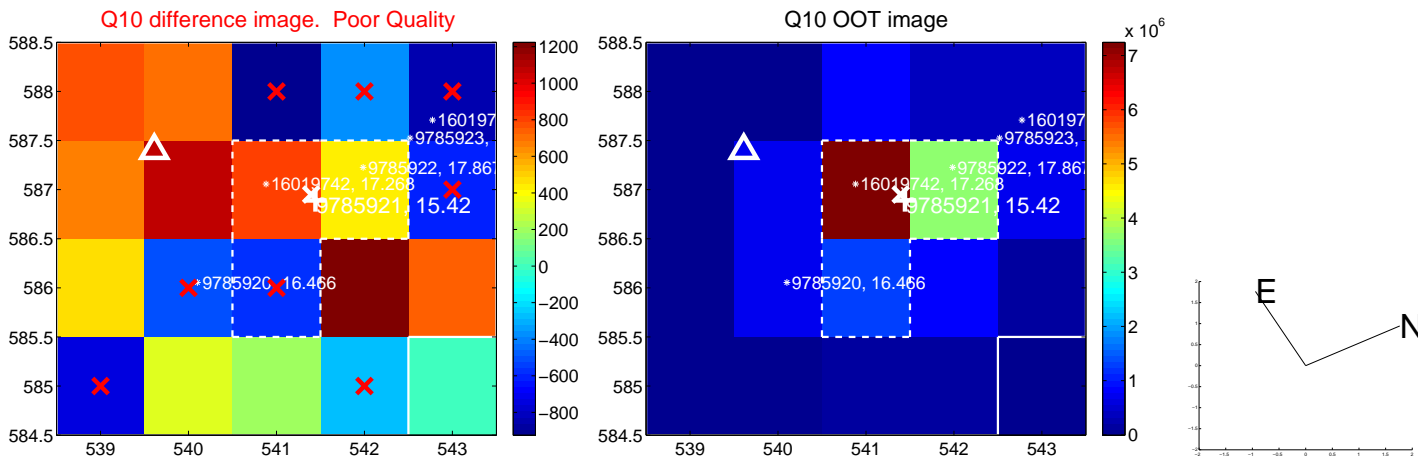
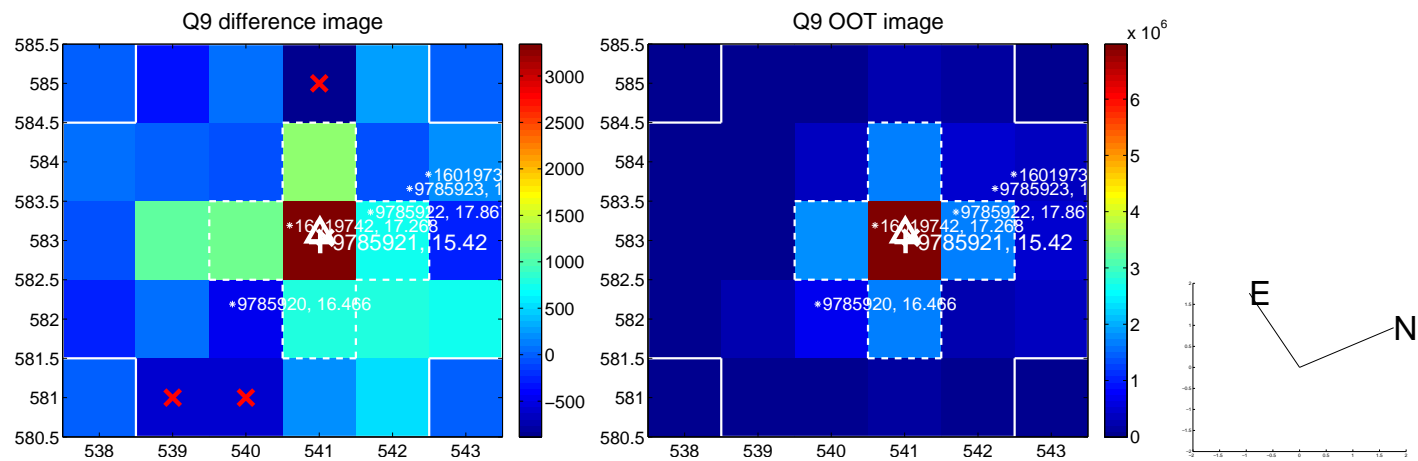
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



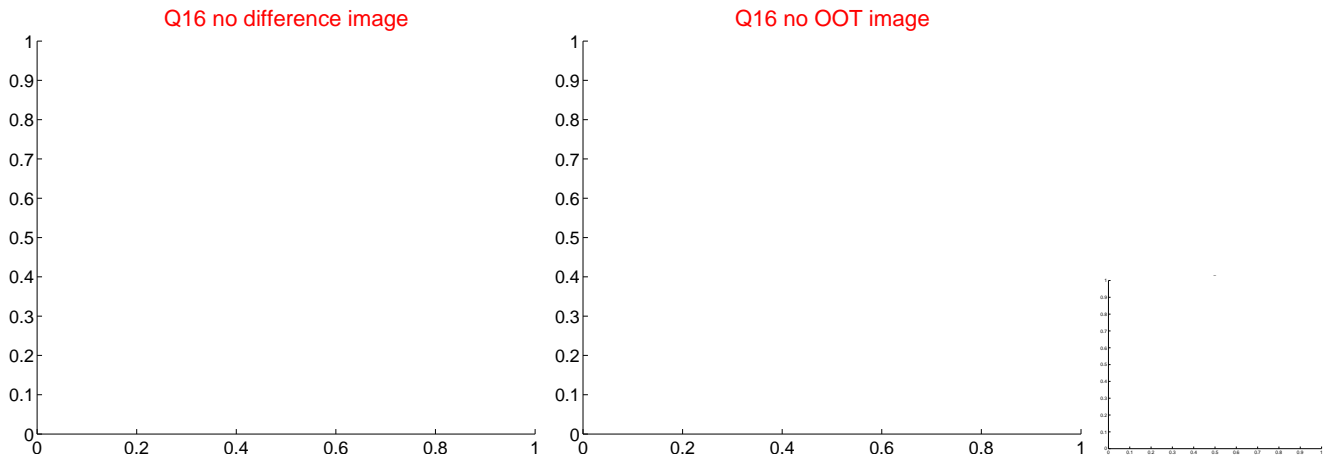
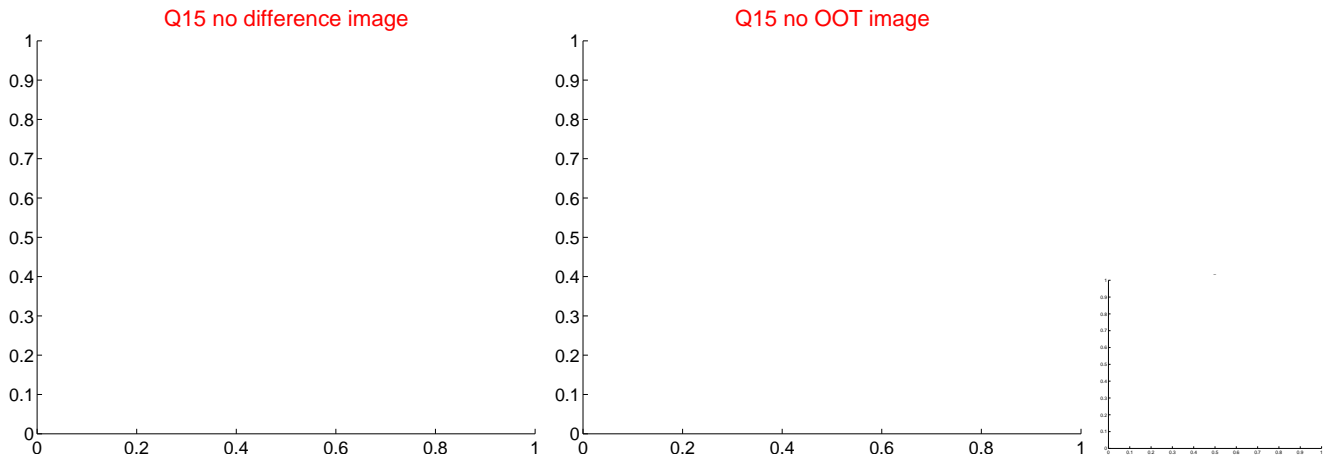
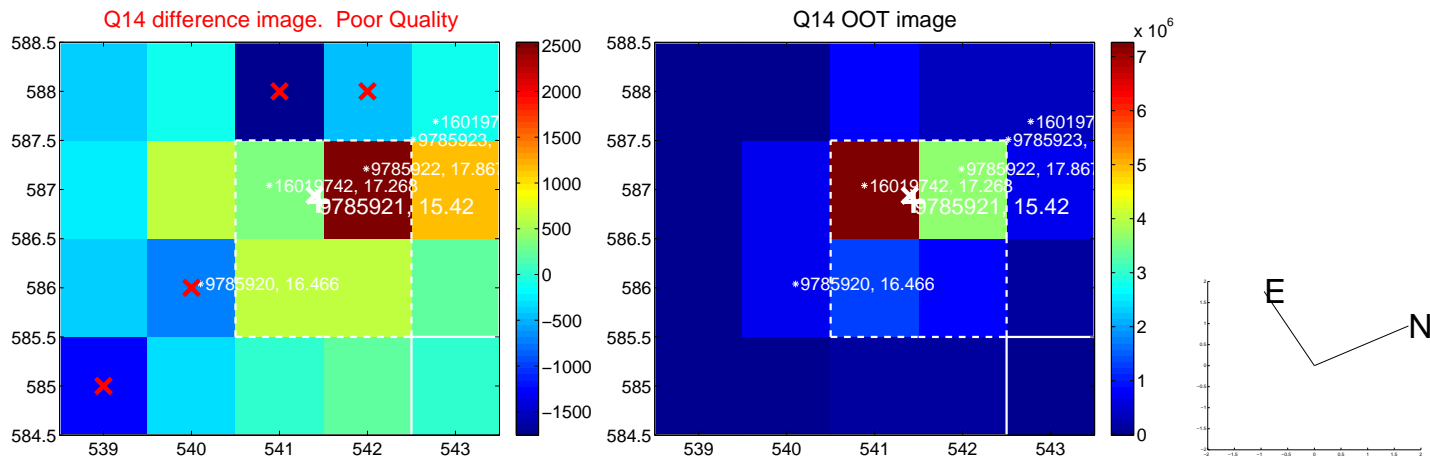
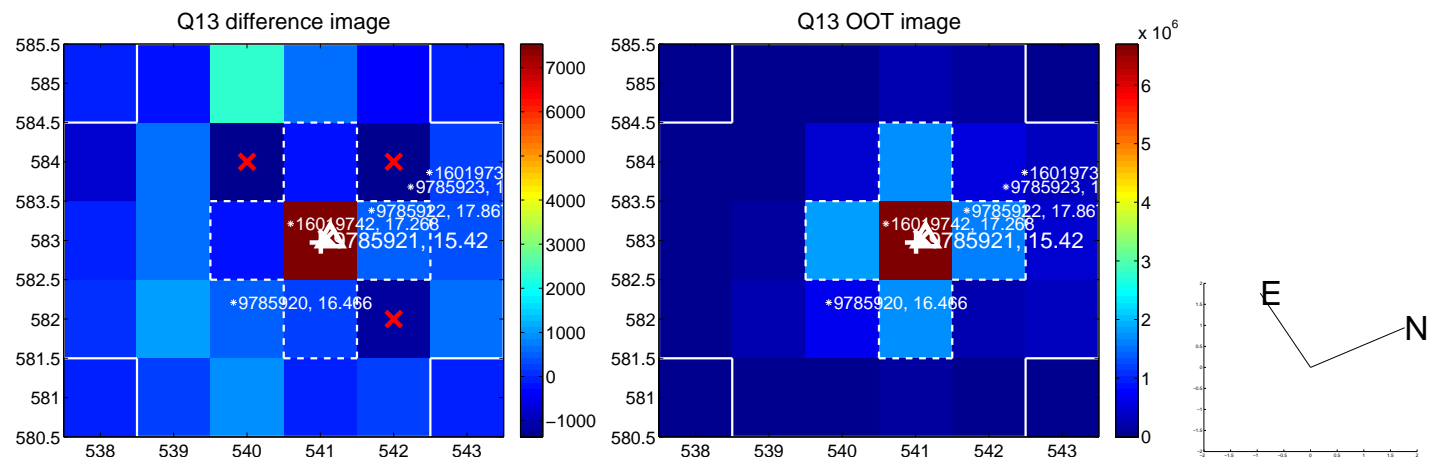
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



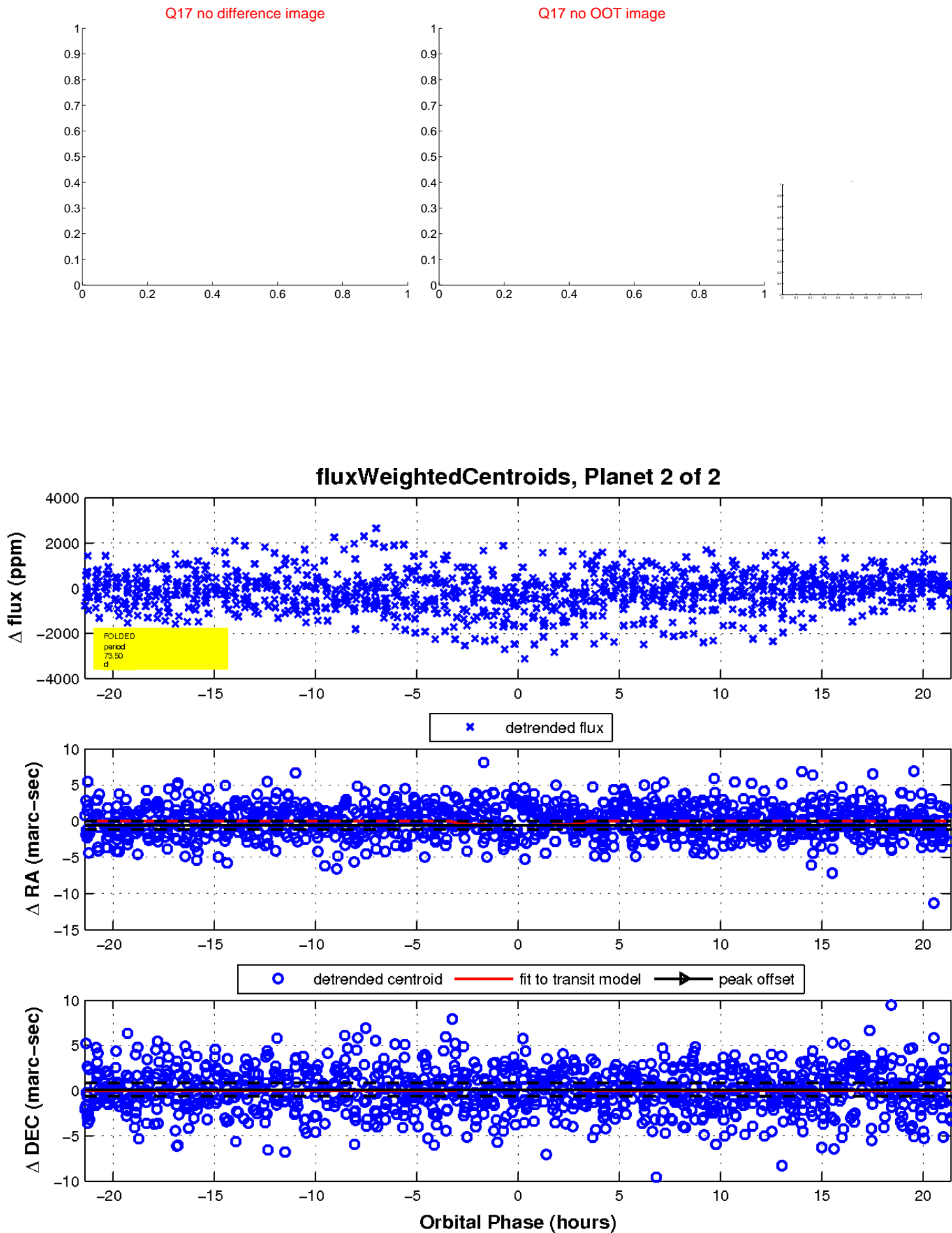
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

