

KIC 009704431

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})
009704431-01	OBS	No	504.078441	317.314195	2637.7	4.973	11.8	7.2	0.29	3360	1.83	0.01
009704431-02	OBS	No	113.822415	223.143299	995.3	1.922	10.1	5.6	0.29	3360	0.96	0.10
009704431-03	OBS	No	273.070806	293.901798	1741.2	9.668	9.3	6.6	0.29	3360	1.22	0.03

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009704431-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— INCONSISTENT_TRANS—CENT_FEW_DIFFS
009704431-02	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—HALO_GHOST
009704431-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—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.

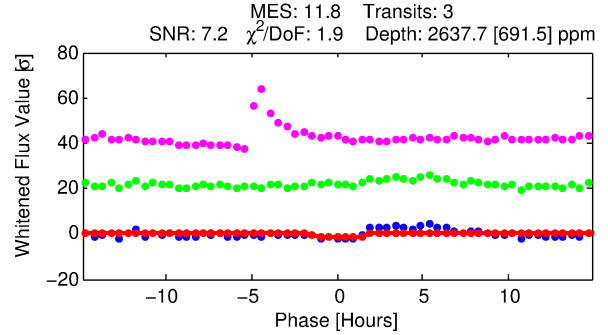
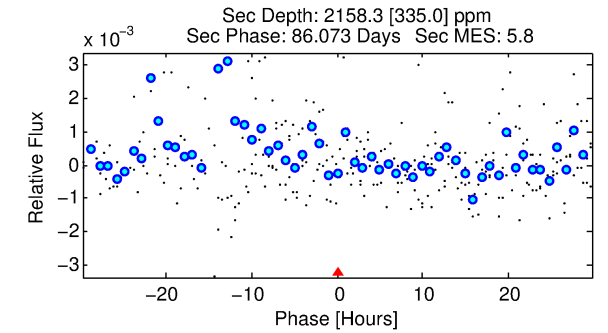
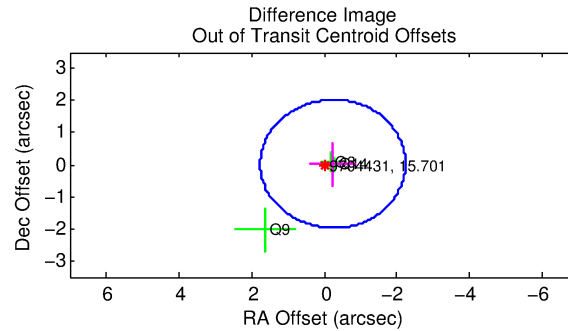
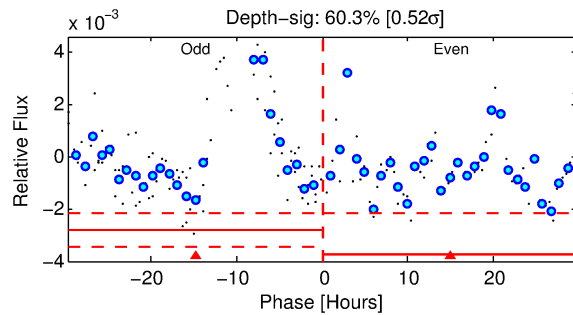
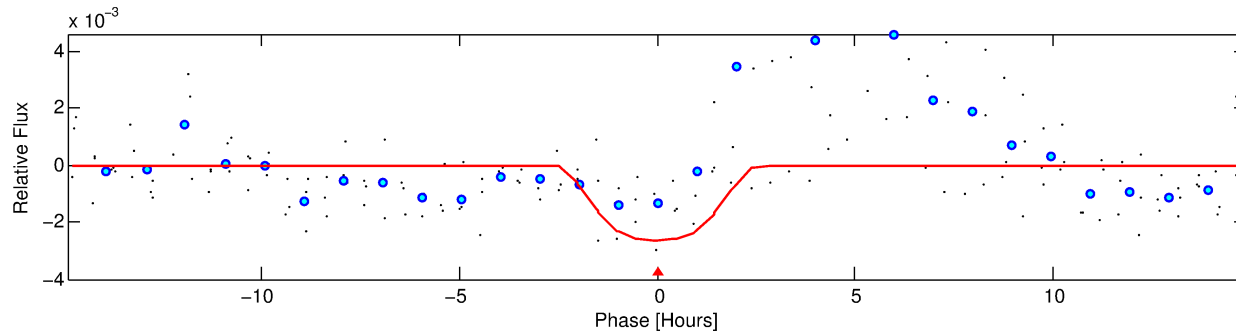
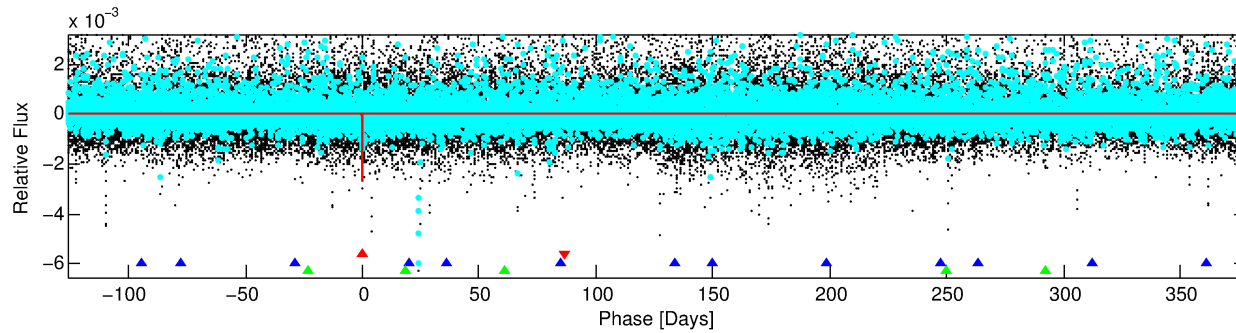
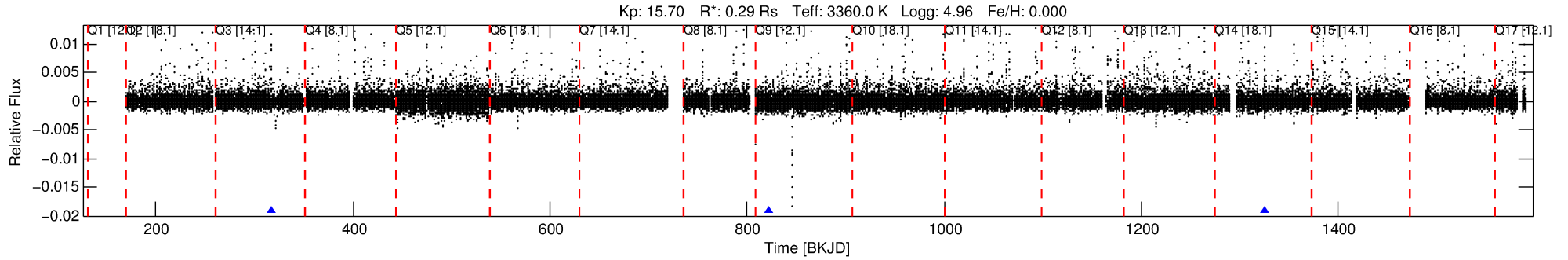
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009704431-01

No Significant Match Found

DV One-Page Summary

KIC: 9704431 Candidate: 1 of 3 Period: 504.078 d



DV Fit Results:

Period = 504.07844 [0.01104] d
Epoch = 317.3142 [0.0140] BKJD
Rp/R* = 0.0586 [0.0112]
a/R* = 394.56 [123.18]
b = 0.93 [0.05]
Seff = 0.01 [0.00]
Teq = 88 [3] K
Rp = 1.84 [0.44] Re
a = 0.8059 [0.0814] AU
Ag = 228964.09 [98230.55] [2.33σ]
Teff = 2992 [311] K [9.33σ]

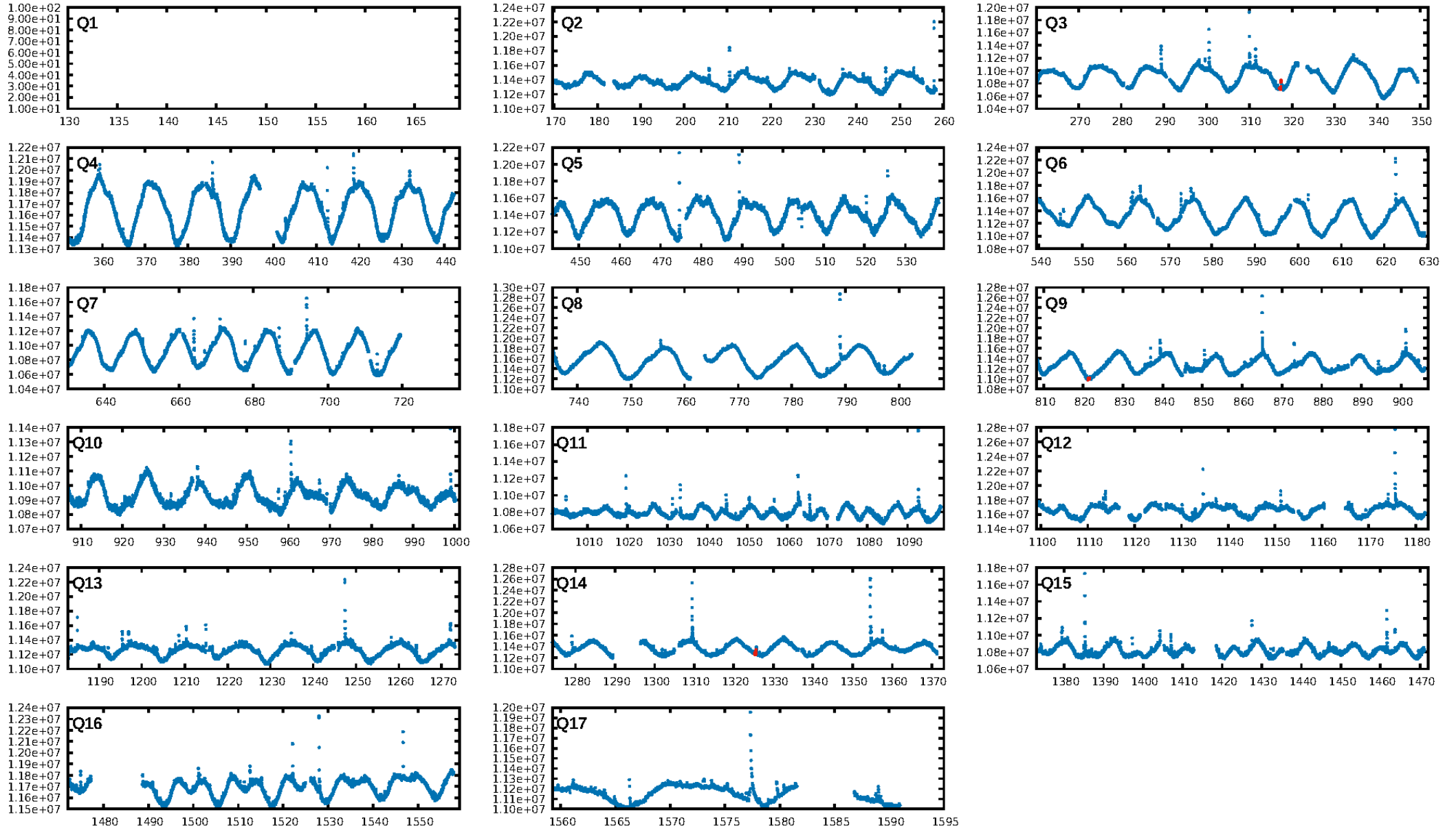
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [509.94σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 7.8%
ModelChiSquareGof-sig: 52.4%
Bootstrap-pfa: 4.94e-11
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 1.494
Centroid-sig: 11.5%
Centroid-so: 1.372 arcsec [1.46σ]
OotOffset-rm: 0.242 arcsec [0.36σ]
KicOffset-rm: 0.296 arcsec [0.43σ]
OotOffset-st: 1/1/0/1 [3]
KicOffset-st: 1/1/0/1 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

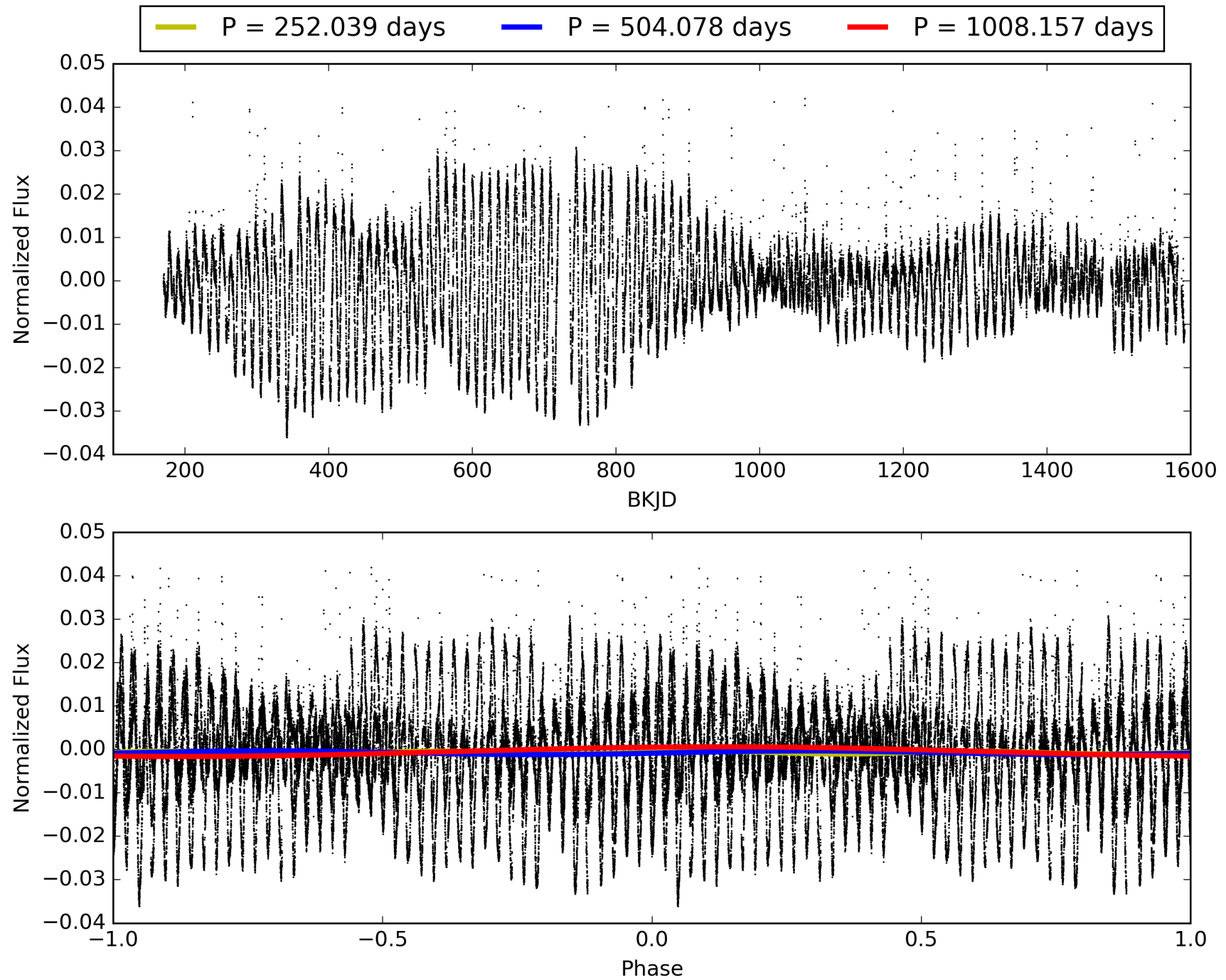
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 18:15:51 Z

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

TCE 009704431-01, PDC Light Curves

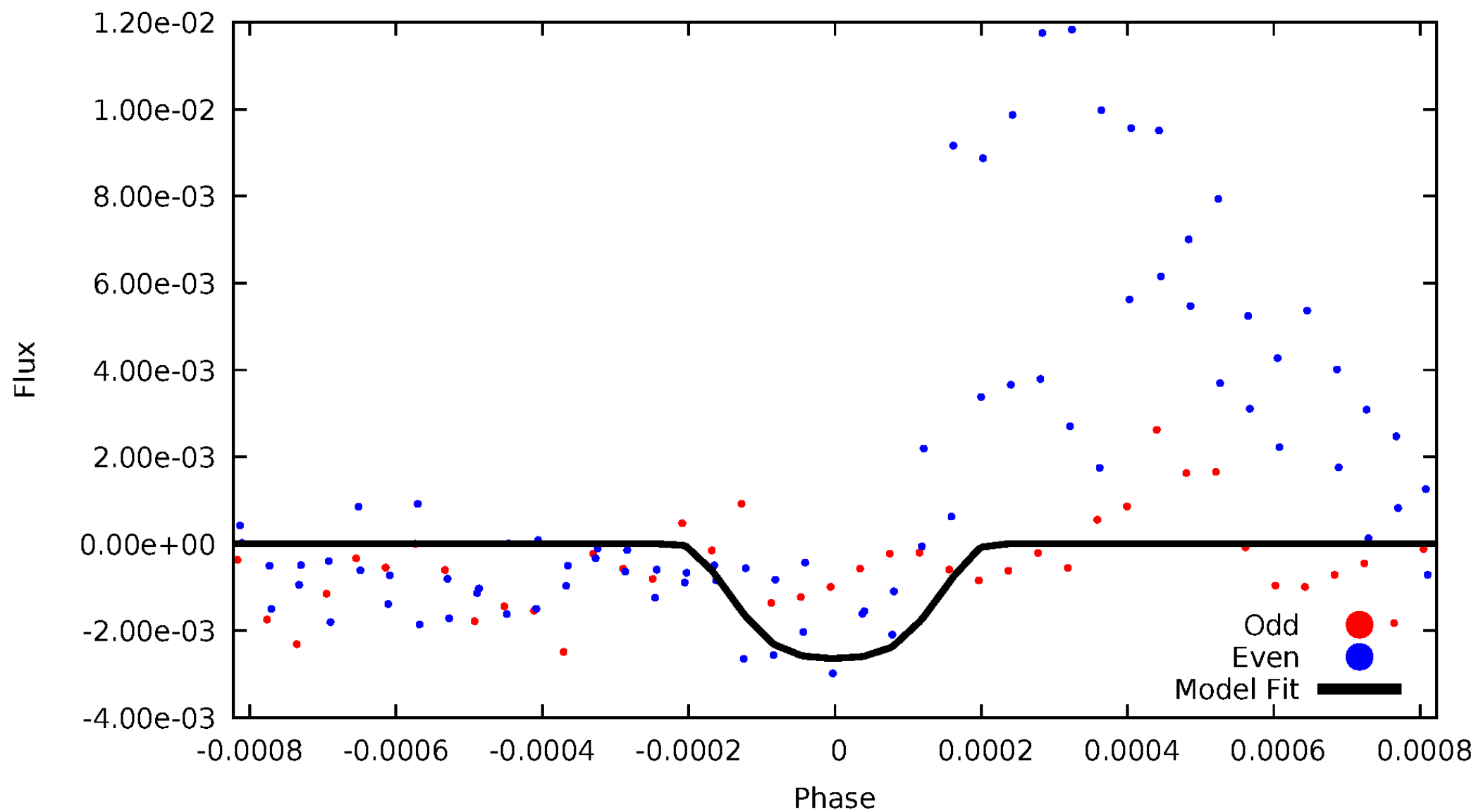


TCE 009704431-01



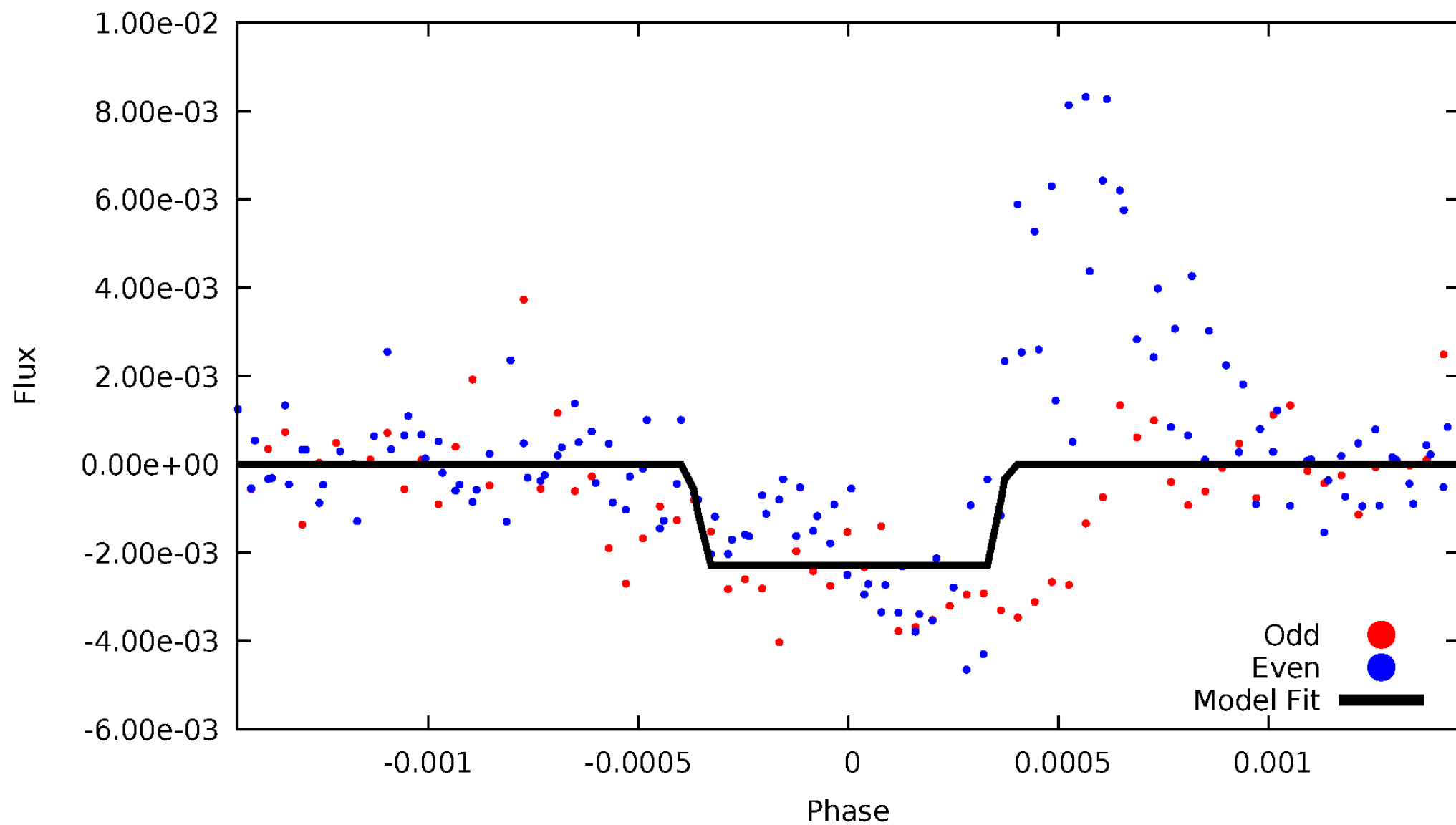
DV Odd/Even

TCE 009704431-01



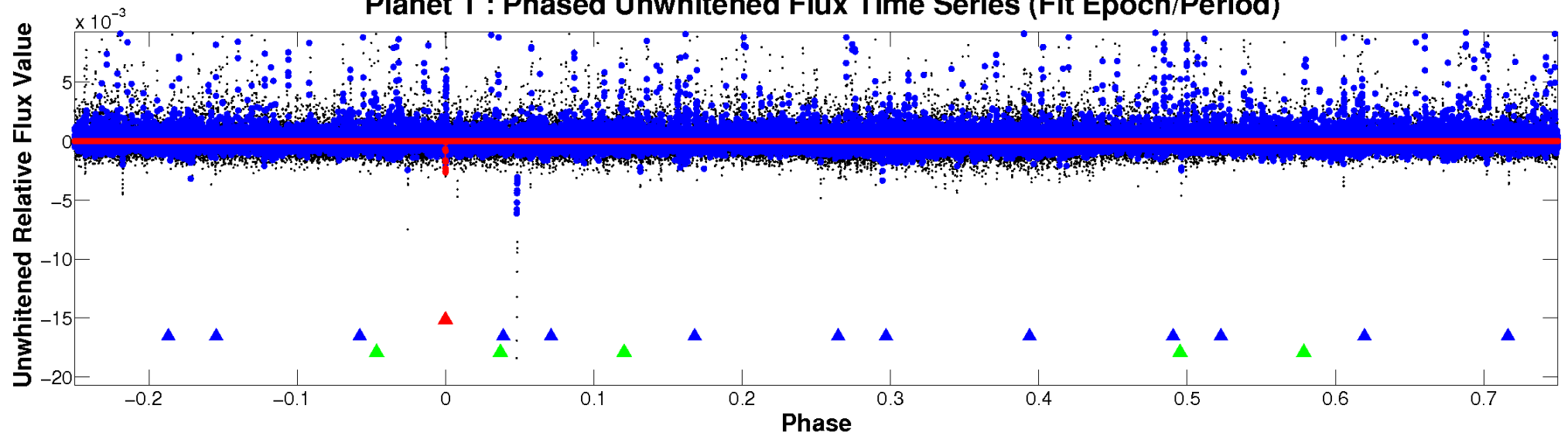
ALT Odd/Even

TCE 009704431-01

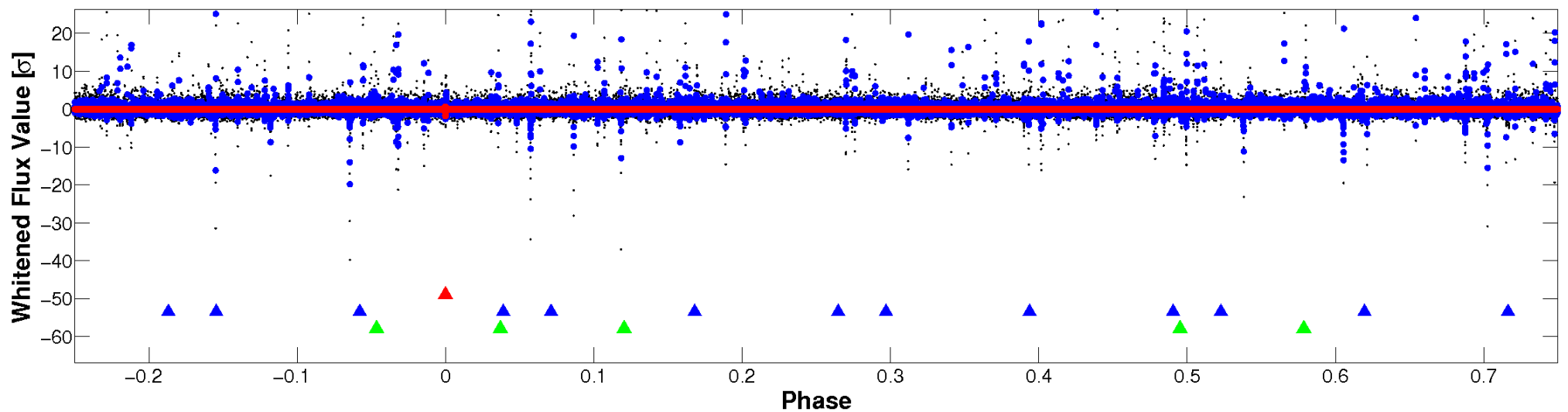


Non-Whitened Vs. Whitened Light Curve

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



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



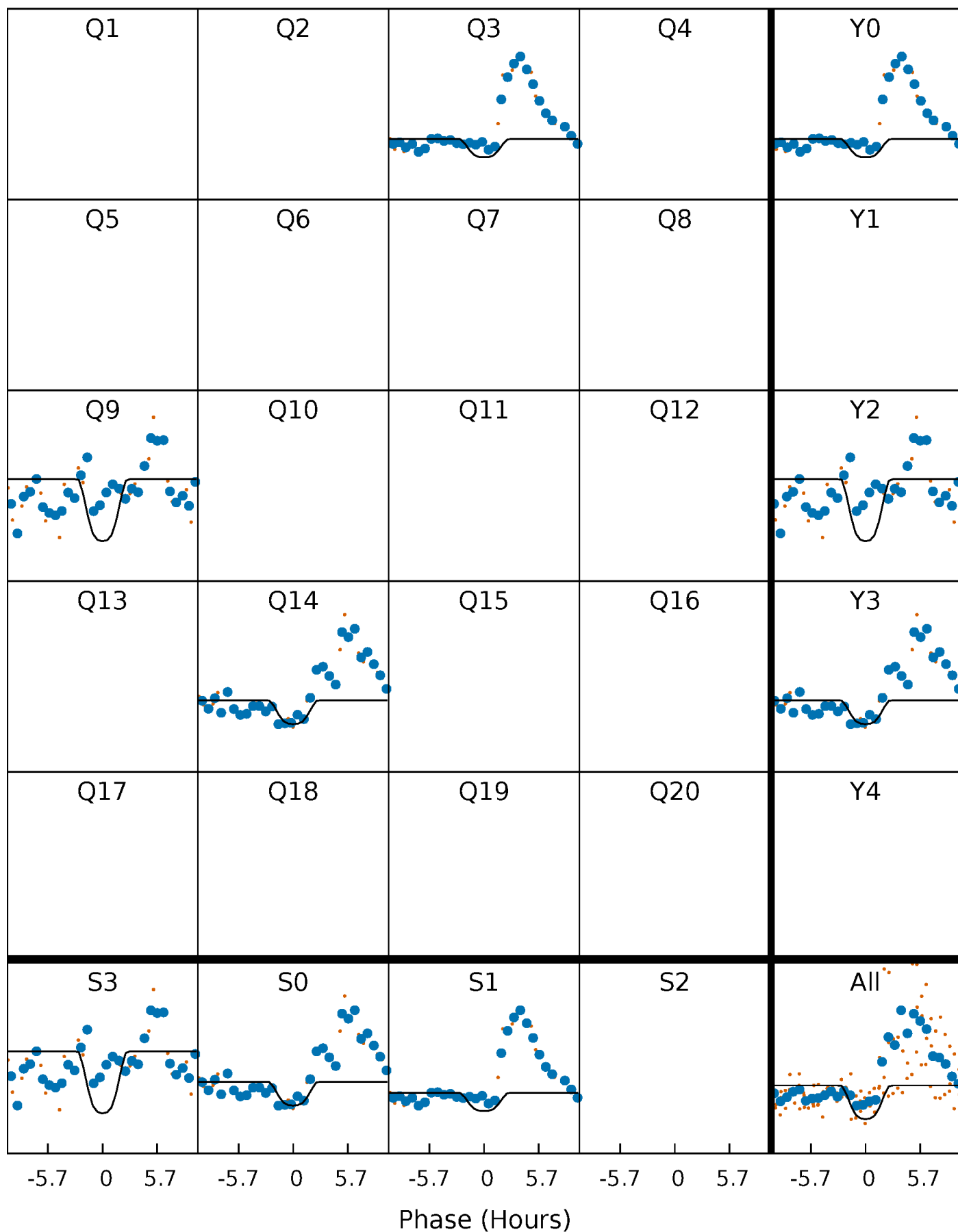
PDC Quarter-Phased Transit Curves

TCE 009704431-01 P=504.078441 Days $T_0=317.314195$ (BKJD)



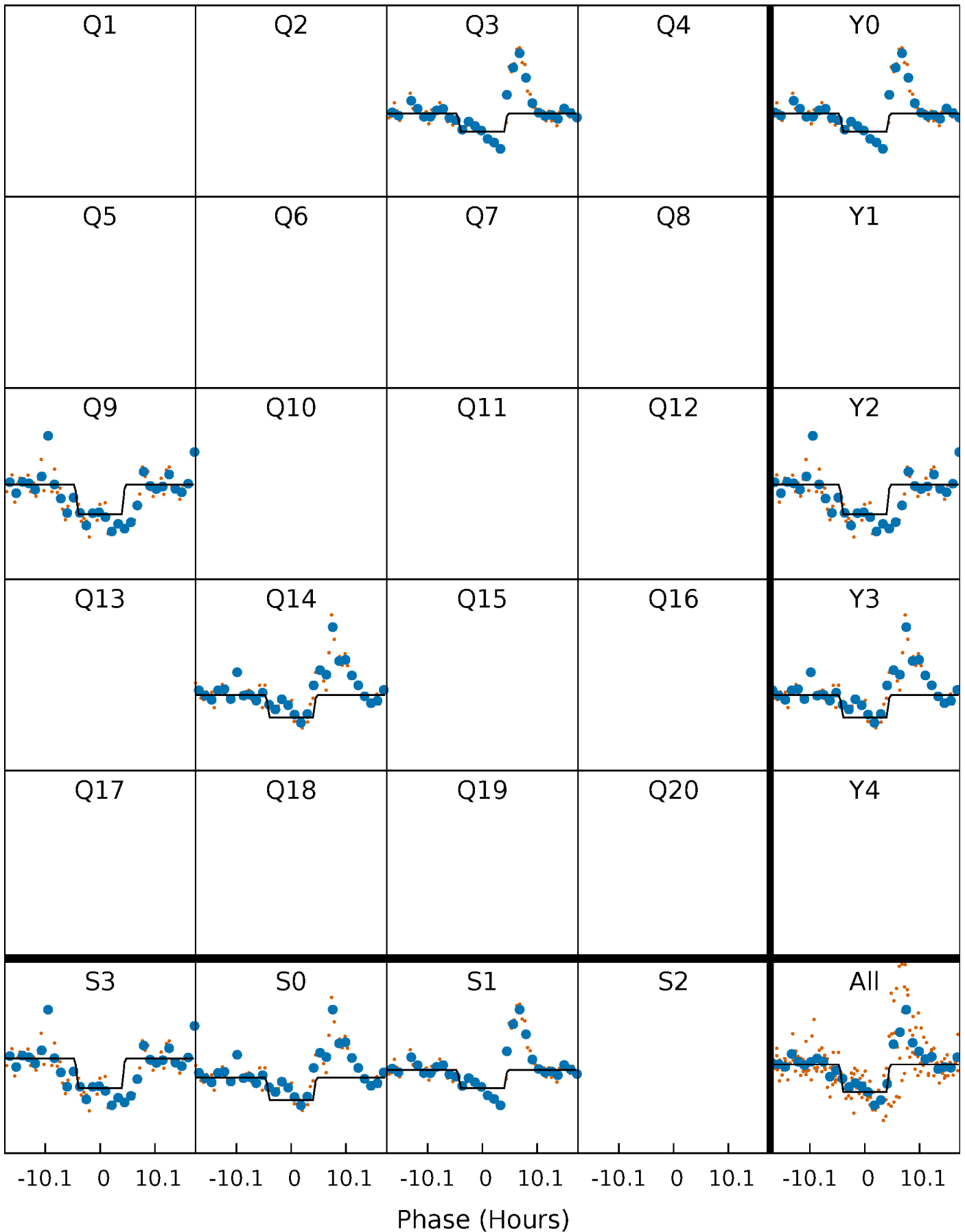
DV Quarter-Phased Transit Curves

TCE 009704431-01 P=504.078441 Days $T_0=317.314195$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

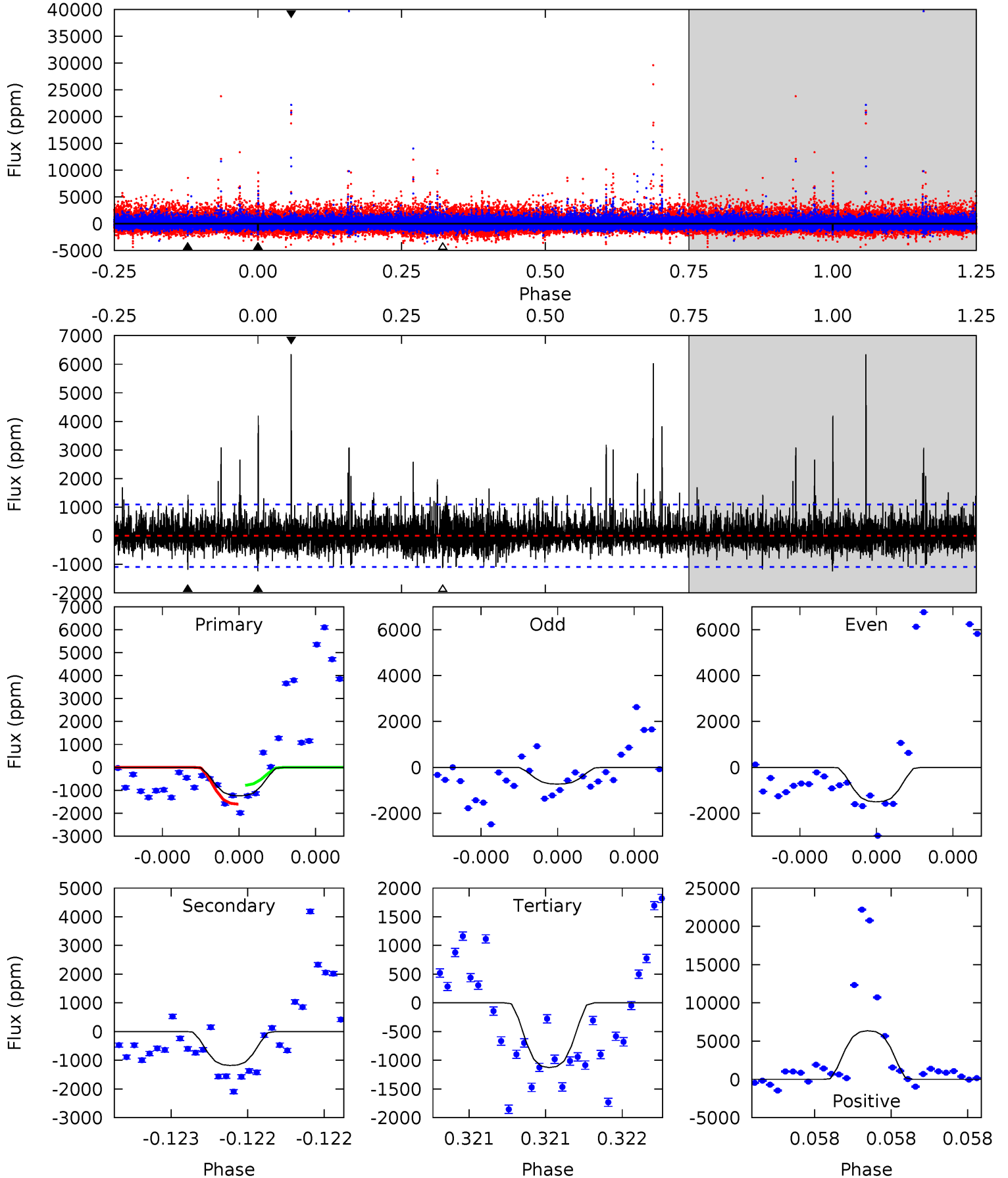
TCE 009704431-01 P=504.095925 Days $T_0=317.192631$ (BKJD)



DV Model-Shift Uniqueness Test

009704431-01, P = 504.078441 Days, E = 317.314195 Days

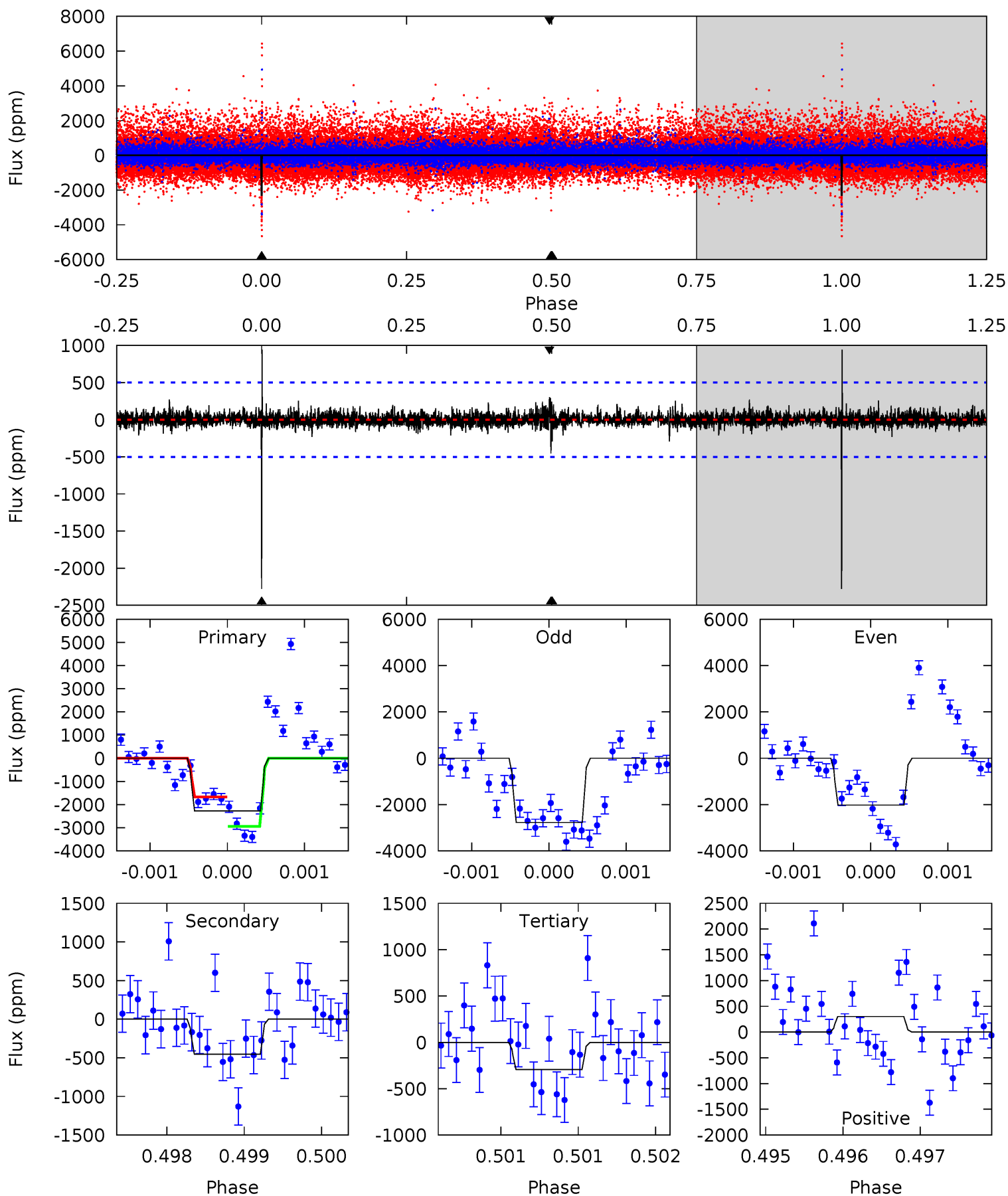
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.36	6.06	5.78	32.6	5.61	3.53	2.12	0.58	-26.2	0.28	-26.5	1.10	1.35	0.84	2.11



Alt Model-Shift Uniqueness Test

009704431-01, P = 504.095925 Days, E = 317.192631 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.9	4.96	3.21	3.31	5.50	3.36	0.62	21.7	21.6	1.75	1.65	3.82	0.90	0.29	6.88



Stellar Parameters For KIC 009704431

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	3360^{+43}_{-37}	$4.961^{+0.040}_{-0.044}$	$0.000^{+0.100}_{-0.100}$	$0.287^{+0.041}_{-0.030}$	$0.274^{+0.047}_{-0.034}$	$16.380^{+3.601}_{-3.540}$
	+1%/-1%	+1%/-1%	+inf%/-inf%	+14%/-10%	+17%/-12%	+22%/-22%
Source	PHO2	PHO2	PHO2	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009704431-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1181 ± 195	$1.88^{+0.37}_{-0.39}$	124^{+3}_{-3}	2865^{+199}_{-146}	119836^{+71506}_{-37613}
Alt.	-453 ± 91	$1.48^{+0.38}_{-0.37}$	124^{+3}_{-3}	2678^{+209}_{-160}	72684^{+59603}_{-28503}

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

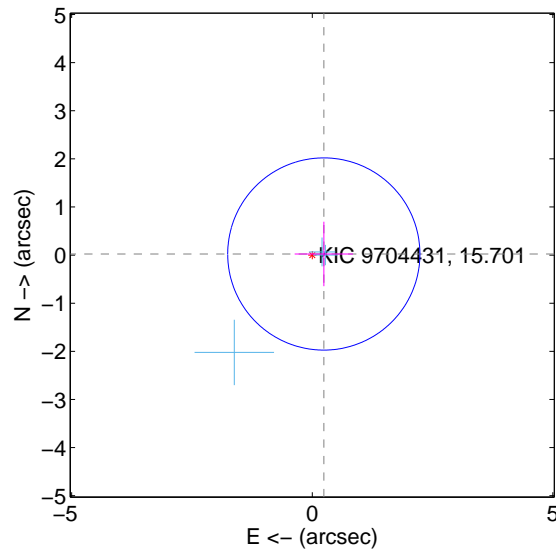
Supplemental centroid analysis for 009704431-01. Kepler magnitude: 15.70. Transit SNR 7.15

There are 3 quarters with good PRF difference image offsets

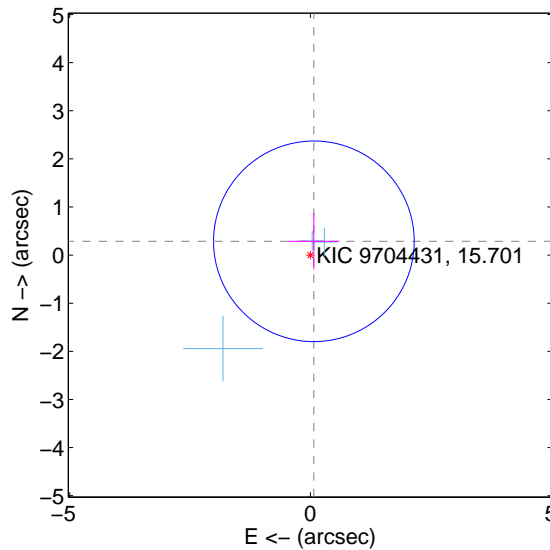
The direct PRF centroid is offset from the target star catalog position by about 0.37 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.242 ± 0.666	0.36	-0.240 ± 0.606	0.023 ± 0.670
PRF-fit source offset from KIC position	0.296 ± 0.695	0.43	-0.074 ± 0.531	0.287 ± 0.583
photometric centroid source offset	1.37 ± 0.94	1.46	1.25 ± 0.95	0.56 ± 0.89

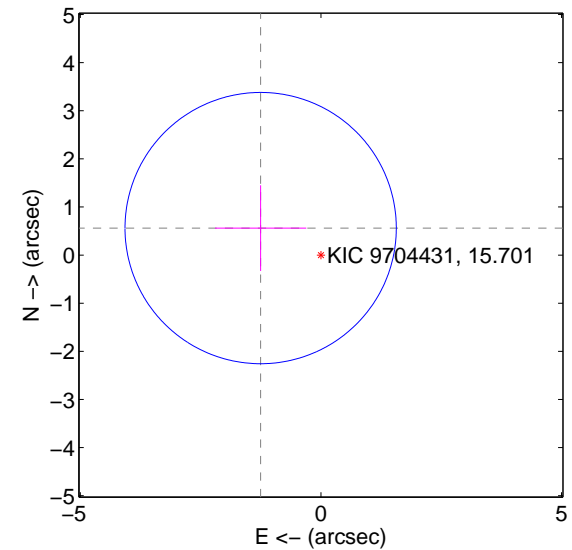
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

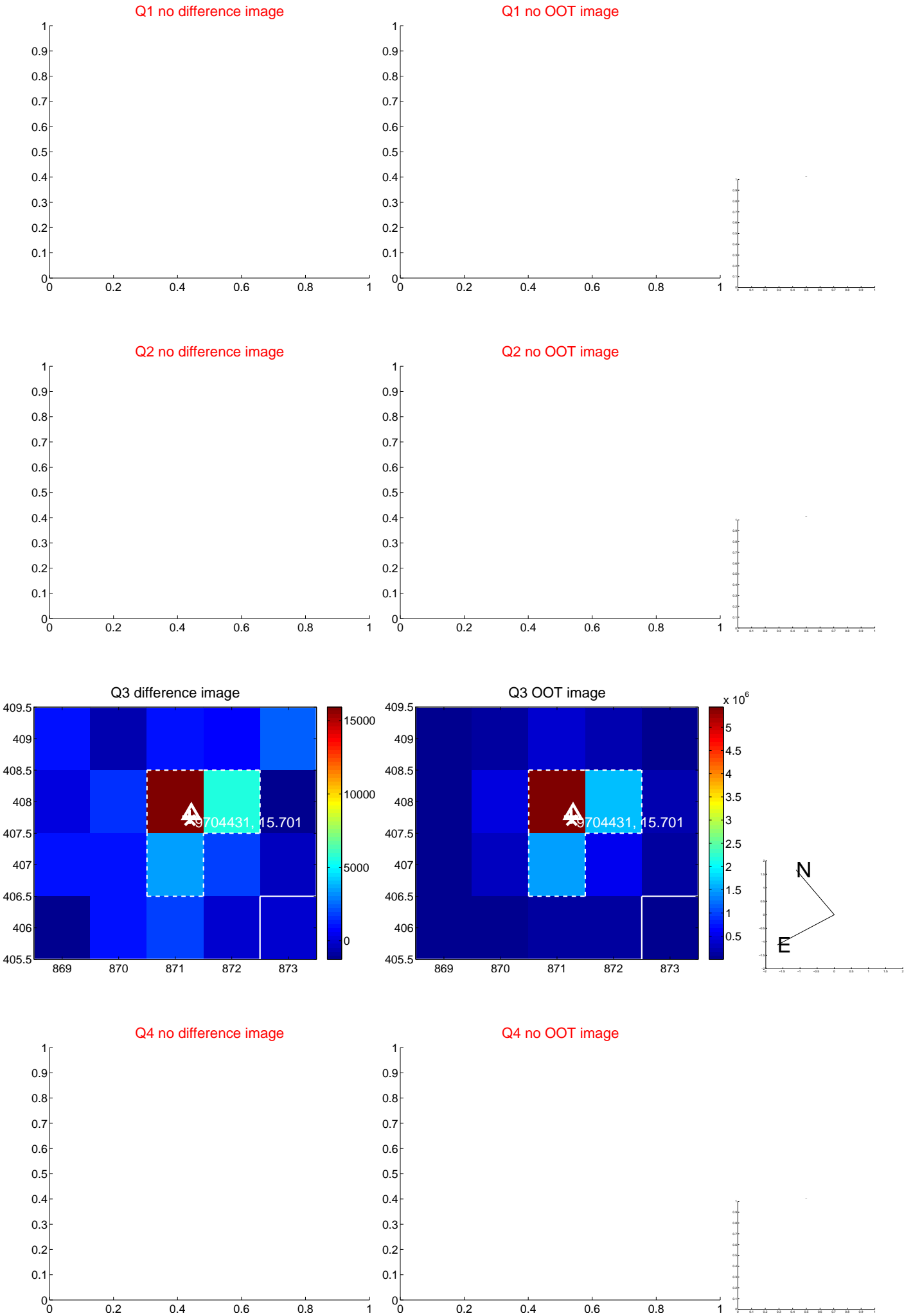


offset from photometric centroids



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.

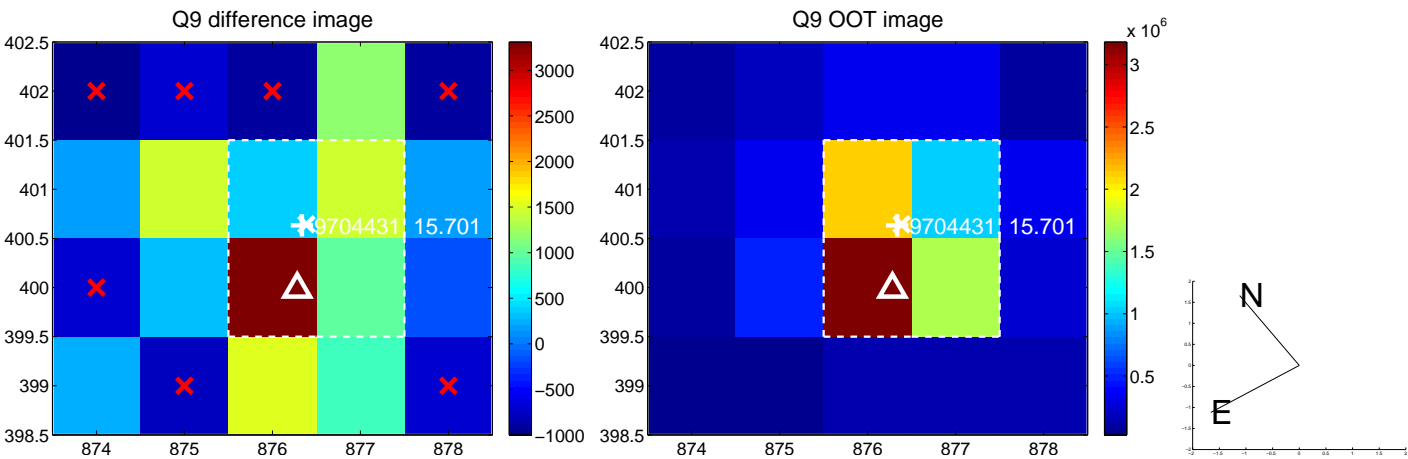
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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.

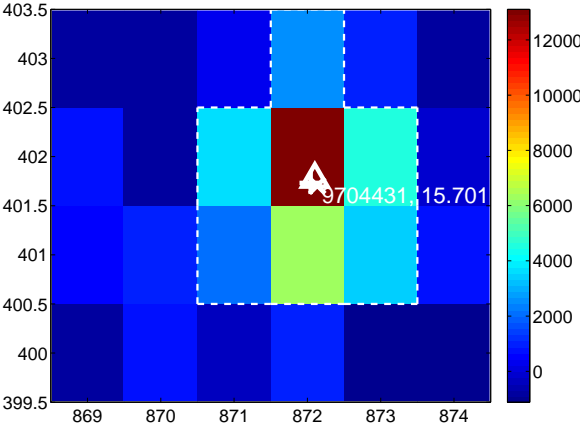
Q13 no difference image



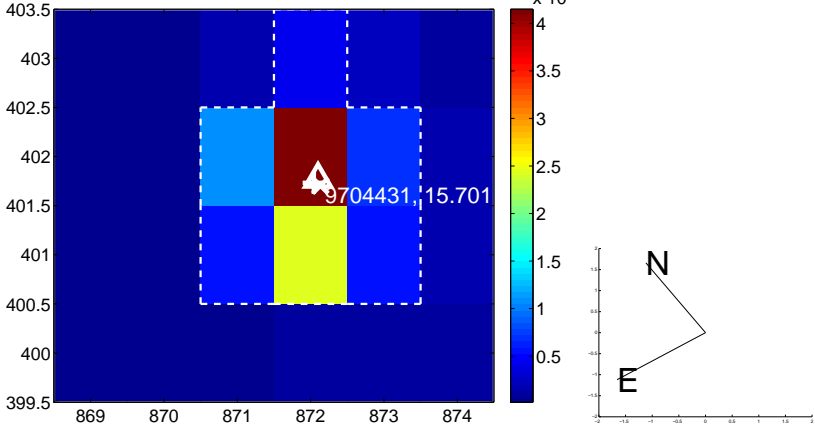
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



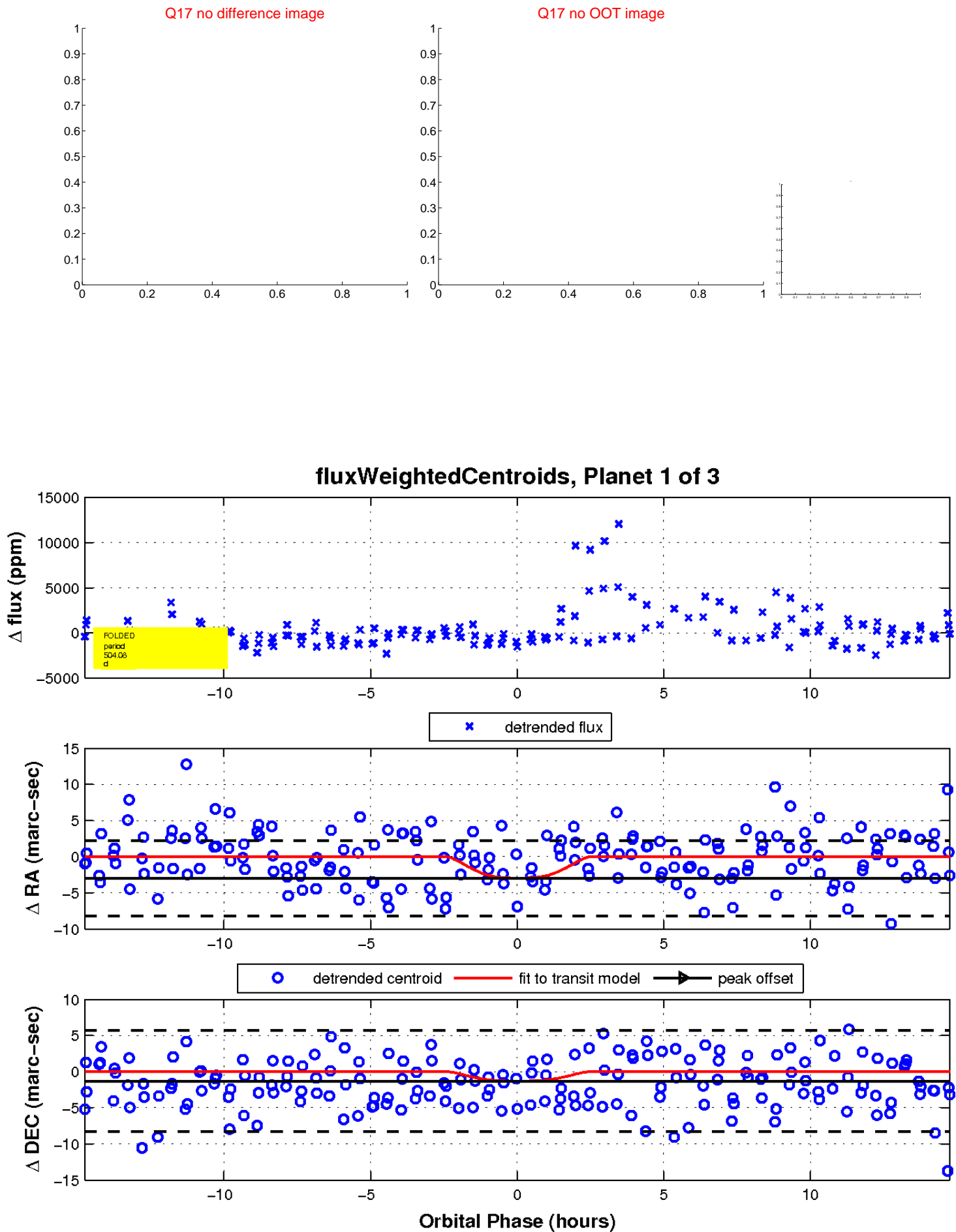
Q16 no difference image



Q16 no OOT image

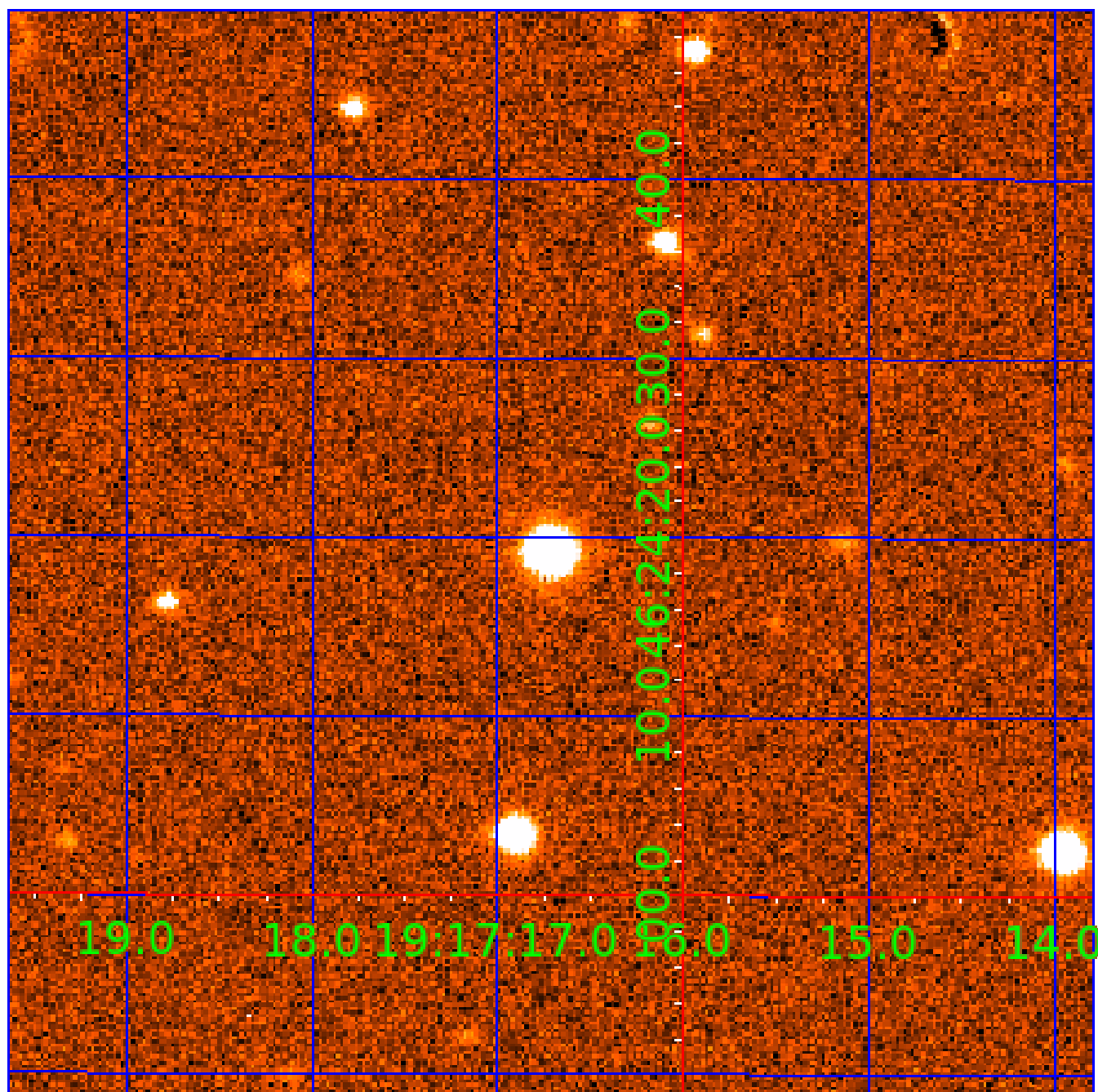


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009704431

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})
009704431-01	OBS	No	504.078441	317.314195	2637.7	4.973	11.8	7.2	0.29	3360	1.83	0.01
009704431-02	OBS	No	113.822415	223.143299	995.3	1.922	10.1	5.6	0.29	3360	0.96	0.10
009704431-03	OBS	No	273.070806	293.901798	1741.2	9.668	9.3	6.6	0.29	3360	1.22	0.03

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009704431-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009704431-02	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—HALO_GHOST
009704431-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—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.

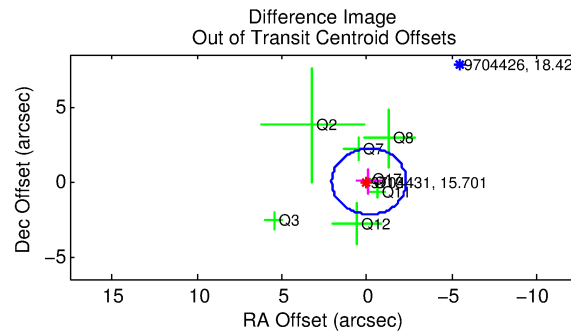
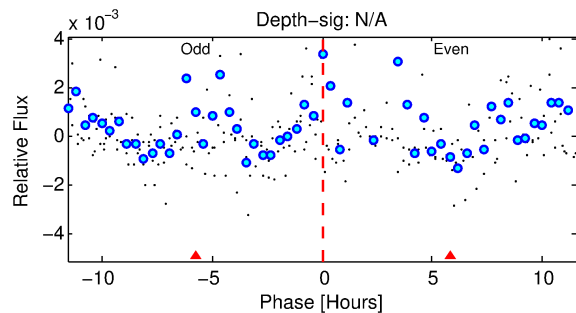
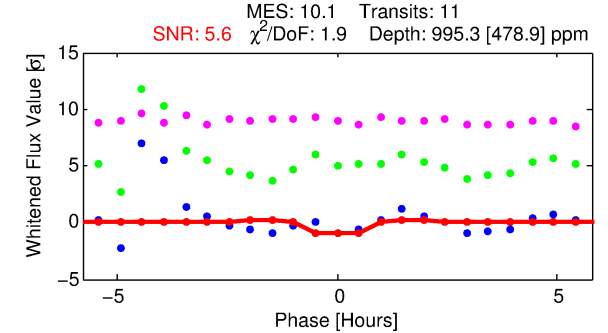
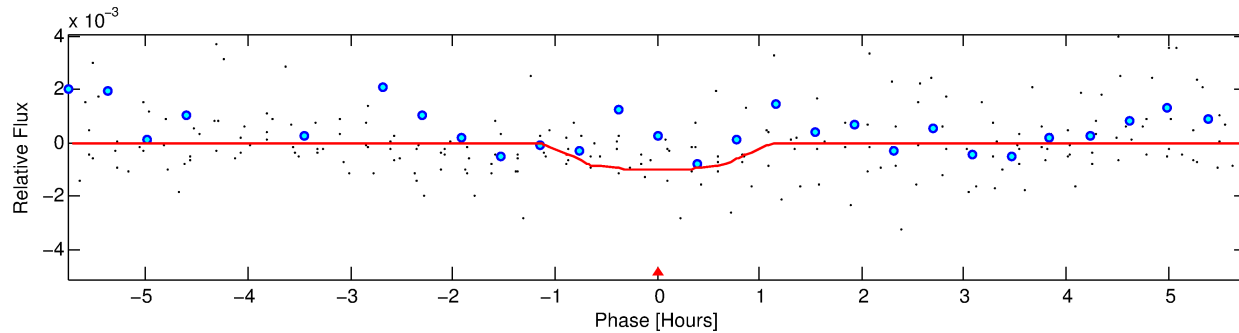
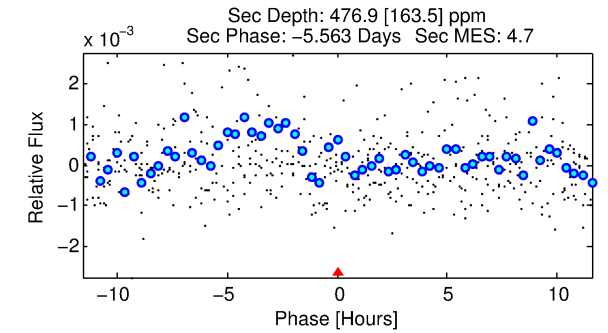
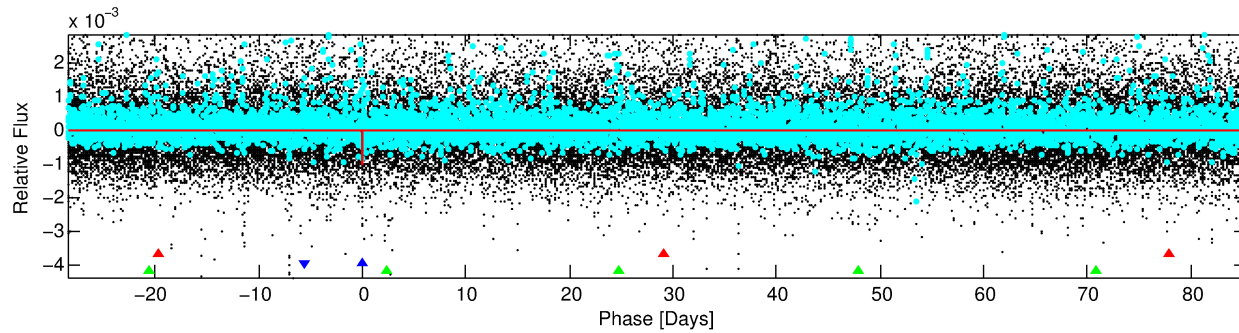
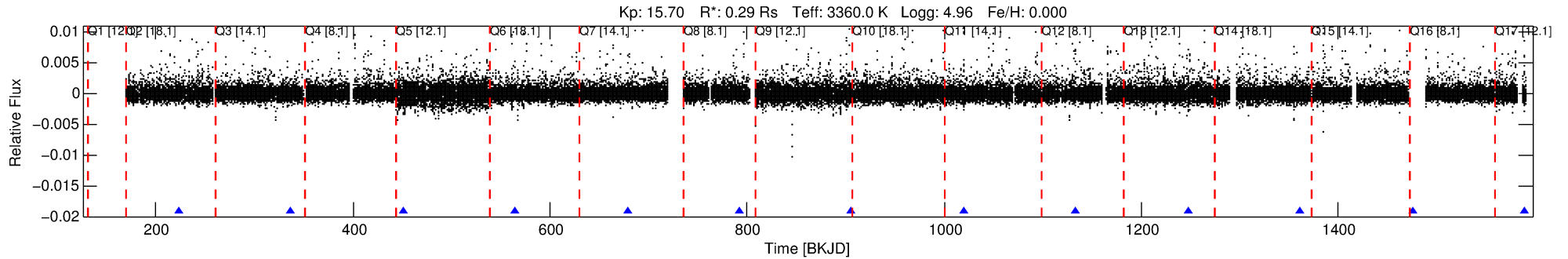
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009704431-02

No Significant Match Found

DV One-Page Summary

KIC: 9704431 Candidate: 2 of 3 Period: 113.822 d



DV Fit Results:

Period = 113.82242 [0.00281] d
Epoch = 223.1433 [0.0183] BKJD
Rp/R* = 0.0307 [0.1316]
a/R* = 351.36 [6420.80]
b = 0.68 [14.64]
Seff = 0.11 [0.01]
Teq = 145 [5] K
Rp = 0.96 [4.12] Re
a = 0.2988 [0.0302] AU
Ag = 25383.27 [217962.06] [0.12 σ]
Teff = 2835 [6085] K [0.44 σ]

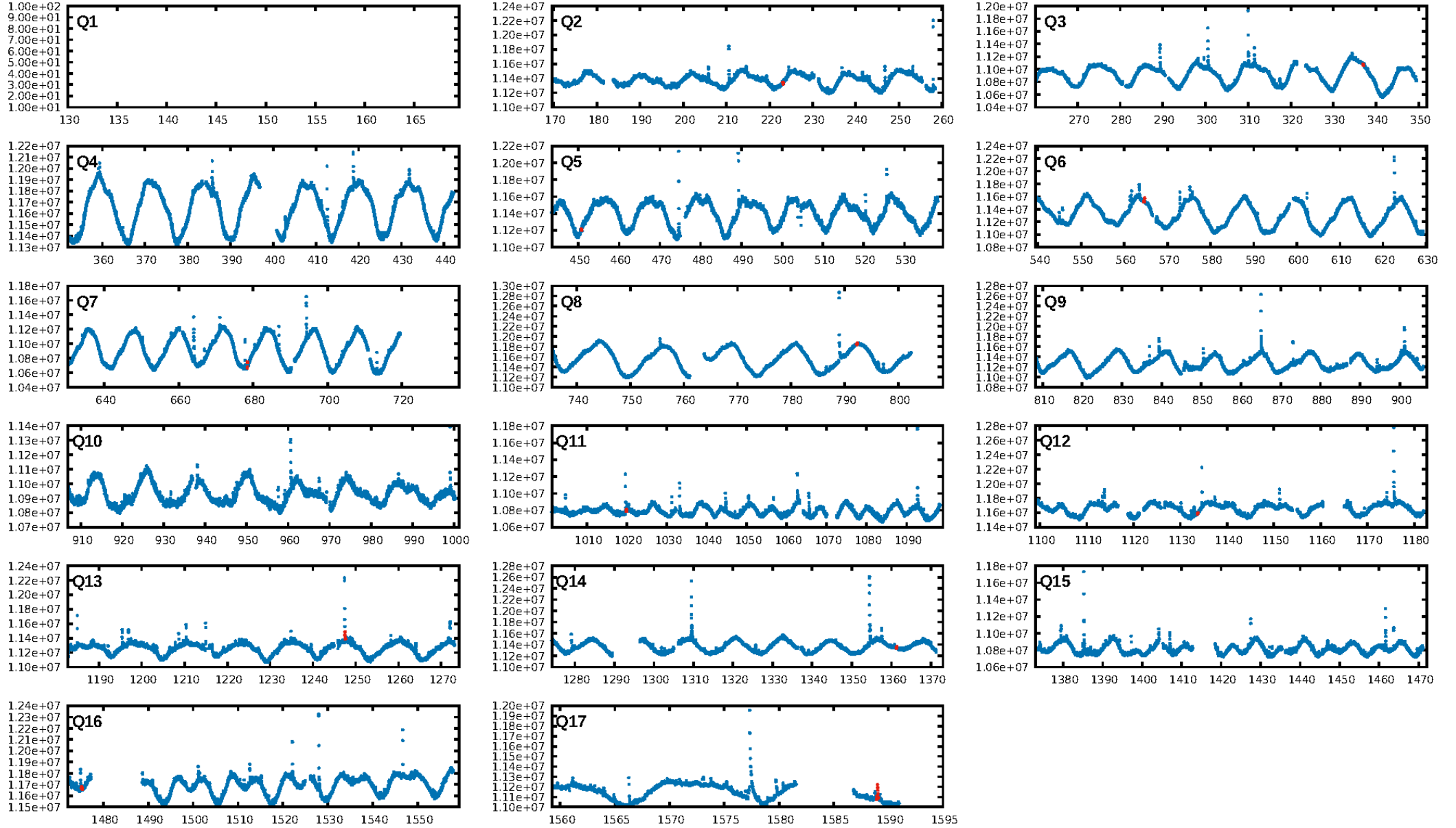
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [387.73 σ]
ModelChiSquare2-sig: 0.3%
ModelChiSquareGof-sig: 81.5%
Bootstrap-pfa: 5.36e-12
RollingBand-fgt: 1.00 [10/10]
GhostDiagnostic-chr: 0.1643
Centroid-sig: 25.4%
Centroid-so: 1.655 arcsec [1.07 σ]
OotOffset-rm: 0.138 arcsec [0.19 σ]
OotOffset-st: 1/3/2/2 [8]
KicOffset-rm: 0.099 arcsec [0.13 σ]
KicOffset-st: 1/3/2/2 [8]
DiffImageQuality-fgm: 0.38 [3/8]
DiffImageOverlap-fno: 1.00 [11/11]

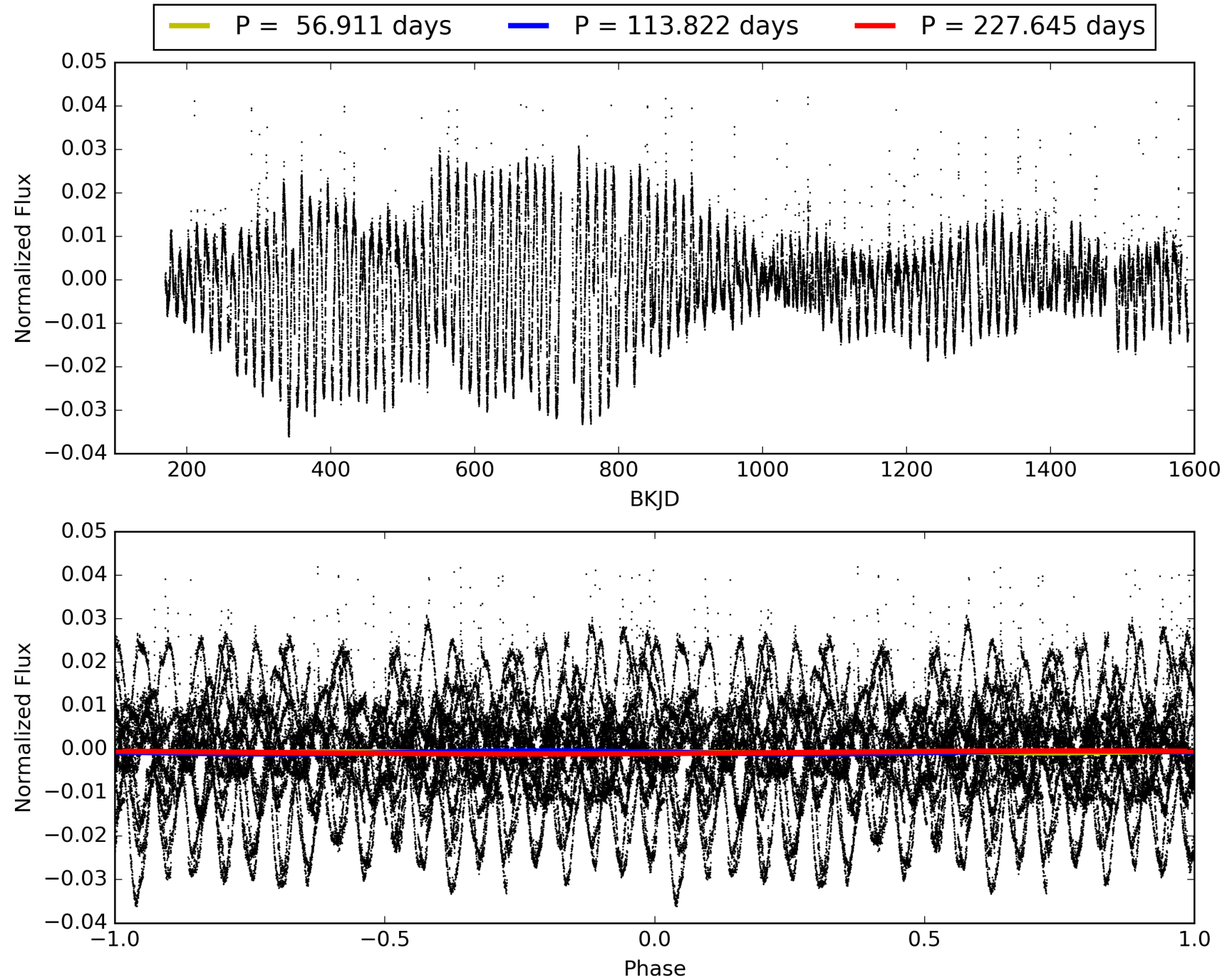
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 18:16:15 Z

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

TCE 009704431-02, PDC Light Curves

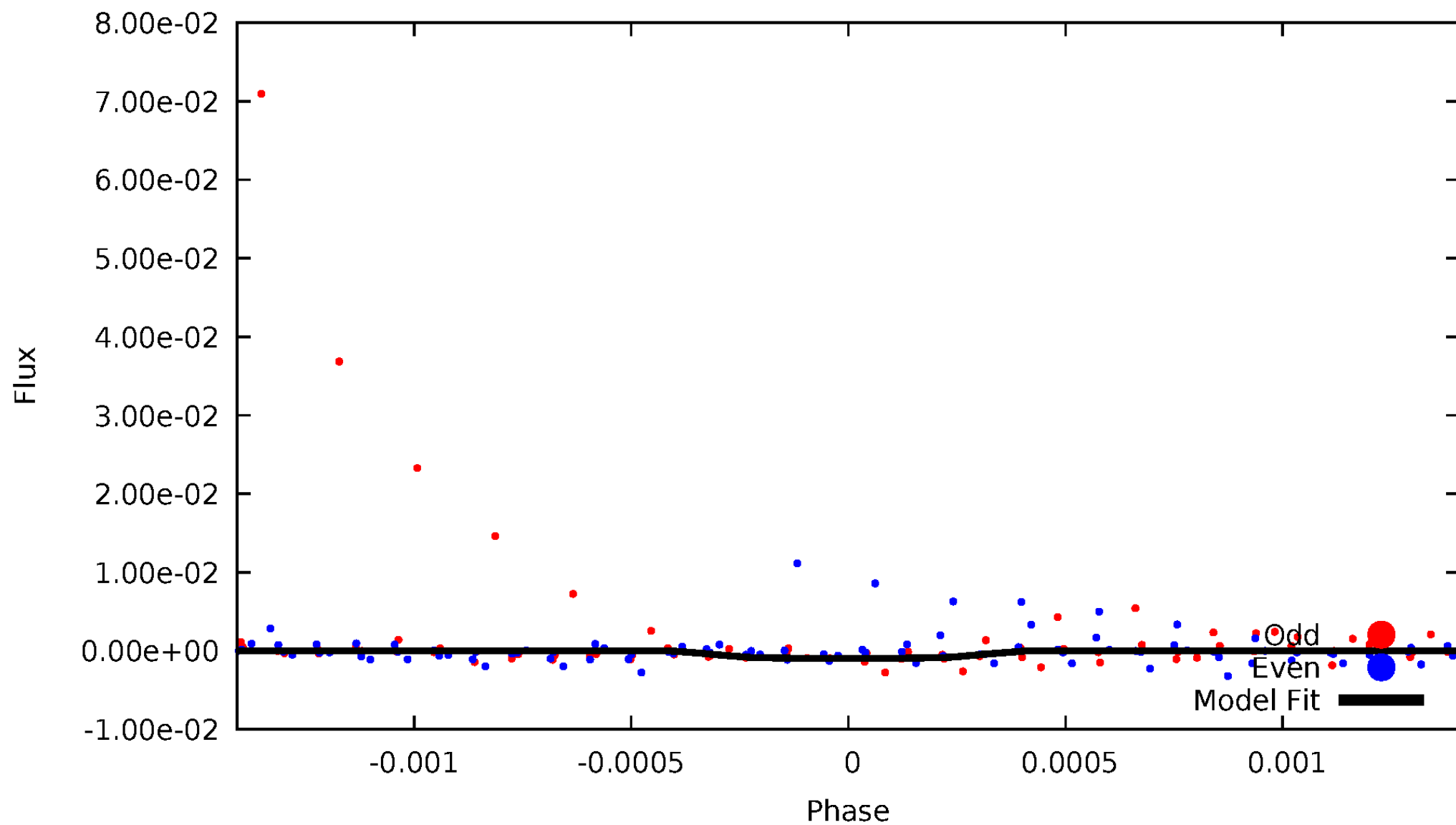


TCE 009704431-02



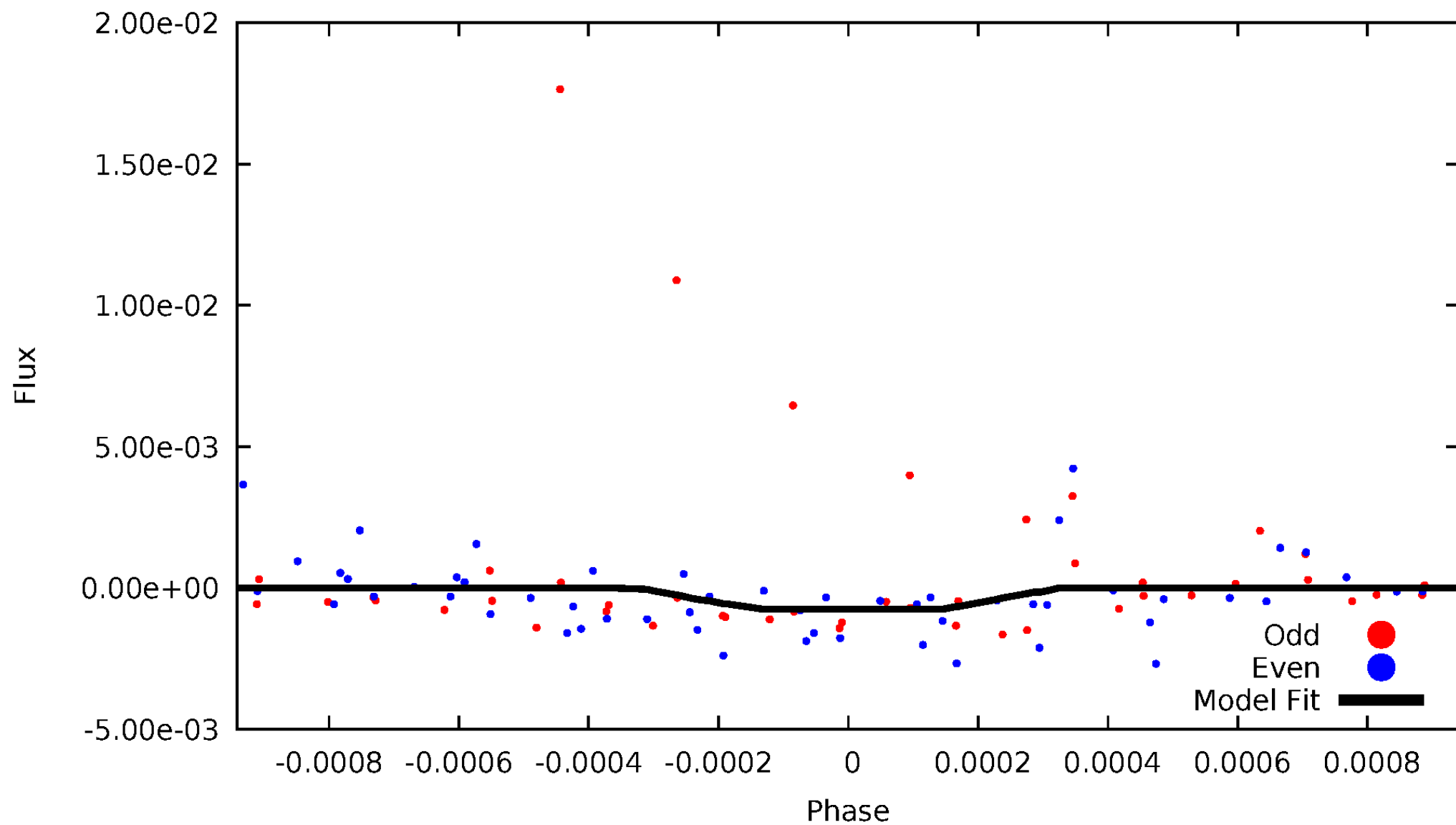
DV Odd/Even

TCE 009704431-02



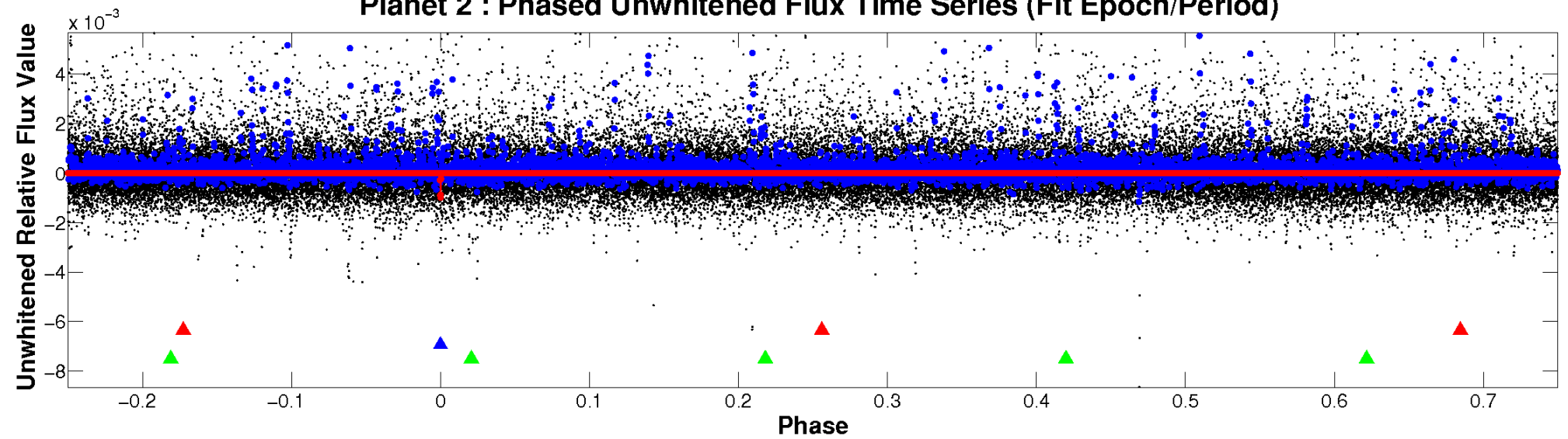
ALT Odd/Even

TCE 009704431-02

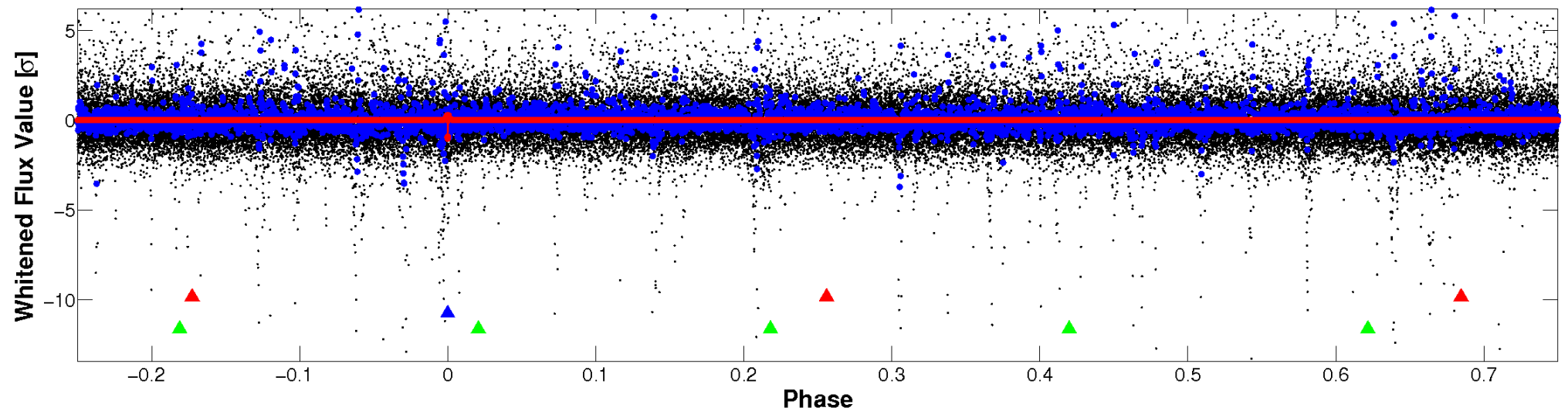


Non-Whitened Vs. Whitened Light Curve

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

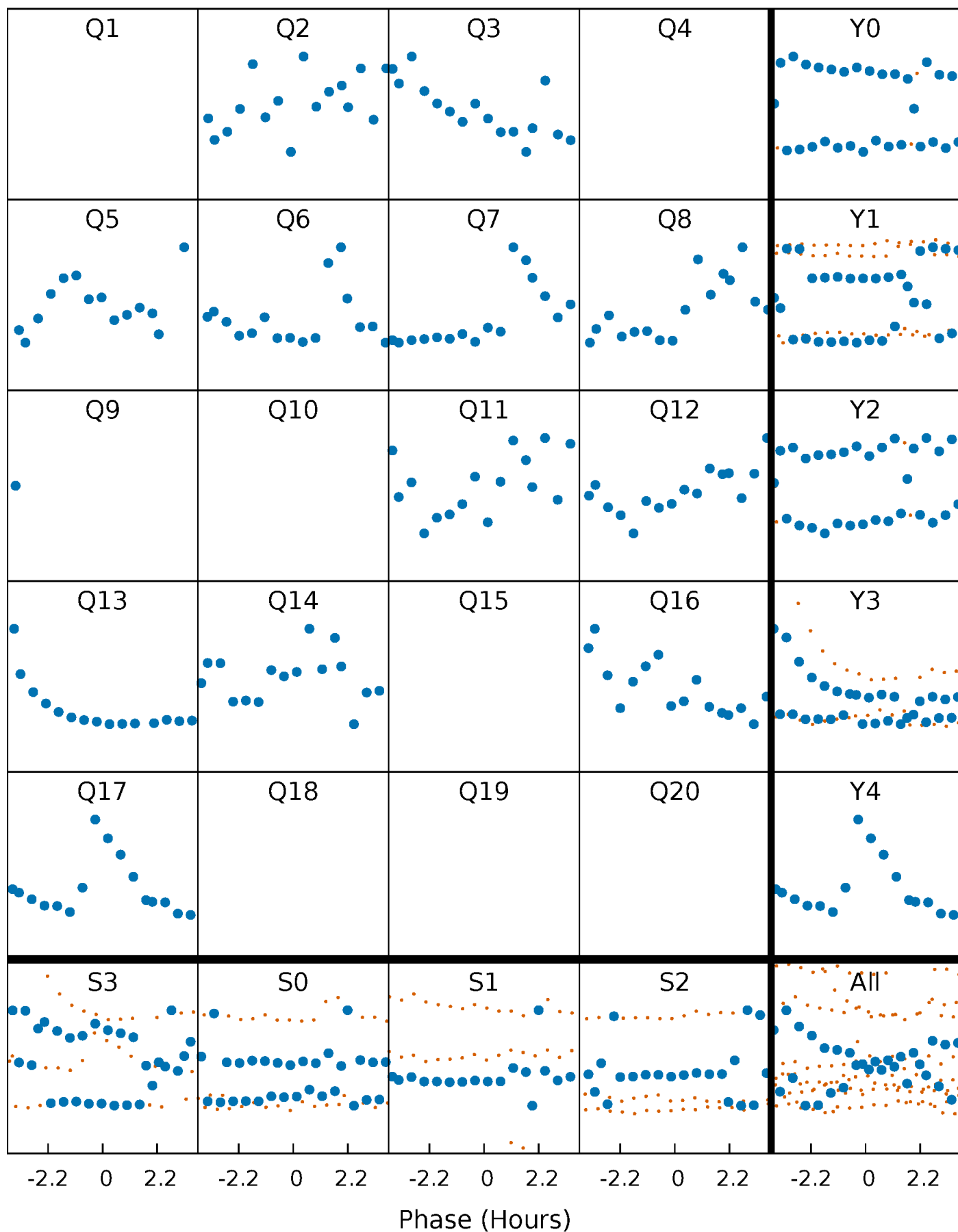


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



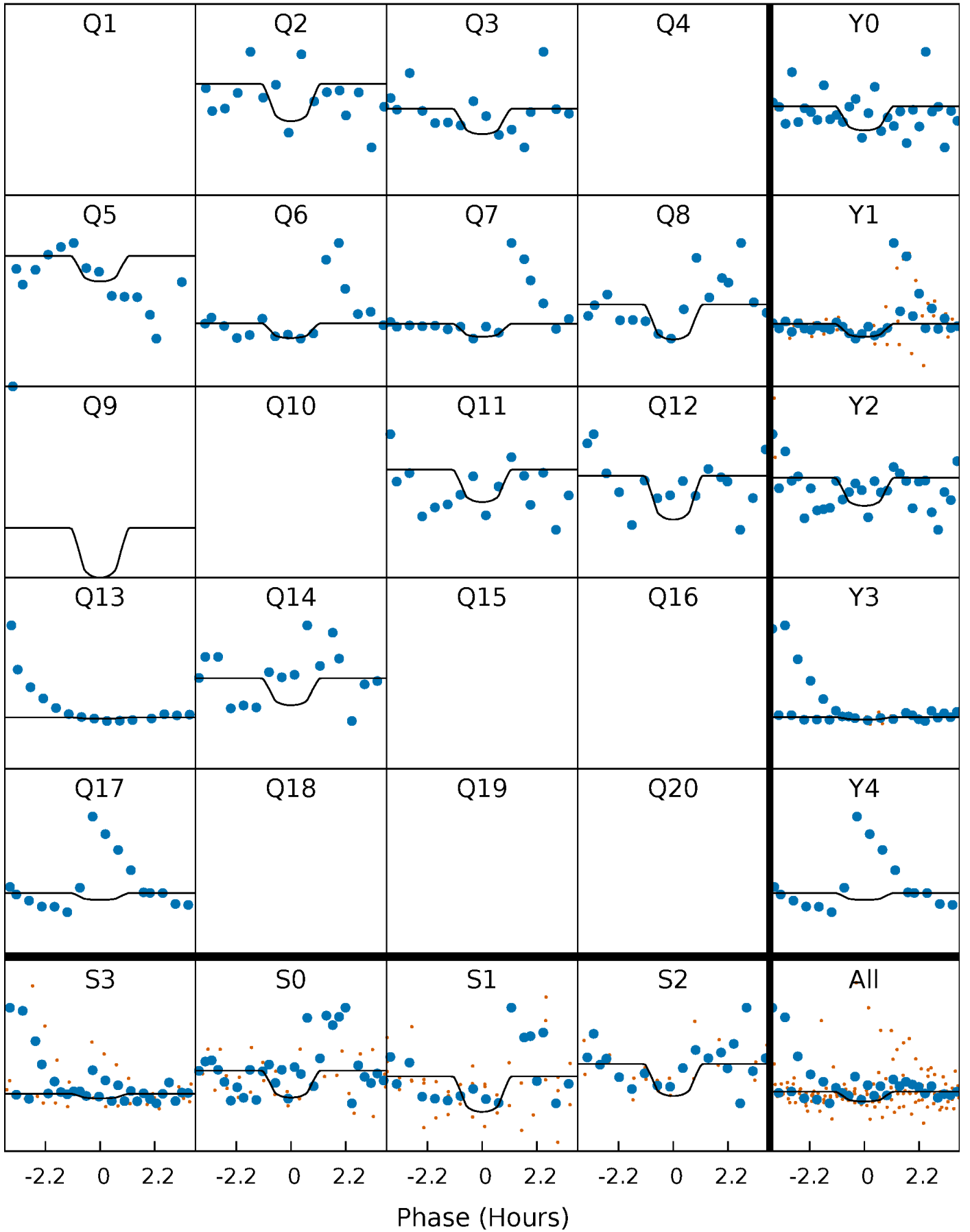
PDC Quarter-Phased Transit Curves

TCE 009704431-02 P=113.822415 Days $T_0=223.143299$ (BKJD)



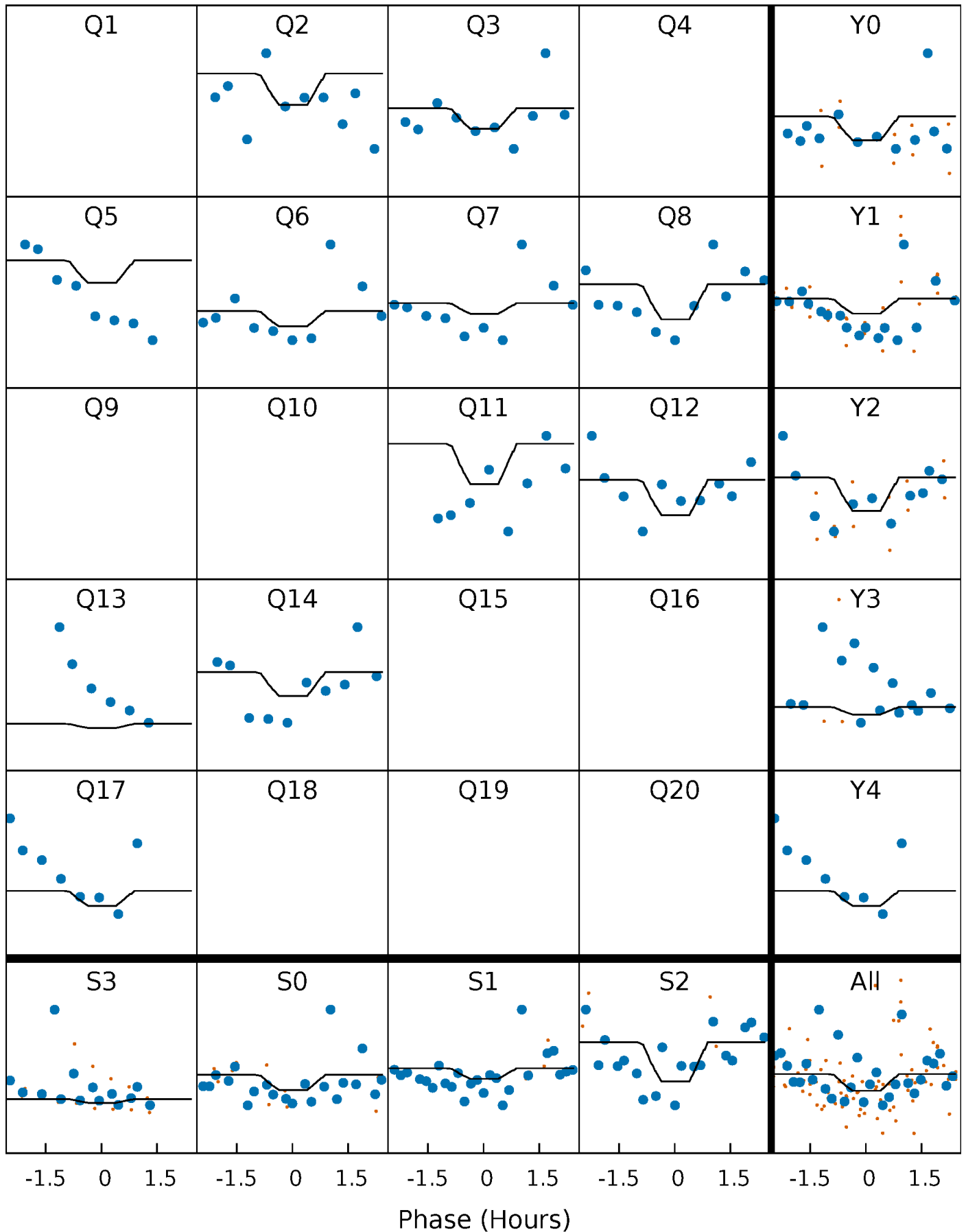
DV Quarter-Phased Transit Curves

TCE 009704431-02 P=113.822415 Days $T_0=223.143299$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

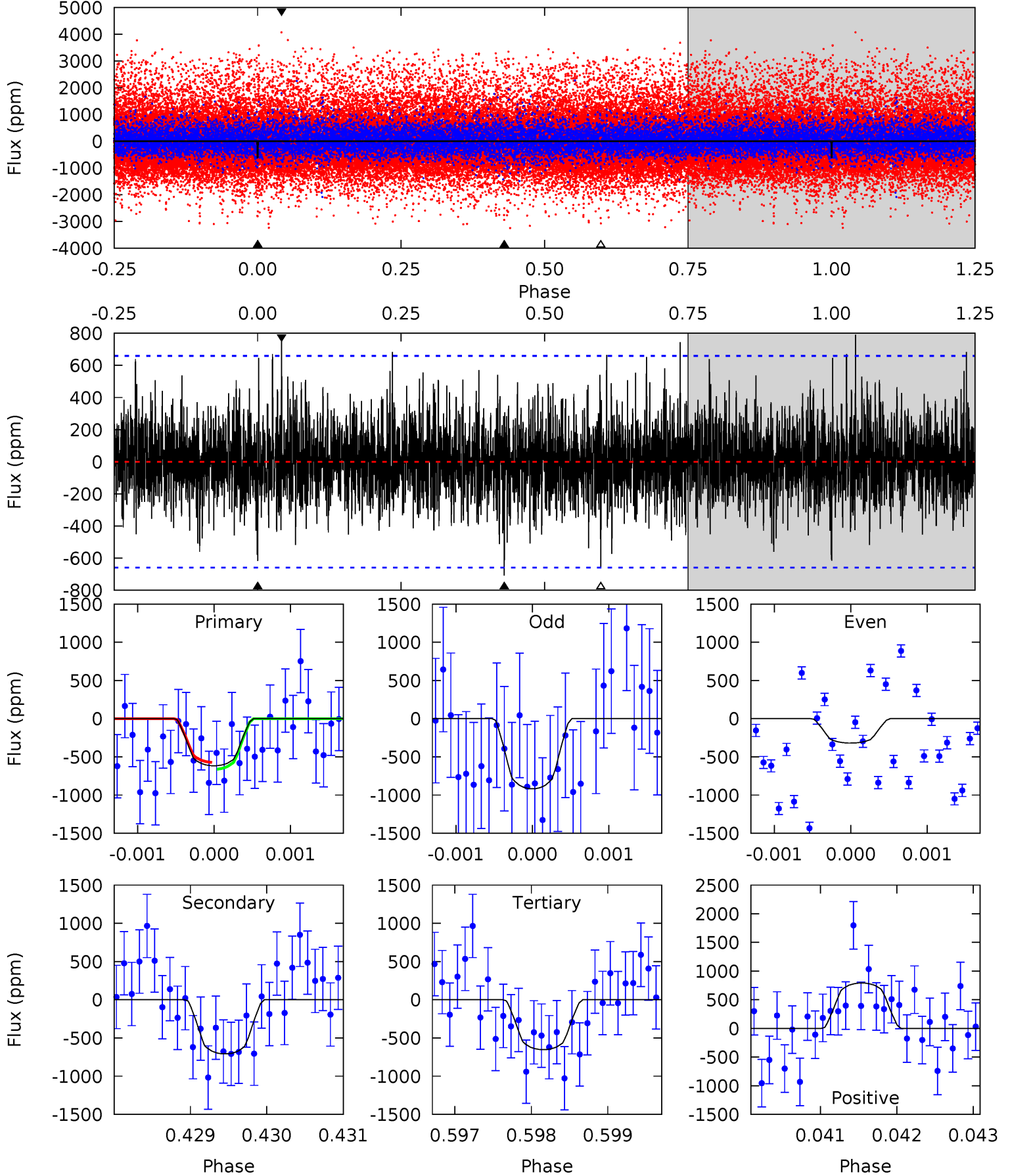
TCE 009704431-02 P=113.812829 Days $T_0=223.187570$ (BKJD)



DV Model-Shift Uniqueness Test

009704431-02, P = 113.822415 Days, E = 109.320884 Days

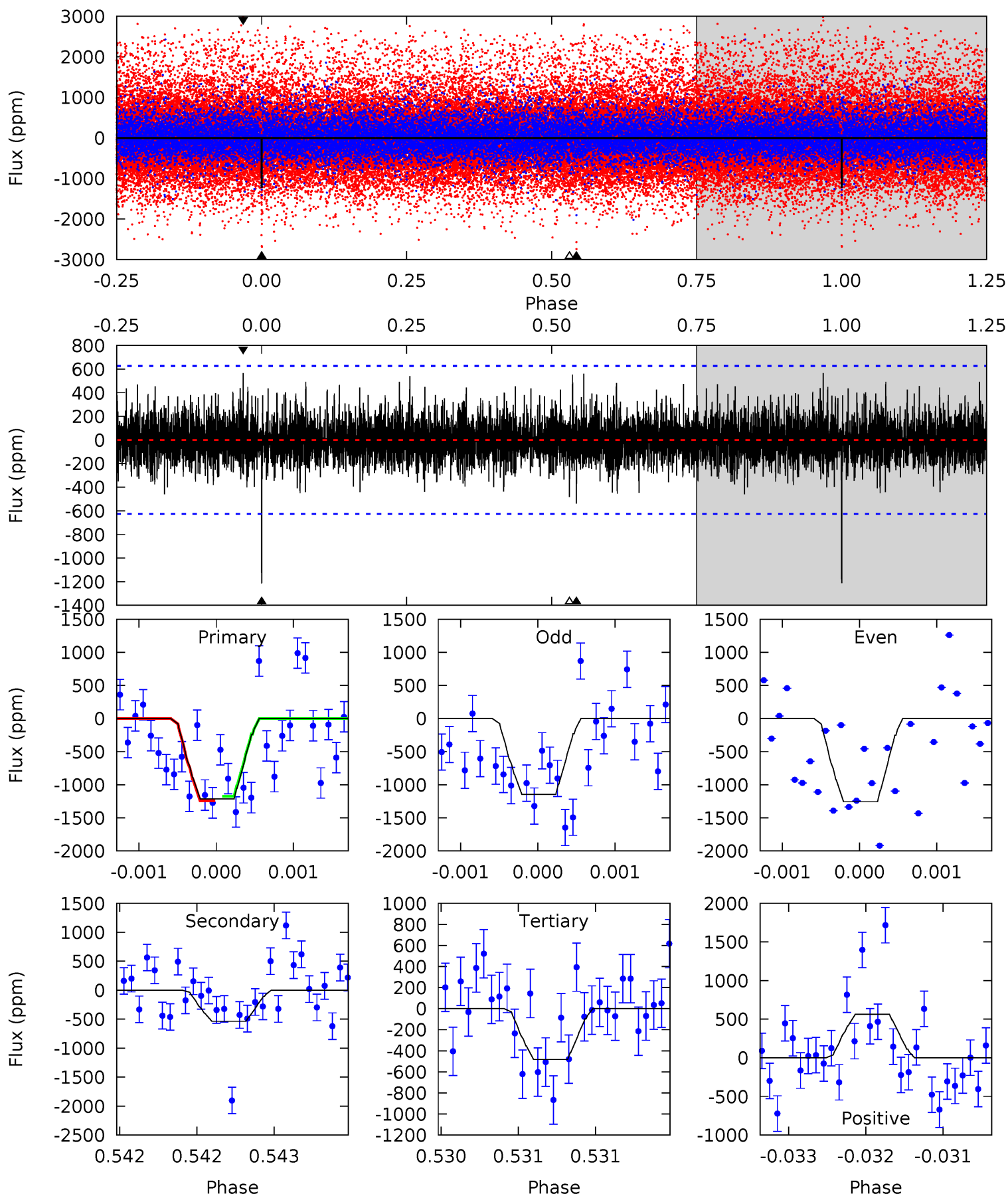
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.12	5.88	5.42	6.57	5.48	3.33	1.50	-0.30	-1.45	0.46	-0.69	2.51	-0.50	0.53	0.37



Alt Model-Shift Uniqueness Test

009704431-02, $P = 113.812829$ Days, $E = 109.374741$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.7	4.75	4.26	4.99	5.53	3.42	1.21	6.46	5.74	0.49	-0.24	0.49	0.47	0.32	0.31



Stellar Parameters For KIC 009704431

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	3360^{+43}_{-37}	$4.961^{+0.040}_{-0.044}$	$0.000^{+0.100}_{-0.100}$	$0.287^{+0.041}_{-0.030}$	$0.274^{+0.047}_{-0.034}$	$16.380^{+3.601}_{-3.540}$
	+1%/-1%	+1%/-1%	+inf%/-inf%	+14%/-10%	+17%/-12%	+22%/-22%
Source	PHO2	PHO2	PHO2	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009704431-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-708 ± 120	$3.23^{+3.33}_{-2.27}$	204^{+5}_{-4}	2339^{+902}_{-332}	3333^{+35742}_{-2529}
Alt.	-538 ± 113	$3.30^{+3.24}_{-2.28}$	203^{+5}_{-5}	2263^{+797}_{-309}	2506^{+23131}_{-1895}

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

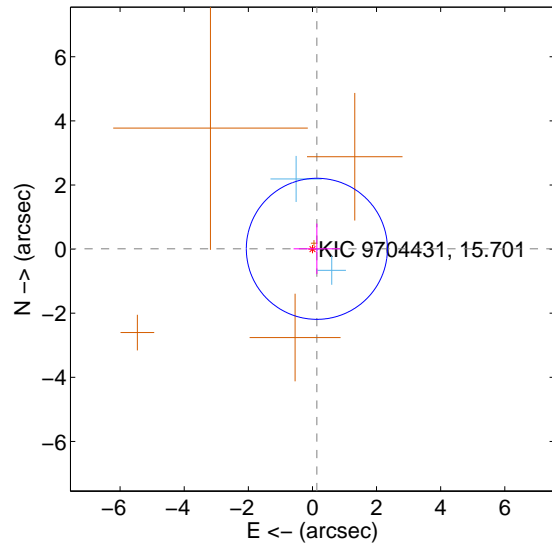
Supplemental centroid analysis for 009704431-02. Kepler magnitude: 15.70. Transit SNR 5.61

There are 3 quarters with good PRF difference image offsets

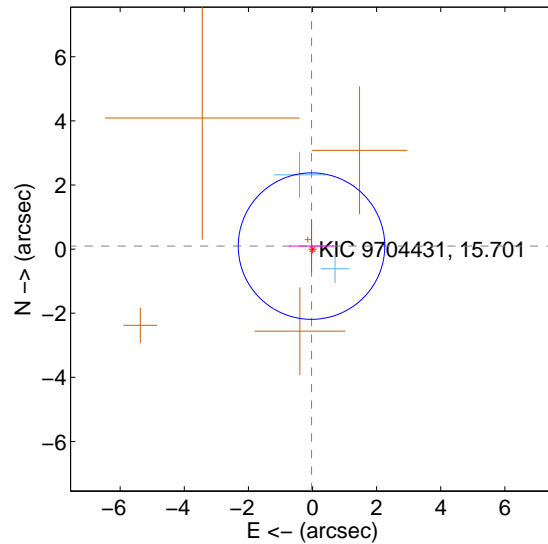
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.138 ± 0.733	0.19	-0.138 ± 0.727	0.009 ± 0.786
PRF-fit source offset from KIC position	0.099 ± 0.762	0.13	0.032 ± 0.699	0.093 ± 0.815
photometric centroid source offset	1.65 ± 1.55	1.07	0.79 ± 1.50	1.45 ± 1.56

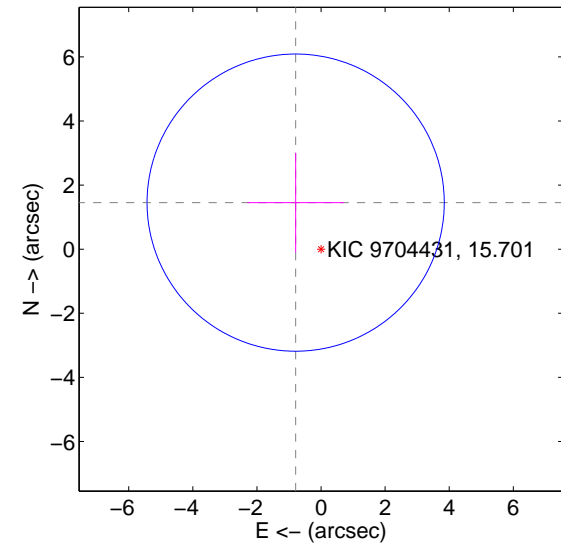
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

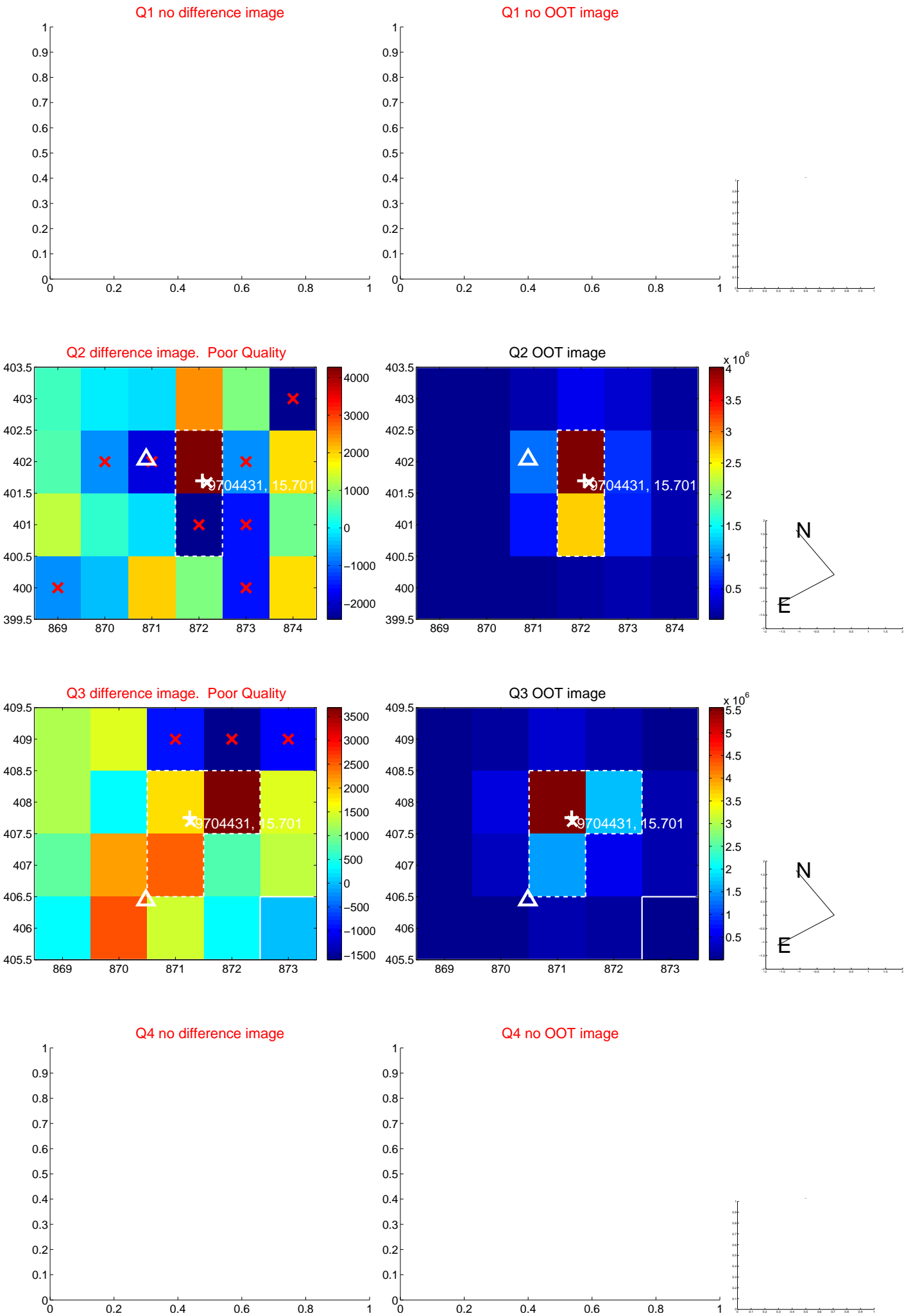


offset from photometric centroids

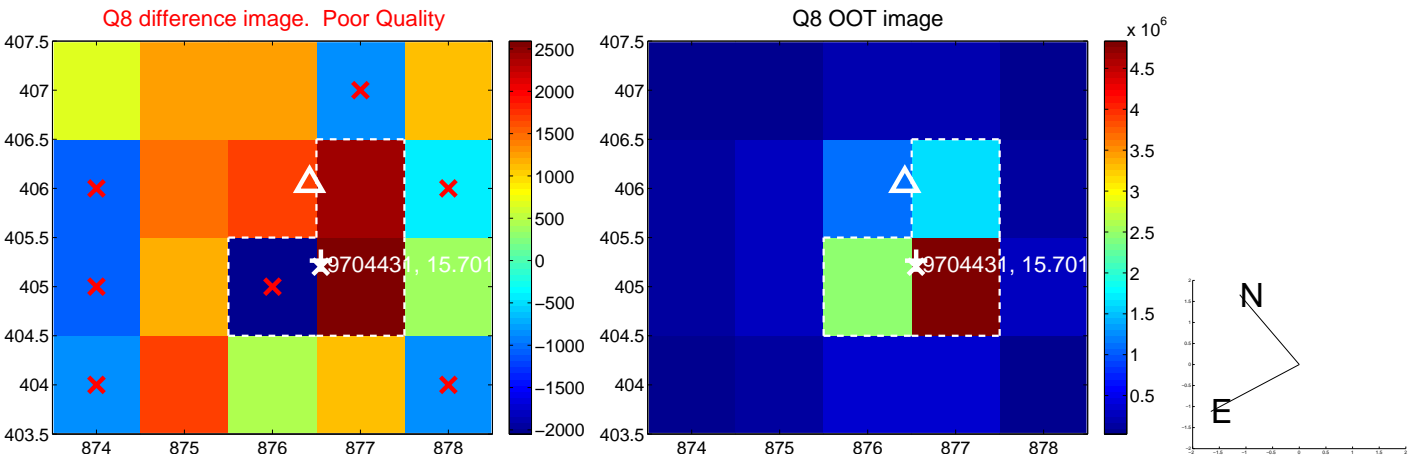
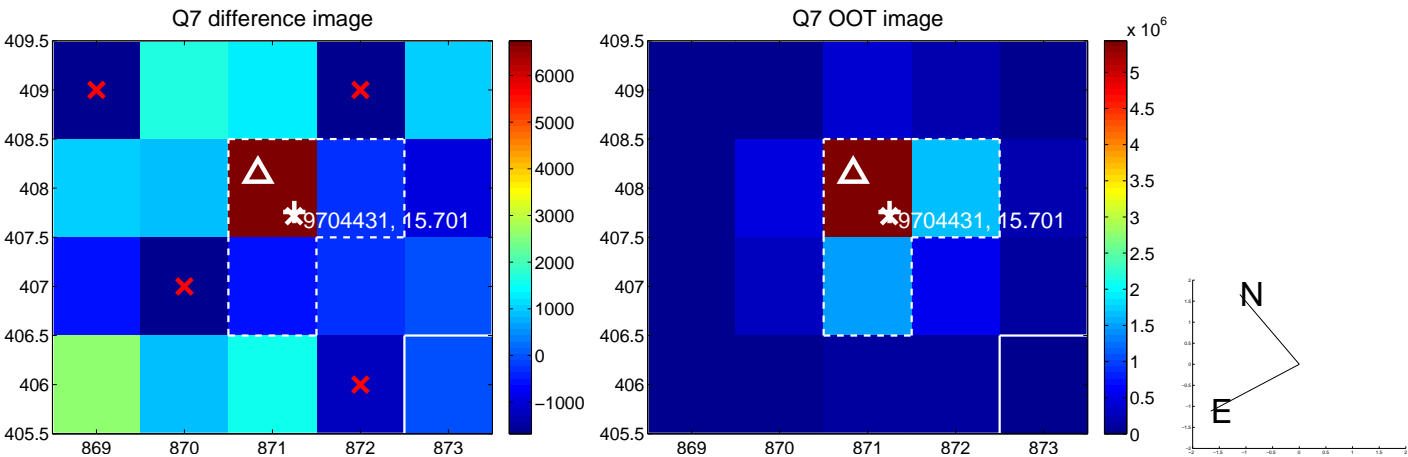
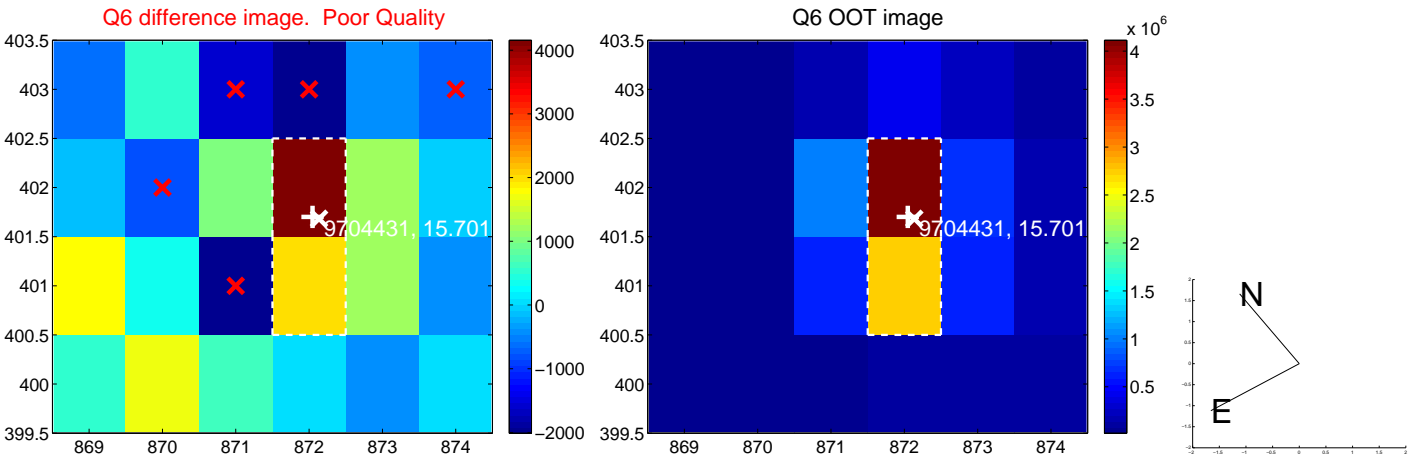
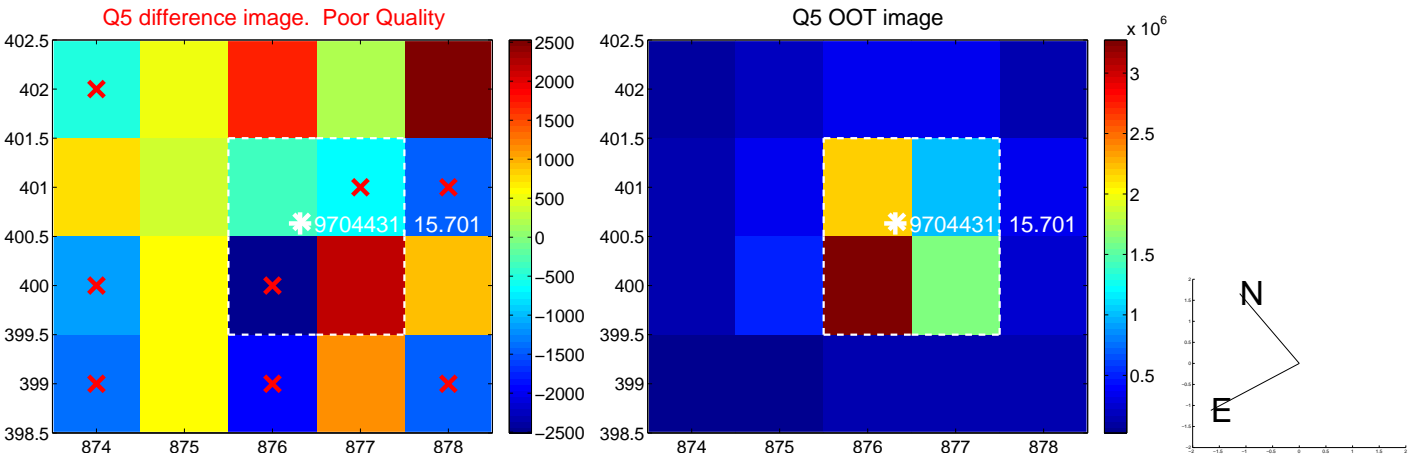


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

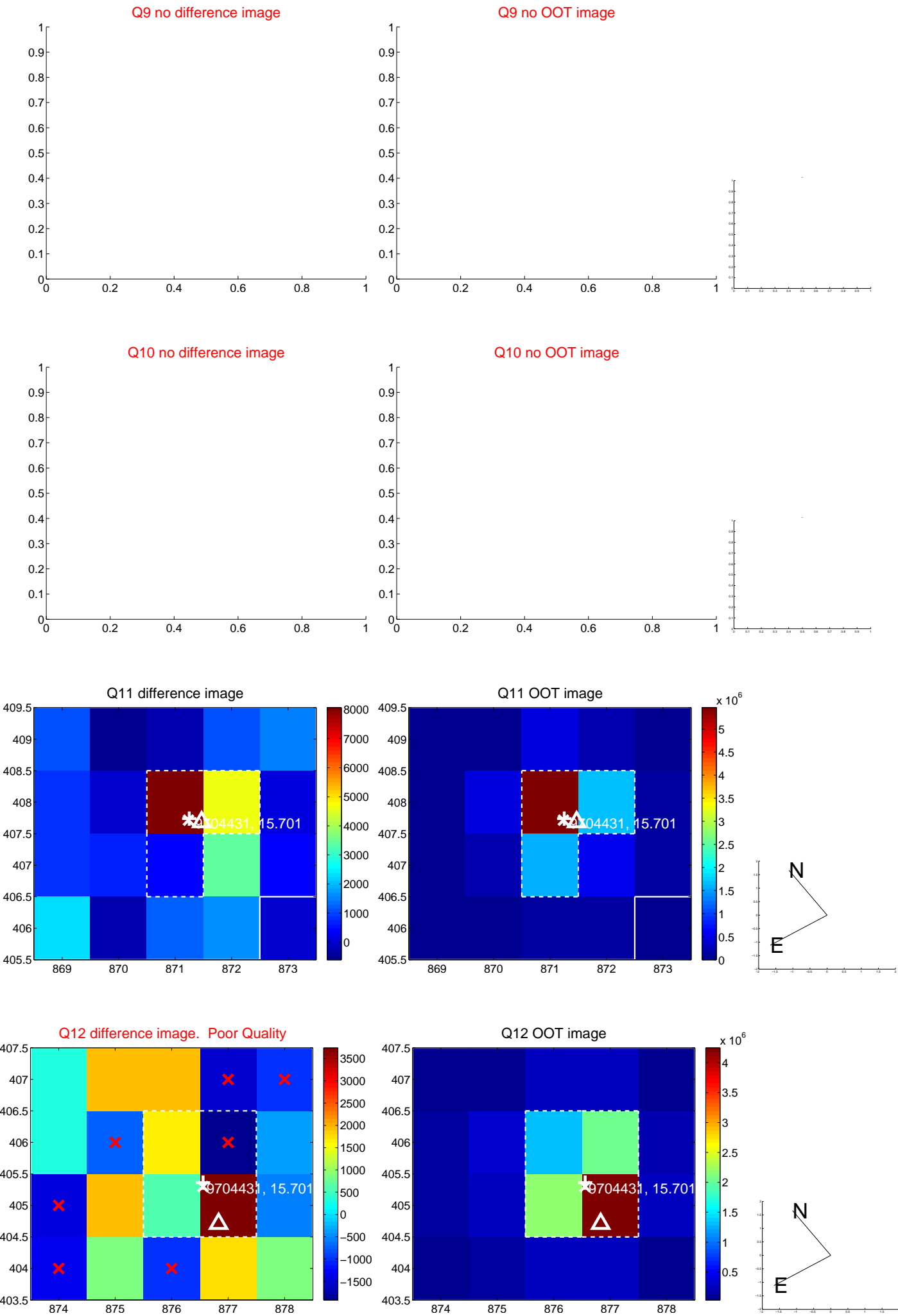
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



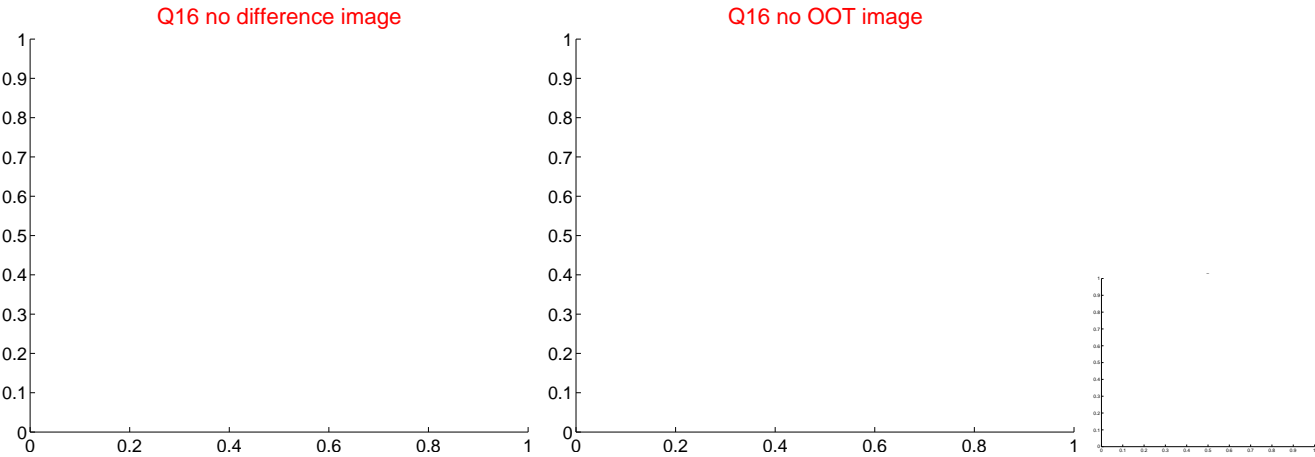
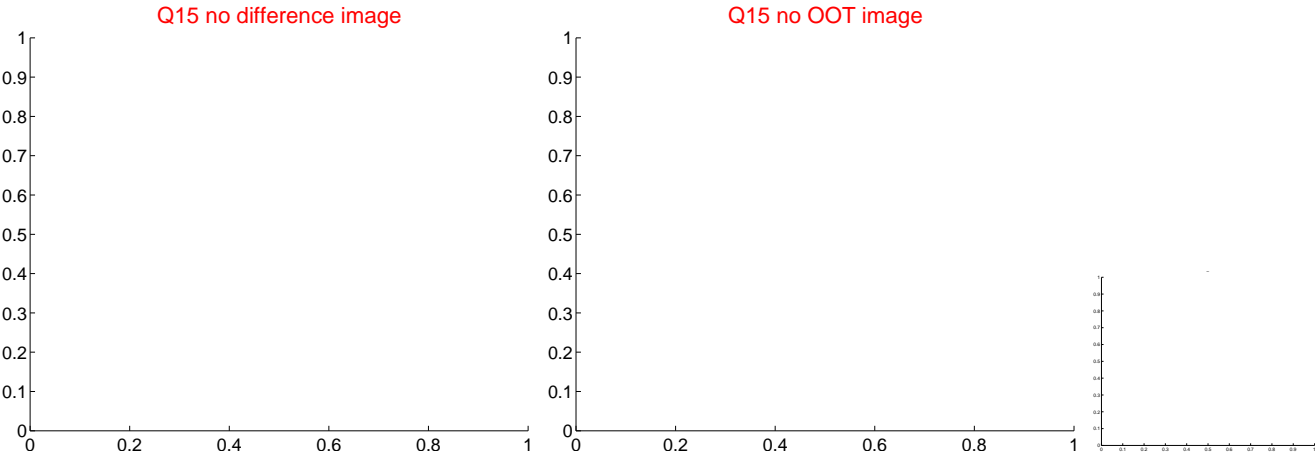
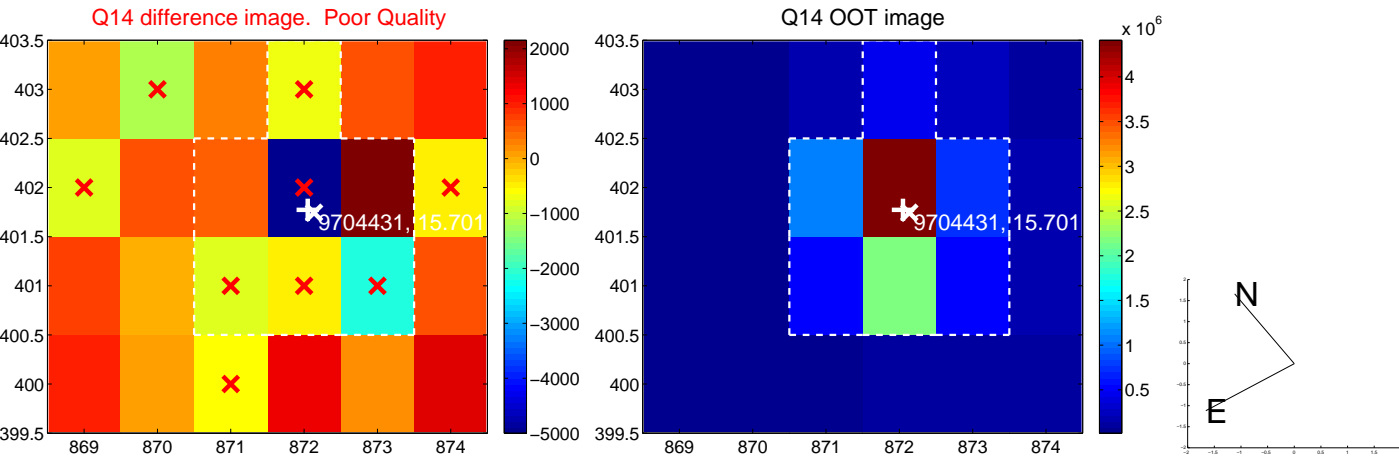
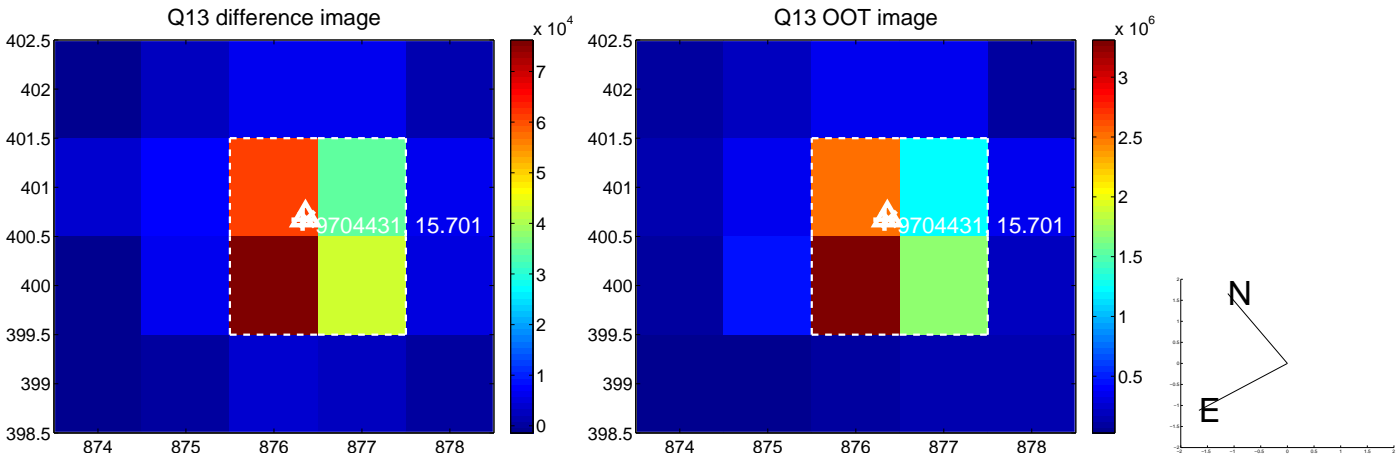
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



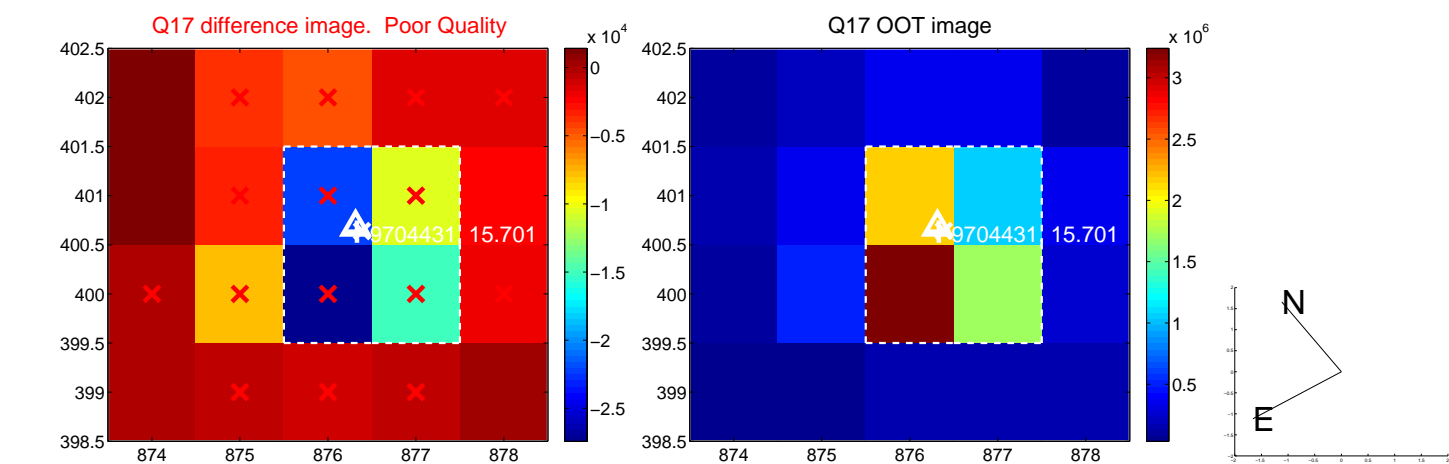
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



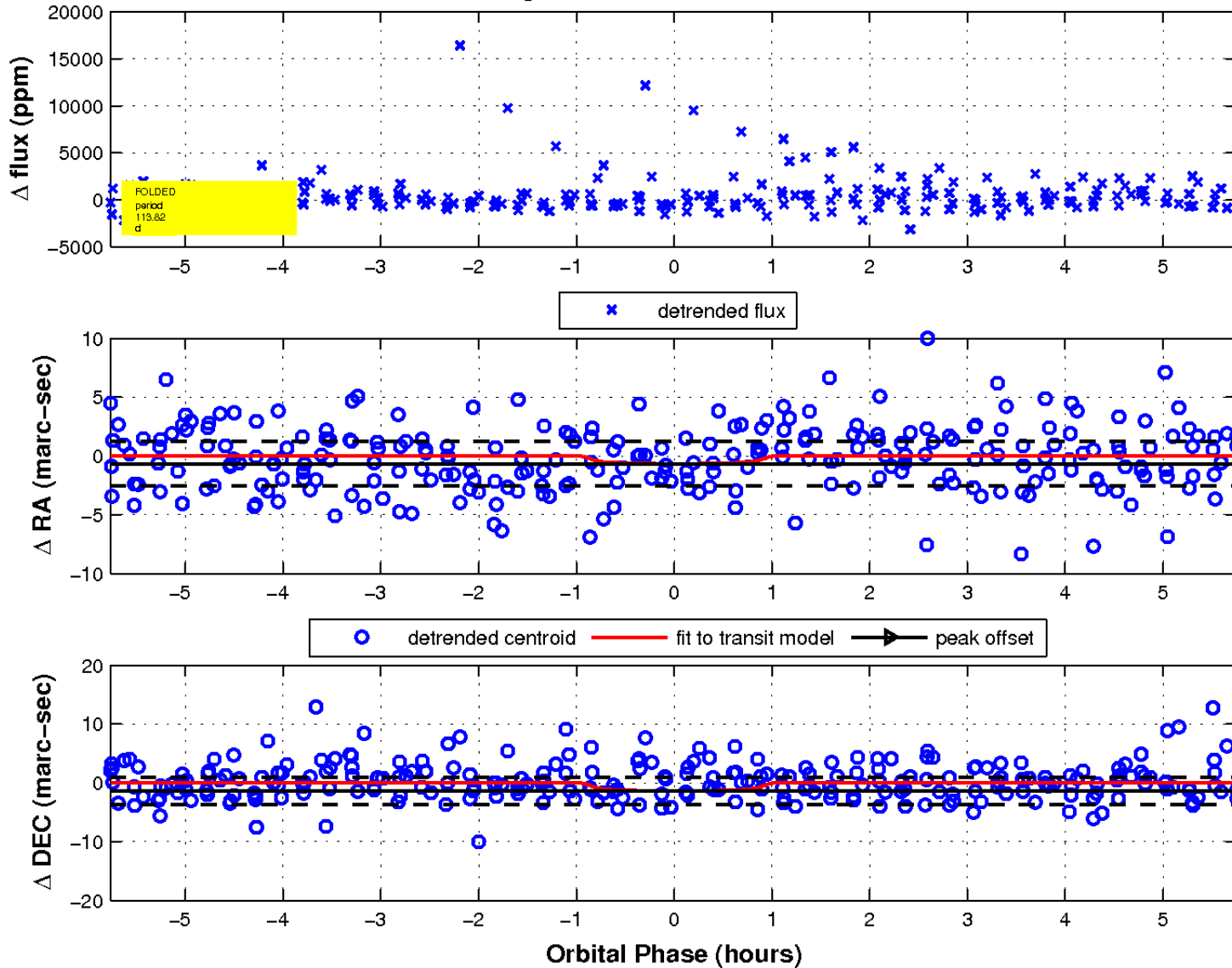
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

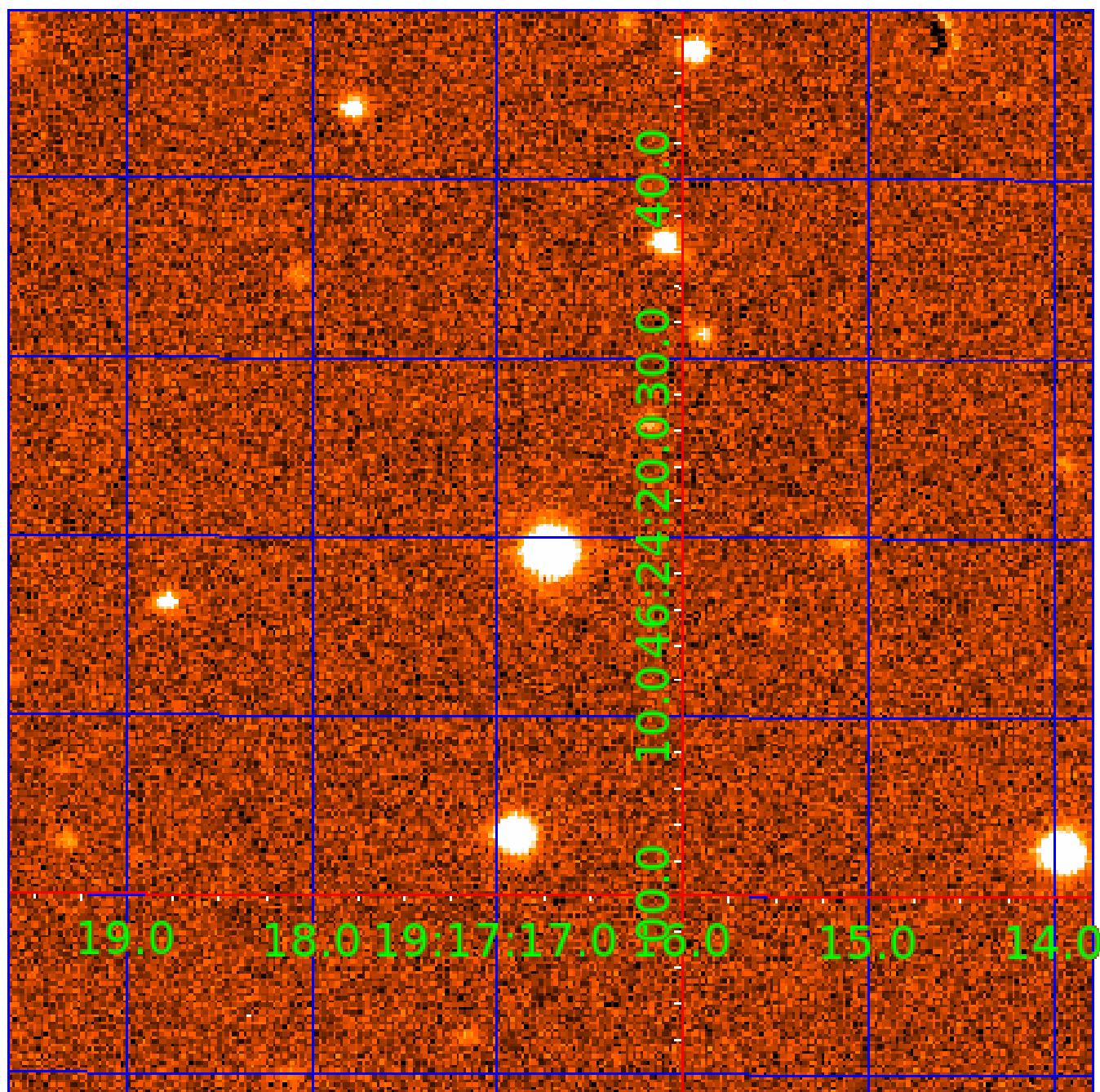


fluxWeightedCentroids, Planet 2 of 3



UKIRT Image

Declination



KIC 009704431

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})
009704431-01	OBS	No	504.078441	317.314195	2637.7	4.973	11.8	7.2	0.29	3360	1.83	0.01
009704431-02	OBS	No	113.822415	223.143299	995.3	1.922	10.1	5.6	0.29	3360	0.96	0.10
009704431-03	OBS	No	273.070806	293.901798	1741.2	9.668	9.3	6.6	0.29	3360	1.22	0.03

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009704431-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009704431-02	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—HALO_GHOST
009704431-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—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.

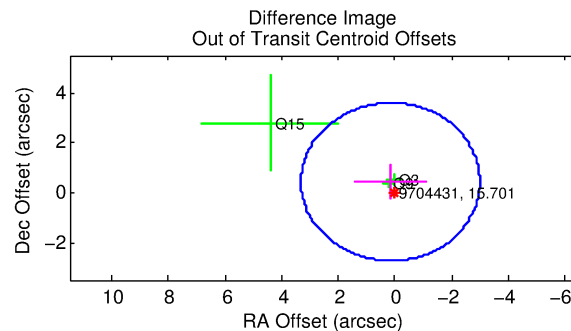
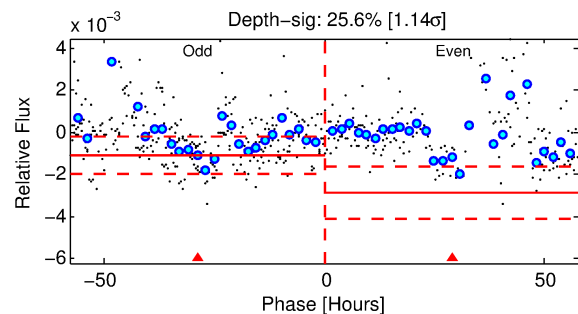
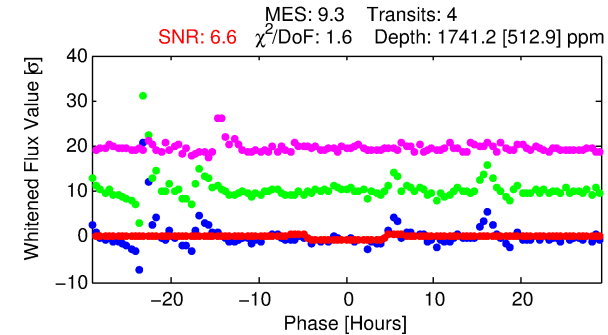
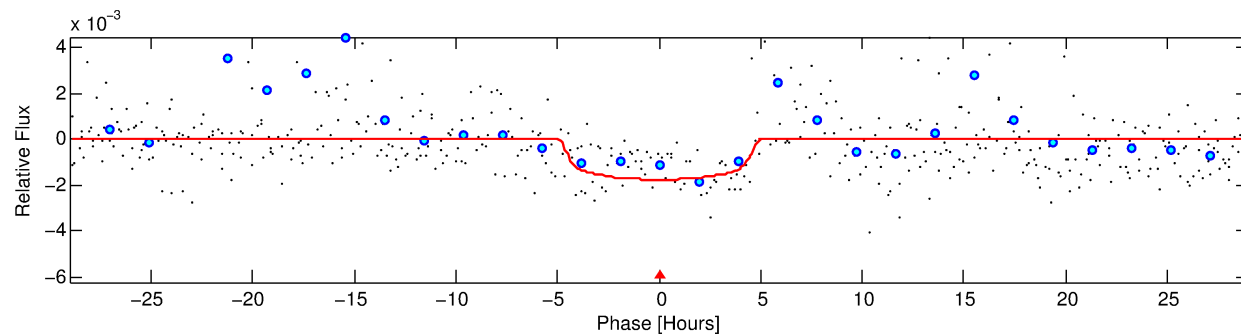
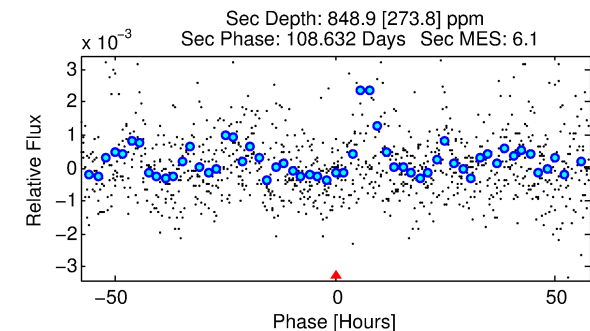
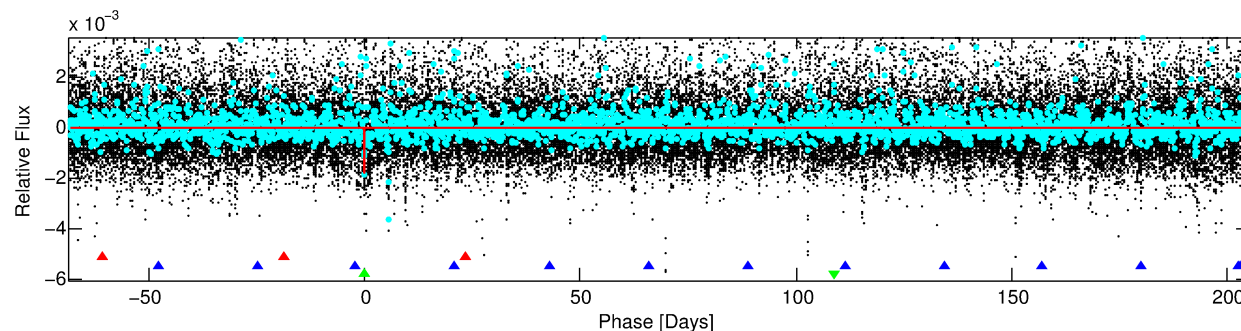
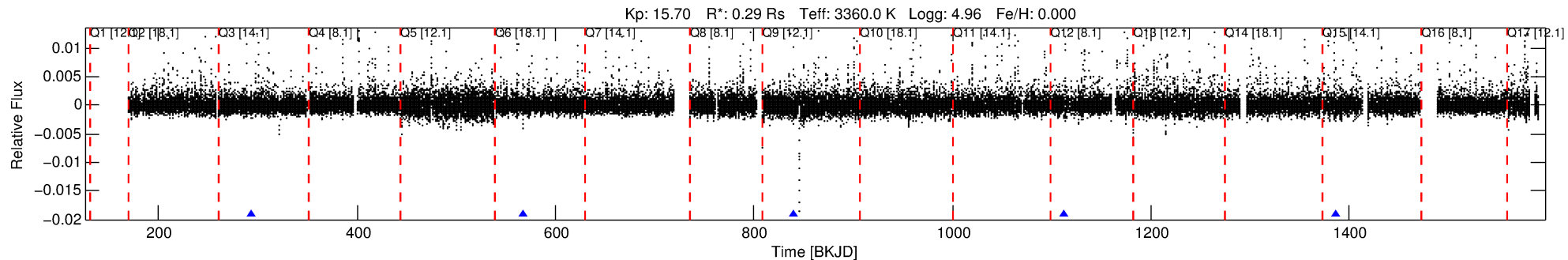
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009704431-03

No Significant Match Found

DV One-Page Summary

KIC: 9704431 Candidate: 3 of 3 Period: 273.071 d



DV Fit Results:

Period = 273.07081 [0.00735] d
Epoch = 293.9018 [0.0204] BKJD
Rp/R* = 0.0388 [0.0243]
a/R* = 198.80 [496.17]
b = 0.48 [4.01]
Seff = 0.03 [0.00]
Teq = 109 [3] K
Rp = 1.22 [0.78] Re
a = 0.5356 [0.0541] AU
Ag = 90558.84 [117461.05] [0.77σ]
Teff = 2910 [941] K [2.98σ]

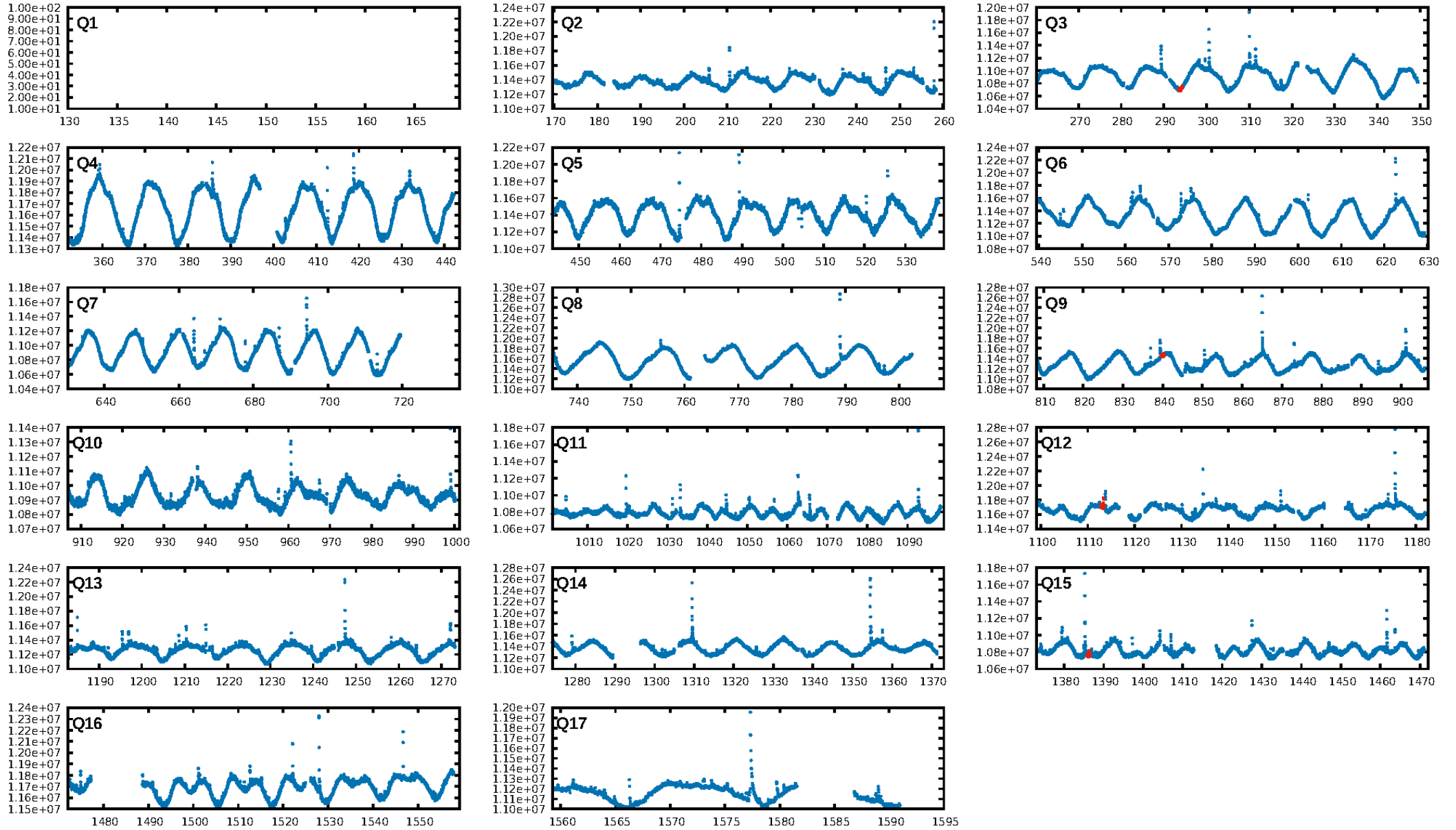
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [387.73σ]
LongPeriod-sig: 100.0% [509.94σ]
ModelChiSquare2-sig: 7.3%
ModelChiSquareGof-sig: 93.6%
Bootstrap-pfa: 2.38e-08
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 1.901
Centroid-sig: 48.0%
Centroid-so: 0.596 arcsec [0.86σ]
OotOffset-rm: 0.457 arcsec [0.43σ]
OotOffset-st: 0/2/0/1 [3]
KicOffset-rm: 0.588 arcsec [0.53σ]
KicOffset-st: 0/2/0/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

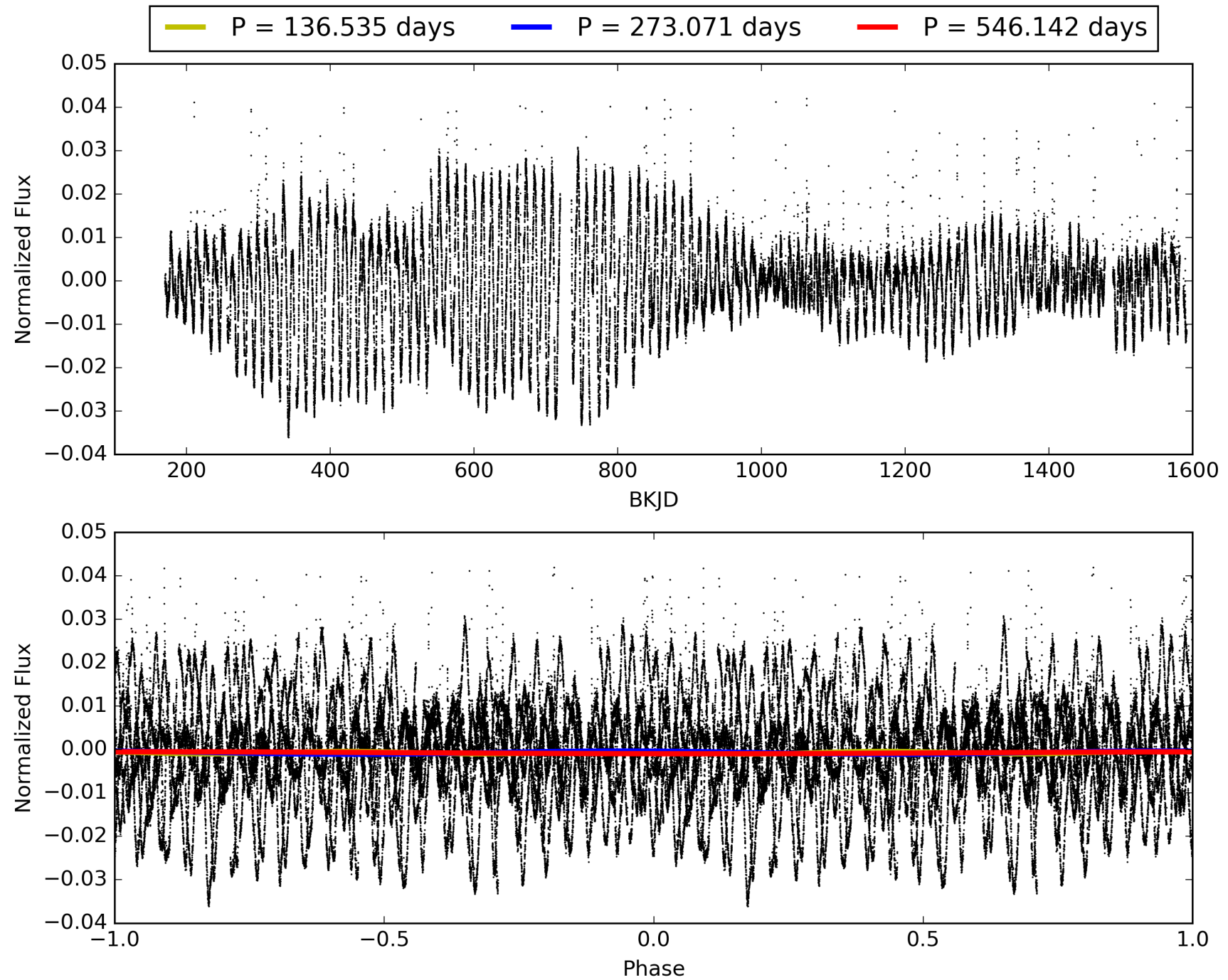
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 18:16:27 Z

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

TCE 009704431-03, PDC Light Curves

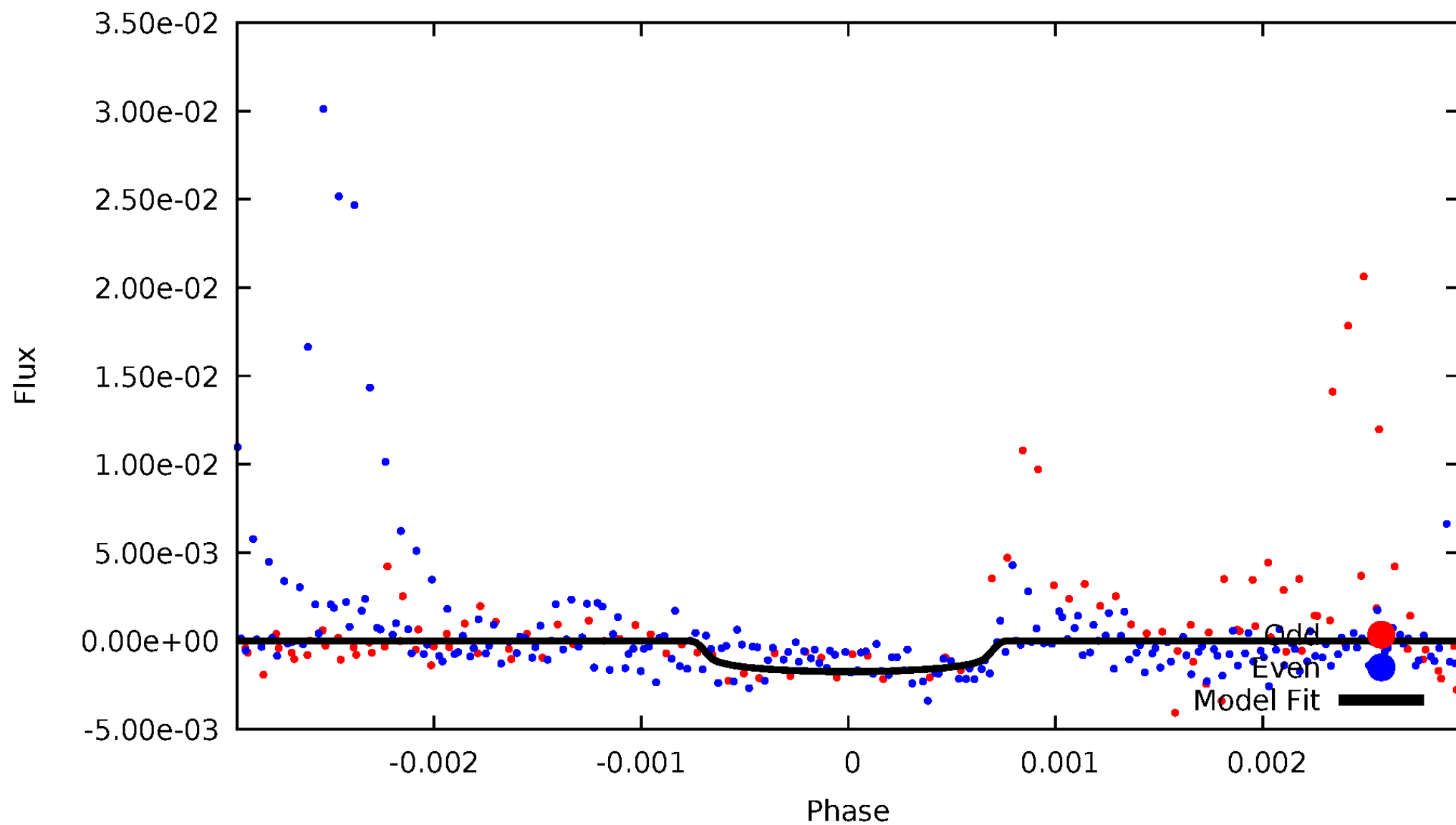


TCE 009704431-03



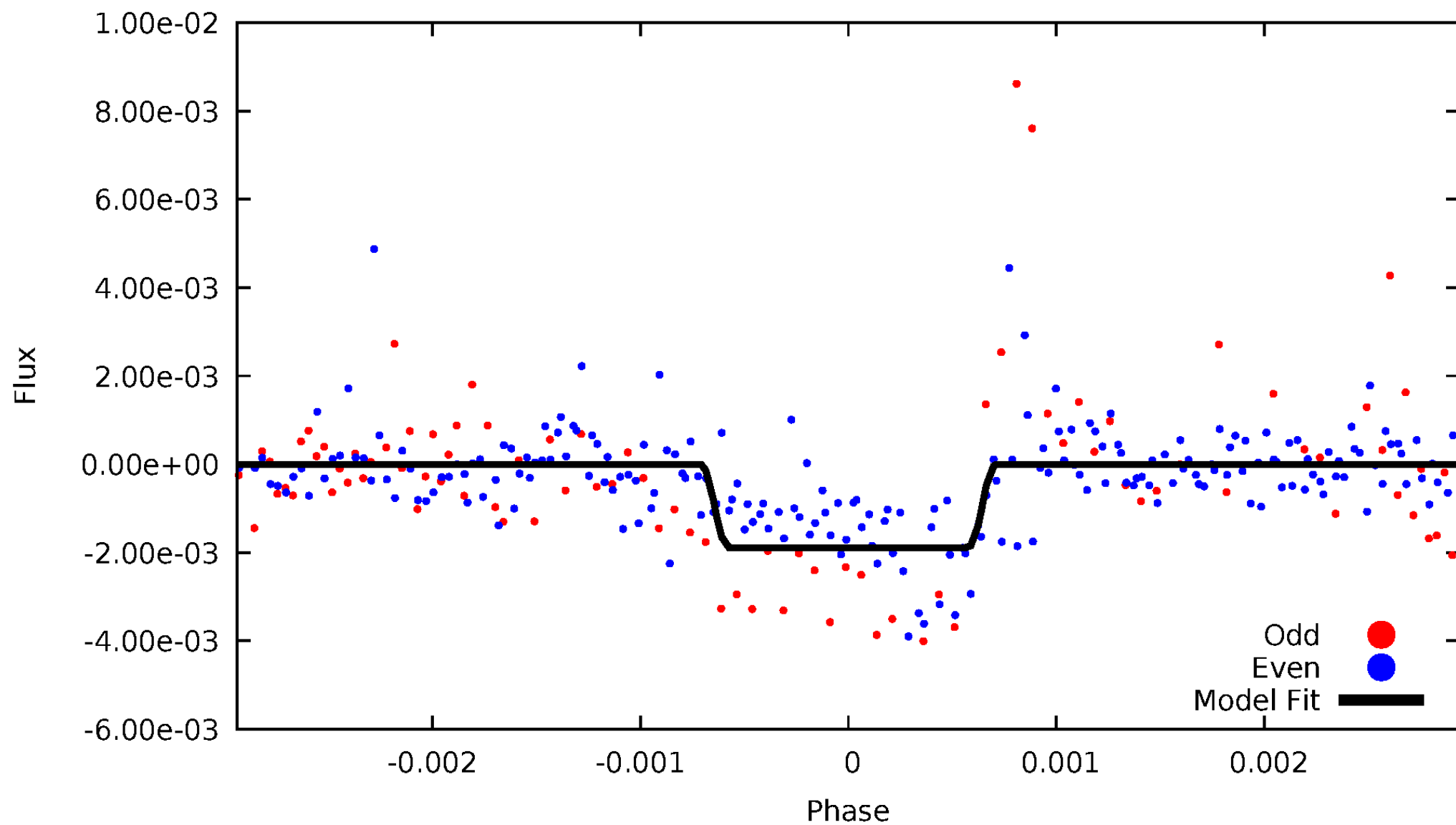
DV Odd/Even

TCE 009704431-03



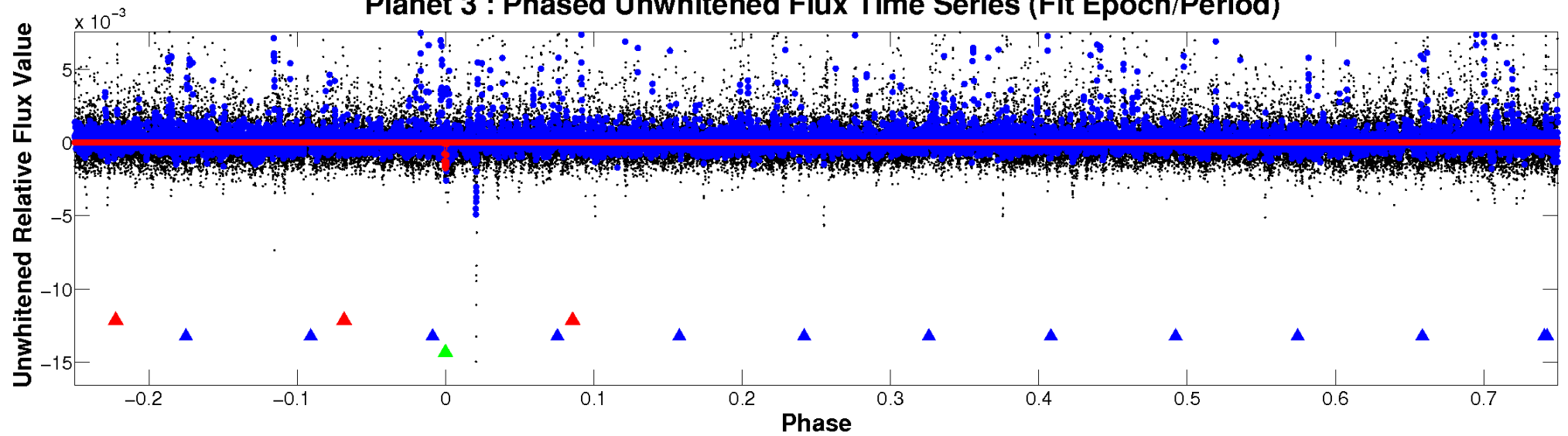
ALT Odd/Even

TCE 009704431-03

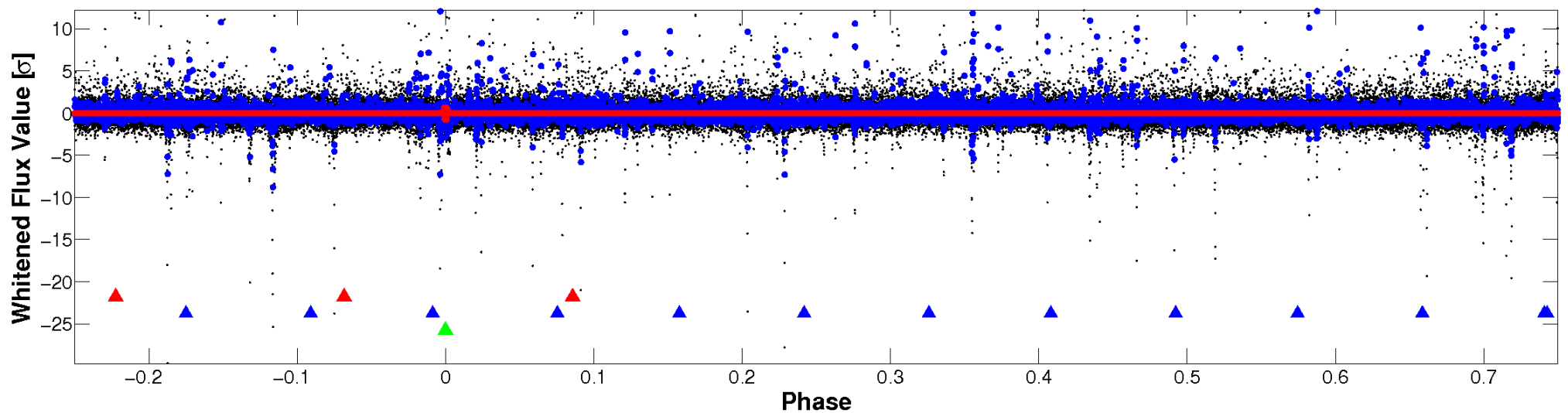


Non-Whitened Vs. Whitened Light Curve

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

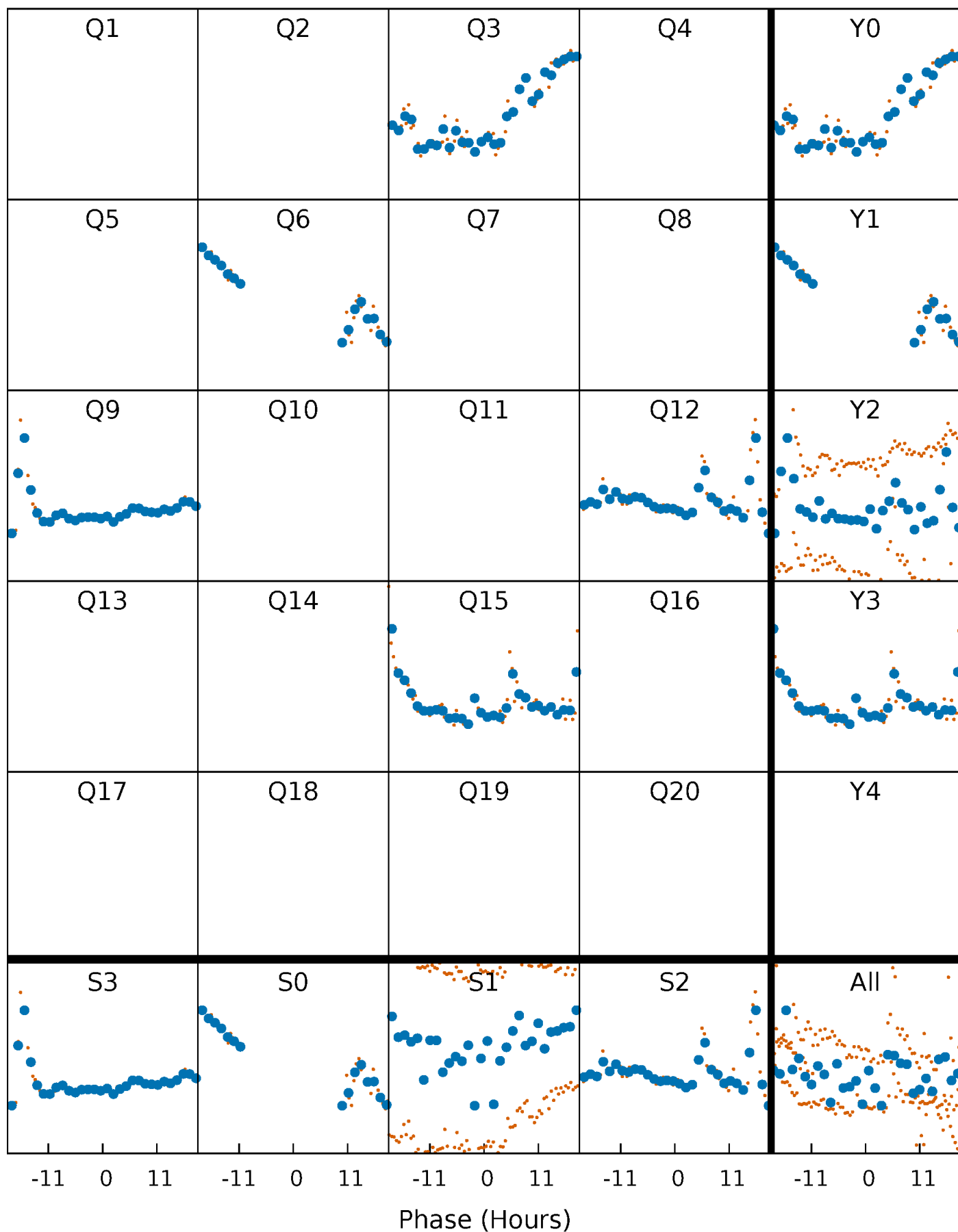


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



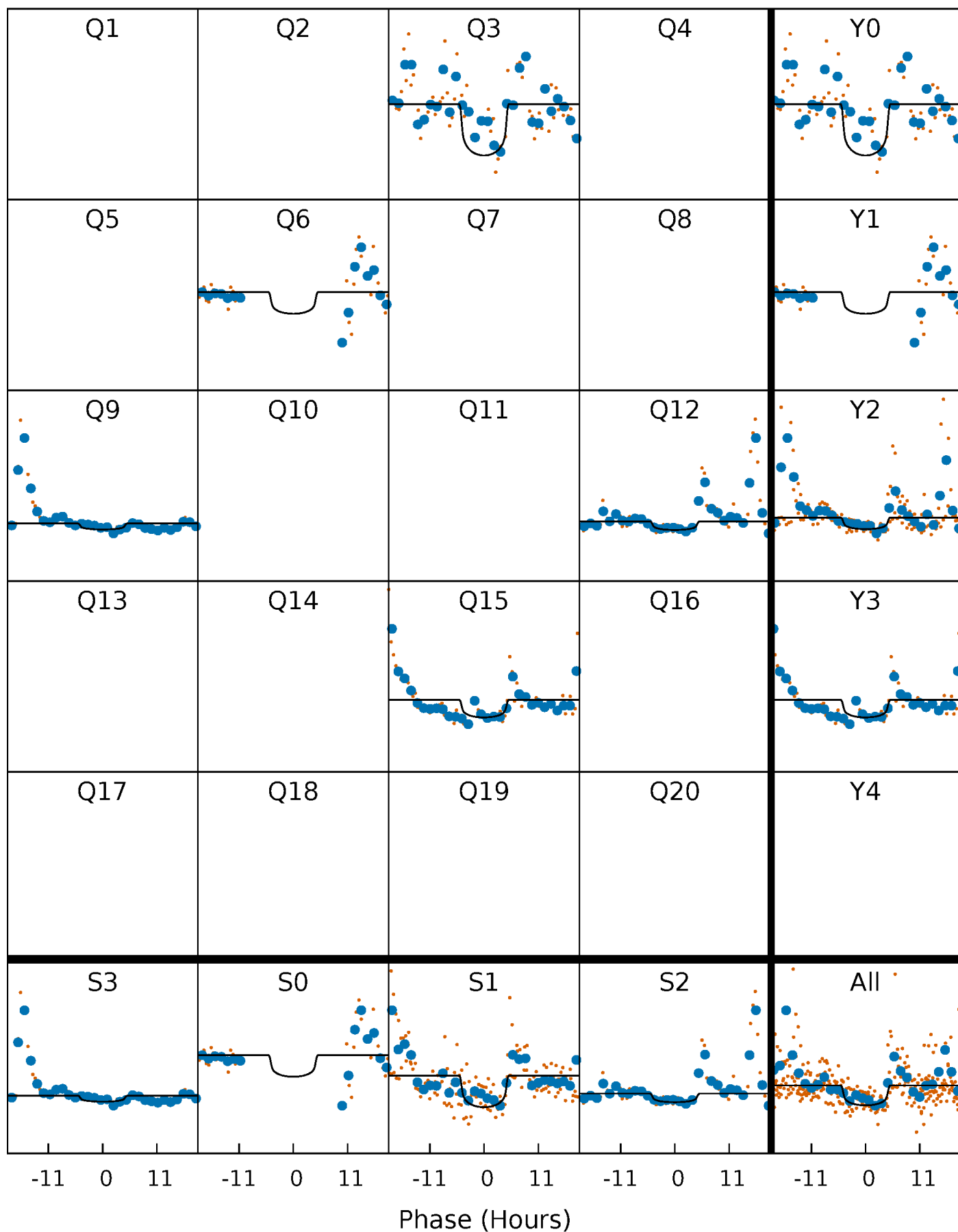
PDC Quarter-Phased Transit Curves

TCE 009704431-03 $P=273.070806$ Days $T_0=293.901798$ (BKJD)



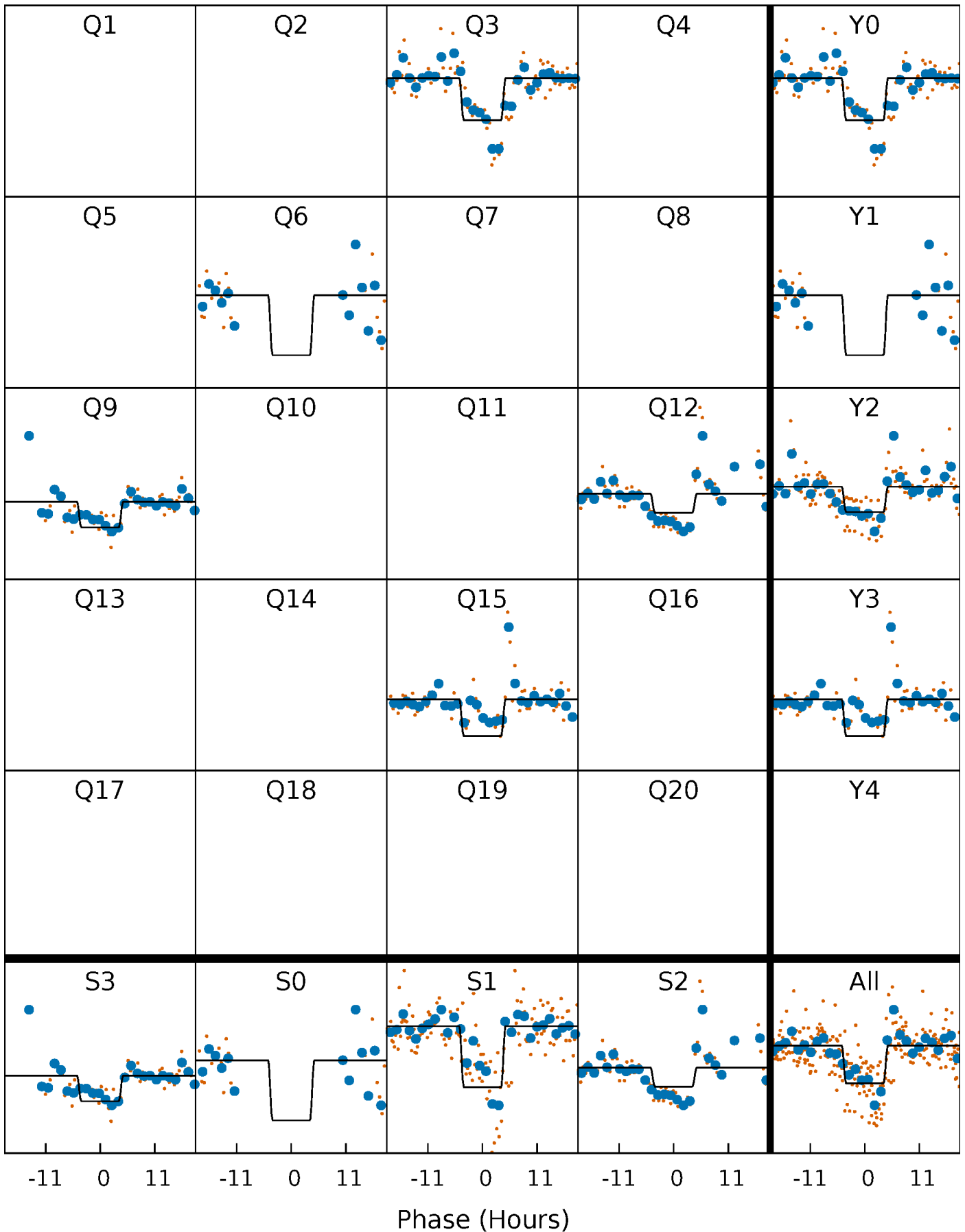
DV Quarter-Phased Transit Curves

TCE 009704431-03 $P=273.070806$ Days $T_0=293.901798$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

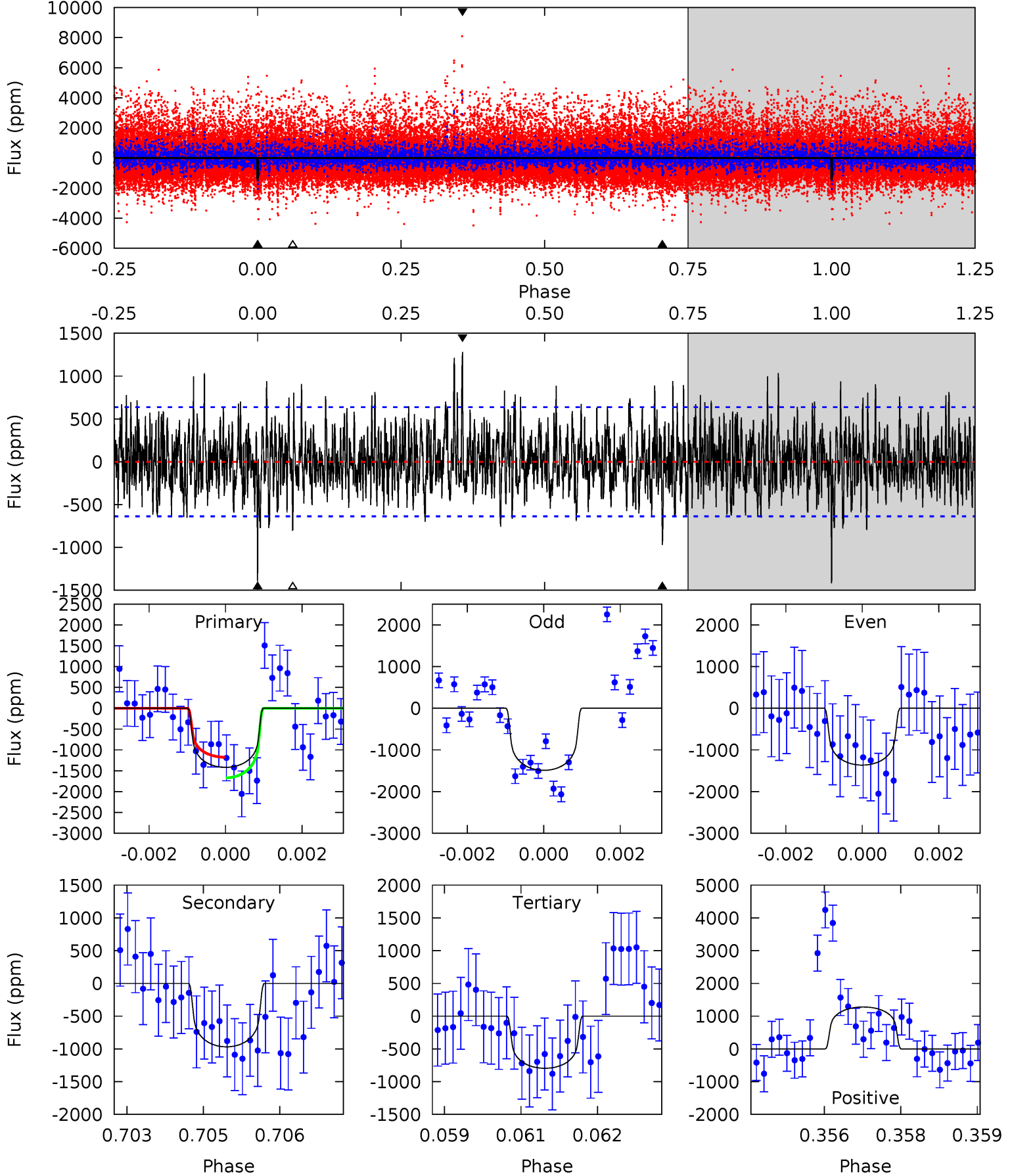
TCE 009704431-03 P=273.067285 Days $T_0=293.921235$ (BKJD)



DV Model-Shift Uniqueness Test

009704431-03, P = 273.070806 Days, E = 20.830992 Days

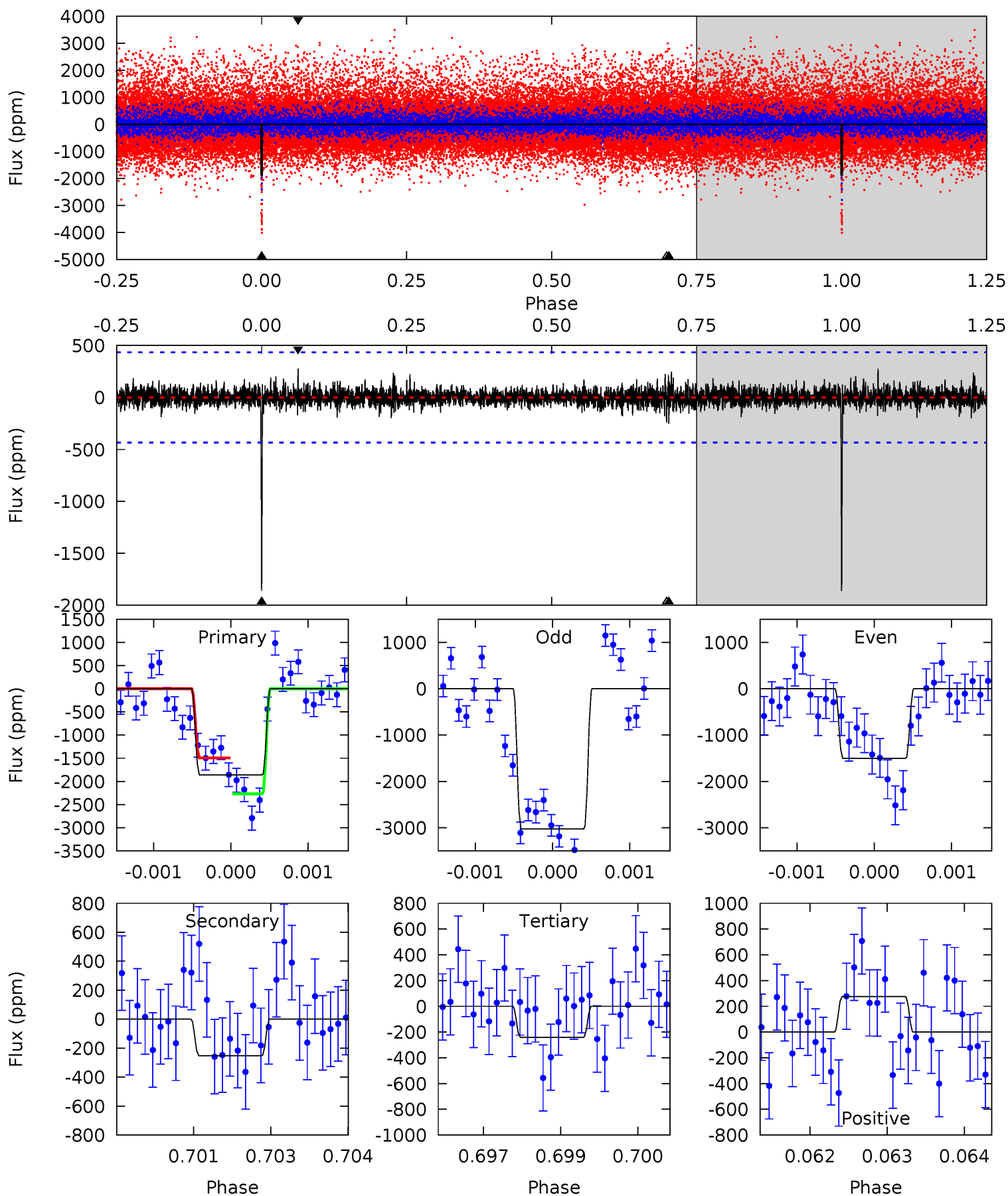
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.0	8.16	6.71	10.8	5.37	3.16	2.40	5.24	1.17	1.46	-2.62	0.37	1.00	0.47	2.11



Alt Model-Shift Uniqueness Test

009704431-03, P = 273.067285 Days, E = 20.853950 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.1	3.13	2.99	3.43	5.39	3.19	0.65	20.1	19.6	0.13	-0.30	7.68	1.07	0.13	4.84



Stellar Parameters For KIC 009704431

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	3360^{+43}_{-37}	$4.961^{+0.040}_{-0.044}$	$0.000^{+0.100}_{-0.100}$	$0.287^{+0.041}_{-0.030}$	$0.274^{+0.047}_{-0.034}$	$16.380^{+3.601}_{-3.540}$
	+1%/-1%	+1%/-1%	+inf%/-inf%	+14%/-10%	+17%/-12%	+22%/-22%
Source	PHO2	PHO2	PHO2	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009704431-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-969 ± 119	$1.29^{+0.73}_{-0.72}$	152^{+4}_{-3}	3090^{+913}_{-355}	$92164^{+379869}_{-54163}$
Alt.	-252 ± 81	$1.38^{+0.80}_{-0.67}$	152^{+4}_{-3}	2531^{+522}_{-272}	20059^{+60808}_{-12288}

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

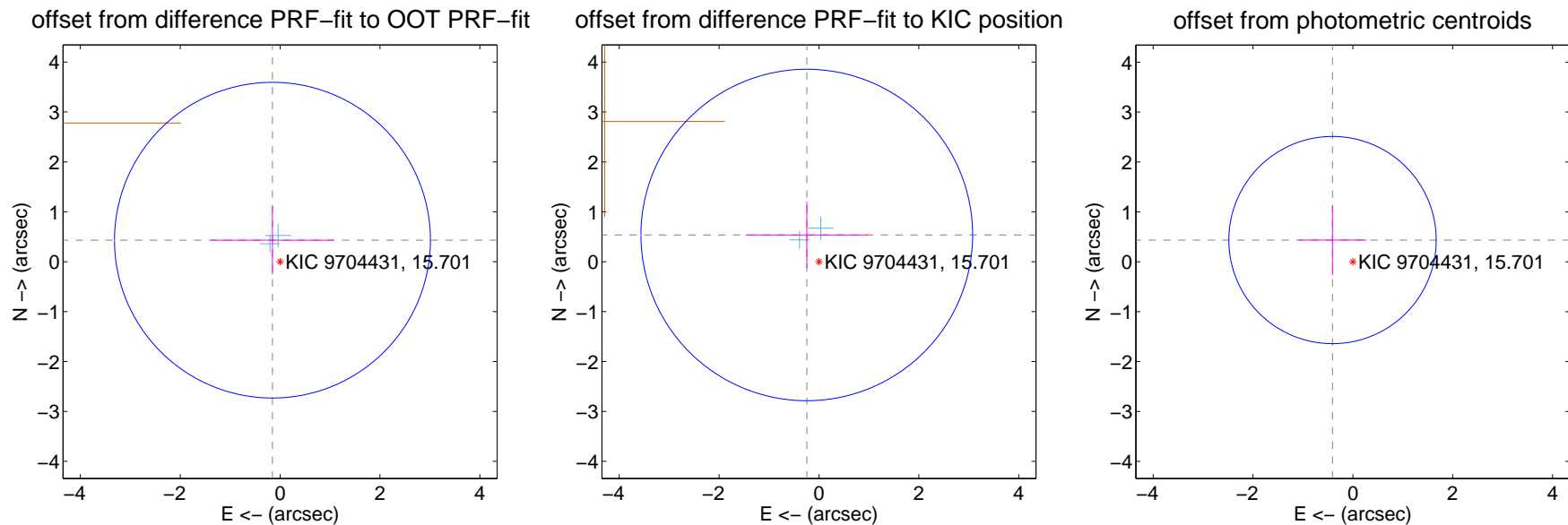
DV Centroid Data

Supplemental centroid analysis for 009704431-03. Kepler magnitude: 15.70. Transit SNR 6.64

There are 2 quarters with good PRF difference image offsets

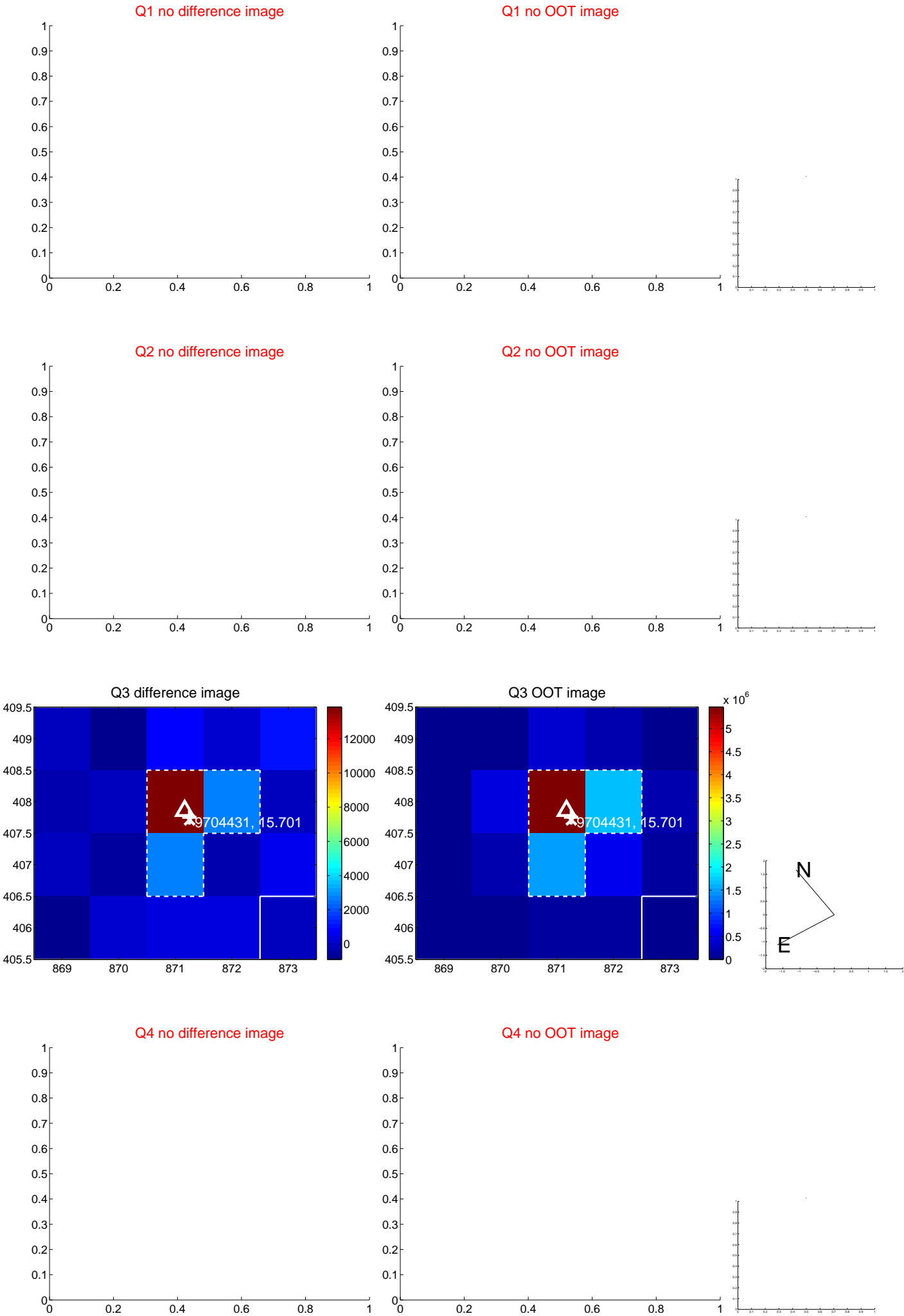
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.457 ± 1.054	0.43	0.153 ± 1.231	0.431 ± 0.684
PRF-fit source offset from KIC position	0.588 ± 1.107	0.53	0.244 ± 1.224	0.535 ± 0.663
photometric centroid source offset	0.60 ± 0.69	0.86	0.41 ± 0.68	0.44 ± 0.70



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.

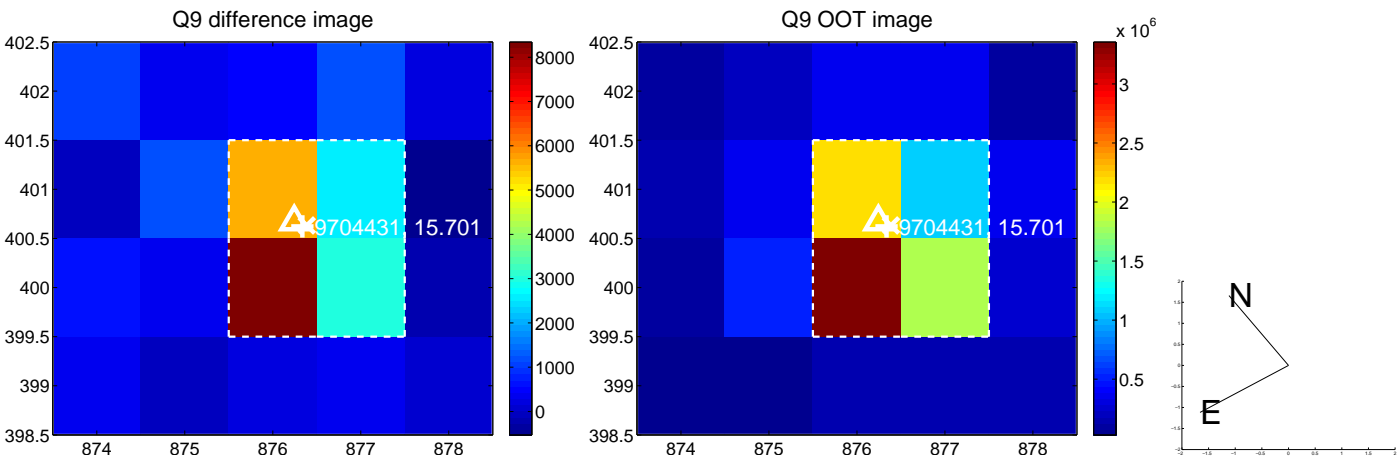
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



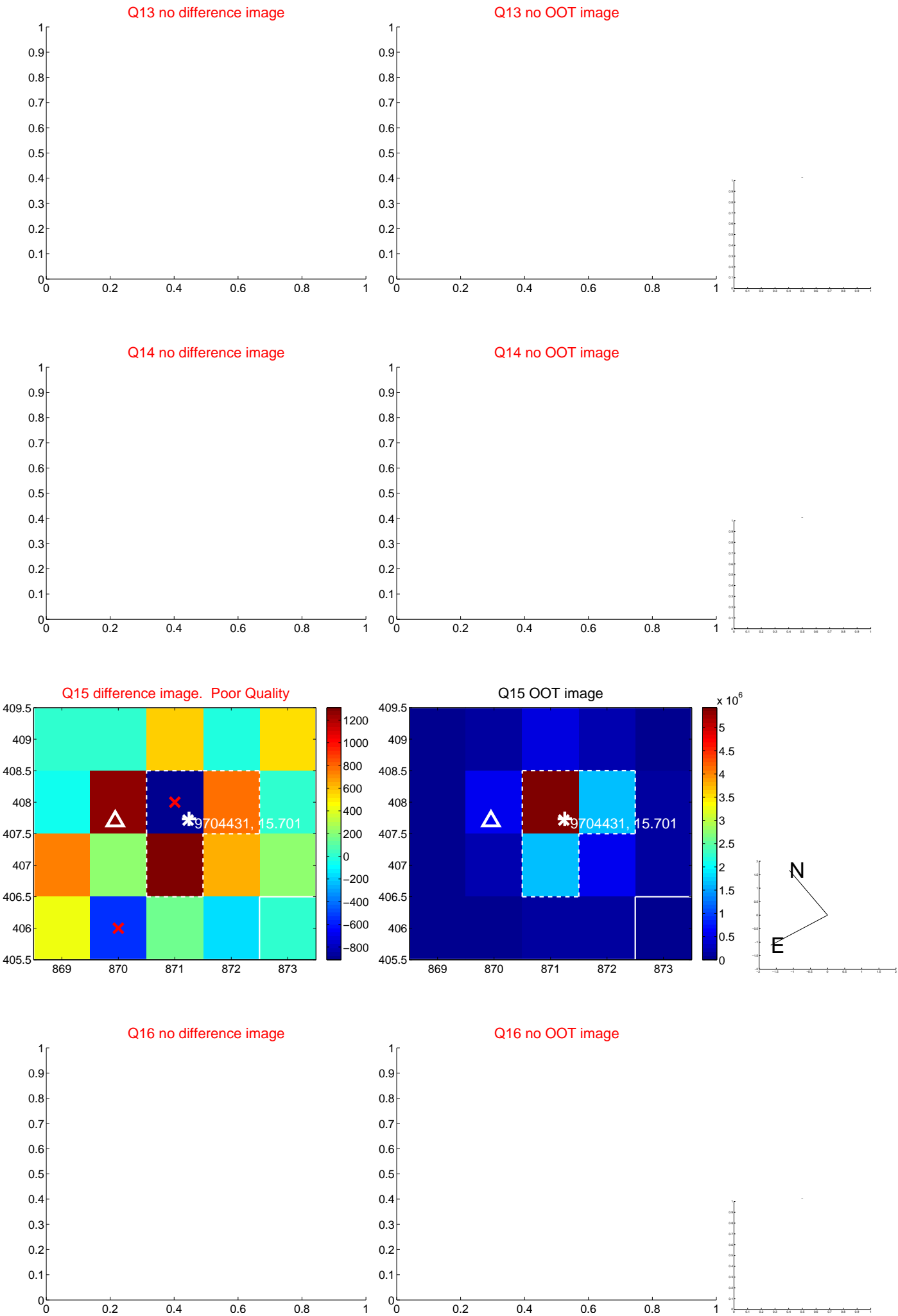
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



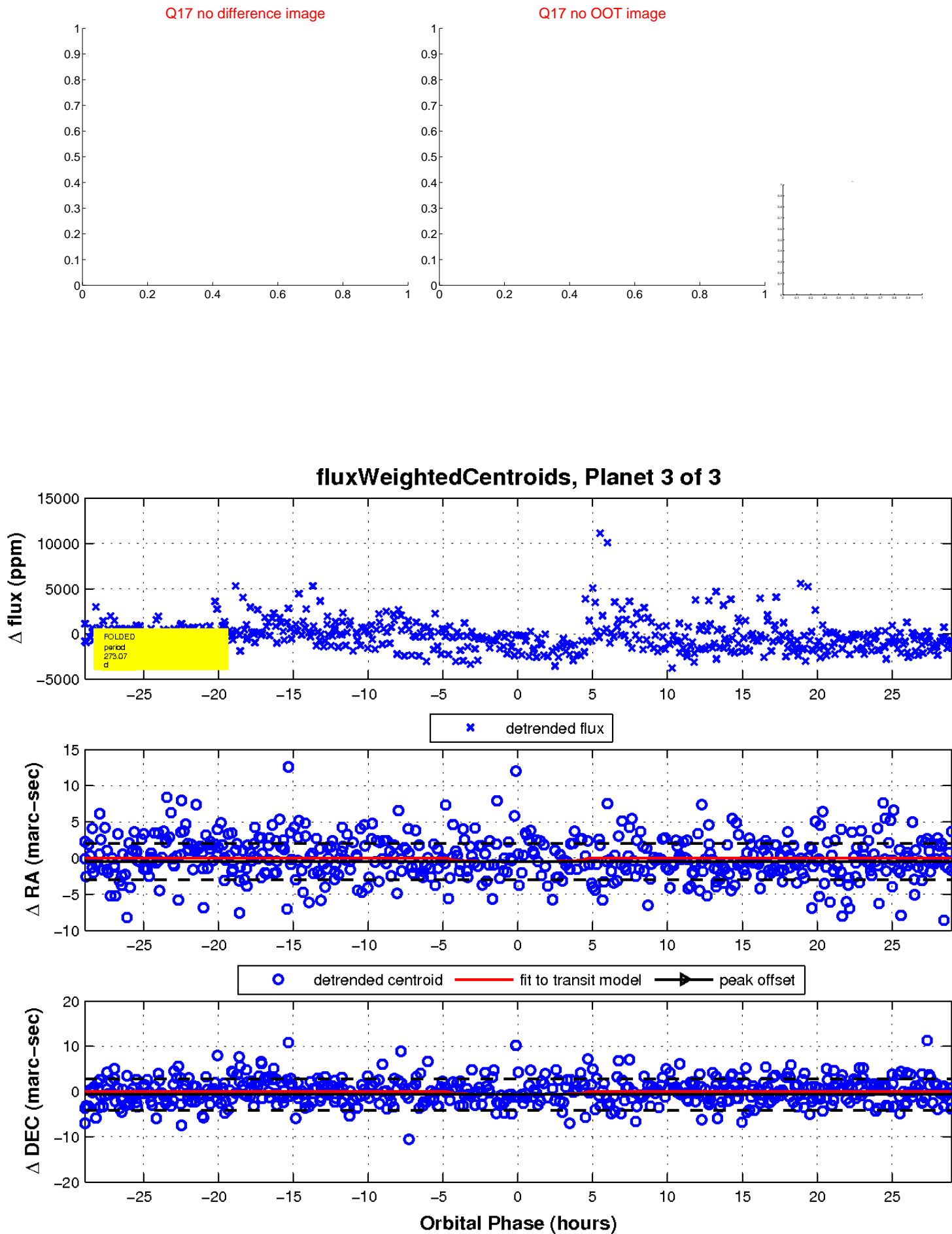
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

