

KIC 009413885

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})
009413885-01	OBS	No	227.575207	245.729629	1908.2	11.801	18.8	9.3	2.64	5112	11.36	9.09
009413885-02	OBS	No	460.347673	246.596209	870.0	9.000	19.1	-1.0	2.64	5112	7.63	3.55
009413885-03	OBS	No	448.303163	371.736059	1816.5	3.274	19.2	8.9	2.64	5112	11.28	3.68
009413885-04	OBS	No	453.052901	344.956509	1160.5	4.310	16.5	5.6	2.64	5112	9.81	3.63
009413885-05	OBS	No	345.810758	350.752876	628.4	5.000	13.1	-1.0	2.64	5112	6.48	5.20

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009413885-01	OBS	FP	0.00	1	0	1	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS—HALO_GHOST
009413885-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS
009413885-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009413885-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009413885-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

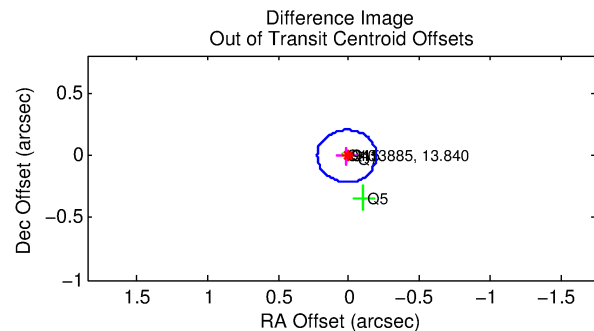
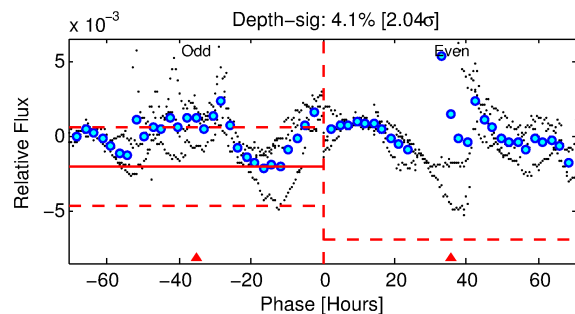
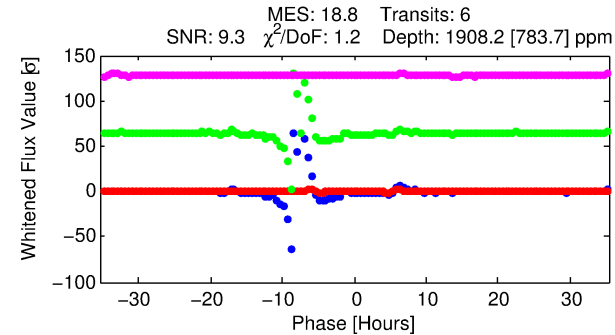
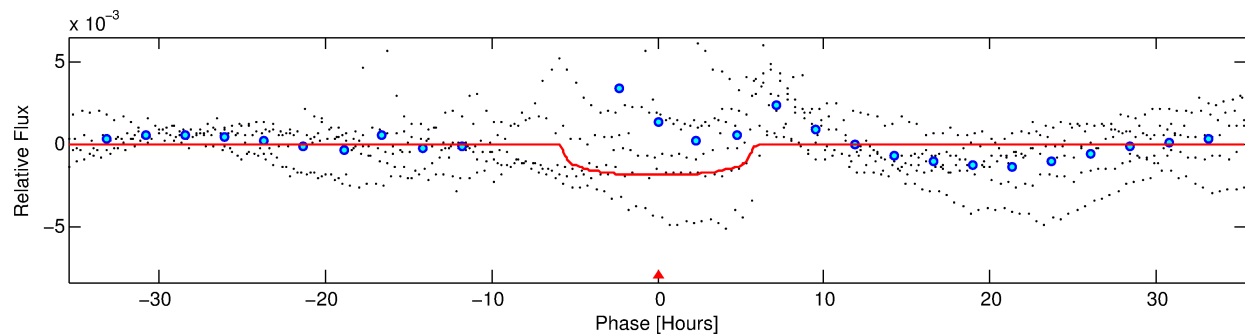
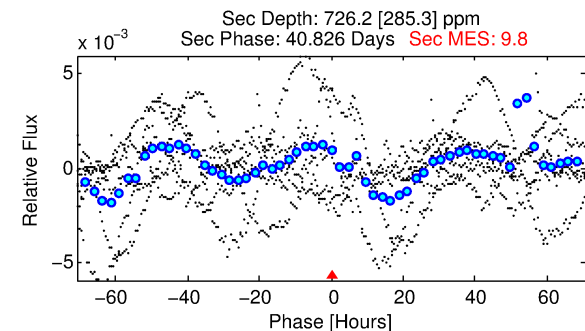
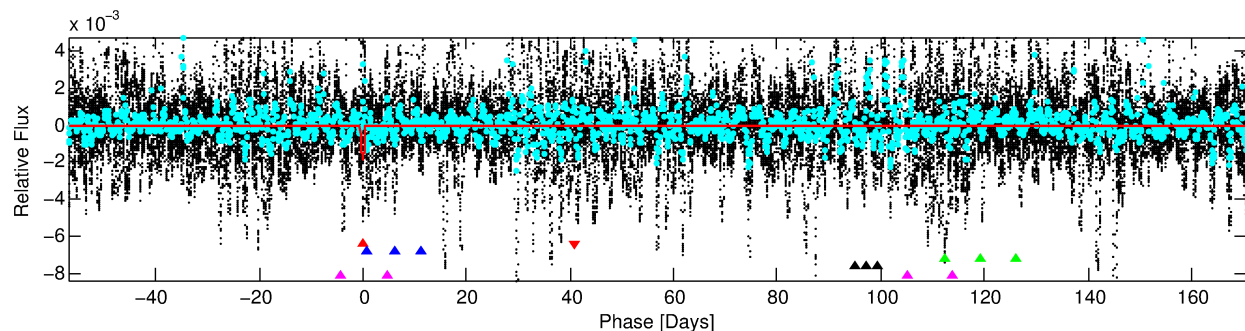
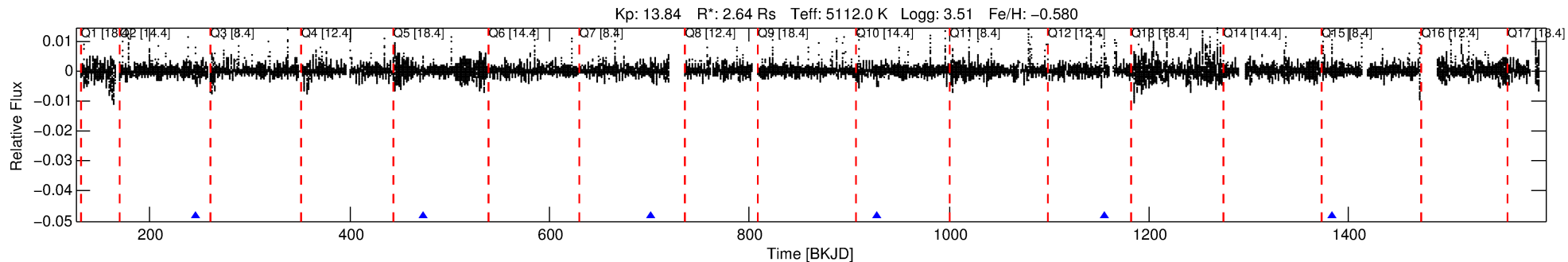
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009413885-01

No Significant Match Found

DV One-Page Summary

KIC: 9413885 Candidate: 1 of 5 Period: 227.575 d



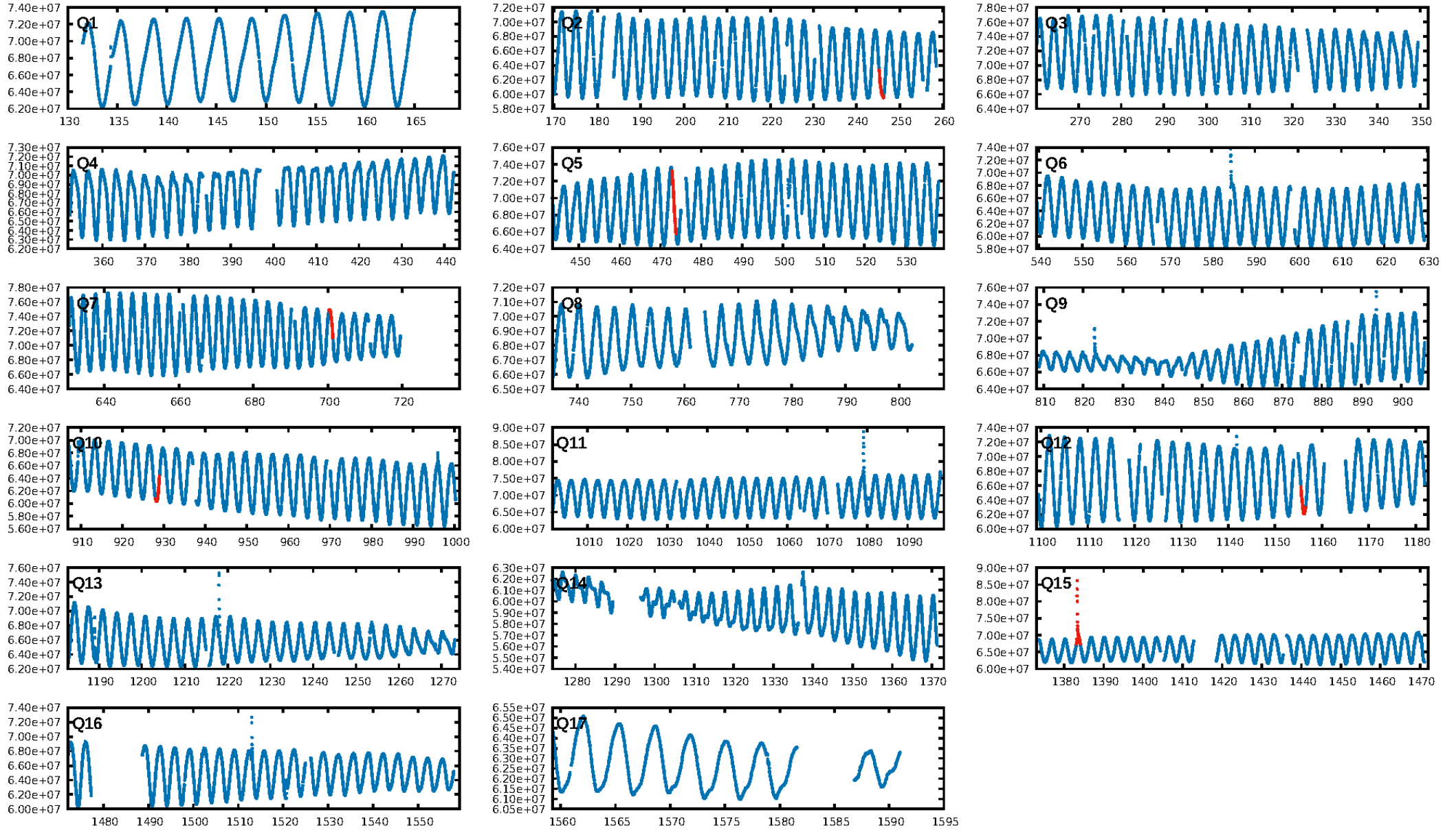
DV Fit Results:

Period = 227.57521 [0.00506] d
Epoch = 245.7296 [0.0144] BKJD
Rp/R* = 0.0395 [0.0227]
a/R* = 149.26 [279.89]
b = 0.23 [7.68]
Seff = 9.09 [15.73]
Teq = 443 [192] K
Rp = 11.36 [11.05] Re
a = 0.6844 [0.6673] AU
Ag = 1450.26 [3061.73] [0.47 σ]
Teffp = 4225 [1288] K [2.90 σ]

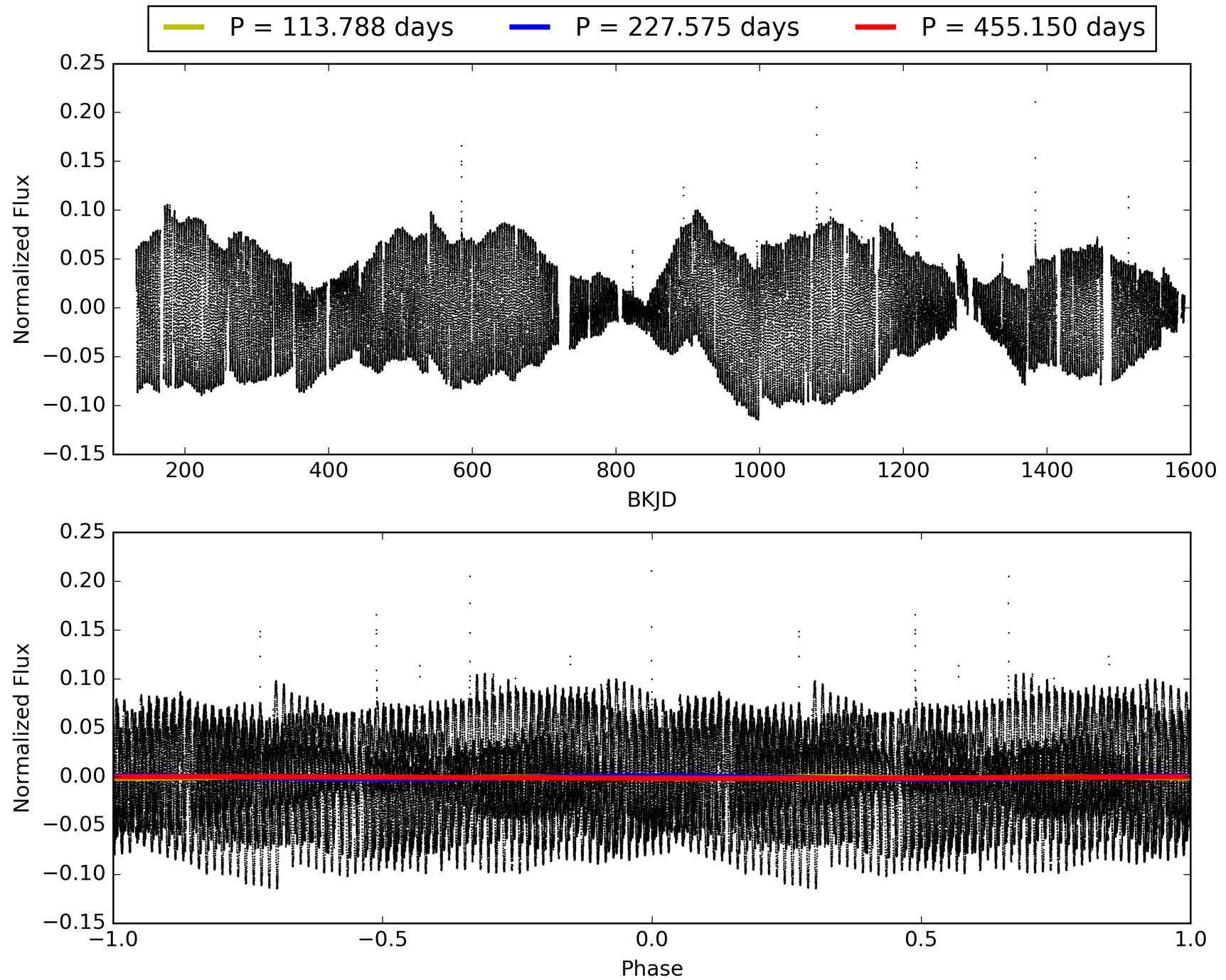
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [221.40 σ]
ModelChiSquare2-sig: 51.5%
ModelChiSquareGof-sig: 99.2%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [6/6]
GhostDiagnostic-chr: -0.009561
Centroid-sig: 21.6%
Centroid-so: 0.089 arcsec [0.49 σ]
OotOffset-rm: 0.015 arcsec [0.22 σ]
KicOffset-rm: 0.205 arcsec [1.81 σ]
OotOffset-st: 1/2/0/1 [4]
KicOffset-st: 1/2/0/1 [4]
DiffImageQuality-fgm: 0.25 [1/4]
DiffImageOverlap-fno: 1.00 [4/4]

TCE 009413885-01, PDC Light Curves

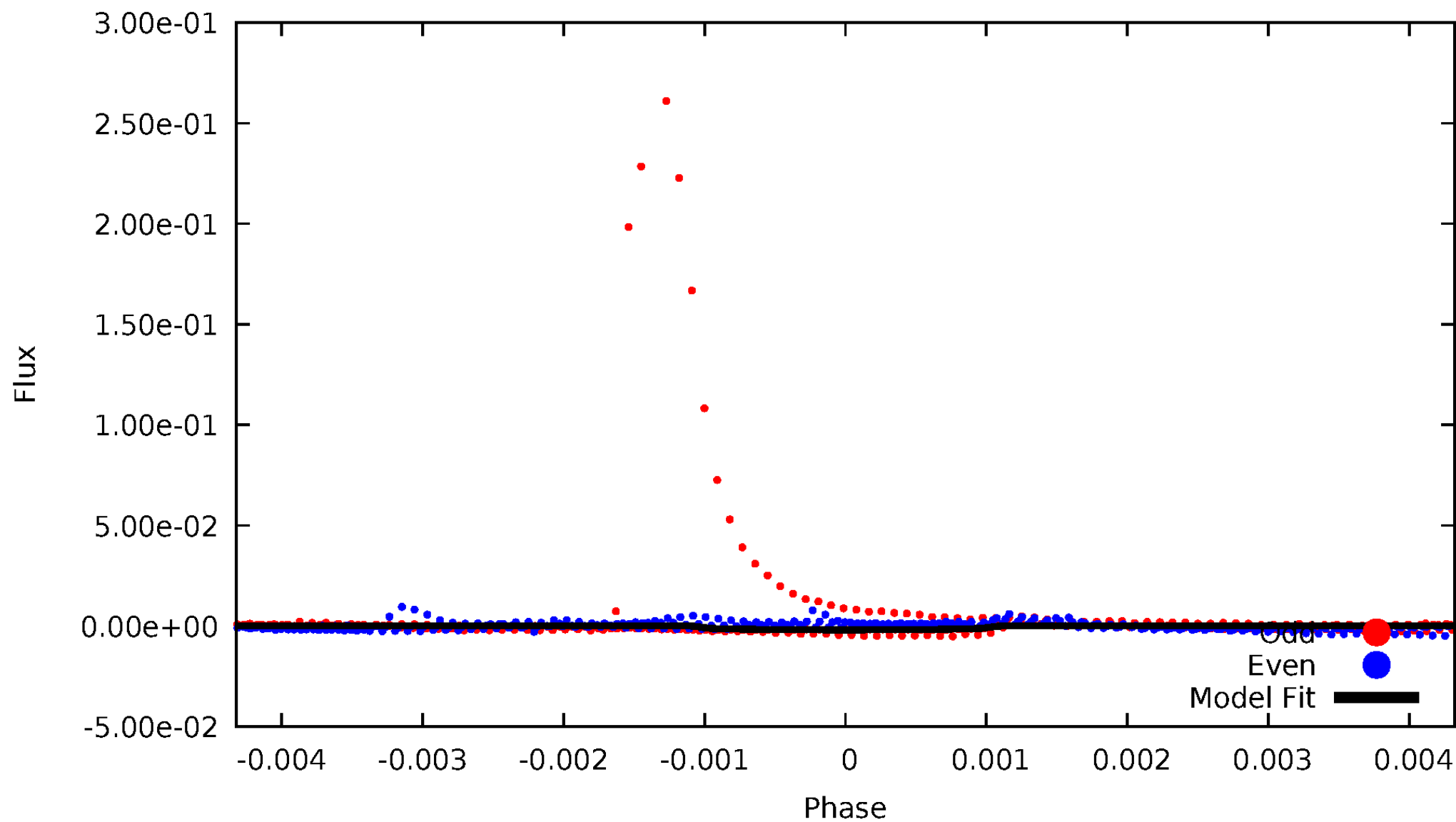


TCE 009413885-01



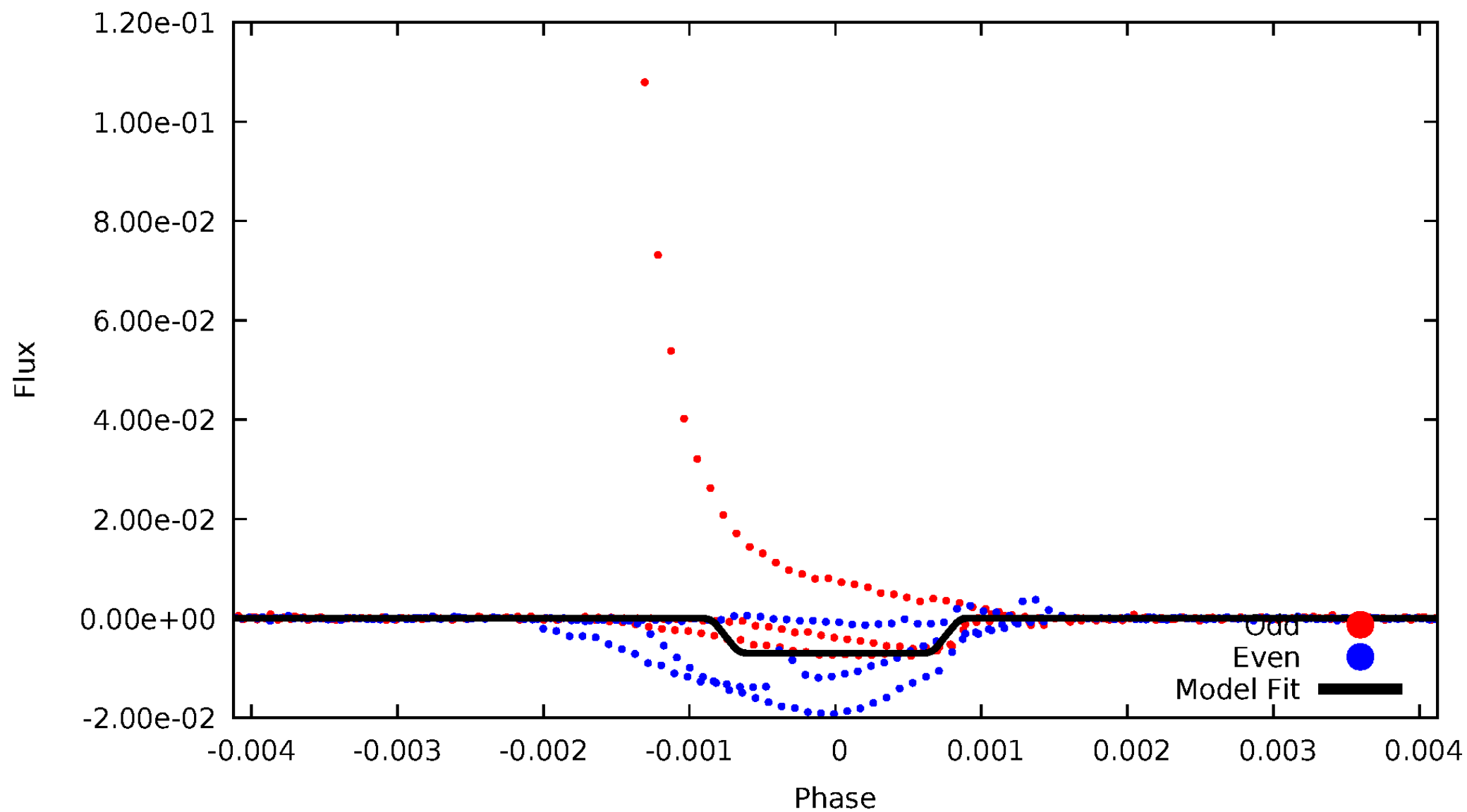
DV Odd/Even

TCE 009413885-01



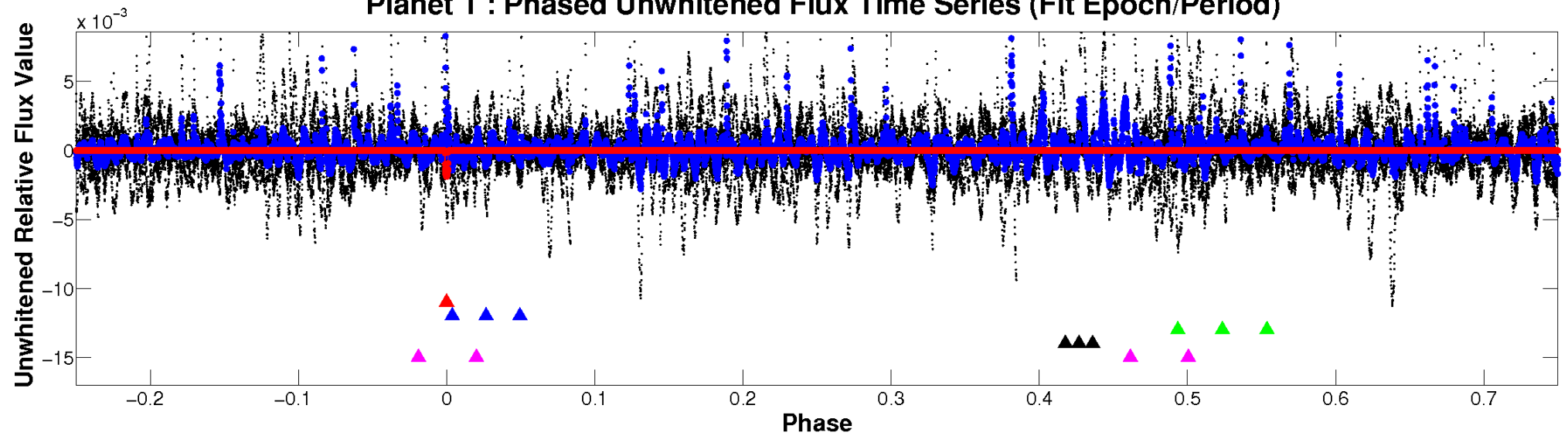
ALT Odd/Even

TCE 009413885-01

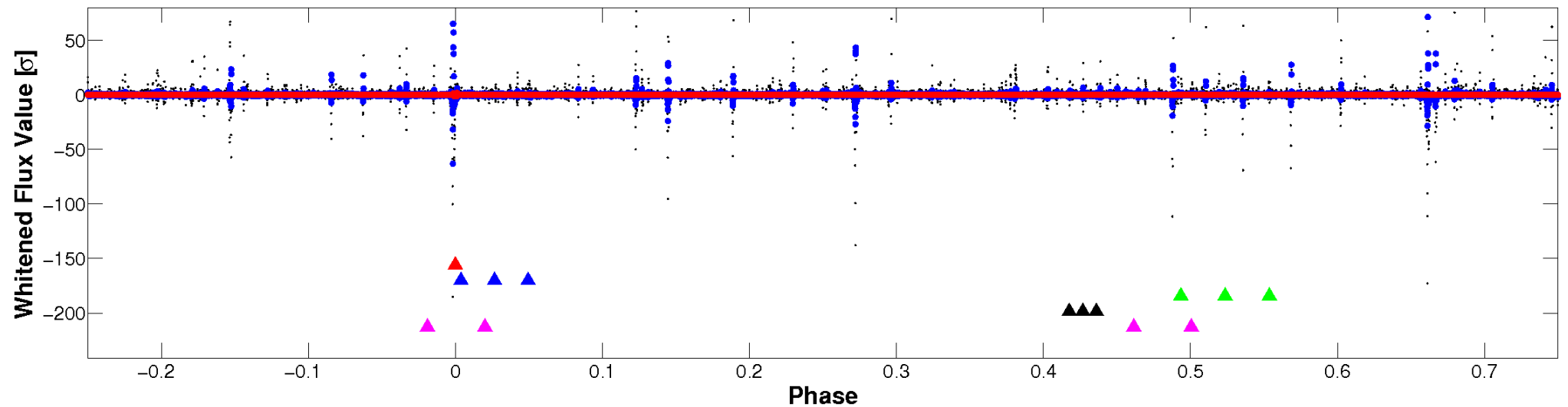


Non-Whitened Vs. Whitened Light Curve

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

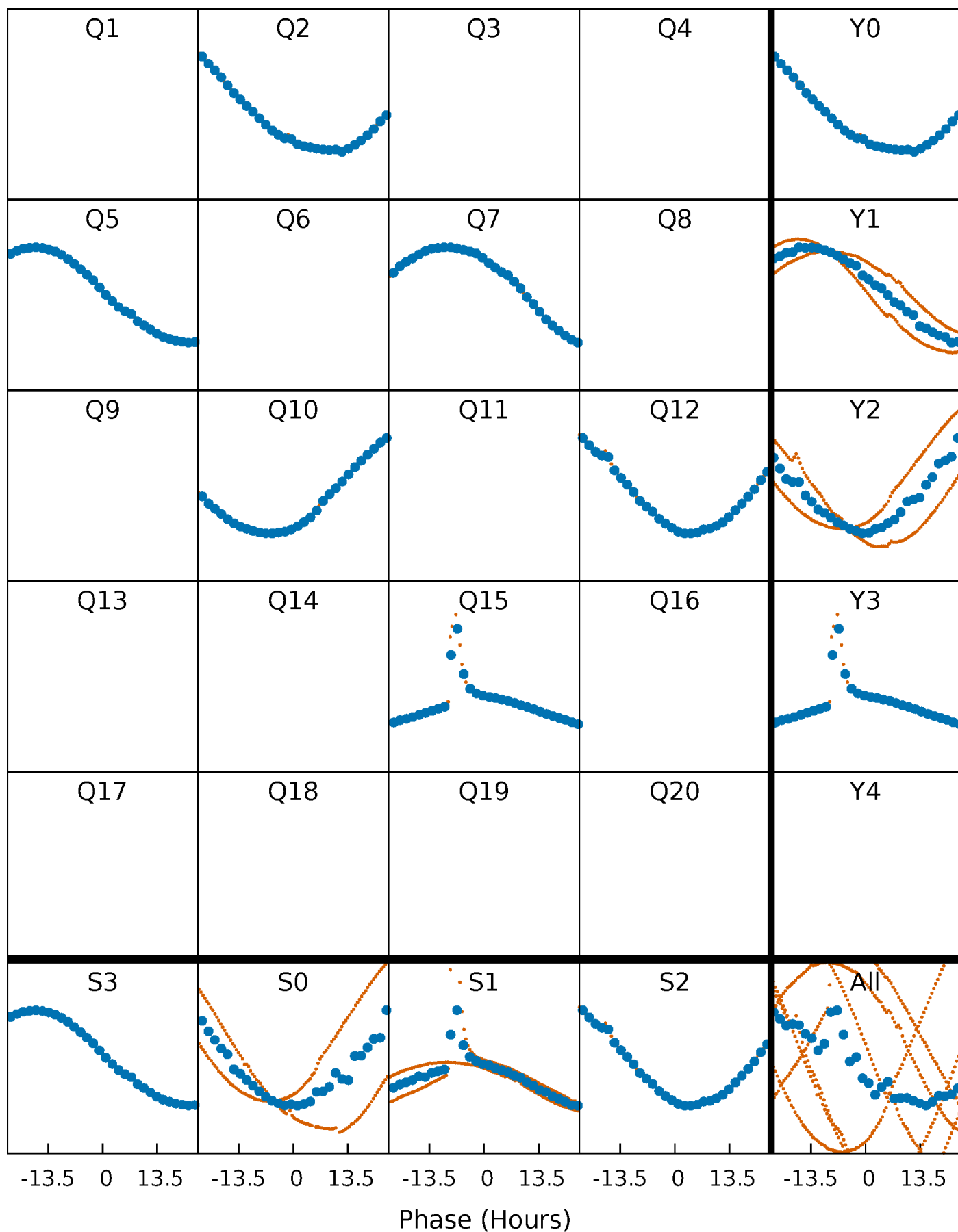


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



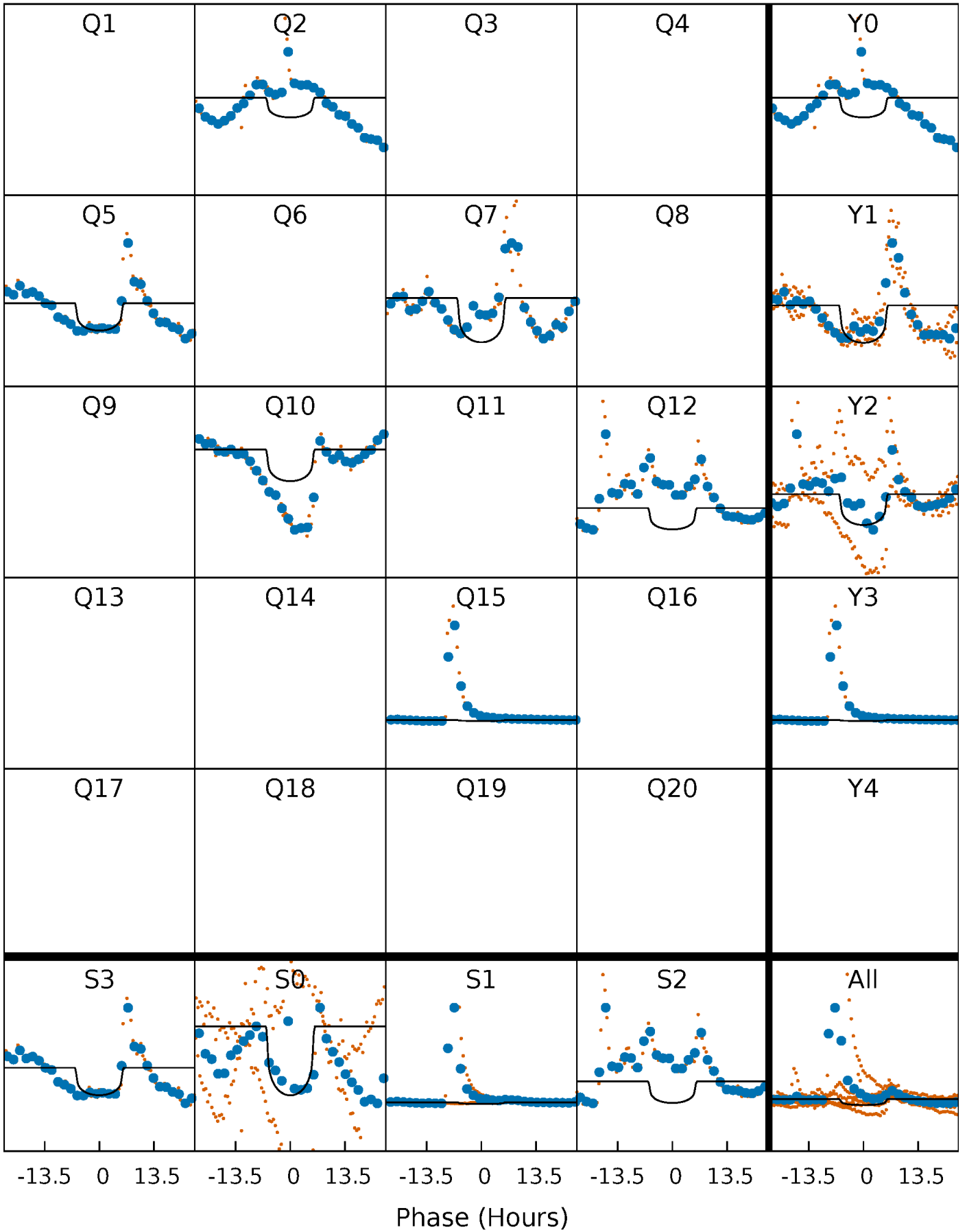
PDC Quarter-Phased Transit Curves

TCE 009413885-01 P=227.575207 Days $T_0=245.729629$ (BKJD)



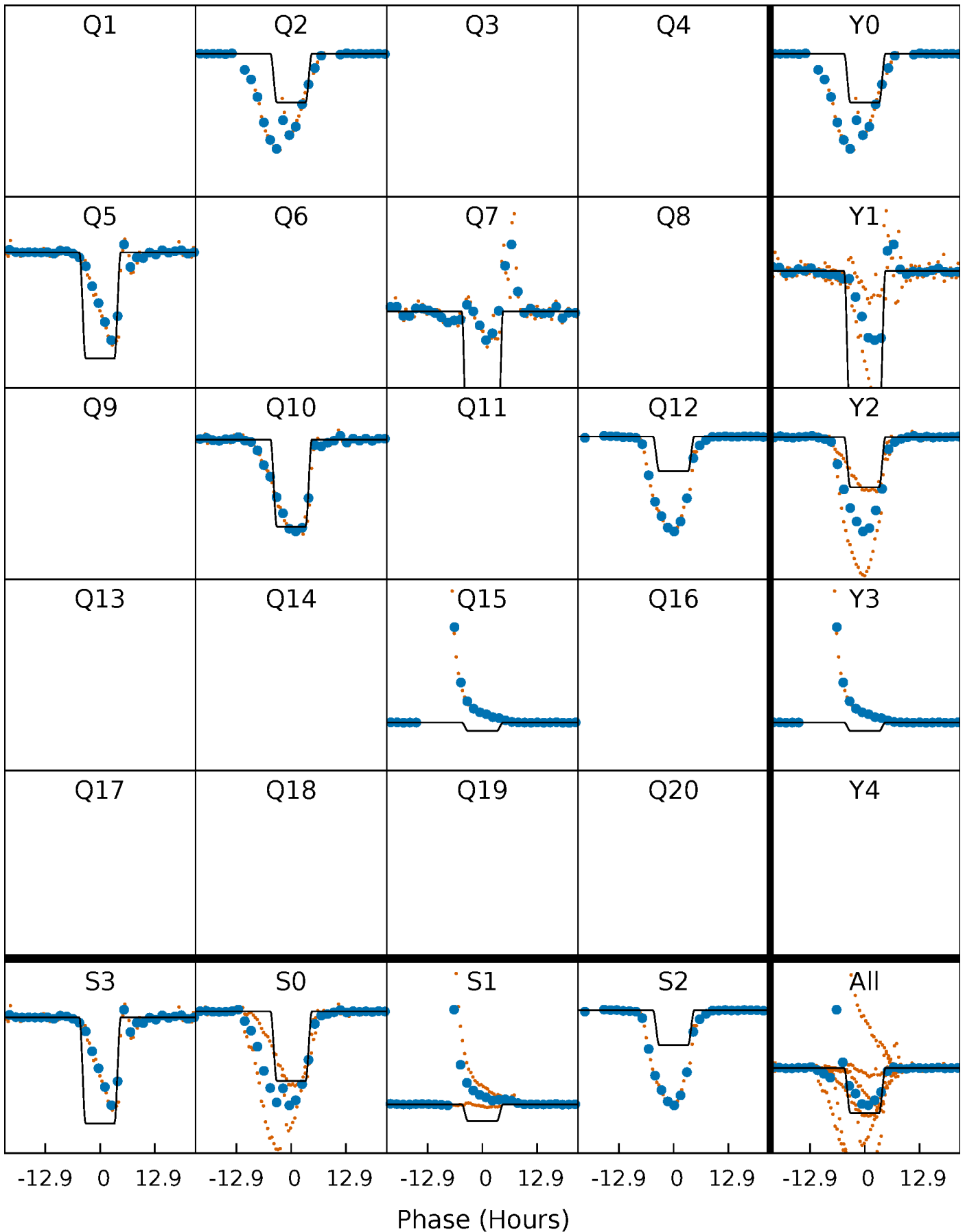
DV Quarter-Phased Transit Curves

TCE 009413885-01 P=227.575207 Days $T_0=245.729629$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

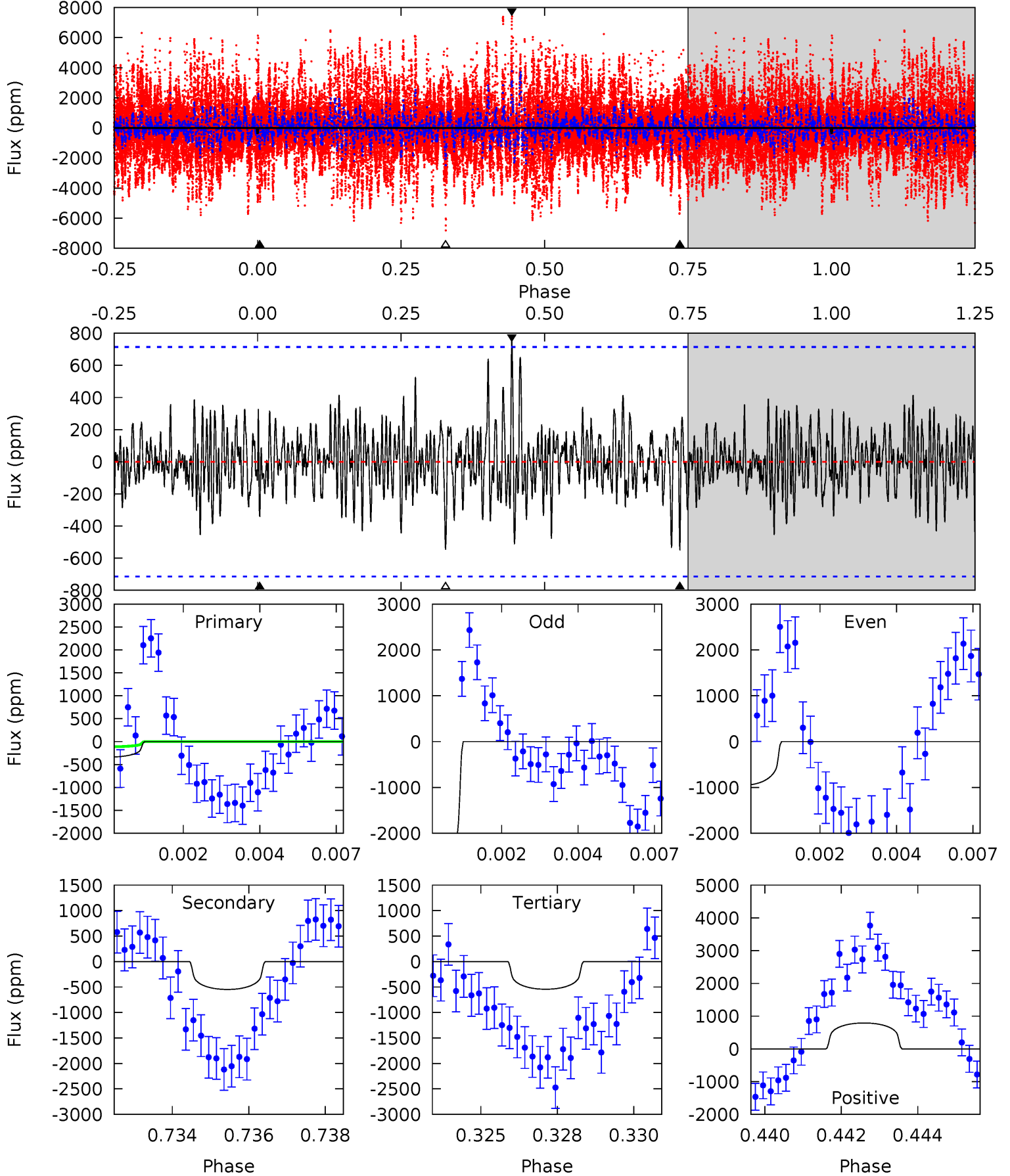
TCE 009413885-01 P=227.582180 Days $T_0=245.764217$ (BKJD)



DV Model-Shift Uniqueness Test

009413885-01, $P = 227.575207$ Days, $E = 18.154422$ Days

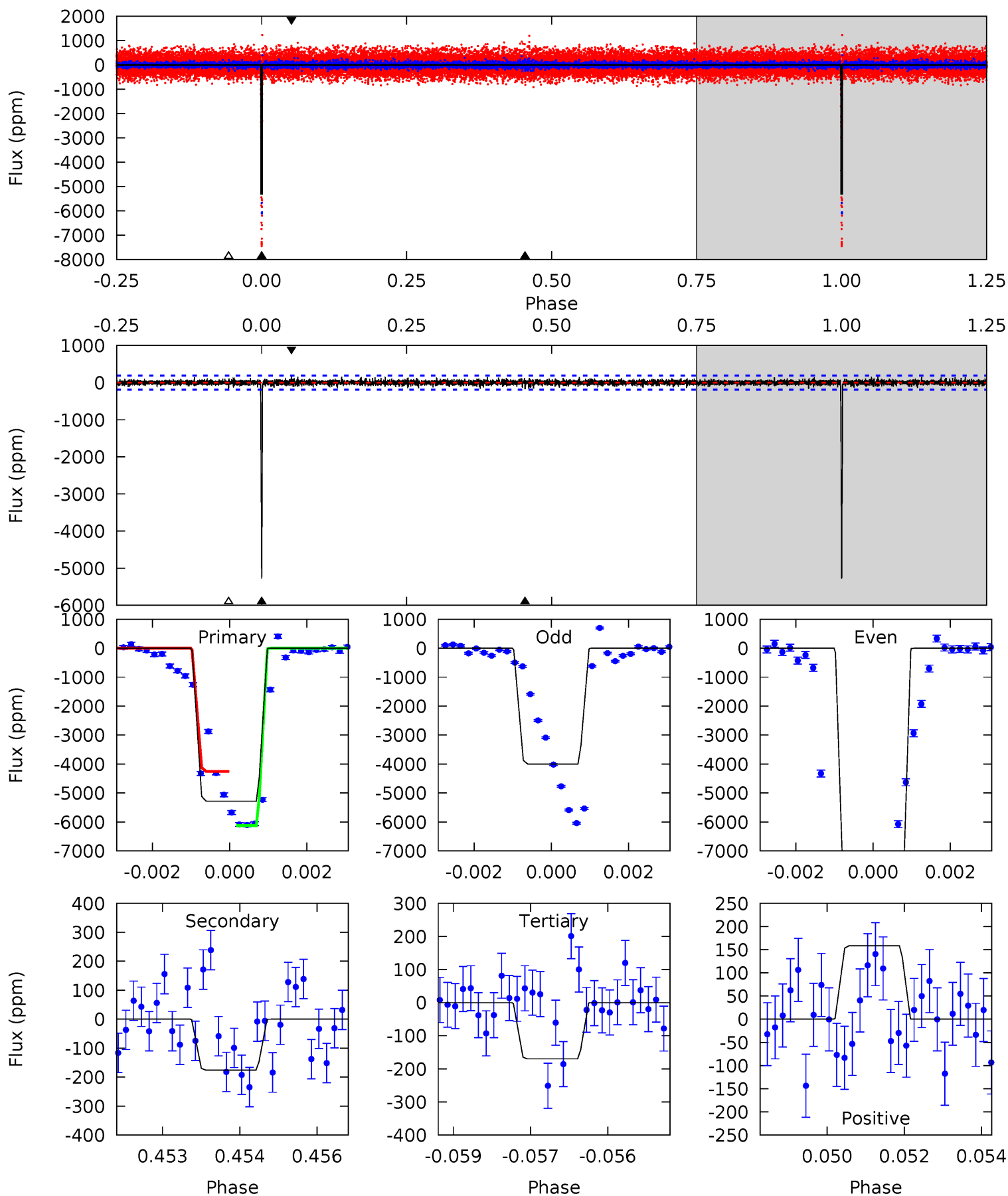
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.52	4.07	4.04	5.87	5.31	3.06	1.20	-1.52	-3.35	0.04	-1.80	7.62	5.27	0.59	1.93



Alt Model-Shift Uniqueness Test

009413885-01, P = 227.582180 Days, E = 18.182037 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
148.8	4.95	4.79	4.47	5.35	3.12	1.05	144.0	144.3	0.16	0.48	98.3	0.92	0.03	25.1



Stellar Parameters For KIC 009413885

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5112^{+137}_{-122}	$3.512^{+1.072}_{-0.357}$	$-0.580^{+0.300}_{-0.250}$	$2.638^{+1.552}_{-2.070}$	$0.824^{+0.262}_{-0.175}$	$0.063^{+3.101}_{-0.048}$
	+3%/-2%	+31%/-10%	+52%/-43%	+59%/-78%	+32%/-21%	+4903%/-76%
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 009413885-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-548 ± 135	$10.07^{+8.86}_{-6.05}$	612^{+100}_{-137}	4181^{+1364}_{-621}	1446^{+7771}_{-1038}
Alt.	-176 ± 36	$23.13^{+11.82}_{-10.38}$	619^{+95}_{-137}	2770^{+264}_{-202}	89^{+195}_{-52}

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

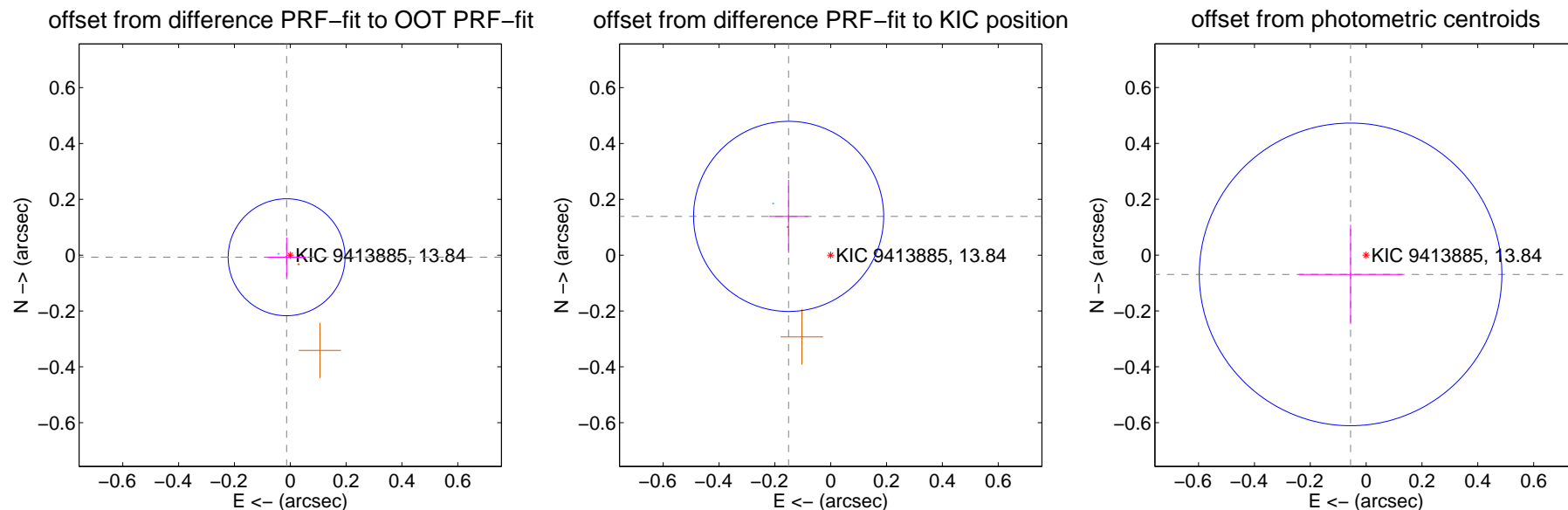
DV Centroid Data

Supplemental centroid analysis for 009413885-01. Kepler magnitude: 13.84. Transit SNR 9.34

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.015 ± 0.070	0.22	0.013 ± 0.069	-0.007 ± 0.071
PRF-fit source offset from KIC position	0.205 ± 0.114	1.81	0.151 ± 0.070	0.139 ± 0.131
photometric centroid source offset	0.09 ± 0.18	0.49	0.06 ± 0.19	-0.07 ± 0.18

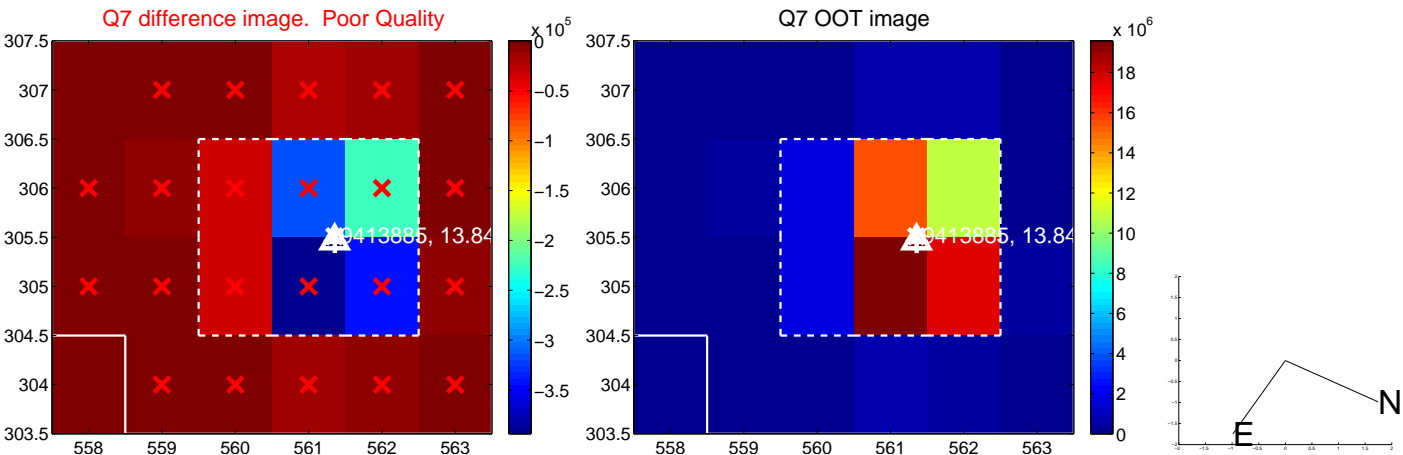
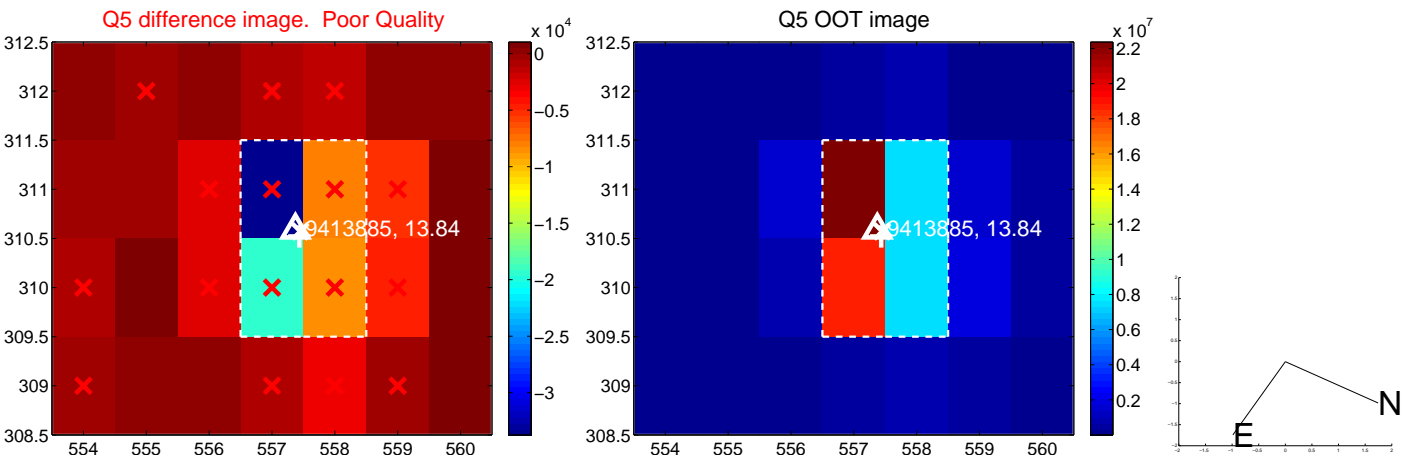


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

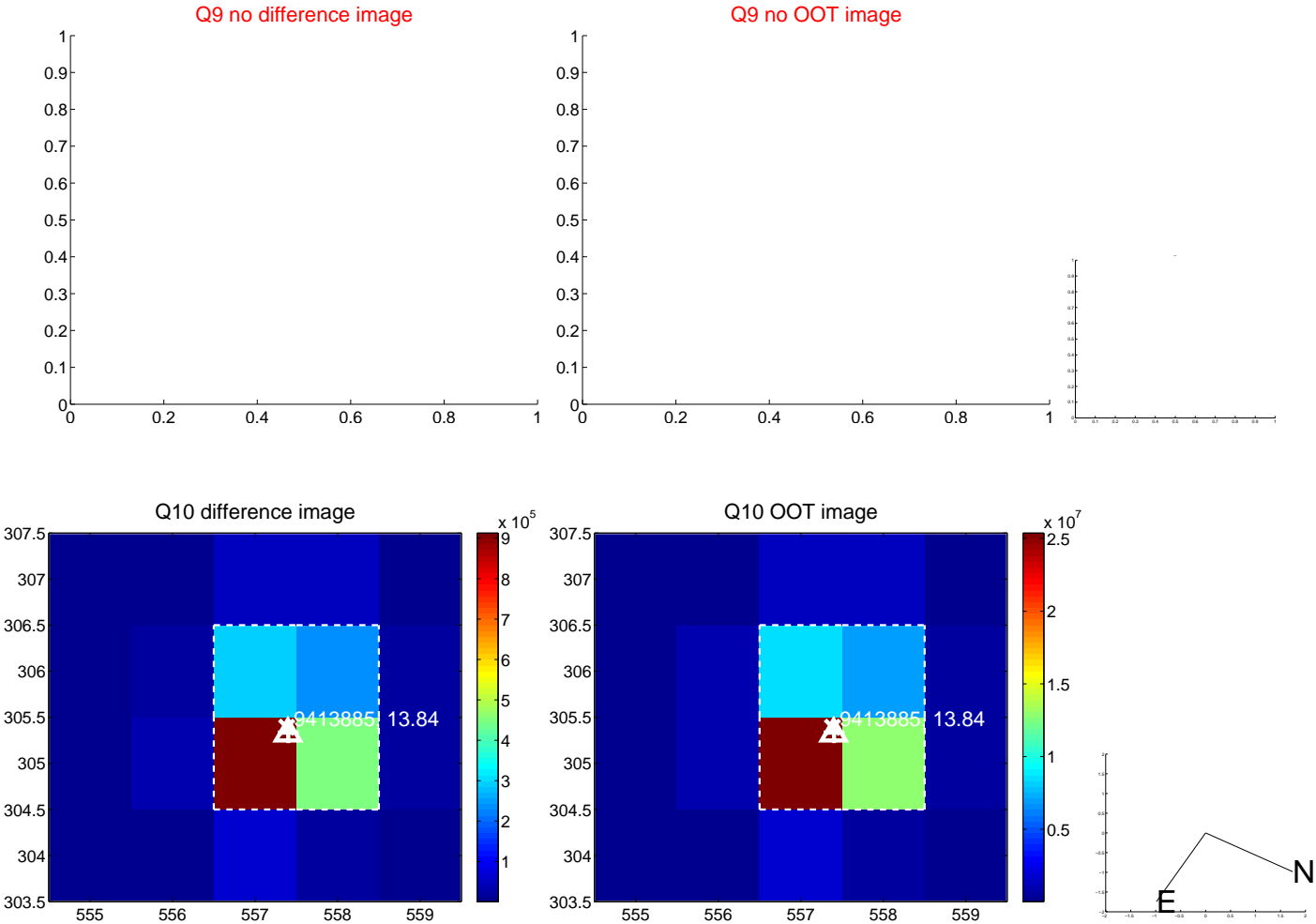
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



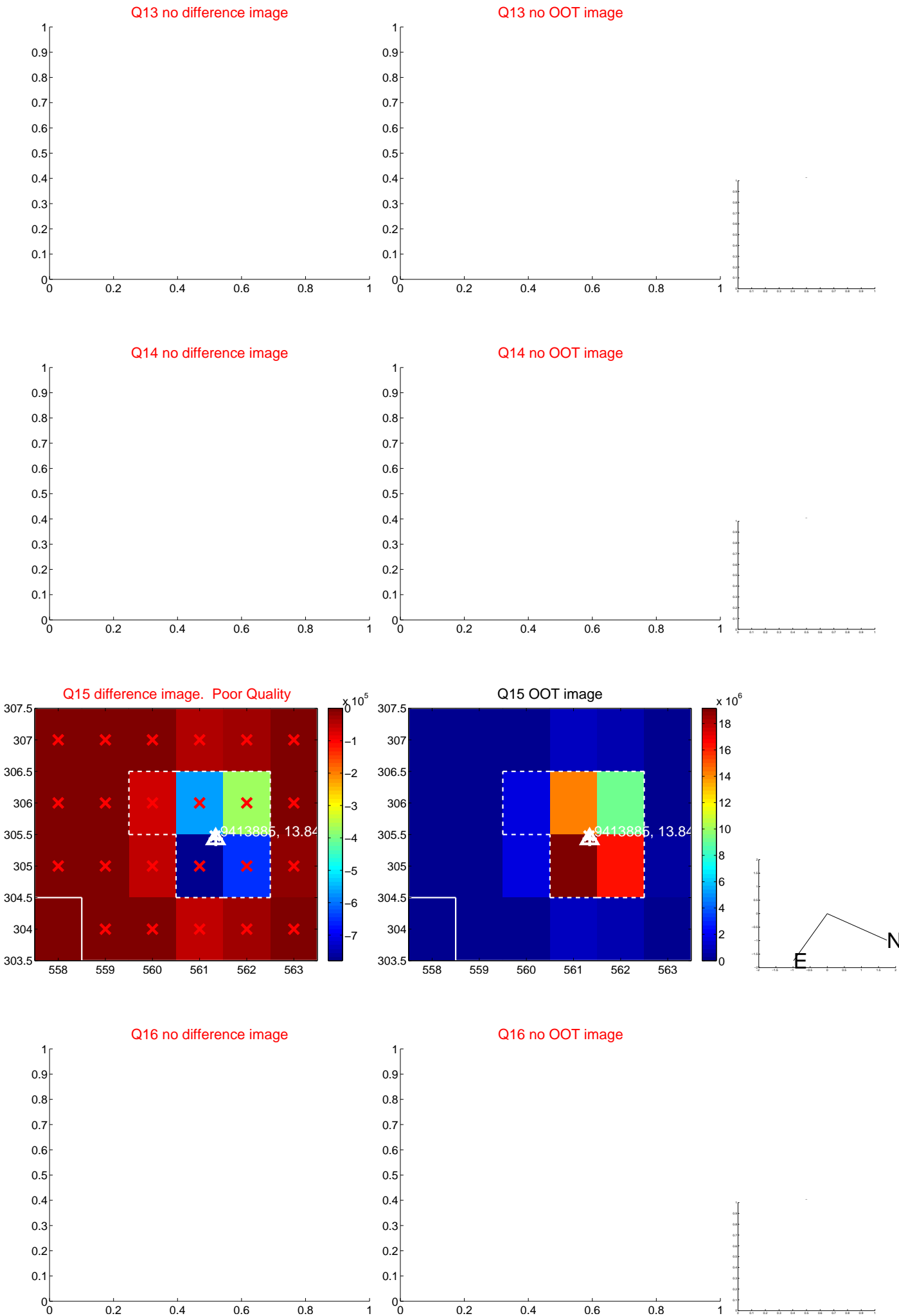
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



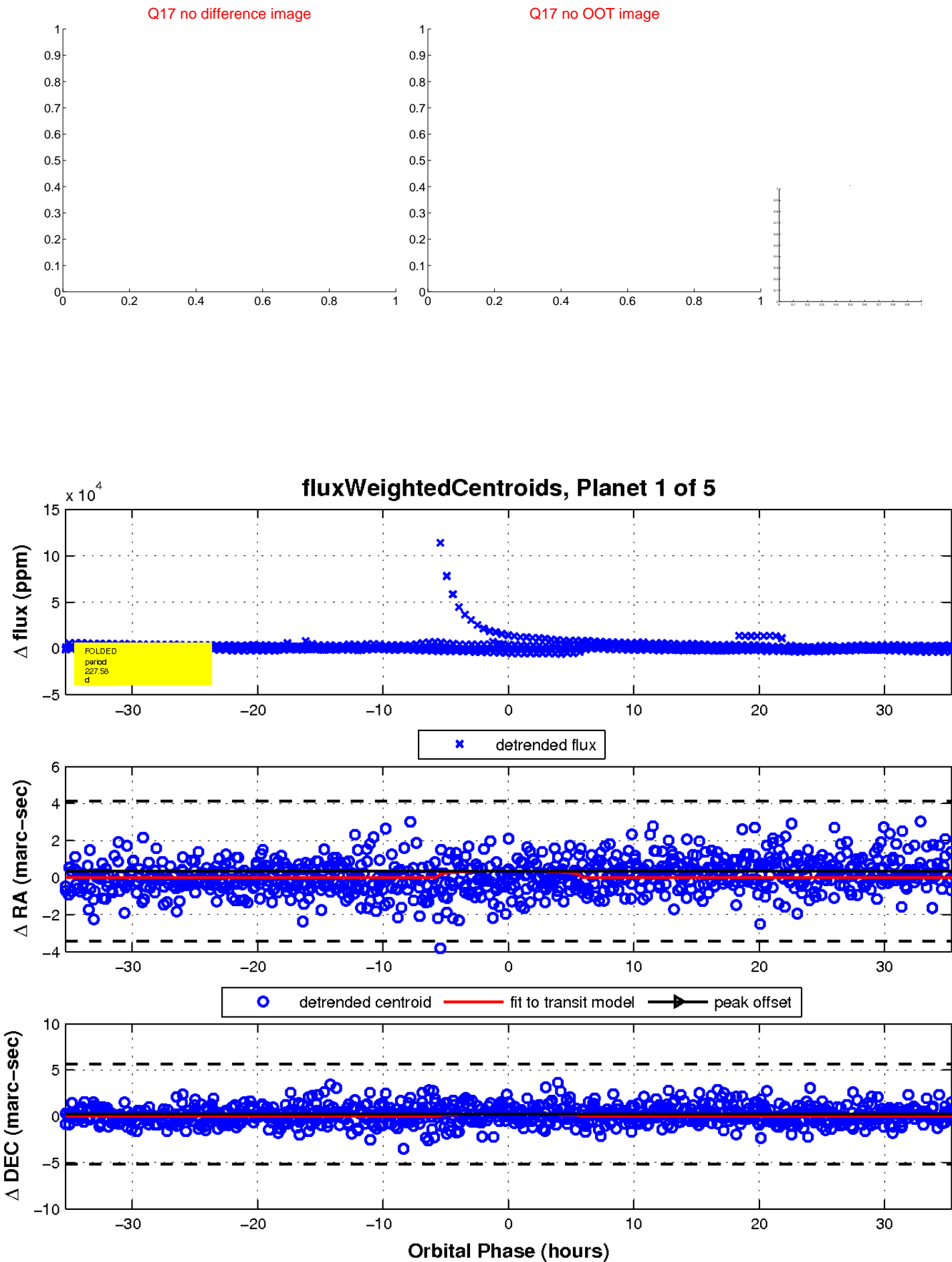
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

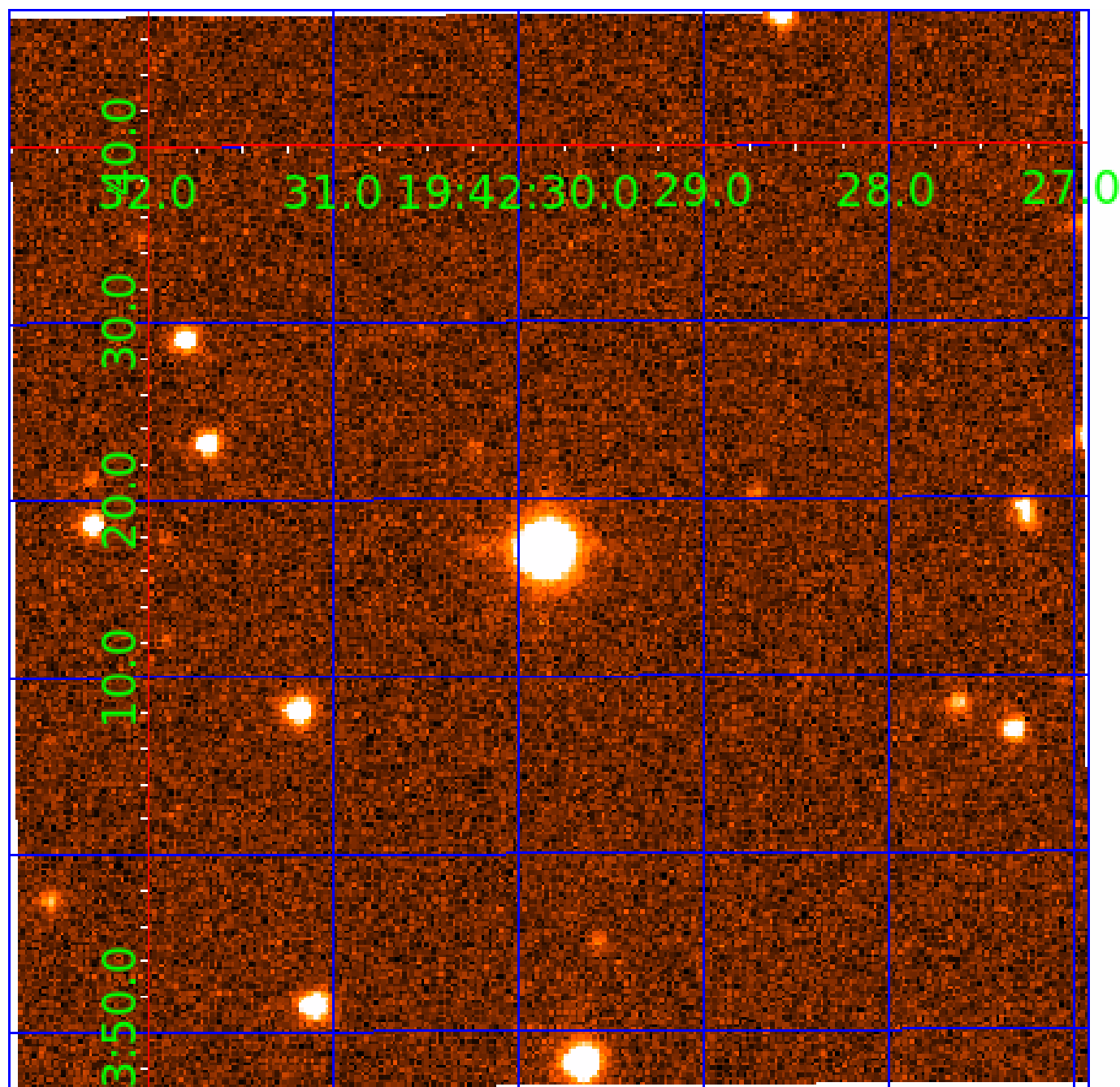


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009413885

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})
009413885-01	OBS	No	227.575207	245.729629	1908.2	11.801	18.8	9.3	2.64	5112	11.36	9.09
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Robovetter Results

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009413885-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS
009413885-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009413885-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009413885-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

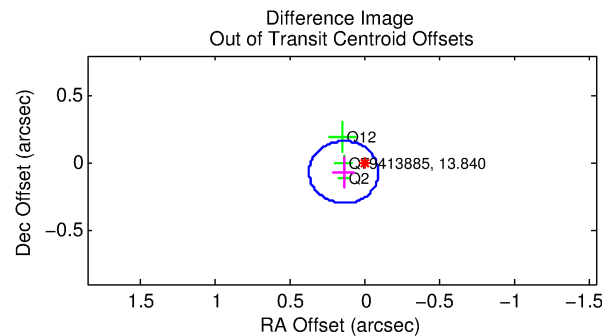
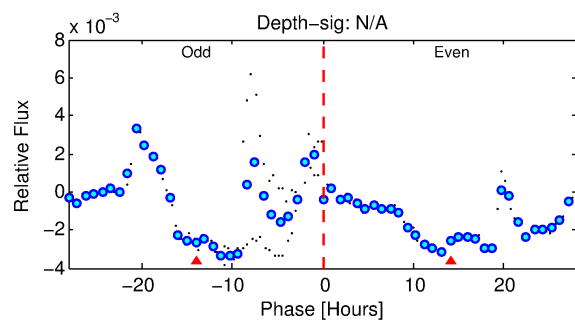
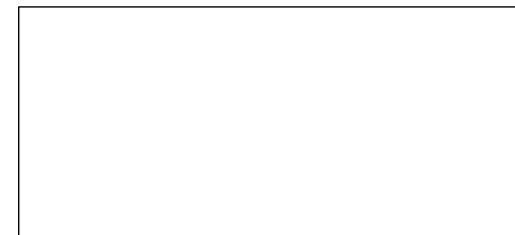
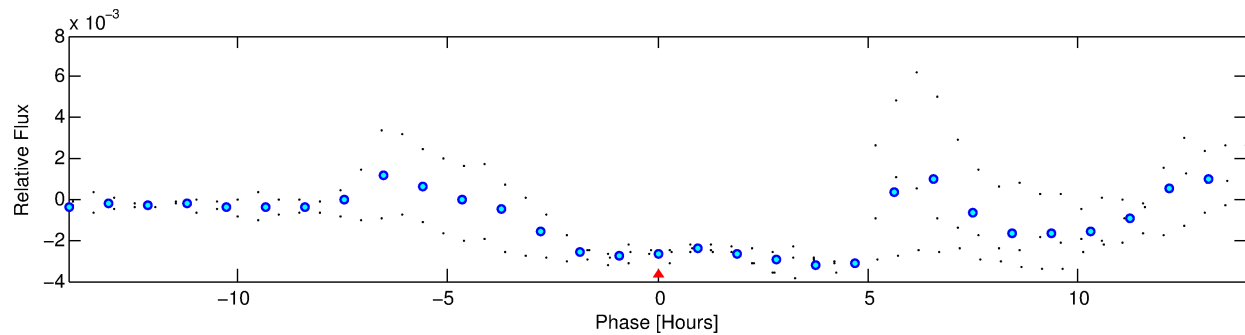
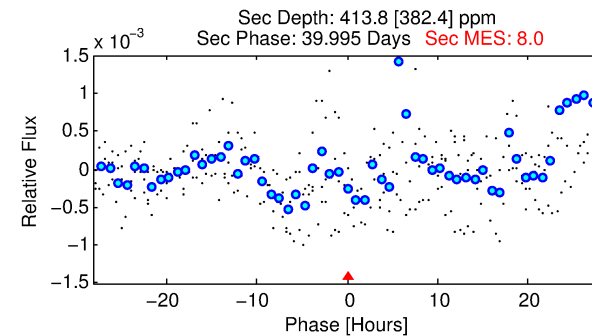
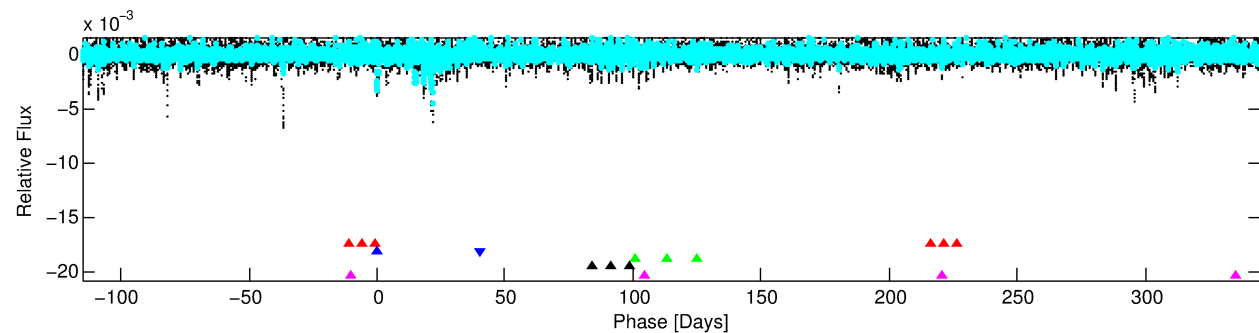
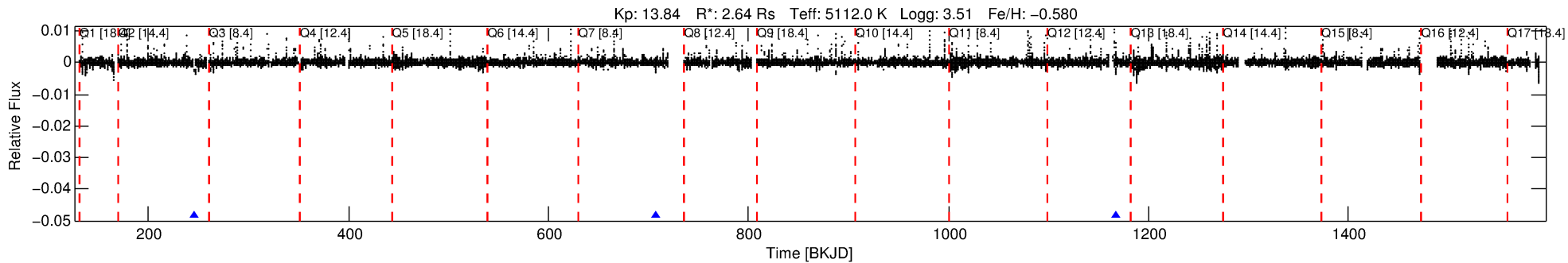
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009413885-02

No Significant Match Found

DV One-Page Summary

KIC: 9413885 Candidate: 2 of 5 Period: 460.348 d



TPS TCE Results:

Period = 460.34767 d
Epoch = 246.5962 BKJD

DV fit results are unavailable

DV Diagnostic Results:

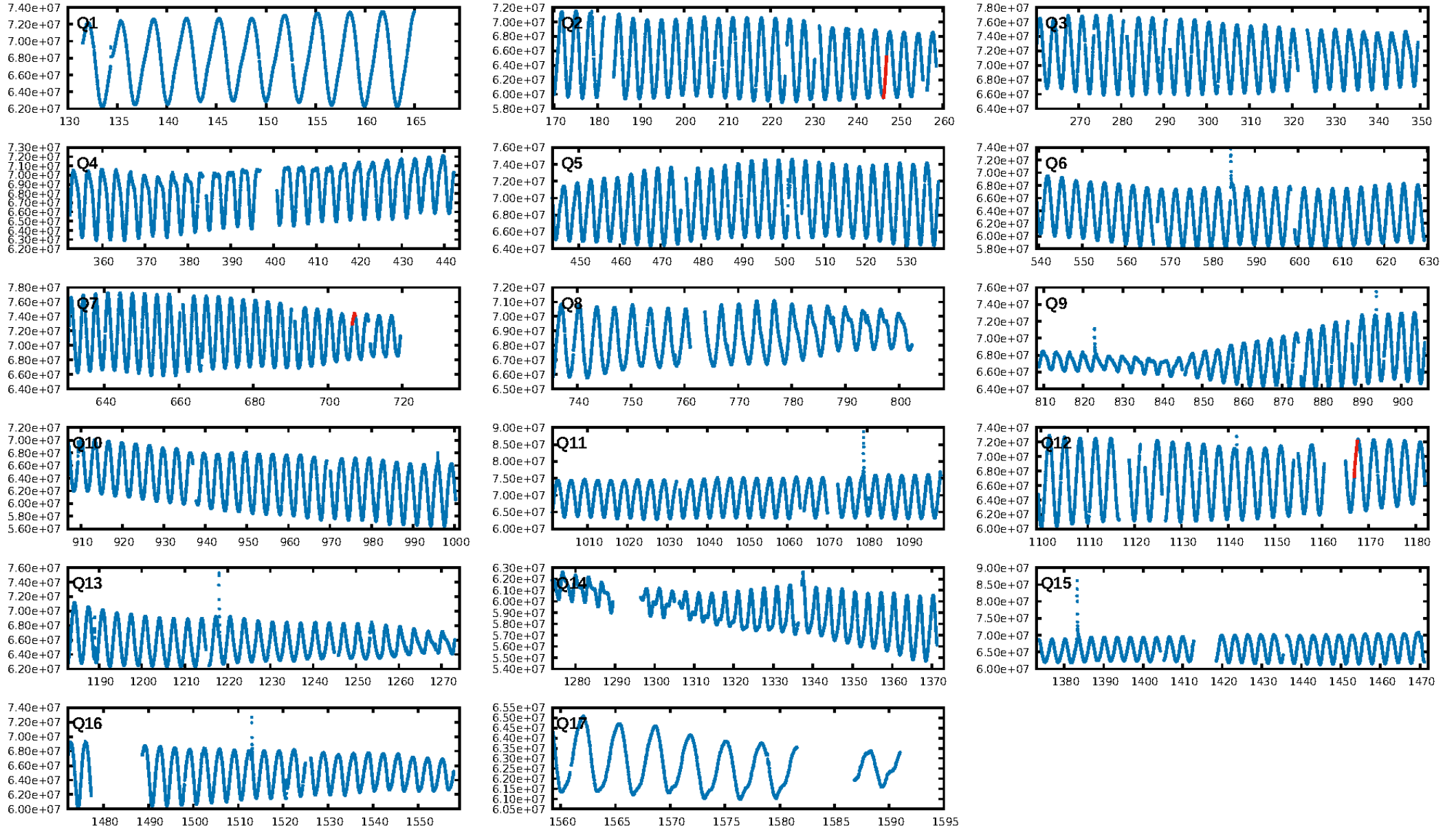
ShortPeriod-sig: 100.0% [17.54 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 47.14

Centroid-sig: 61.7%
Centroid-so: 0.257 arcsec [7.37 σ]
OotOffset-rm: 0.152 arcsec [1.97 σ]
KicOffset-rm: 0.305 arcsec [3.61 σ]
OotOffset-st: 1/1/1/0 [3]
KicOffset-st: 1/1/1/0 [3]
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DiffImageOverlap-fno: 1.00 [3/3]

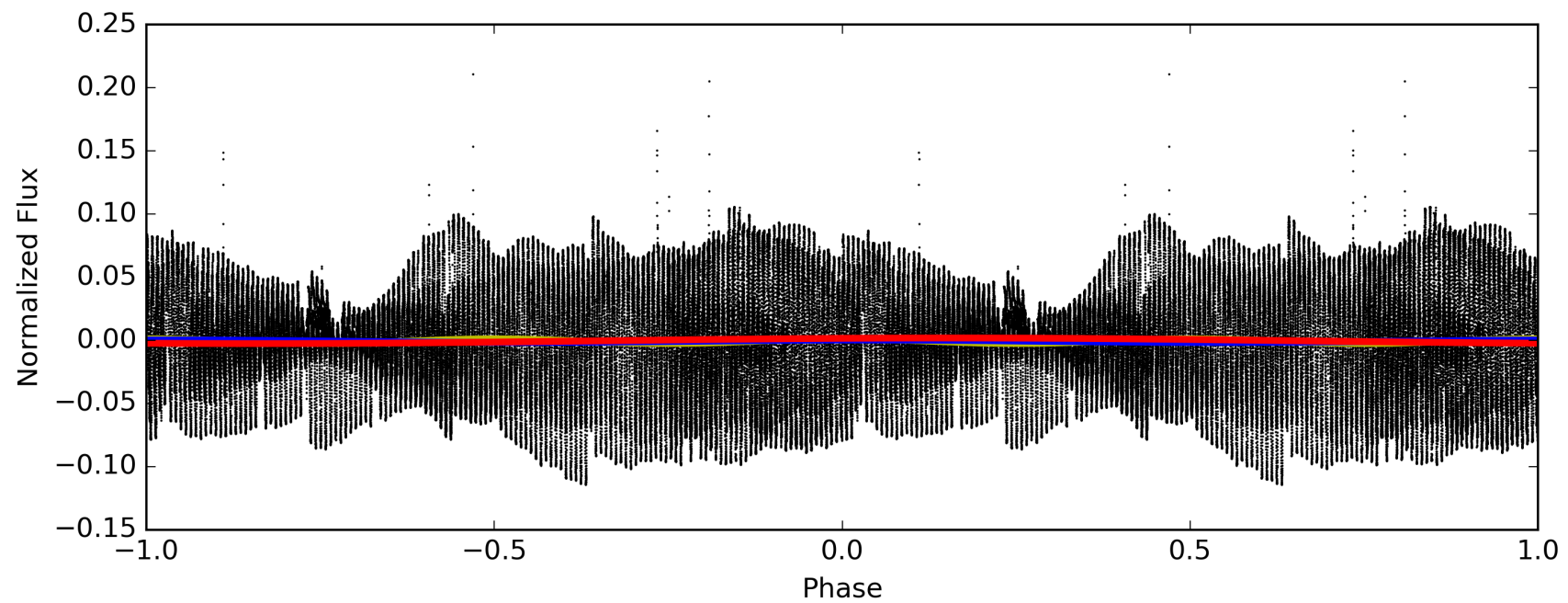
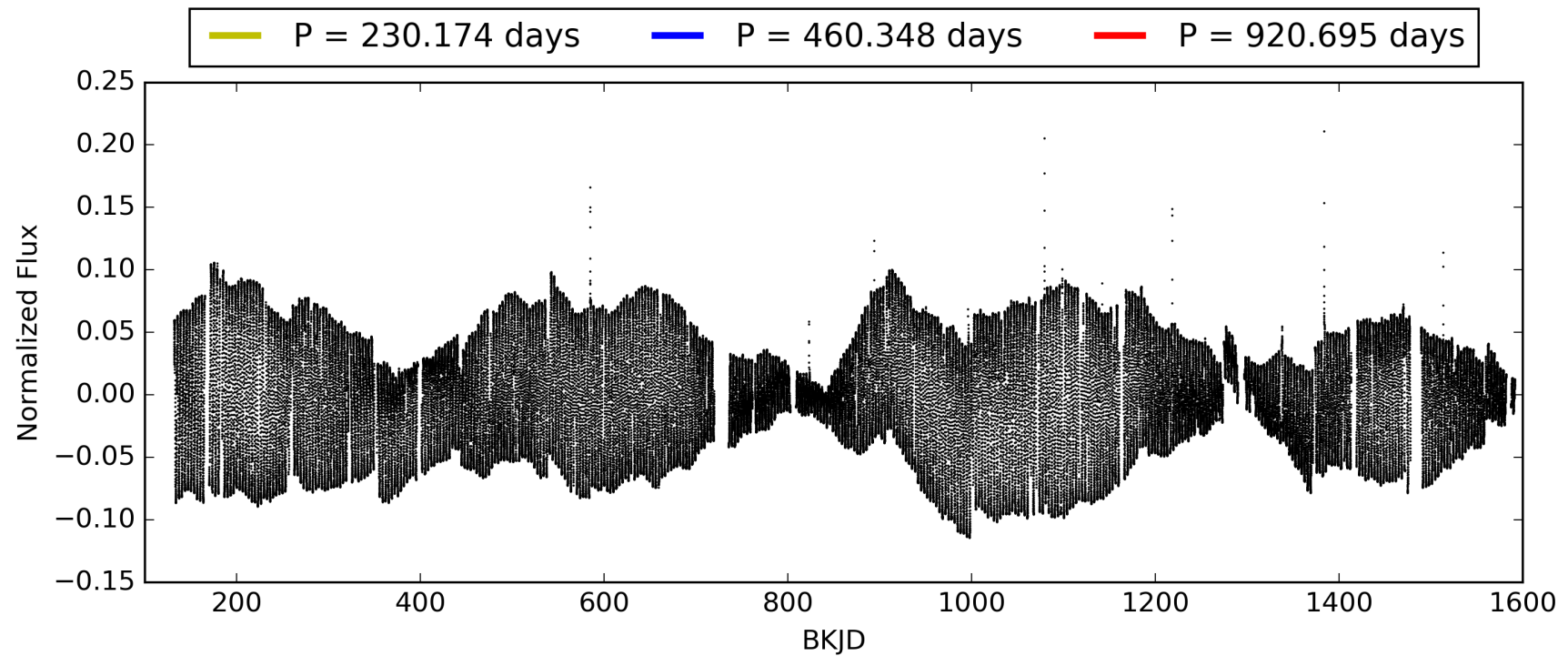
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:02:09 Z

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

TCE 009413885-02, PDC Light Curves

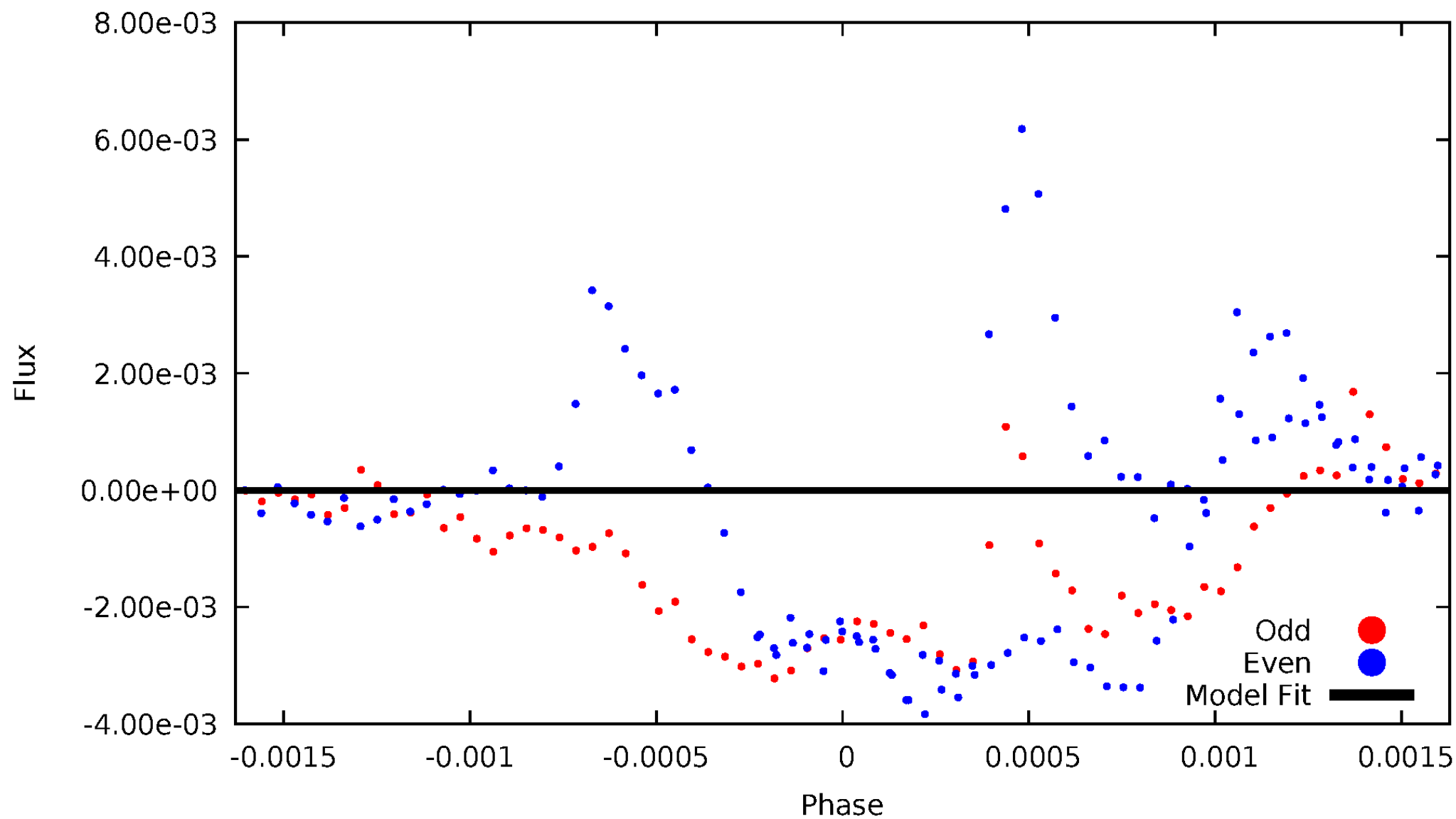


TCE 009413885-02



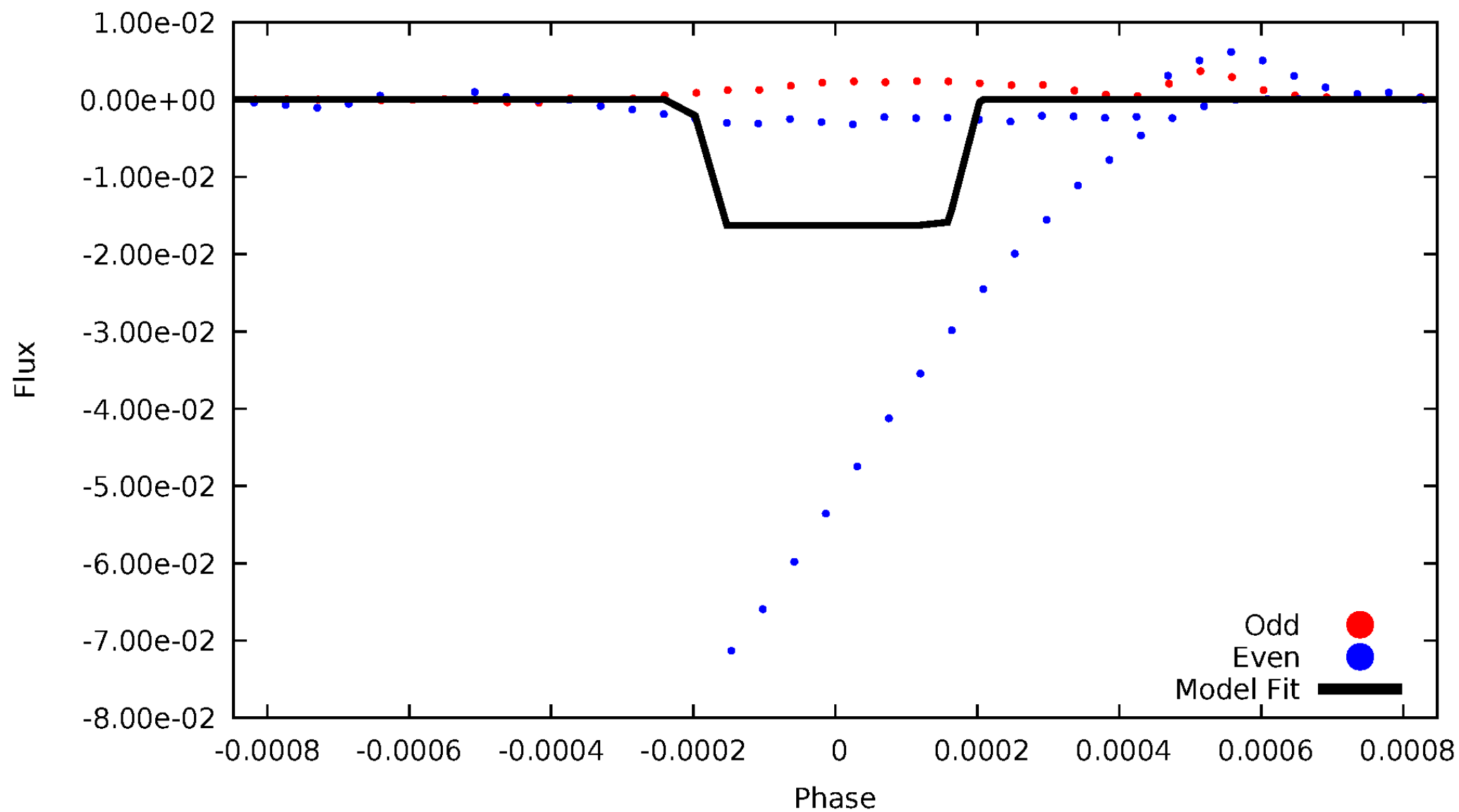
DV Odd/Even

TCE 009413885-02



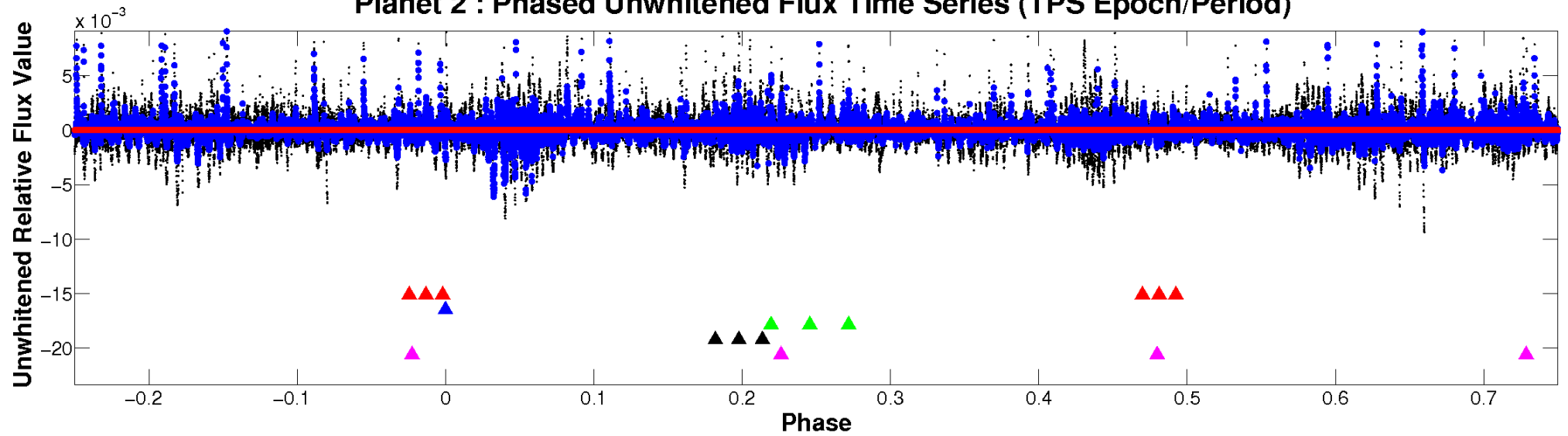
ALT Odd/Even

TCE 009413885-02



Non-Whitened Vs. Whitened Light Curve

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

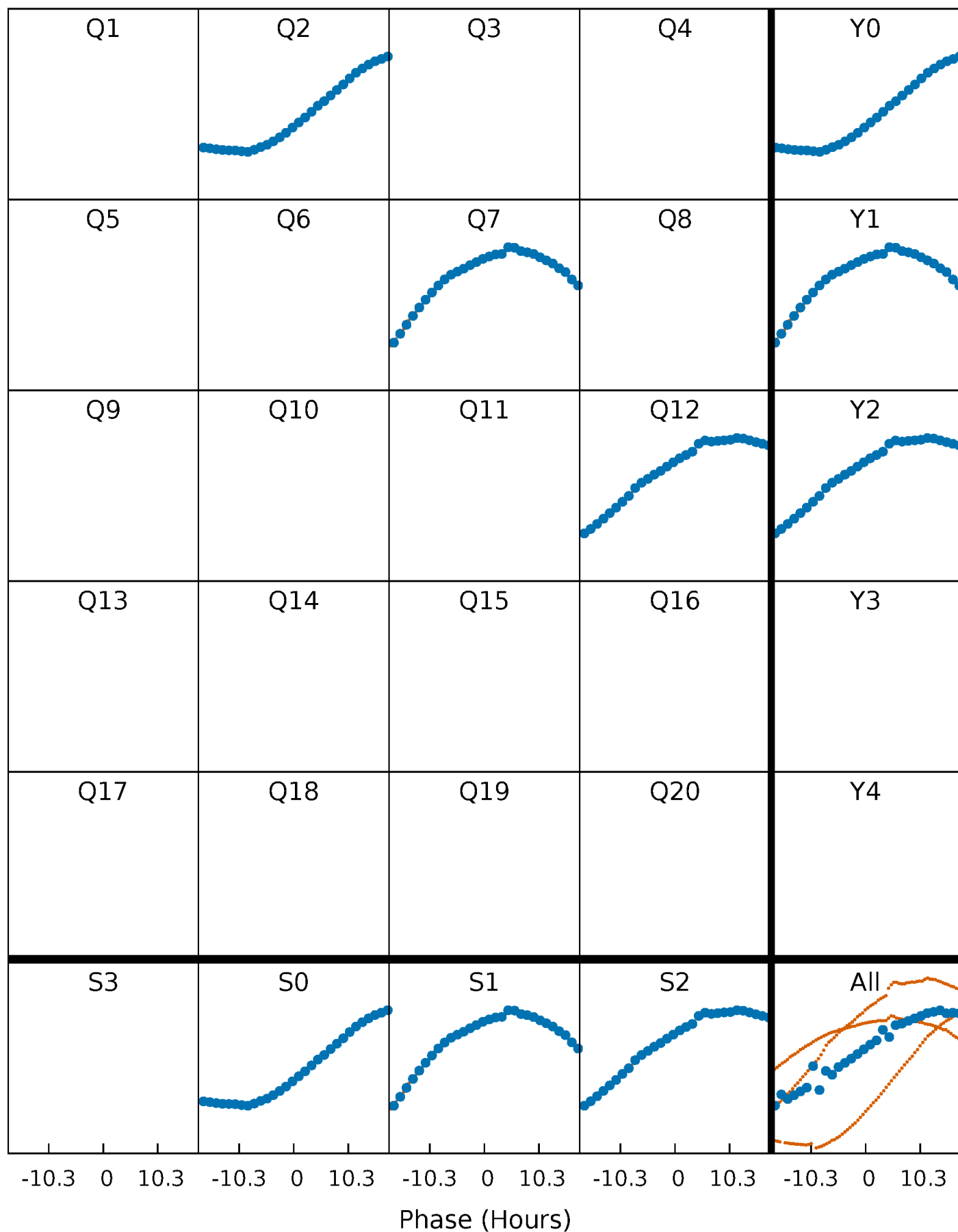


Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)



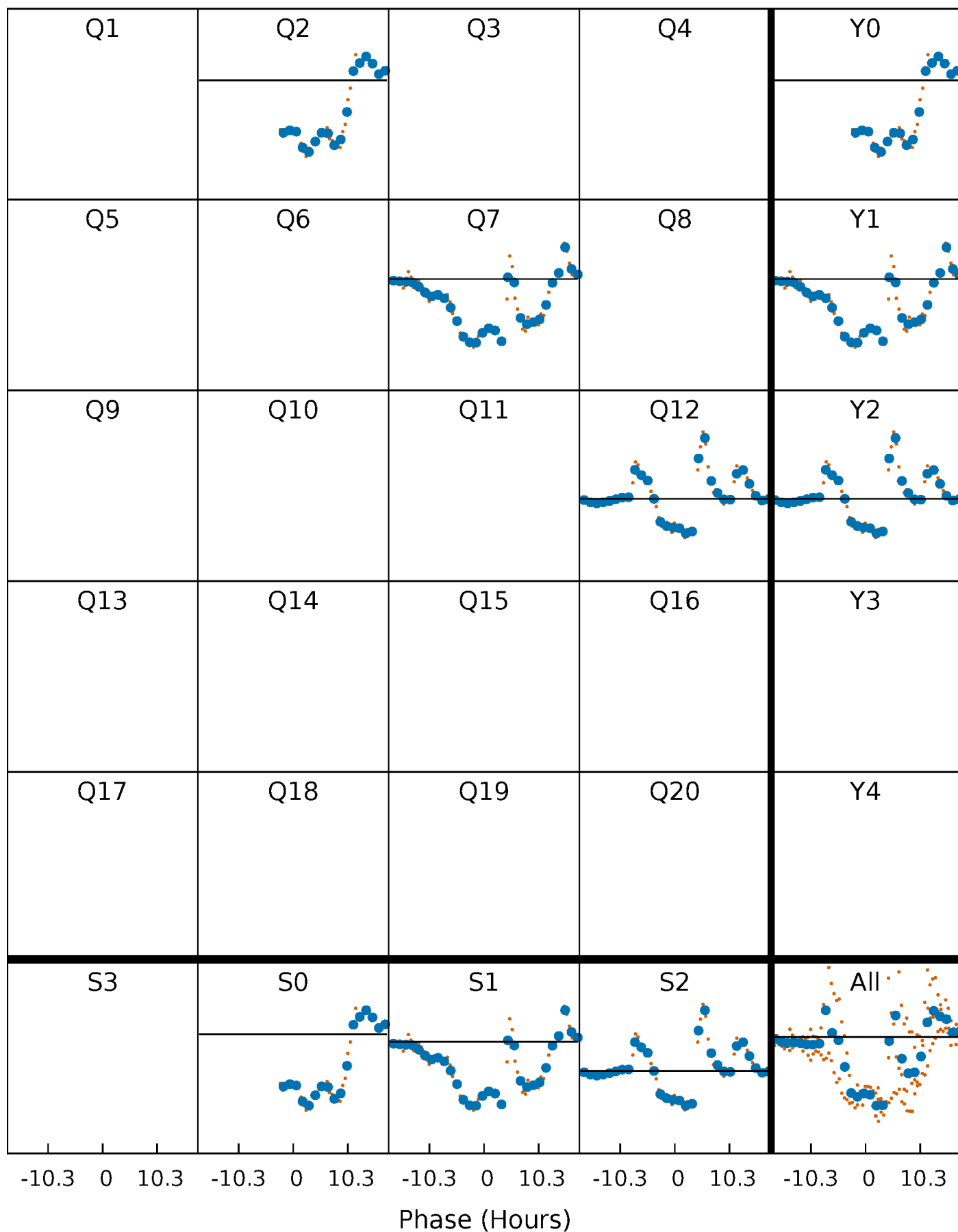
PDC Quarter-Phased Transit Curves

TCE 009413885-02 $P=460.347673$ Days $T_0=246.596209$ (BKJD)



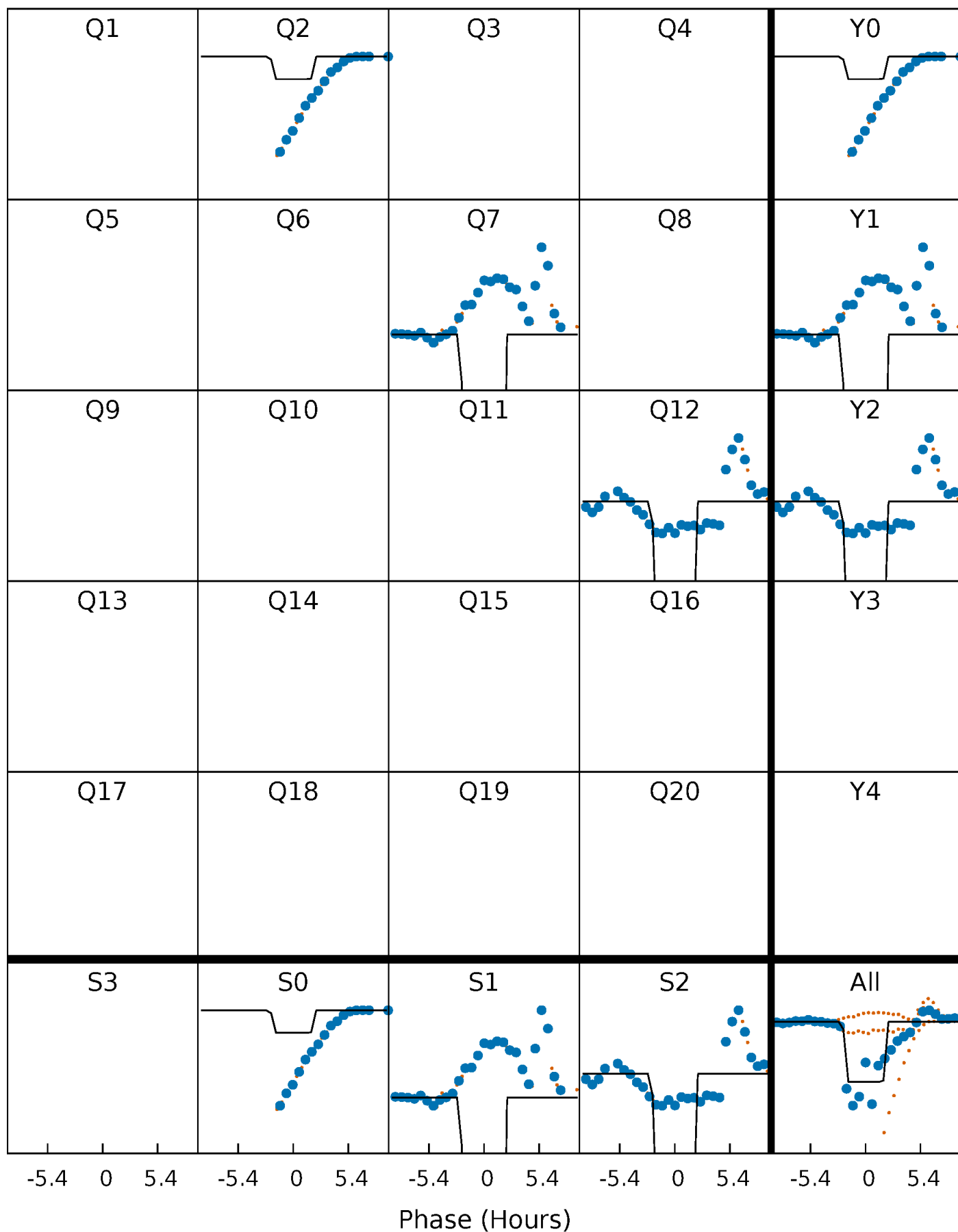
DV Quarter-Phased Transit Curves

TCE 009413885-02 $P=460.347673$ Days $T_0=246.596209$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

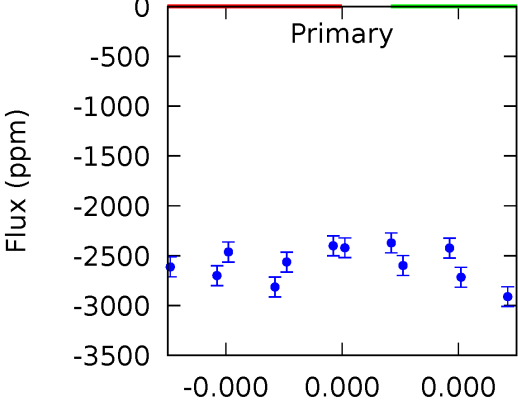
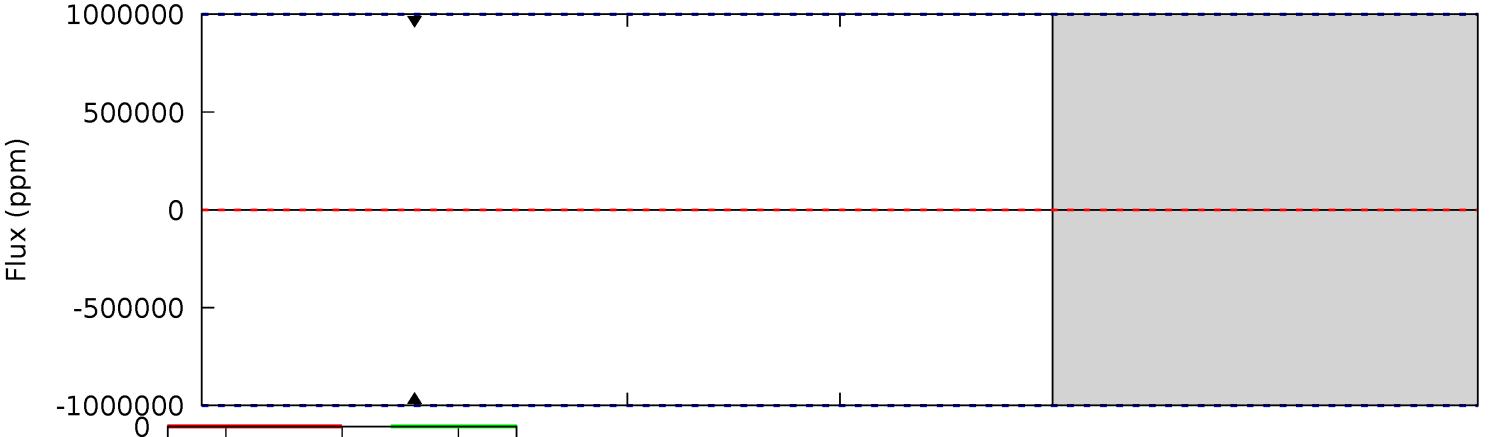
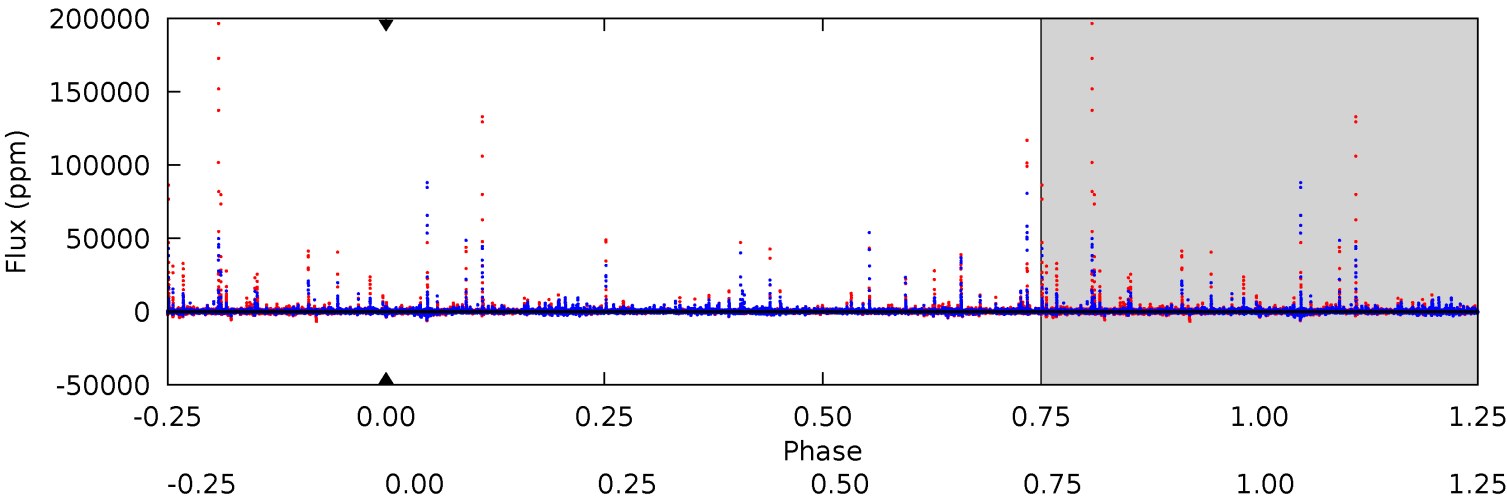
TCE 009413885-02 P=460.347673 Days $T_0=246.561351$ (BKJD)



DV Model-Shift Uniqueness Test

009413885-02, P = 460.347673 Days, E = 246.596209 Days

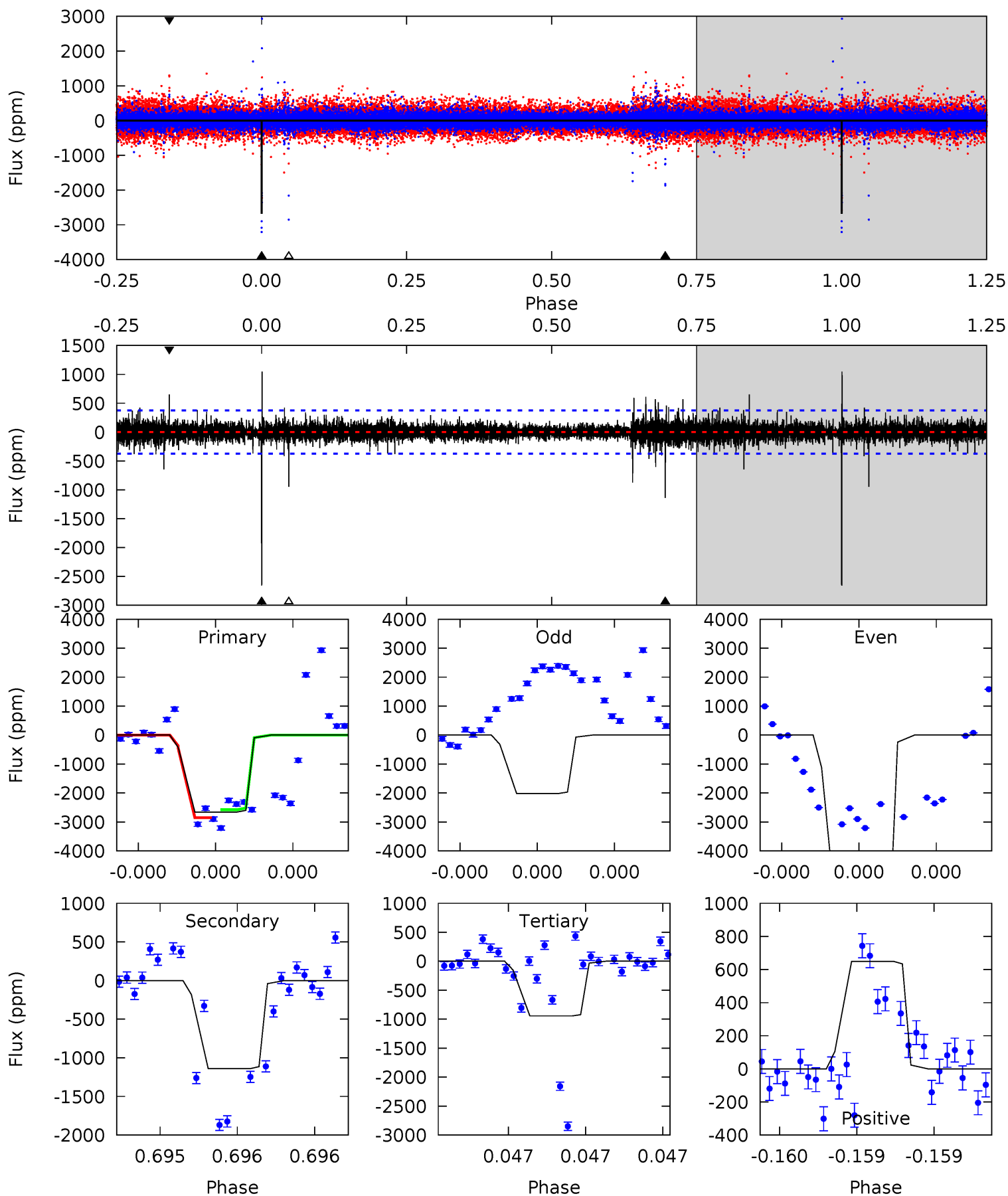
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

009413885-02, P = 460.347673 Days, E = 246.561351 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
39.9	17.1	14.2	9.74	5.61	3.54	1.12	25.7	30.2	2.93	7.37	43.4	6.32	0.28	0



Stellar Parameters For KIC 009413885

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5112^{+137}_{-122}	$3.512^{+1.072}_{-0.357}$	$-0.580^{+0.300}_{-0.250}$	$2.638^{+1.552}_{-2.070}$	$0.824^{+0.262}_{-0.175}$	$0.063^{+3.101}_{-0.048}$
	+3%/-2%	+31%/-10%	+52%/-43%	+59%/-78%	+32%/-21%	+4903%/-76%
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 009413885-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	0 ± 1000000	$19.15^{+26.25}_{-13.77}$	482^{+77}_{-99}	3851^{+12343}_{-17298}	$1932^{+402411}_{-247302}$
Alt.	-1139 ± 67	$35.27^{+34.23}_{-21.31}$	487^{+75}_{-105}	3109^{+1075}_{-414}	631^{+3292}_{-467}

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

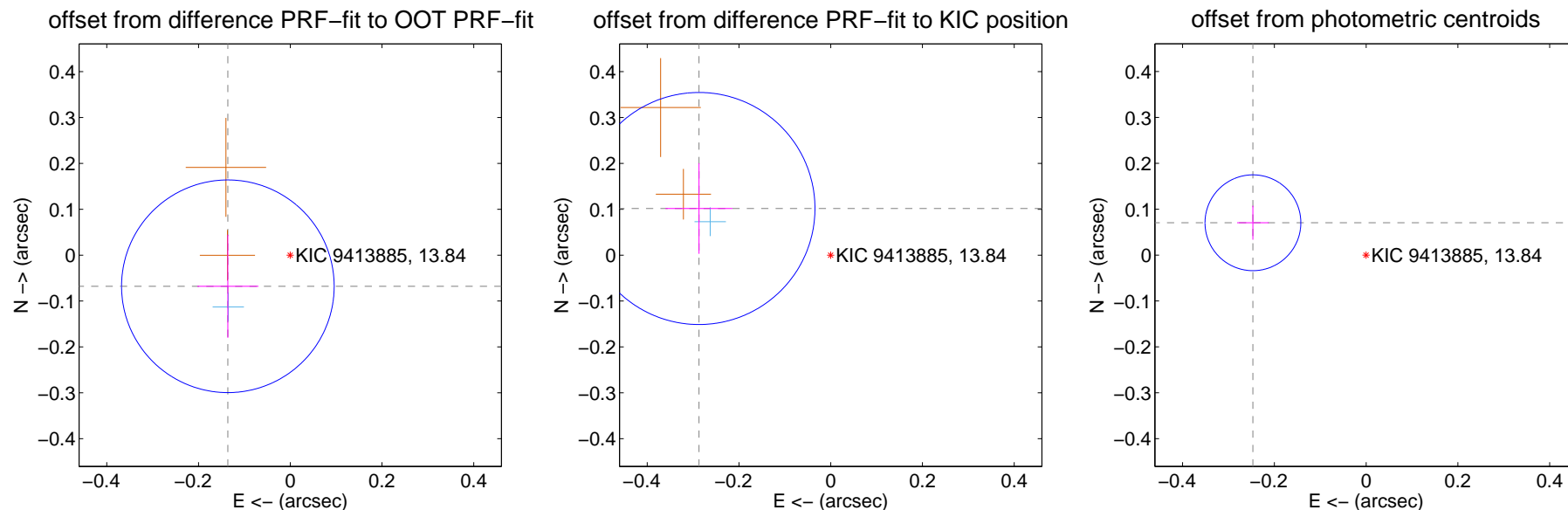
DV Centroid Data

Supplemental centroid analysis for 009413885-02. Kepler magnitude: 13.84. Transit SNR -1.00

There are 1 quarters with good PRF difference image offsets

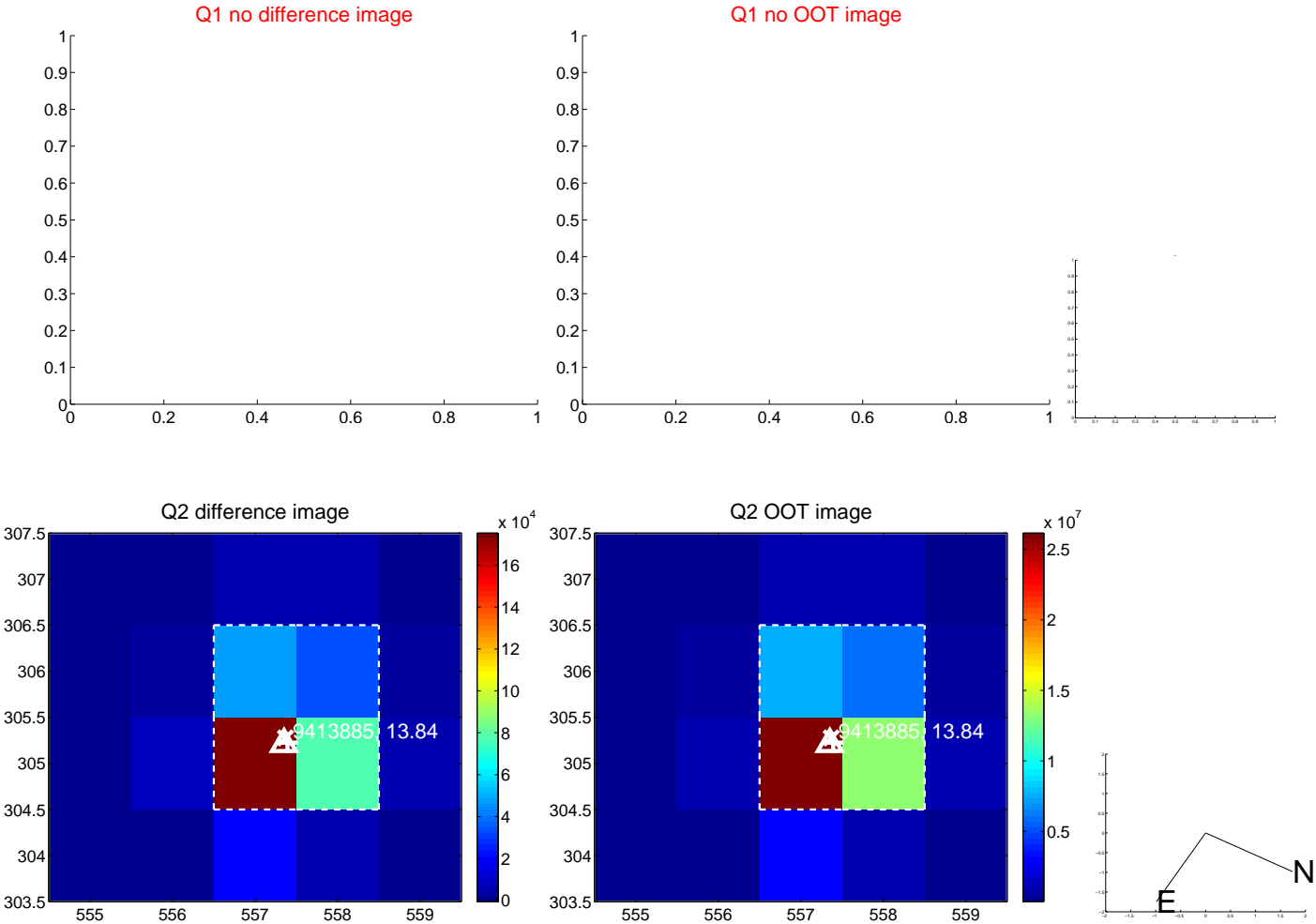
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.152 ± 0.077	1.97	0.136 ± 0.067	-0.068 ± 0.112
PRF-fit source offset from KIC position	0.305 ± 0.084	3.61	0.287 ± 0.073	0.102 ± 0.099
photometric centroid source offset	0.26 ± 0.03	7.37	0.25 ± 0.03	0.07 ± 0.04

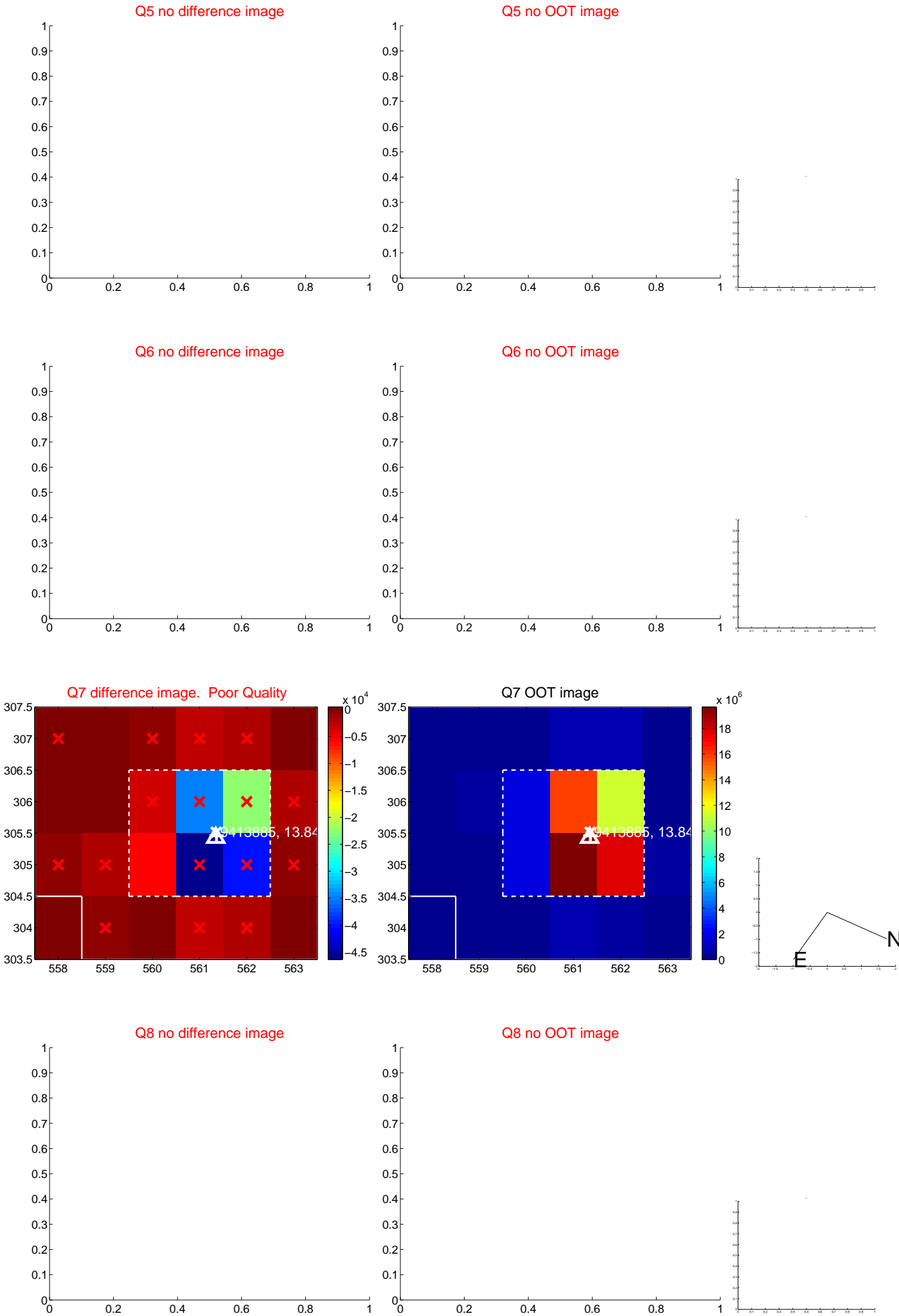


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

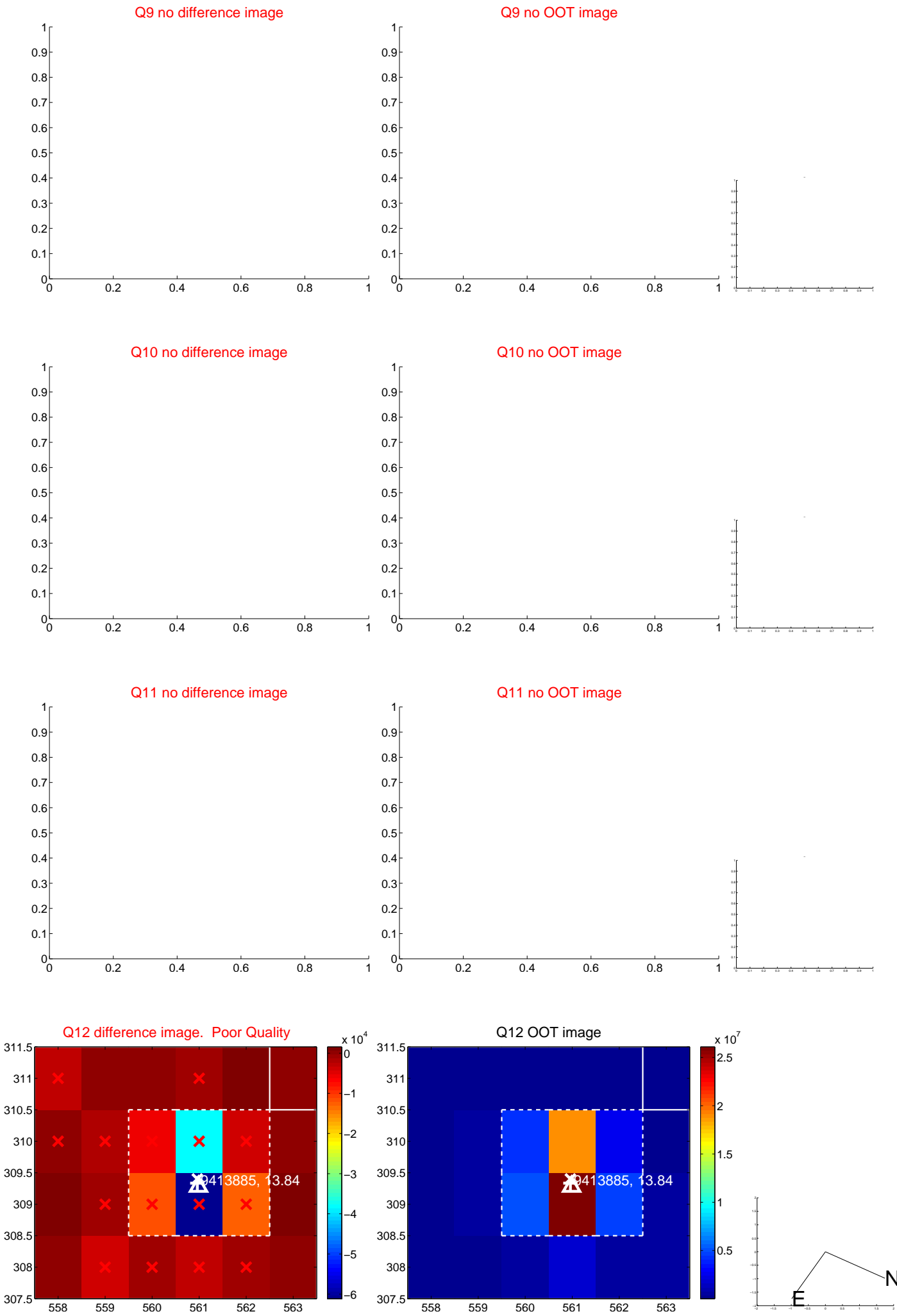
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



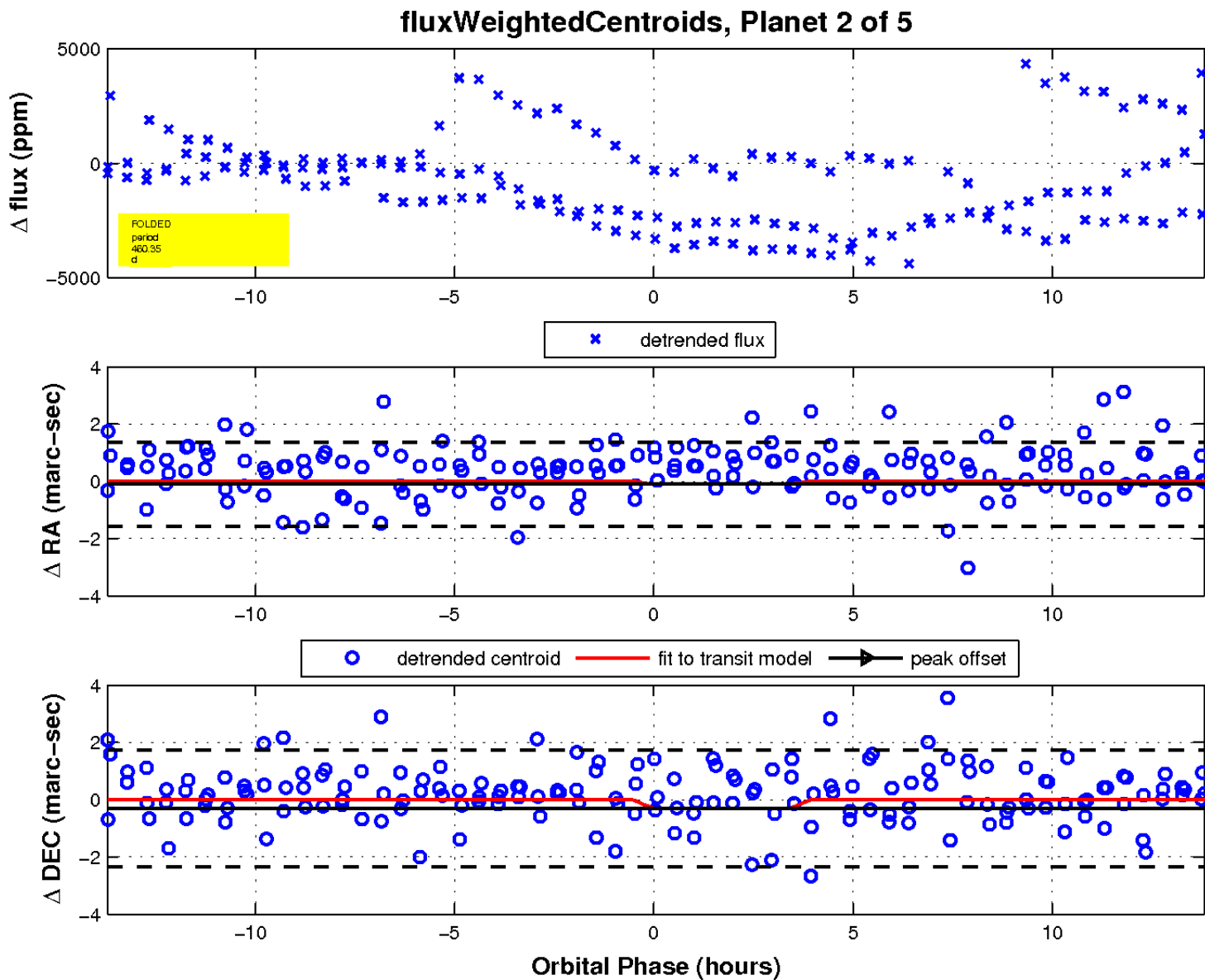
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

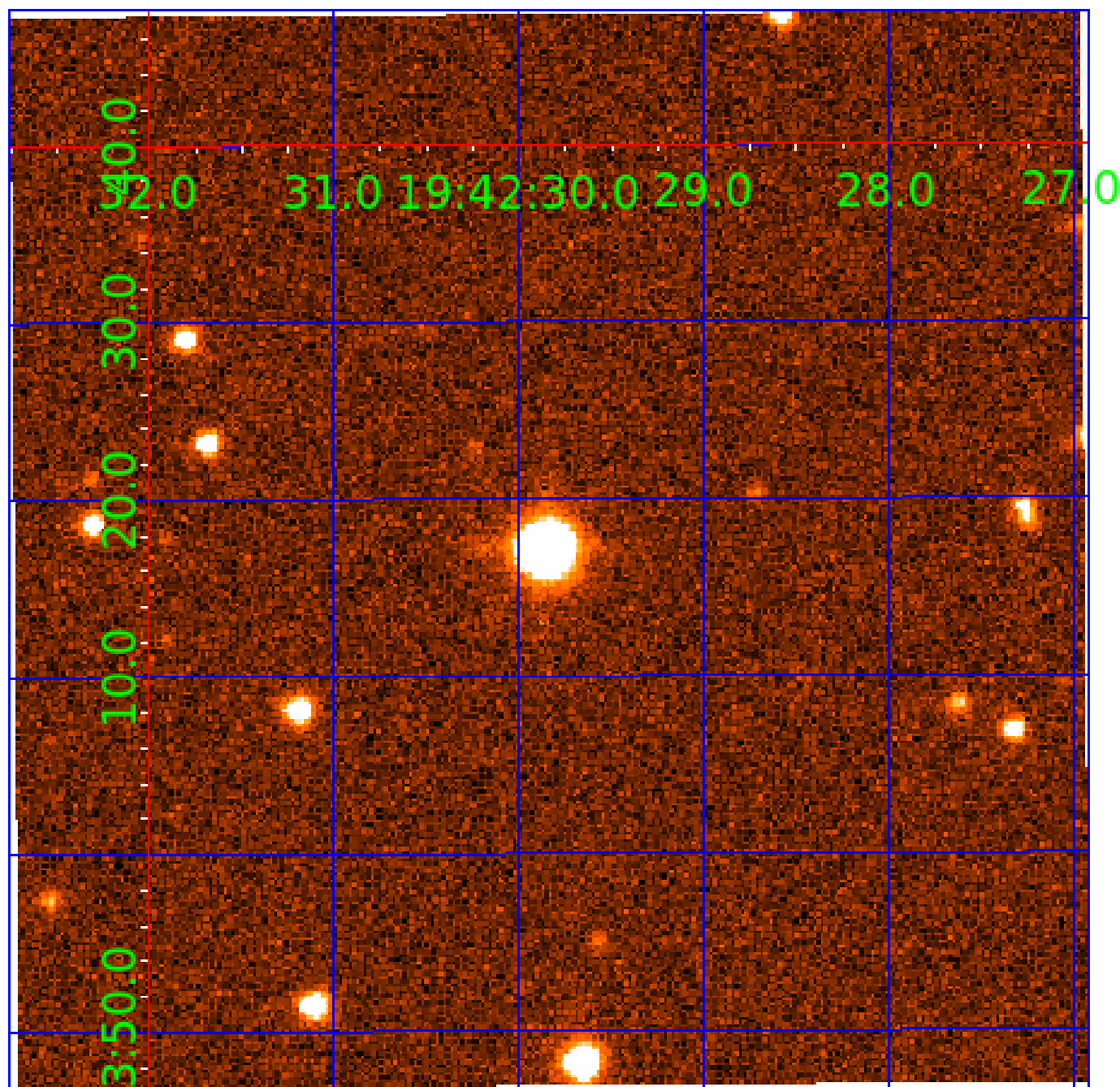


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009413885

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})
009413885-01	OBS	No	227.575207	245.729629	1908.2	11.801	18.8	9.3	2.64	5112	11.36	9.09
009413885-02	OBS	No	460.347673	246.596209	870.0	9.000	19.1	-1.0	2.64	5112	7.63	3.55
009413885-03	OBS	No	448.303163	371.736059	1816.5	3.274	19.2	8.9	2.64	5112	11.28	3.68
009413885-04	OBS	No	453.052901	344.956509	1160.5	4.310	16.5	5.6	2.64	5112	9.81	3.63
009413885-05	OBS	No	345.810758	350.752876	628.4	5.000	13.1	-1.0	2.64	5112	6.48	5.20

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009413885-01	OBS	FP	0.00	1	0	1	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS—HALO_GHOST
009413885-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS
009413885-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009413885-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009413885-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

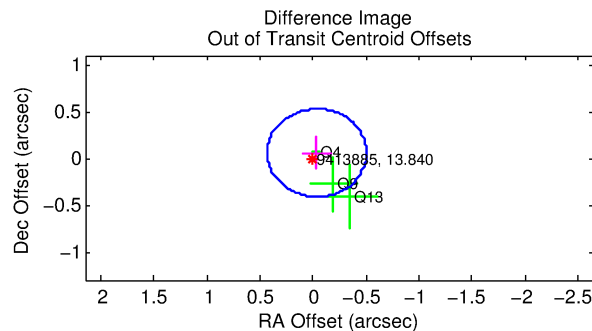
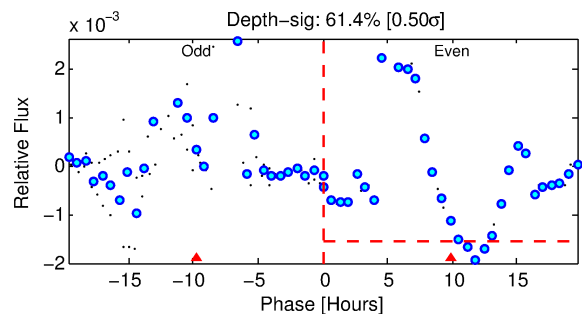
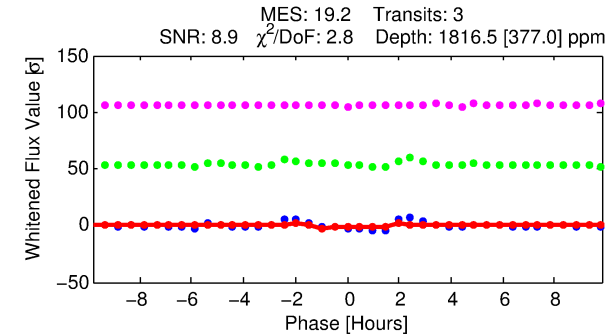
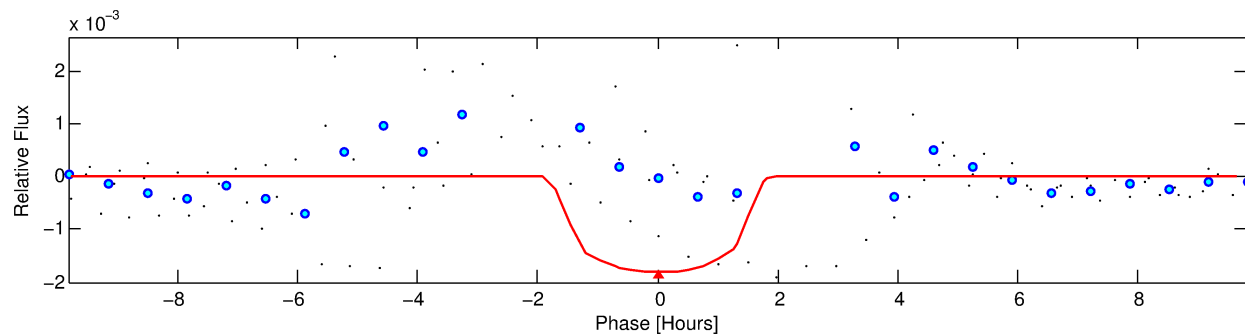
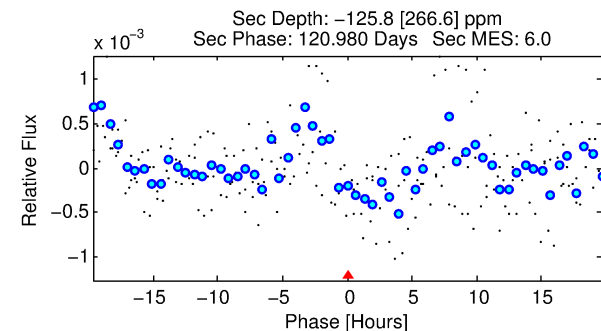
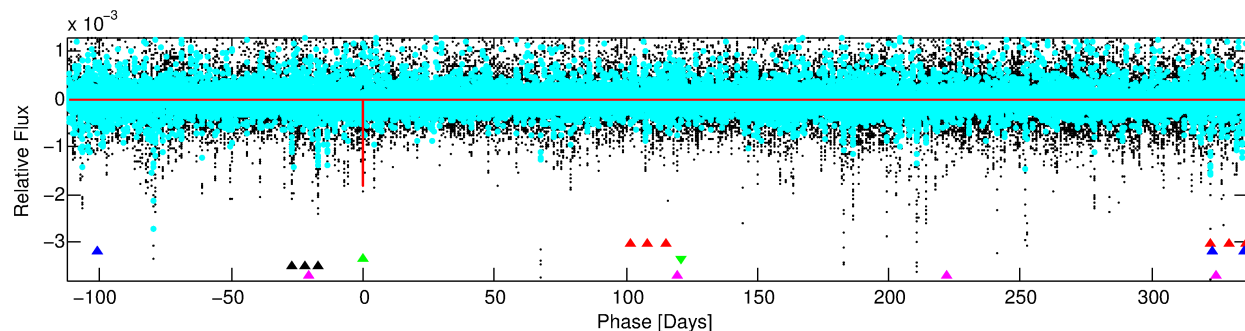
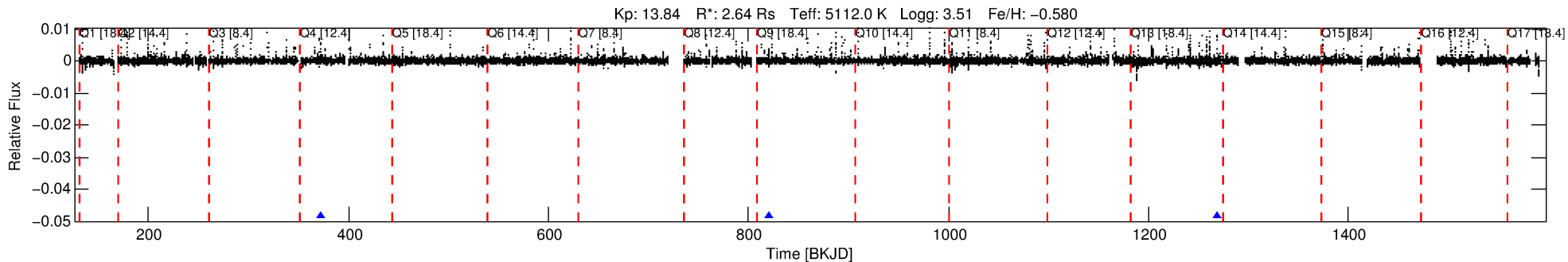
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009413885-03

No Significant Match Found

DV One-Page Summary

KIC: 9413885 Candidate: 3 of 5 Period: 448.303 d



DV Fit Results:

Period = 448.30316 [0.00680] d
Epoch = 371.7361 [0.0069] BKJD
Rp/R* = 0.0392 [0.0641]
a/R* = 998.43 [6285.23]
b = 0.41 [12.89]
Seff = 3.68 [6.37]
Teff = 353 [153] K
Rp = 11.28 [20.47] Re
a = 1.0755 [1.0486] AU
Ag = N/A
Teffp = N/A

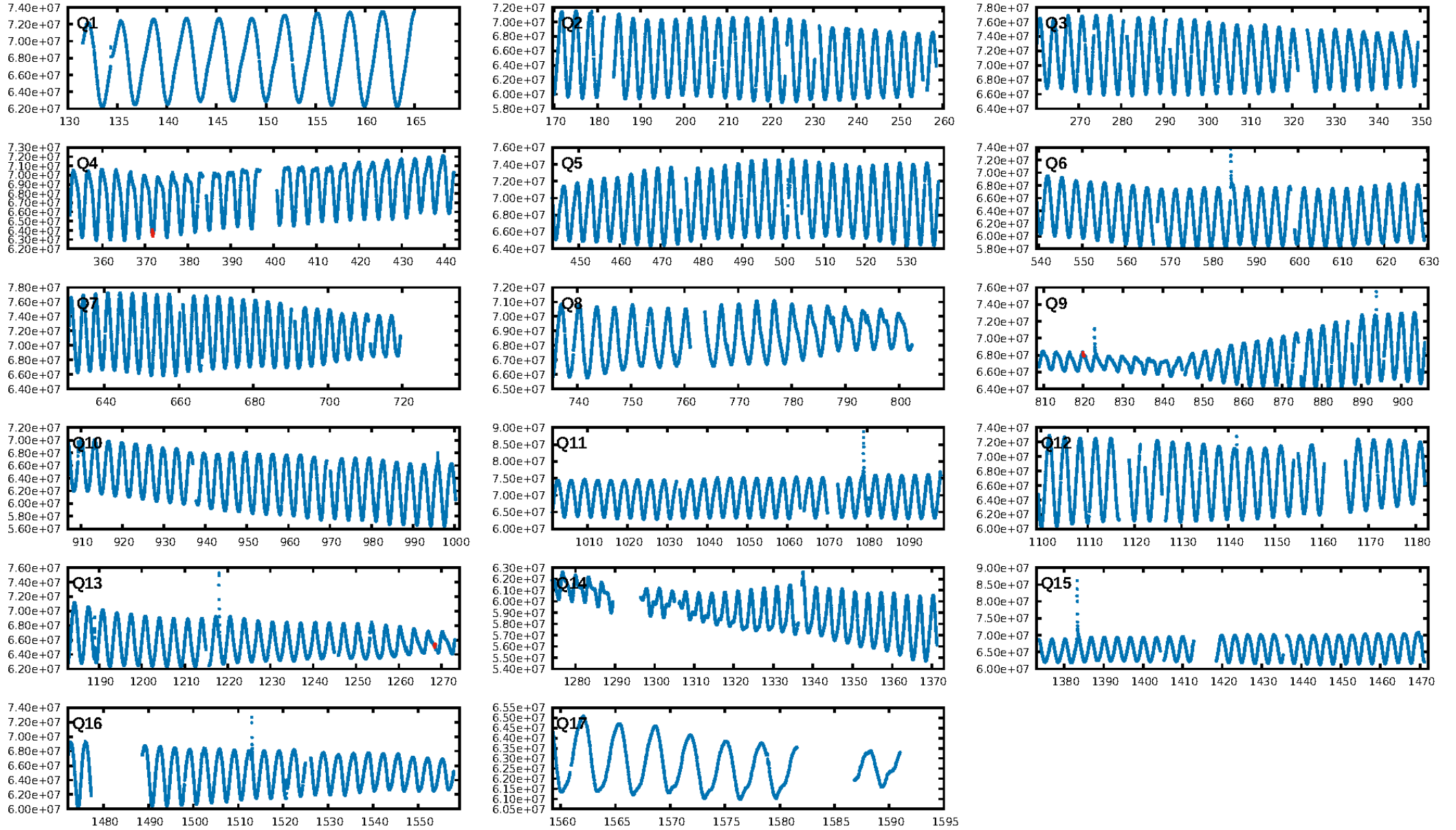
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [411.58σ]
LongPeriod-sig: 100.0% [21.06σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 2.3%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 4.249
Centroid-sig: 67.1%
Centroid-so: 0.038 arcsec [0.10σ]
OotOffset-rm: 0.067 arcsec [0.43σ]
KicOffset-rm: 0.288 arcsec [1.89σ]
OotOffset-st: 0/0/1/2 [3]
KicOffset-st: 0/0/1/2 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

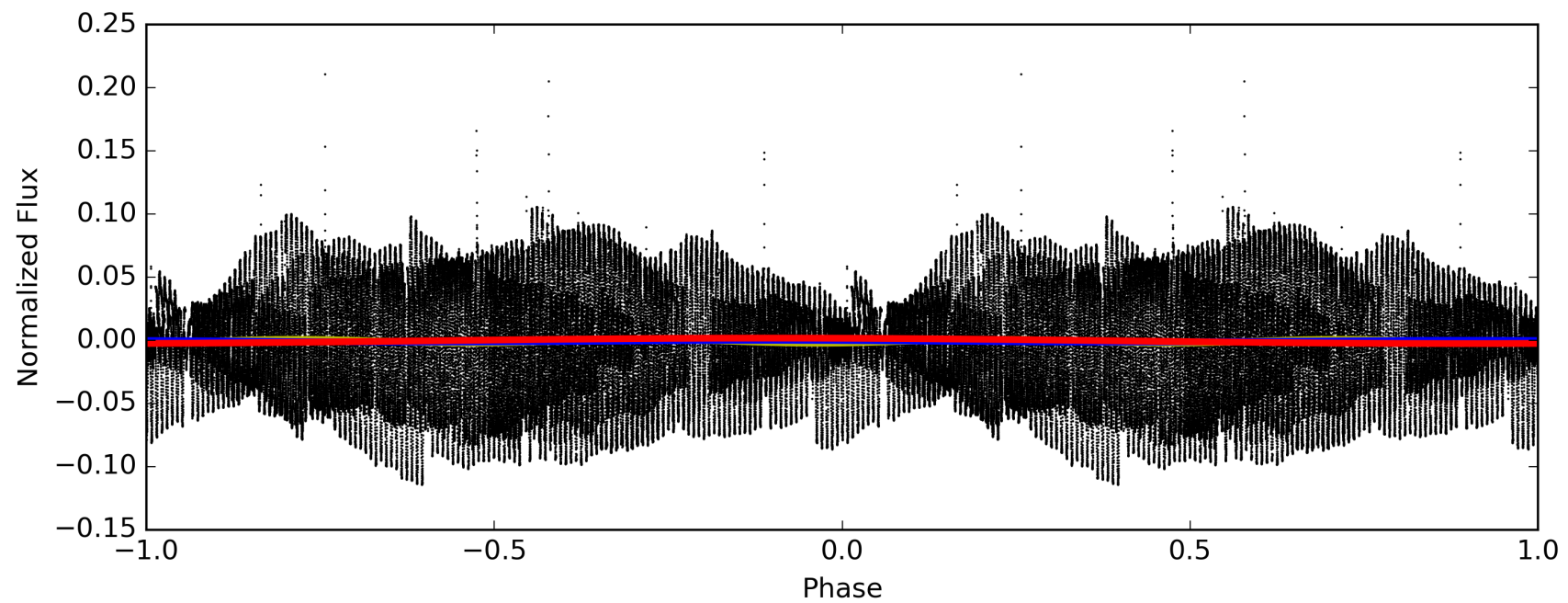
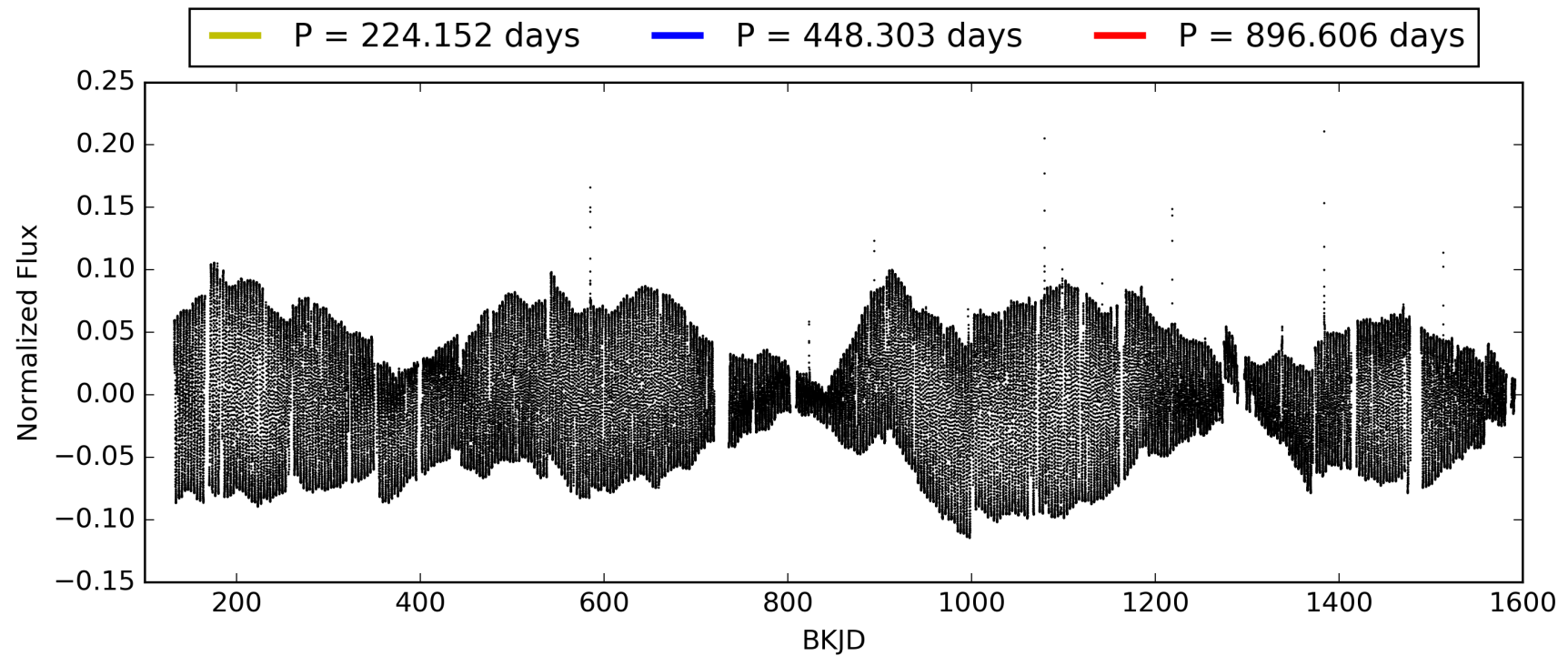
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:02:27 Z

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

TCE 009413885-03, PDC Light Curves

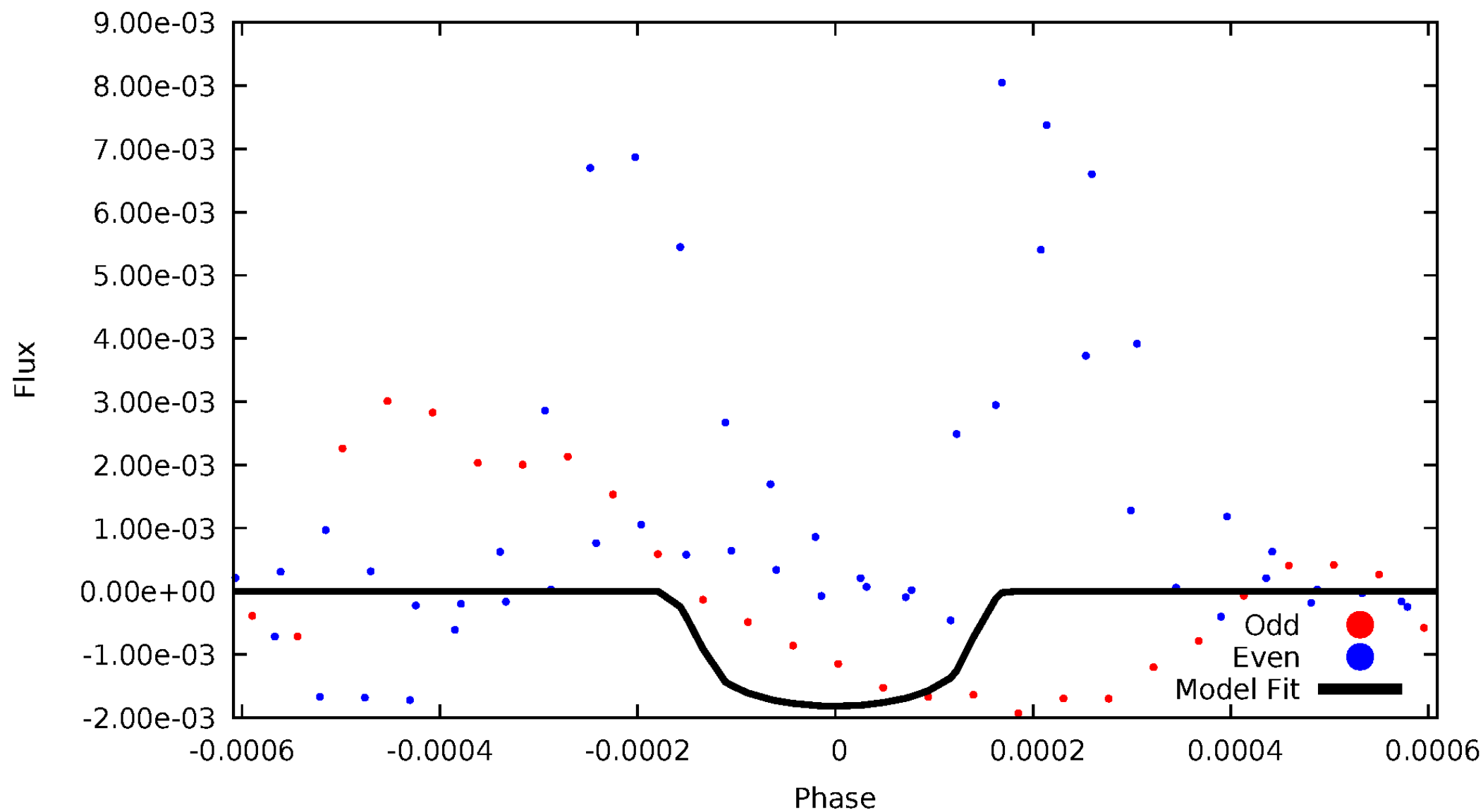


TCE 009413885-03



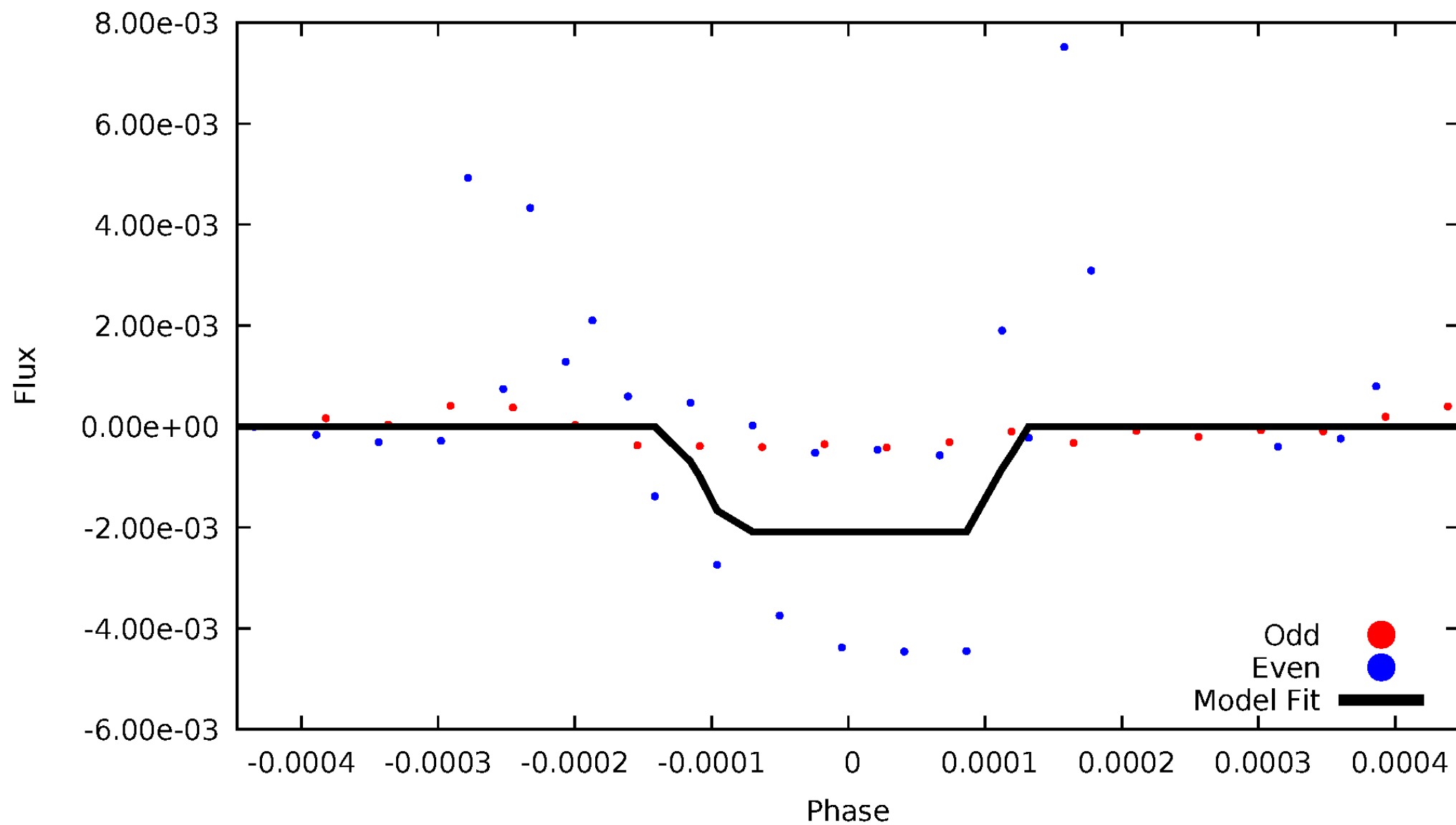
DV Odd/Even

TCE 009413885-03



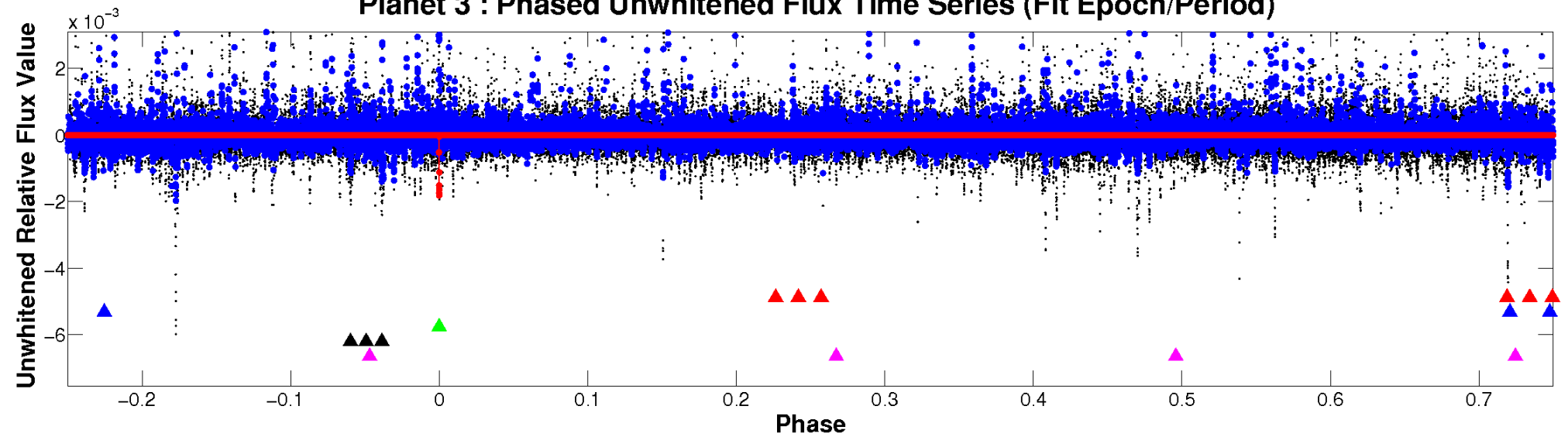
ALT Odd/Even

TCE 009413885-03

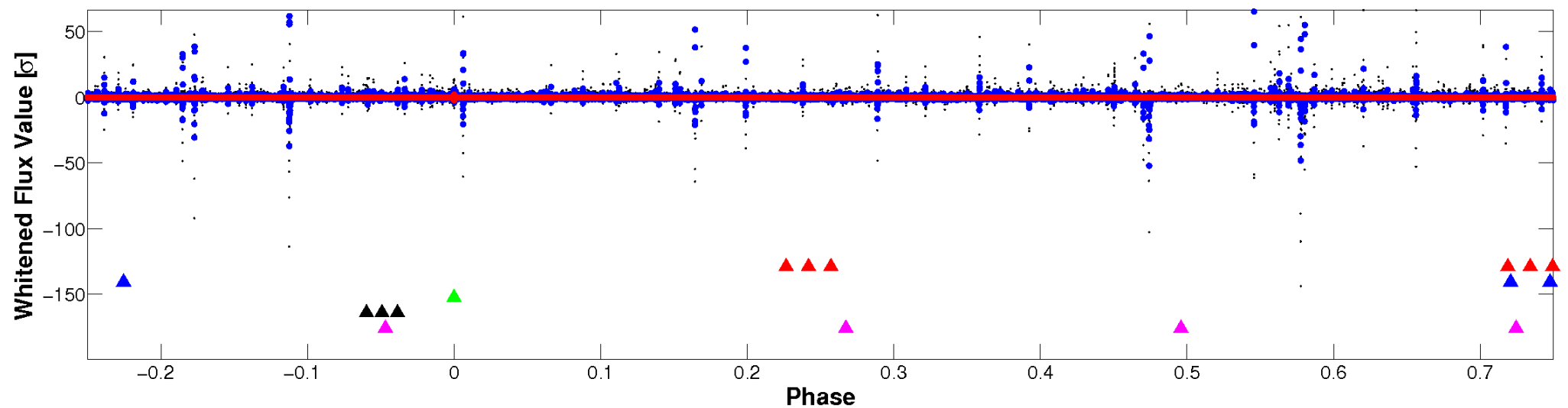


Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

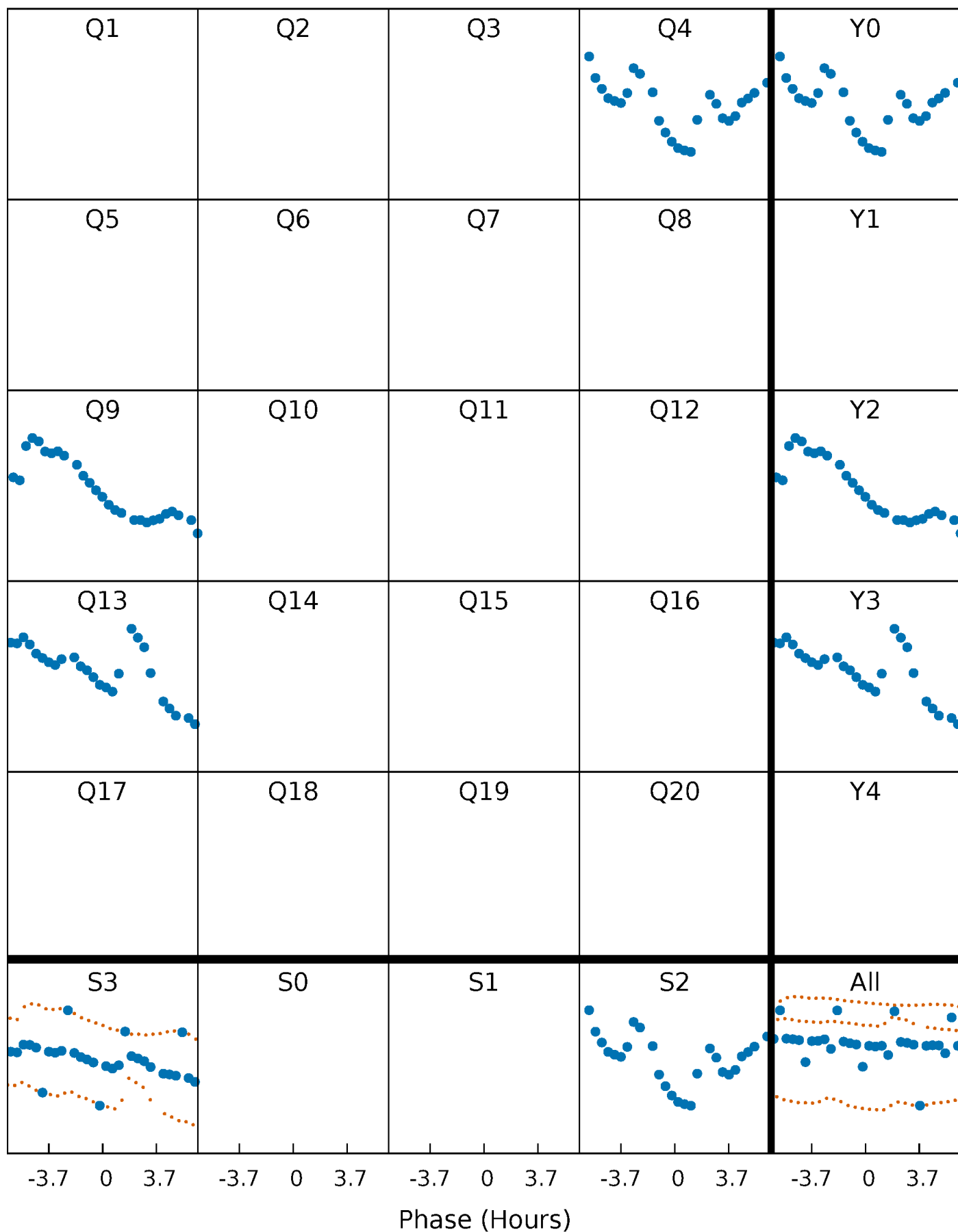


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



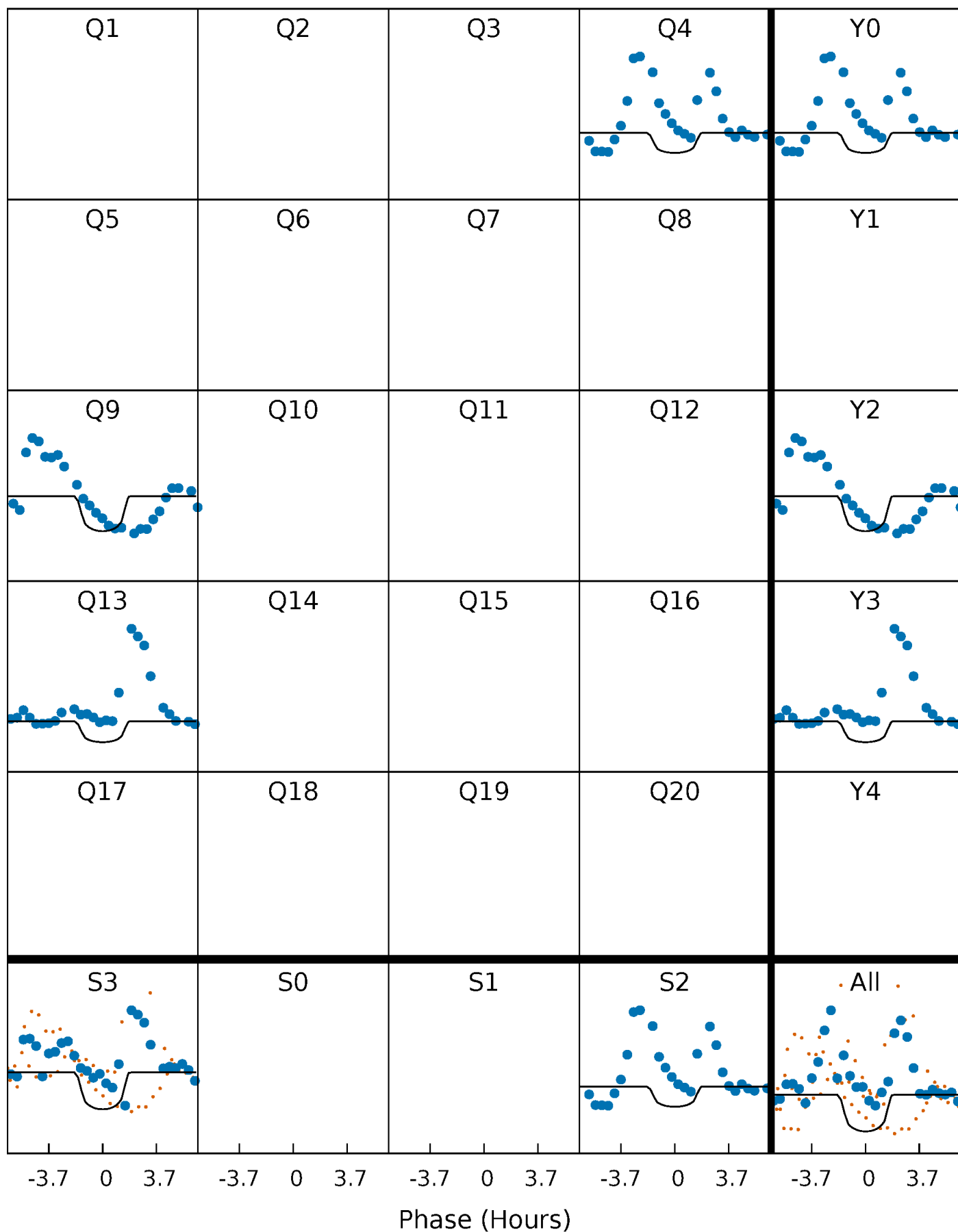
PDC Quarter-Phased Transit Curves

TCE 009413885-03 P=448.303163 Days $T_0=371.736060$ (BKJD)



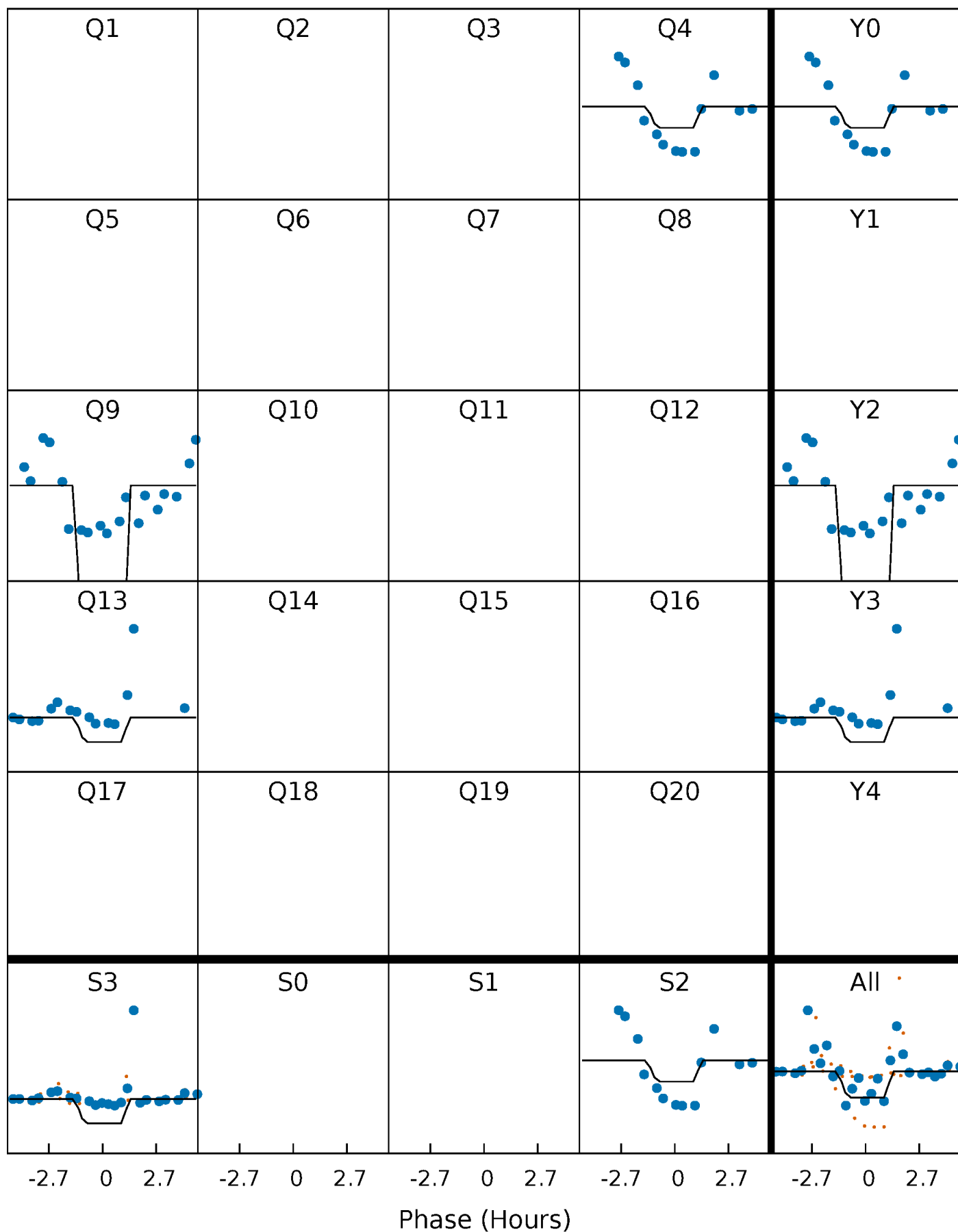
DV Quarter-Phased Transit Curves

TCE 009413885-03 P=448.303163 Days $T_0=371.736060$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

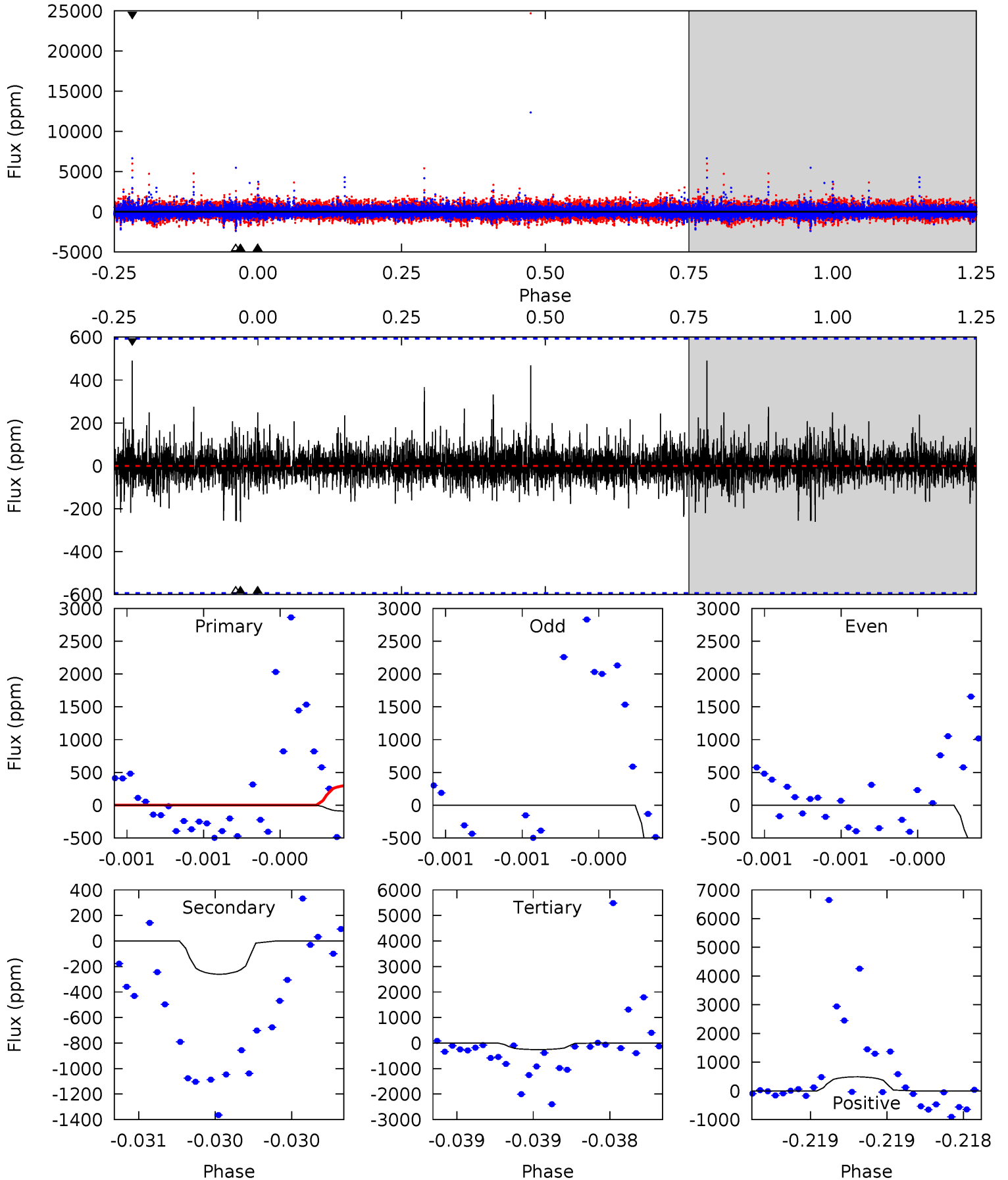
TCE 009413885-03 P=448.298684 Days $T_0=371.749642$ (BKJD)



DV Model-Shift Uniqueness Test

009413885-03, P = 448.303163 Days, E = 371.736060 Days

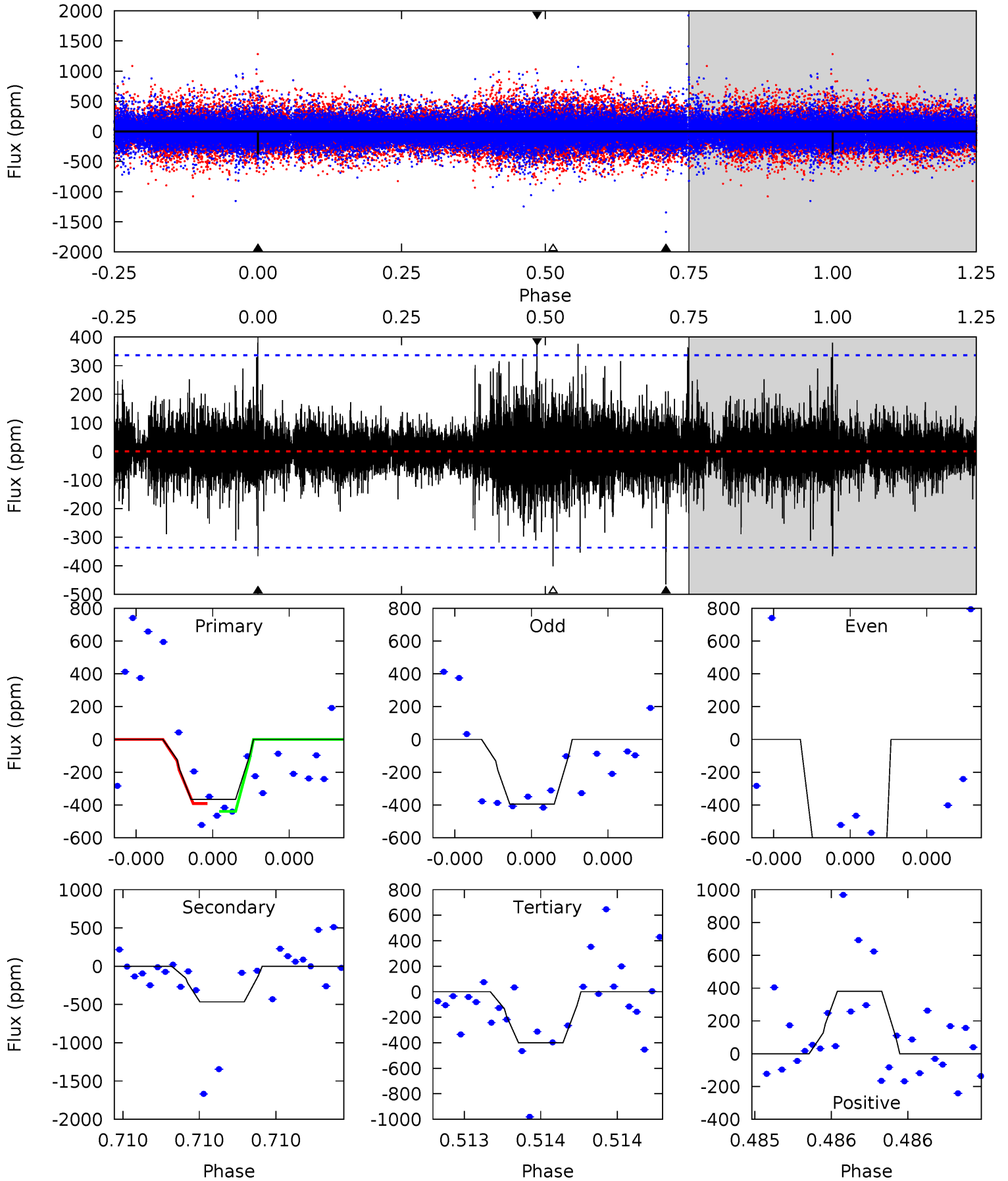
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.90	2.48	2.43	4.66	5.64	3.58	0.50	-1.53	-3.76	0.05	-2.18	1.12	0.22	0.65	1.02



Alt Model-Shift Uniqueness Test

009413885-03, P = 448.298684 Days, E = 371.749642 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.20	7.88	6.79	6.44	5.69	3.66	1.01	-0.59	-0.24	1.09	1.43	13.9	3.96	0.45	0



Stellar Parameters For KIC 009413885

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5112^{+137}_{-122}	$3.512^{+1.072}_{-0.357}$	$-0.580^{+0.300}_{-0.250}$	$2.638^{+1.552}_{-2.070}$	$0.824^{+0.262}_{-0.175}$	$0.063^{+3.101}_{-0.048}$
	+3%/-2%	+31%/-10%	+52%/-43%	+59%/-78%	+32%/-21%	+4903%/-76%
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 009413885-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-261 ± 105	$14.57^{+19.69}_{-9.79}$	483^{+80}_{-102}	3198^{+1353}_{-606}	748^{+6260}_{-628}
Alt.	-465 ± 59	$18.34^{+18.62}_{-12.84}$	489^{+75}_{-108}	3361^{+1635}_{-534}	935^{+9041}_{-715}

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 $A_{obs} \gg 1.0$

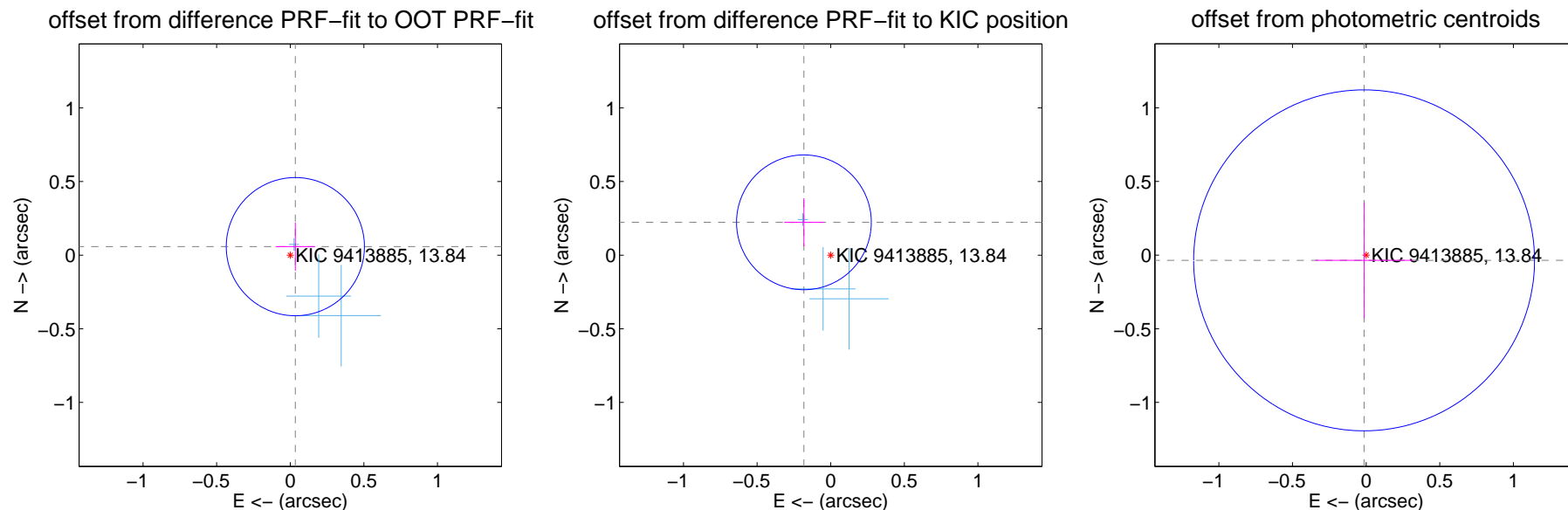
DV Centroid Data

Supplemental centroid analysis for 009413885-03. Kepler magnitude: 13.84. Transit SNR 8.92

There are 3 quarters with good PRF difference image offsets

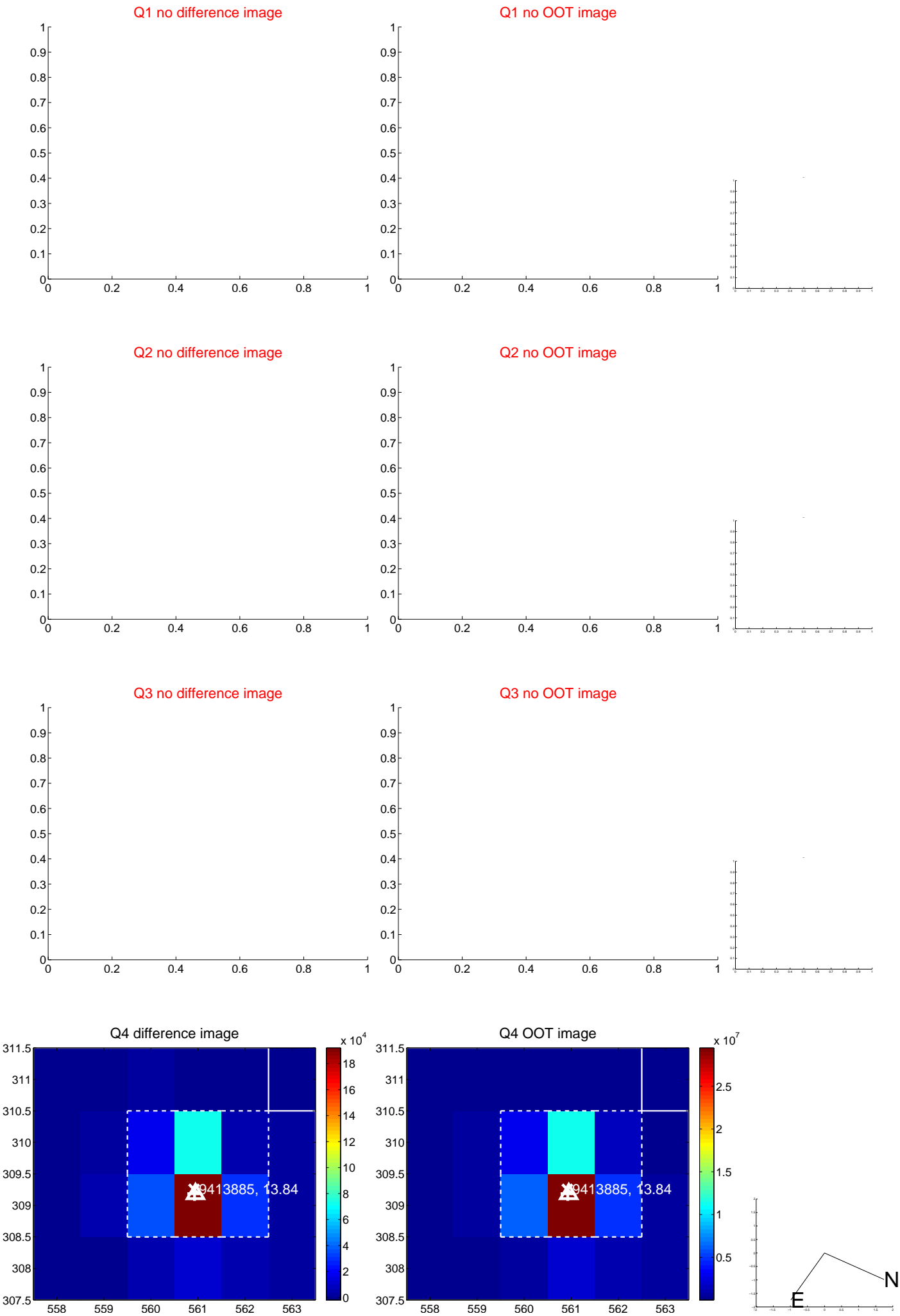
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.067 ± 0.156	0.43	-0.035 ± 0.134	0.058 ± 0.164
PRF-fit source offset from KIC position	0.288 ± 0.153	1.89	0.182 ± 0.134	0.223 ± 0.164
photometric centroid source offset	0.04 ± 0.39	0.10	0.01 ± 0.33	-0.04 ± 0.39



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.

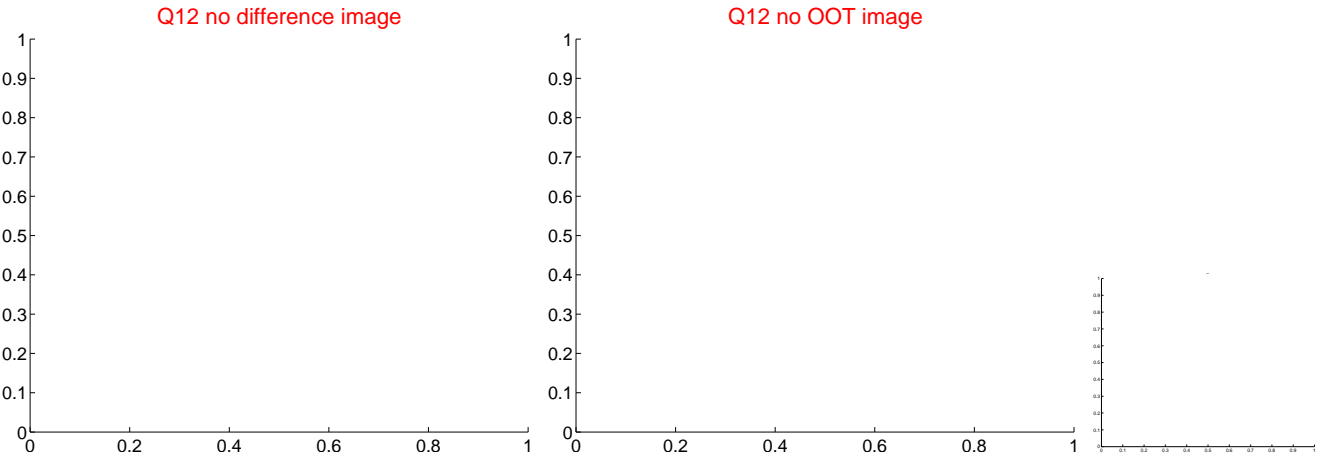
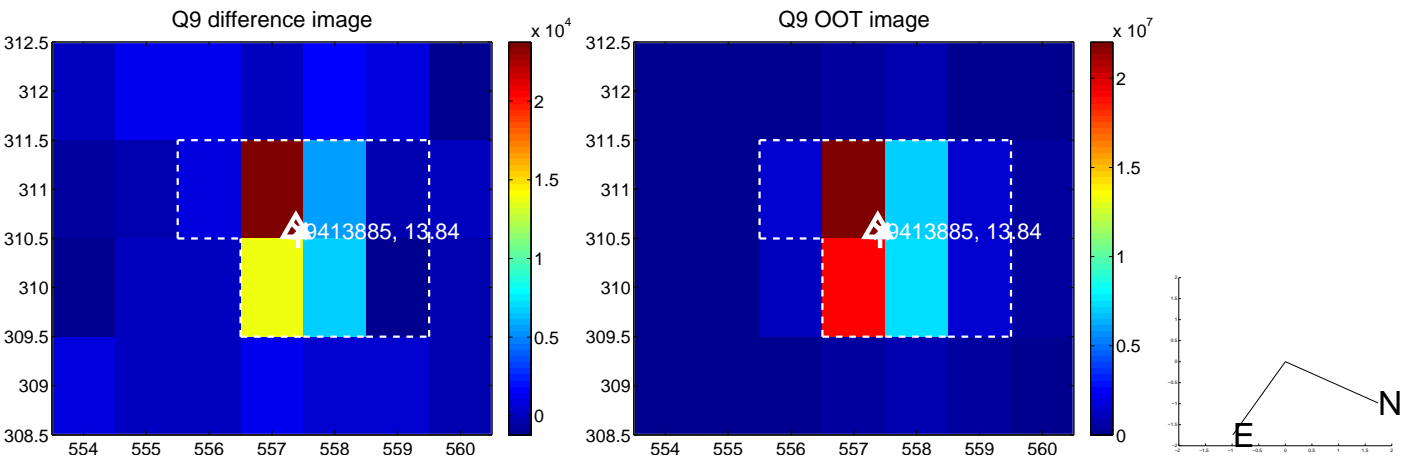
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



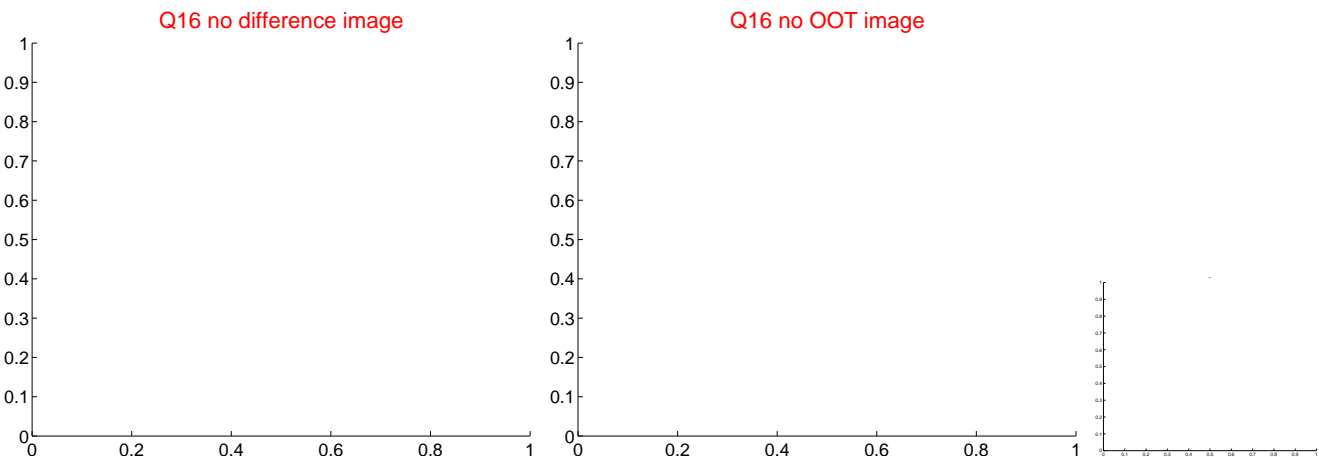
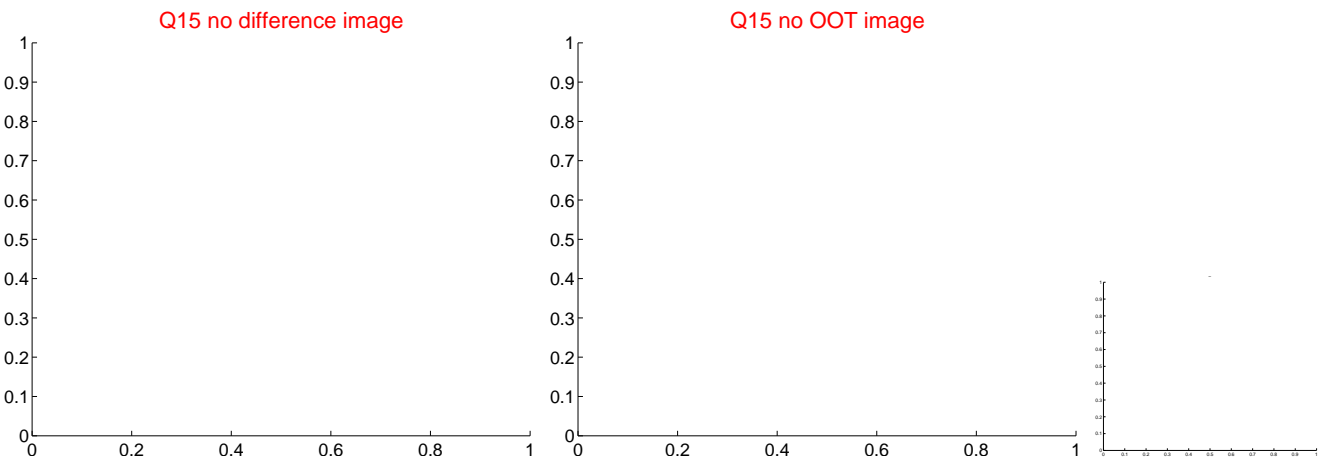
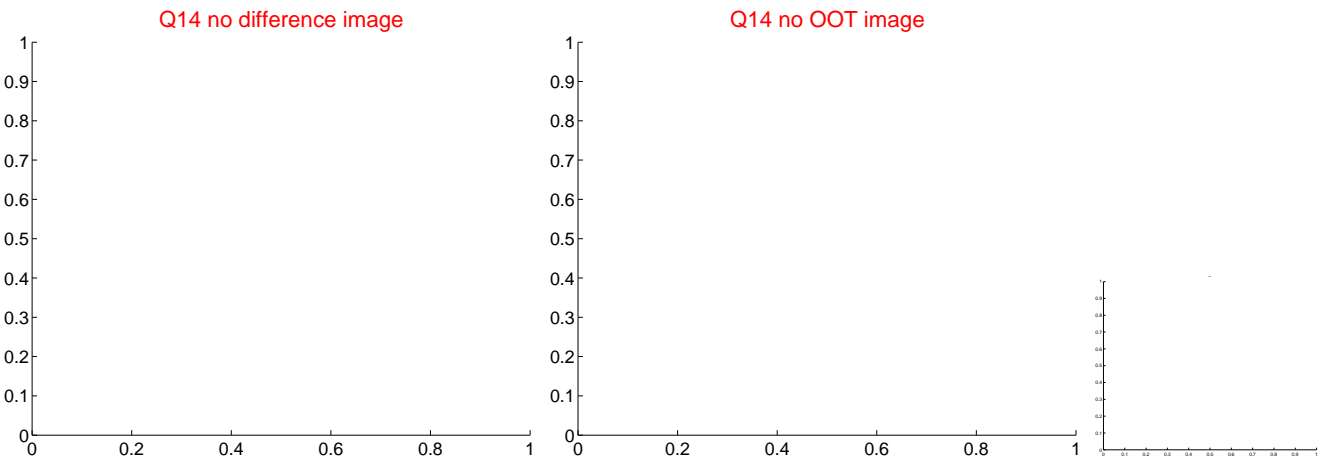
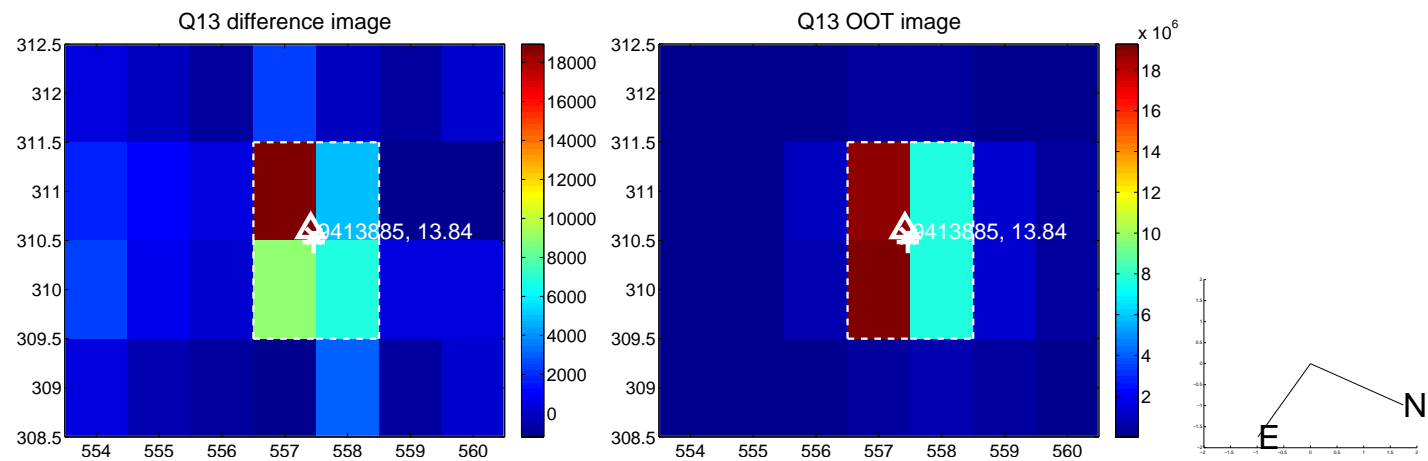
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



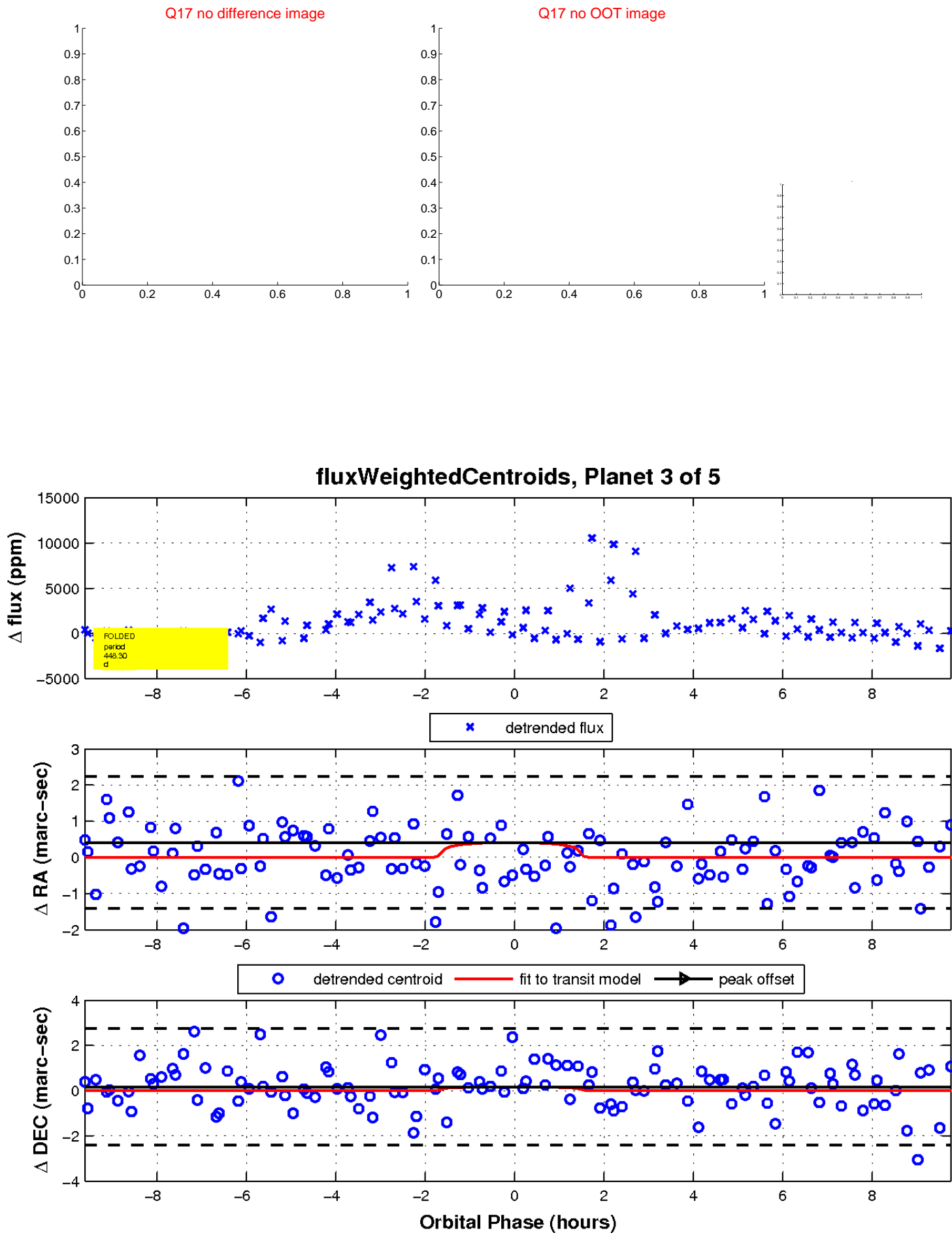
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

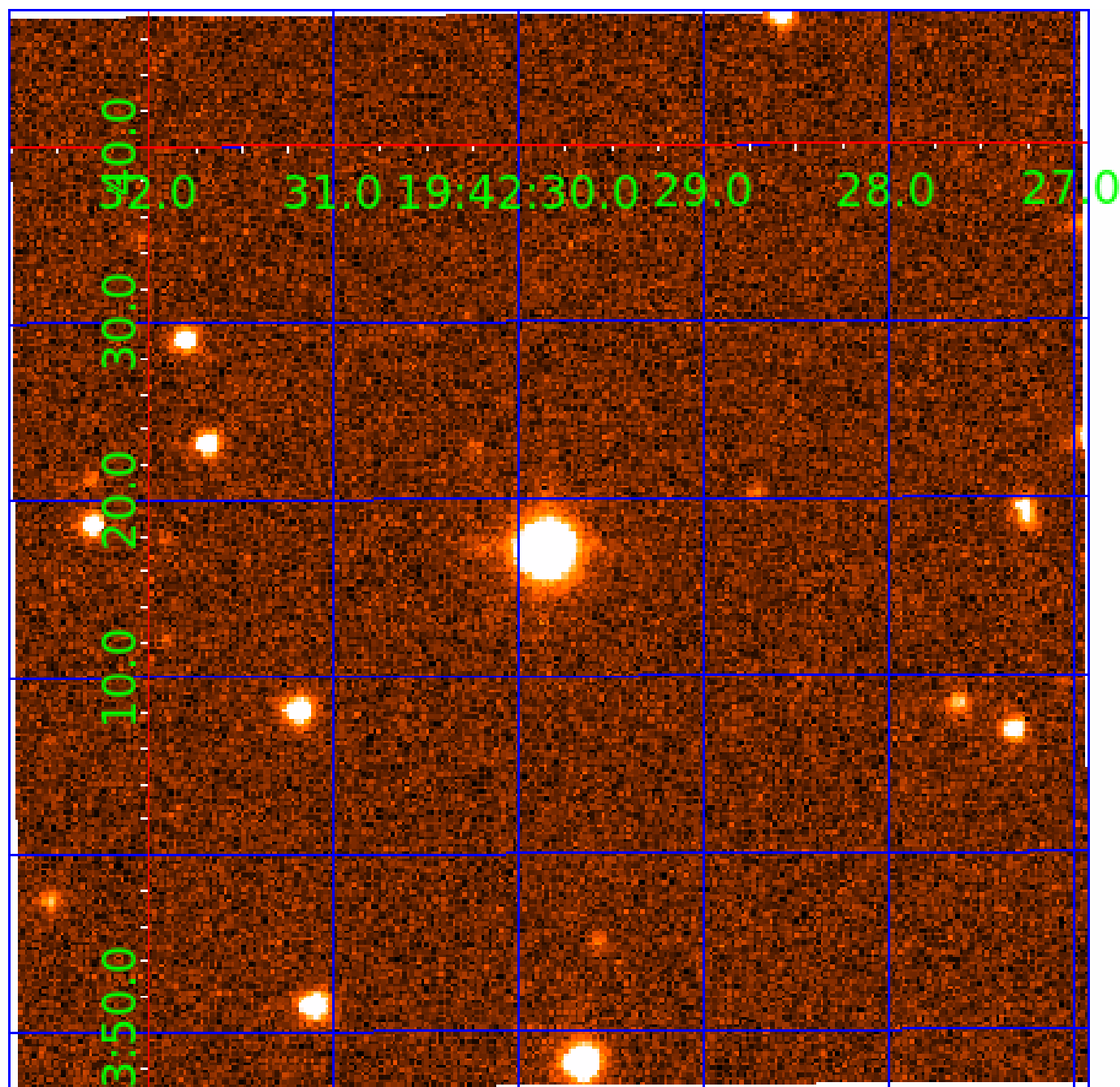


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009413885

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})
009413885-01	OBS	No	227.575207	245.729629	1908.2	11.801	18.8	9.3	2.64	5112	11.36	9.09
009413885-02	OBS	No	460.347673	246.596209	870.0	9.000	19.1	-1.0	2.64	5112	7.63	3.55
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009413885-04	OBS	No	453.052901	344.956509	1160.5	4.310	16.5	5.6	2.64	5112	9.81	3.63
009413885-05	OBS	No	345.810758	350.752876	628.4	5.000	13.1	-1.0	2.64	5112	6.48	5.20

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009413885-01	OBS	FP	0.00	1	0	1	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS—HALO_GHOST
009413885-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS
009413885-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009413885-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009413885-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

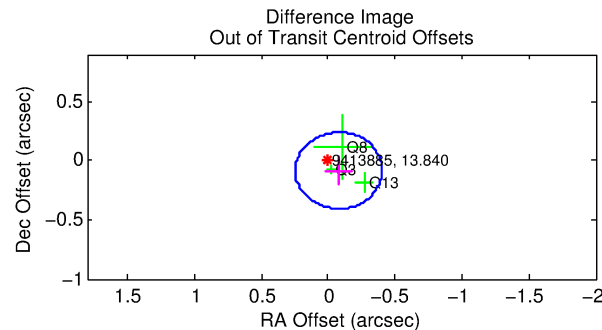
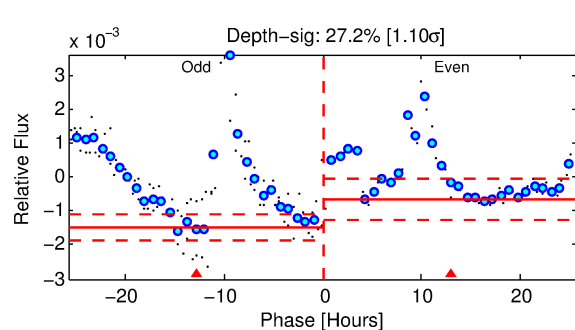
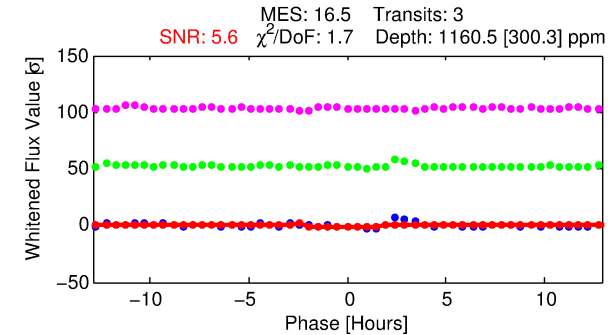
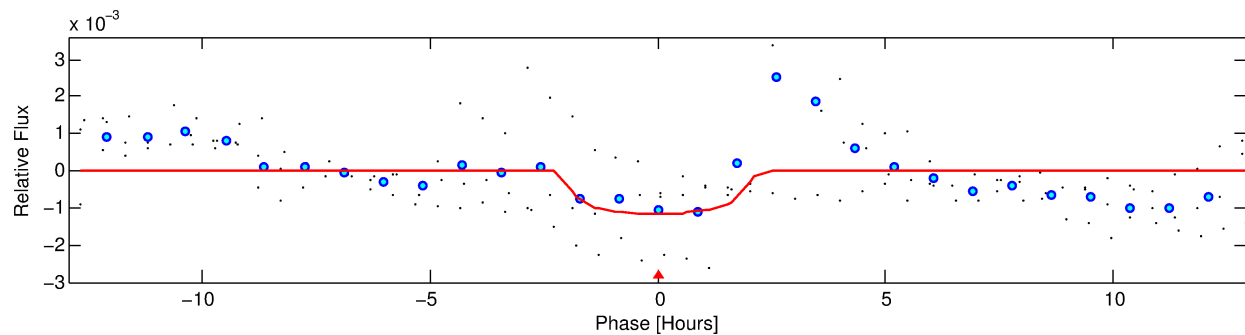
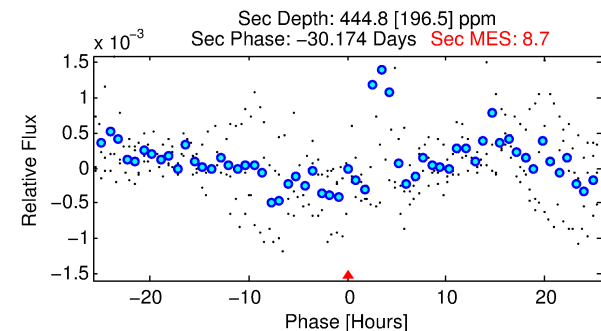
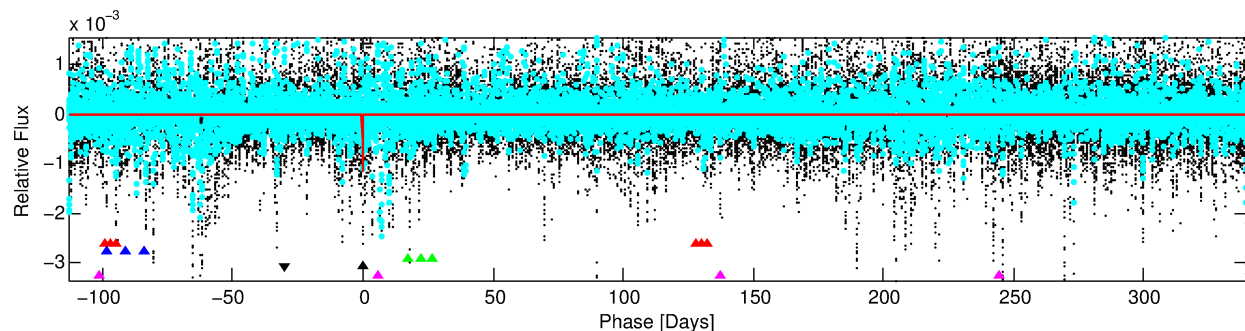
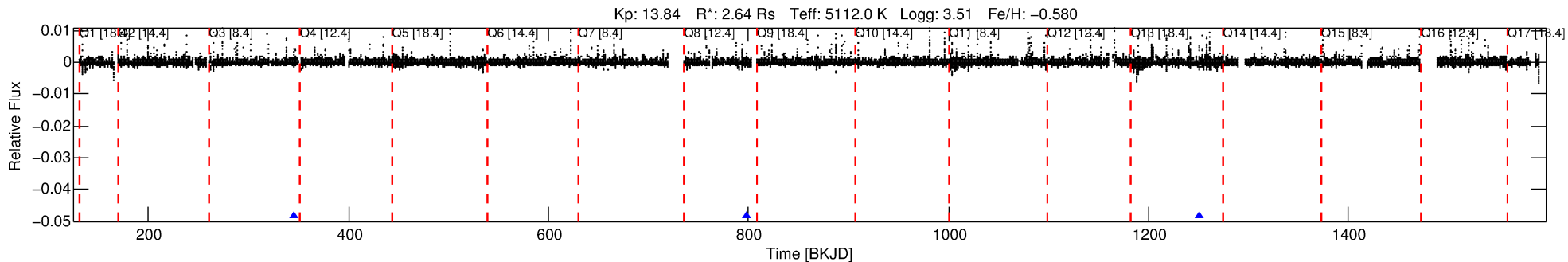
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009413885-04

No Significant Match Found

DV One-Page Summary

KIC: 9413885 Candidate: 4 of 5 Period: 453.053 d



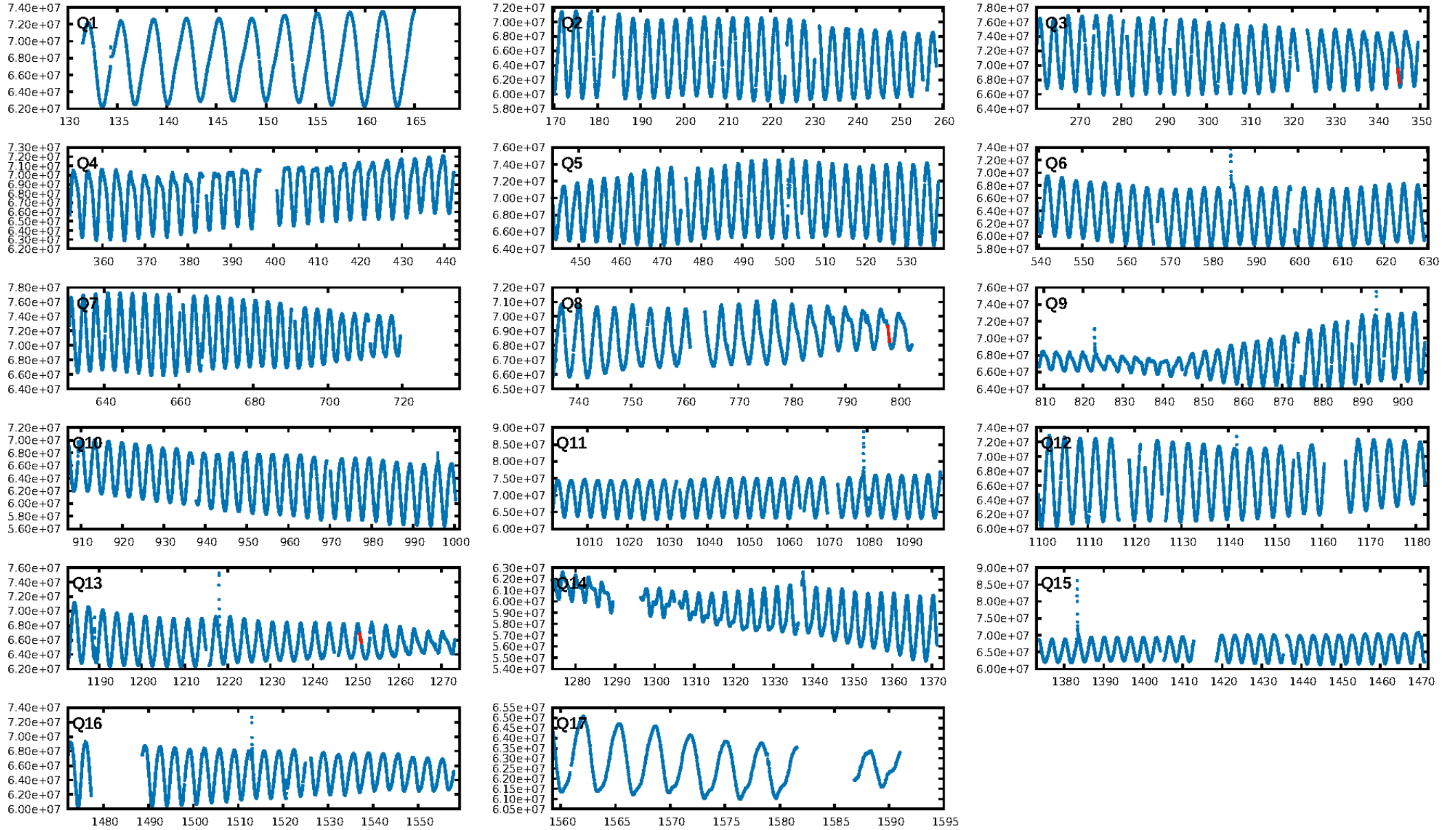
DV Fit Results:

Period = 453.05290 [0.00607] d
Epoch = 344.9565 [0.0059] BKJD
Rp/R* = 0.0341 [0.0351]
a/R* = 564.43 [2245.96]
b = 0.76 [2.26]
Seff = 3.63 [6.28]
Teq = 352 [152] K
Rp = 9.81 [12.71] Re
a = 1.0830 [1.0560] AU
Ag = 2980.05 [8119.17] [0.37σ]
Teffp = 4021 [2121] K [1.73σ]

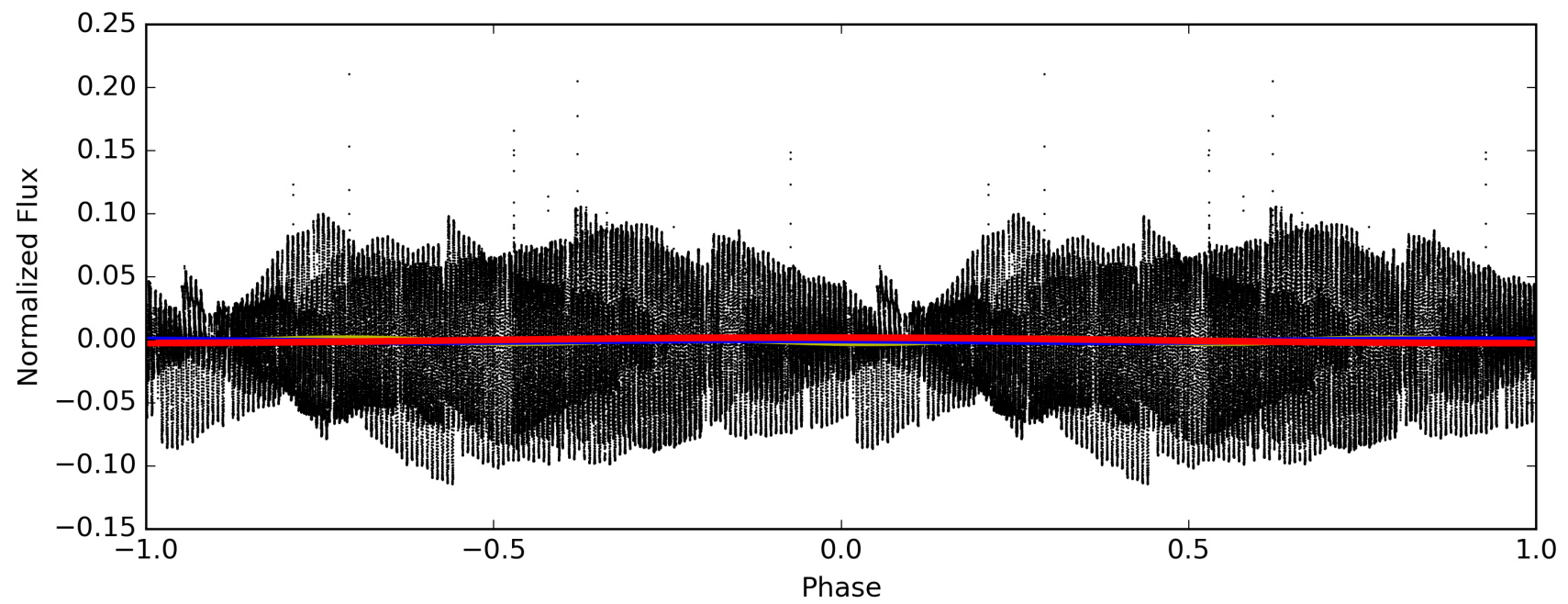
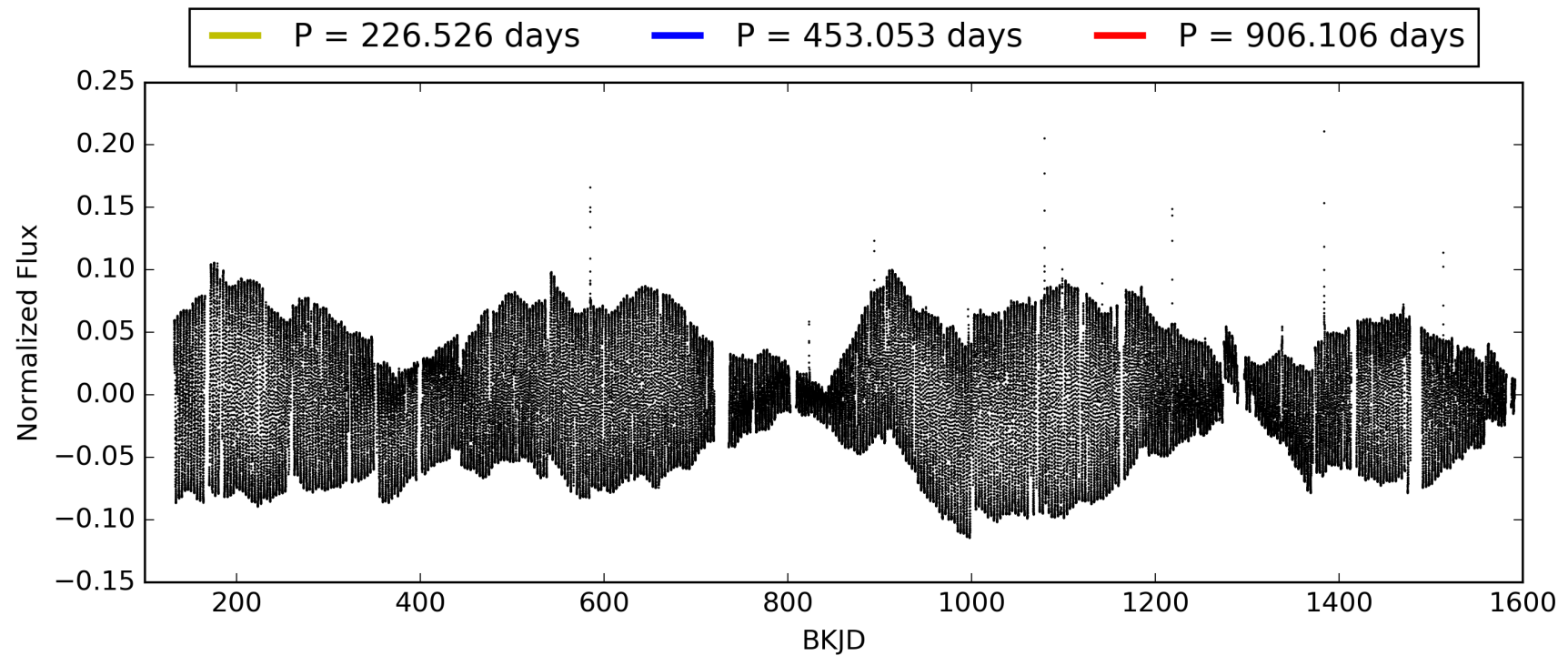
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [21.06σ]
LongPeriod-sig: 100.0% [17.54σ]
ModelChiSquare2-sig: 11.3%
ModelChiSquareGof-sig: 45.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.6047
Centroid-sig: 13.8%
Centroid-so: 0.441 arcsec [0.85σ]
OotOffset-rm: 0.114 arcsec [1.05σ]
KicOffset-rm: 0.136 arcsec [1.34σ]
OotOffset-st: 0/1/1/1 [3]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

TCE 009413885-04, PDC Light Curves

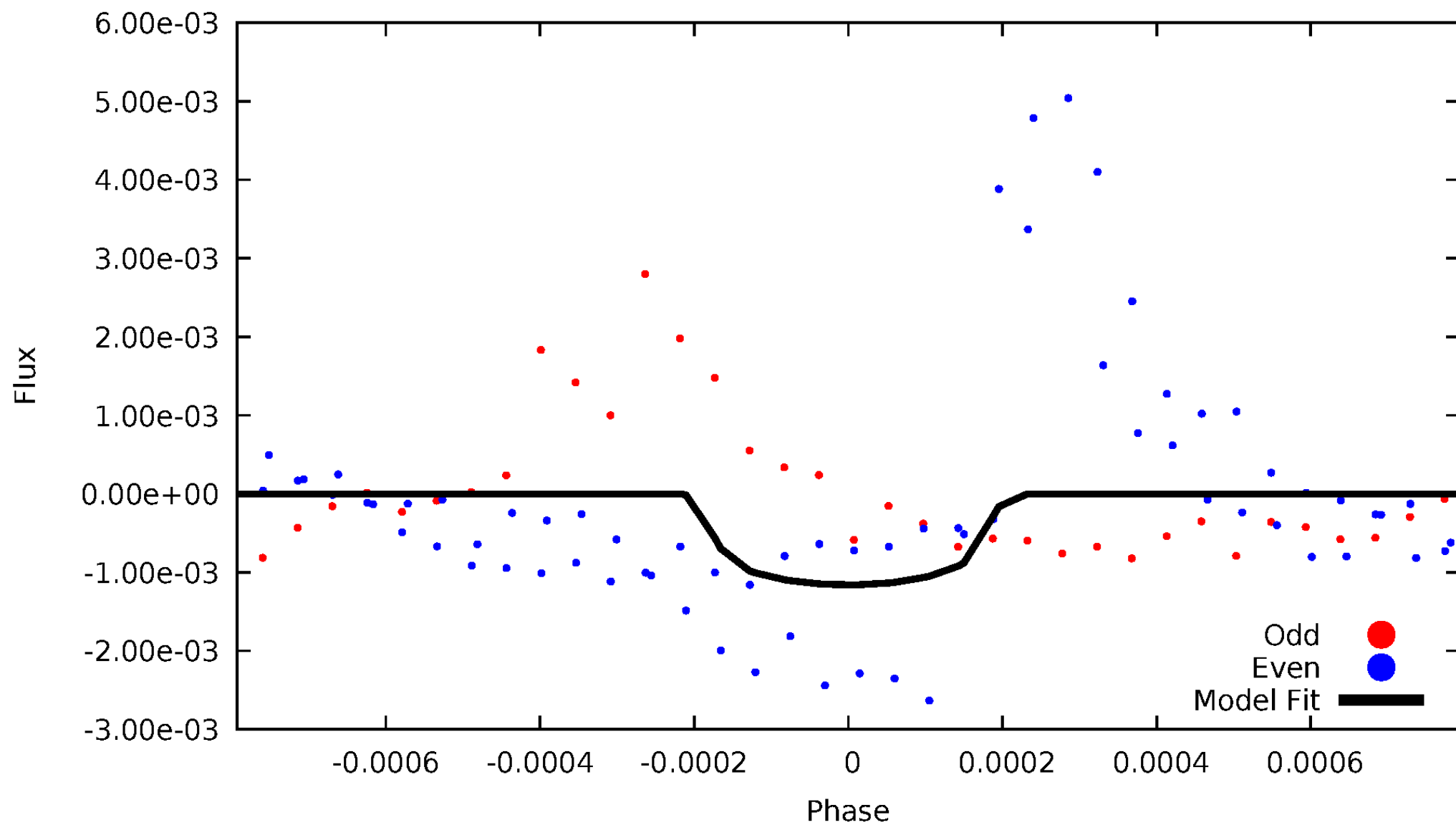


TCE 009413885-04



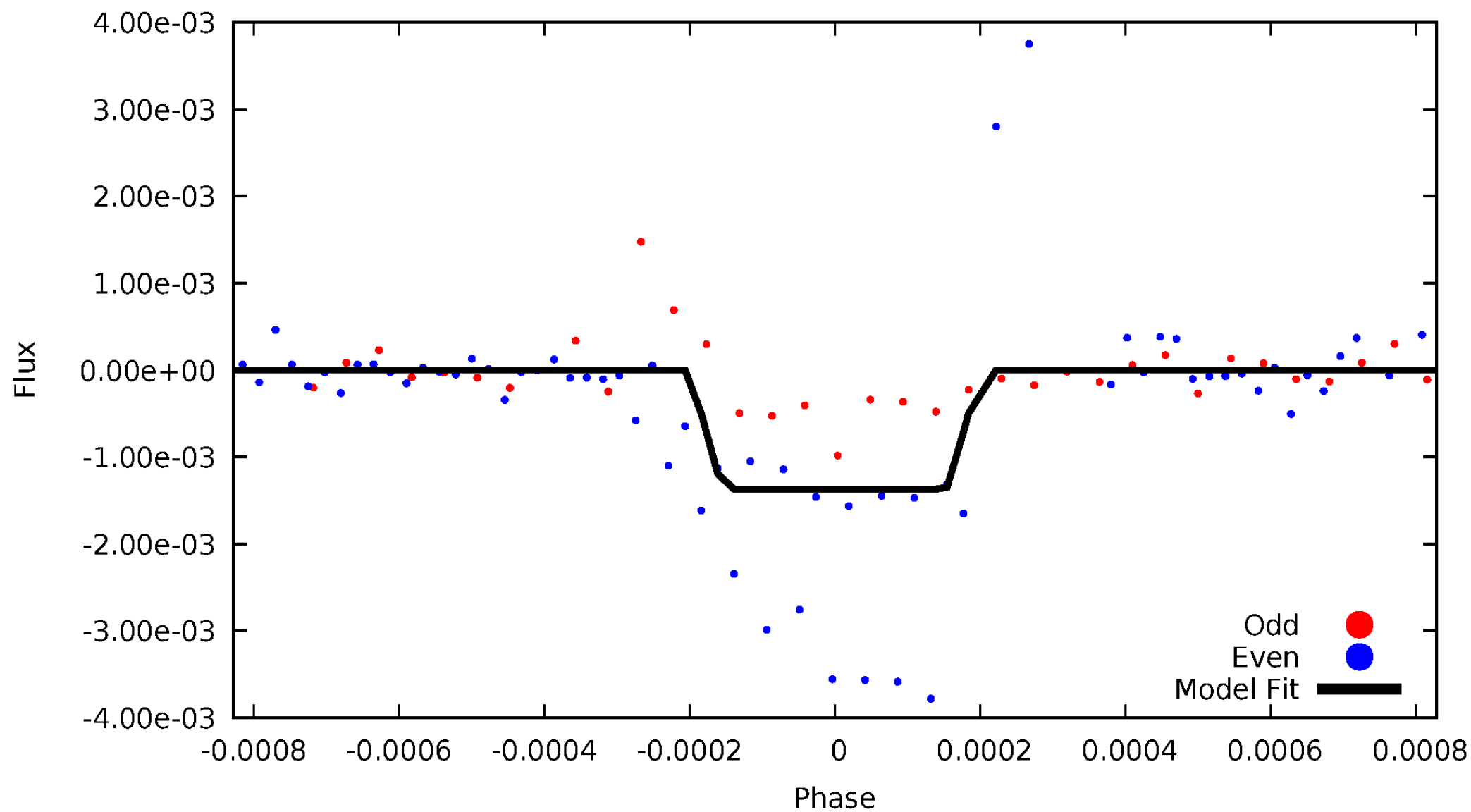
DV Odd/Even

TCE 009413885-04



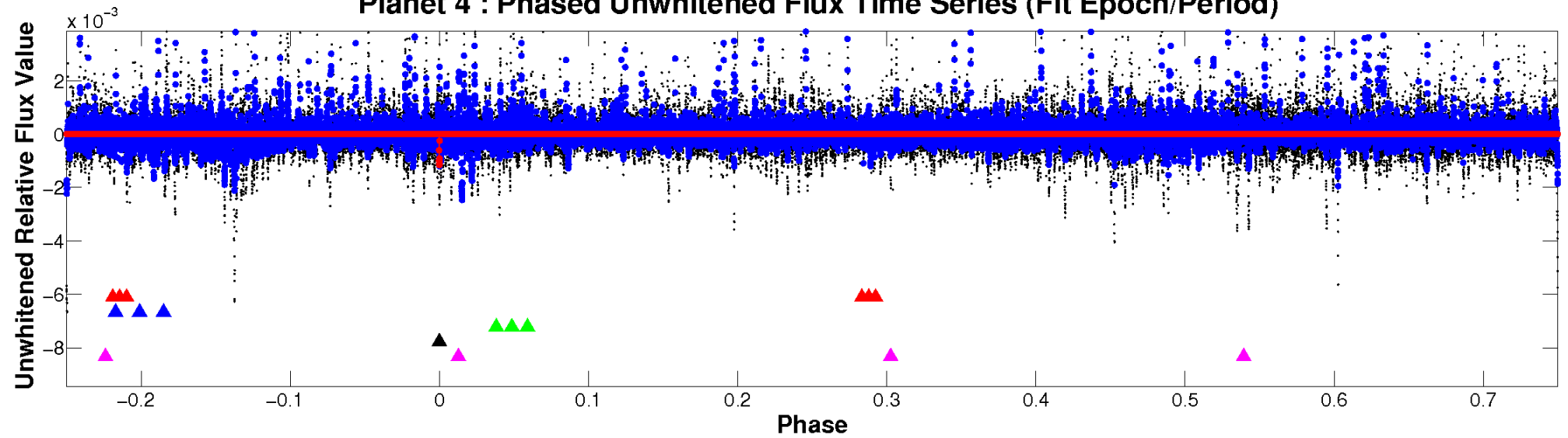
ALT Odd/Even

TCE 009413885-04

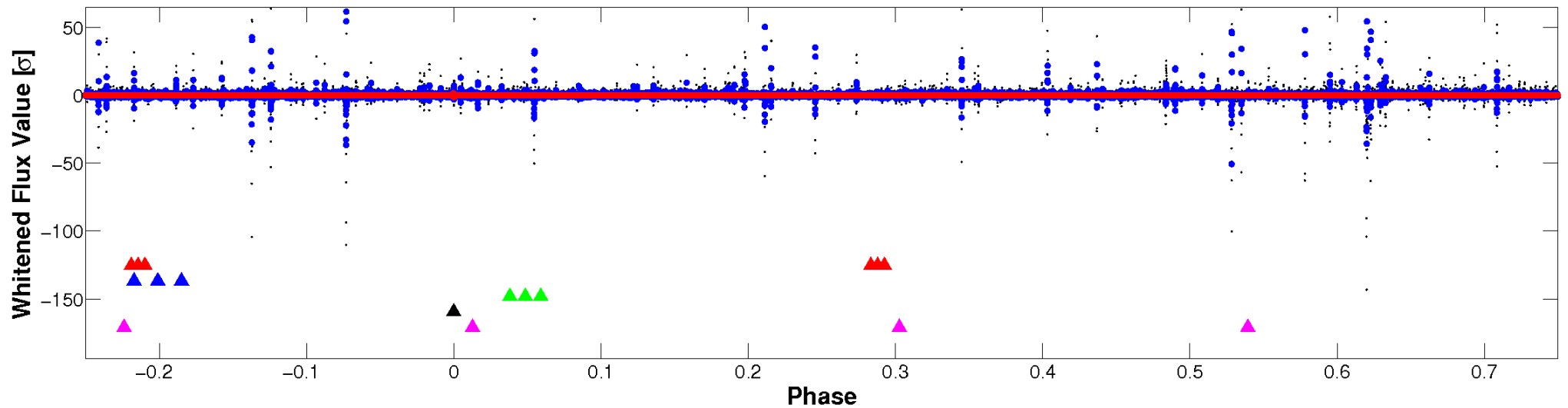


Non-Whitened Vs. Whitened Light Curve

Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

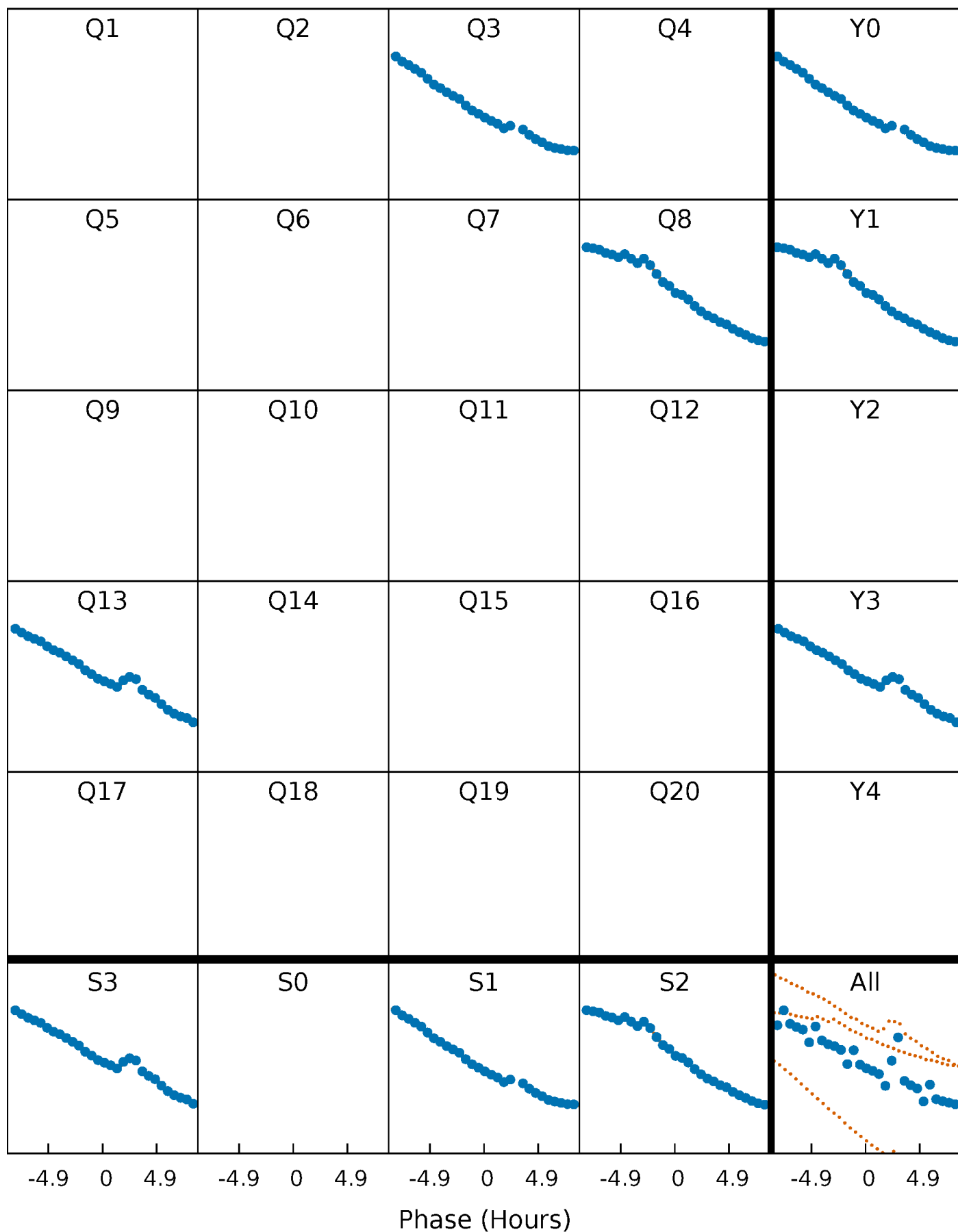


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



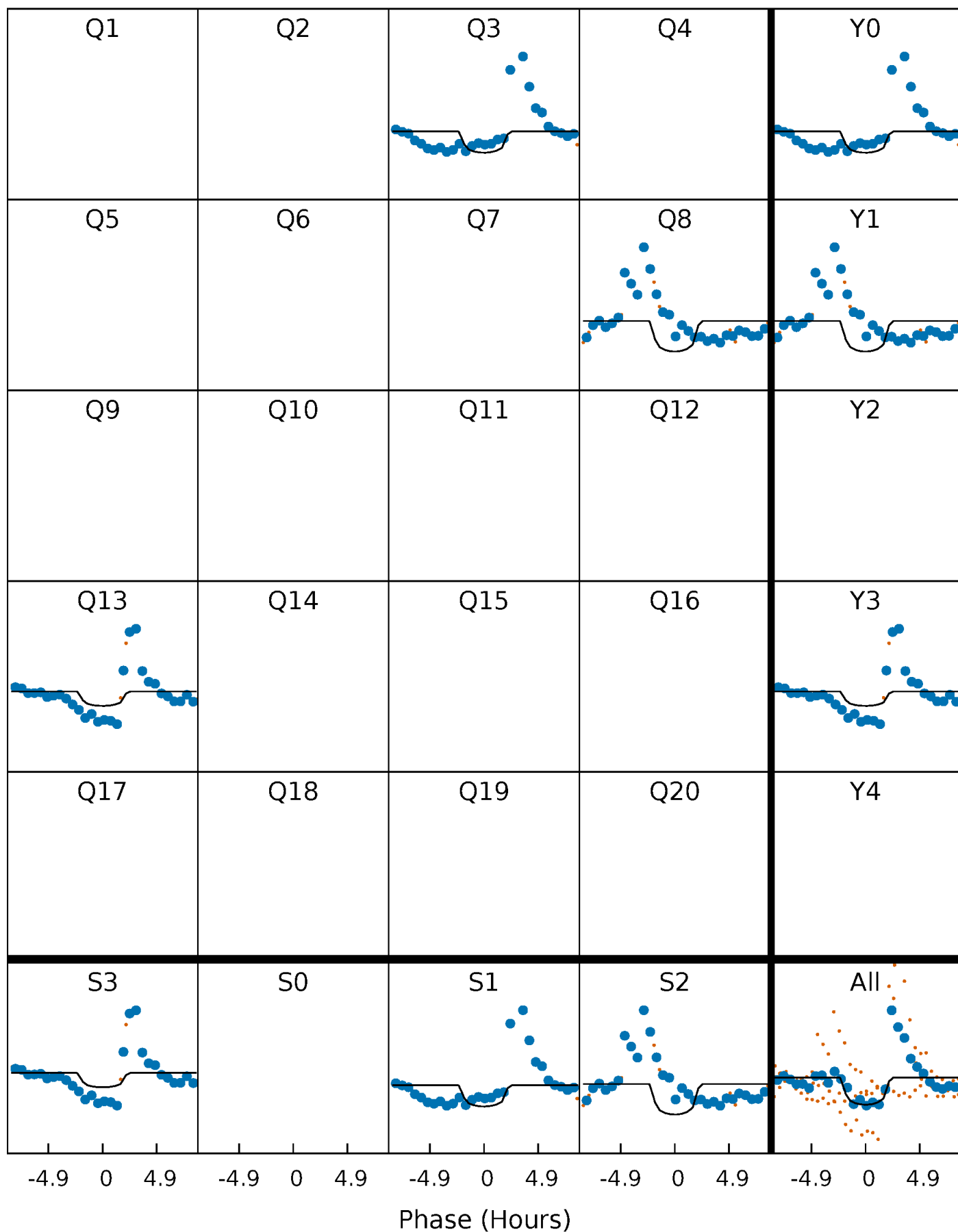
PDC Quarter-Phased Transit Curves

TCE 009413885-04 $P=453.052901$ Days $T_0=344.956509$ (BKJD)



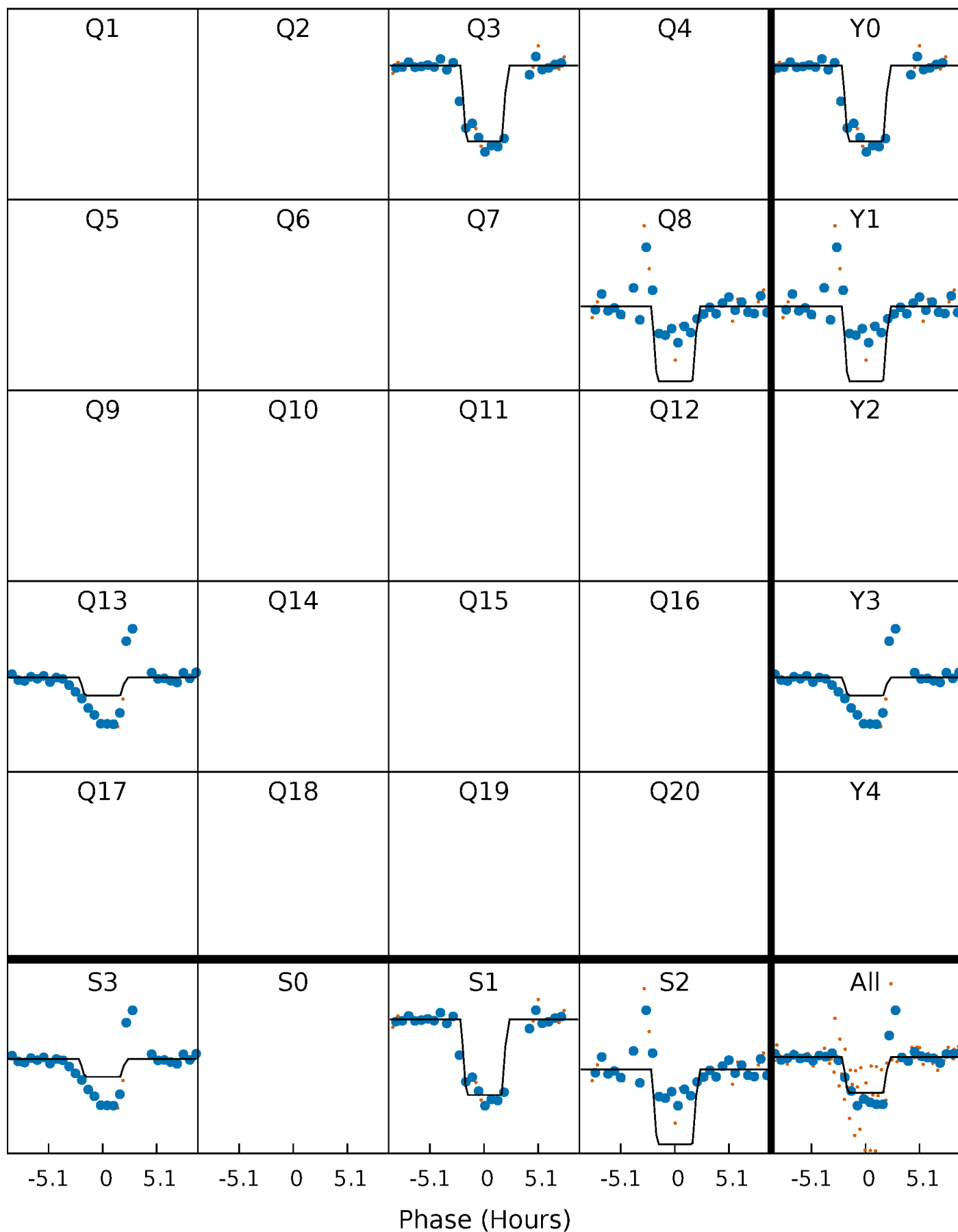
DV Quarter-Phased Transit Curves

TCE 009413885-04 P=453.052901 Days $T_0=344.956509$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

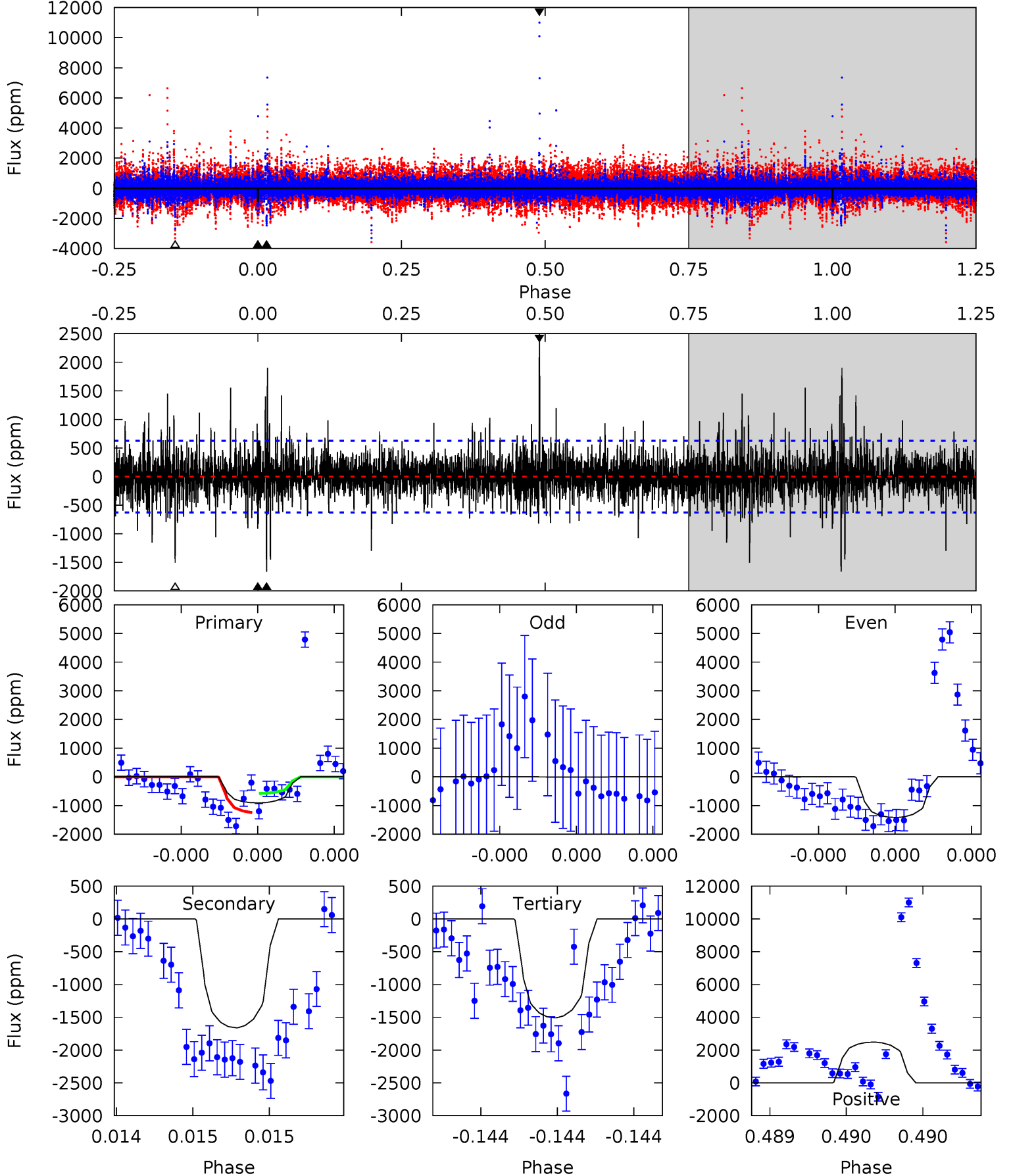
TCE 009413885-04 $P=453.039270$ Days $T_0=344.971645$ (BKJD)



DV Model-Shift Uniqueness Test

009413885-04, P = 453.052901 Days, E = 344.956509 Days

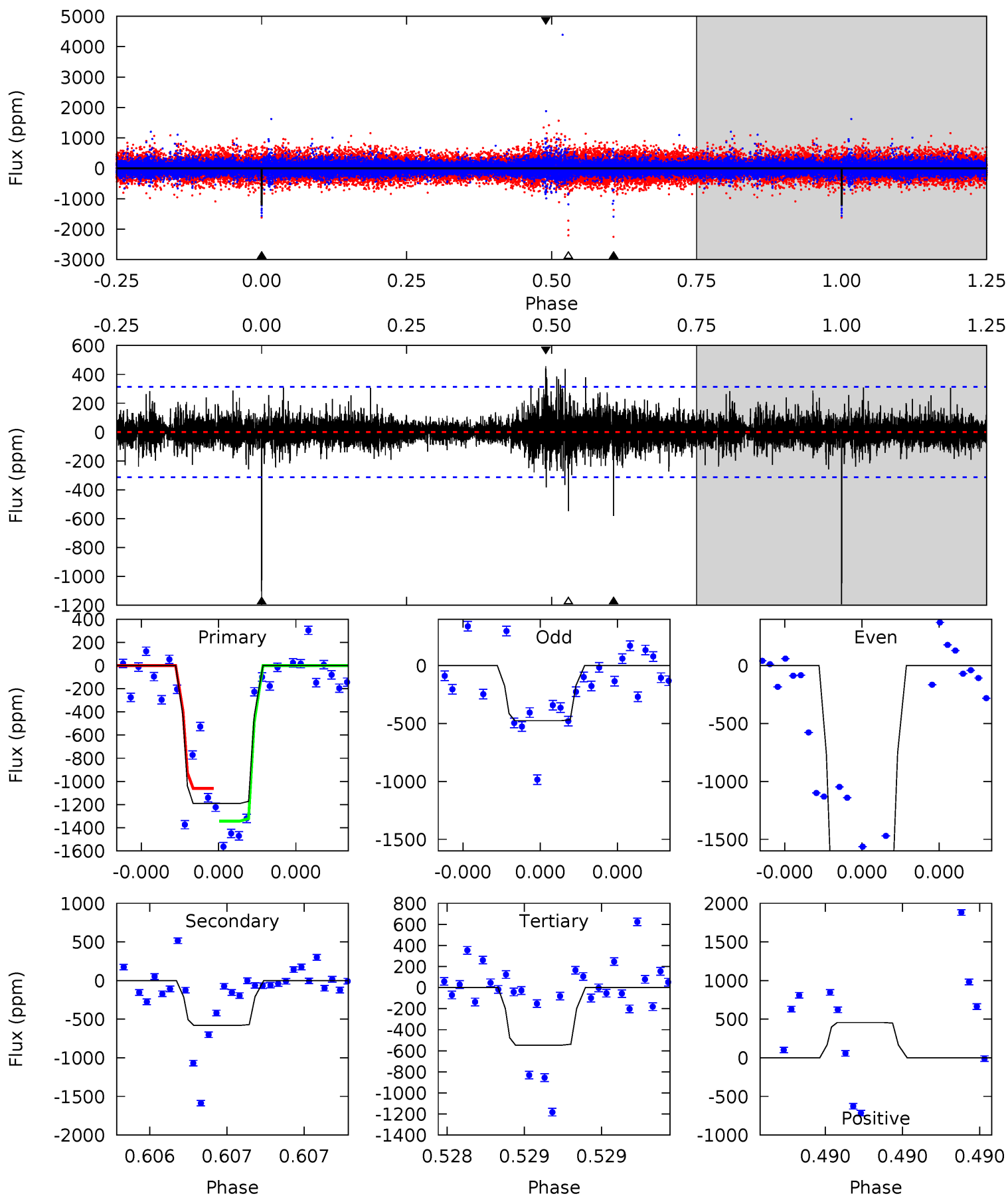
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.12	14.8	13.5	22.2	5.61	3.53	2.25	-5.36	-14.1	1.35	-7.40	3.66	1.26	0.60	3.00



Alt Model-Shift Uniqueness Test

009413885-04, P = 453.039270 Days, E = 344.971645 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.3	10.4	9.79	8.18	5.61	3.54	1.06	11.5	13.1	0.60	2.20	14.4	1.25	0.28	0



Stellar Parameters For KIC 009413885

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5112^{+137}_{-122}	$3.512^{+1.072}_{-0.357}$	$-0.580^{+0.300}_{-0.250}$	$2.638^{+1.552}_{-2.070}$	$0.824^{+0.262}_{-0.175}$	$0.063^{+3.101}_{-0.048}$
	+3%/-2%	+31%/-10%	+52%/-43%	+59%/-78%	+32%/-21%	+4903%/-76%
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 009413885-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-1660 ± 112	$10.49^{+10.67}_{-6.63}$	481^{+81}_{-105}	5063^{+3059}_{-955}	10009^{+66977}_{-7455}
Alt.	-580 ± 56	$11.02^{+10.95}_{-7.08}$	483^{+80}_{-109}	4063^{+1939}_{-707}	3229^{+22581}_{-2450}

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

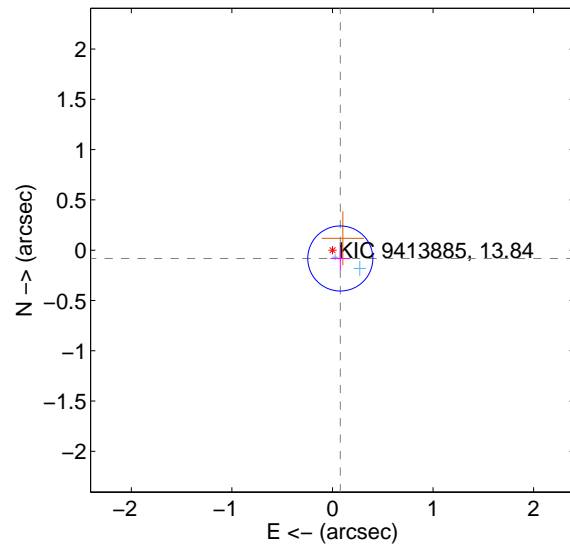
Supplemental centroid analysis for 009413885-04. Kepler magnitude: 13.84. Transit SNR 5.60

There are 2 quarters with good PRF difference image offsets

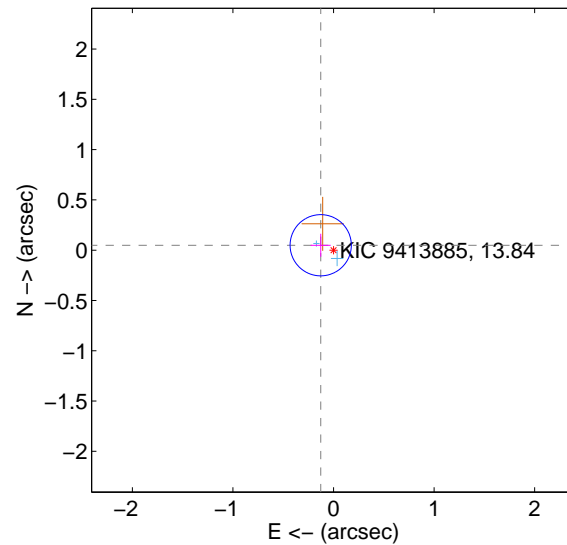
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.114 ± 0.108	1.05	-0.078 ± 0.099	-0.083 ± 0.115
PRF-fit source offset from KIC position	0.136 ± 0.101	1.34	0.127 ± 0.099	0.049 ± 0.115
photometric centroid source offset	0.44 ± 0.52	0.85	-0.01 ± 0.46	-0.44 ± 0.52

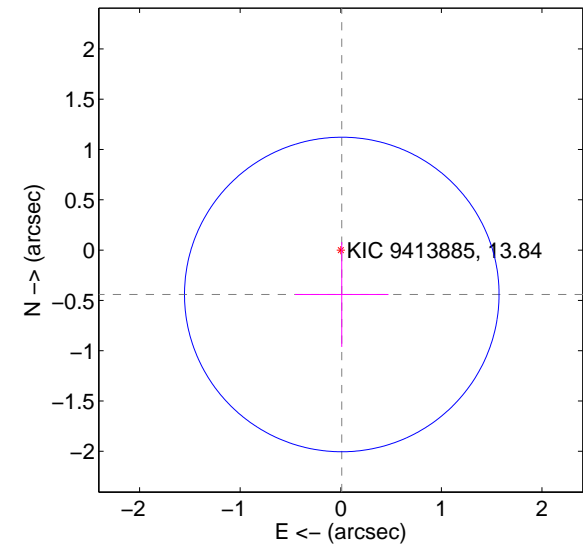
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

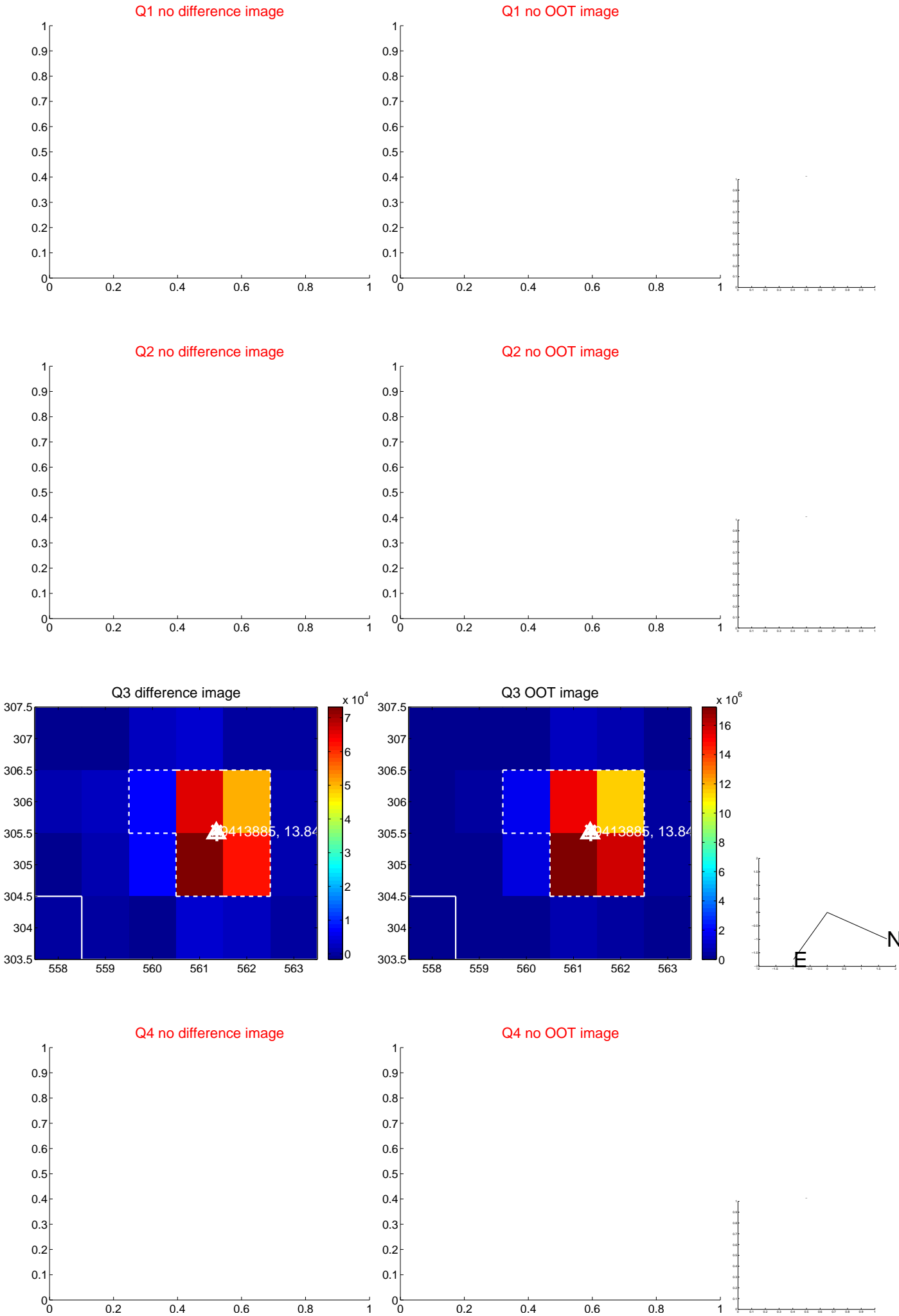


offset from photometric centroids

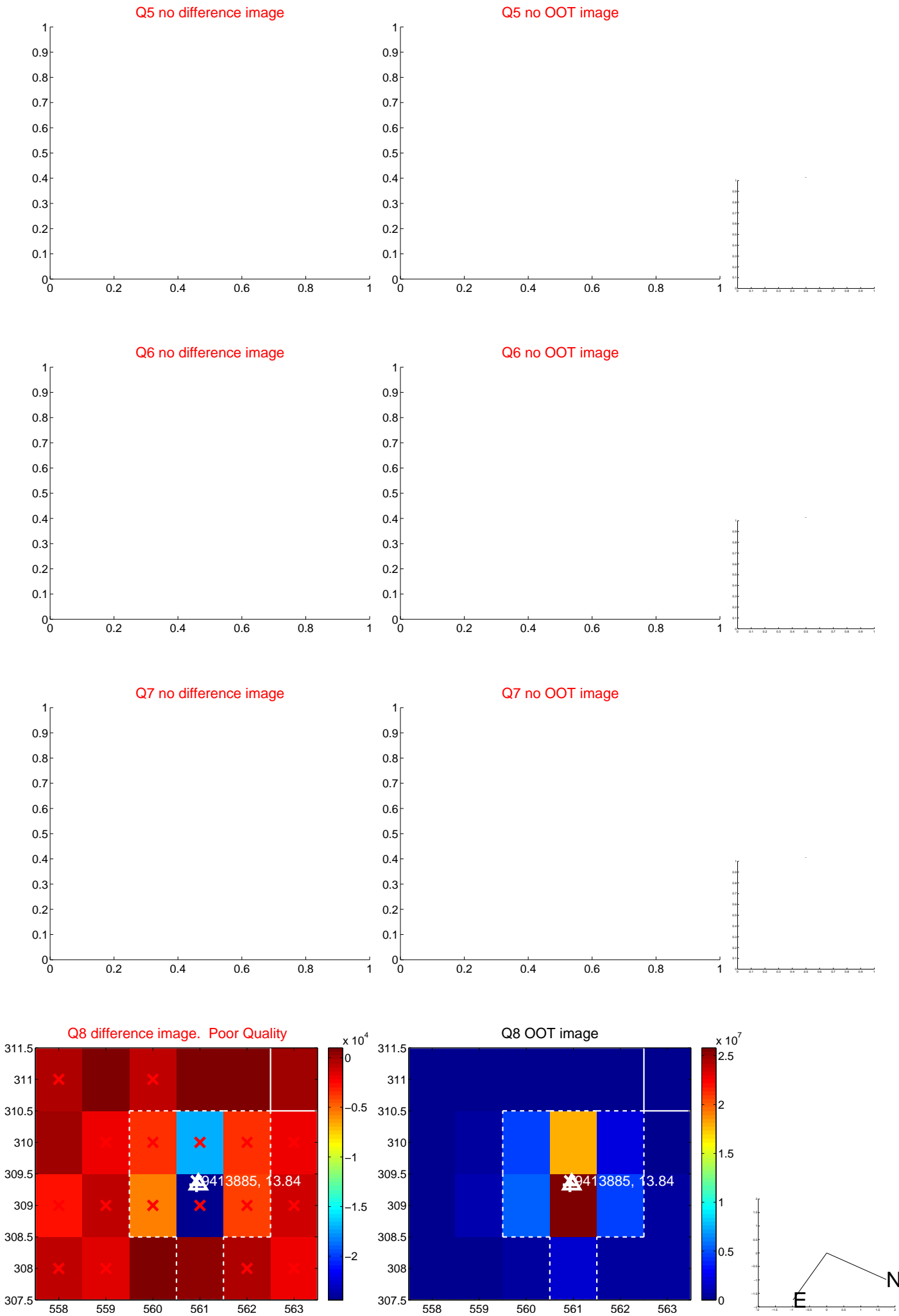


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



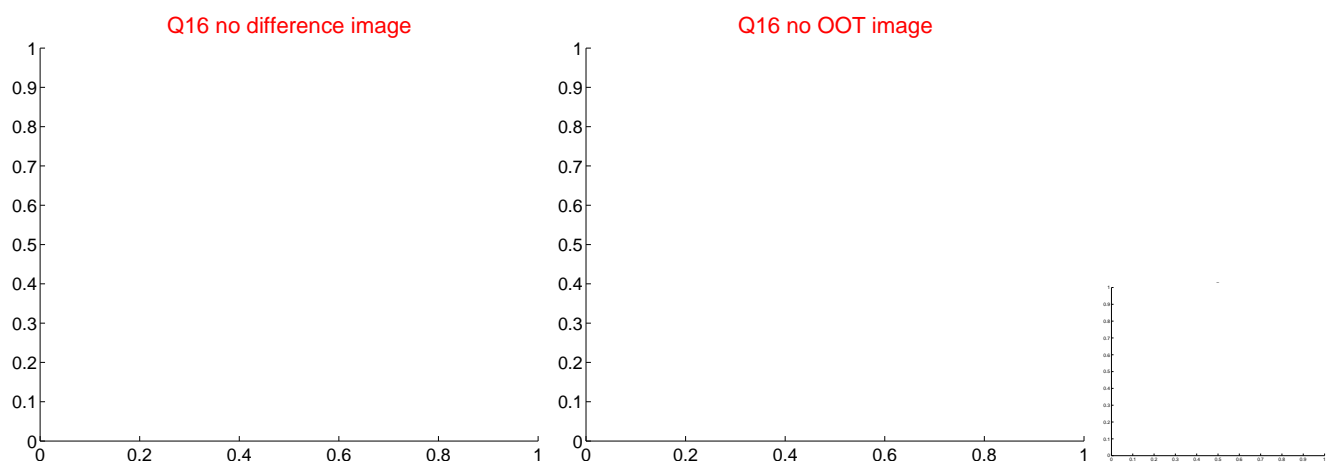
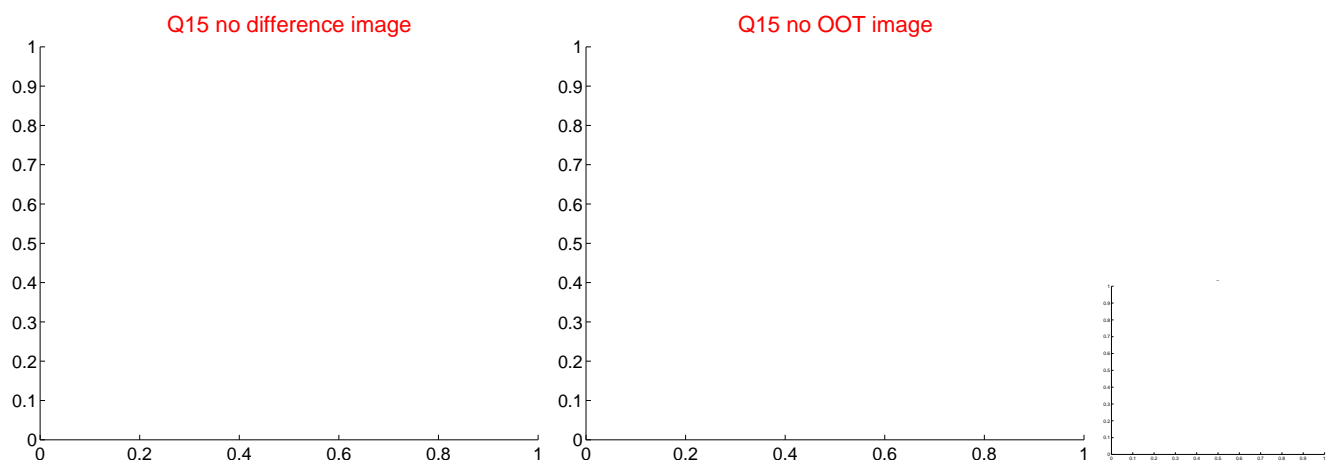
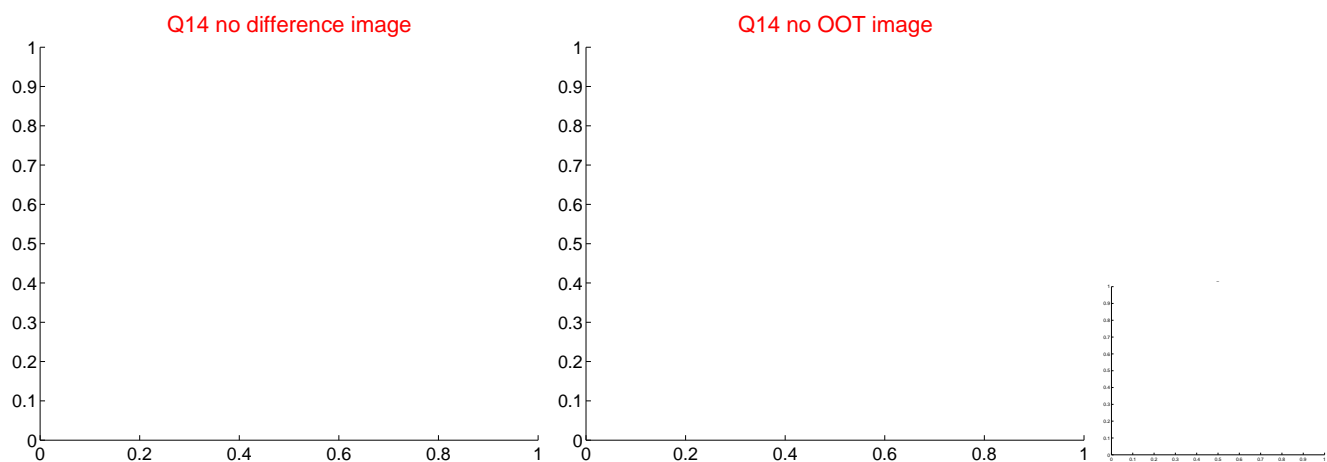
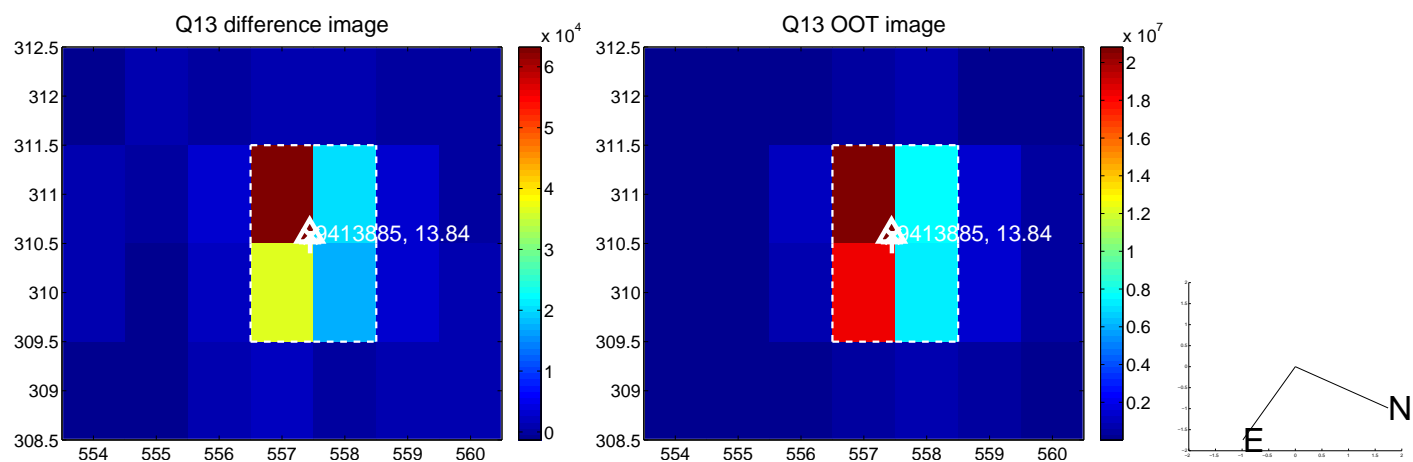
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



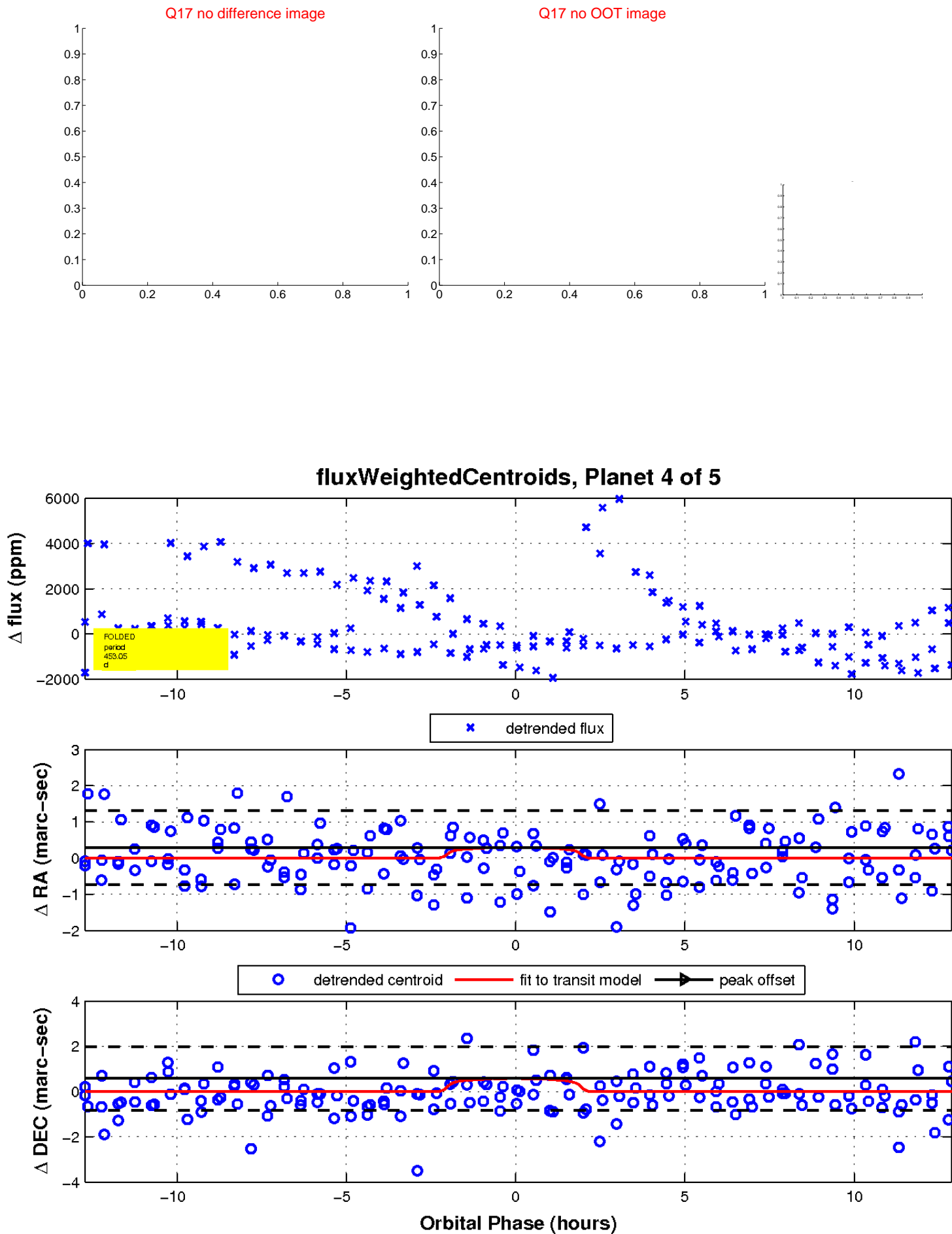
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

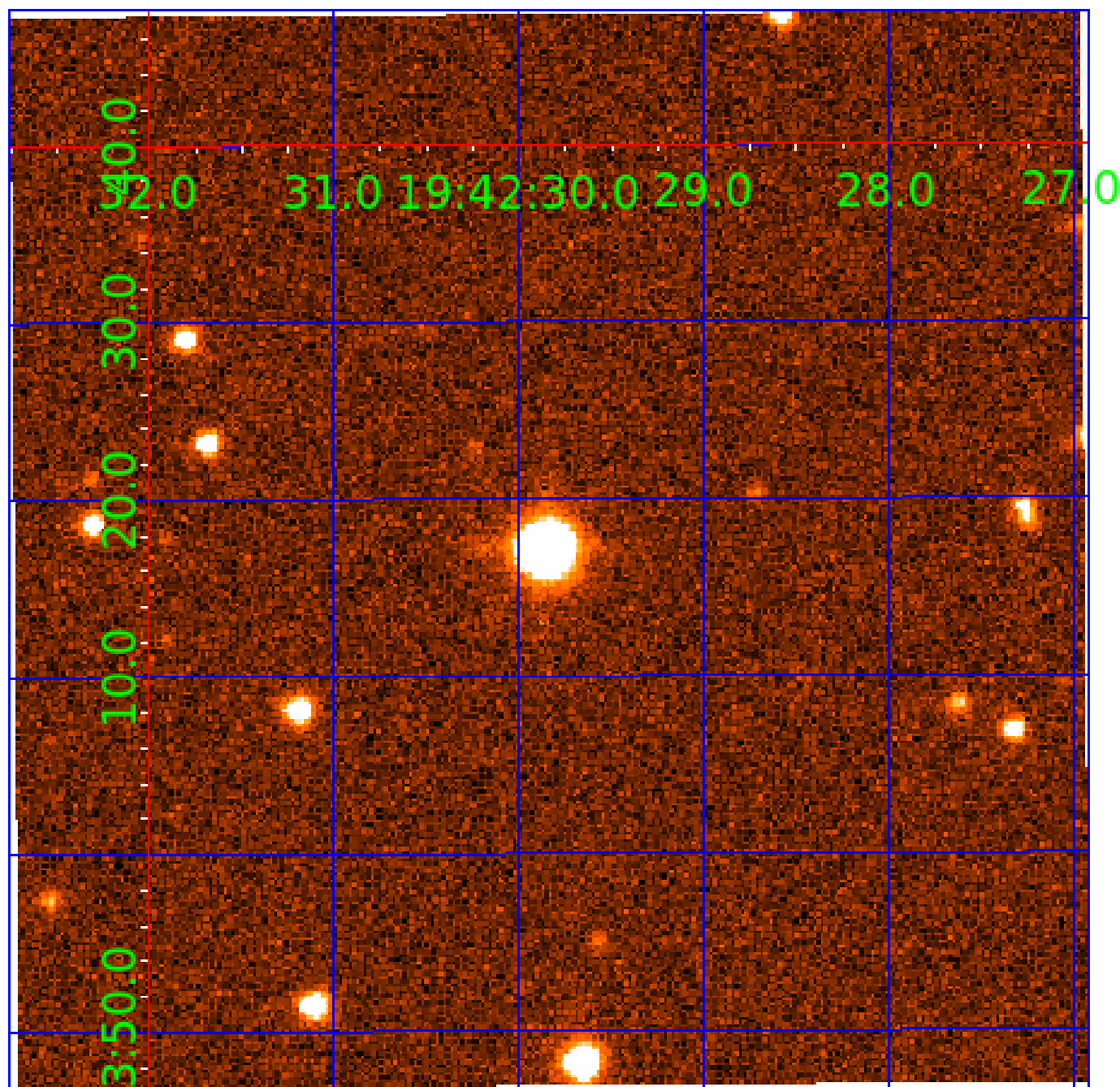


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009413885

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})
009413885-01	OBS	No	227.575207	245.729629	1908.2	11.801	18.8	9.3	2.64	5112	11.36	9.09
009413885-02	OBS	No	460.347673	246.596209	870.0	9.000	19.1	-1.0	2.64	5112	7.63	3.55
009413885-03	OBS	No	448.303163	371.736059	1816.5	3.274	19.2	8.9	2.64	5112	11.28	3.68
009413885-04	OBS	No	453.052901	344.956509	1160.5	4.310	16.5	5.6	2.64	5112	9.81	3.63
009413885-05	OBS	No	345.810758	350.752876	628.4	5.000	13.1	-1.0	2.64	5112	6.48	5.20

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009413885-01	OBS	FP	0.00	1	0	1	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS—HALO_GHOST
009413885-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS
009413885-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009413885-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009413885-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

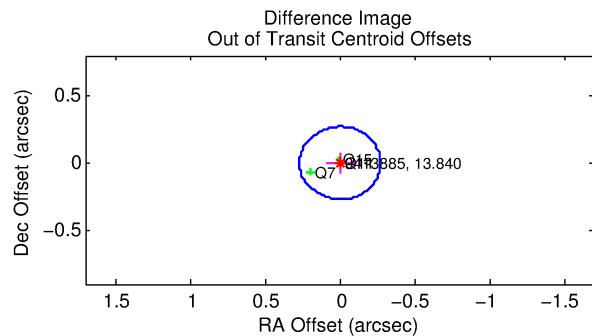
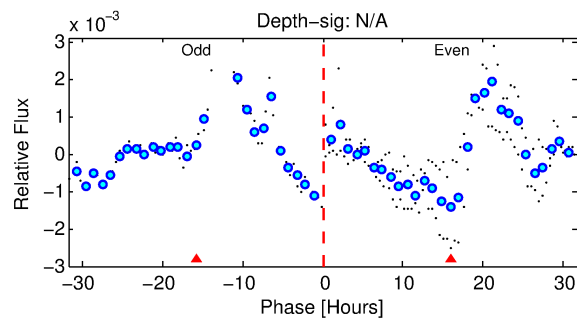
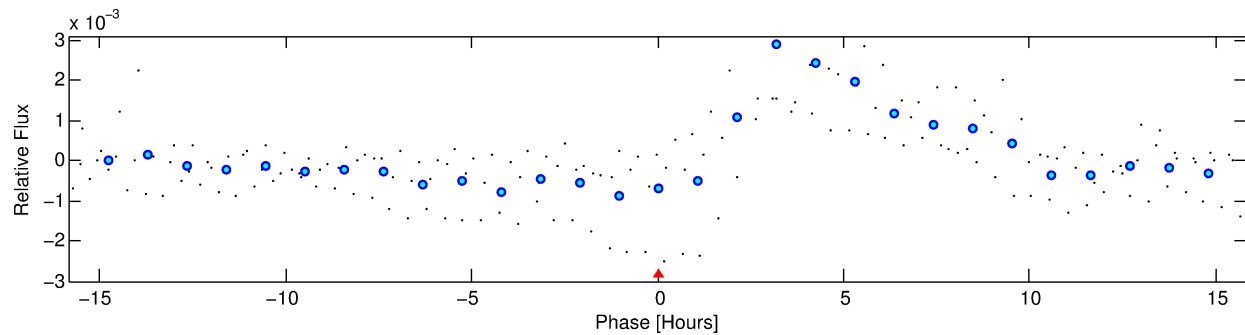
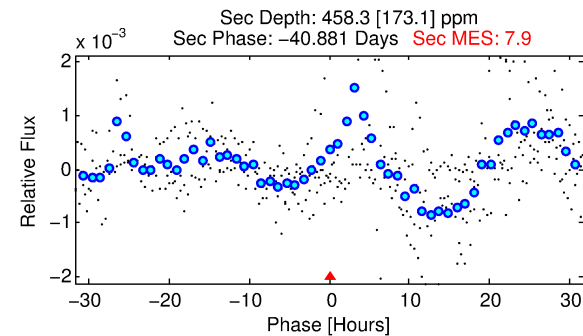
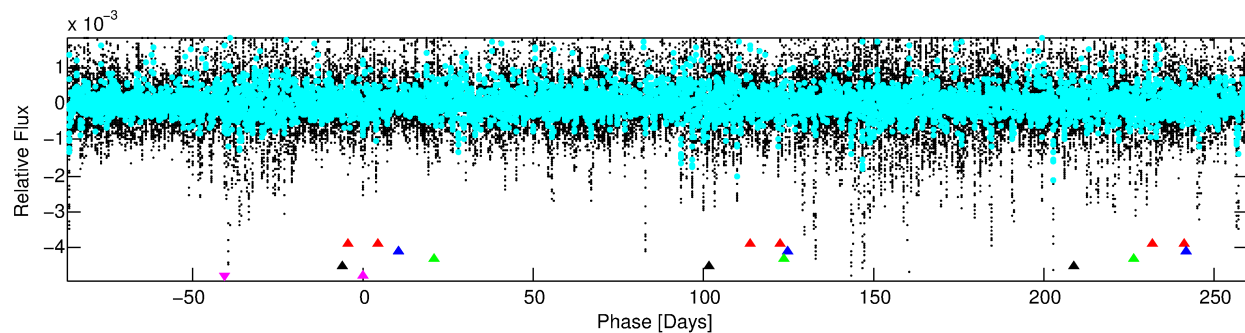
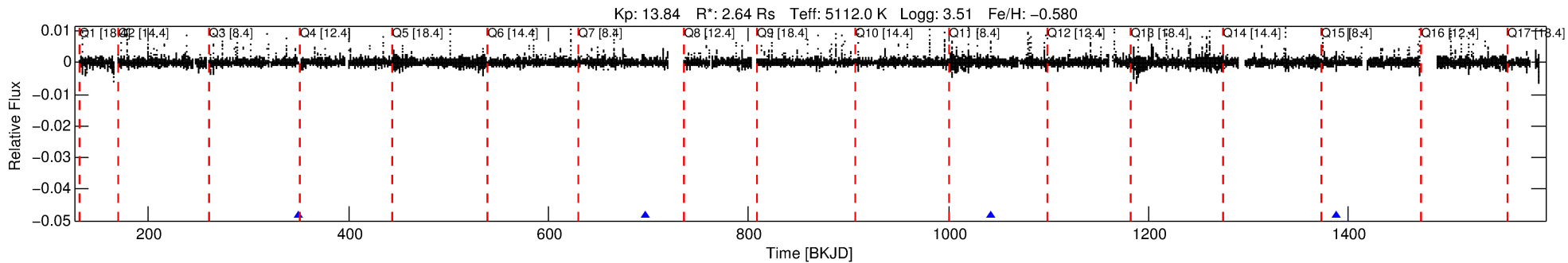
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009413885-05

No Significant Match Found

DV One-Page Summary

KIC: 9413885 Candidate: 5 of 5 Period: 345.811 d



TPS TCE Results:

Period = 345.81076 d
Epoch = 350.7529 BKJD

DV fit results are unavailable

DV Diagnostic Results:

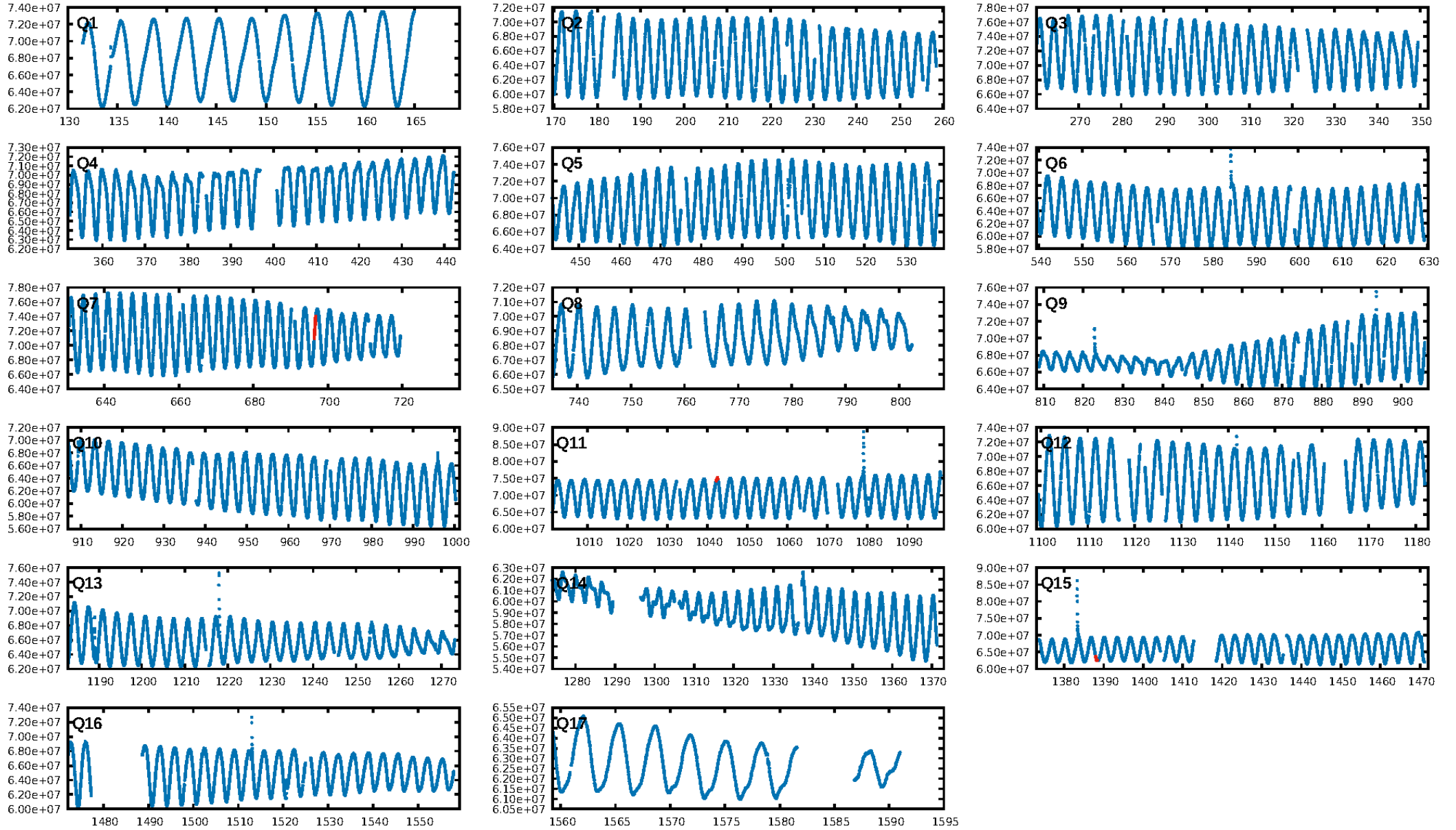
ShortPeriod-sig: 100.0% [221.40σ]
LongPeriod-sig: 100.0% [411.58σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 1.269

Centroid-sig: 4.3%
Centroid-so: 0.434 arcsec [1.68σ]
OotOffset-rm: 0.003 arcsec [0.04σ]
KicOffset-rm: 0.206 arcsec [2.70σ]
OotOffset-st: 0/3/0/0 [3]
KicOffset-st: 0/3/0/0 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 1.00 [3/3]

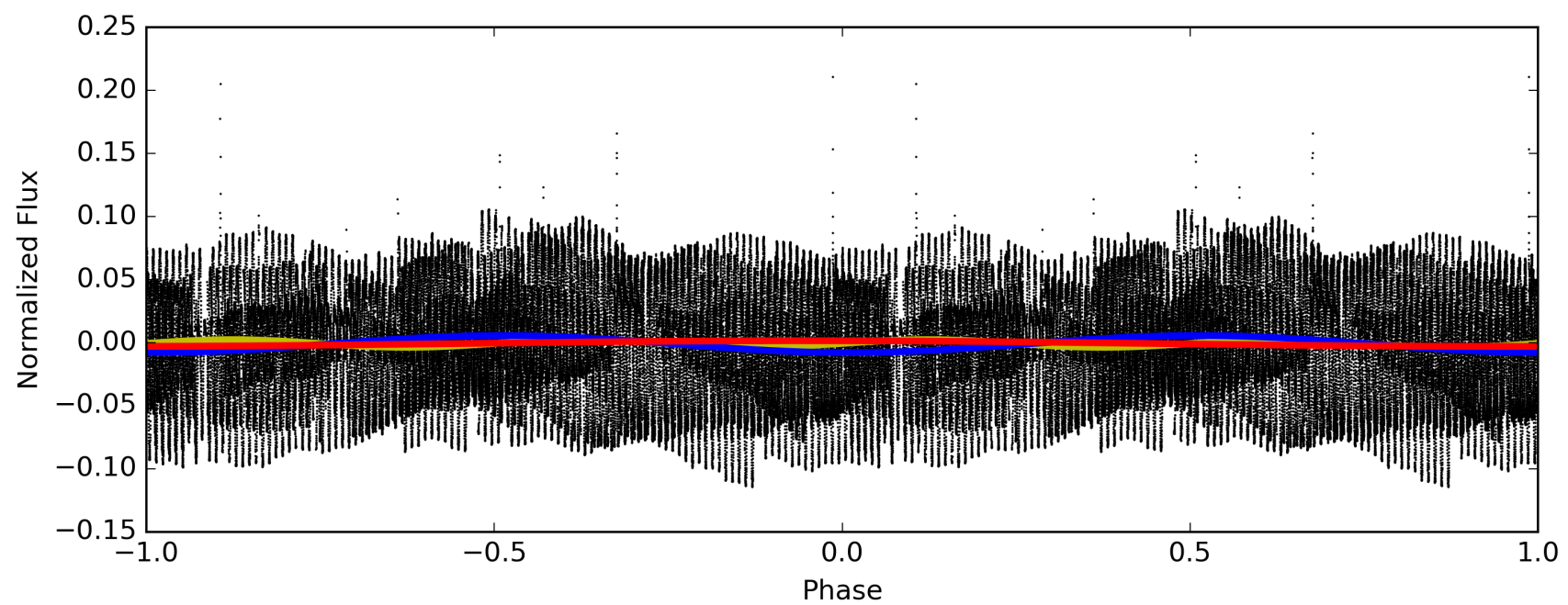
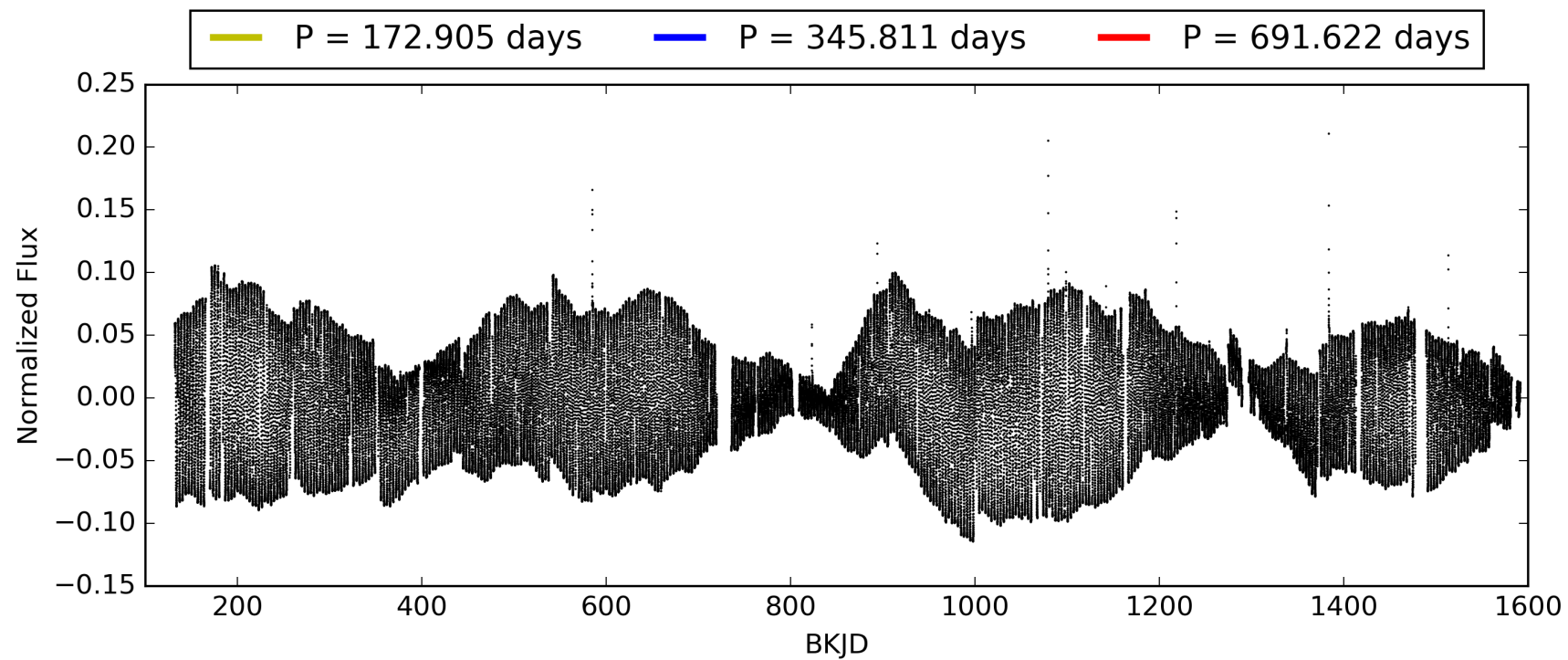
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:02:54 Z

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

TCE 009413885-05, PDC Light Curves

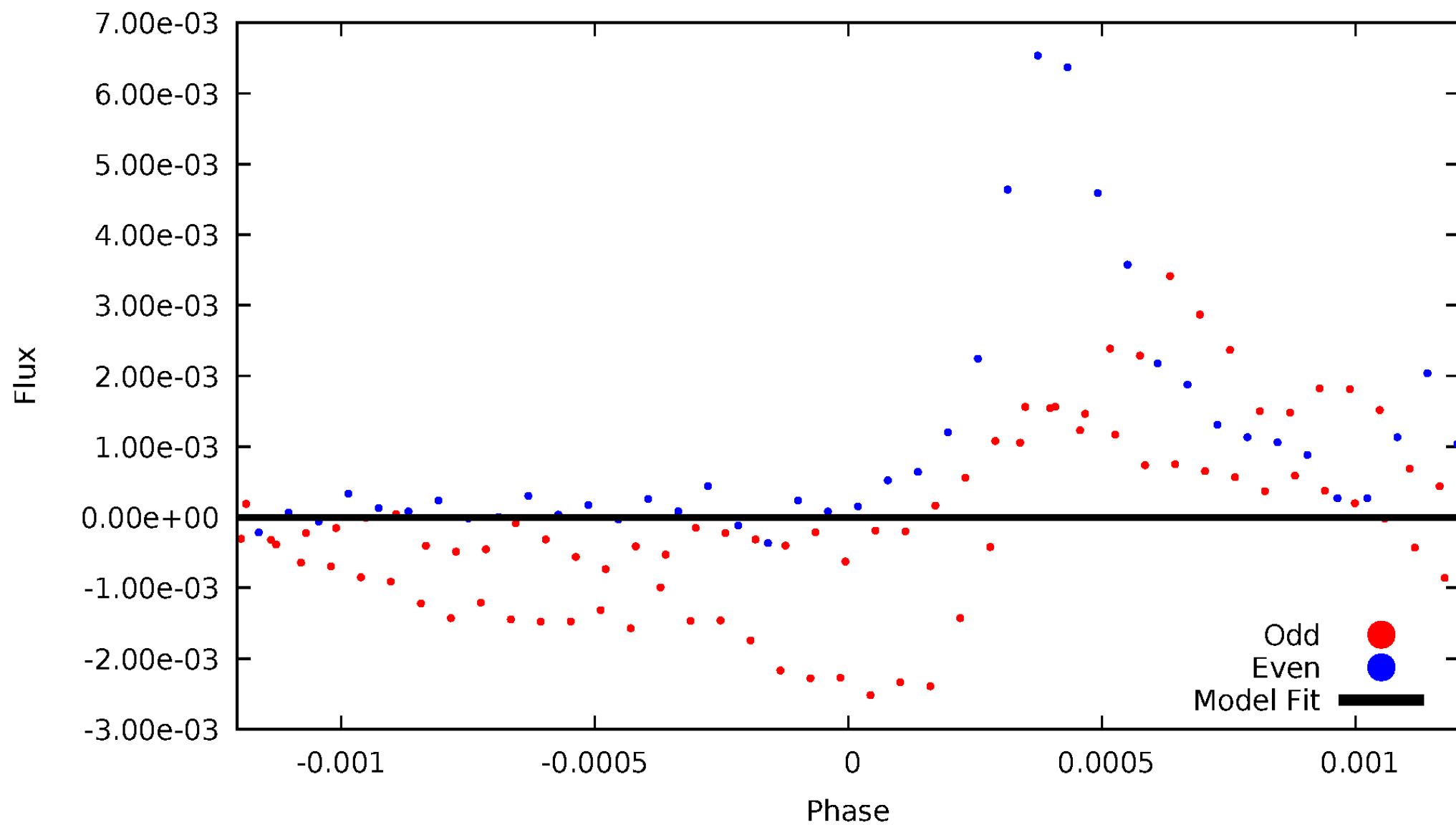


TCE 009413885-05



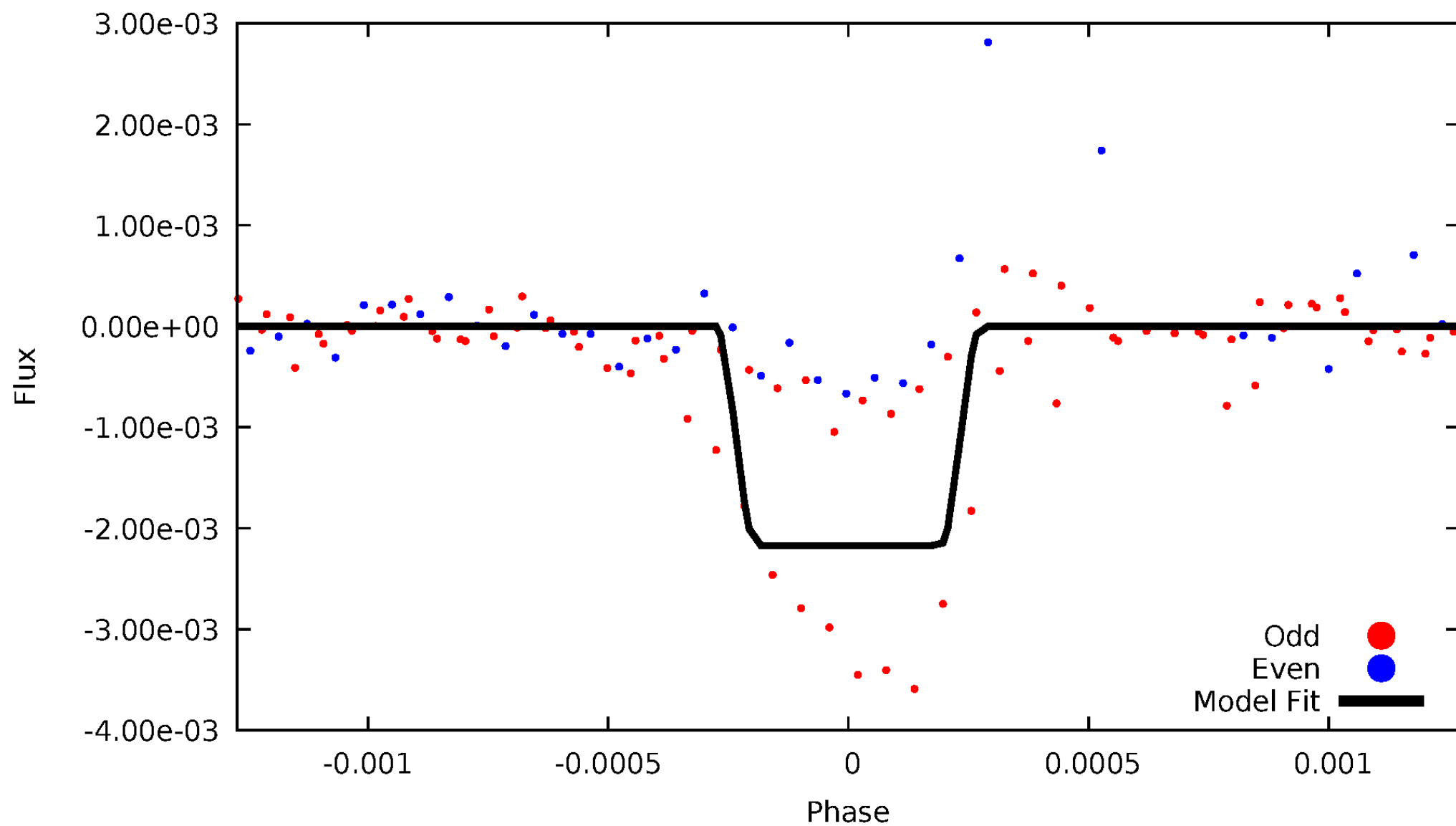
DV Odd/Even

TCE 009413885-05



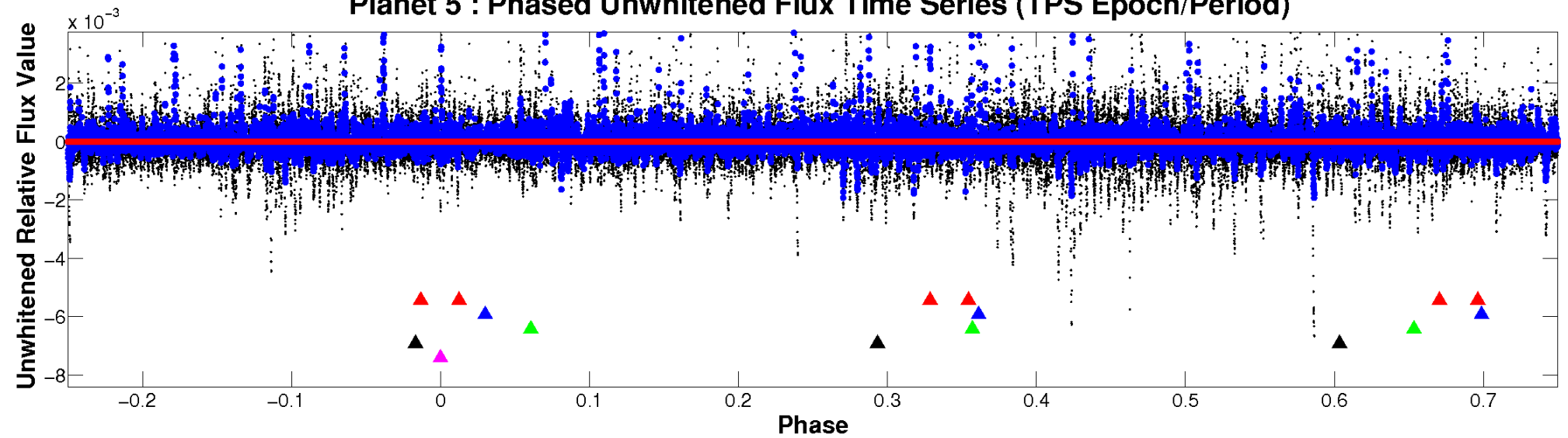
ALT Odd/Even

TCE 009413885-05

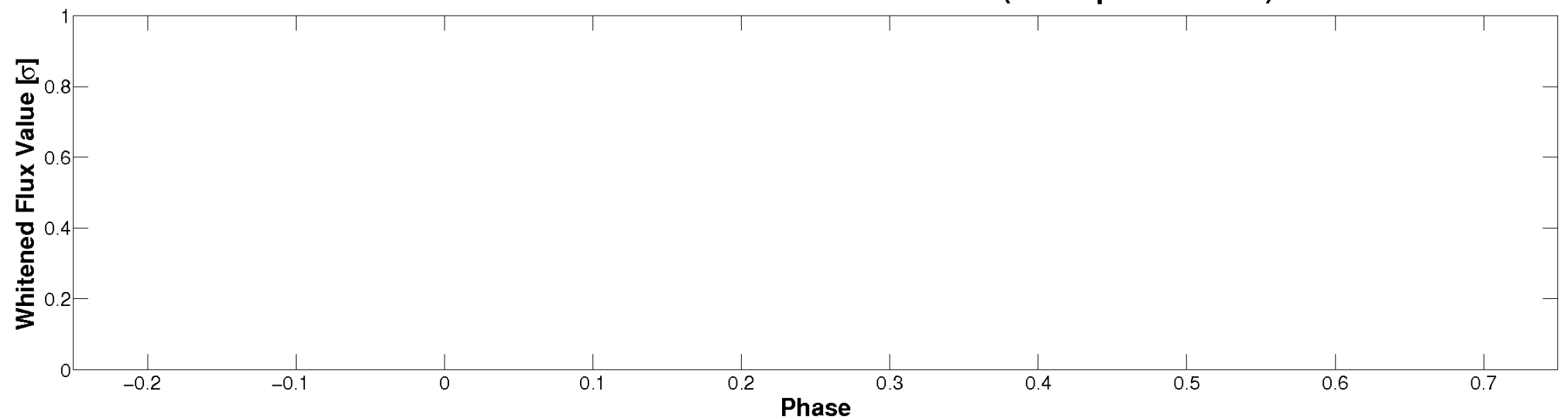


Non-Whitened Vs. Whitened Light Curve

Planet 5 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)

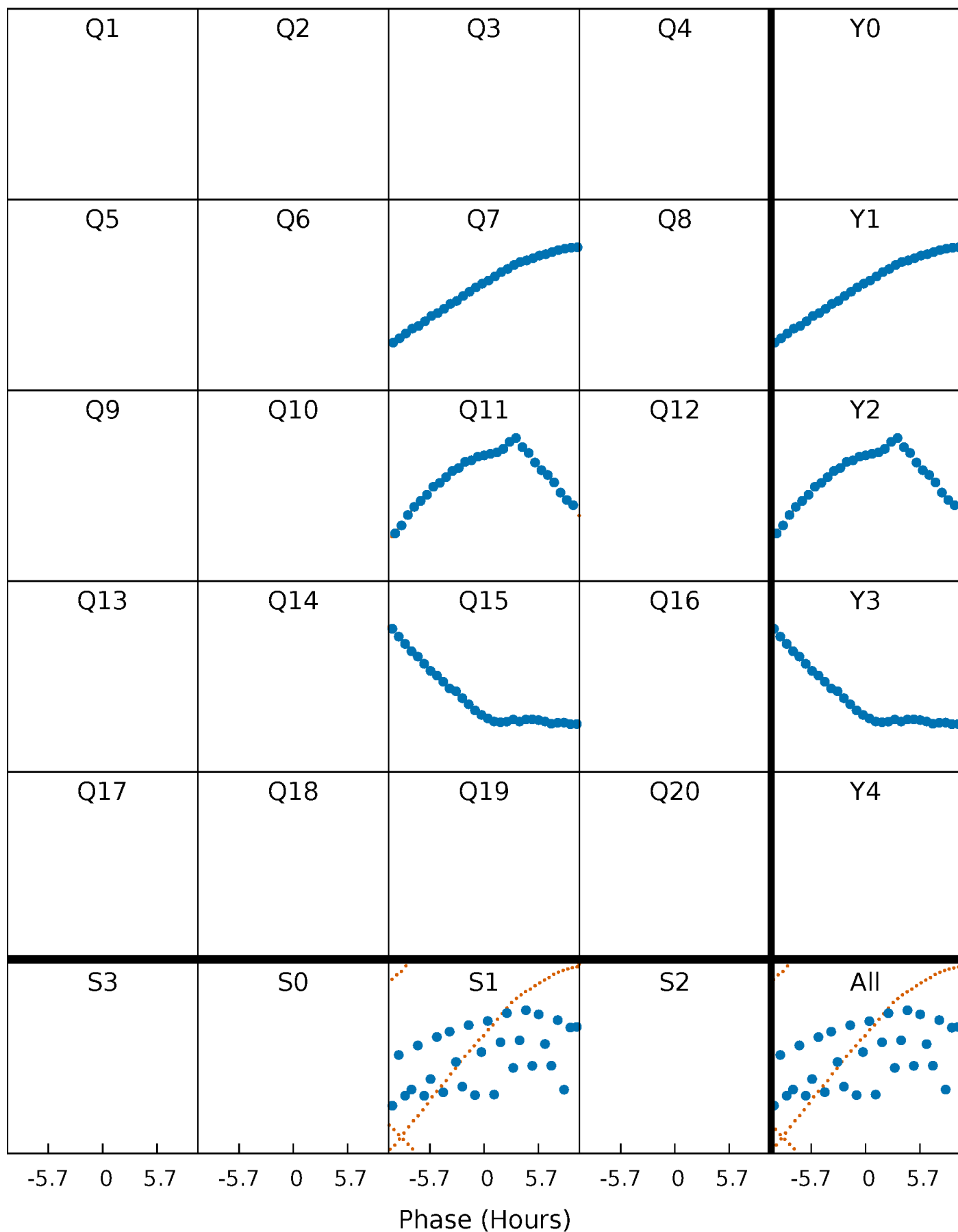


Planet 5 : Phased Whitened Flux Time Series (TPS Epoch/Period)



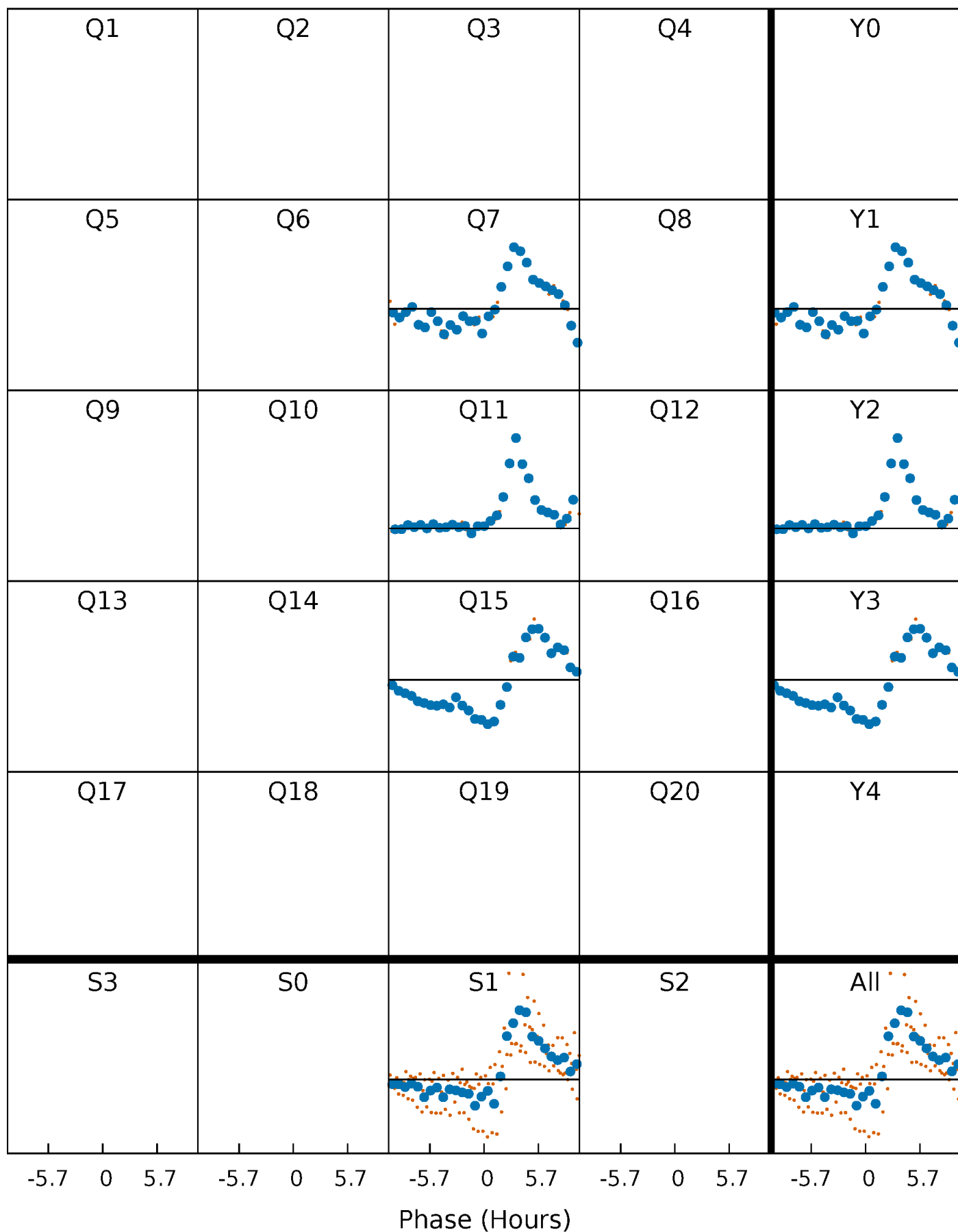
PDC Quarter-Phased Transit Curves

TCE 009413885-05 $P=345.810758$ Days $T_0=350.752876$ (BKJD)



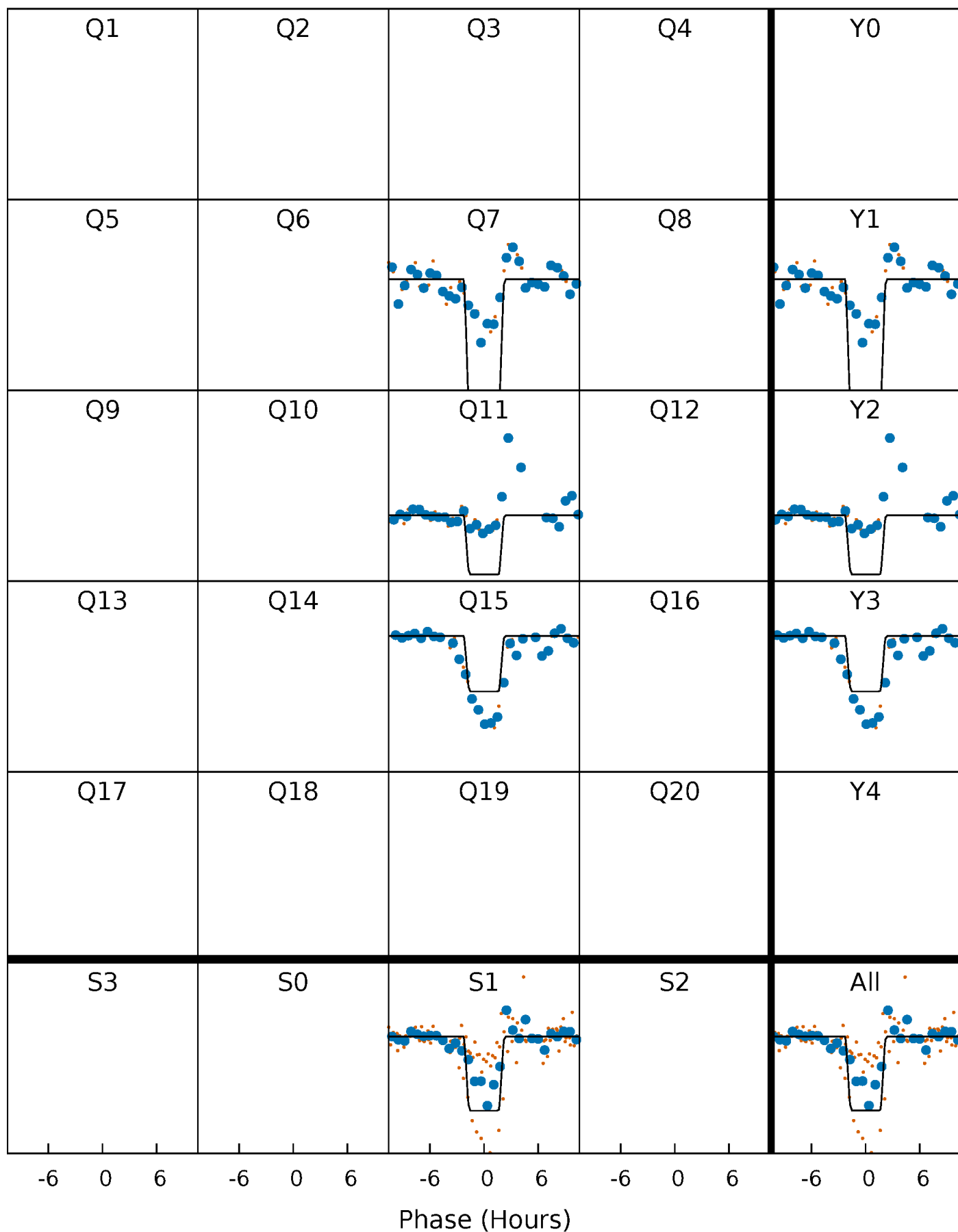
DV Quarter-Phased Transit Curves

TCE 009413885-05 $P=345.810758$ Days $T_0=350.752876$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

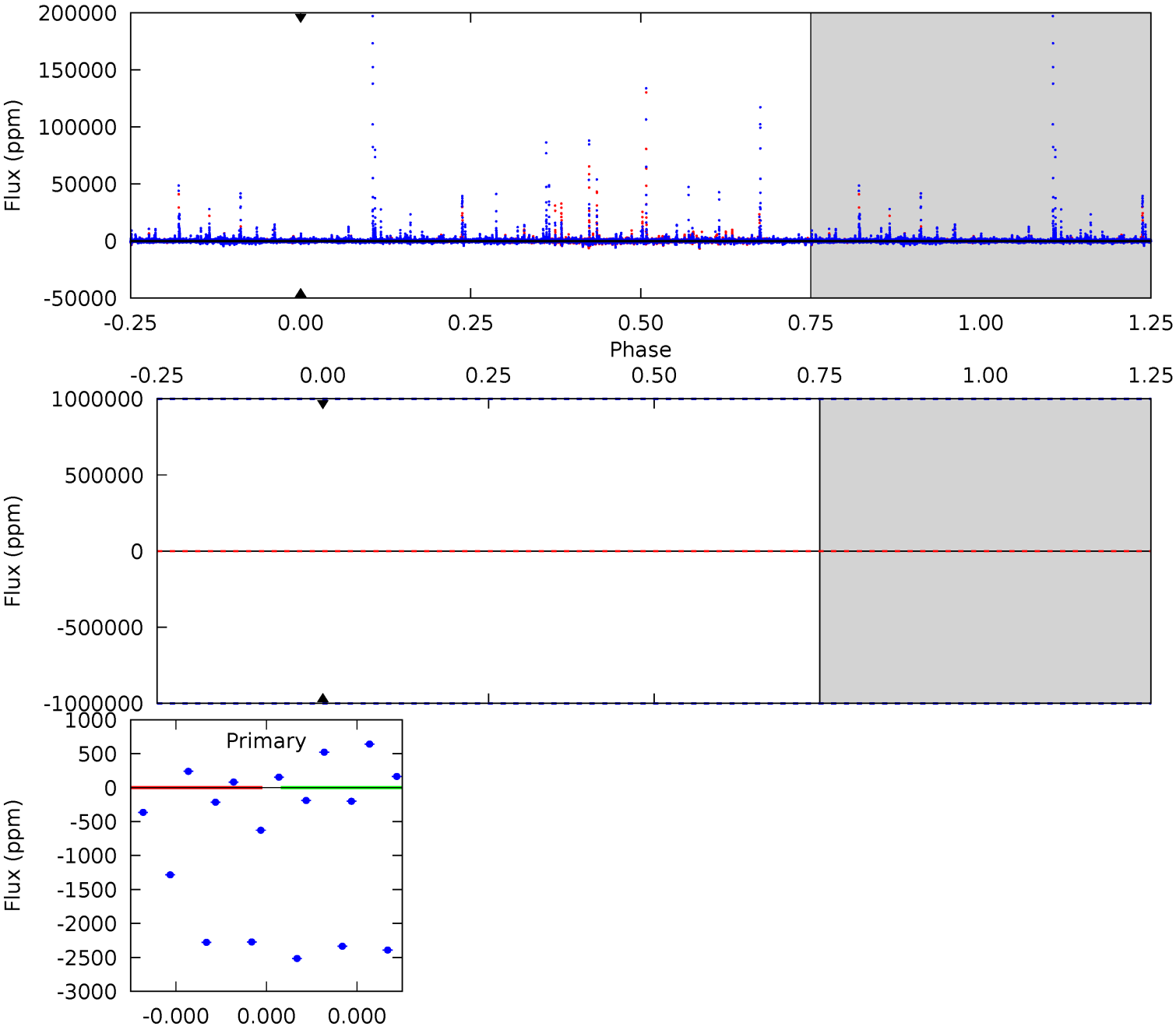
TCE 009413885-05 $P=345.810758$ Days $T_0=350.761020$ (BKJD)



DV Model-Shift Uniqueness Test

009413885-05, P = 345.810758 Days, E = 4.942118 Days

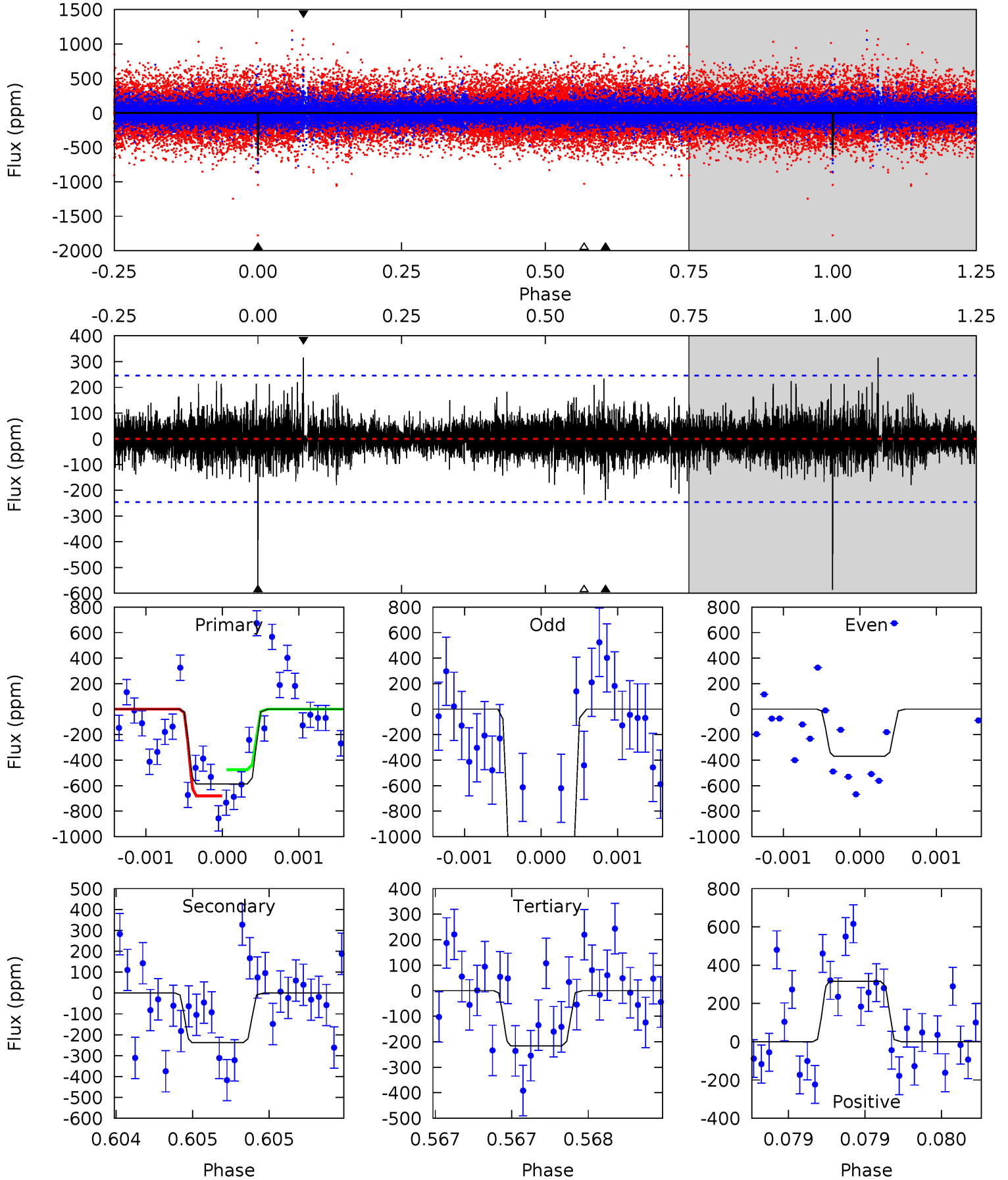
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

009413885-05, P = 345.810758 Days, E = 4.950262 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.3	5.39	4.89	7.15	5.56	3.46	0.97	8.39	6.14	0.50	-1.76	17.2	2.04	0.35	2.34



Stellar Parameters For KIC 009413885

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5112^{+137}_{-122}	$3.512^{+1.072}_{-0.357}$	$-0.580^{+0.300}_{-0.250}$	$2.638^{+1.552}_{-2.070}$	$0.824^{+0.262}_{-0.175}$	$0.063^{+3.101}_{-0.048}$
	+3%/-2%	+31%/-10%	+52%/-43%	+59%/-78%	+32%/-21%	+4903%/-76%
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 009413885-05 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	0 ± 1000000	$20.83^{+26.02}_{-15.02}$	535^{+84}_{-117}	4022^{+11531}_{-16962}	$1811^{+247497}_{-157539}$
Alt.	-238 ± 44	$21.73^{+30.17}_{-15.04}$	528^{+93}_{-123}	2829^{+1229}_{-442}	220^{+2219}_{-180}

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 $A_{obs} \gg 1.0$

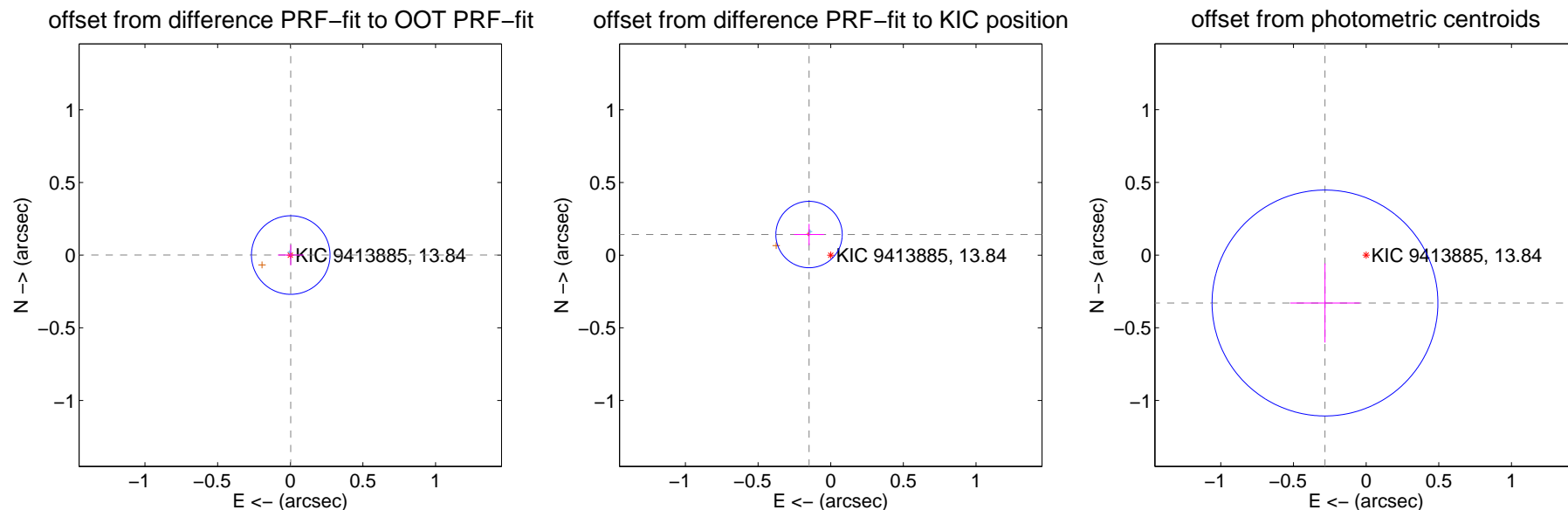
DV Centroid Data

Supplemental centroid analysis for 009413885-05. Kepler magnitude: 13.84. Transit SNR -1.00

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.003 ± 0.090	0.04	-0.003 ± 0.088	0.001 ± 0.071
PRF-fit source offset from KIC position	0.206 ± 0.076	2.70	0.149 ± 0.104	0.142 ± 0.073
photometric centroid source offset	0.43 ± 0.26	1.68	0.28 ± 0.24	-0.33 ± 0.27

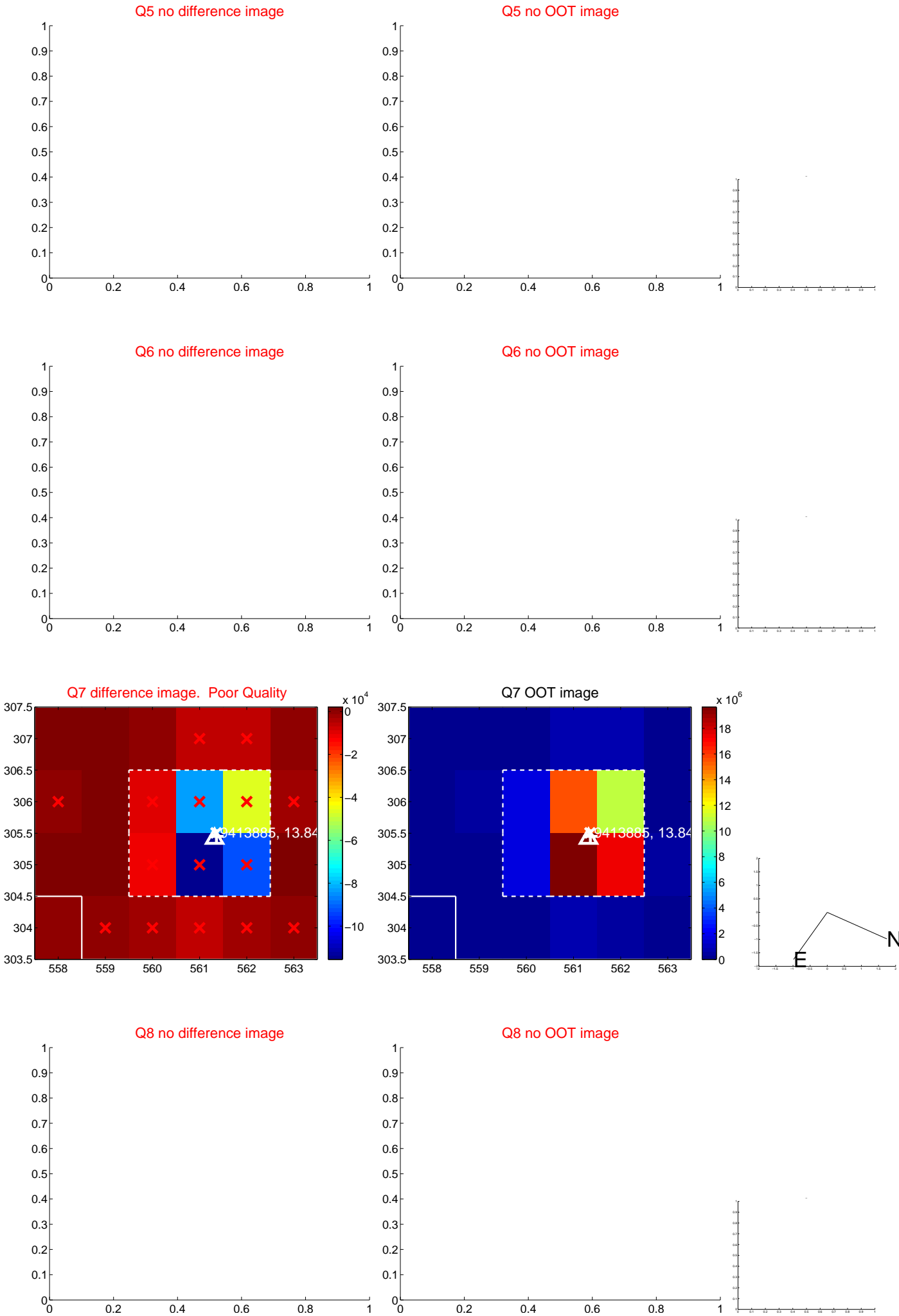


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

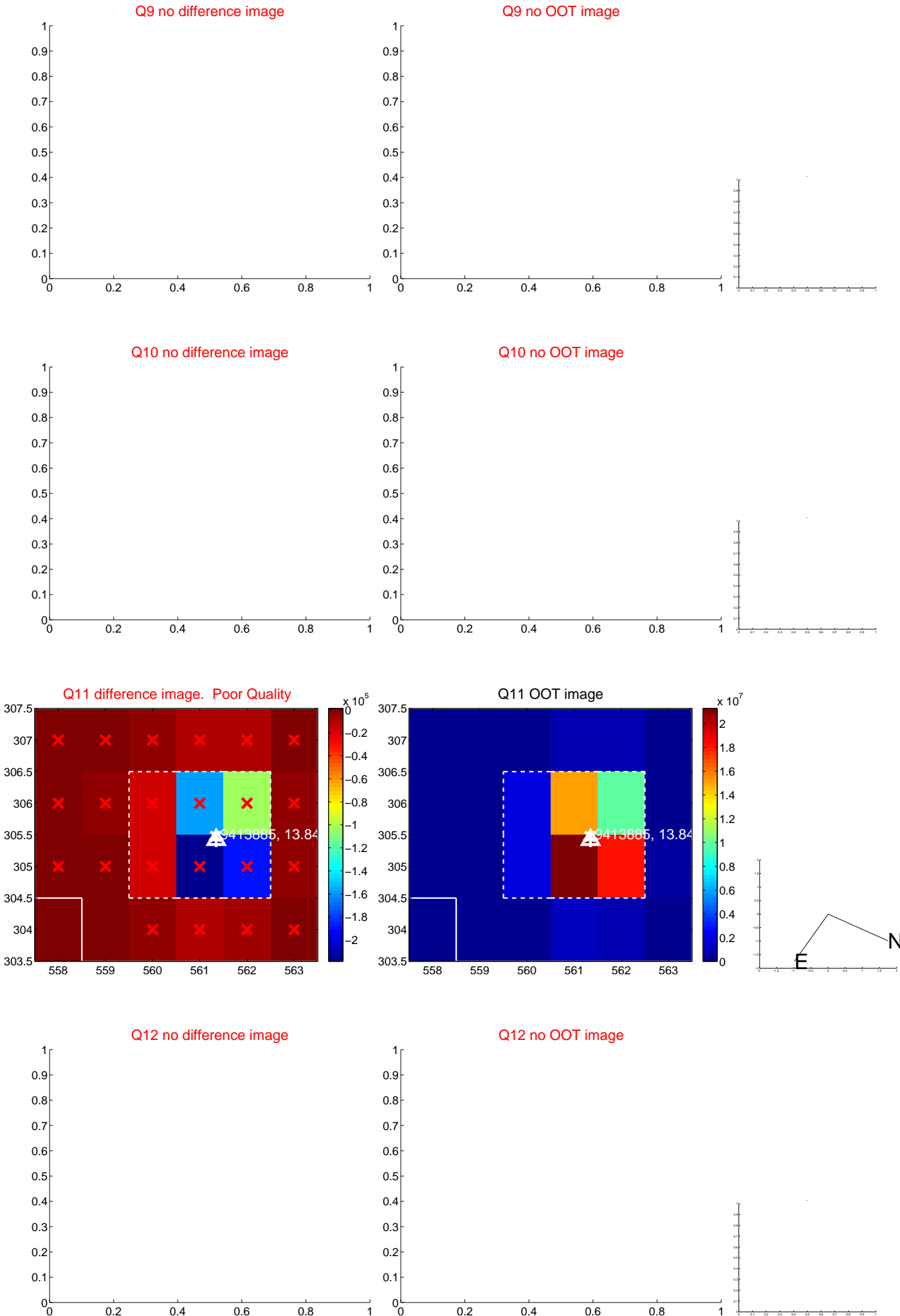
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



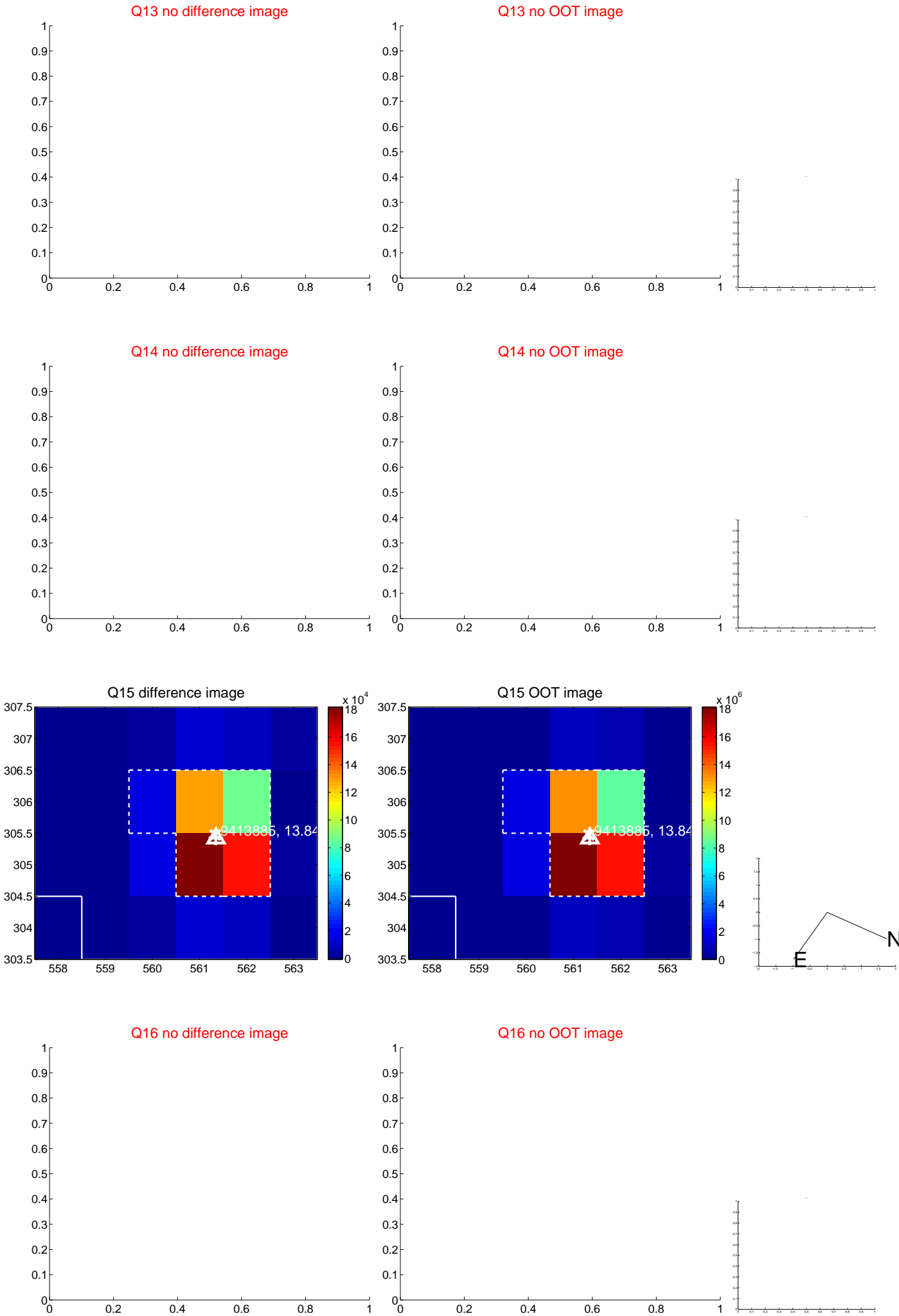
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



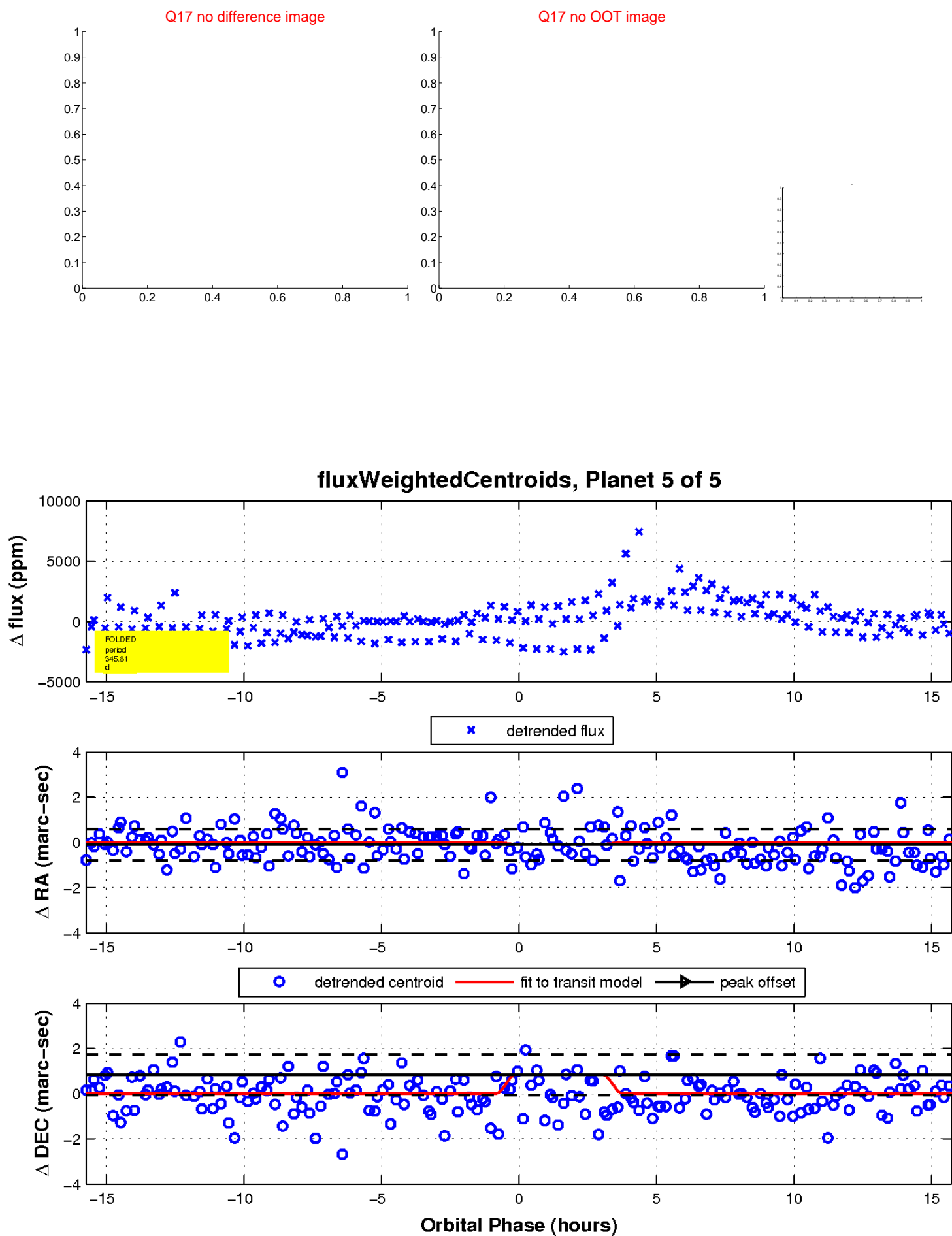
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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UKIRT Image

Declination

