

KIC 009872330

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})
009872330-01	OBS	No	610.079429	247.054340	1841.3	2.824	13.8	6.6	0.81	5752	3.47	0.35
009872330-02	OBS	No	305.563220	372.367589	1127.0	1.364	12.4	5.2	0.81	5752	2.97	0.88
009872330-03	OBS	No	405.705316	416.021259	1534.4	3.866	10.5	6.3	0.81	5752	3.47	0.60
009872330-04	OBS	No	341.709813	259.745047	964.7	2.475	11.1	3.5	0.81	5752	2.74	0.76
009872330-05	OBS	No	524.128729	487.558404	1460.0	3.262	9.9	5.7	0.81	5752	3.18	0.43

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009872330-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009872330-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009872330-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009872330-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009872330-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

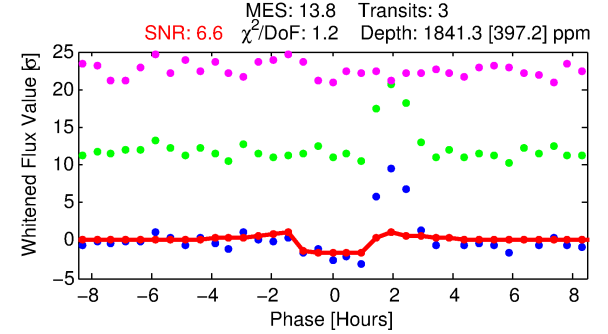
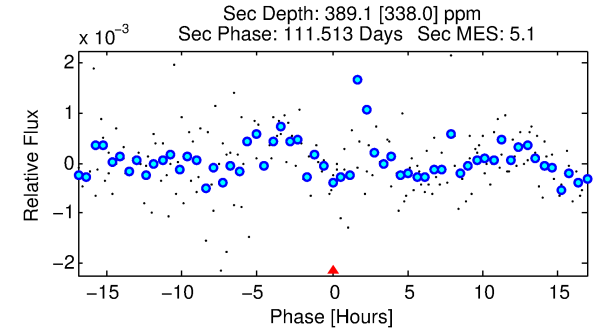
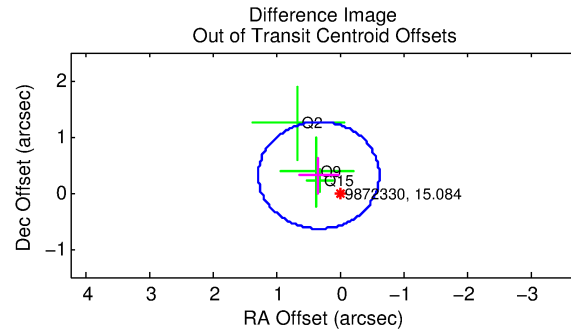
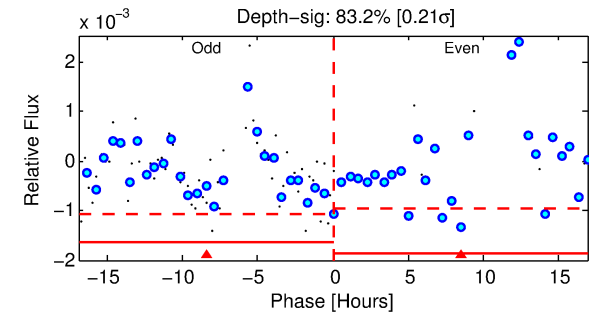
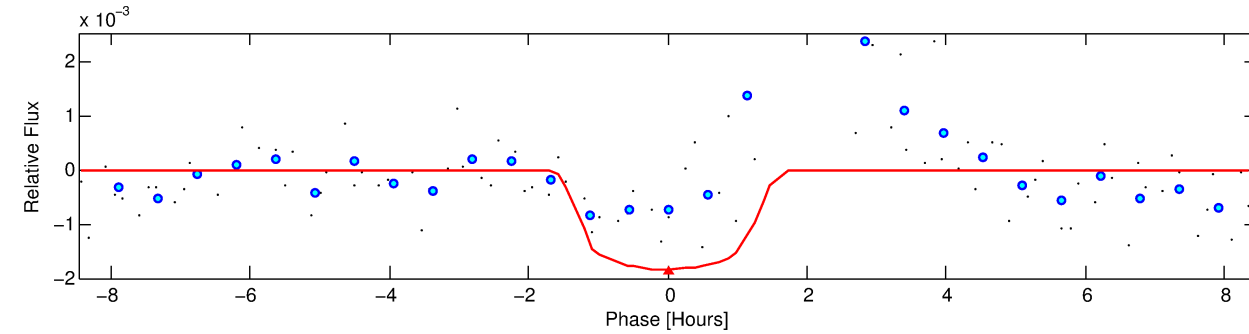
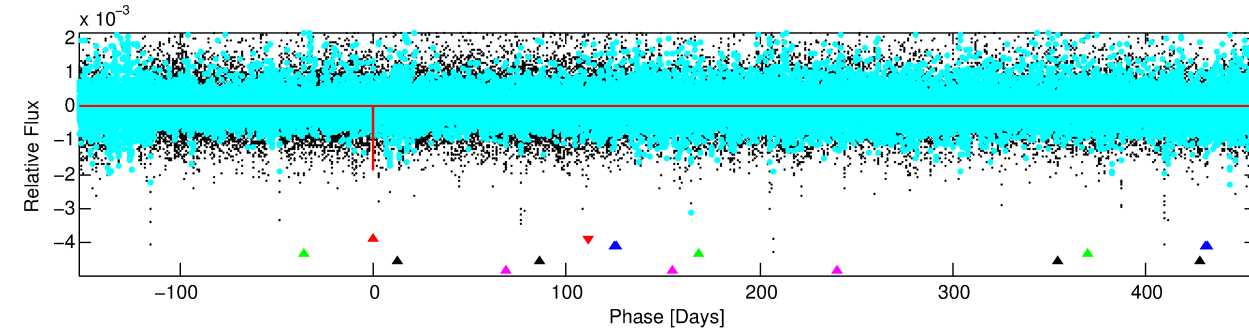
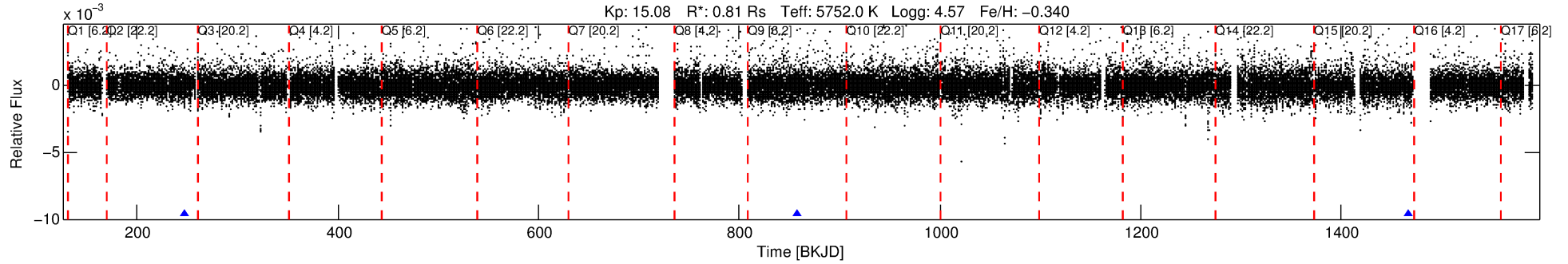
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009872330-01

No Significant Match Found

DV One-Page Summary

KIC: 9872330 Candidate: 1 of 5 Period: 610.079 d



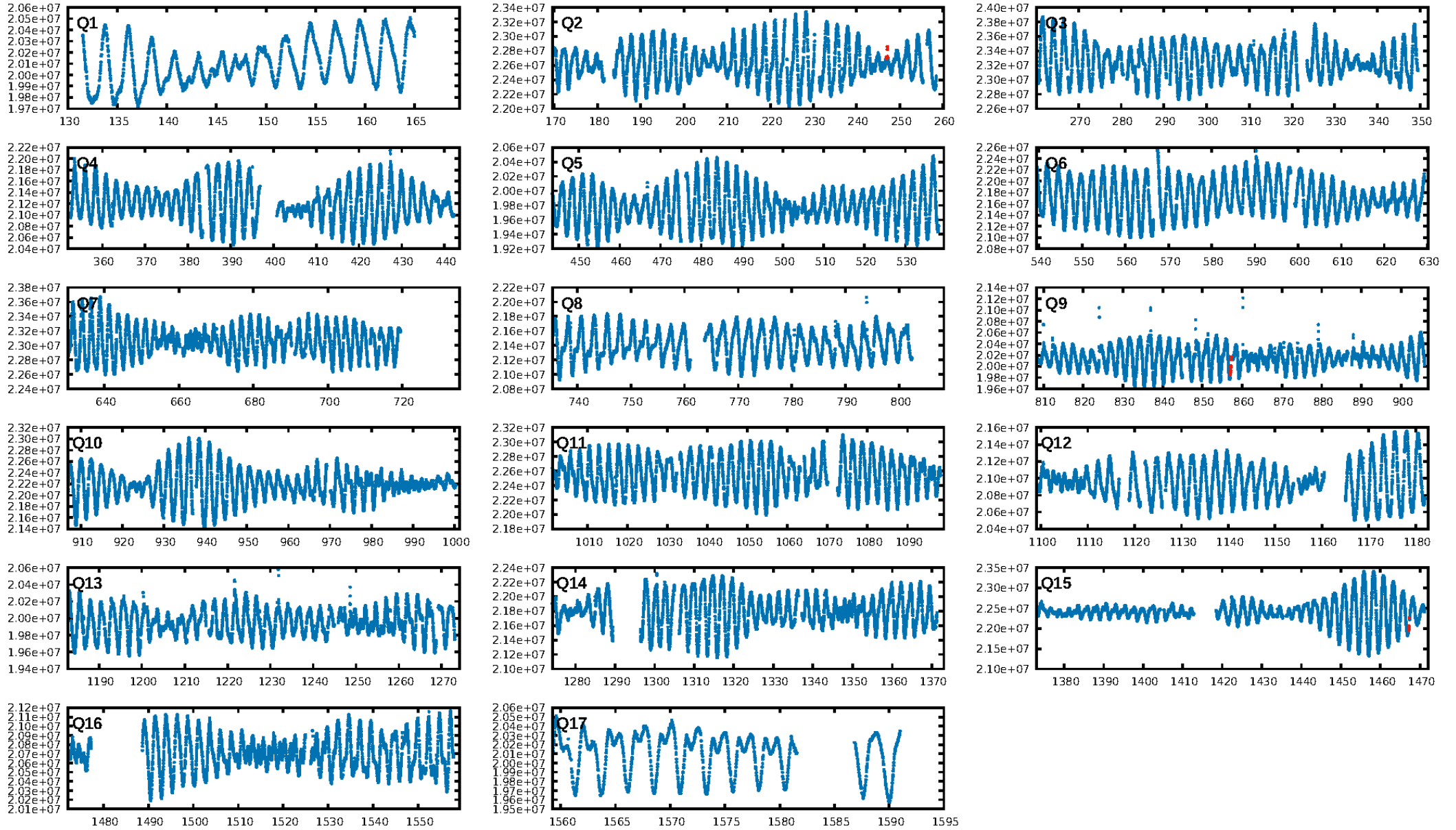
DV Fit Results:

Period = 610.07943 [0.00604] d
Epoch = 247.0543 [0.0078] BKJD
Rp/R* = 0.0394 [0.0846]
a/R* = 1657.68 [16149.57]
b = 0.27 [34.14]
Seff = 0.35 [0.12]
Teq = 196 [17] K
Rp = 3.47 [7.49] Re
a = 1.3506 [0.3002] AU
Ag = 32503.34 [142732.22] [0.23 σ]
Teffp = 4070 [4457] K [0.87 σ]

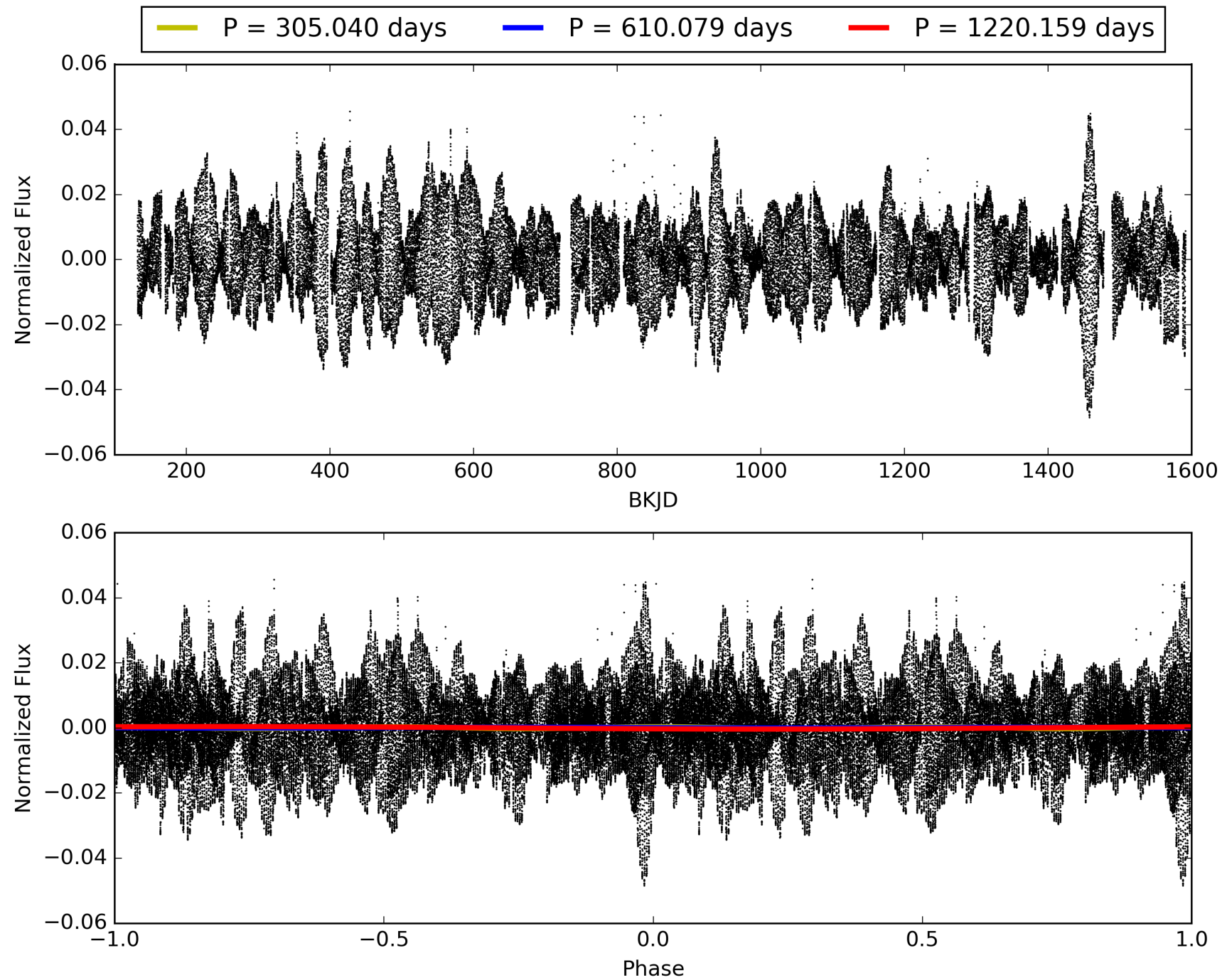
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [478.07 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 69.4%
ModelChiSquareGof-sig: 86.8%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -3.298
Centroid-sig: 37.8%
Centroid-so: 1.004 arcsec [0.91 σ]
OotOffset-rm: 0.462 arcsec [1.46 σ]
OotOffset-st: 1/1/0/1 [3]
KicOffset-rm: 0.331 arcsec [1.04 σ]
KicOffset-st: 1/1/0/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

TCE 009872330-01, PDC Light Curves

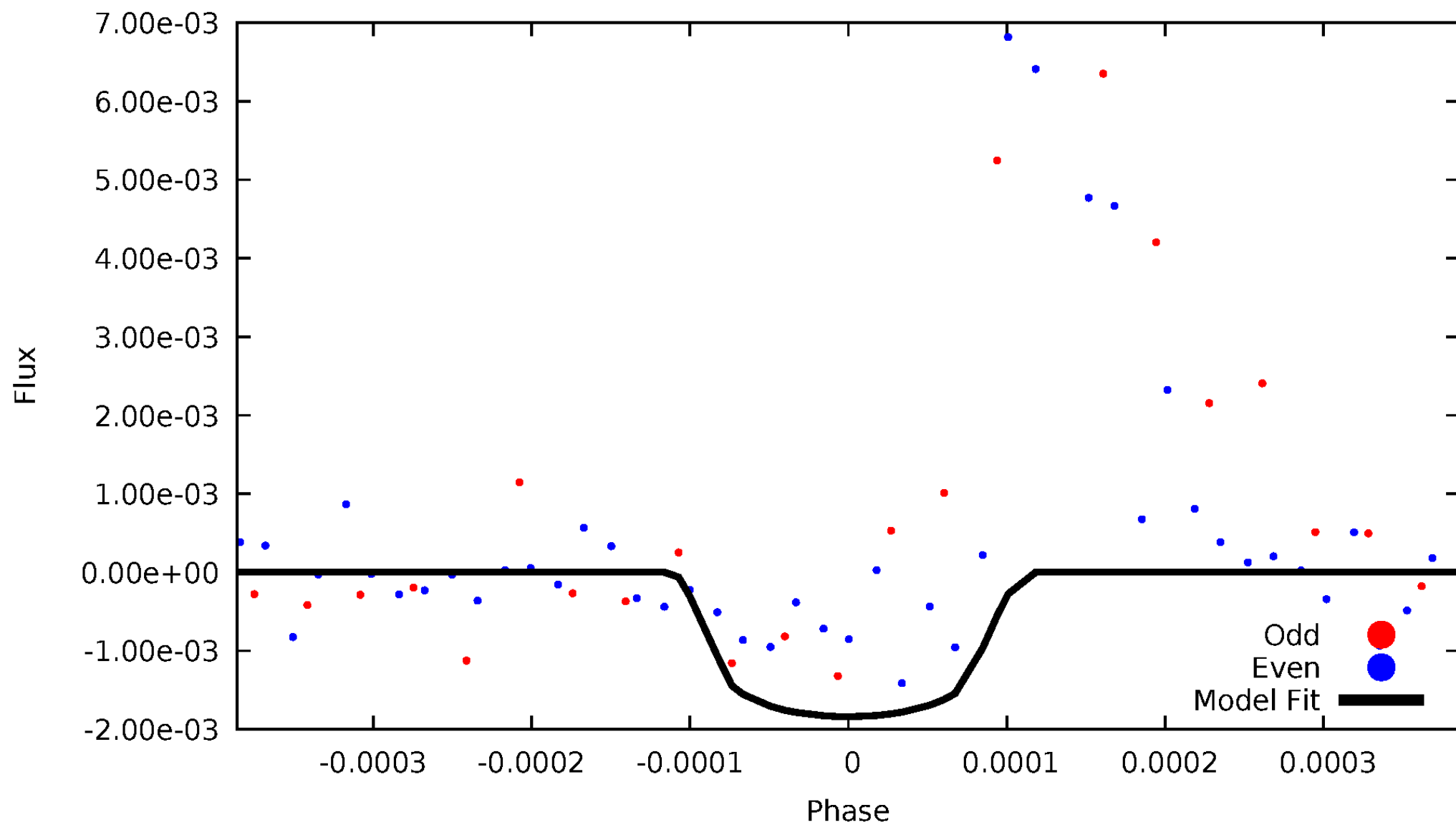


TCE 009872330-01



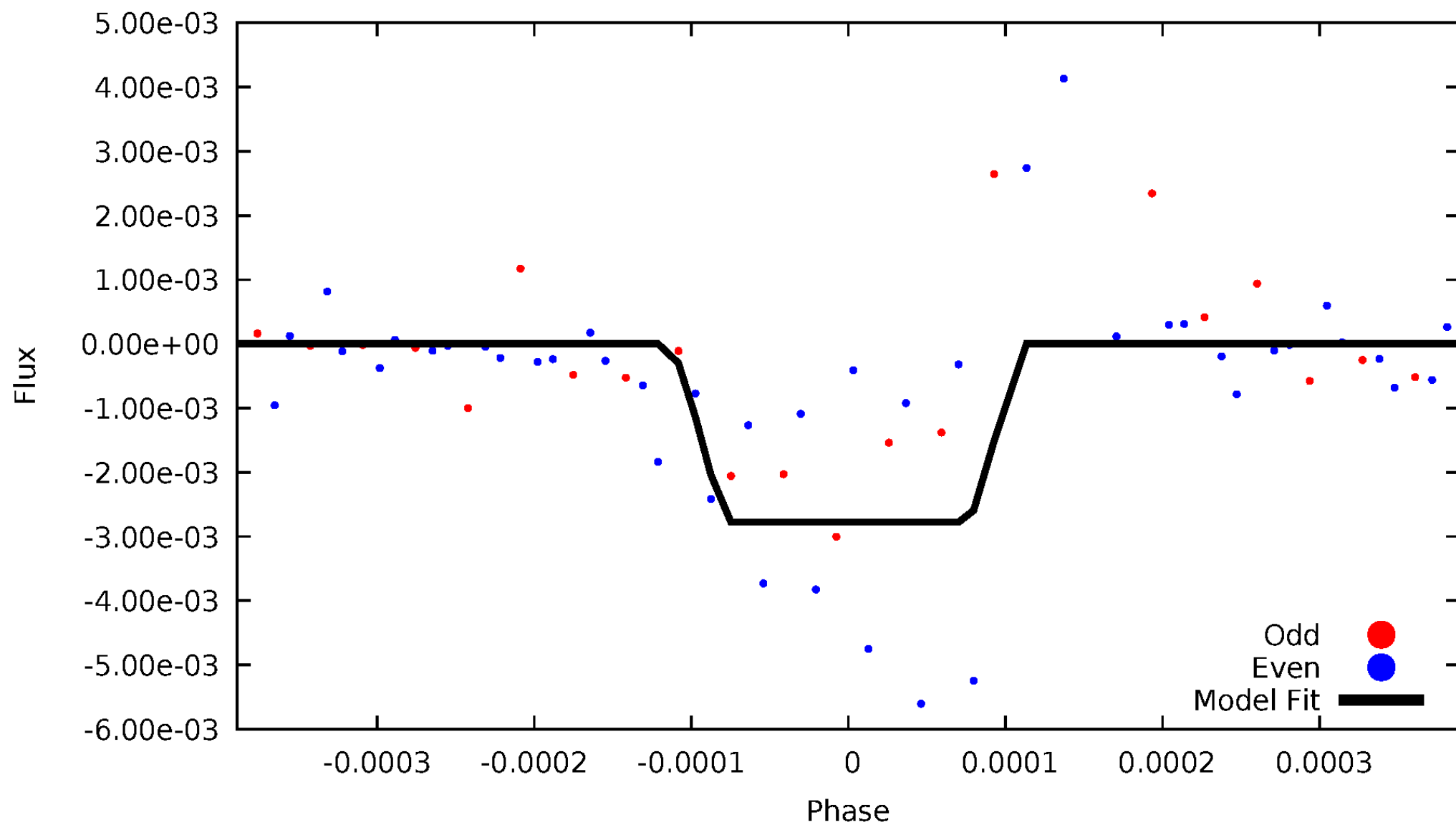
DV Odd/Even

TCE 009872330-01

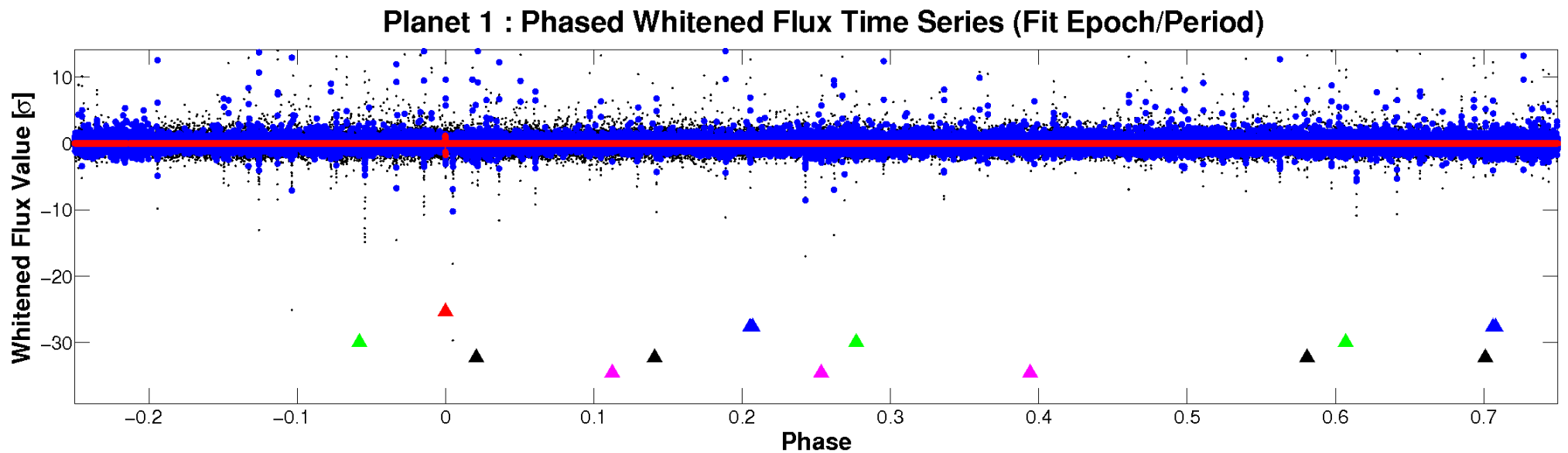
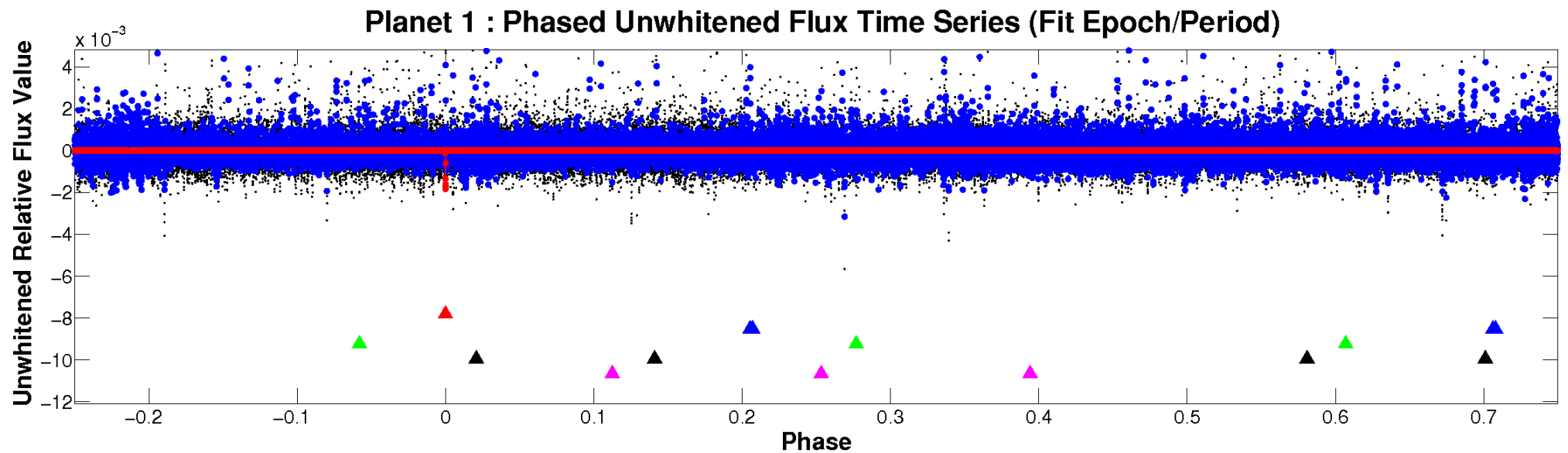


ALT Odd/Even

TCE 009872330-01

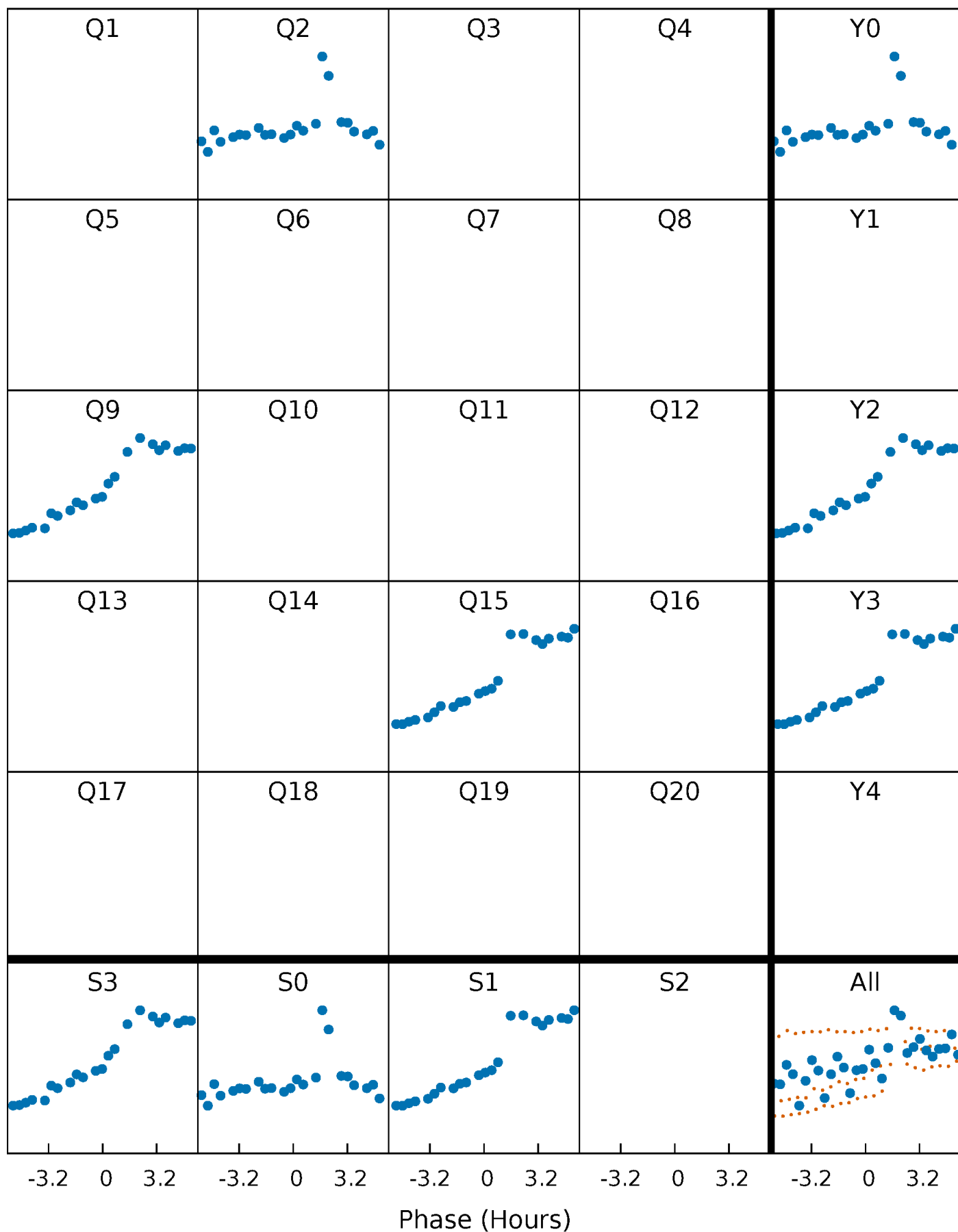


Non-Whitened Vs. Whitened Light Curve



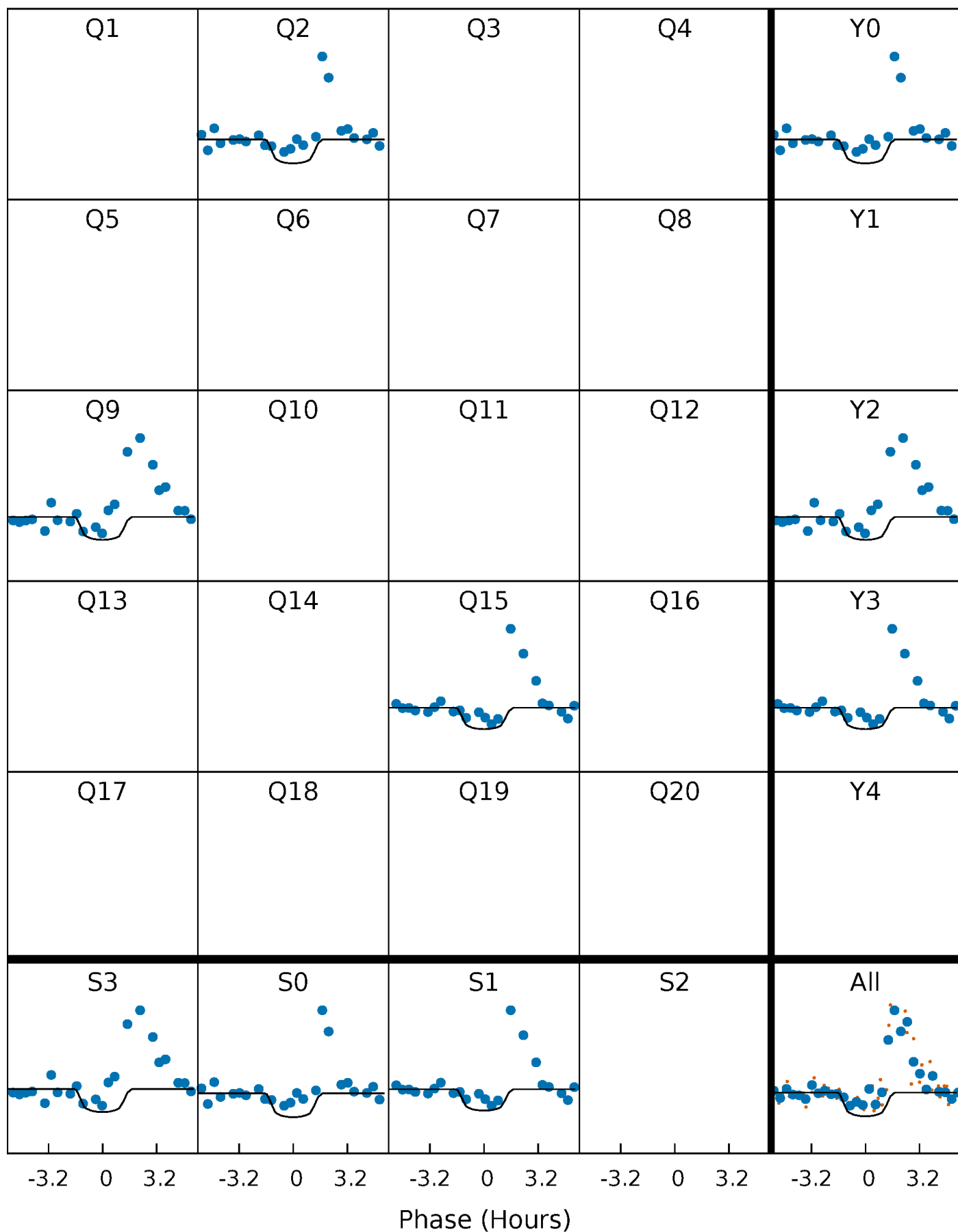
PDC Quarter-Phased Transit Curves

TCE 009872330-01 P=610.079429 Days $T_0=247.054340$ (BKJD)



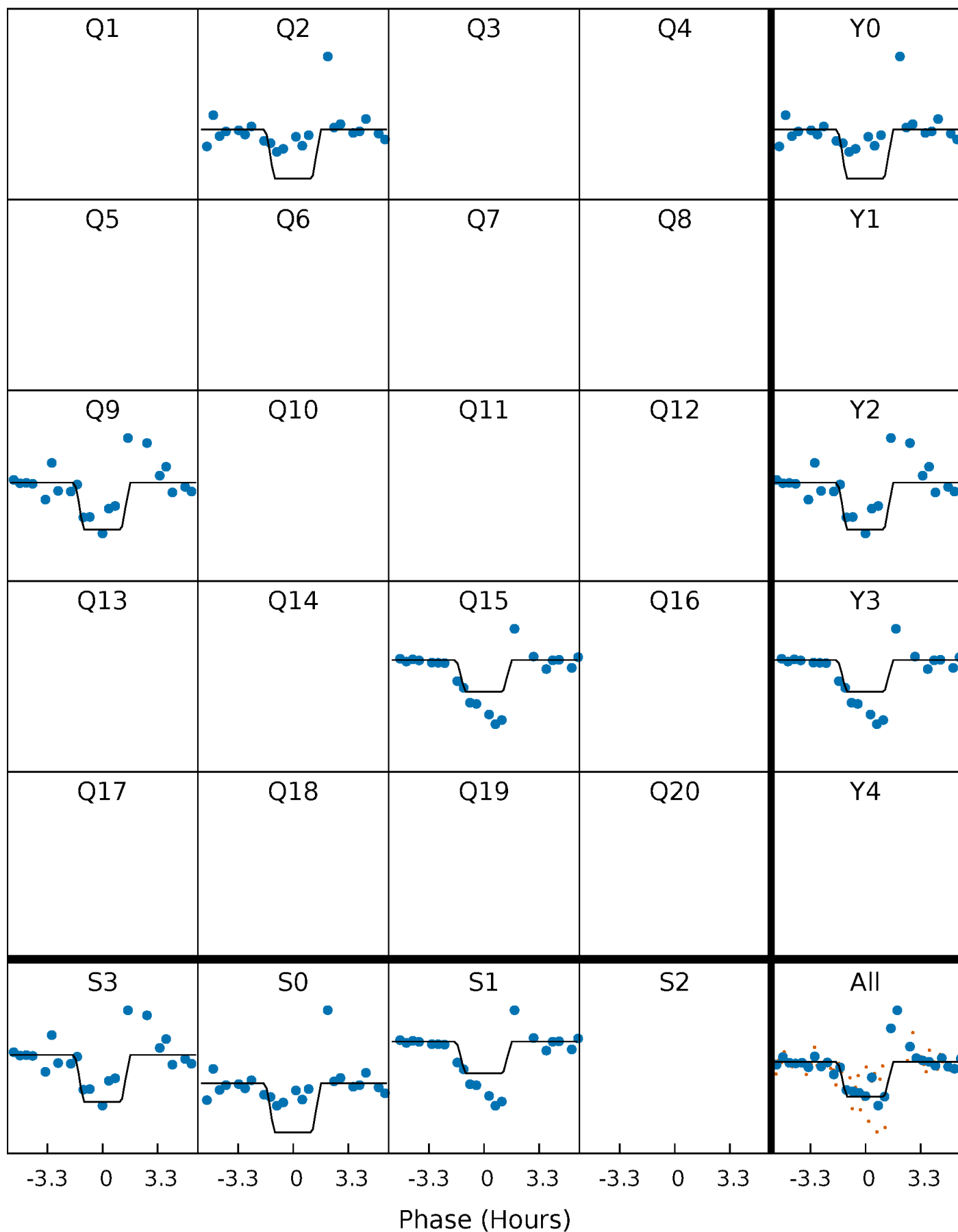
DV Quarter-Phased Transit Curves

TCE 009872330-01 P=610.079429 Days $T_0=247.054340$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

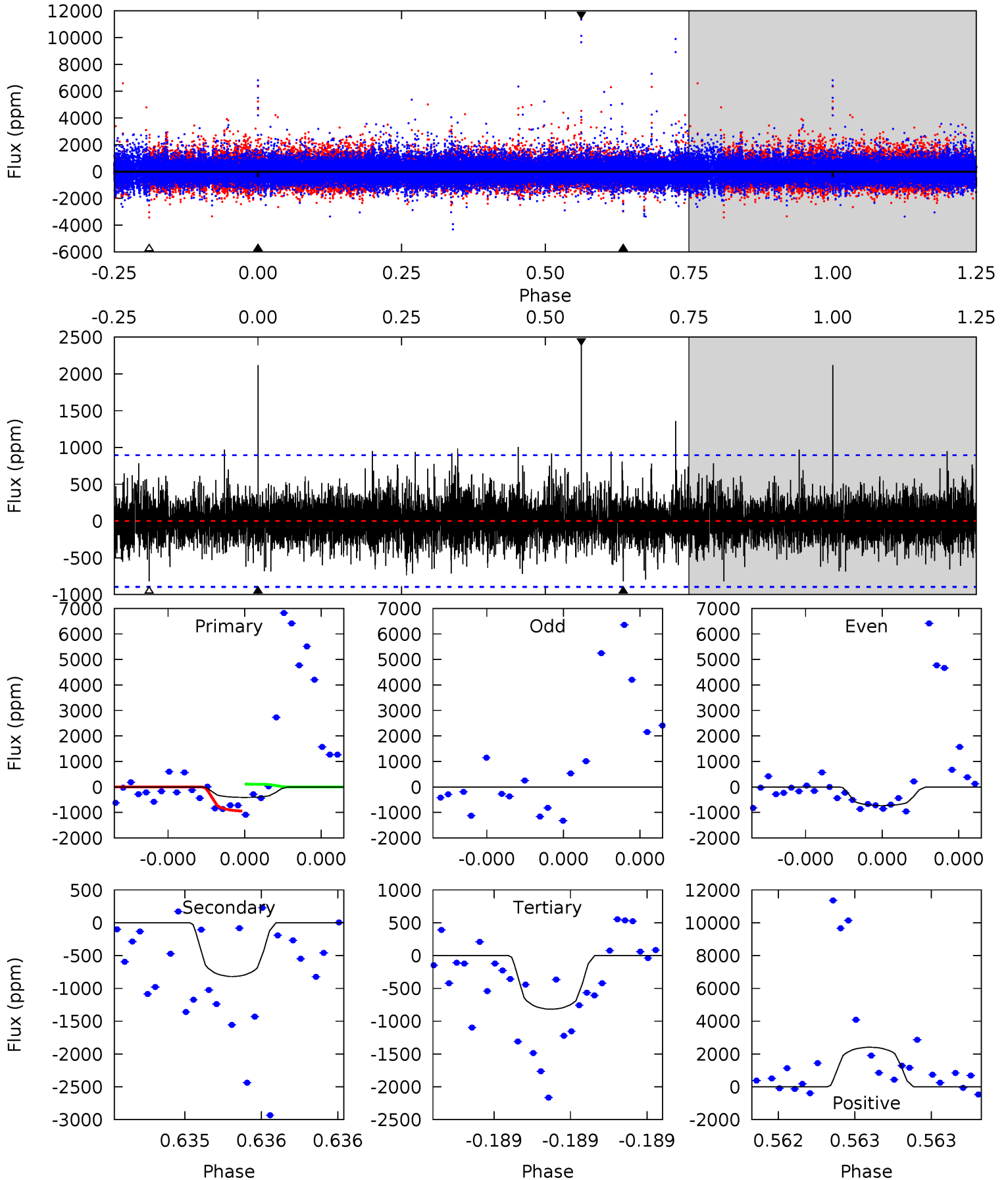
TCE 009872330-01 P=610.071178 Days $T_0=247.063253$ (BKJD)



DV Model-Shift Uniqueness Test

009872330-01, P = 610.079429 Days, E = 247.054340 Days

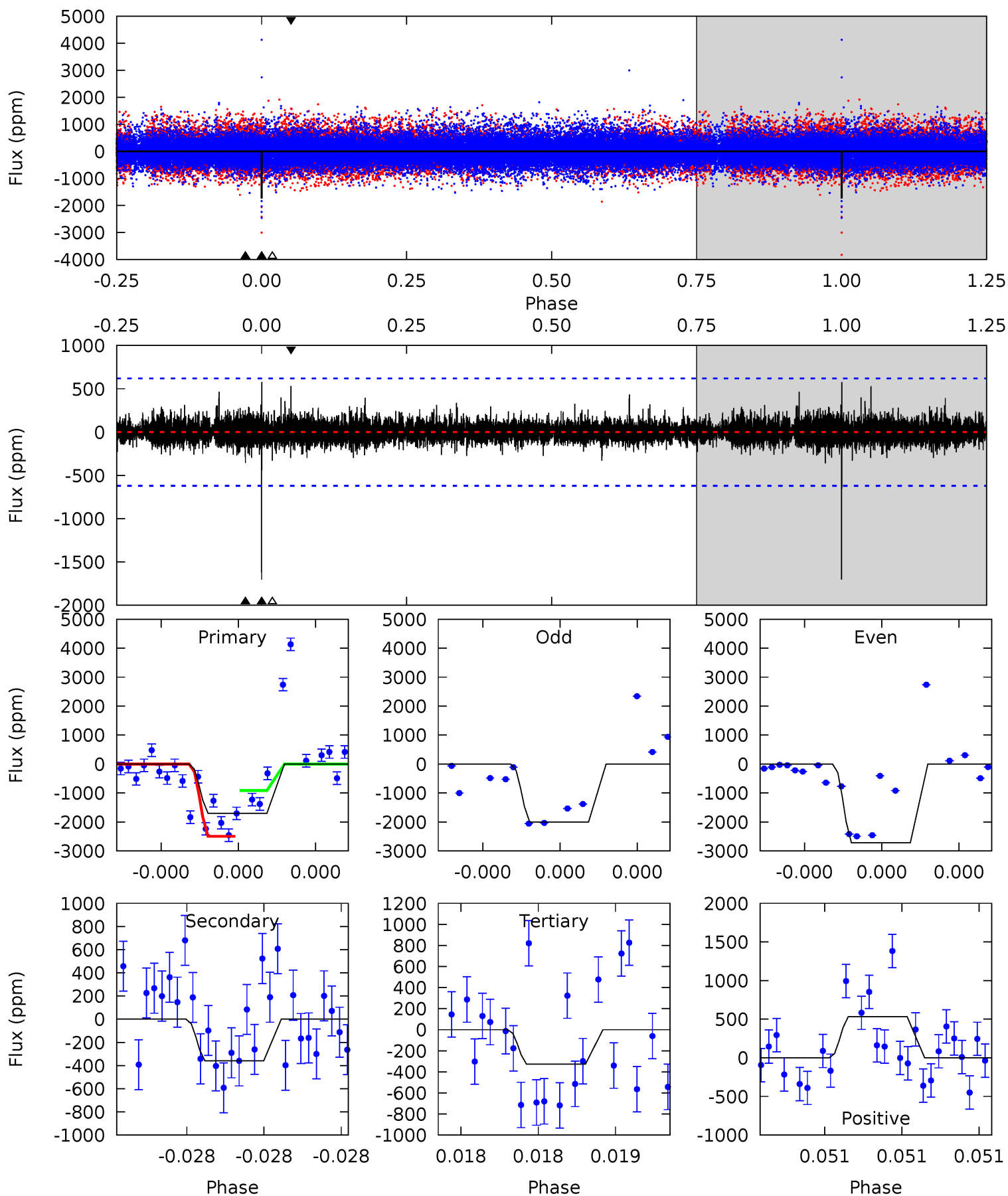
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.61	5.24	5.23	15.4	5.72	3.71	1.34	-2.62	-12.8	0.01	-10.2	1.78	0.81	0.75	2.67



Alt Model-Shift Uniqueness Test

009872330-01, P = 610.071178 Days, E = 247.063253 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.8	3.32	3.03	4.93	5.74	3.73	0.66	12.7	10.8	0.29	-1.61	3.30	1.44	0.25	7.02



Stellar Parameters For KIC 009872330

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5752^{+143}_{-158}	$4.571^{+0.042}_{-0.178}$	$-0.340^{+0.300}_{-0.300}$	$0.806^{+0.212}_{-0.071}$	$0.882^{+0.091}_{-0.100}$	$2.370^{+0.521}_{-1.058}$
	+2%/-3%	+1%/-4%	+88%/-88%	+26%/-9%	+10%/-11%	+22%/-45%
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 009872330-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-820 ± 156	$7.03^{+6.20}_{-4.43}$	280^{+18}_{-13}	3880^{+1956}_{-741}	$16987^{+107175}_{-12701}$
Alt.	-358 ± 108	$7.63^{+6.39}_{-5.45}$	278^{+18}_{-11}	3283^{+1894}_{-553}	5906^{+72759}_{-4232}

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

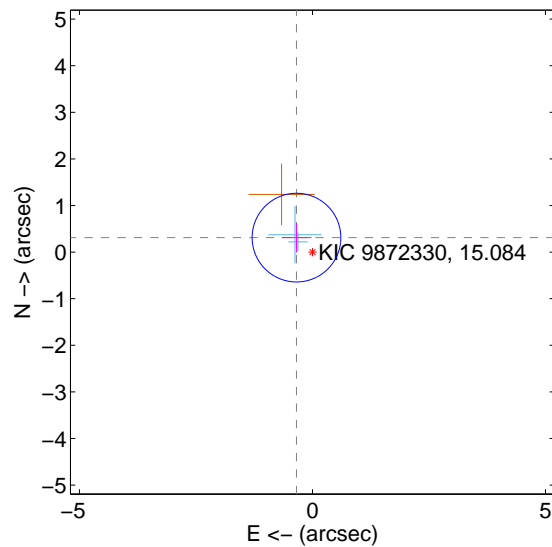
Supplemental centroid analysis for 009872330-01. Kepler magnitude: 15.08. Transit SNR 6.62

There are 2 quarters with good PRF difference image offsets

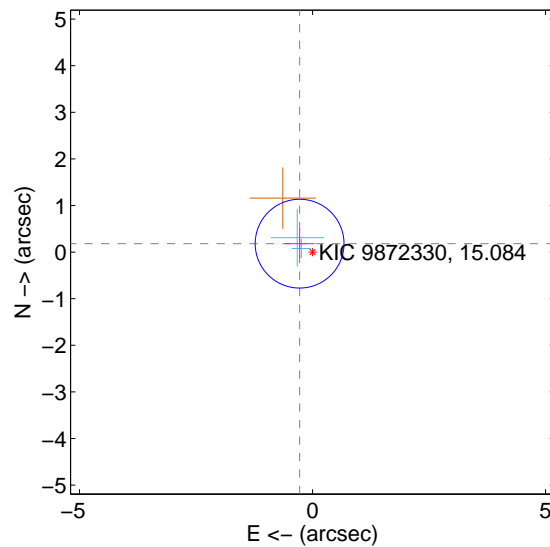
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.462 ± 0.317	1.46	0.342 ± 0.318	0.311 ± 0.316
PRF-fit source offset from KIC position	0.331 ± 0.318	1.04	0.277 ± 0.318	0.181 ± 0.316
photometric centroid source offset	1.00 ± 1.11	0.91	0.94 ± 1.11	-0.35 ± 1.11

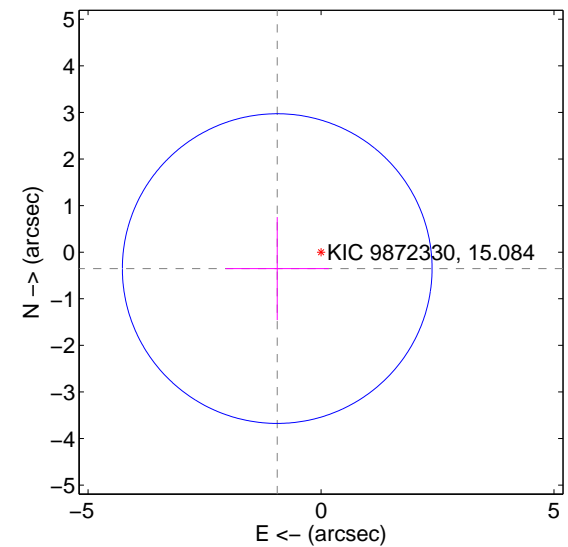
offset from difference PRF-fit to OOT PRF-fit



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.

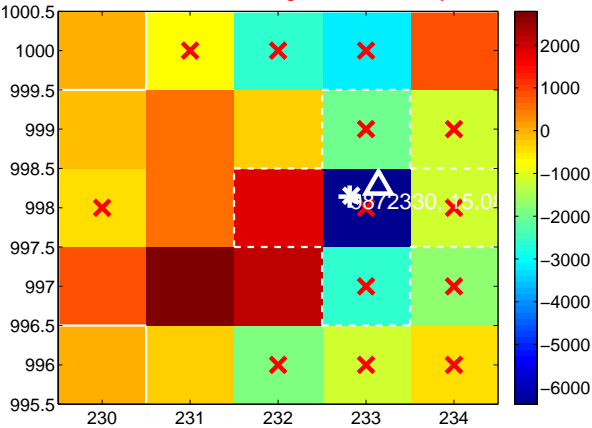
Q1 no difference image



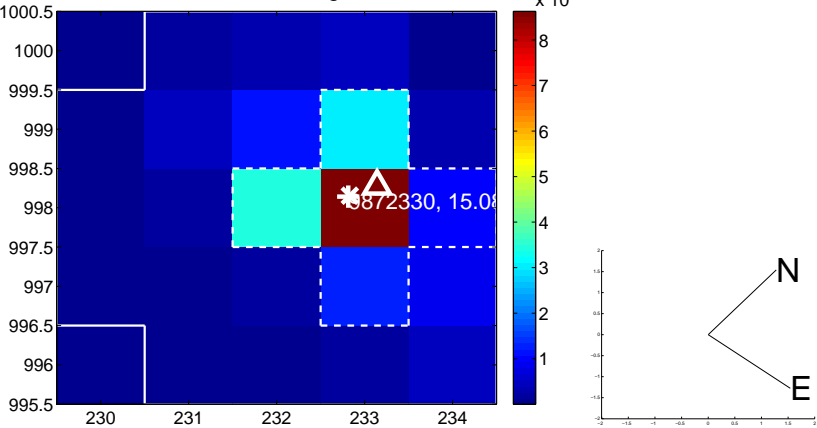
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



Q3 no difference image



Q3 no OOT image



Q4 no difference image



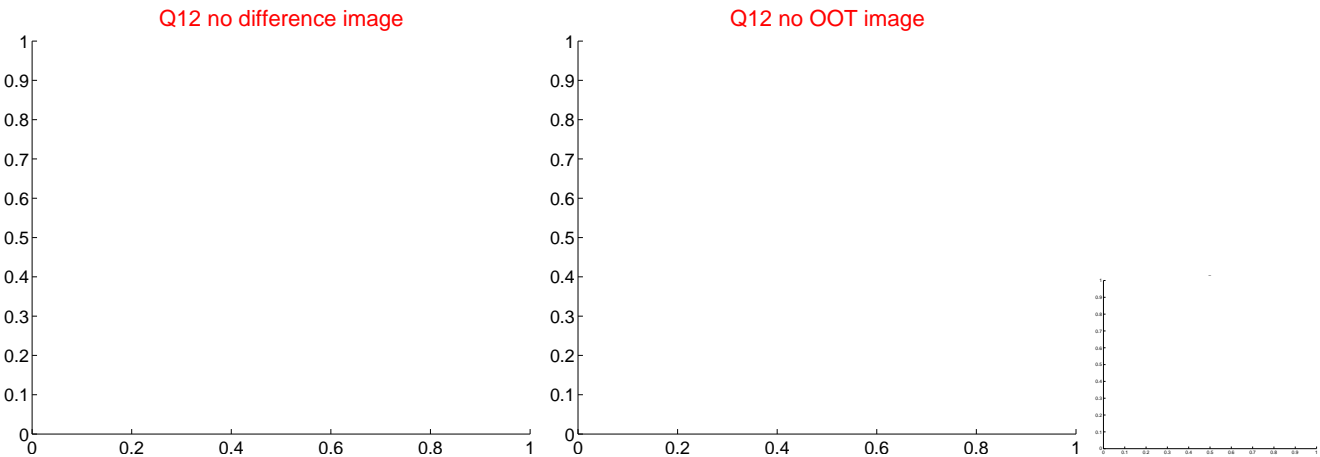
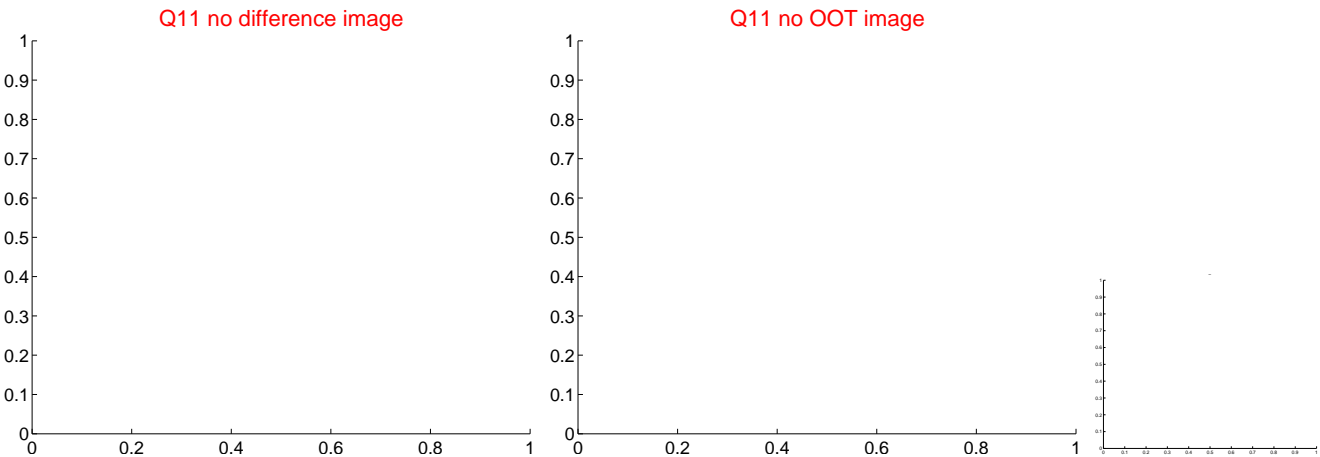
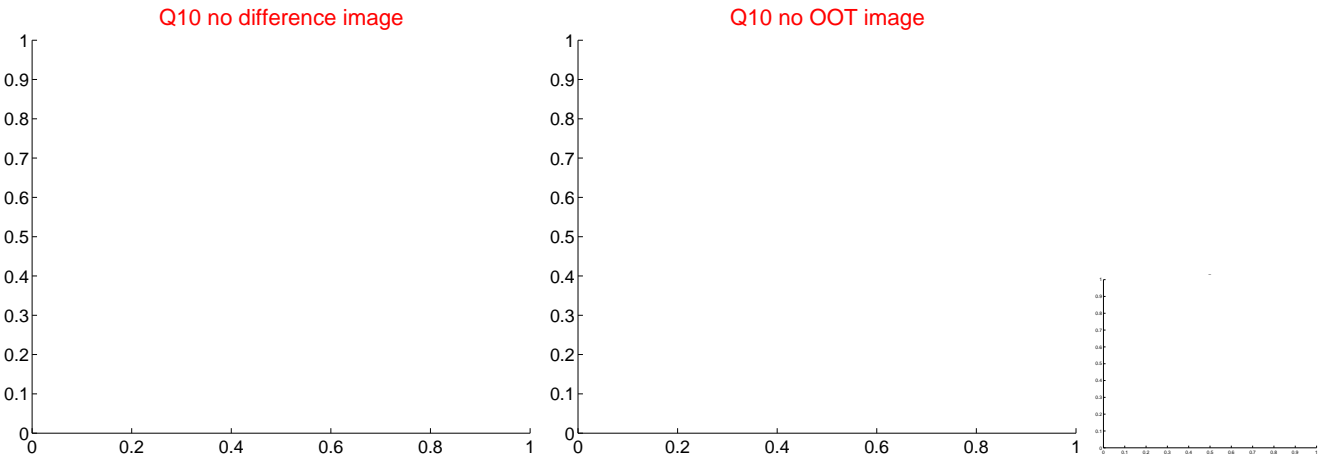
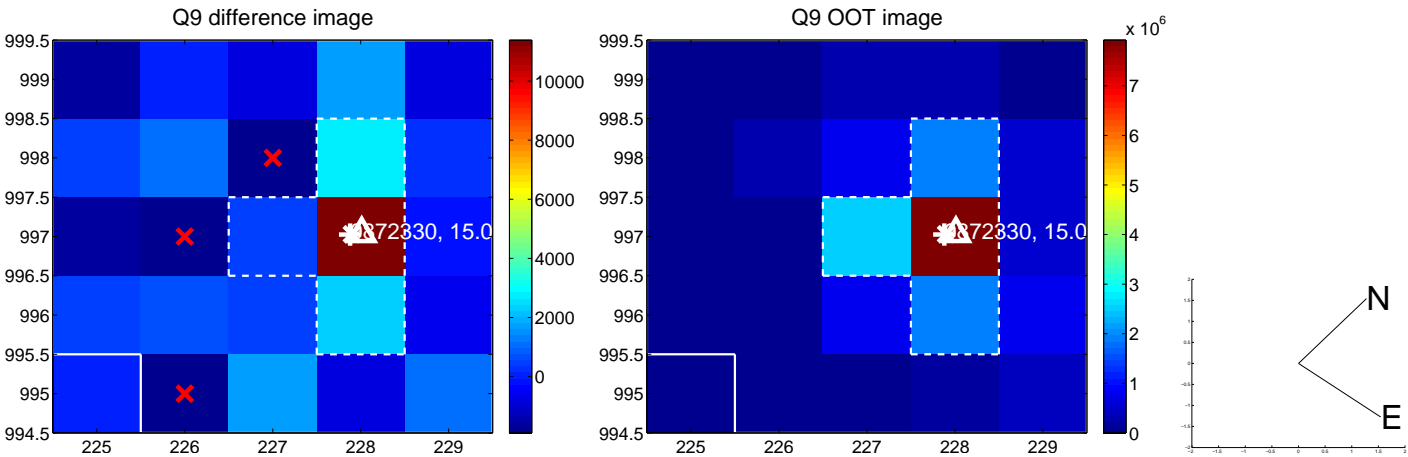
Q4 no OOT image



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.

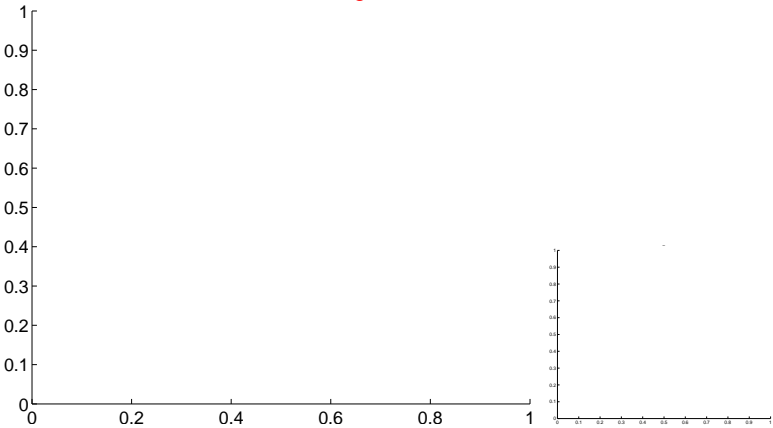


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

Q13 no difference image



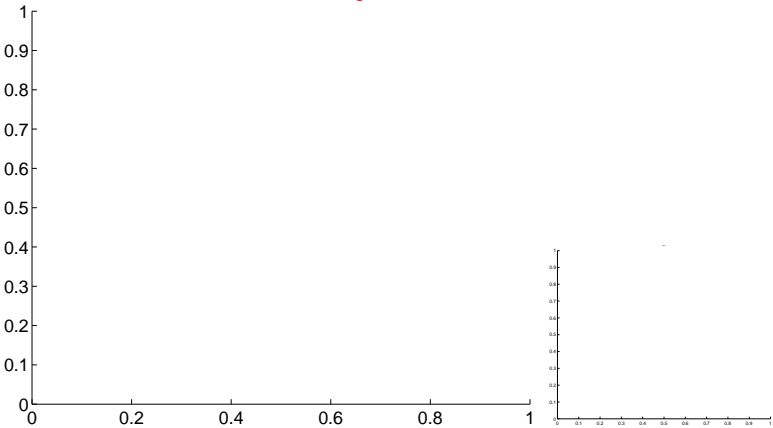
Q13 no OOT image



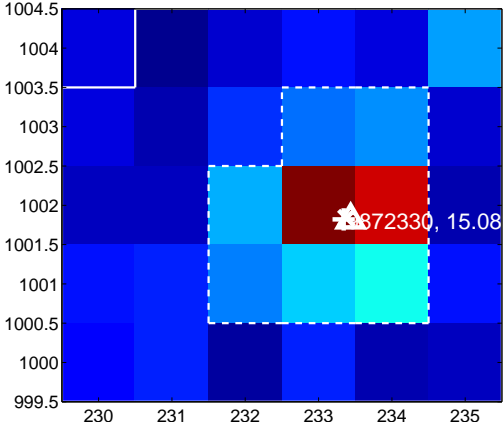
Q14 no difference image



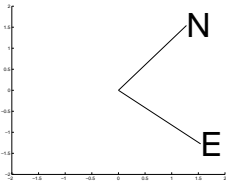
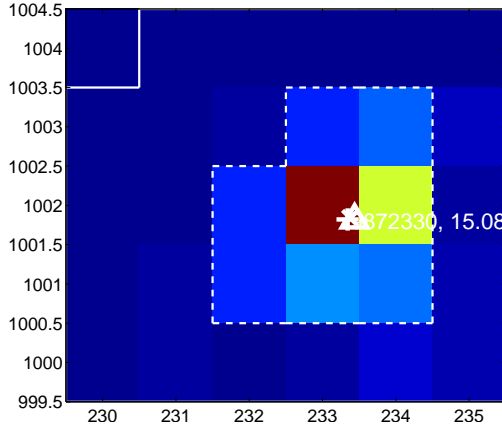
Q14 no OOT image



Q15 difference image



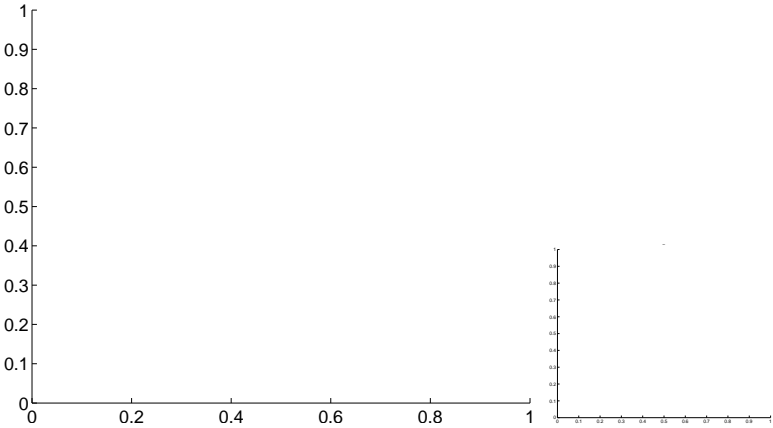
Q15 OOT image



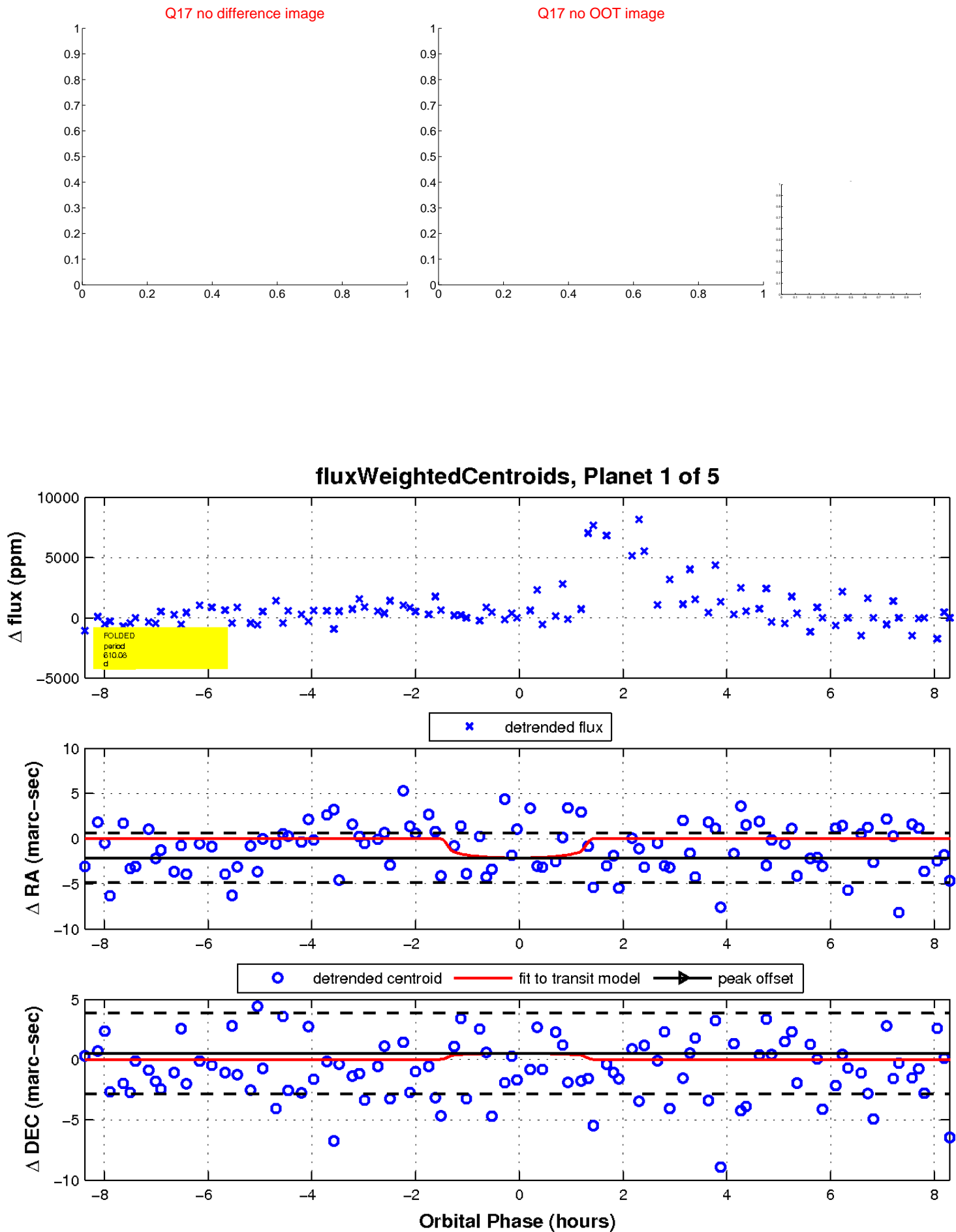
Q16 no difference image



Q16 no OOT image

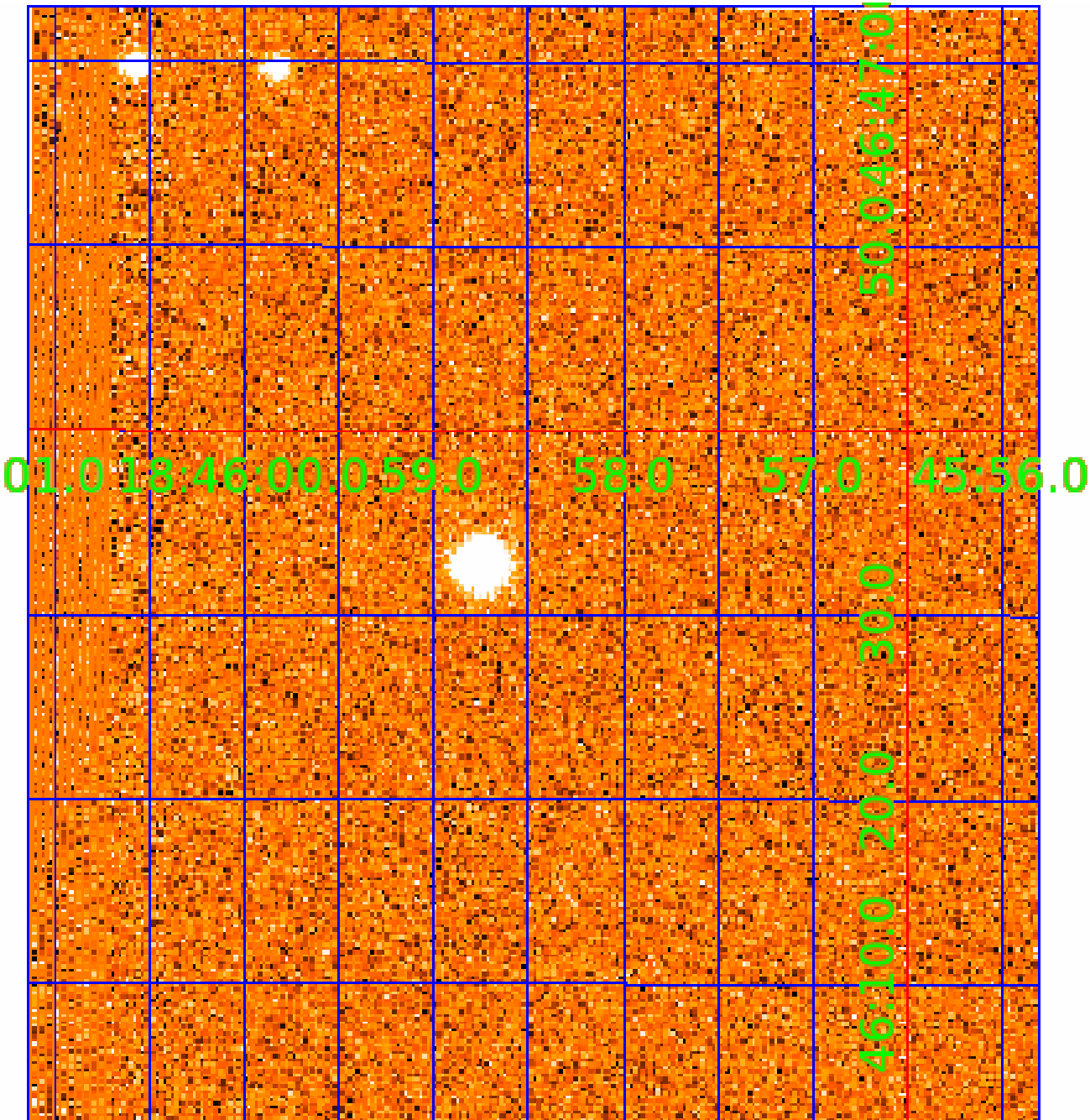


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009872330

Q1-17 DR25 TCE Parameters

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009872330-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— INCONSISTENT_TRANS—CENT_FEW_DIFFS
009872330-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009872330-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS— CENT_FEW_DIFFS
009872330-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS— HALO_GHOST

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

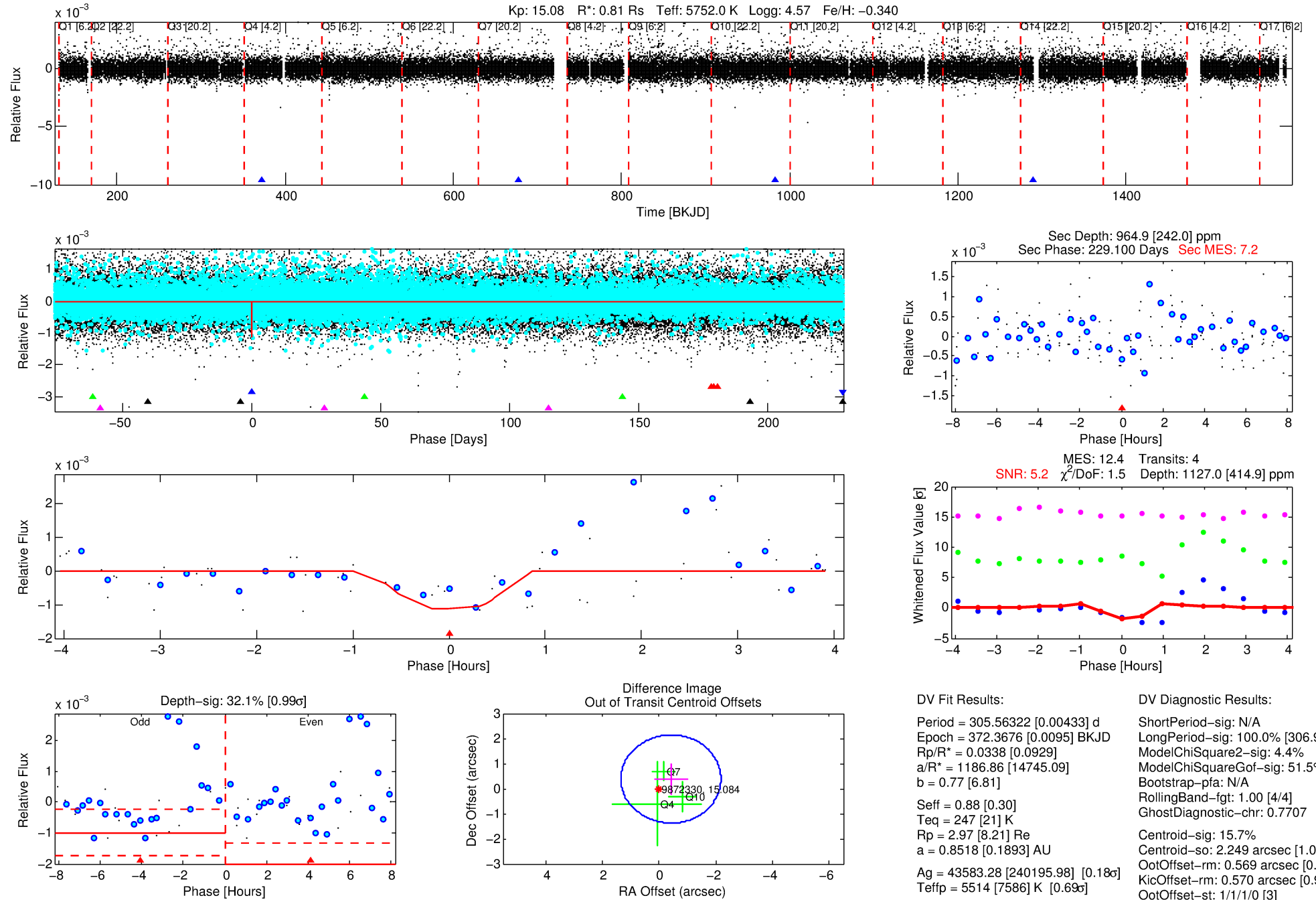
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009872330-02

No Significant Match Found

DV One-Page Summary

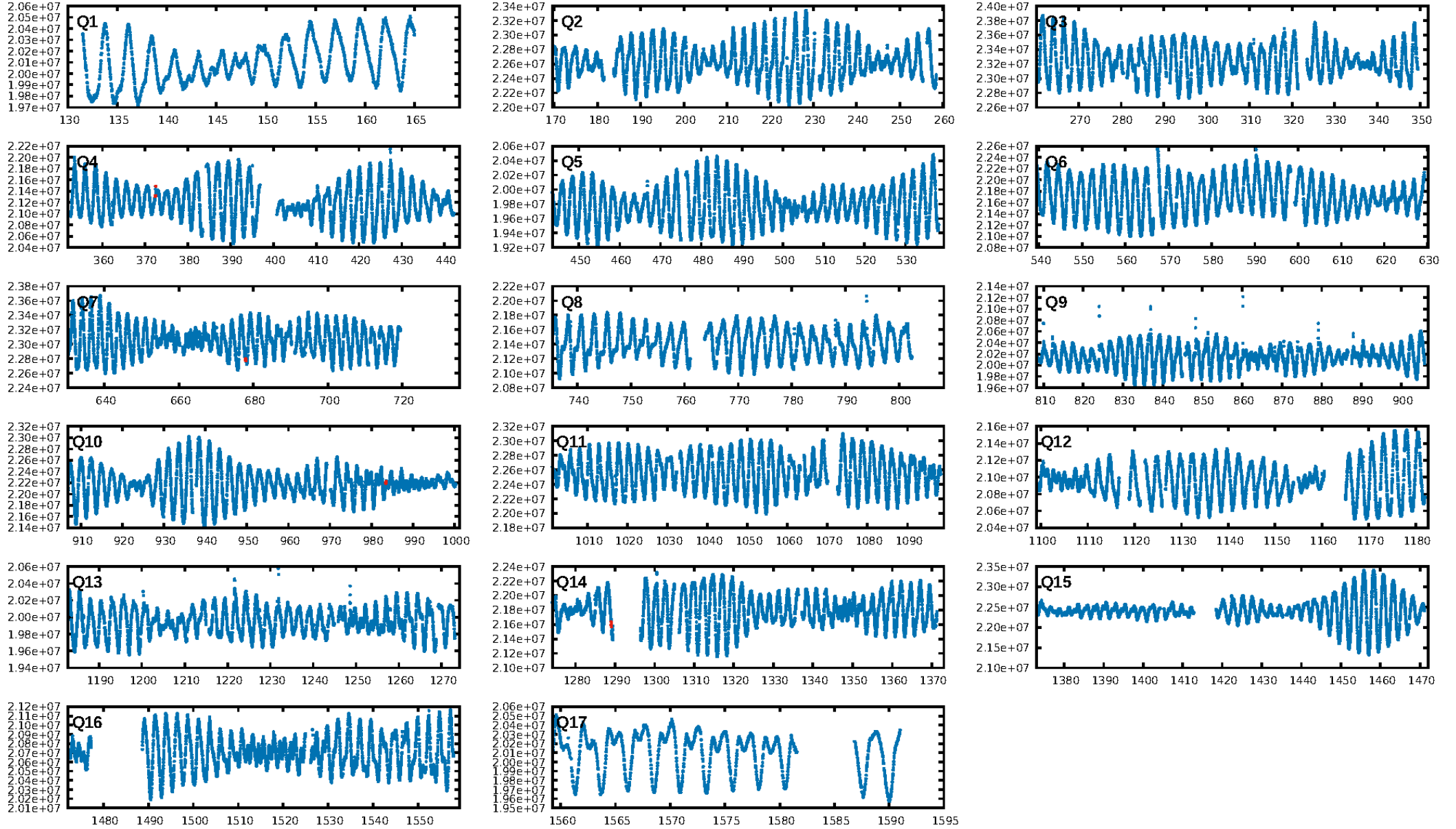
KIC: 9872330 Candidate: 2 of 5 Period: 305.563 d



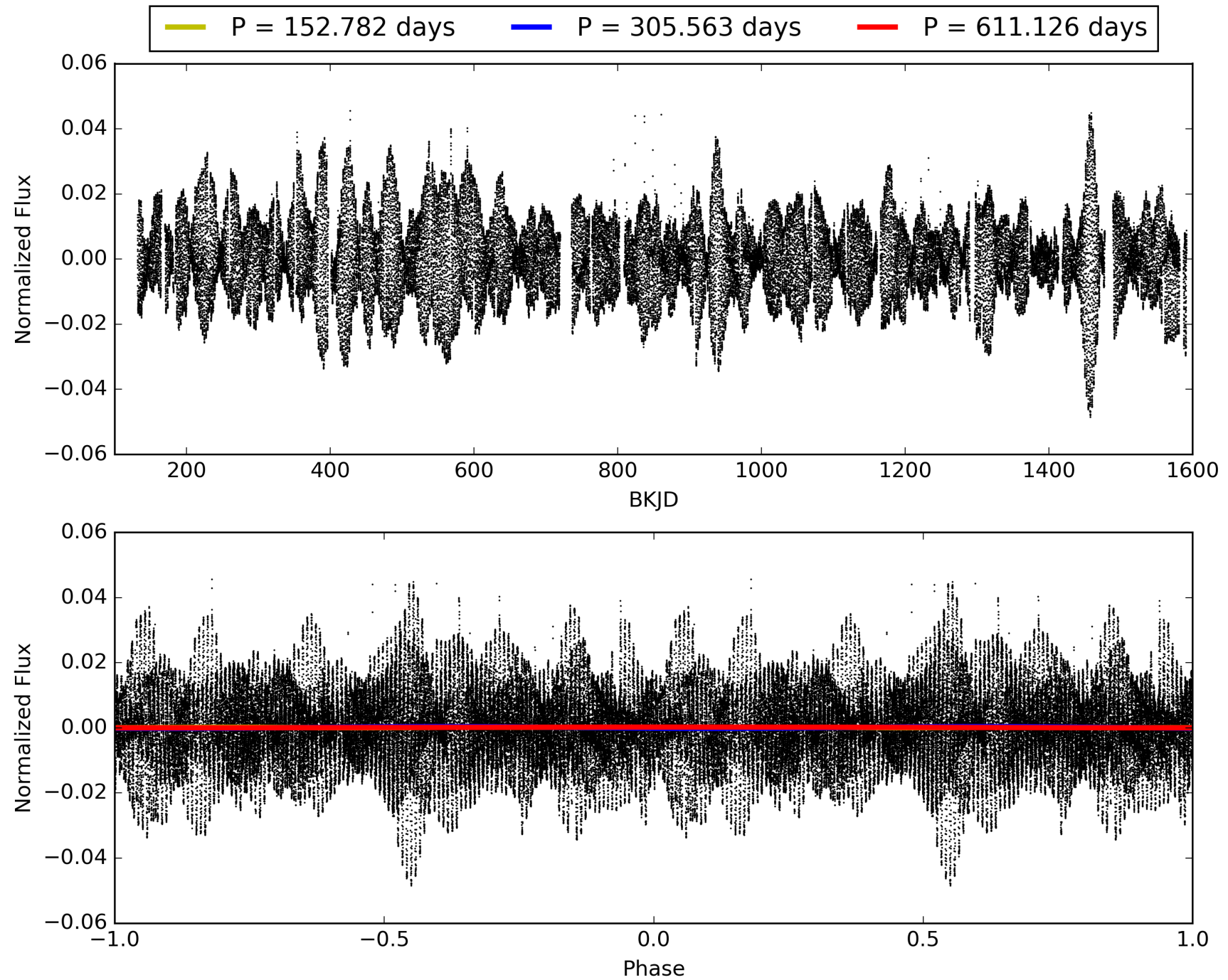
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:37:23 Z

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

TCE 009872330-02, PDC Light Curves

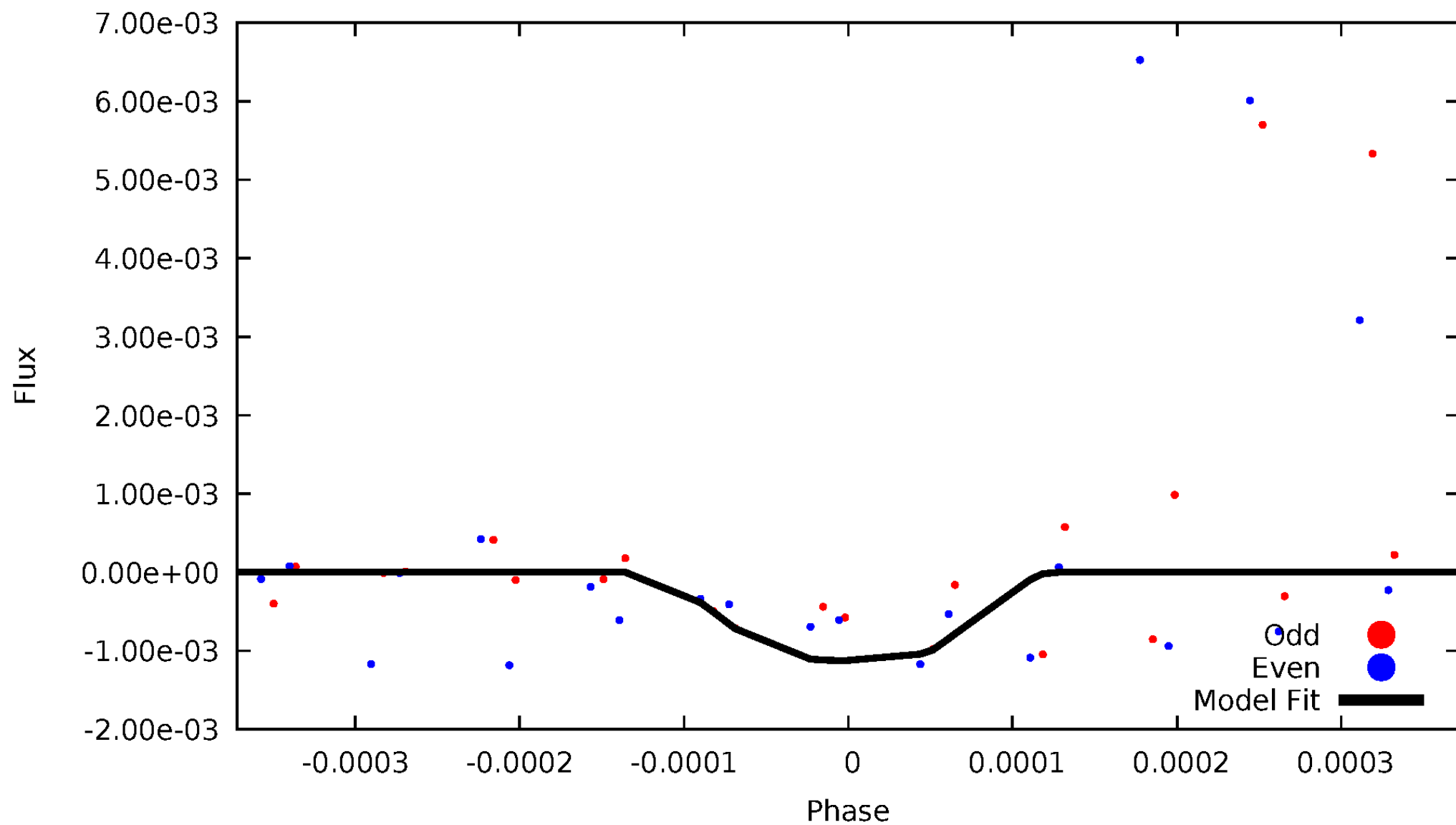


TCE 009872330-02



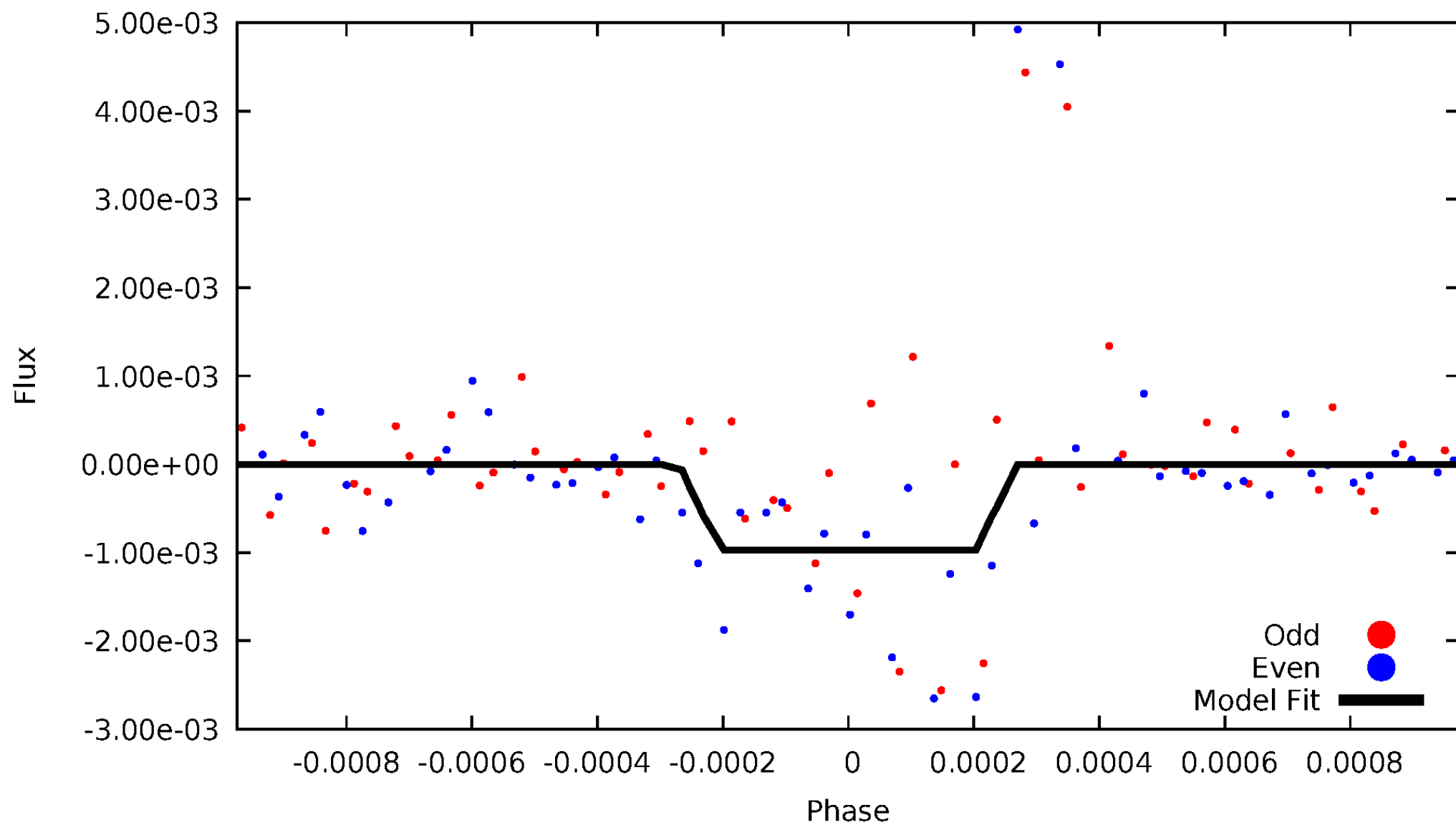
DV Odd/Even

TCE 009872330-02



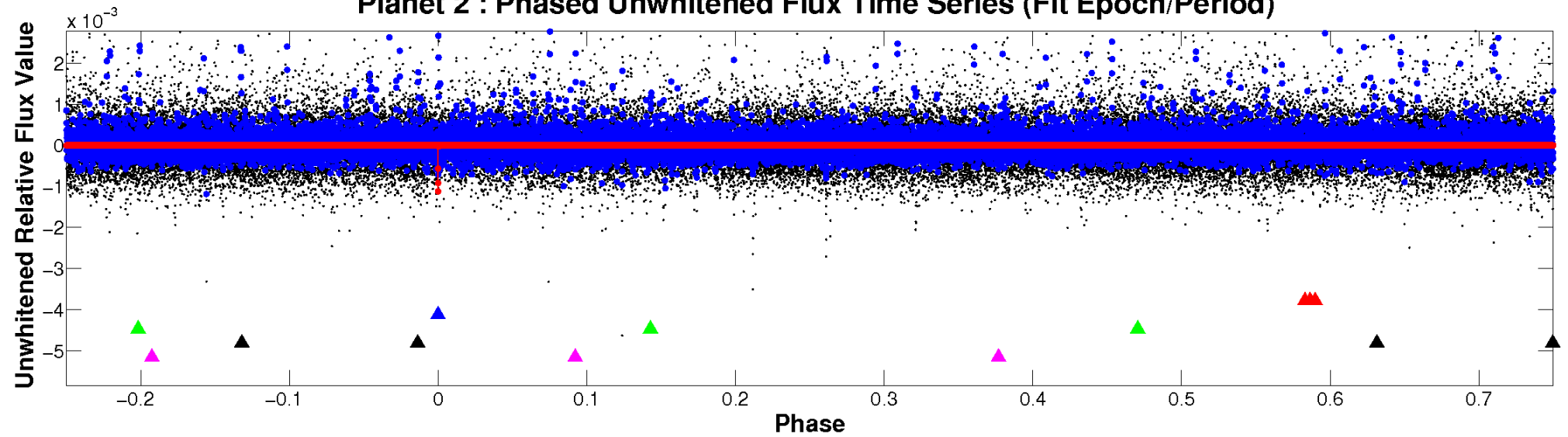
ALT Odd/Even

TCE 009872330-02

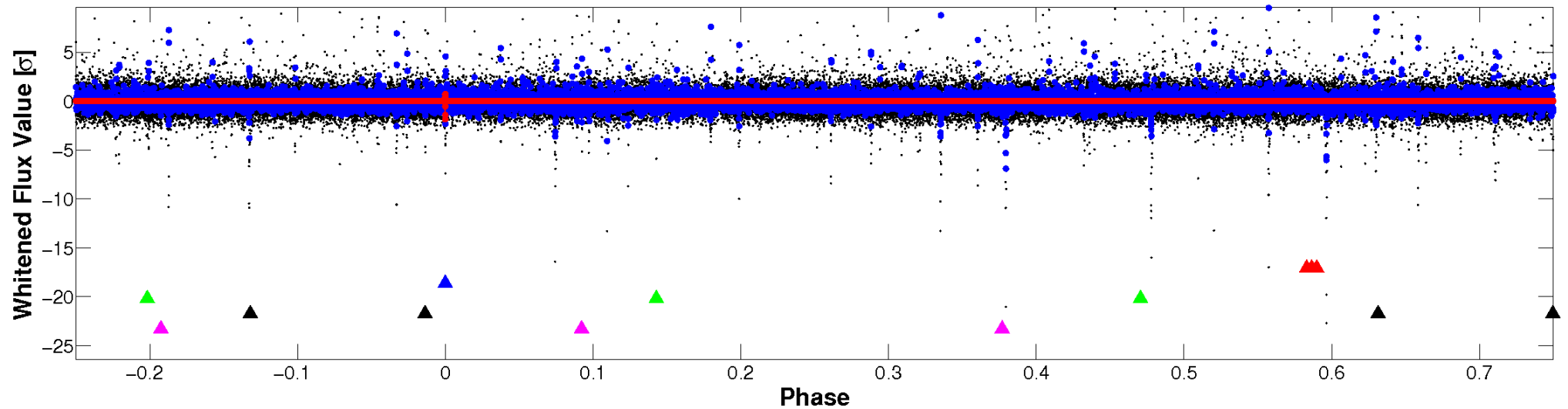


Non-Whitened Vs. Whitened Light Curve

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

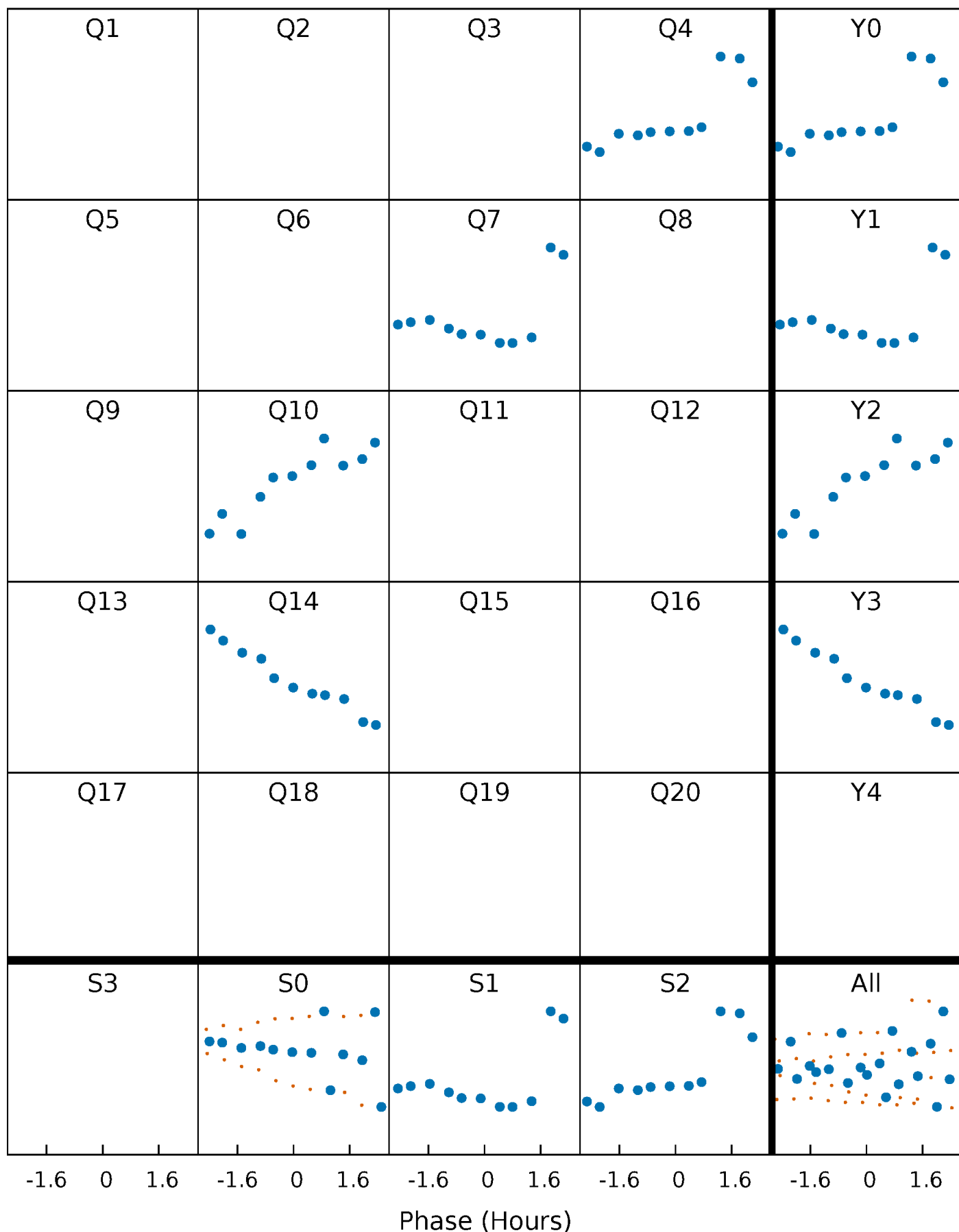


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



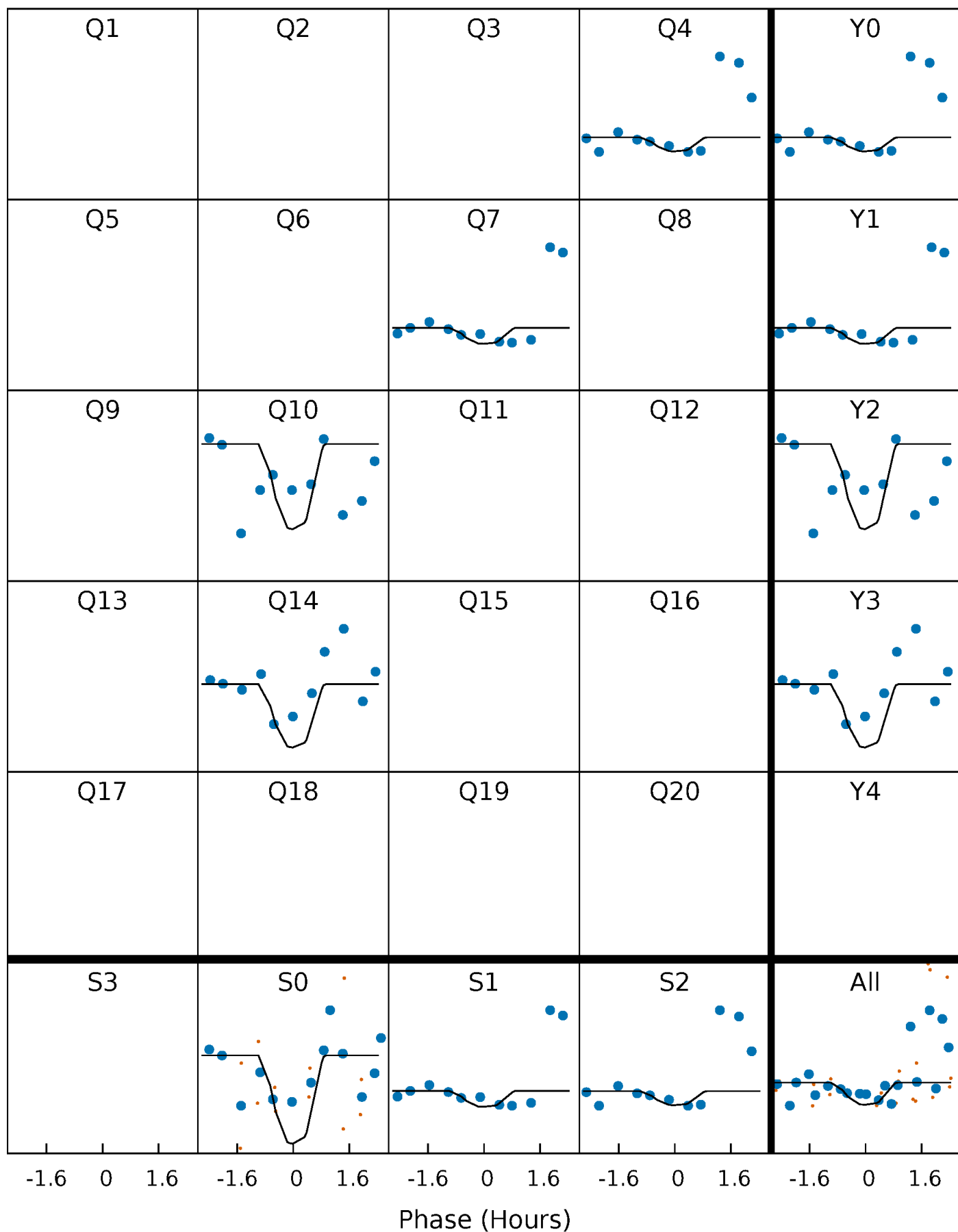
PDC Quarter-Phased Transit Curves

TCE 009872330-02 P=305.563220 Days $T_0=372.367589$ (BKJD)



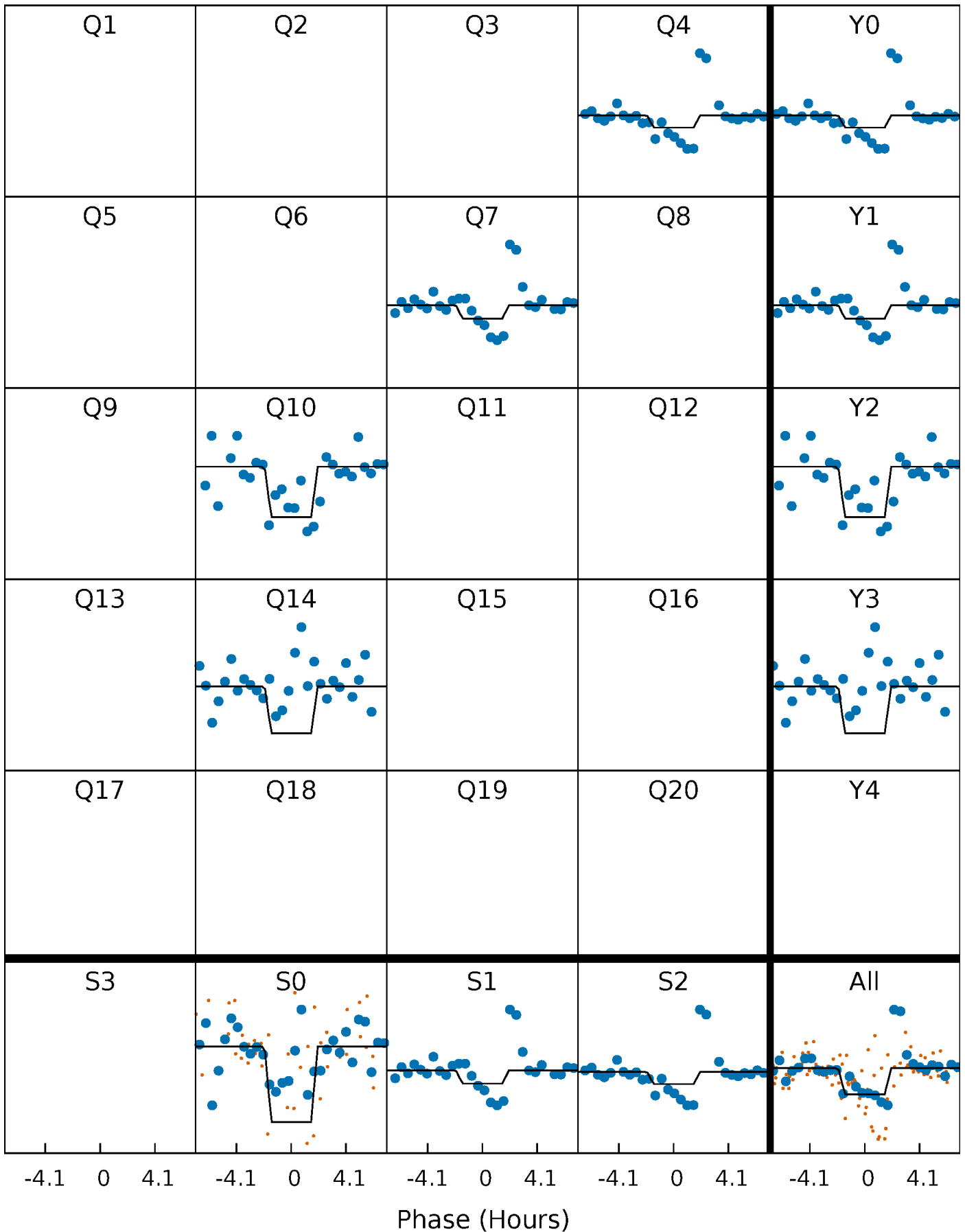
DV Quarter-Phased Transit Curves

TCE 009872330-02 P=305.563220 Days $T_0=372.367589$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

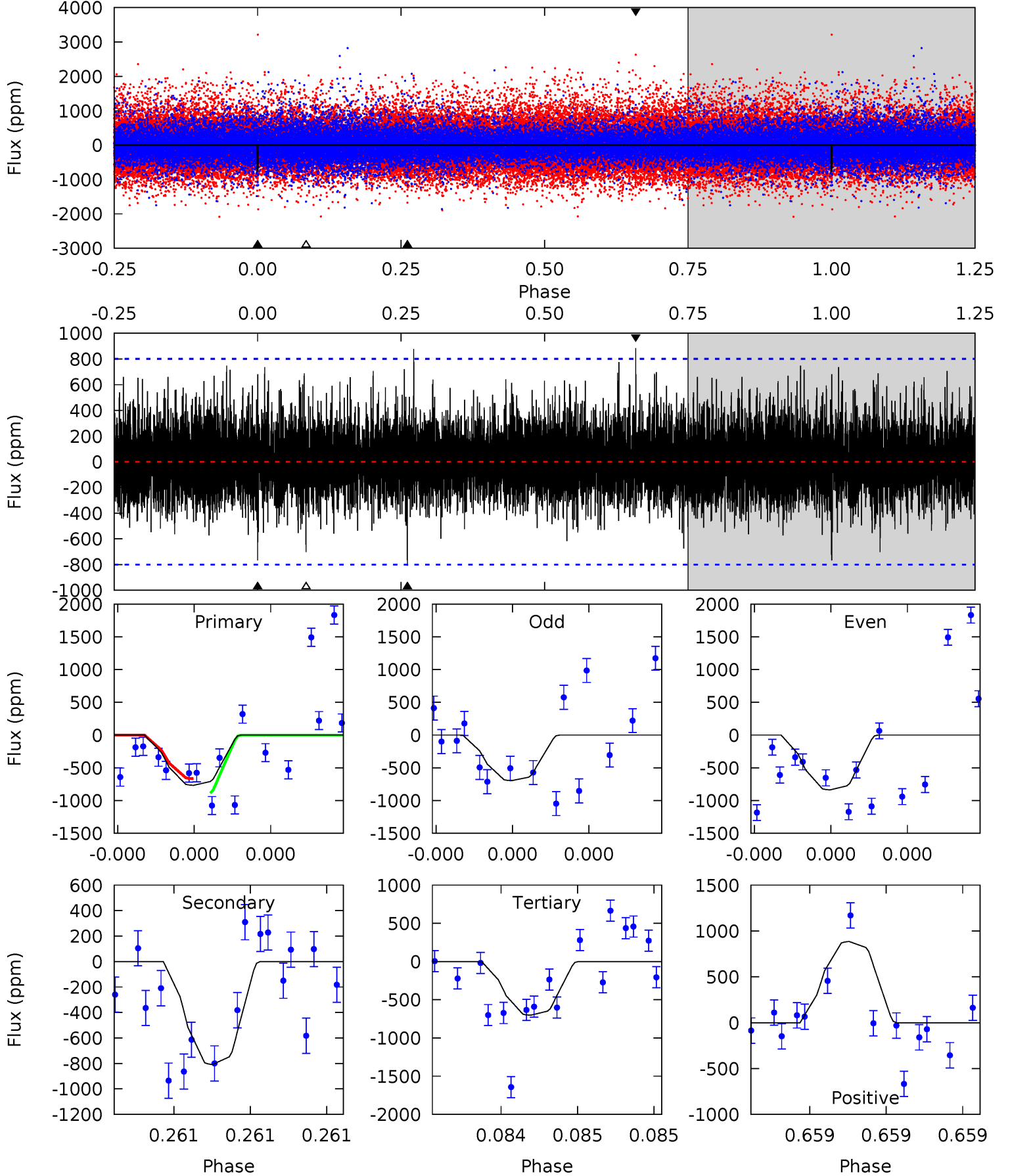
TCE 009872330-02 P=305.582399 Days $T_0=372.339274$ (BKJD)



DV Model-Shift Uniqueness Test

009872330-02, P = 305.563220 Days, E = 66.804369 Days

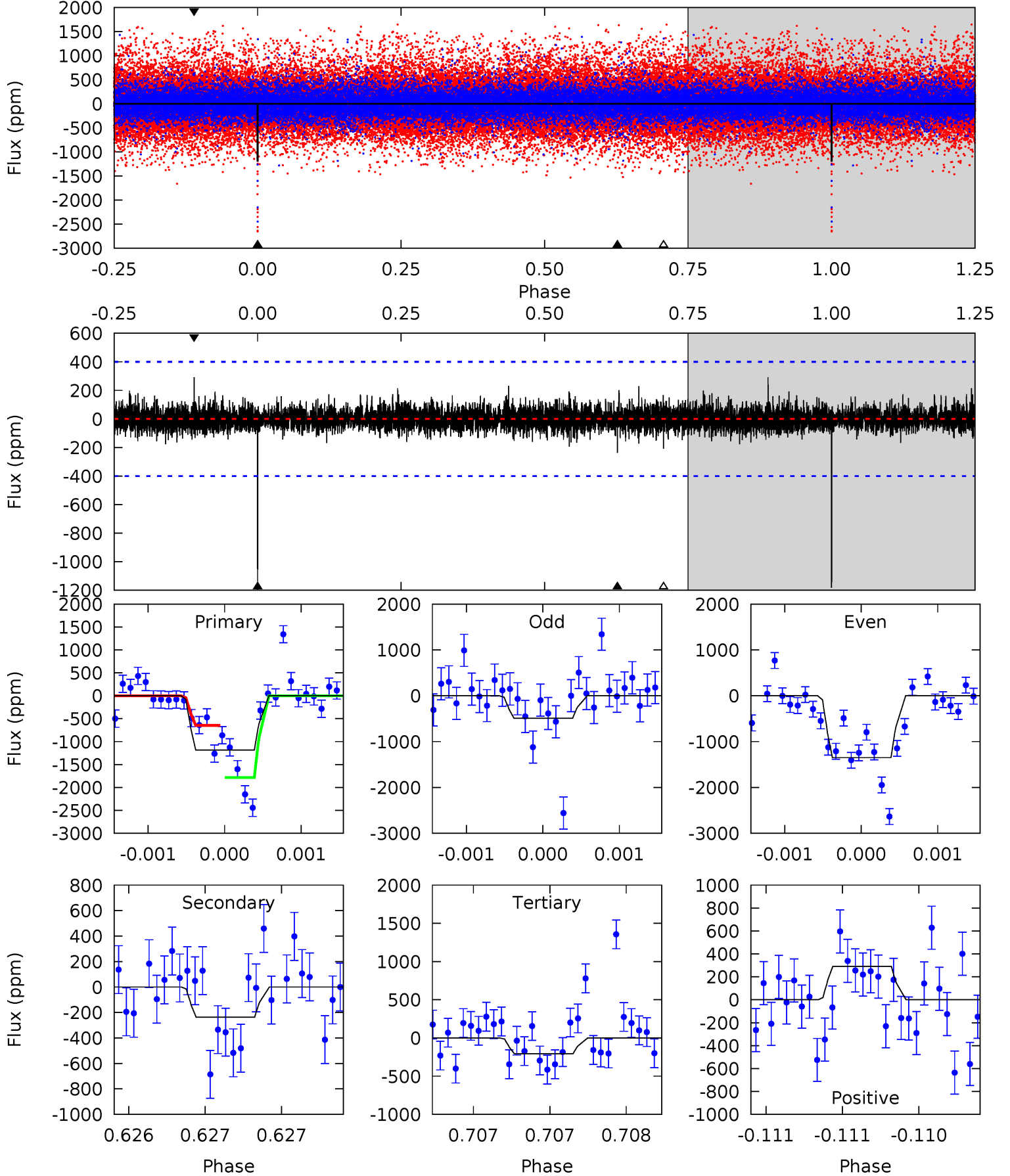
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.48	5.78	5.02	6.33	5.72	3.71	1.25	0.47	-0.84	0.77	-0.55	0.48	1.06	0.52	0.79



Alt Model-Shift Uniqueness Test

009872330-02, P = 305.582399 Days, E = 66.756875 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.5	3.29	2.89	4.06	5.57	3.47	0.67	13.6	12.4	0.41	-0.77	6.18	0.90	0.20	7.96



Stellar Parameters For KIC 009872330

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5752^{+143}_{-158}	$4.571^{+0.042}_{-0.178}$	$-0.340^{+0.300}_{-0.300}$	$0.806^{+0.212}_{-0.071}$	$0.882^{+0.091}_{-0.100}$	$2.370^{+0.521}_{-1.058}$
	+2%/-3%	+1%/-4%	+88%/-88%	+26%/-9%	+10%/-11%	+22%/-45%
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 009872330-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-809 ± 140	$7.51^{+7.36}_{-5.03}$	352^{+20}_{-13}	3775^{+2236}_{-714}	5463^{+45982}_{-4027}
Alt.	-237 ± 72	$7.01^{+7.23}_{-4.86}$	353^{+21}_{-15}	3180^{+1577}_{-597}	1844^{+18049}_{-1457}

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

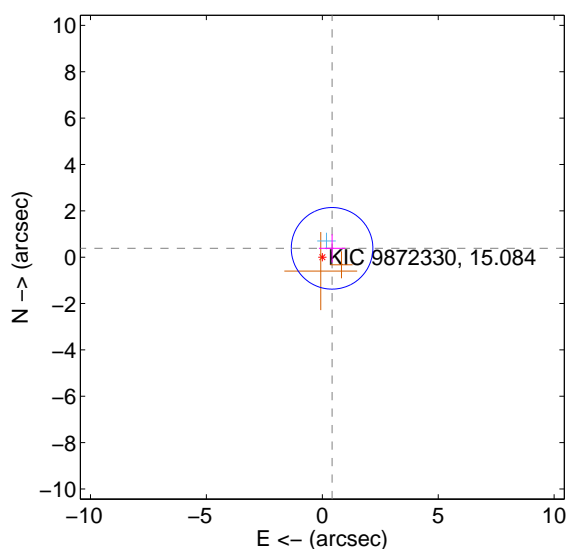
Supplemental centroid analysis for 009872330-02. Kepler magnitude: 15.08. Transit SNR 5.19

There are 1 quarters with good PRF difference image offsets

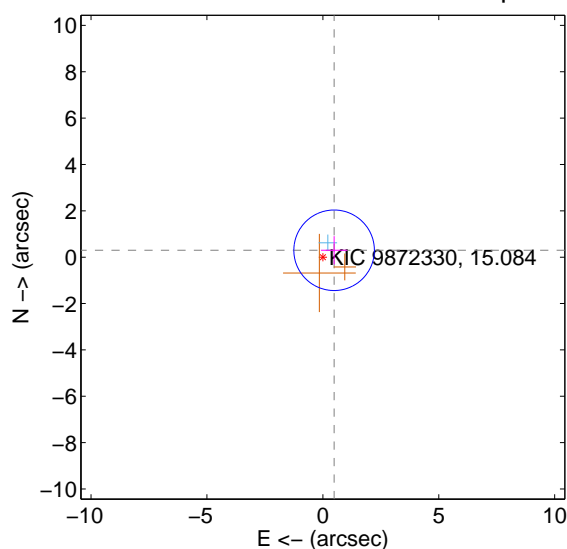
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.569 ± 0.587	0.97	-0.421 ± 0.567	0.382 ± 0.610
PRF-fit source offset from KIC position	0.570 ± 0.579	0.98	-0.486 ± 0.567	0.298 ± 0.610
photometric centroid source offset	2.25 ± 2.15	1.05	1.24 ± 2.16	1.88 ± 2.14

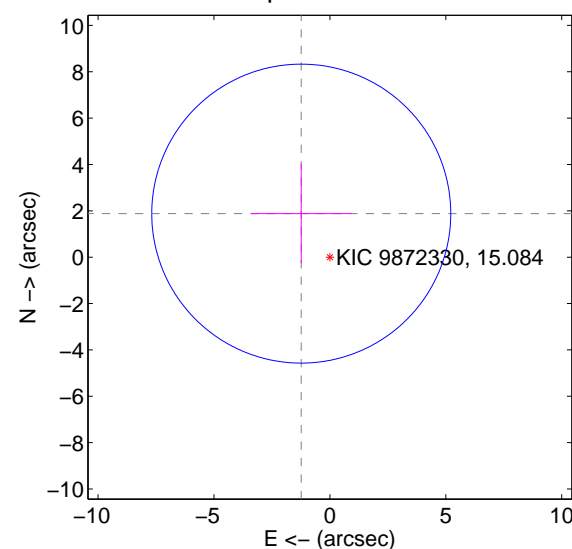
offset from difference PRF-fit to OOT PRF-fit



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.

Q1 no difference image



Q1 no OOT image



Q2 no difference image



Q2 no OOT image



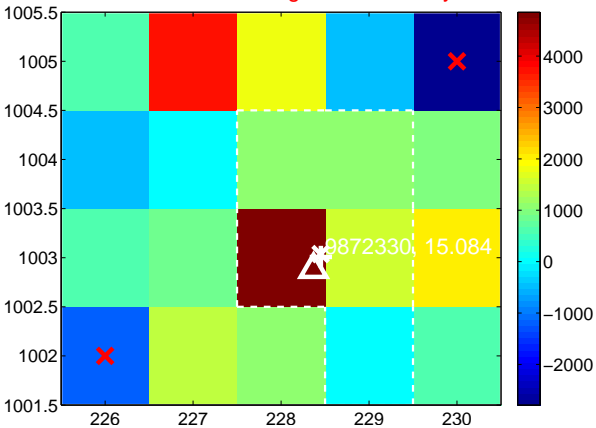
Q3 no difference image



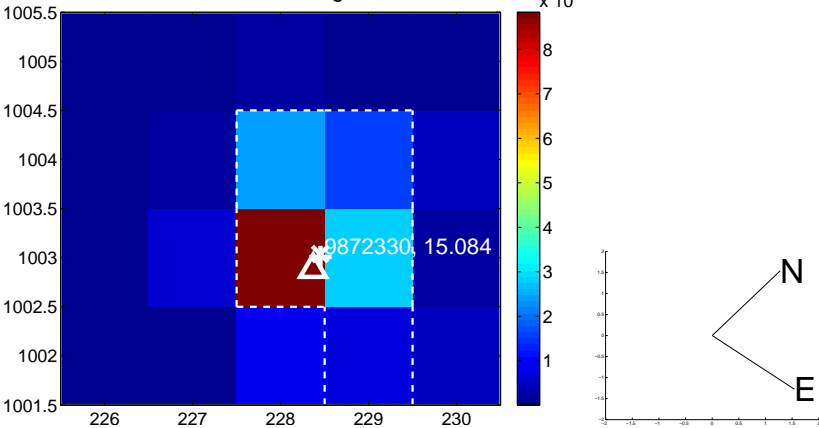
Q3 no OOT image



Q4 difference image. Poor Quality



Q4 OOT image



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

Q5 no difference image



Q5 no OOT image



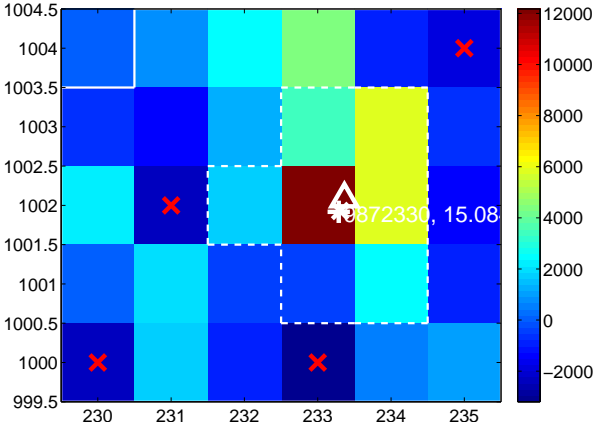
Q6 no difference image



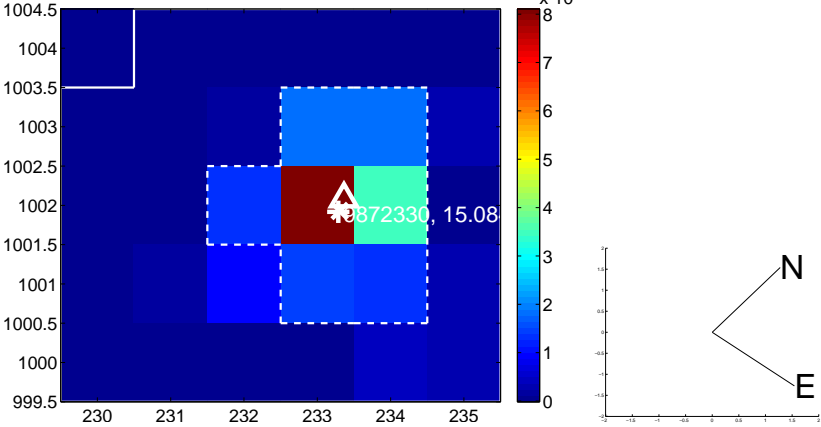
Q6 no OOT image



Q7 difference image



Q7 OOT image



Q8 no difference image



Q8 no OOT image



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

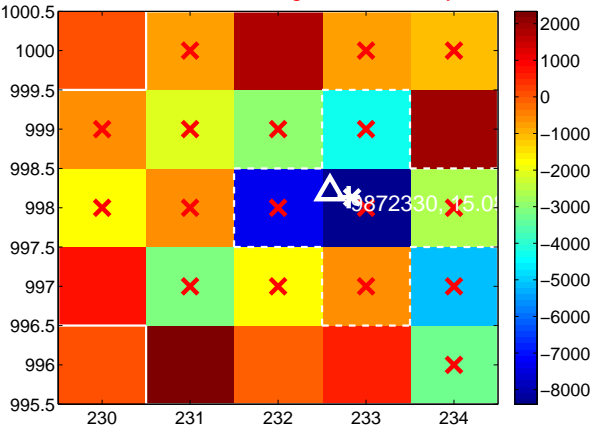
Q9 no difference image



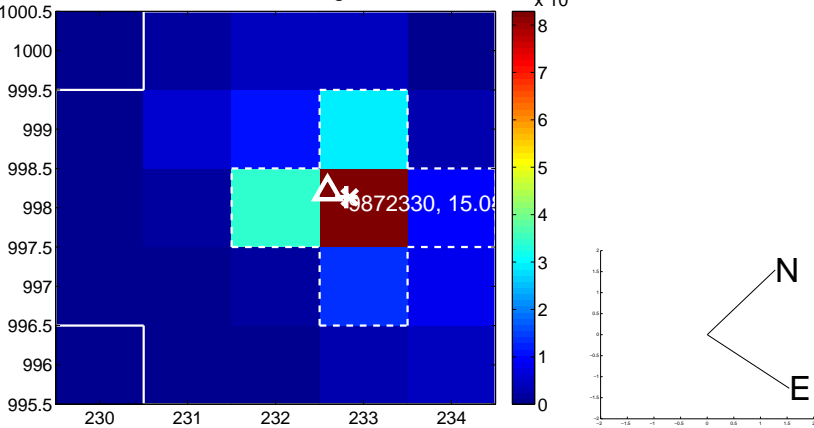
Q9 no OOT image



Q10 difference image. Poor Quality



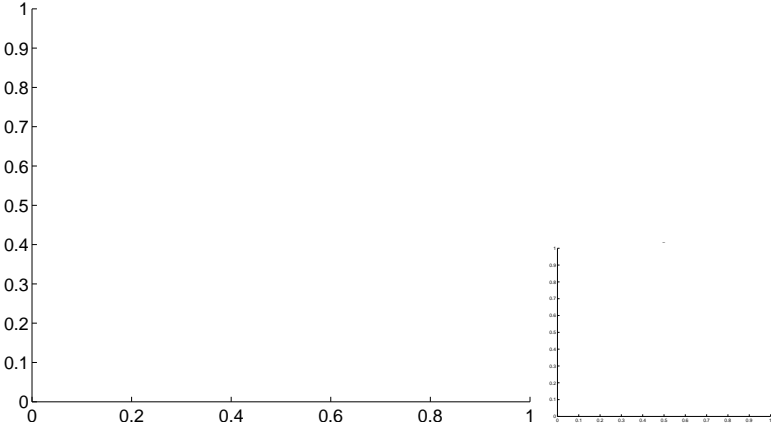
Q10 OOT image



Q11 no difference image



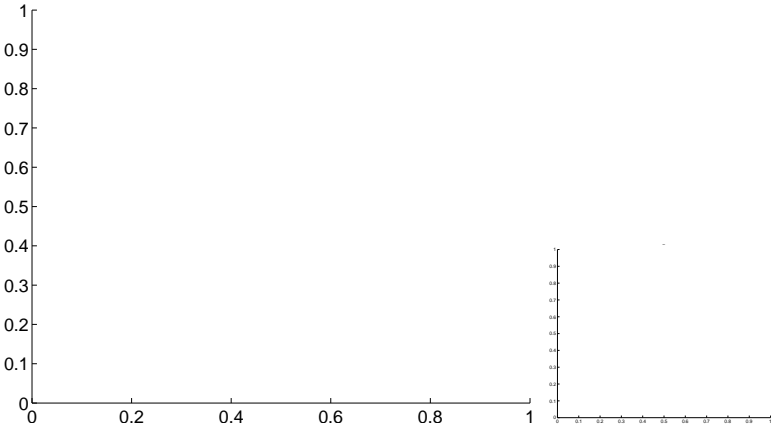
Q11 no OOT image



Q12 no difference image



Q12 no OOT image



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

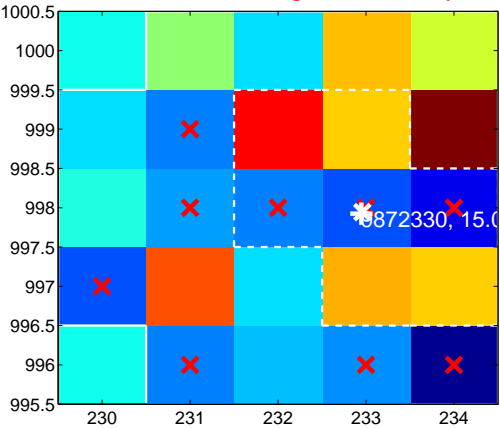
Q13 no difference image



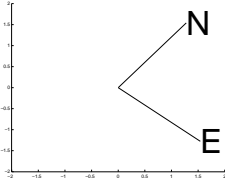
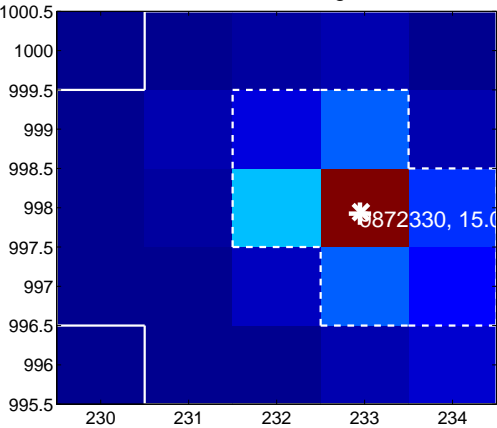
Q13 no OOT image



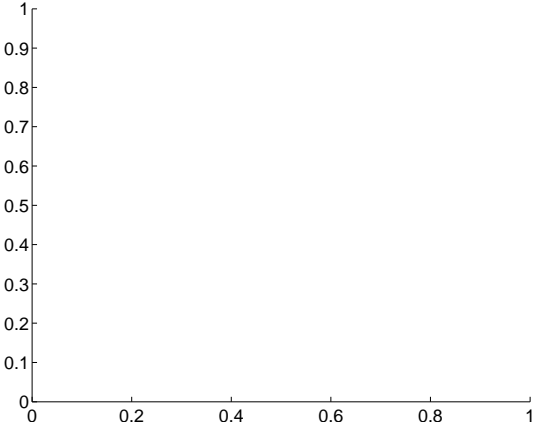
Q14 difference image. Poor Quality



Q14 OOT image



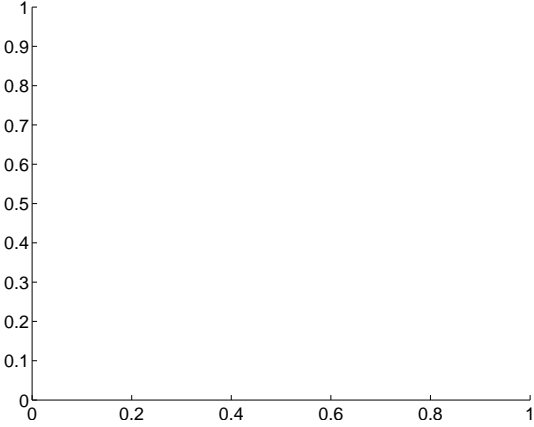
Q15 no difference image



Q15 no OOT image



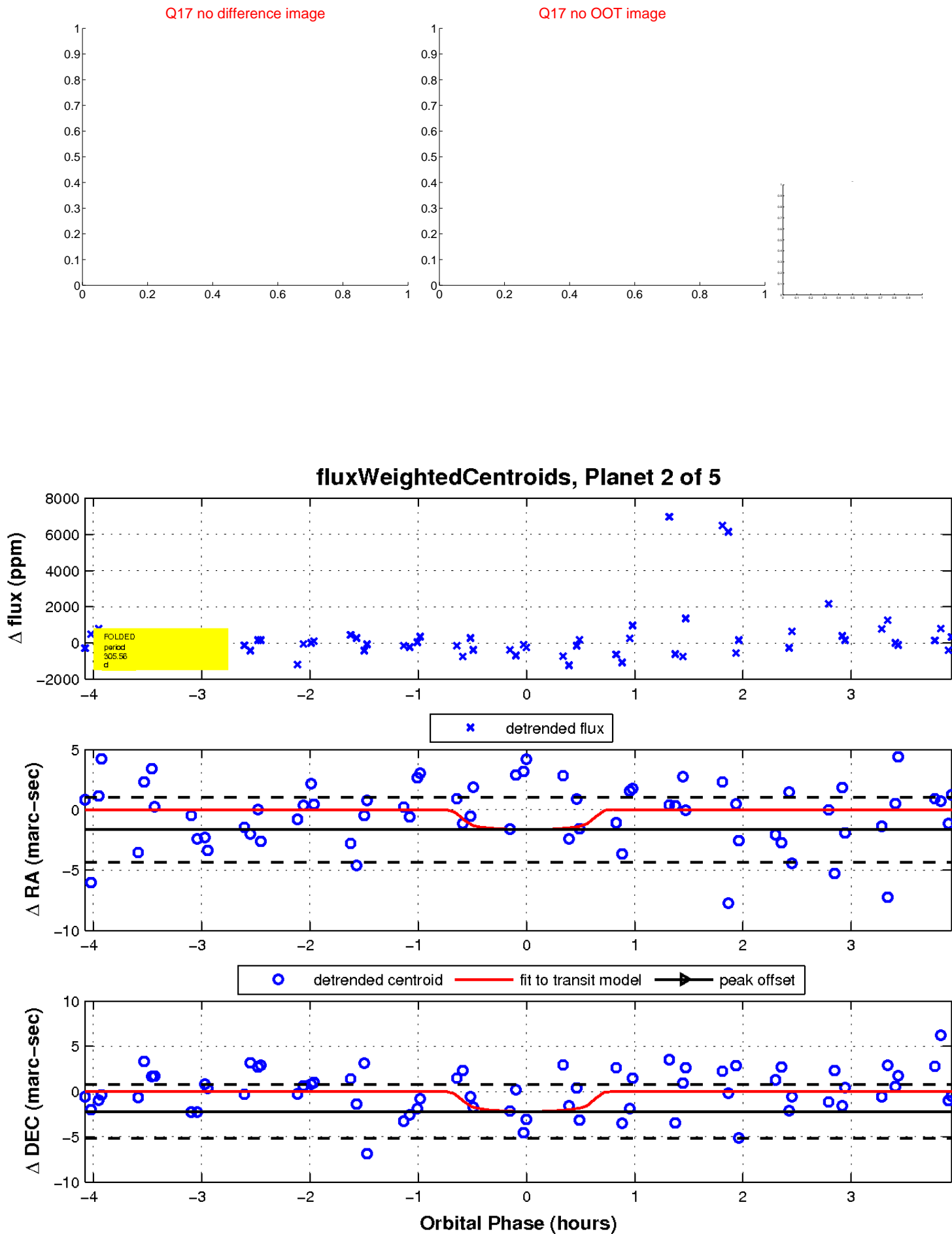
Q16 no difference image



Q16 no OOT image

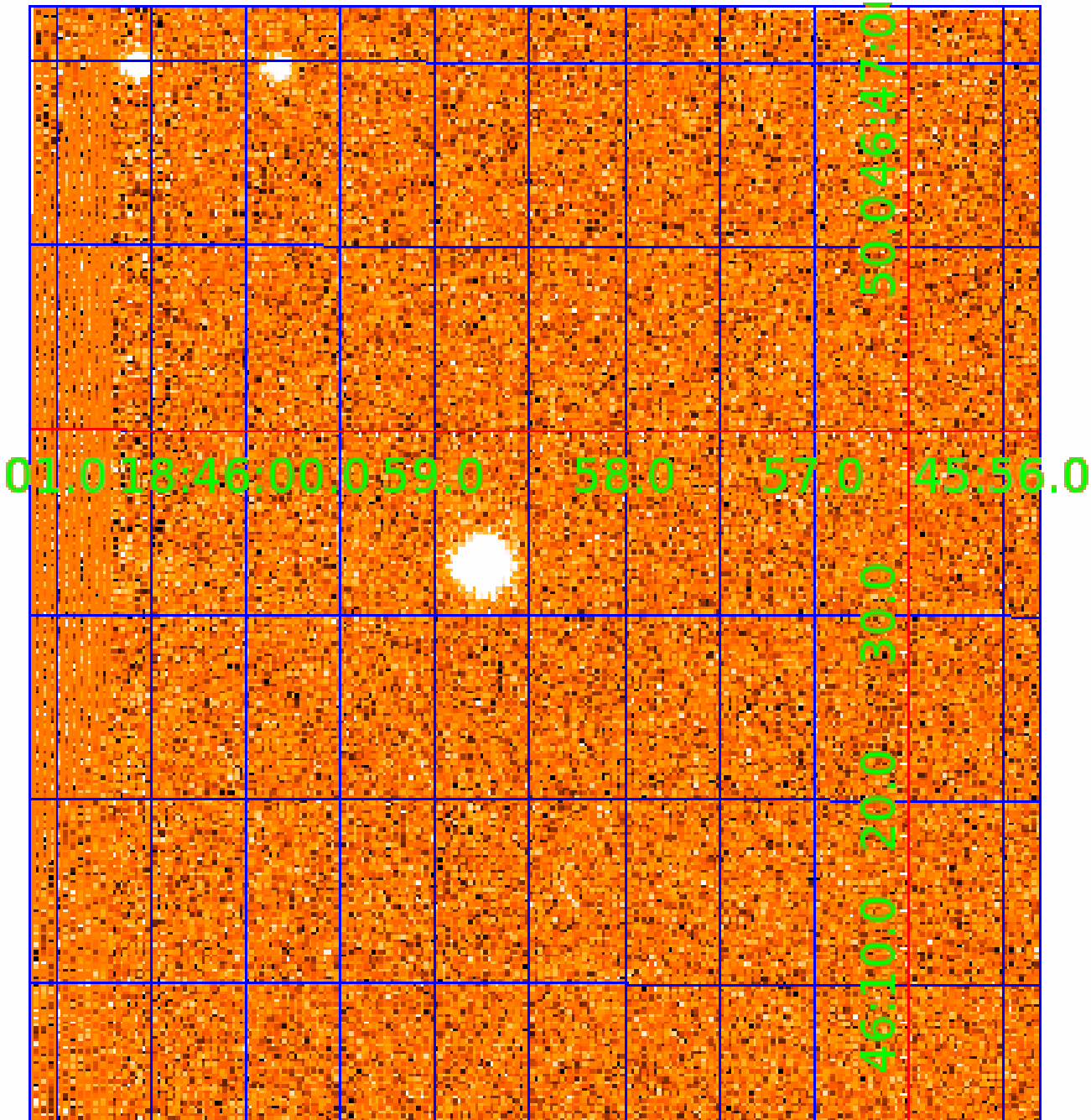


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009872330

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})
009872330-01	OBS	No	610.079429	247.054340	1841.3	2.824	13.8	6.6	0.81	5752	3.47	0.35
009872330-02	OBS	No	305.563220	372.367589	1127.0	1.364	12.4	5.2	0.81	5752	2.97	0.88
009872330-03	OBS	No	405.705316	416.021259	1534.4	3.866	10.5	6.3	0.81	5752	3.47	0.60
009872330-04	OBS	No	341.709813	259.745047	964.7	2.475	11.1	3.5	0.81	5752	2.74	0.76
009872330-05	OBS	No	524.128729	487.558404	1460.0	3.262	9.9	5.7	0.81	5752	3.18	0.43

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009872330-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009872330-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— INCONSISTENT_TRANS—CENT_FEW_DIFFS
009872330-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009872330-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS— CENT_FEW_DIFFS
009872330-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS— HALO_GHOST

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

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

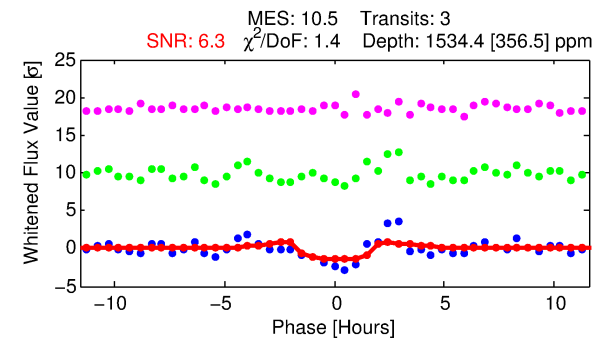
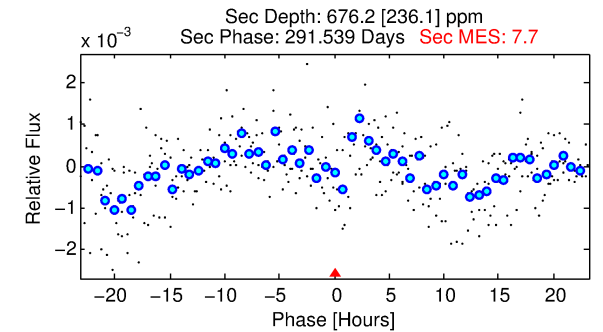
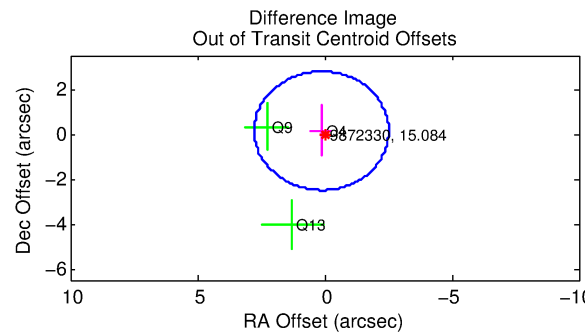
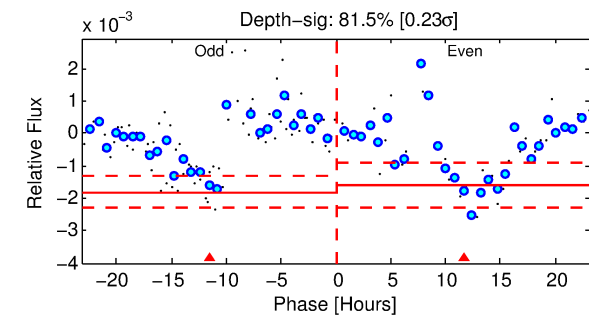
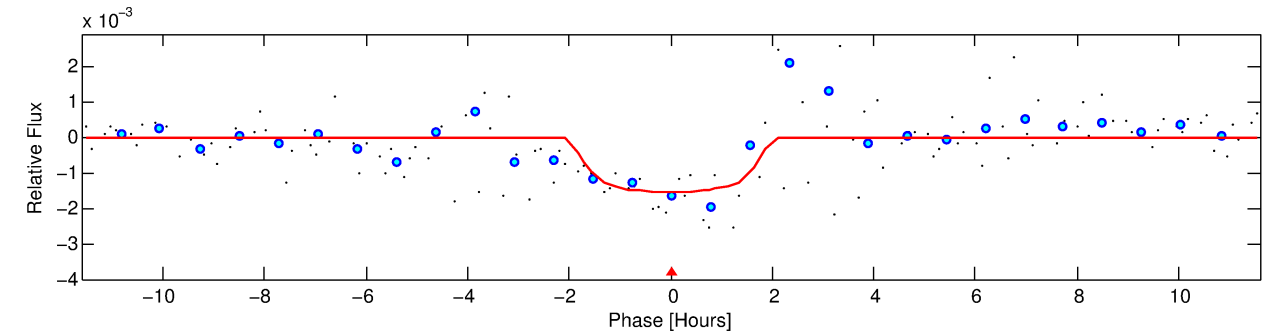
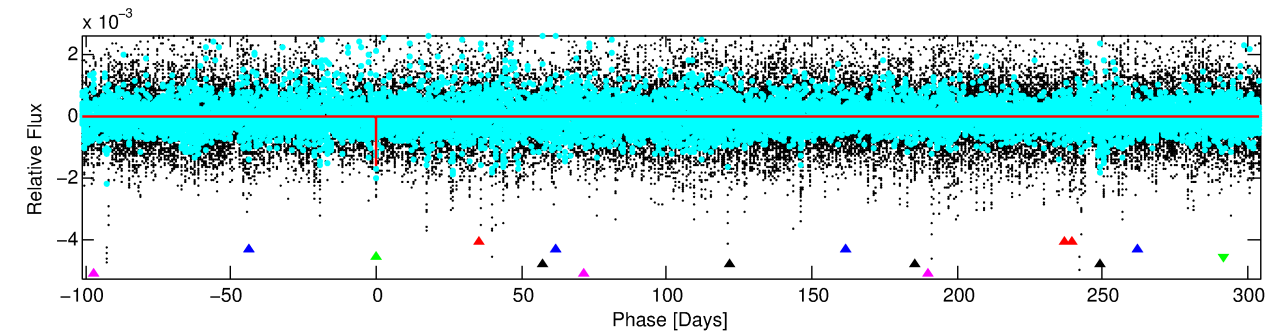
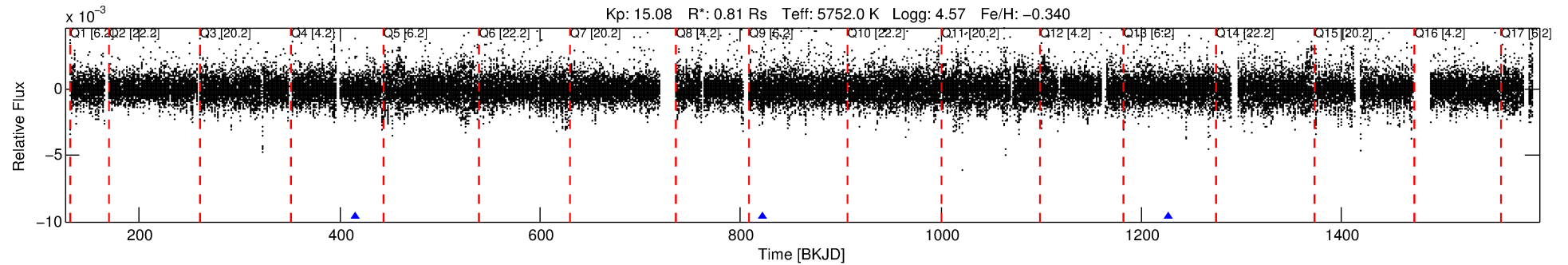
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009872330-03

No Significant Match Found

DV One-Page Summary

KIC: 9872330 Candidate: 3 of 5 Period: 405.705 d



DV Fit Results:

Period = 405.70532 [0.00867] d
Epoch = 416.0213 [0.0097] BKJD
Rp/R* = 0.0395 [0.0335]
a/R* = 550.63 [2092.12]
b = 0.78 [1.92]
Seff = 0.60 [0.21]
Teq = 225 [19] K
Rp = 3.47 [3.09] Re
a = 1.0290 [0.2287] AU
Ag = 32662.33 [57633.18] [0.57 σ]
Teffp = 4668 [2028] K [2.19 σ]

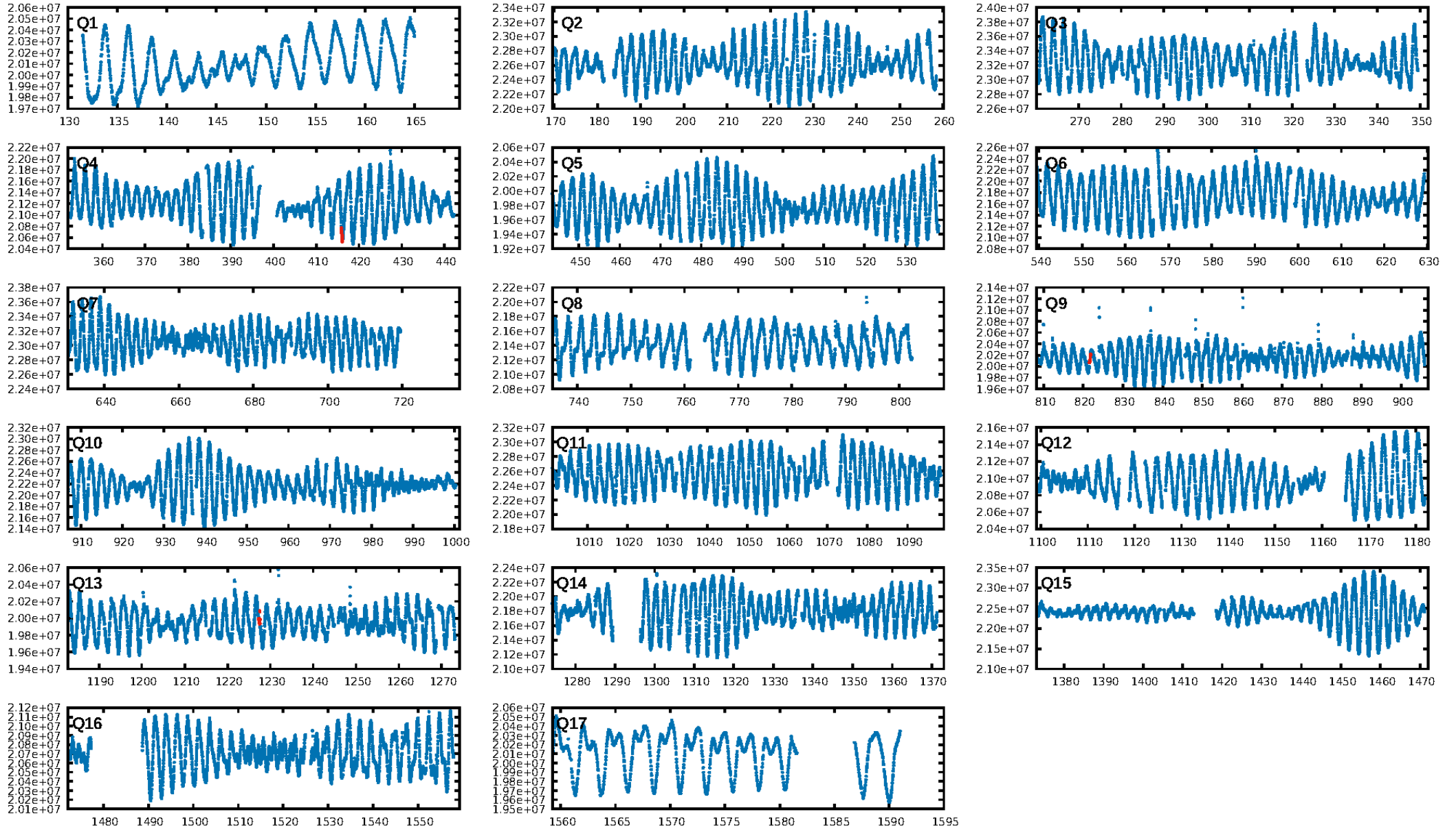
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [334.59 σ]
LongPeriod-sig: 100.0% [561.88 σ]
ModelChiSquare2-sig: 81.9%
ModelChiSquareGof-sig: 90.1%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.22
Centroid-sig: 5.8%
Centroid-so: 1.196 arcsec [1.03 σ]
OotOffset-rm: 0.189 arcsec [0.21 σ]
KicOffset-rm: 0.136 arcsec [0.19 σ]
OotOffset-st: 0/0/1/2 [3]
KicOffset-st: 0/0/1/2 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 1.00 [3/3]

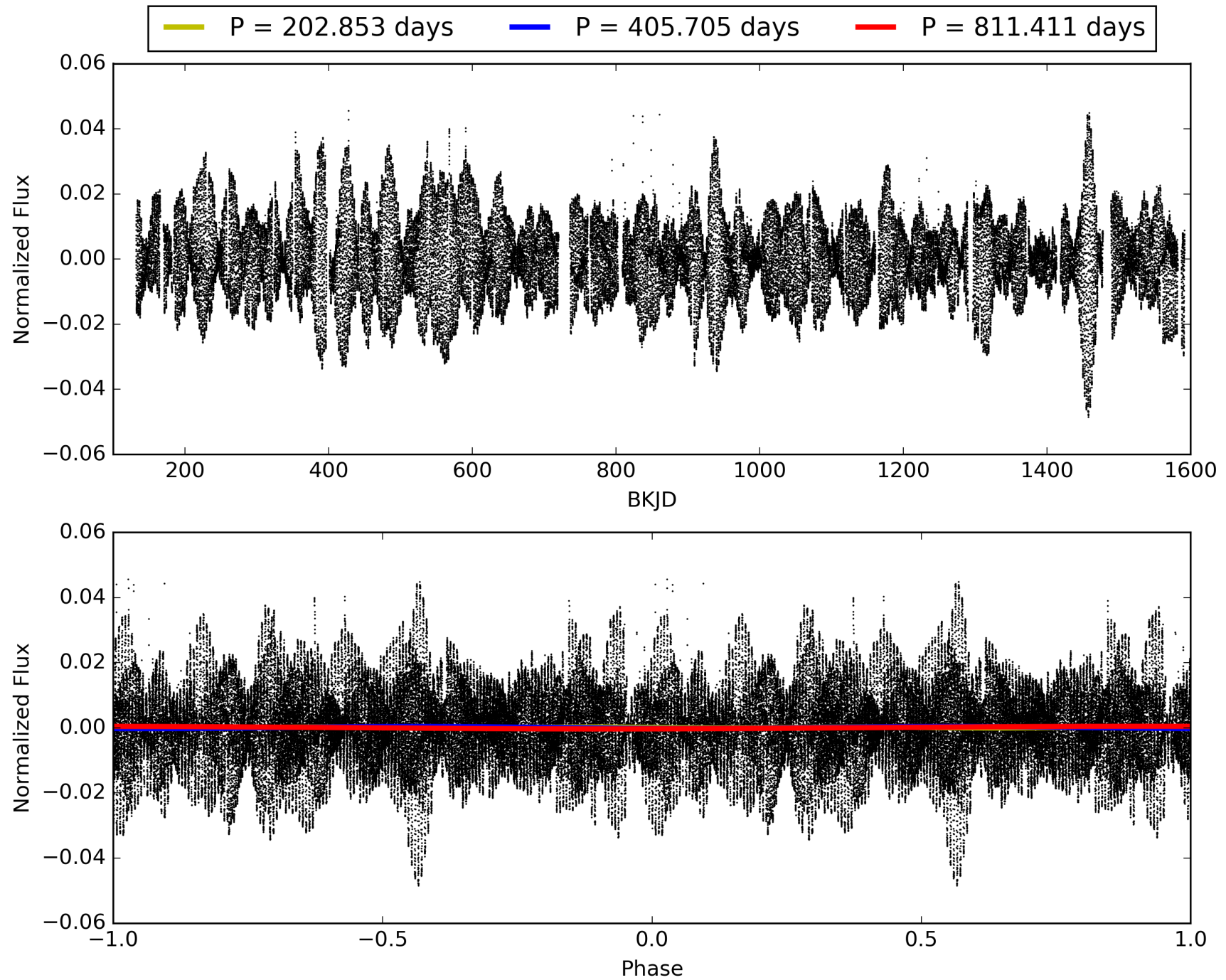
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:37:40 Z

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

TCE 009872330-03, PDC Light Curves

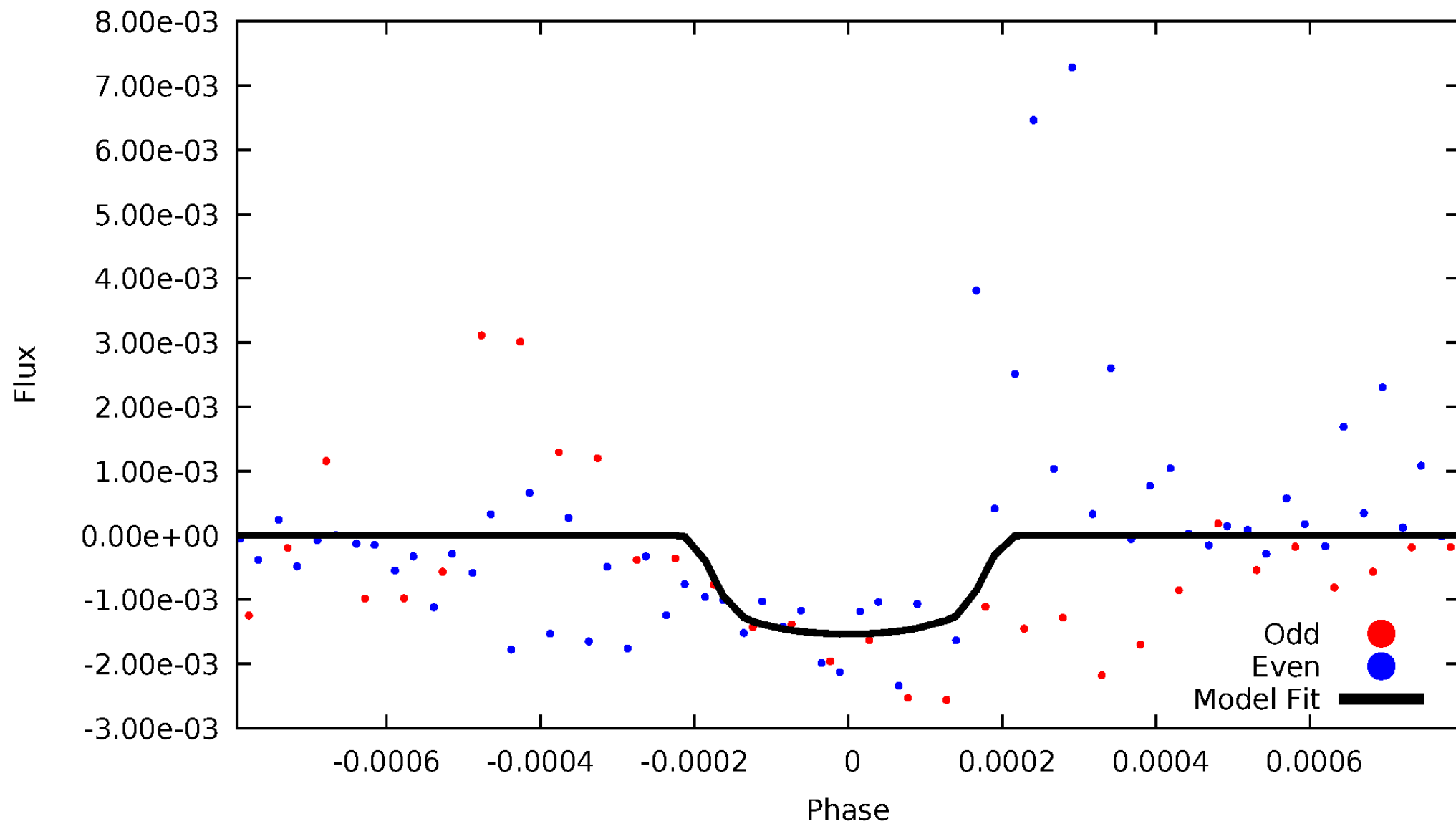


TCE 009872330-03



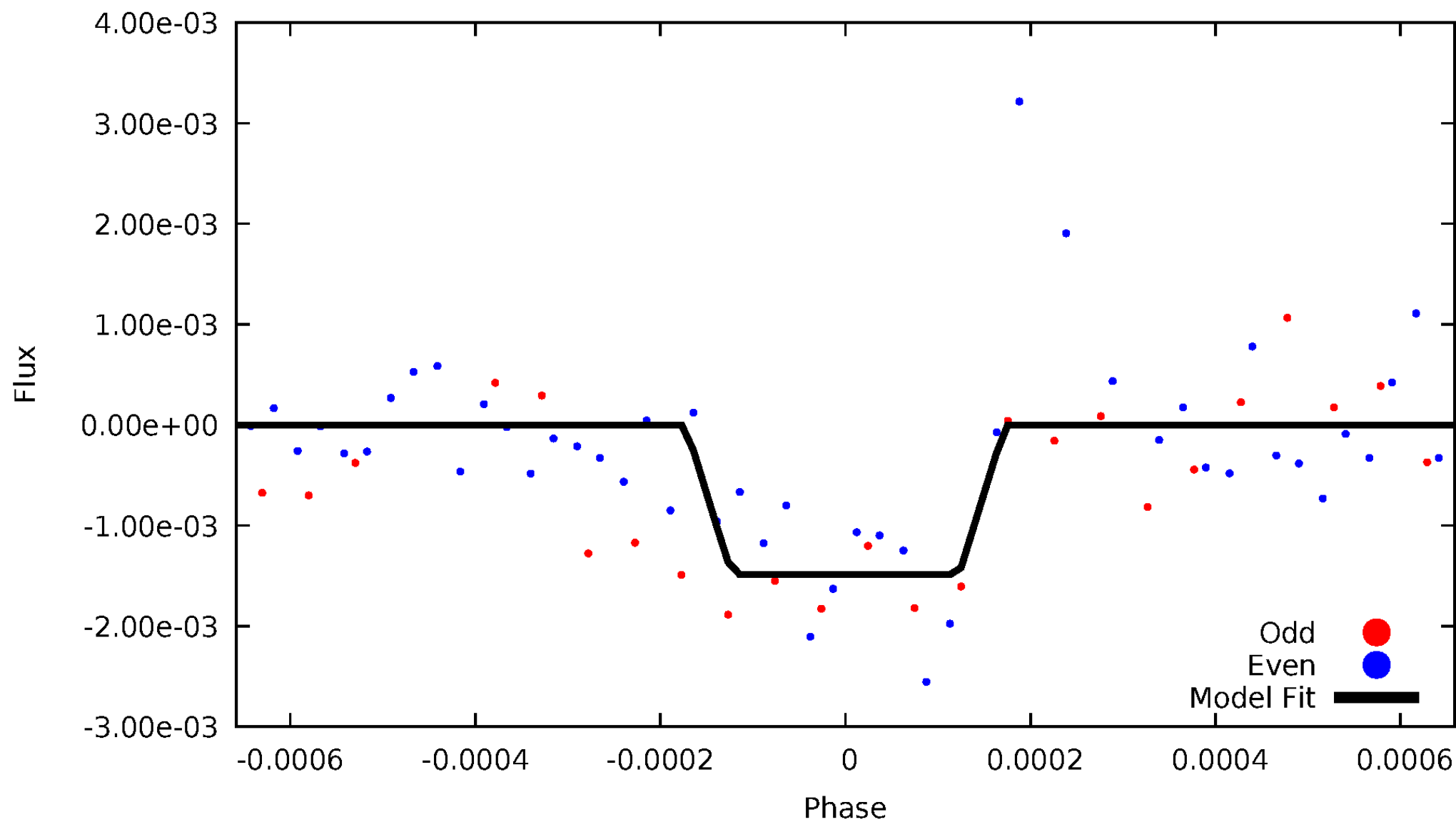
DV Odd/Even

TCE 009872330-03



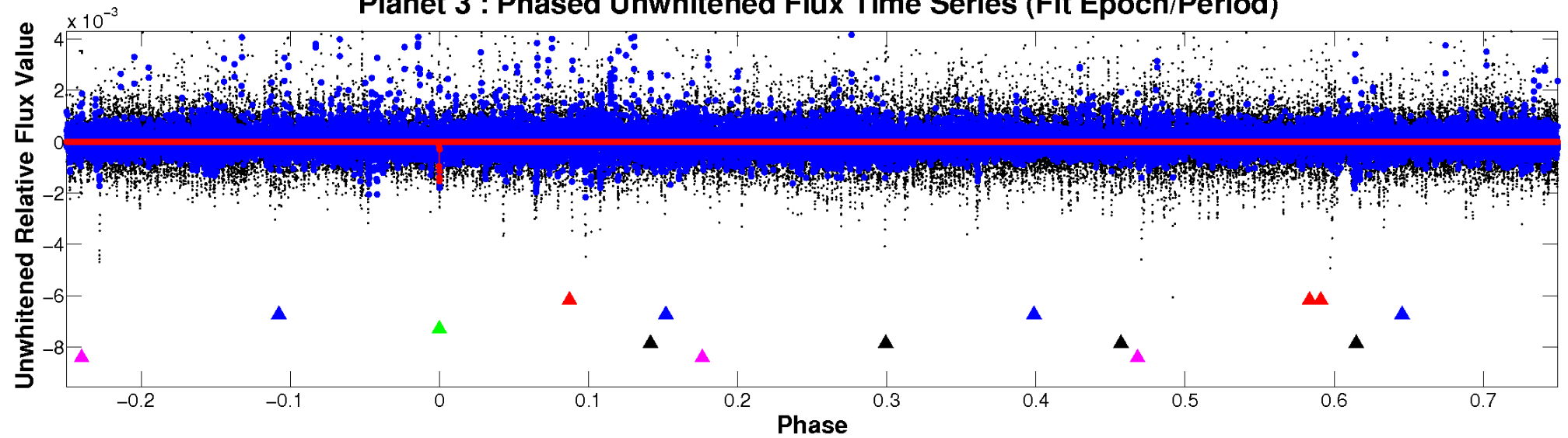
ALT Odd/Even

TCE 009872330-03

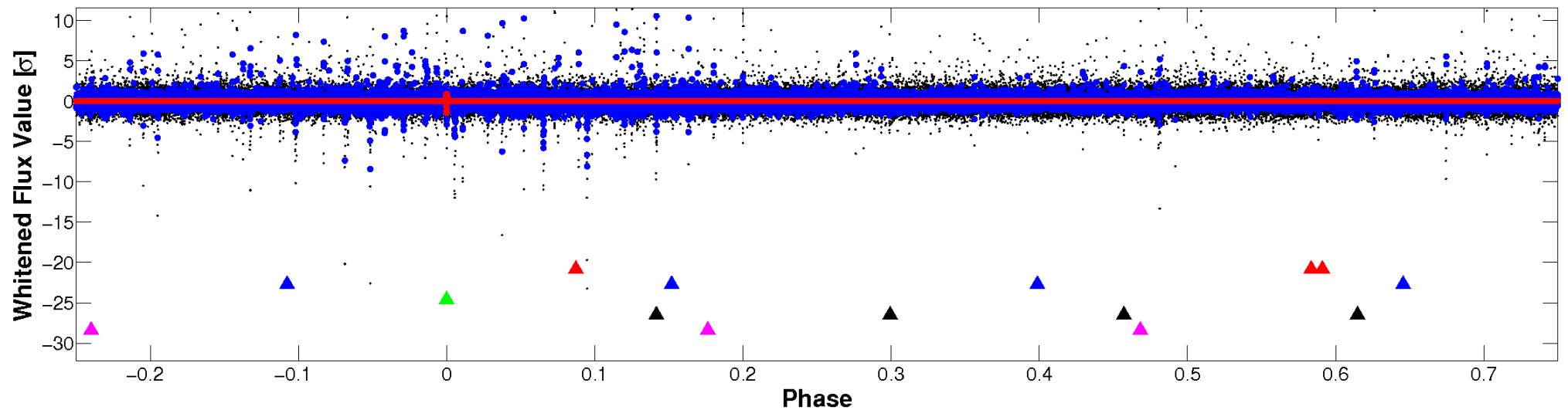


Non-Whitened Vs. Whitened Light Curve

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

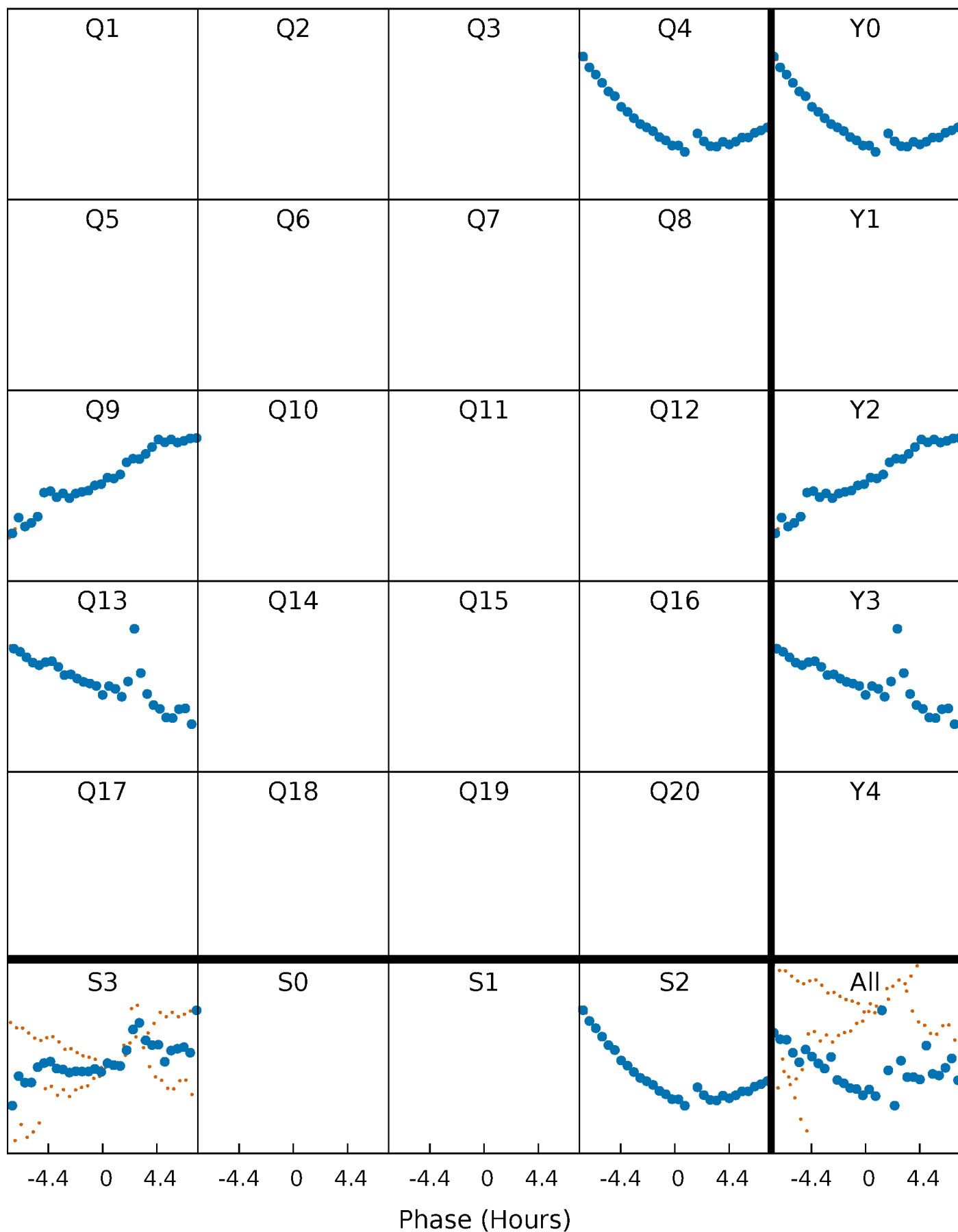


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



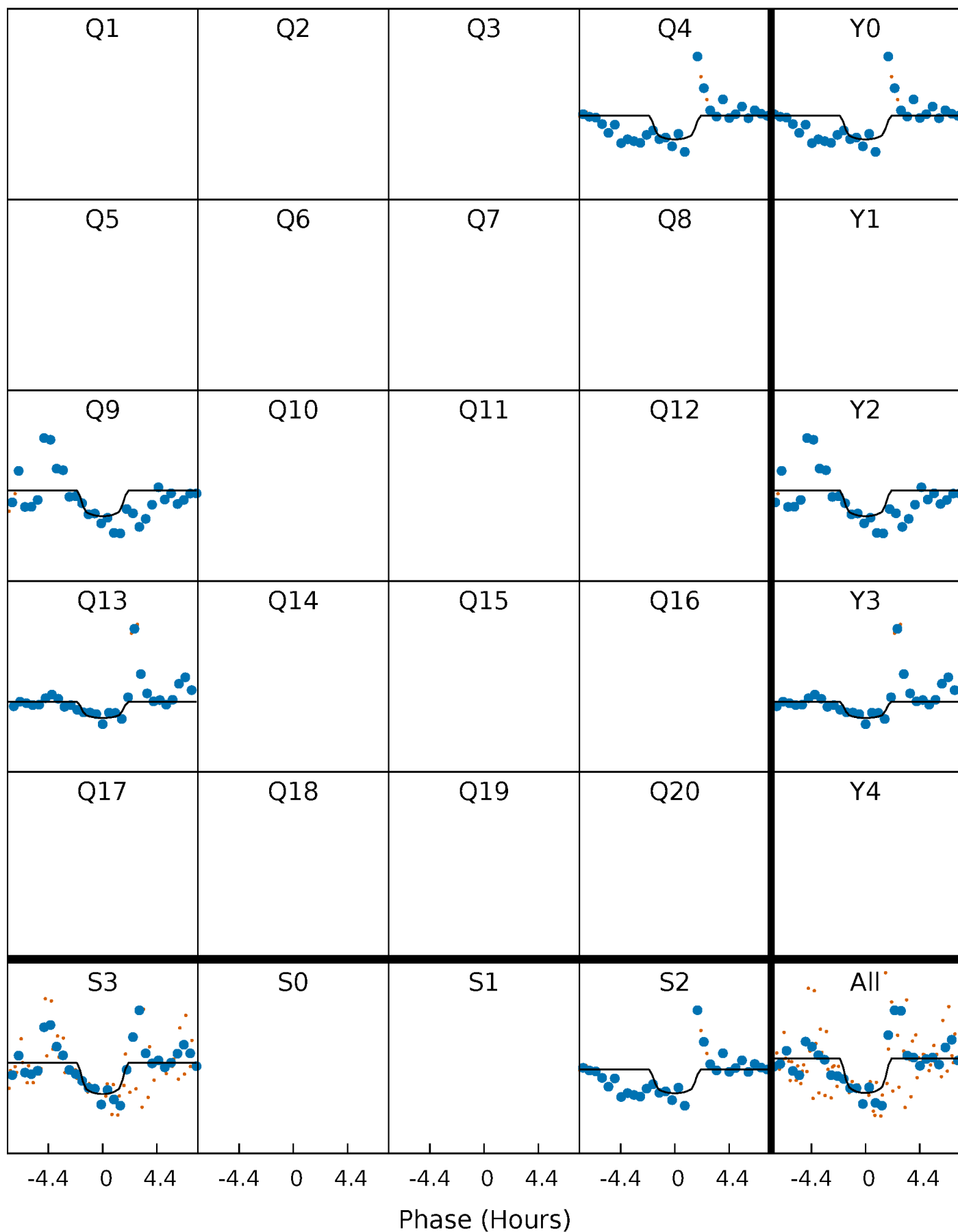
PDC Quarter-Phased Transit Curves

TCE 009872330-03 P=405.705316 Days $T_0=416.021259$ (BKJD)



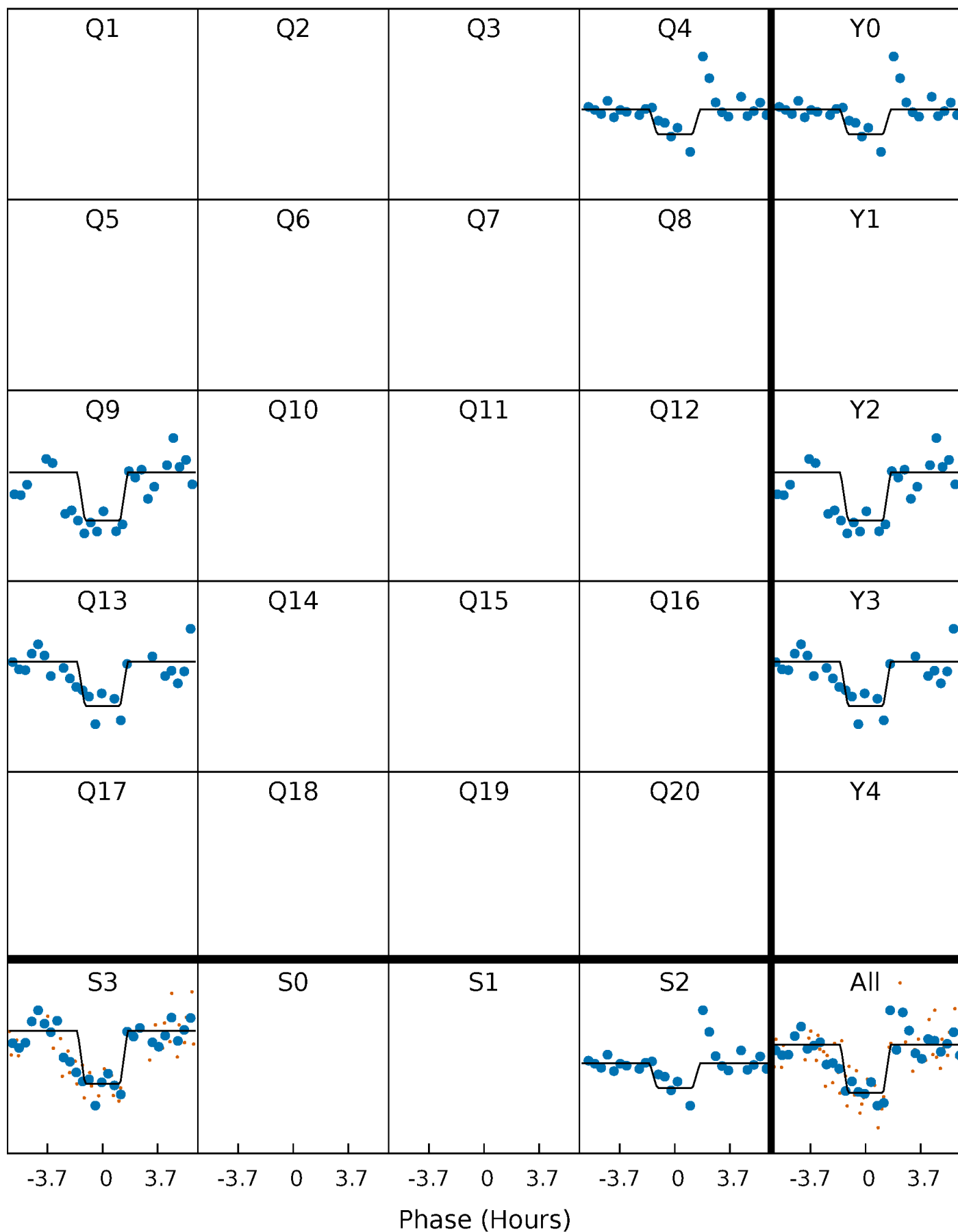
DV Quarter-Phased Transit Curves

TCE 009872330-03 $P=405.705316$ Days $T_0=416.021259$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

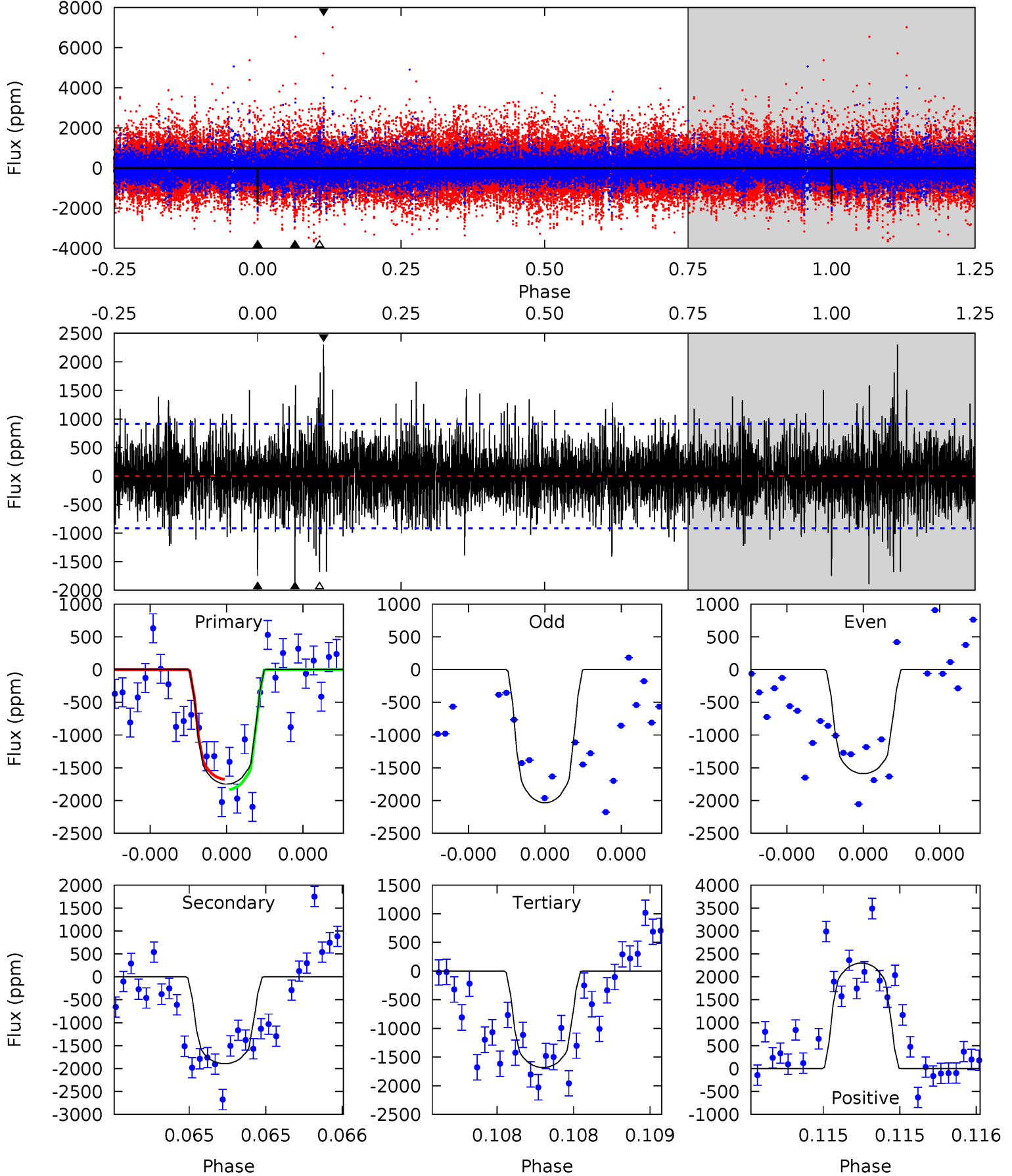
TCE 009872330-03 P=405.715145 Days $T_0=416.012491$ (BKJD)



DV Model-Shift Uniqueness Test

009872330-03, P = 405.705316 Days, E = 10.315943 Days

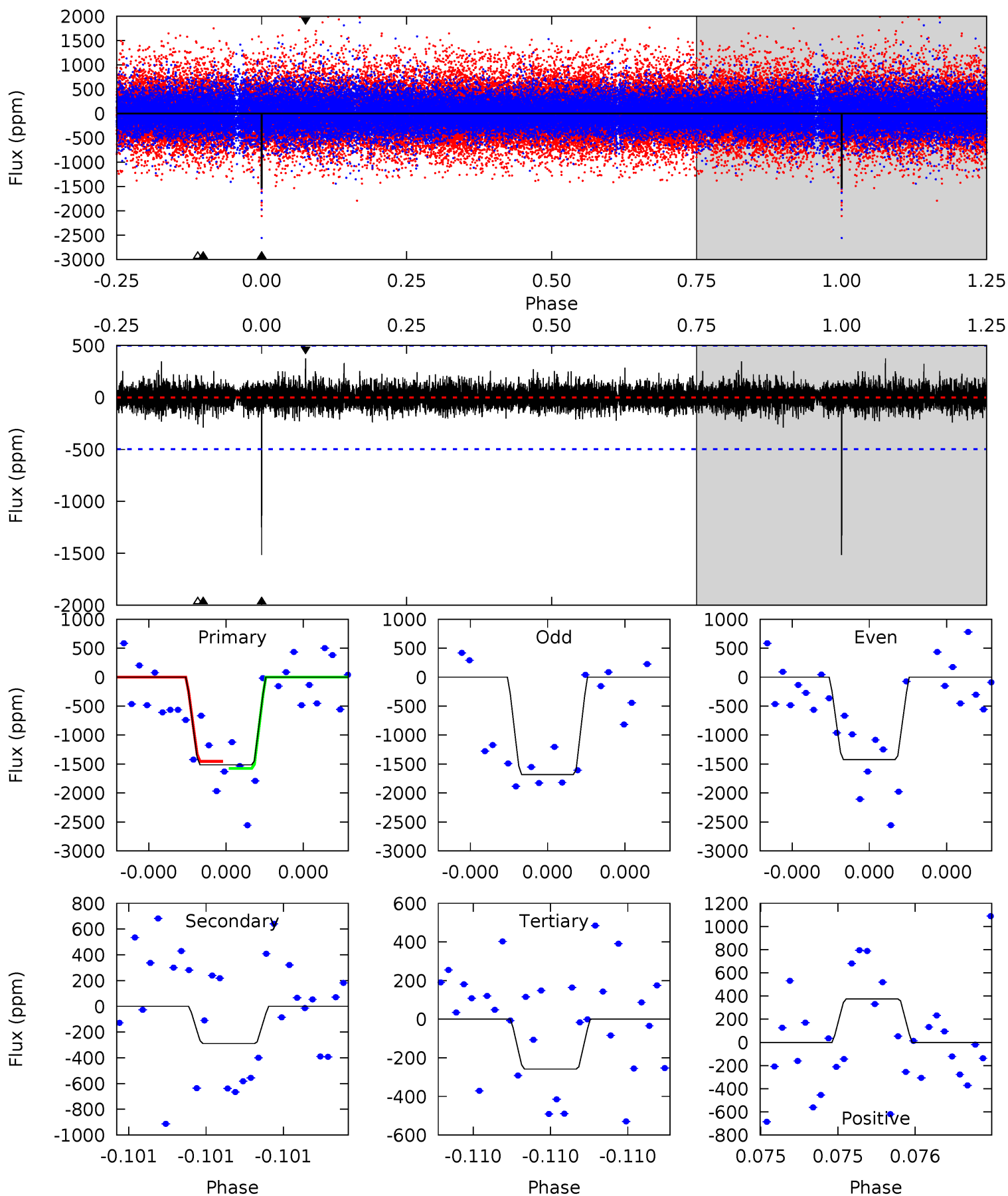
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.7	11.6	10.3	14.1	5.60	3.51	2.34	0.41	-3.37	1.30	-2.48	1.10	1.11	0.55	0.48



Alt Model-Shift Uniqueness Test

009872330-03, P = 405.715145 Days, E = 10.297346 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.2	3.28	2.93	4.25	5.64	3.58	0.71	14.2	12.9	0.35	-0.98	1.34	1.01	0.20	0.69



Stellar Parameters For KIC 009872330

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5752^{+143}_{-158}	$4.571^{+0.042}_{-0.178}$	$-0.340^{+0.300}_{-0.300}$	$0.806^{+0.212}_{-0.071}$	$0.882^{+0.091}_{-0.100}$	$2.370^{+0.521}_{-1.058}$
	+2%/-3%	+1%/-4%	+88%/-88%	+26%/-9%	+10%/-11%	+22%/-45%
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 009872330-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-1894 ± 163	$4.15^{+2.90}_{-2.51}$	320^{+21}_{-13}	5655^{+4226}_{-1133}	$63537^{+362223}_{-41497}$
Alt.	-289 ± 88	$4.09^{+2.75}_{-2.37}$	320^{+20}_{-12}	3856^{+1607}_{-600}	9435^{+42427}_{-6213}

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

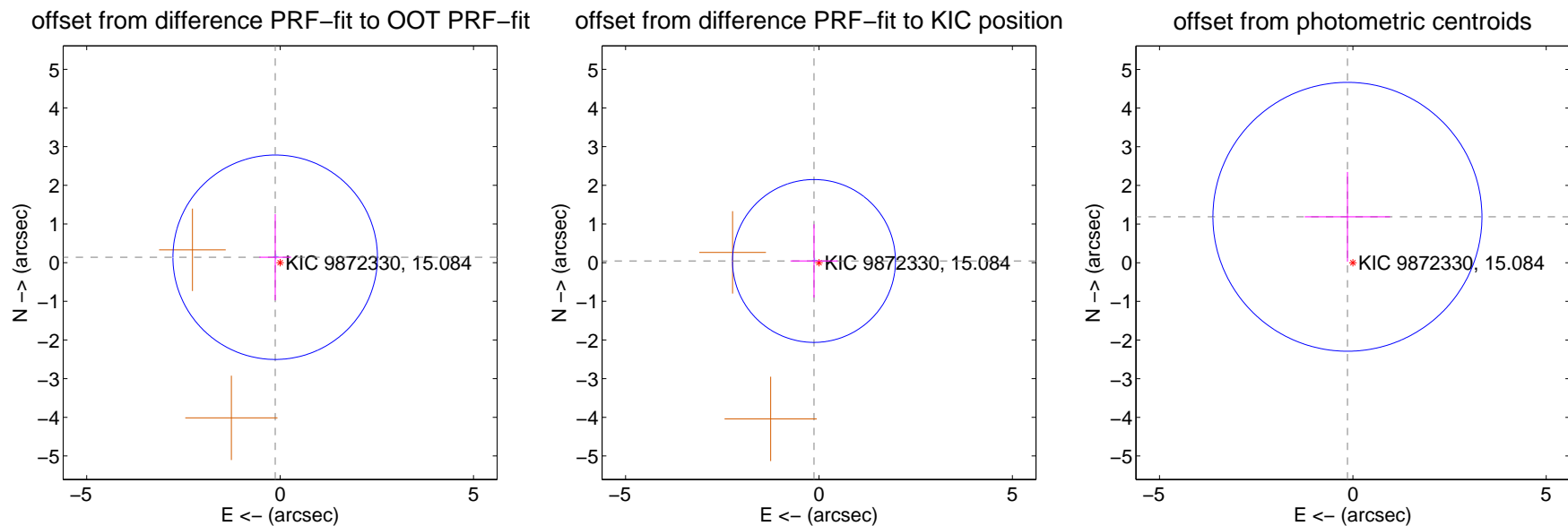
DV Centroid Data

Supplemental centroid analysis for 009872330-03. Kepler magnitude: 15.08. Transit SNR 6.25

There are 1 quarters with good PRF difference image offsets

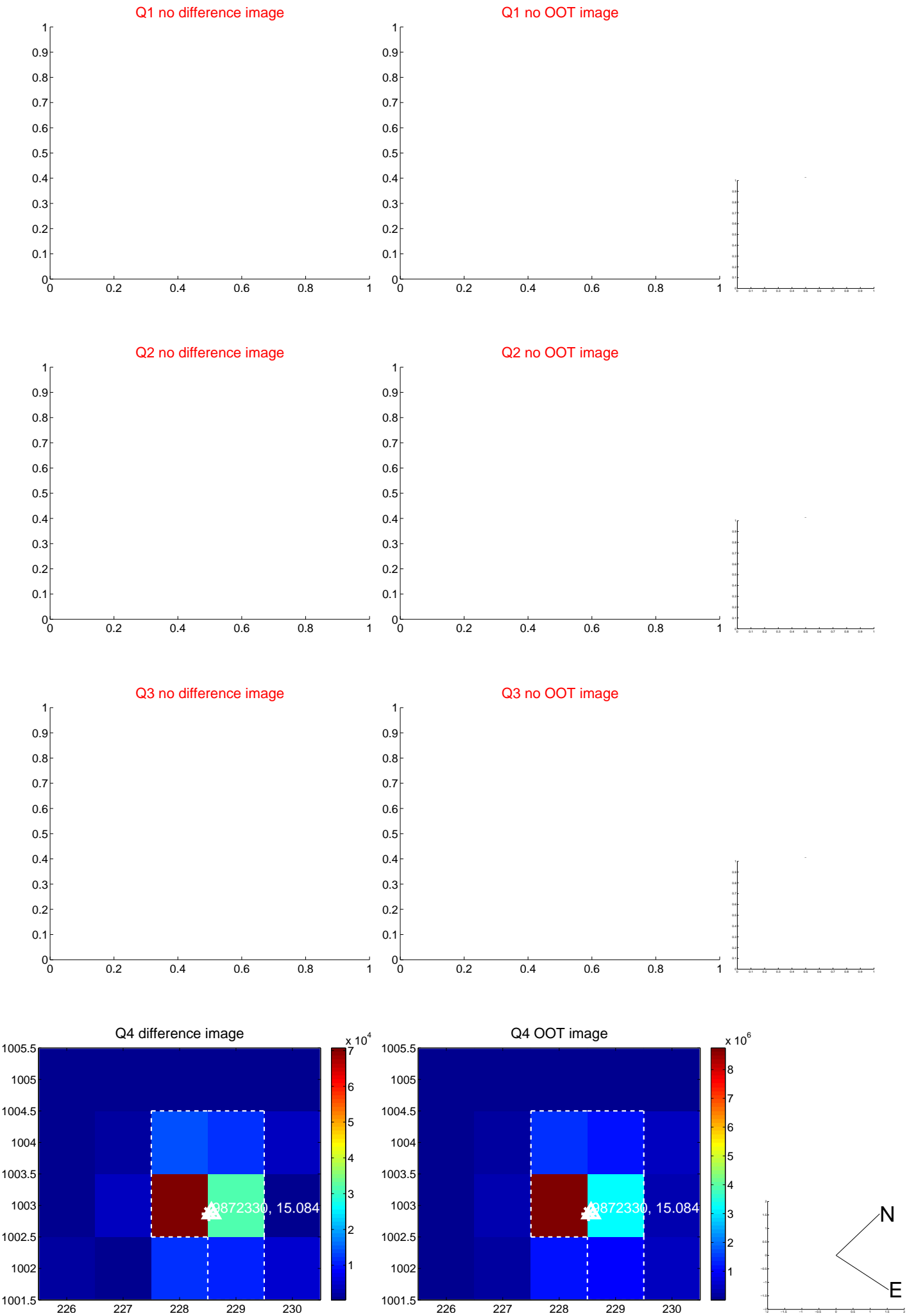
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.189 ± 0.881	0.21	0.127 ± 0.411	0.140 ± 1.114
PRF-fit source offset from KIC position	0.136 ± 0.702	0.19	0.129 ± 0.608	0.043 ± 0.948
photometric centroid source offset	1.20 ± 1.16	1.03	0.14 ± 1.10	1.19 ± 1.16



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.

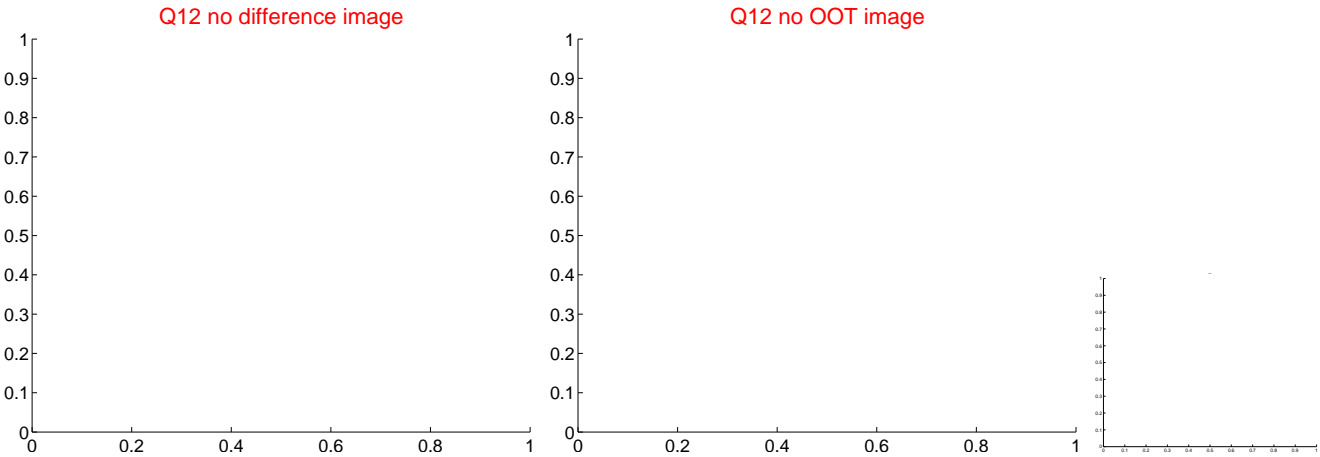
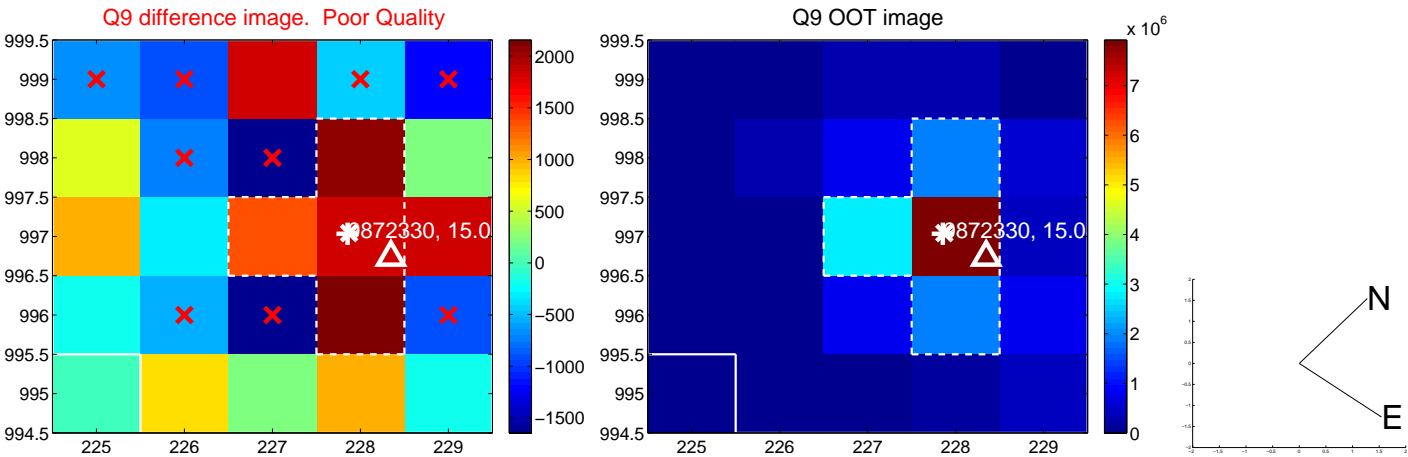
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



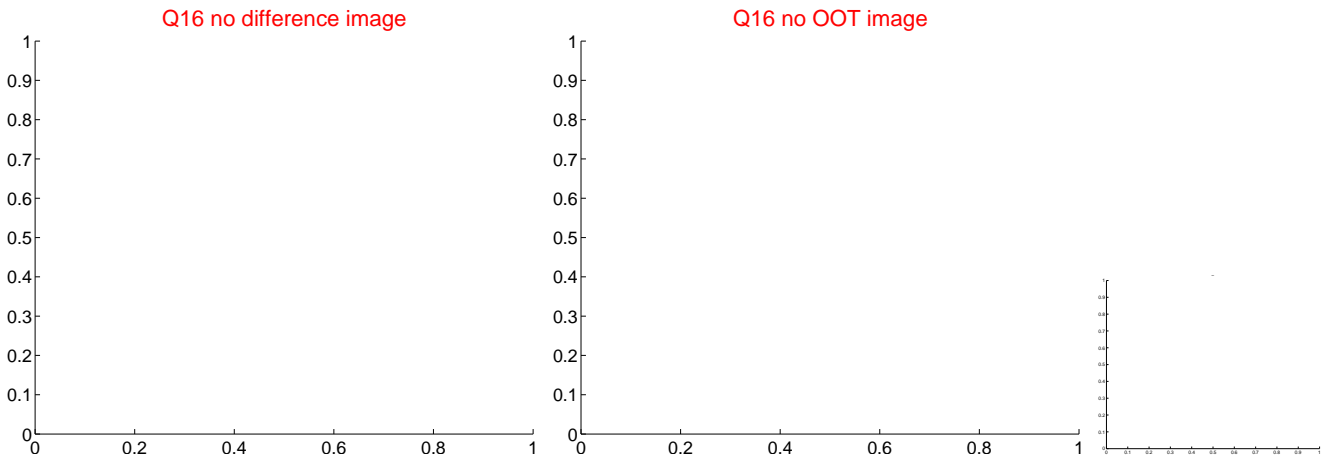
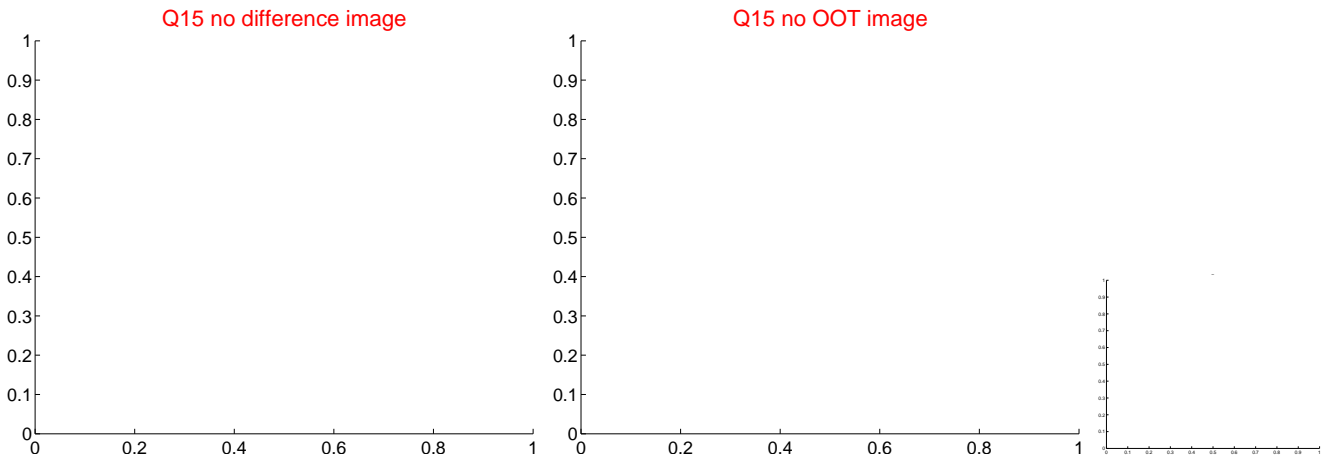
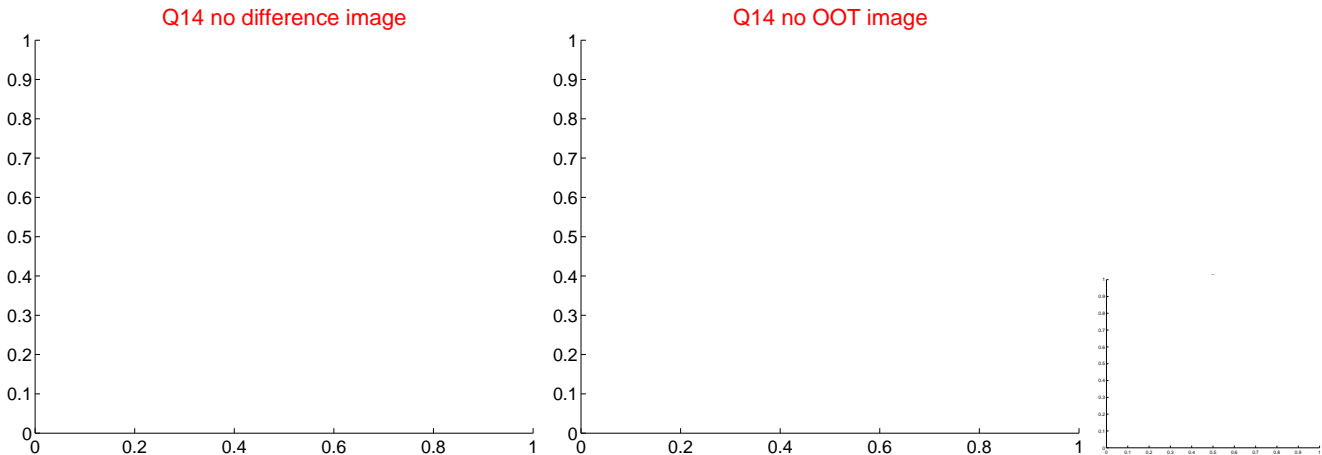
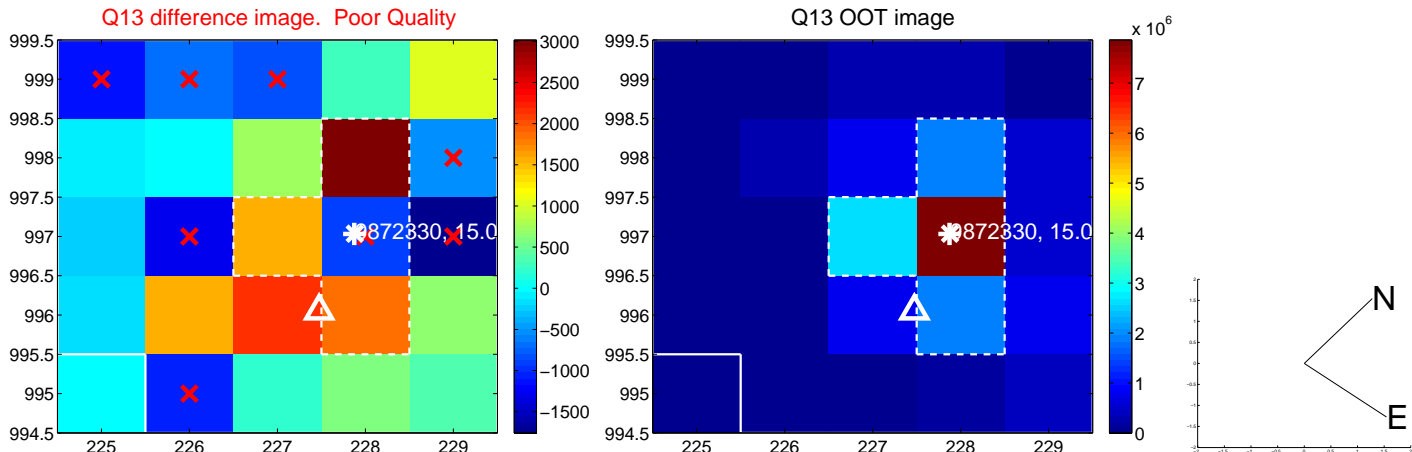
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



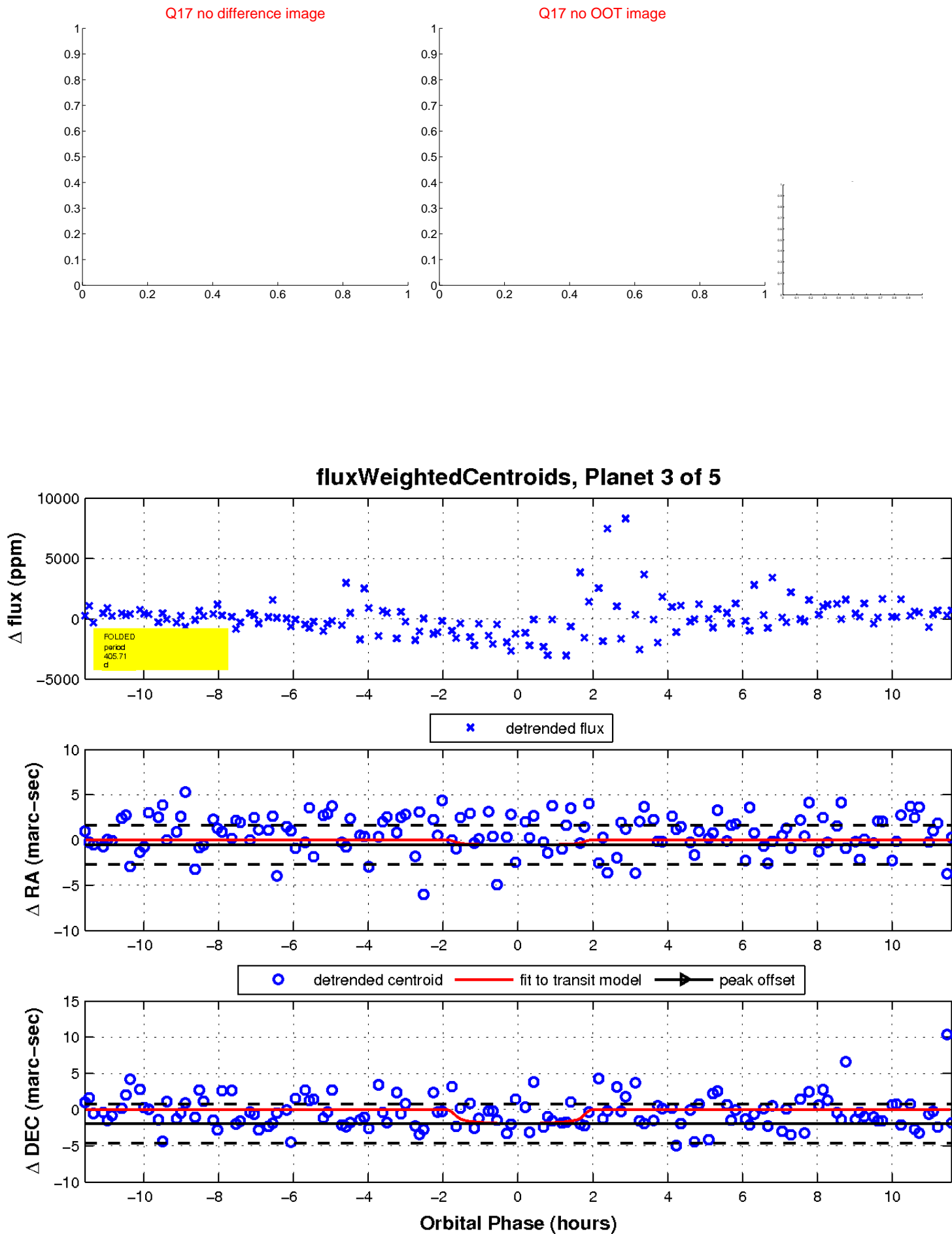
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

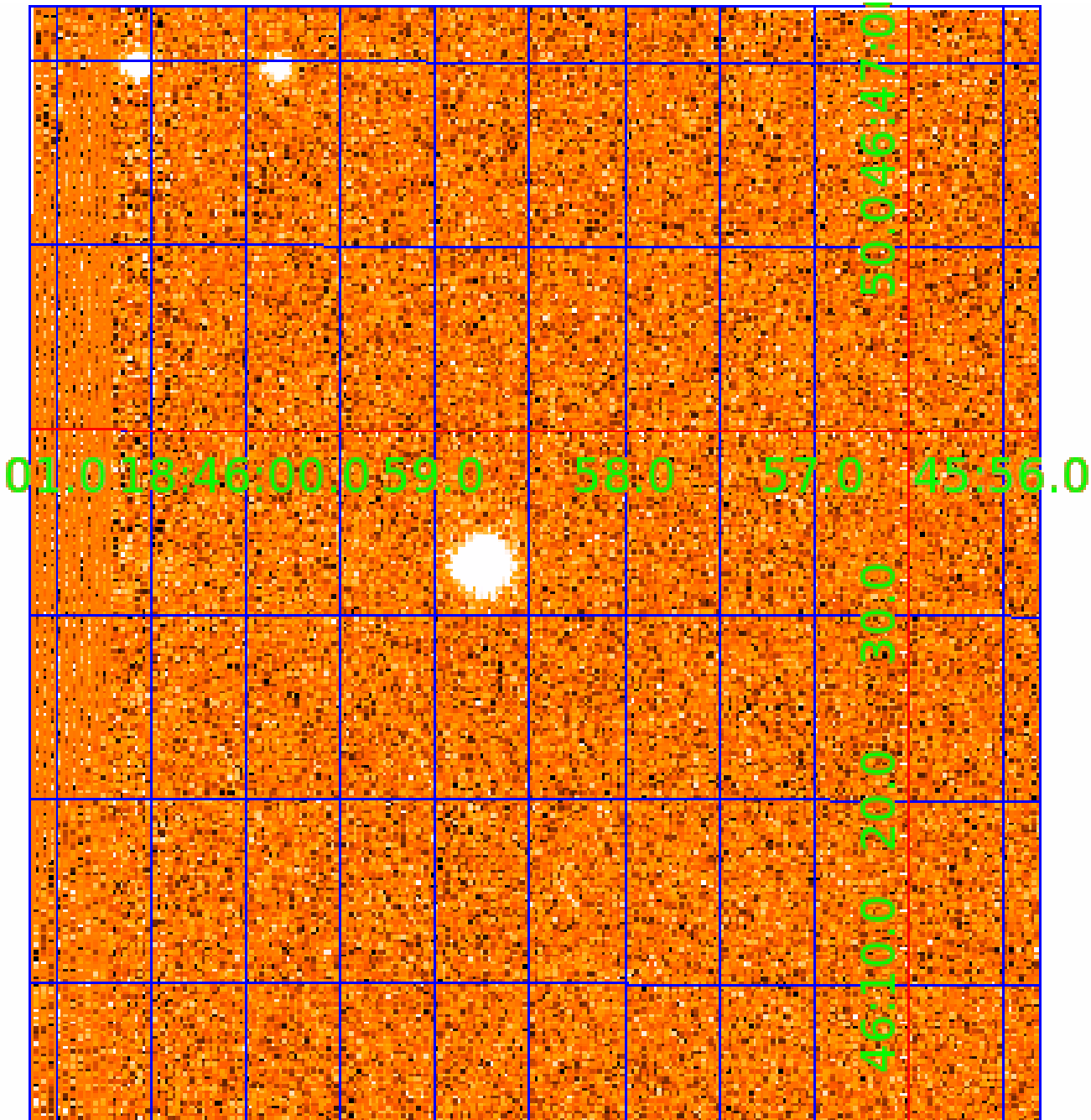


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009872330

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})
009872330-01	OBS	No	610.079429	247.054340	1841.3	2.824	13.8	6.6	0.81	5752	3.47	0.35
009872330-02	OBS	No	305.563220	372.367589	1127.0	1.364	12.4	5.2	0.81	5752	2.97	0.88
009872330-03	OBS	No	405.705316	416.021259	1534.4	3.866	10.5	6.3	0.81	5752	3.47	0.60
009872330-04	OBS	No	341.709813	259.745047	964.7	2.475	11.1	3.5	0.81	5752	2.74	0.76
009872330-05	OBS	No	524.128729	487.558404	1460.0	3.262	9.9	5.7	0.81	5752	3.18	0.43

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009872330-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009872330-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009872330-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009872330-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009872330-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

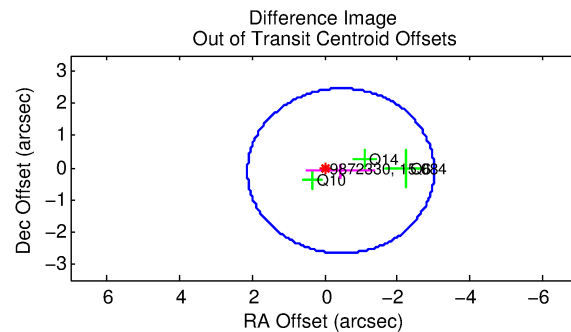
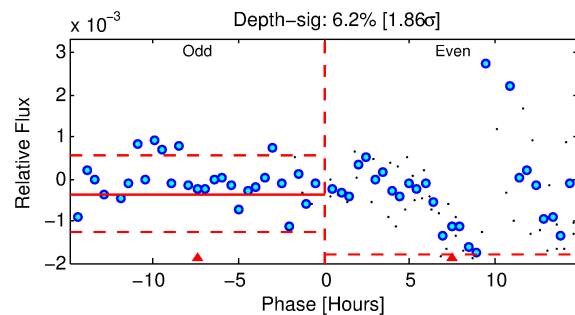
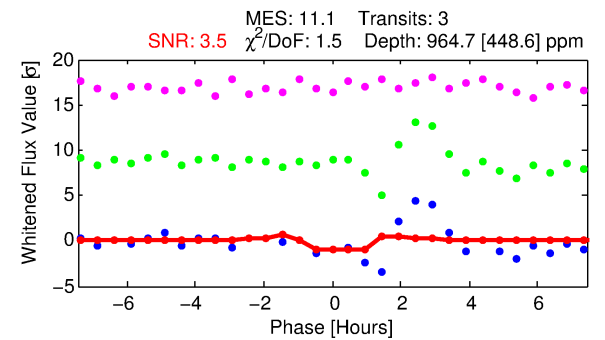
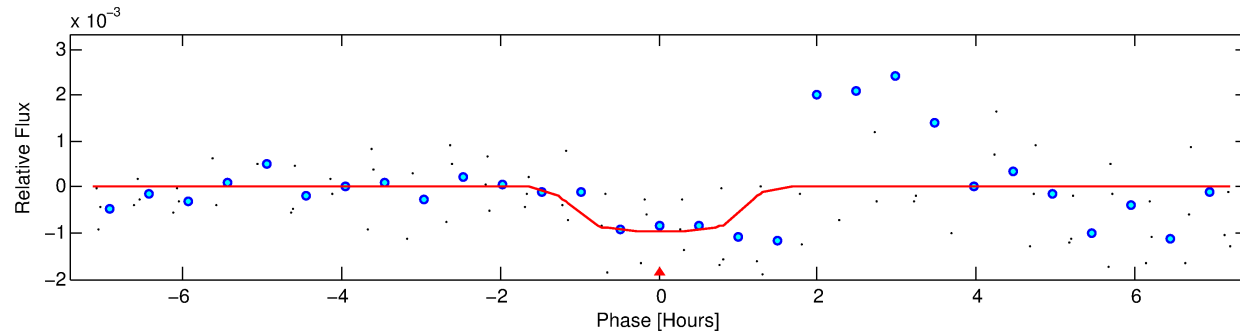
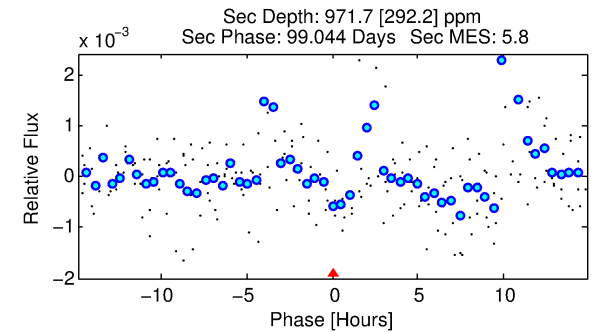
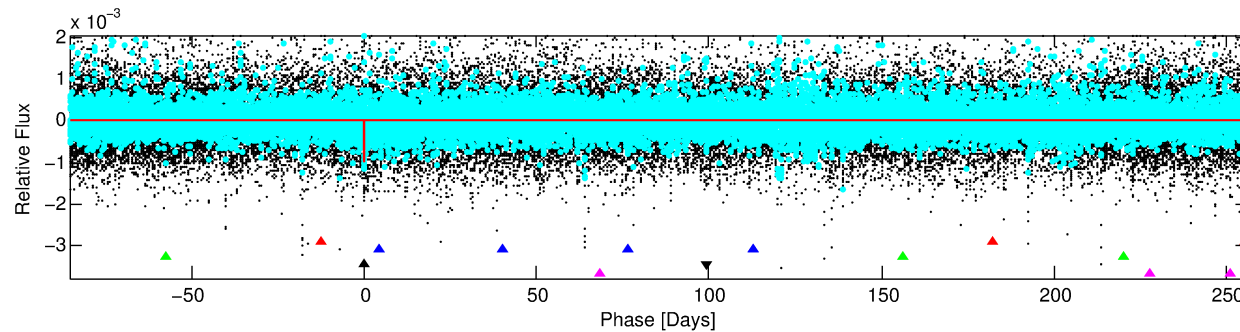
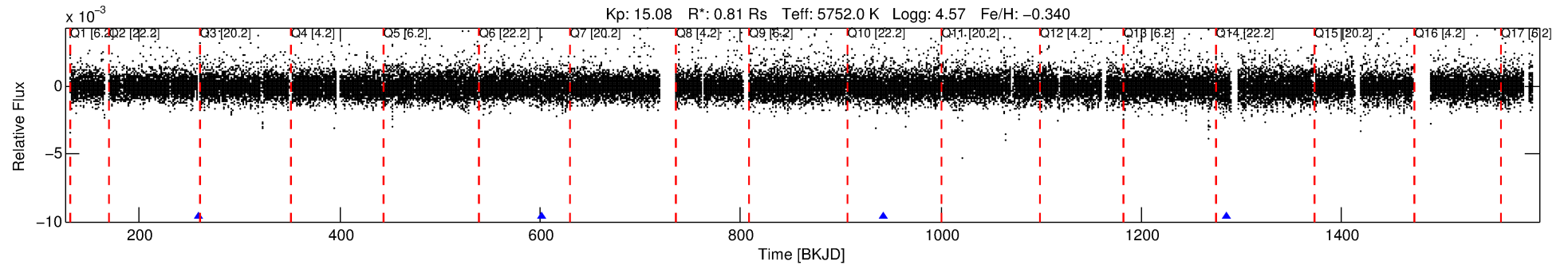
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009872330-04

No Significant Match Found

DV One-Page Summary

KIC: 9872330 Candidate: 4 of 5 Period: 341.710 d



DV Fit Results:

Period = 341.70981 [0.01181] d
Epoch = 259.7450 [0.0238] BKJD
Rp/R* = 0.0312 [0.1922]
a/R* = 730.36 [21040.52]
b = 0.76 [15.91]
Seff = 0.76 [0.26]
Teq = 238 [20] K
Rp = 2.74 [16.92] Re
a = 0.9177 [0.2040] AU
Ag = 59862.72 [738410.28] [0.08σ]
Teffp = 5751 [17730] K [0.31σ]

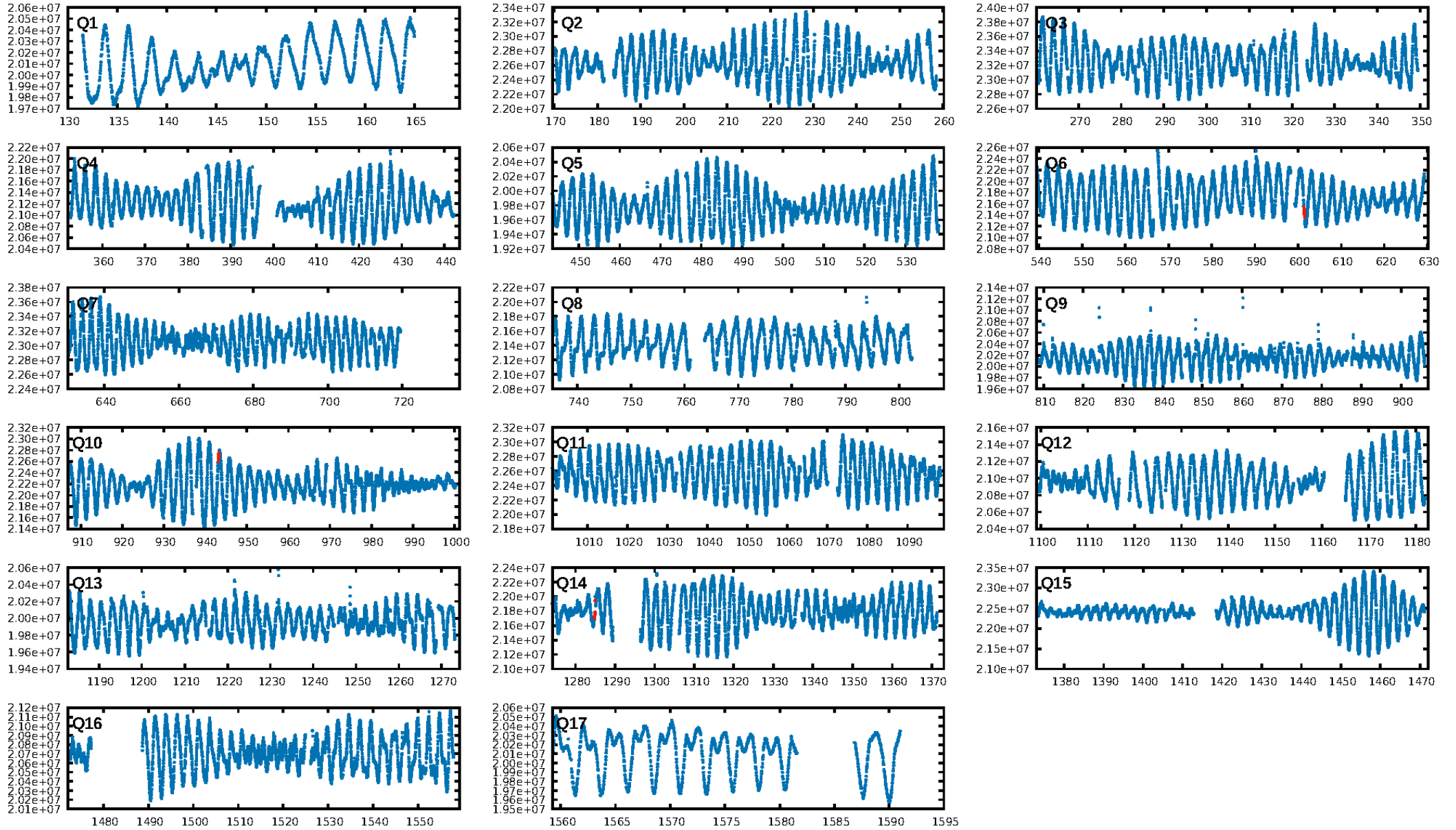
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [306.98σ]
LongPeriod-sig: 100.0% [334.59σ]
ModelChiSquare2-sig: 17.1%
ModelChiSquareGof-sig: 62.1%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 1.906
Centroid-sig: 28.5%
Centroid-so: 2.117 arcsec [0.99σ]
OotOffset-rm: 0.458 arcsec [0.53σ]
OotOffset-st: 3/0/0/0 [3]
KicOffset-rm: 0.512 arcsec [0.76σ]
KicOffset-st: 3/0/0/0 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

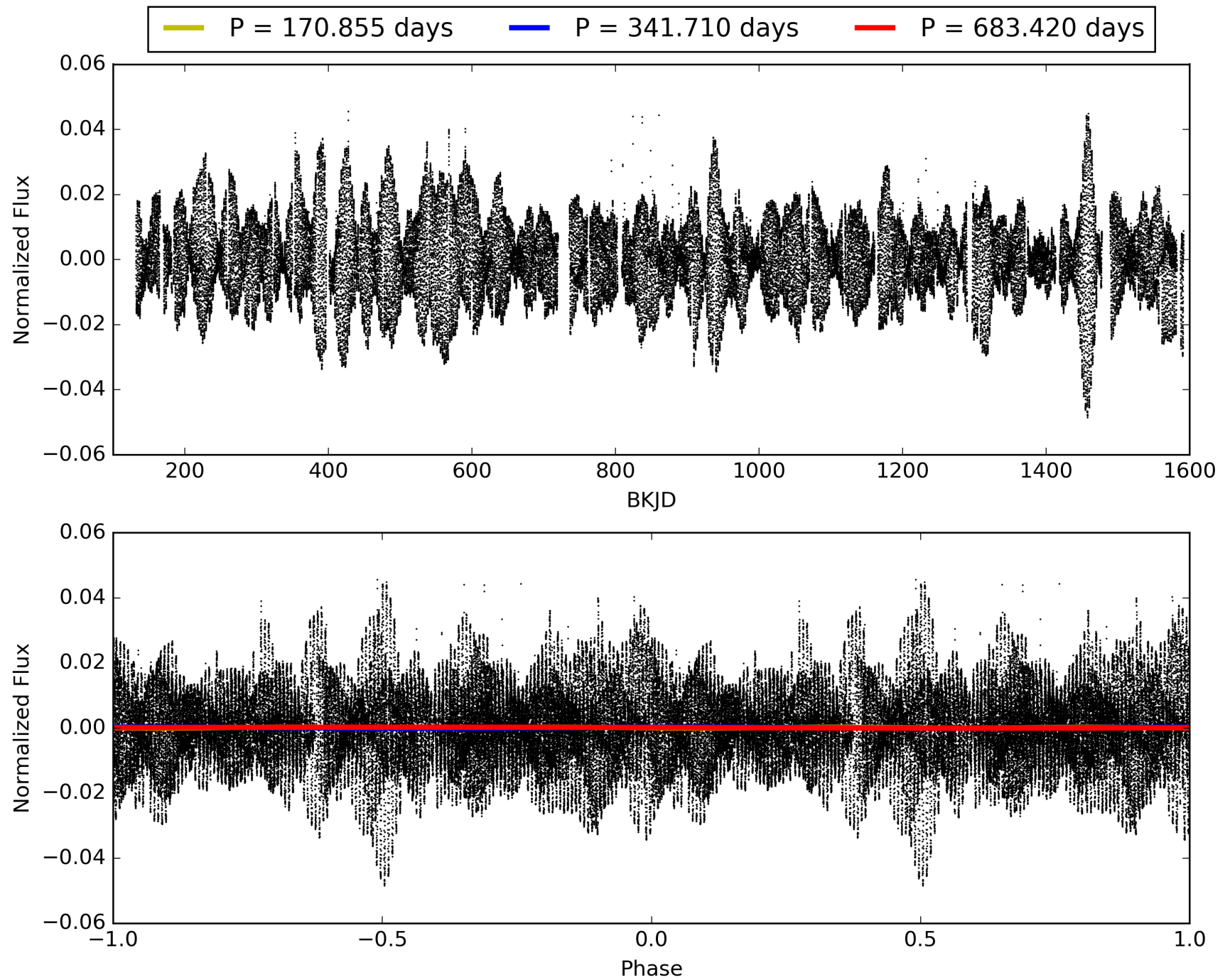
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:38:00 Z

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

TCE 009872330-04, PDC Light Curves

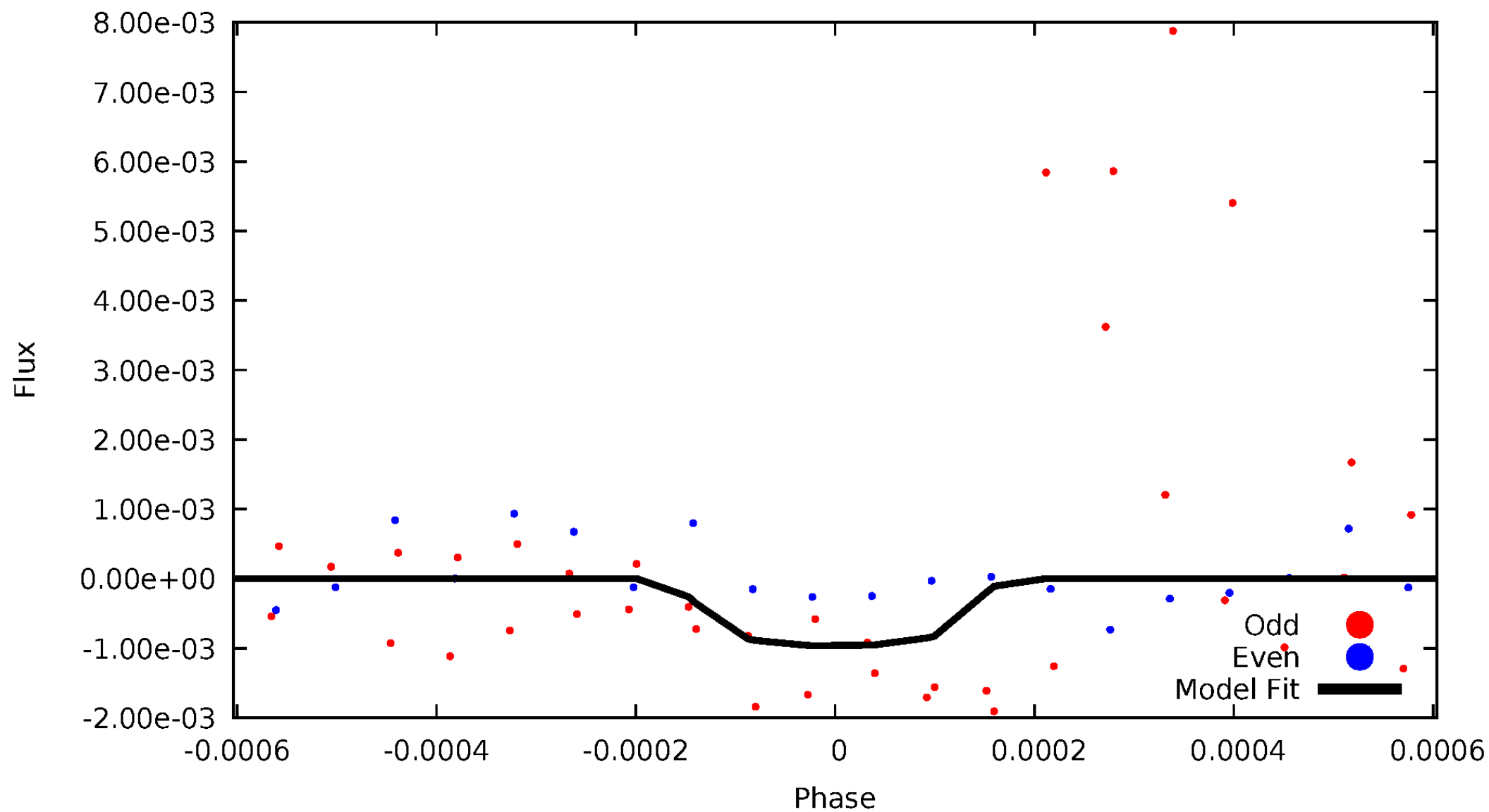


TCE 009872330-04



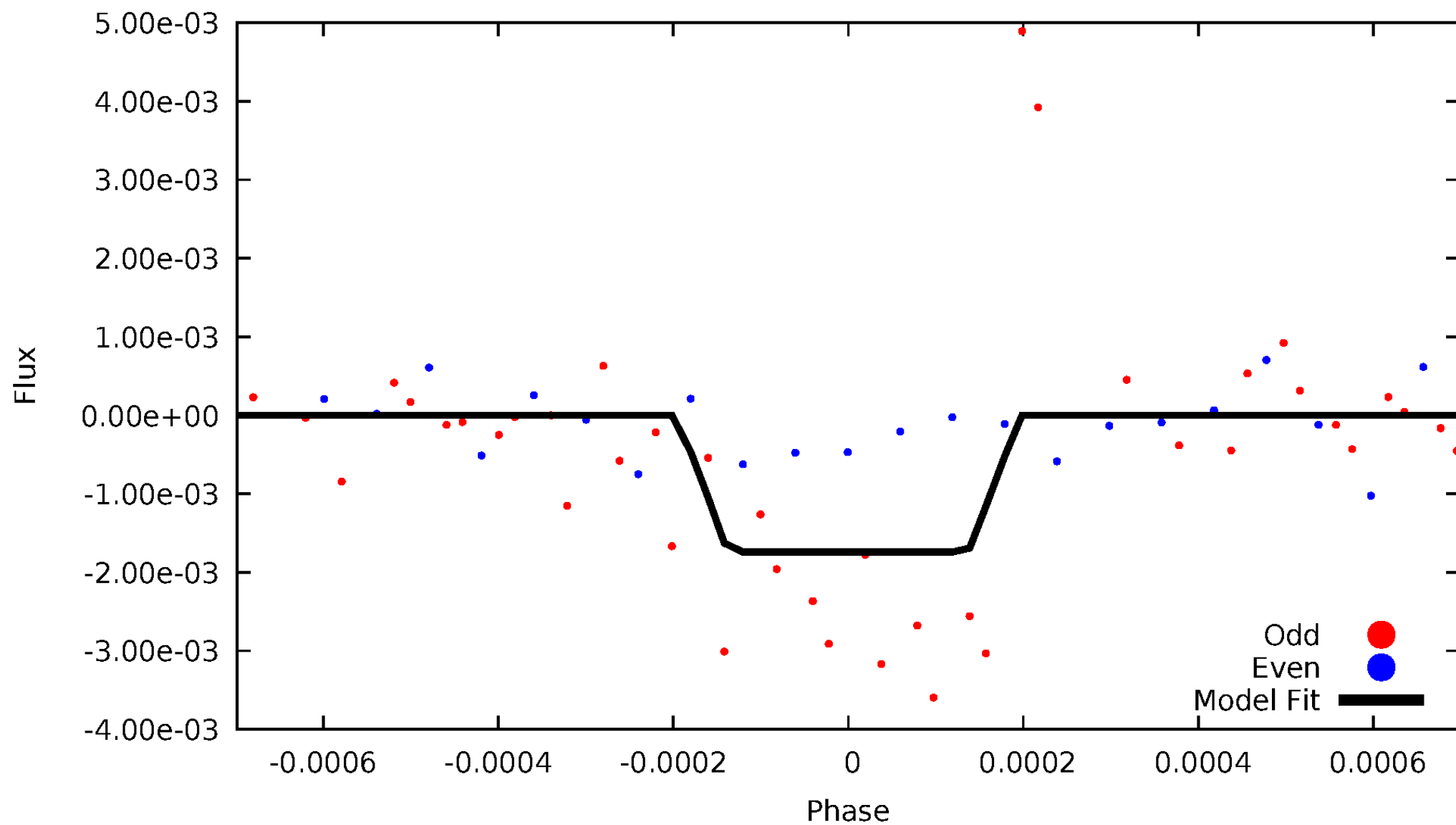
DV Odd/Even

TCE 009872330-04



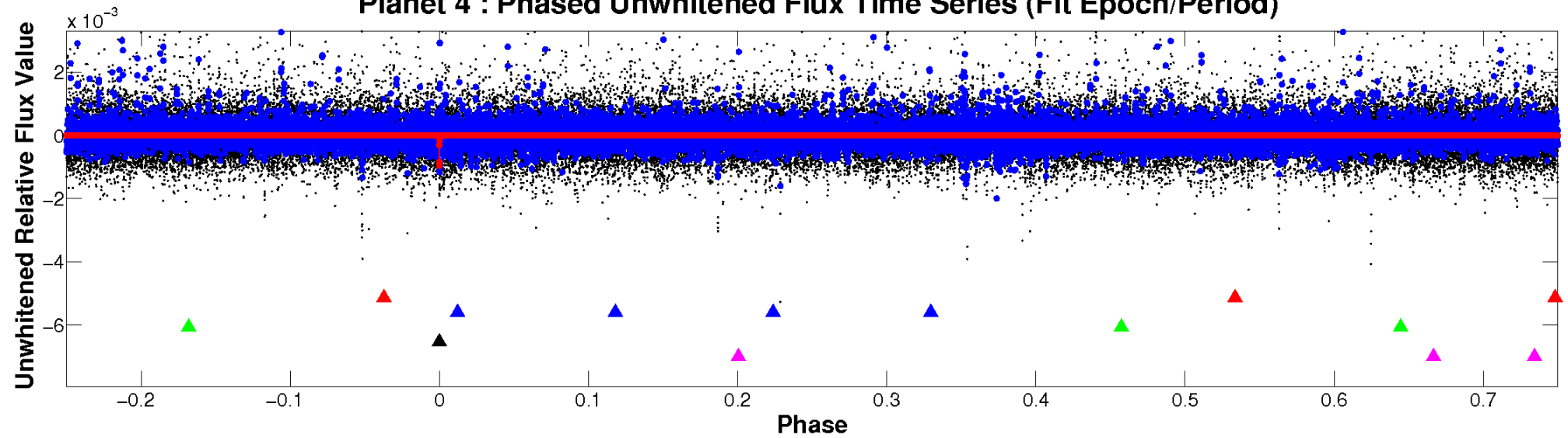
ALT Odd/Even

TCE 009872330-04

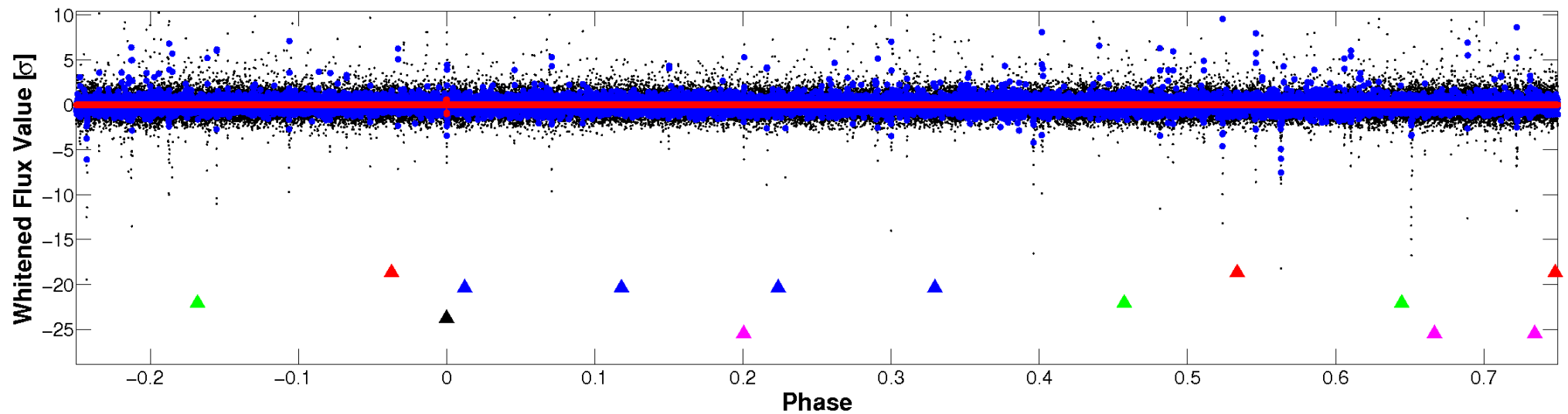


Non-Whitened Vs. Whitened Light Curve

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

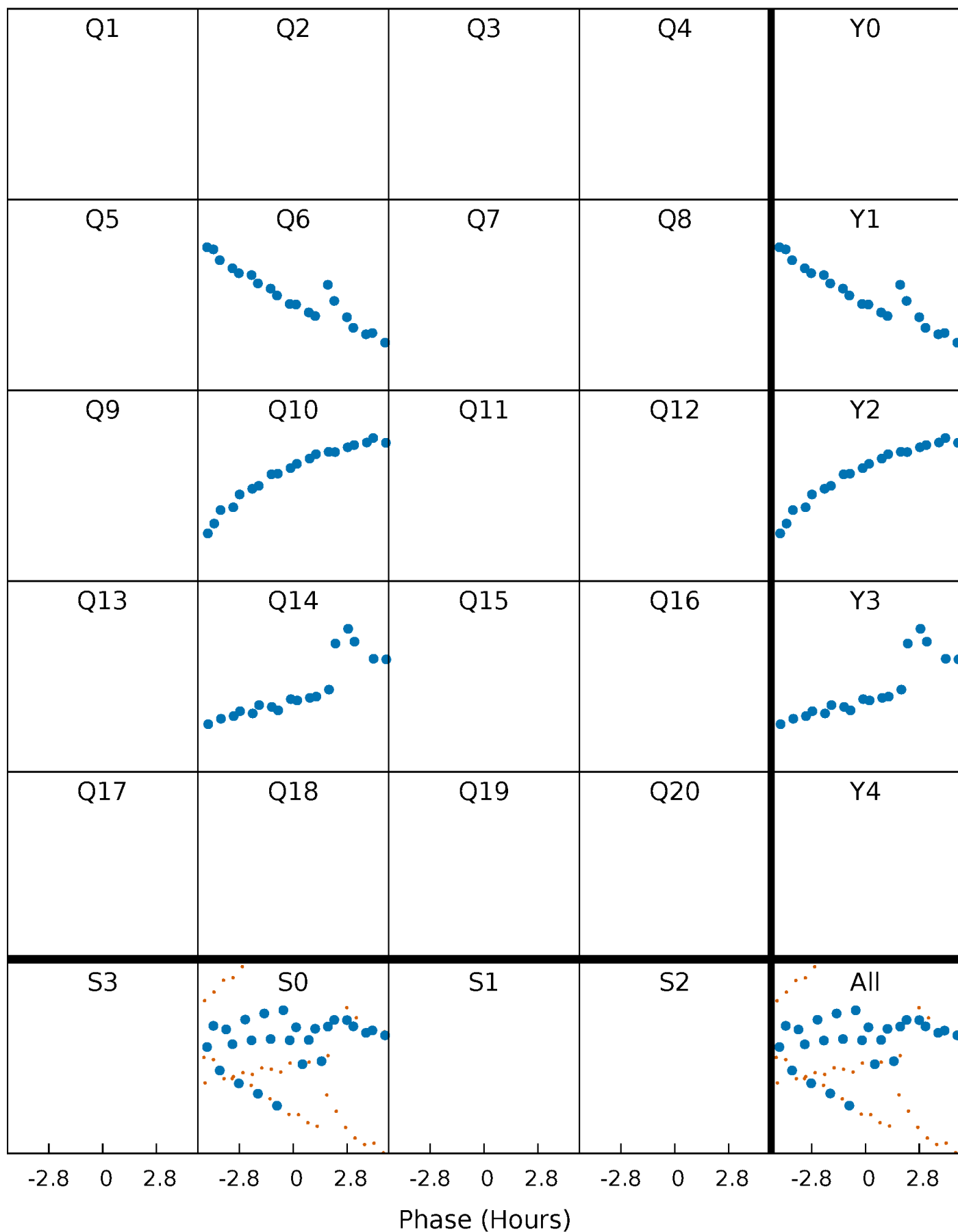


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



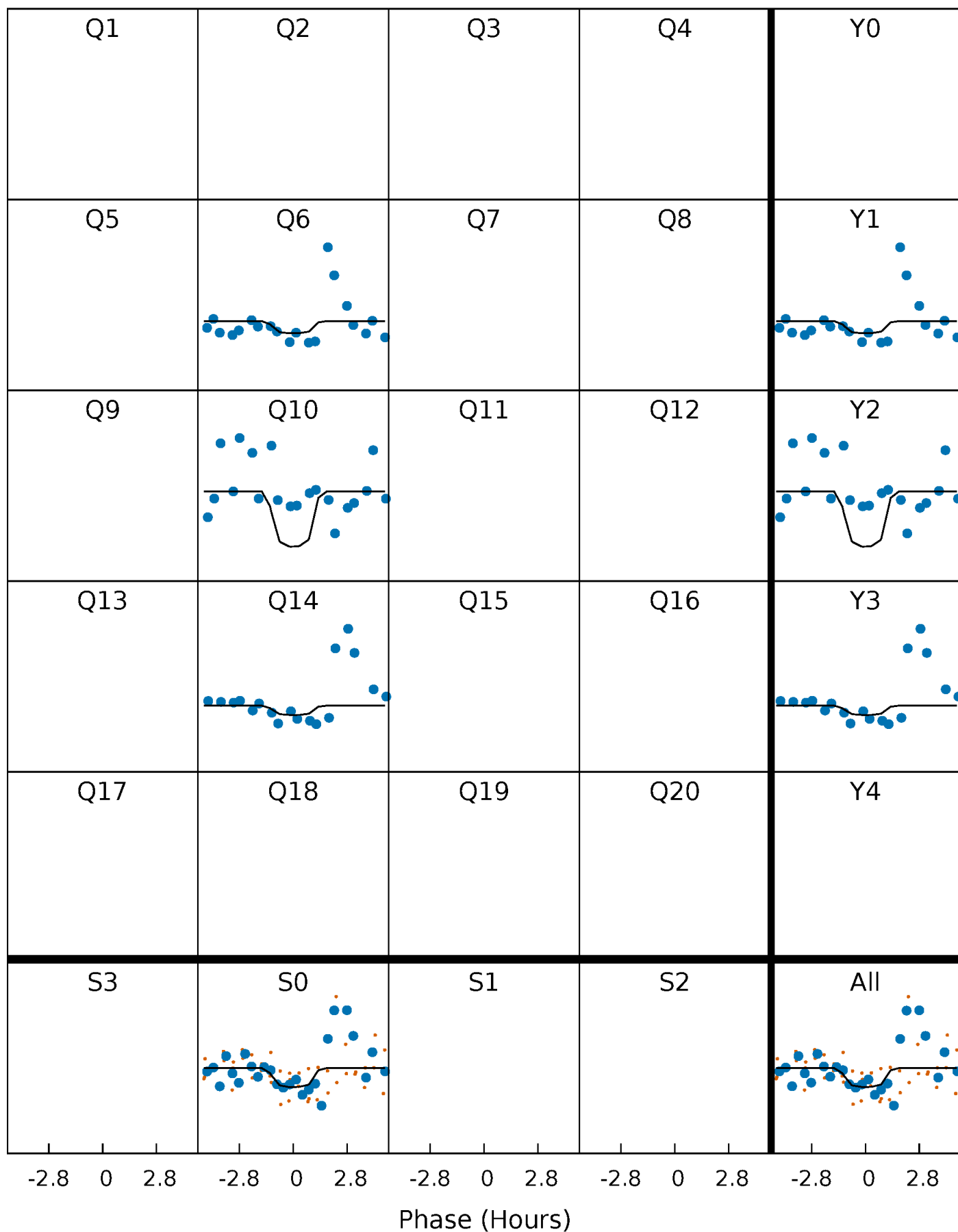
PDC Quarter-Phased Transit Curves

TCE 009872330-04 P=341.709813 Days $T_0=259.745047$ (BKJD)



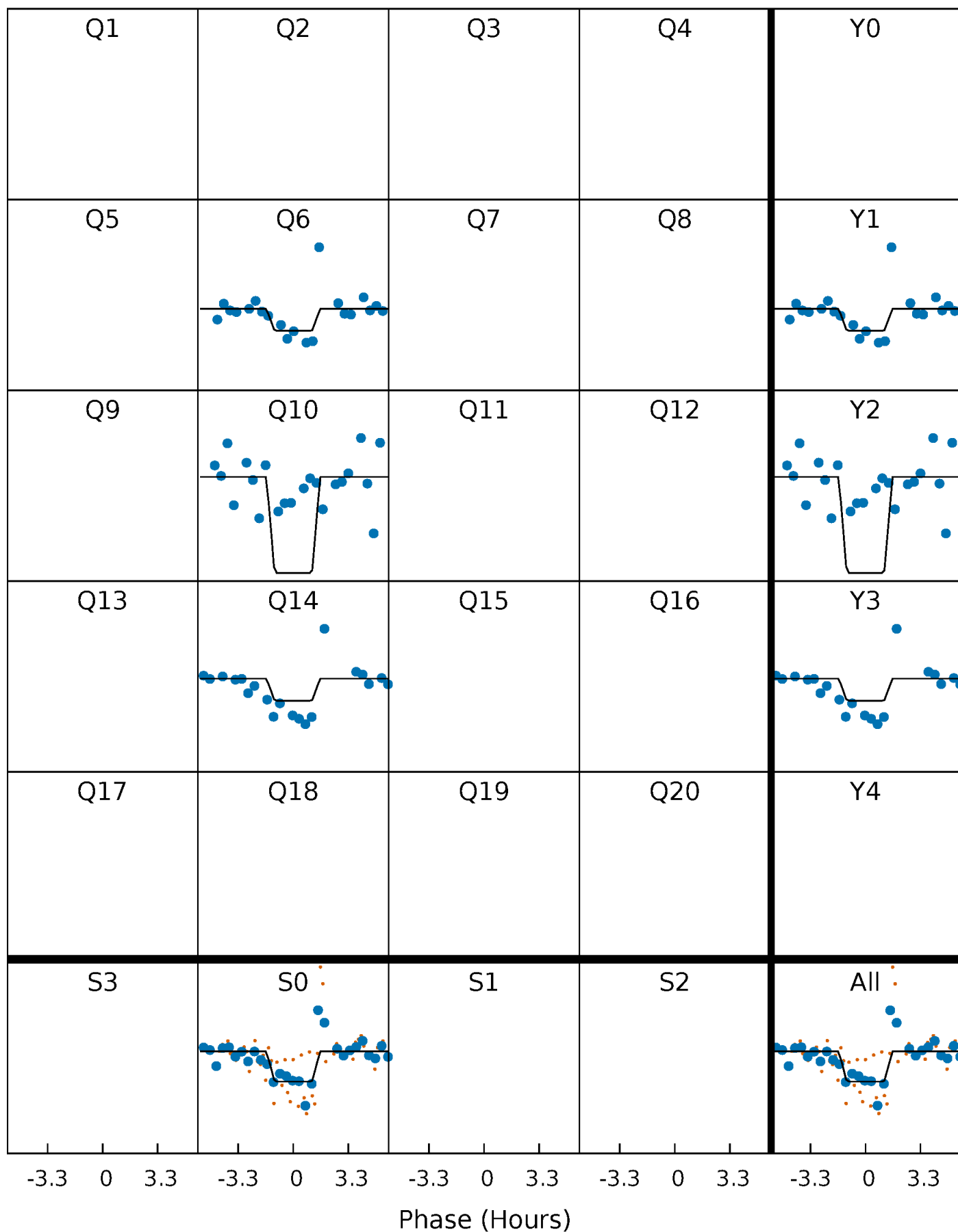
DV Quarter-Phased Transit Curves

TCE 009872330-04 P=341.709813 Days $T_0=259.745047$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

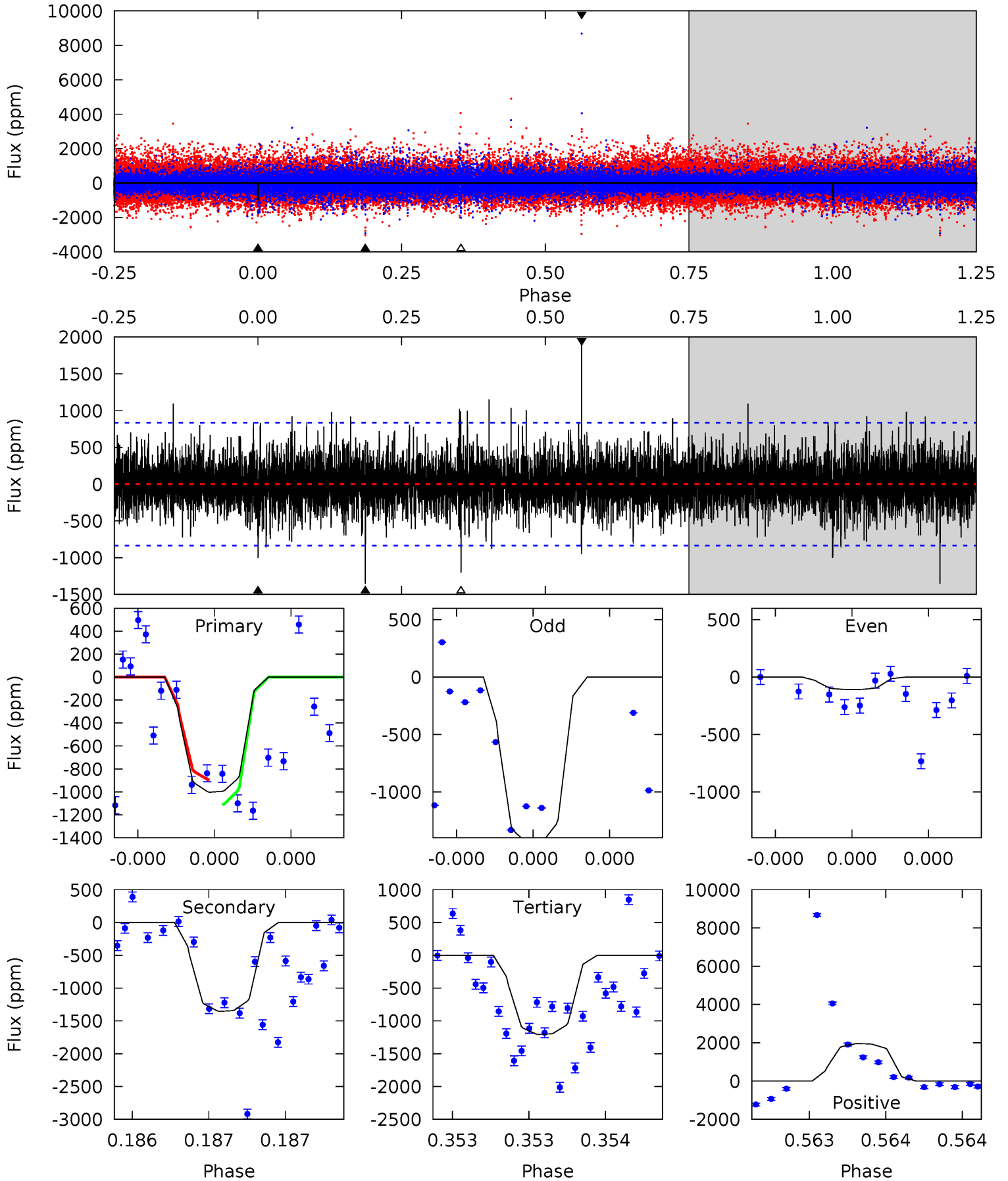
TCE 009872330-04 P=341.718181 Days $T_0=259.741193$ (BKJD)



DV Model-Shift Uniqueness Test

009872330-04, P = 341.709813 Days, E = 259.745047 Days

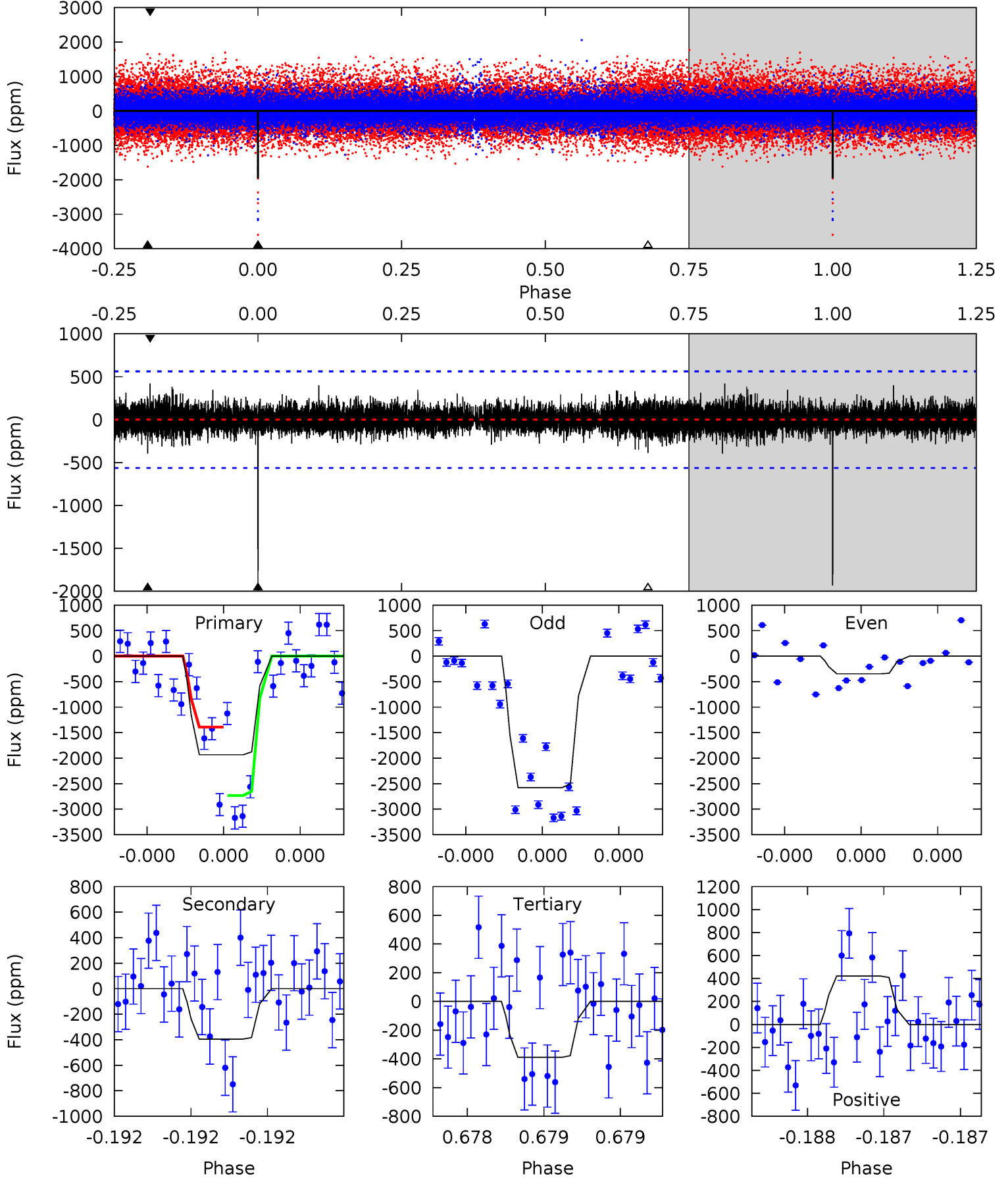
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.79	9.16	8.16	13.2	5.66	3.61	1.55	-1.38	-6.44	1.00	-4.06	4.14	0.70	0.59	0.74



Alt Model-Shift Uniqueness Test

009872330-04, P = 341.718181 Days, E = 259.741193 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.3	3.95	3.89	4.21	5.62	3.55	0.84	15.4	15.1	0.06	-0.26	11.8	0.89	0.18	6.69



Stellar Parameters For KIC 009872330

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5752^{+143}_{-158}	$4.571^{+0.042}_{-0.178}$	$-0.340^{+0.300}_{-0.300}$	$0.806^{+0.212}_{-0.071}$	$0.882^{+0.091}_{-0.100}$	$2.370^{+0.521}_{-1.058}$
	+2%/-3%	+1%/-4%	+88%/-88%	+26%/-9%	+10%/-11%	+22%/-45%
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 009872330-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1354 ± 148	$13.39^{+13.77}_{-9.48}$	339^{+19}_{-14}	3411^{+1836}_{-613}	3569^{+34316}_{-2705}
Alt.	-395 ± 100	$12.73^{+14.85}_{-8.90}$	340^{+18}_{-15}	2901^{+1331}_{-528}	1143^{+11227}_{-918}

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 $A_{obs} \gg 1.0$

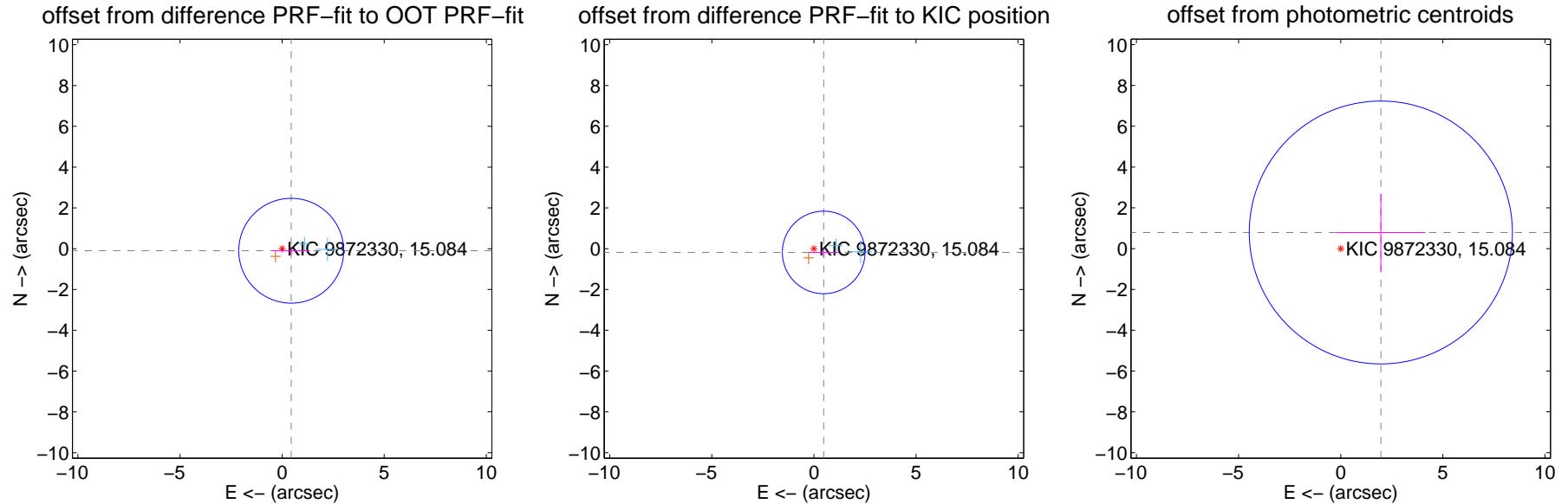
DV Centroid Data

Supplemental centroid analysis for 009872330-04. Kepler magnitude: 15.08. Transit SNR 3.53

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.458 ± 0.857	0.53	-0.446 ± 0.911	-0.100 ± 0.195
PRF-fit source offset from KIC position	0.512 ± 0.675	0.76	-0.478 ± 0.718	-0.184 ± 0.221
photometric centroid source offset	2.12 ± 2.15	0.99	-1.96 ± 2.18	0.79 ± 1.90



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.

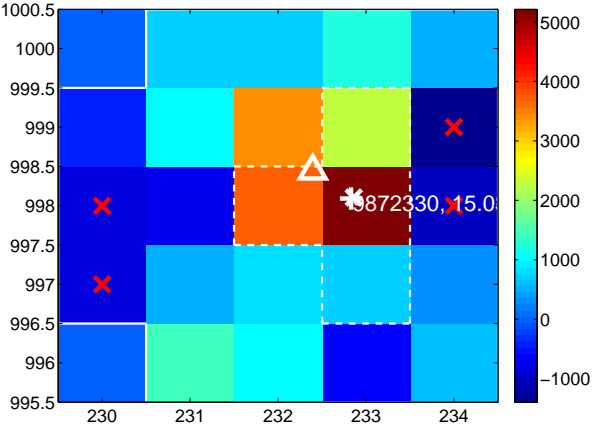
Q5 no difference image



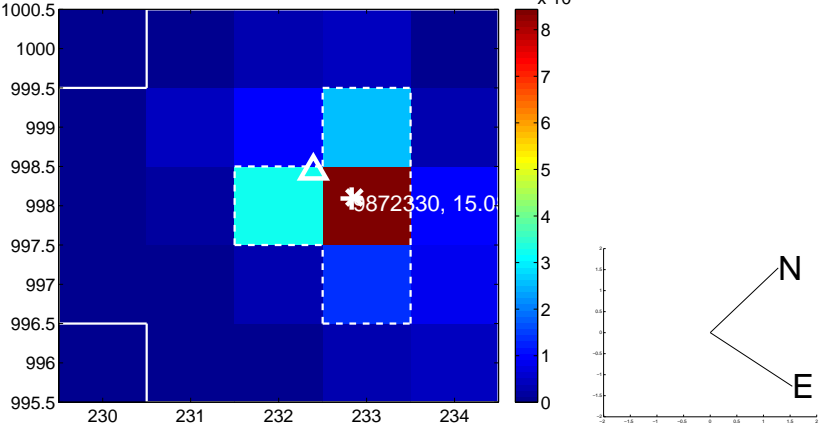
Q5 no OOT image



Q6 difference image



Q6 OOT image



Q7 no difference image



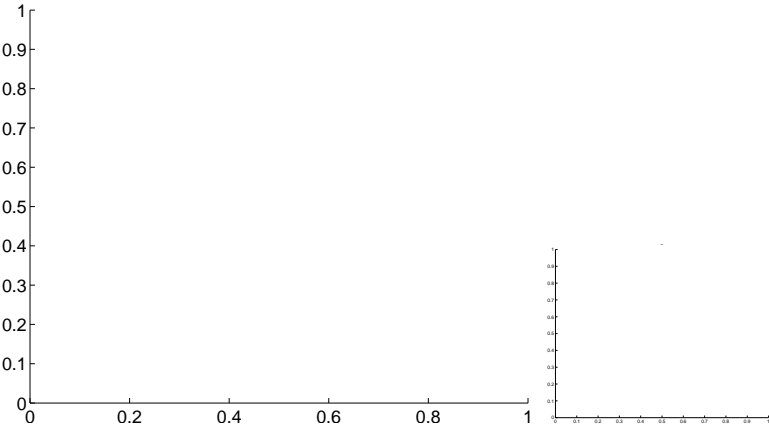
Q7 no OOT image



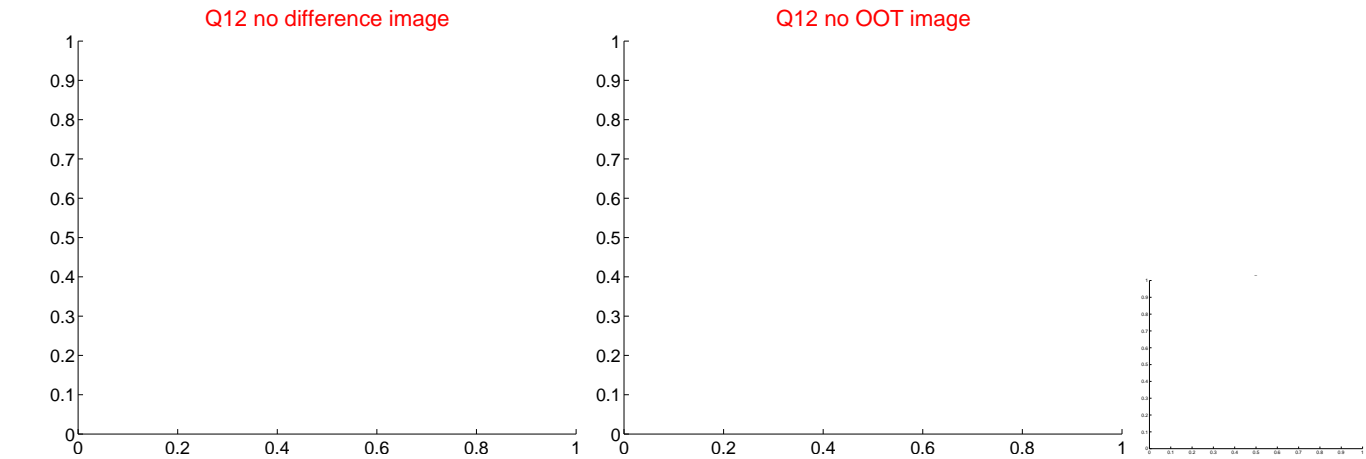
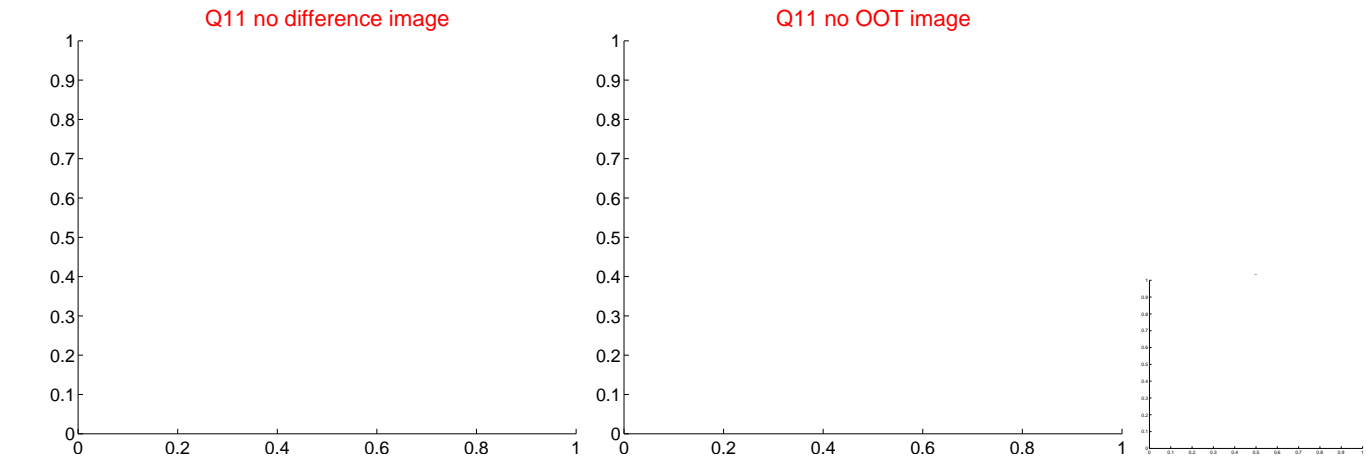
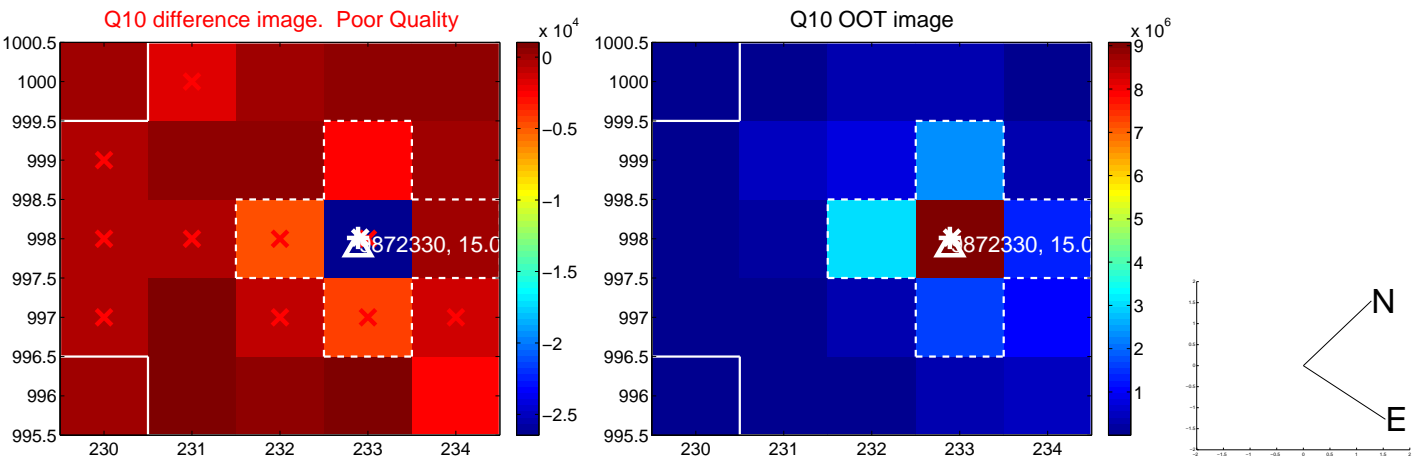
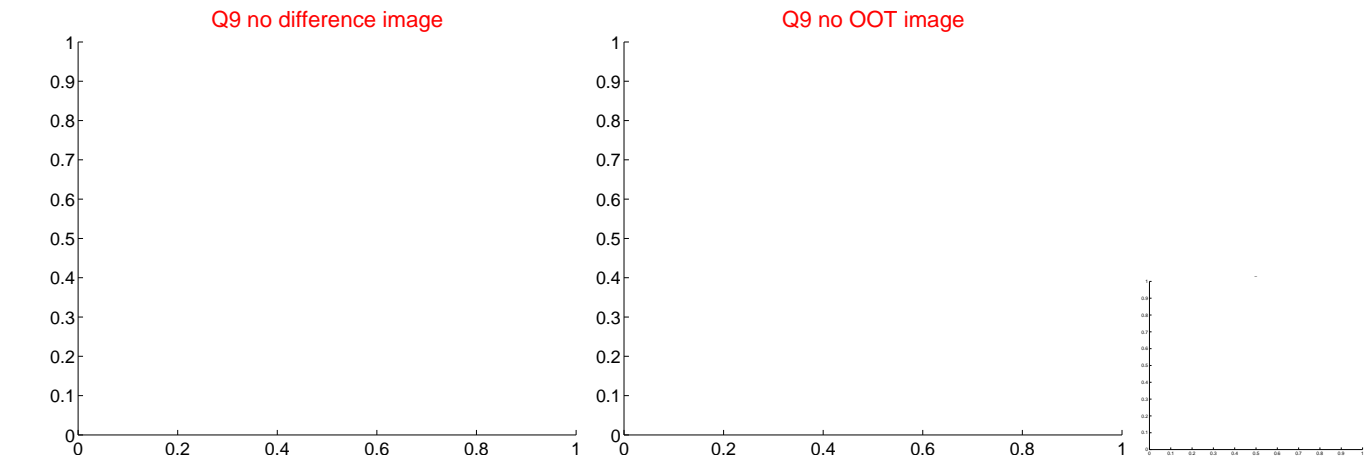
Q8 no difference image



Q8 no OOT image



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



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

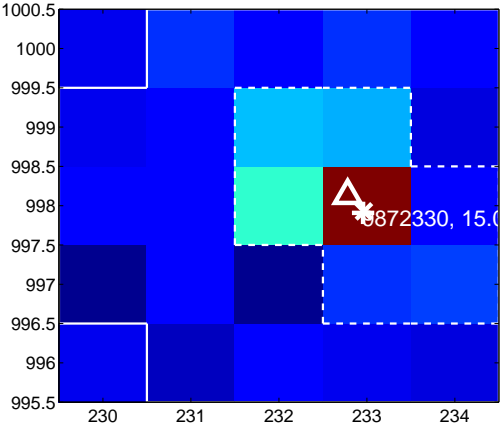
Q13 no difference image



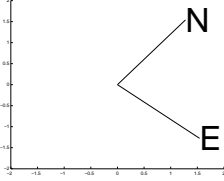
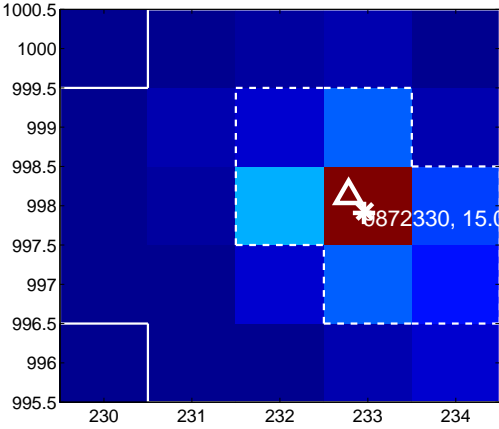
Q13 no OOT image



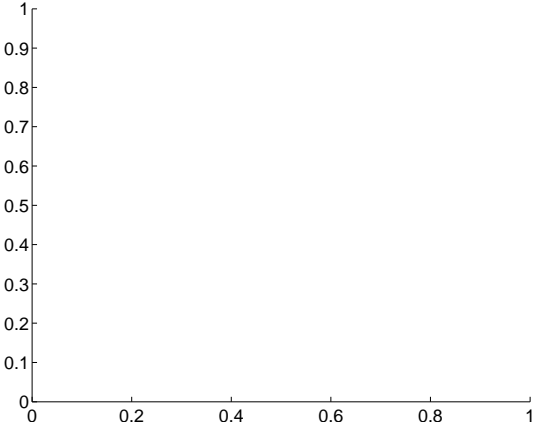
Q14 difference image



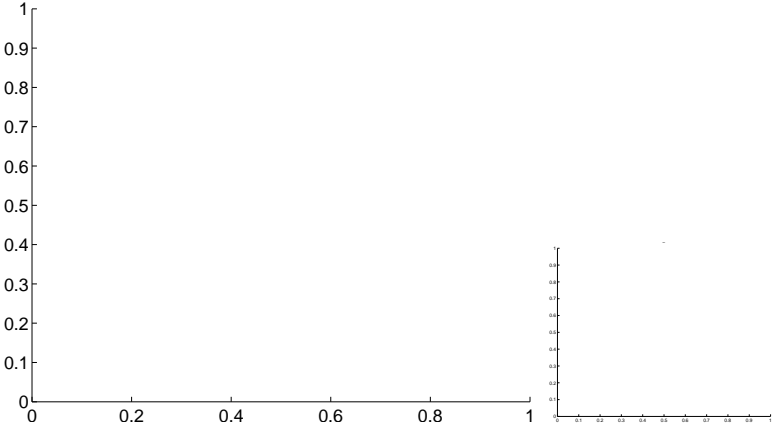
Q14 OOT image



Q15 no difference image



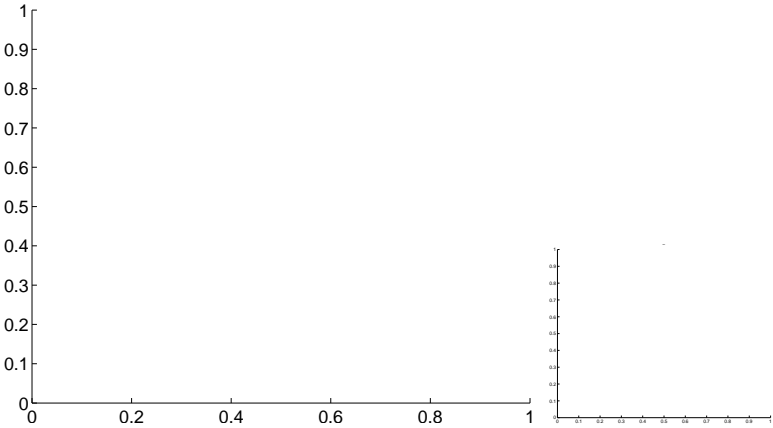
Q15 no OOT image



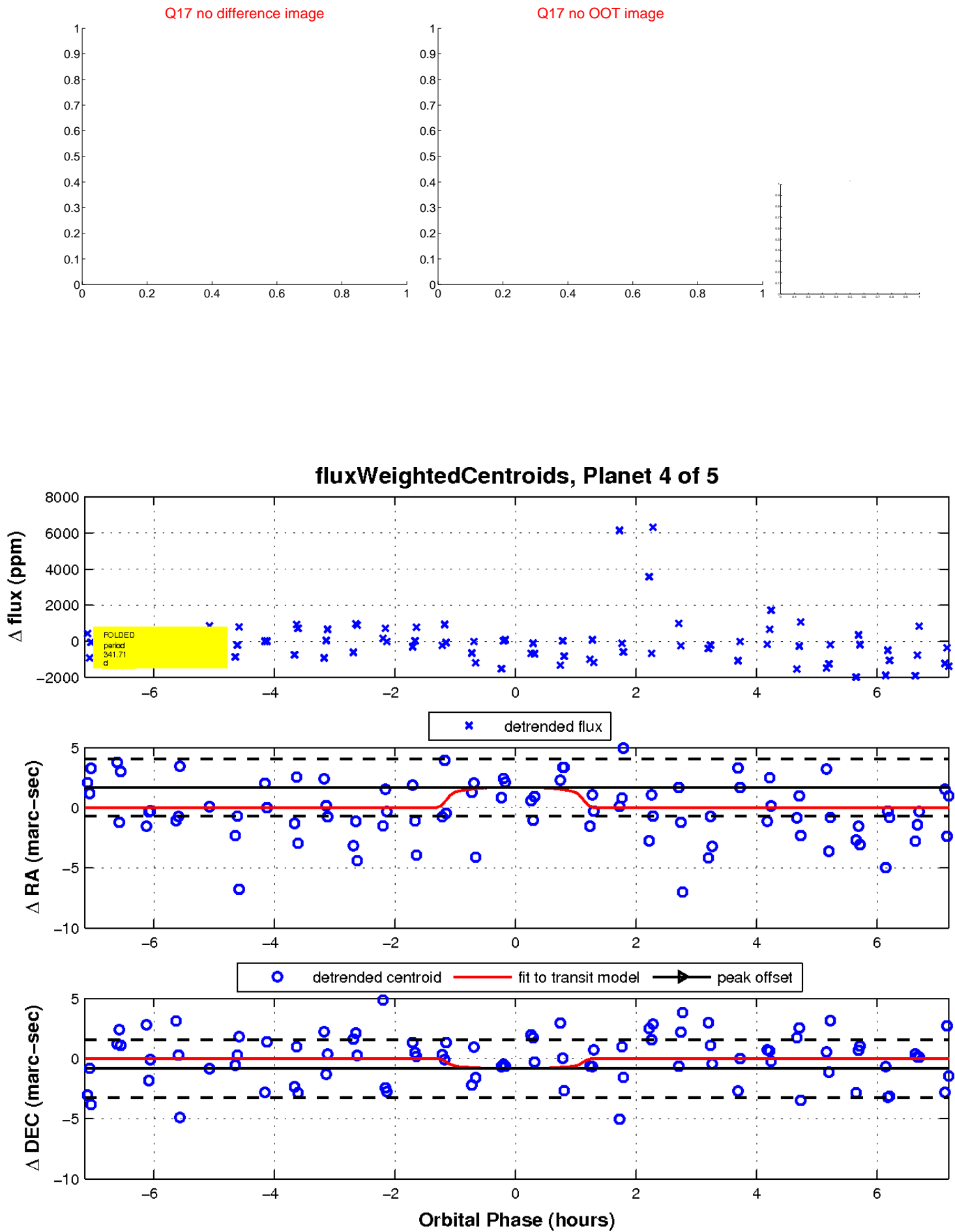
Q16 no difference image



Q16 no OOT image

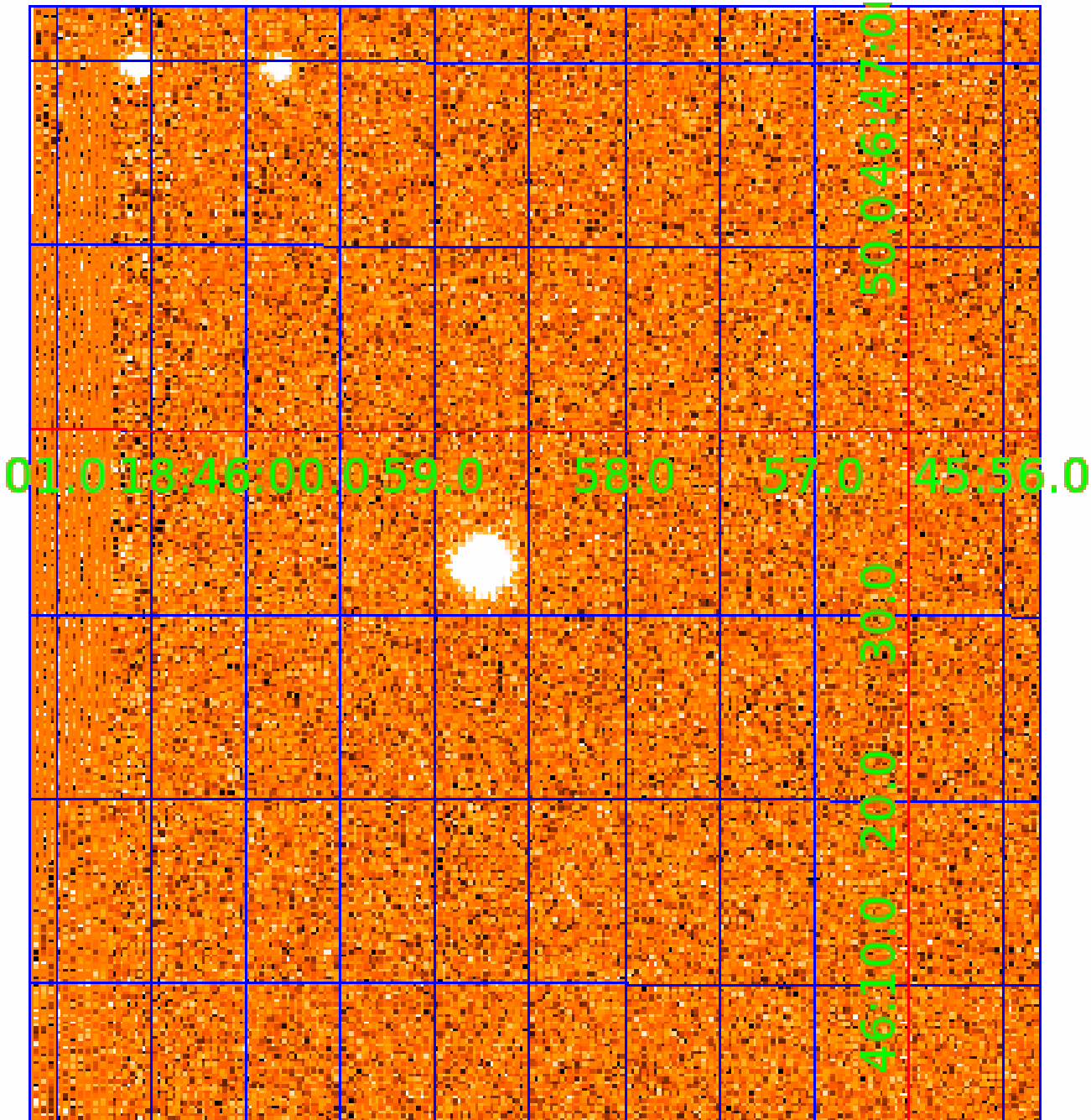


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009872330

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})
009872330-01	OBS	No	610.079429	247.054340	1841.3	2.824	13.8	6.6	0.81	5752	3.47	0.35
009872330-02	OBS	No	305.563220	372.367589	1127.0	1.364	12.4	5.2	0.81	5752	2.97	0.88
009872330-03	OBS	No	405.705316	416.021259	1534.4	3.866	10.5	6.3	0.81	5752	3.47	0.60
009872330-04	OBS	No	341.709813	259.745047	964.7	2.475	11.1	3.5	0.81	5752	2.74	0.76
009872330-05	OBS	No	524.128729	487.558404	1460.0	3.262	9.9	5.7	0.81	5752	3.18	0.43

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009872330-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009872330-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009872330-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009872330-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009872330-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

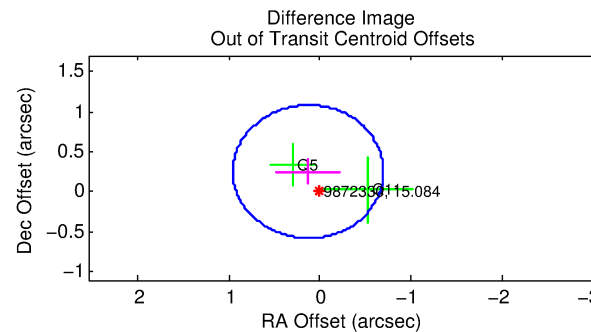
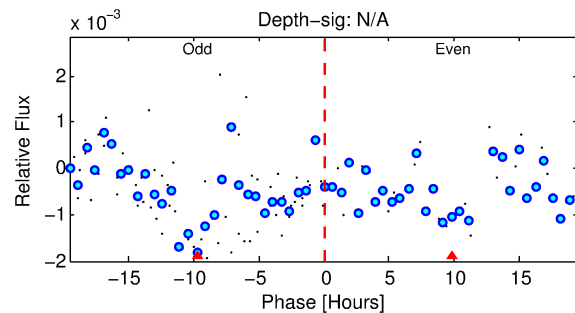
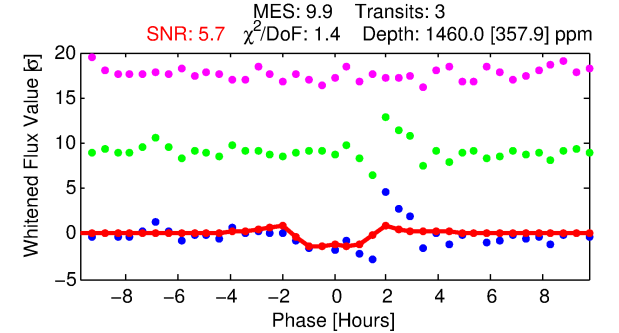
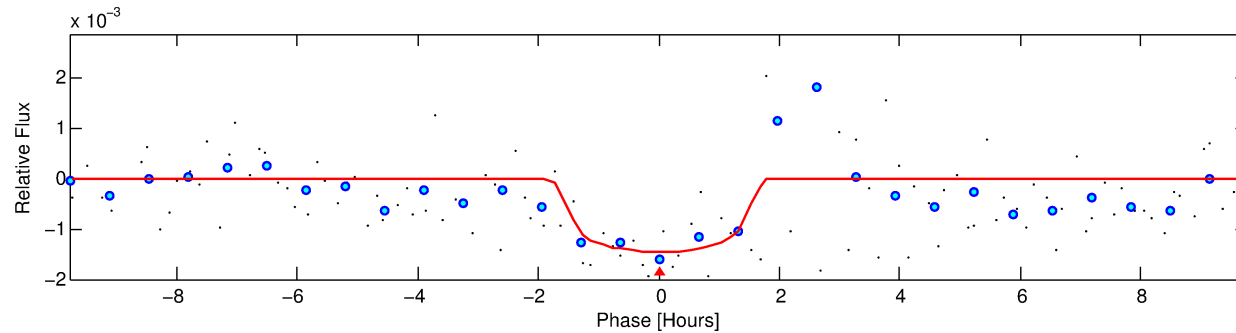
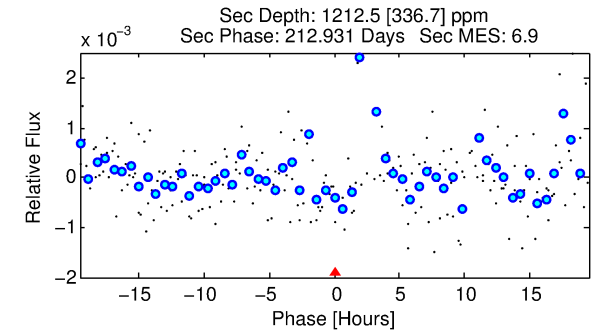
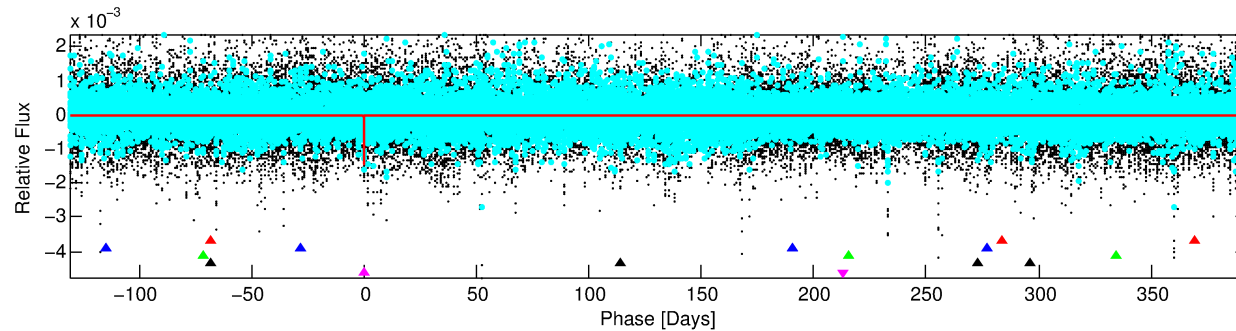
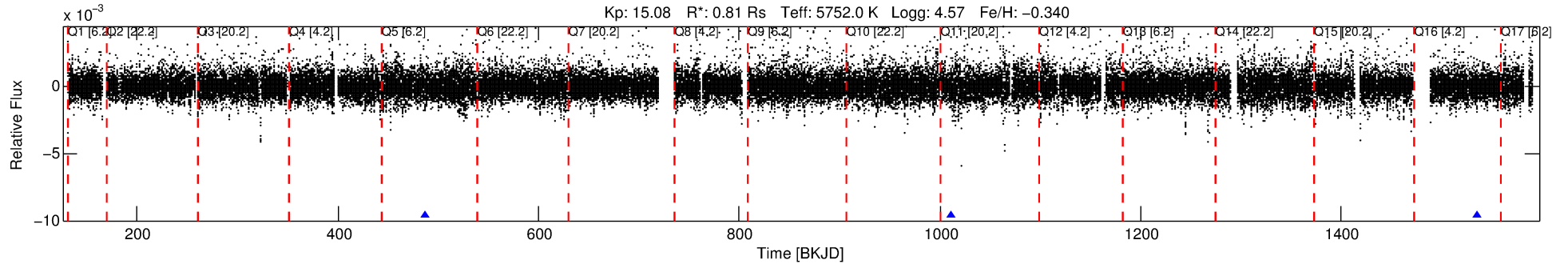
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009872330-05

No Significant Match Found

DV One-Page Summary

KIC: 9872330 Candidate: 5 of 5 Period: 524.129 d



DV Fit Results:

Period = 524.12873 [0.00745] d
Epoch = 487.5584 [0.0107] BKJD
Rp/R* = 0.0362 [0.0515]
a/R* = 1076.26 [6894.01]
b = 0.55 [8.13]
Seff = 0.43 [0.15]
Teq = 206 [18] K
Rp = 3.18 [4.60] Re
a = 1.2205 [0.2713] AU
Ag = 98023.95 [281820.35] [0.35]
Teffp = 5641 [4032] K [1.35]

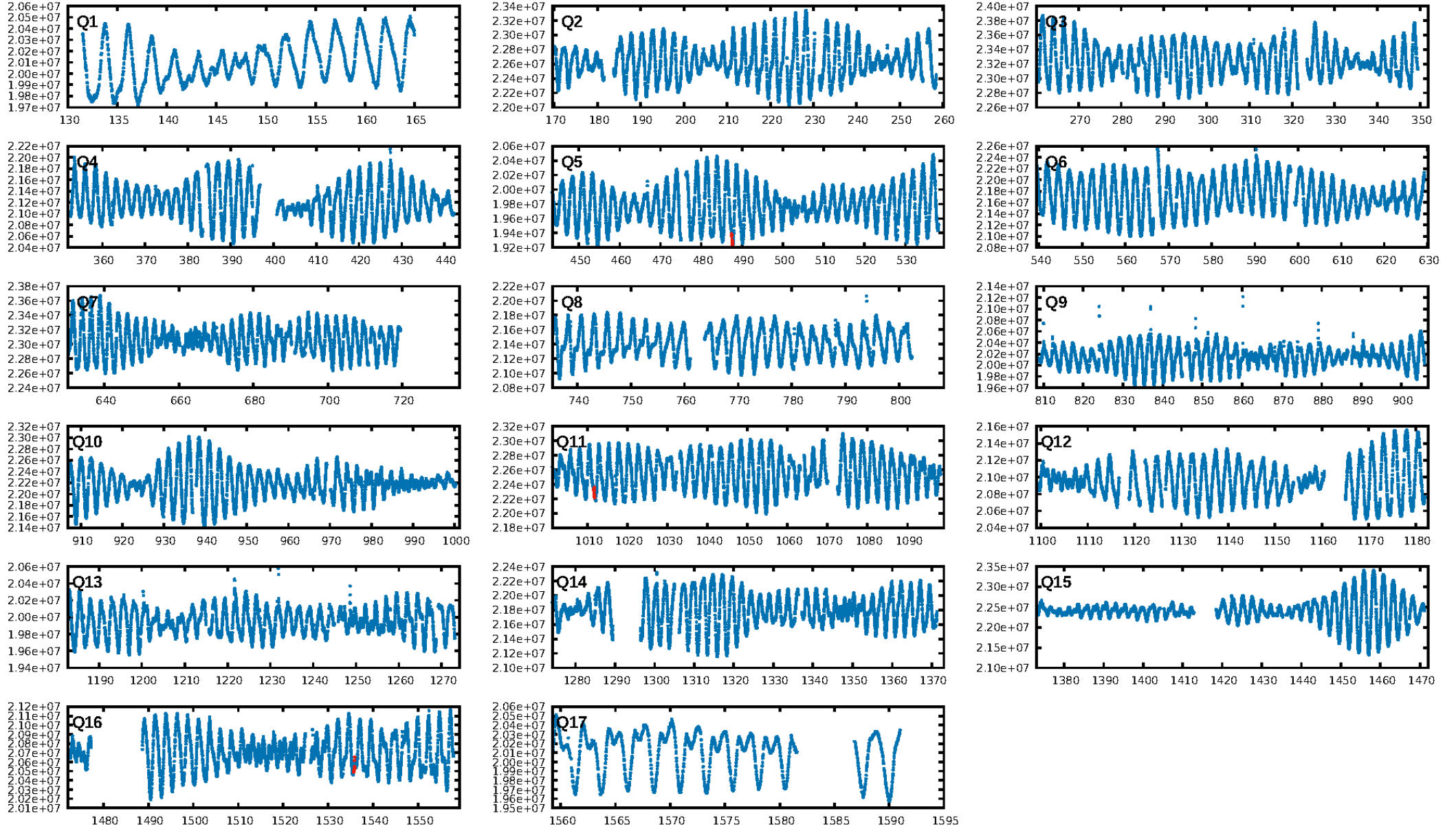
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [561.88]
LongPeriod-sig: 100.0% [478.07]
ModelChiSquare2-sig: 9.3%
ModelChiSquareGof-sig: 77.1%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.02342
Centroid-sig: 90.0%
Centroid-so: 0.592 arcsec [0.44]
OotOffset-rm: 0.282 arcsec [1.02]
OotOffset-st: 0/1/0/1 [2]
KicOffset-rm: 0.193 arcsec [0.52]
KicOffset-st: 0/1/0/1 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 1.00 [3/3]

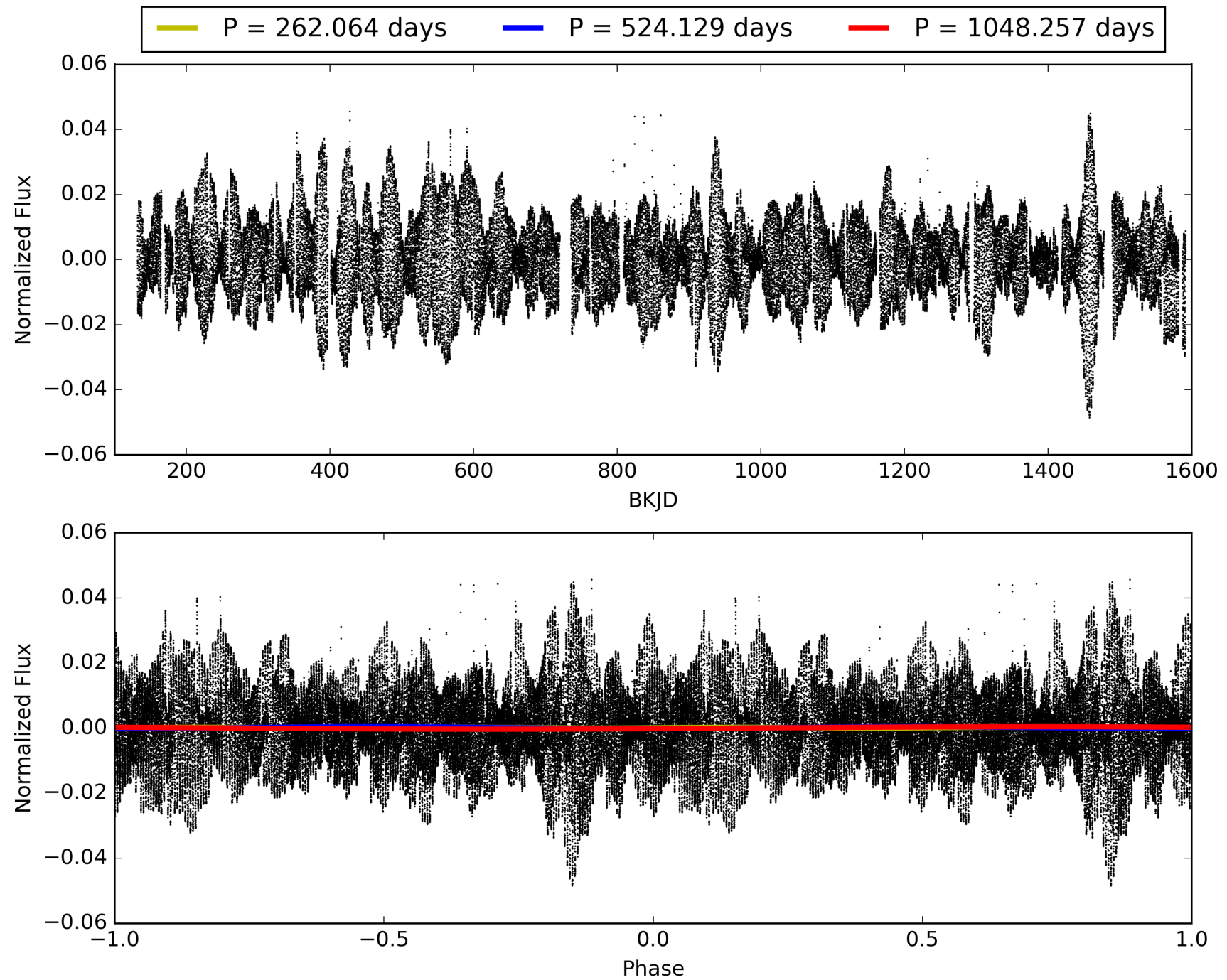
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:38:22 Z

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

TCE 009872330-05, PDC Light Curves

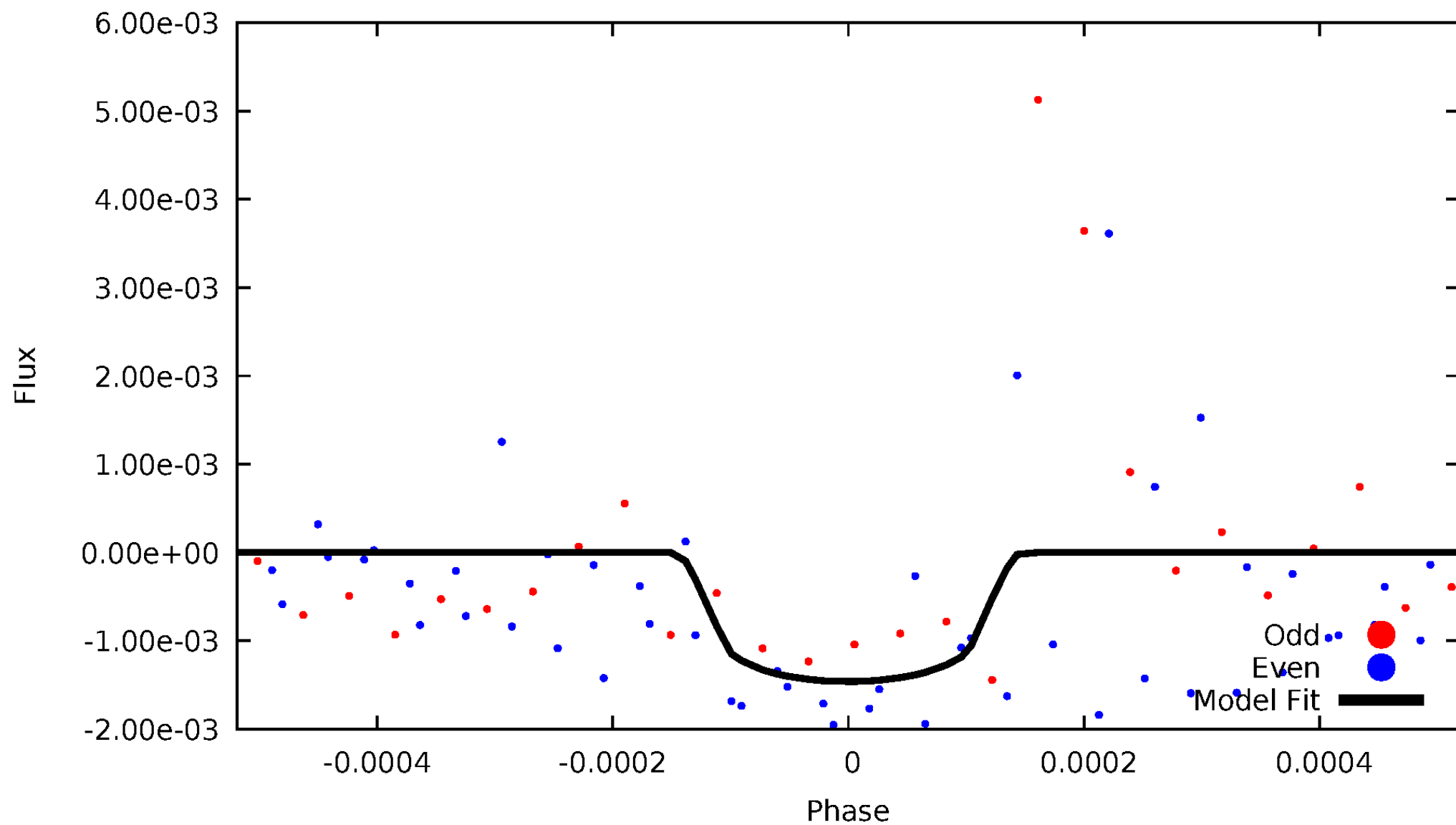


TCE 009872330-05



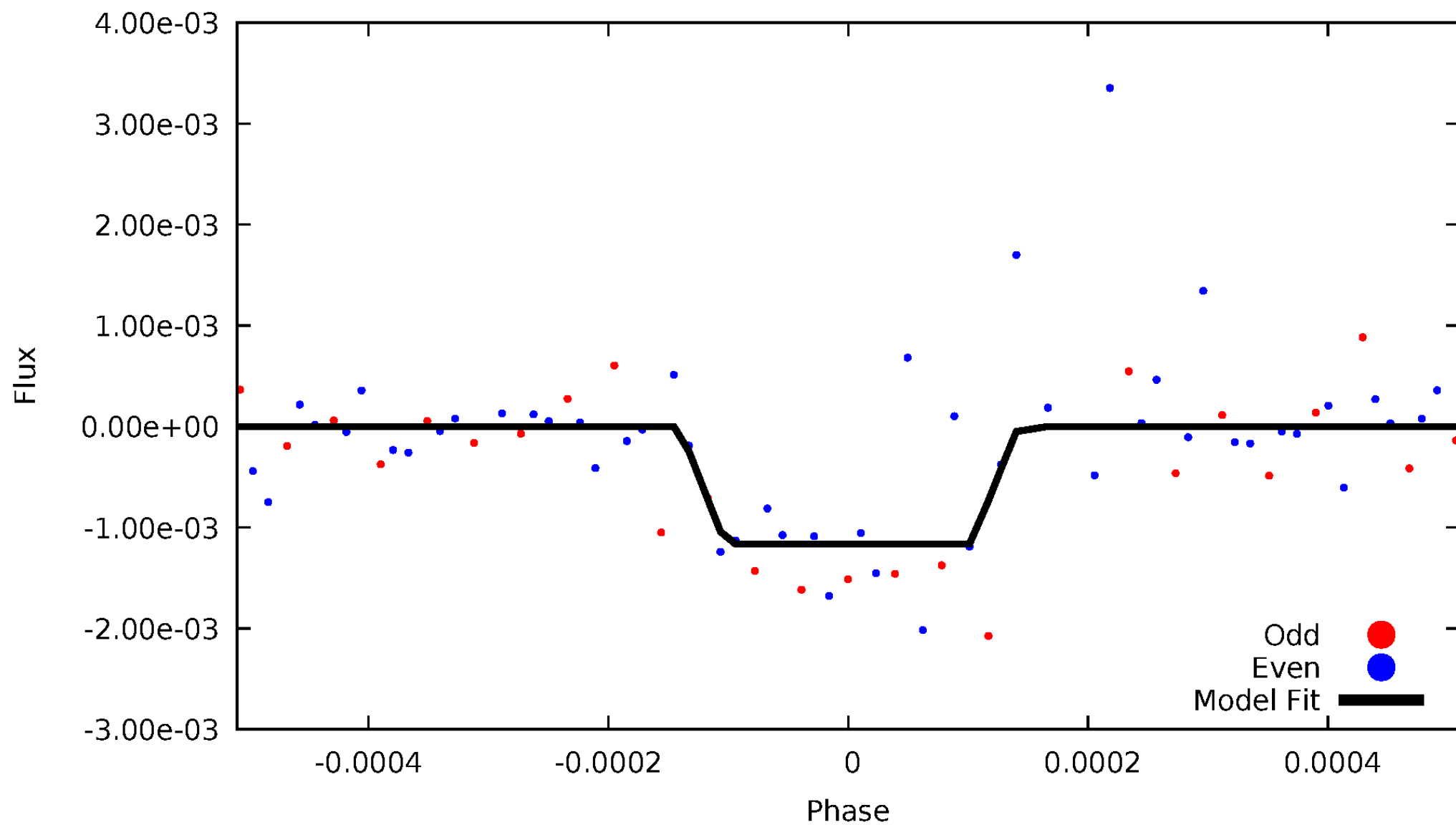
DV Odd/Even

TCE 009872330-05



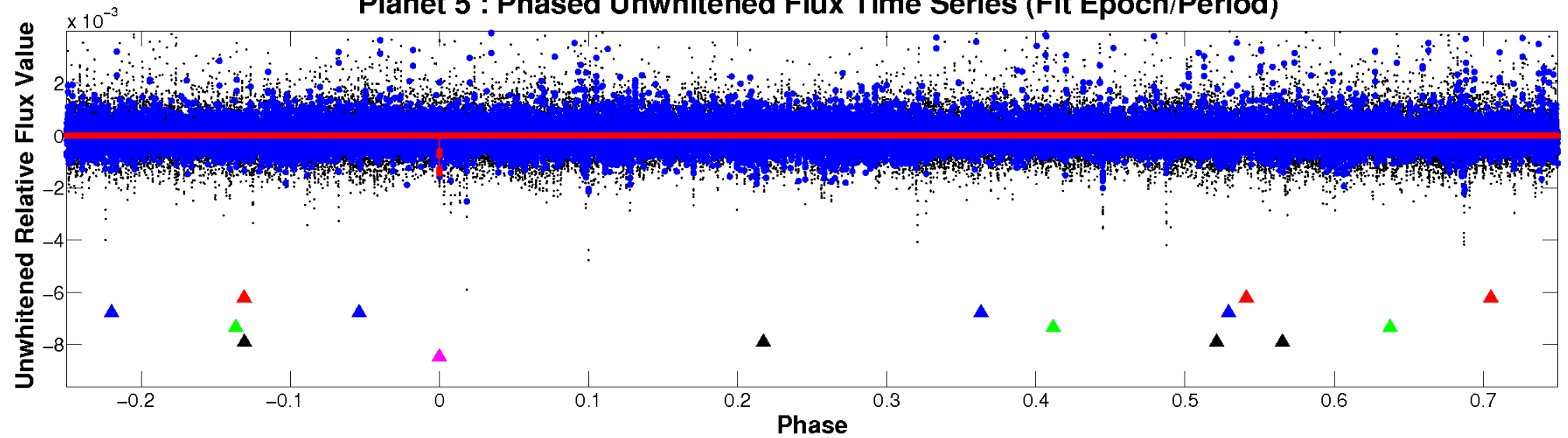
ALT Odd/Even

TCE 009872330-05

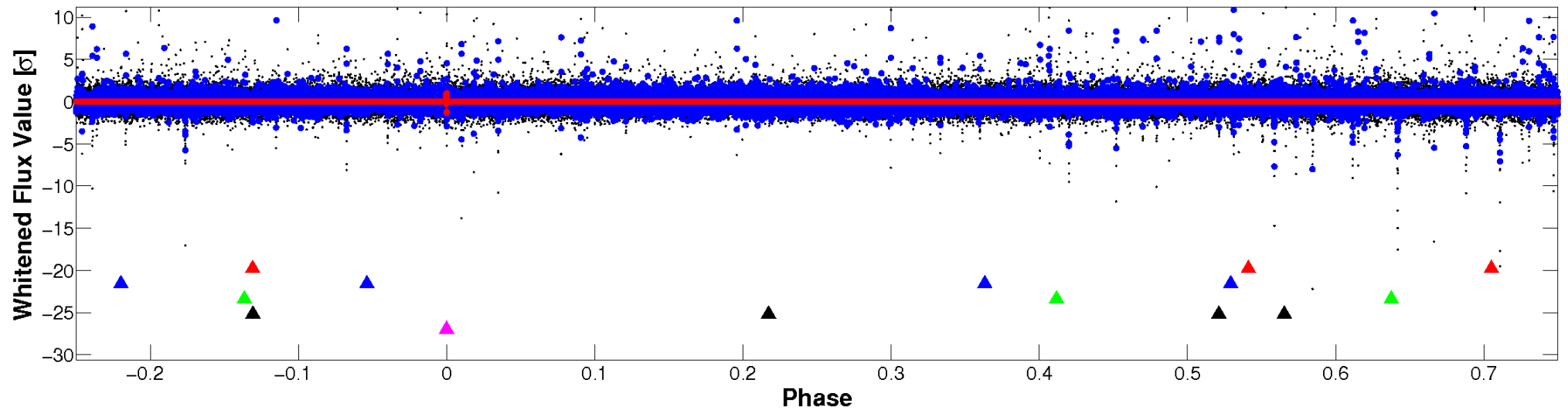


Non-Whitened Vs. Whitened Light Curve

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

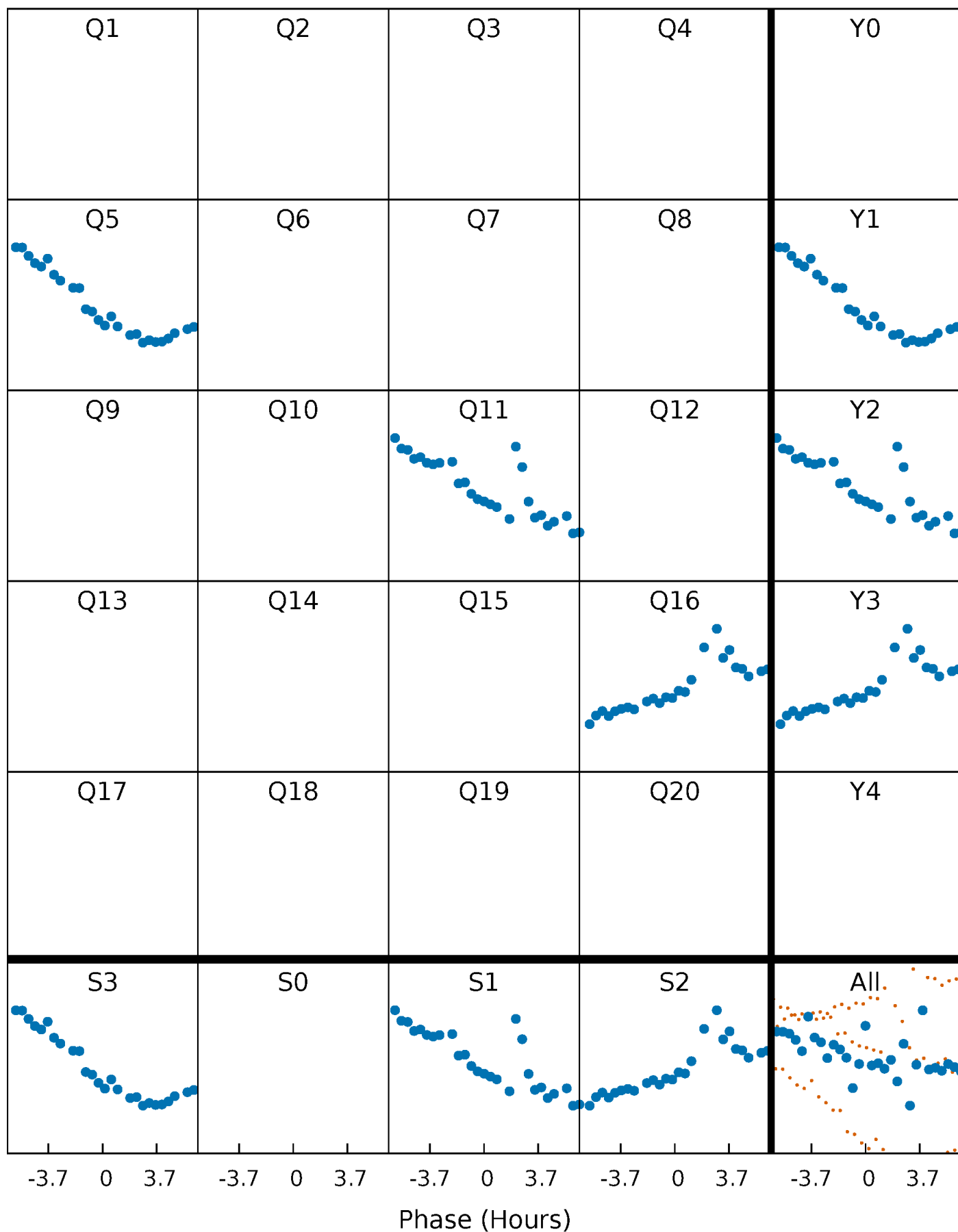


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



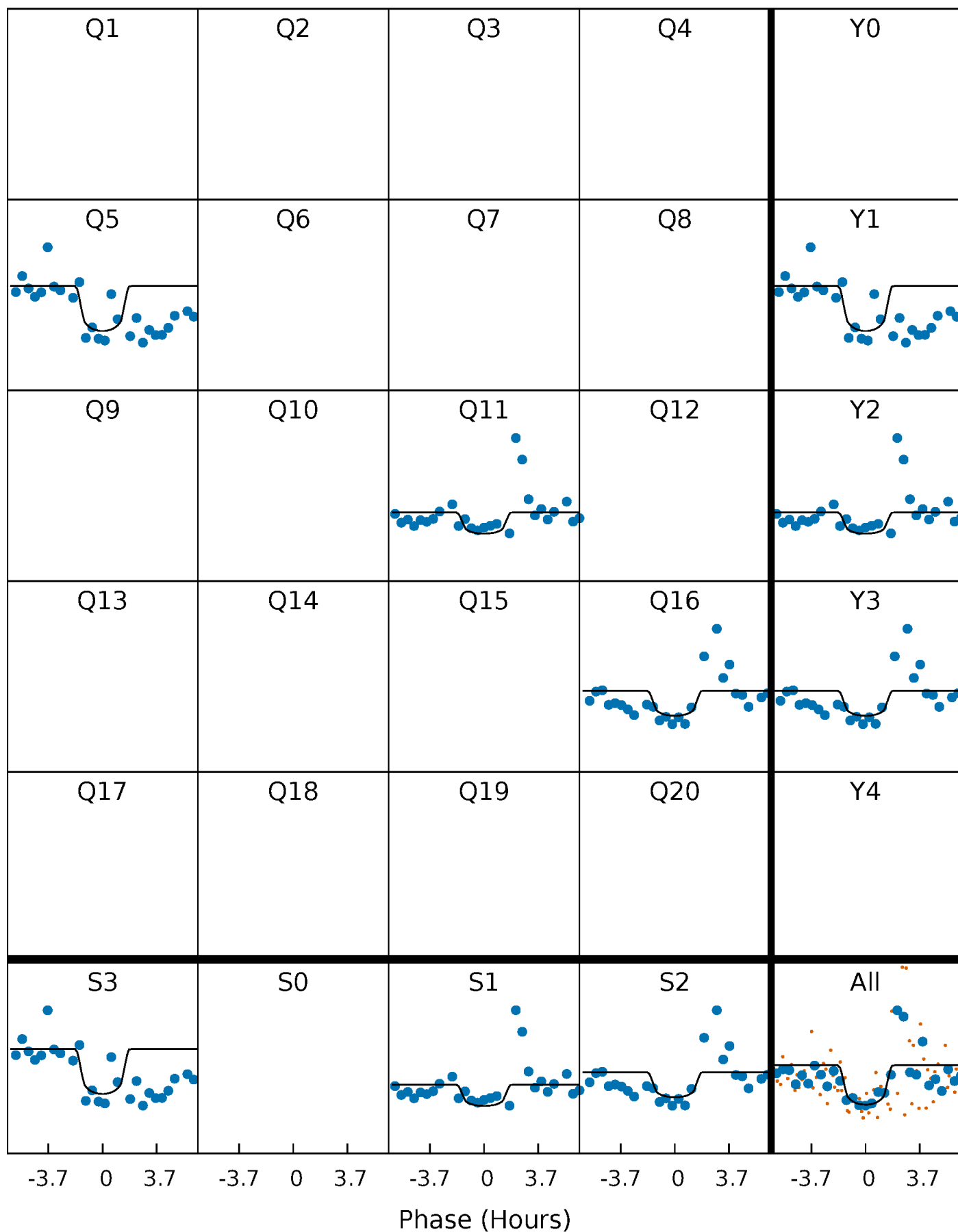
PDC Quarter-Phased Transit Curves

TCE 009872330-05 $P=524.128729$ Days $T_0=487.558404$ (BKJD)



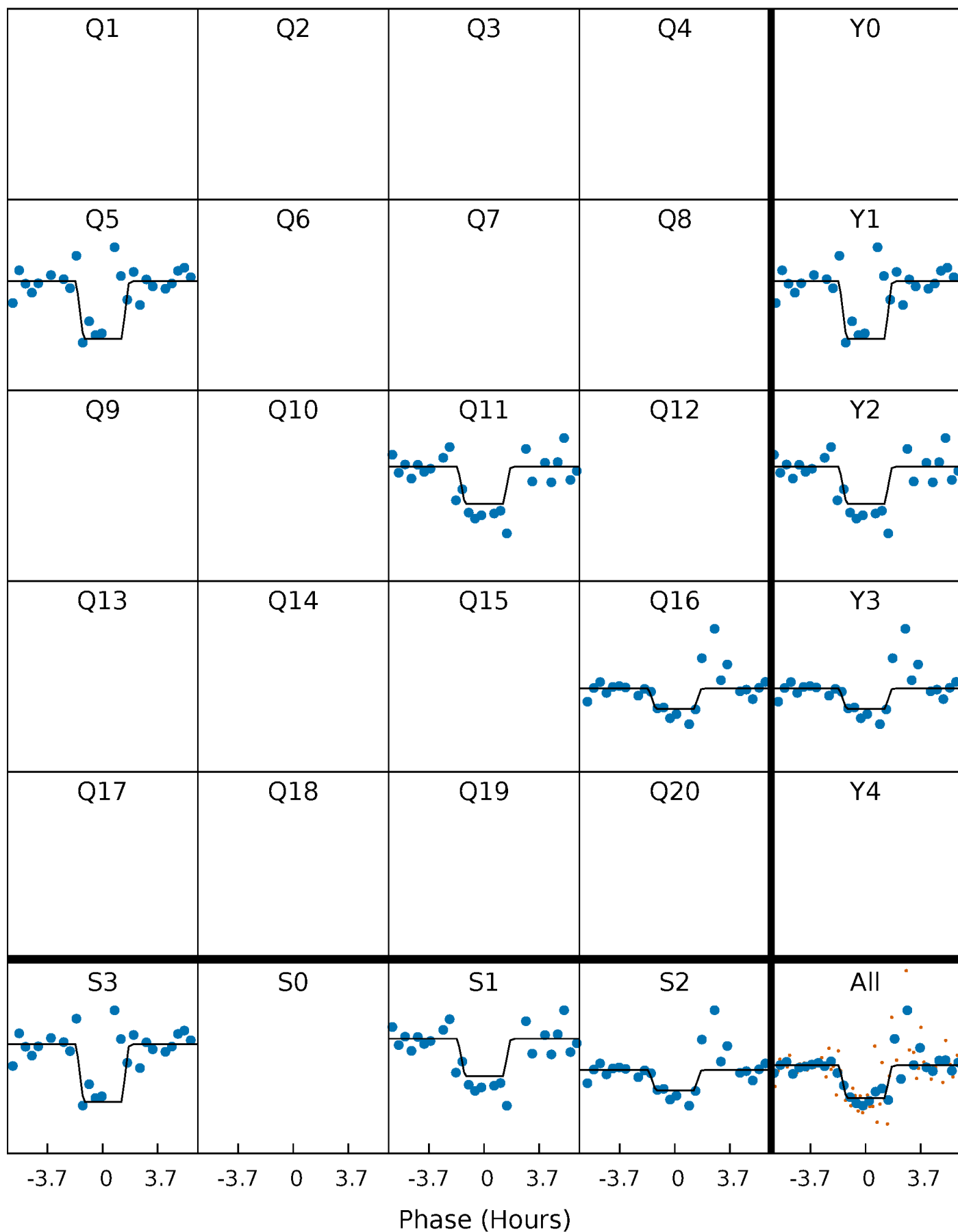
DV Quarter-Phased Transit Curves

TCE 009872330-05 $P=524.128729$ Days $T_0=487.558404$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

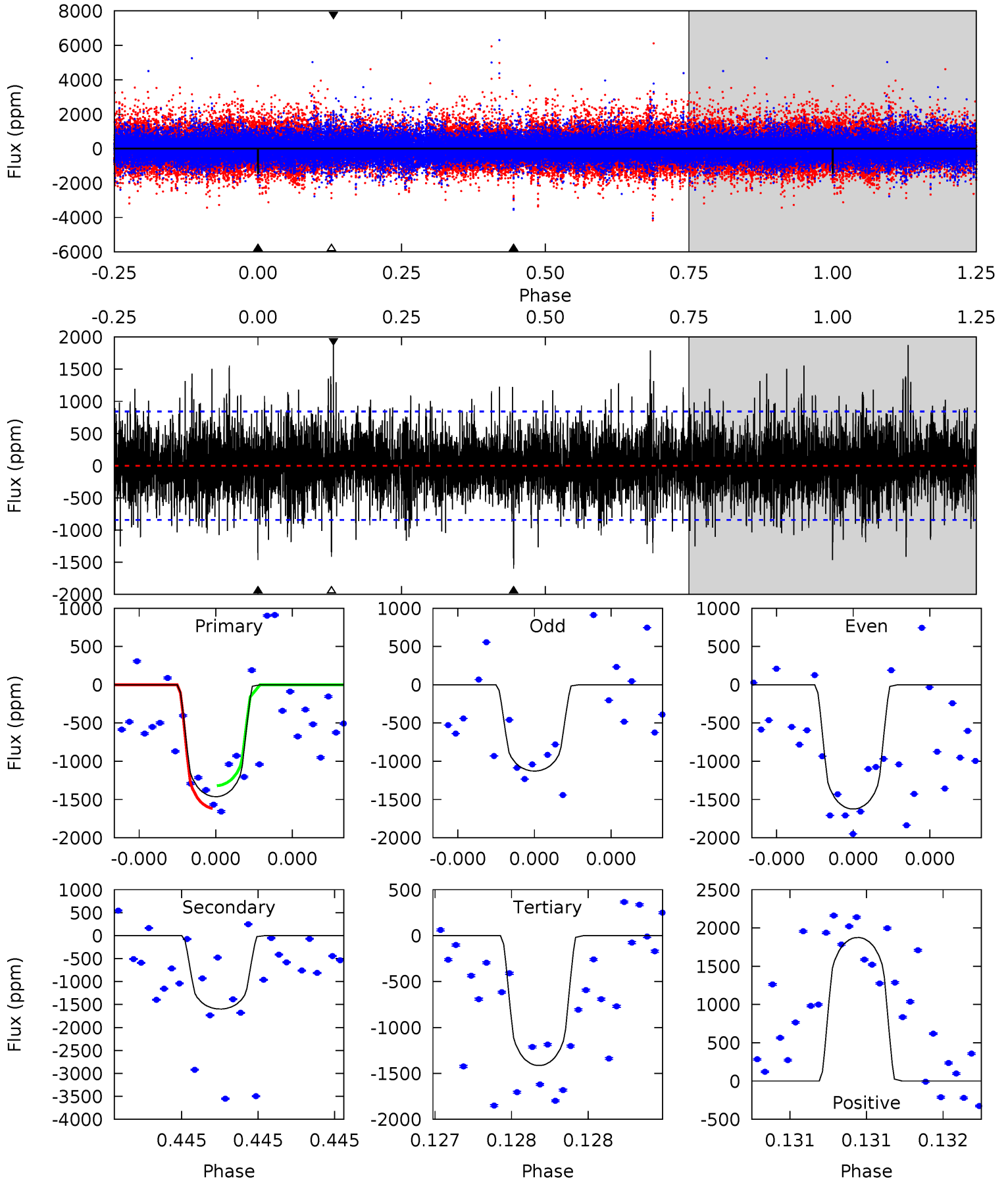
TCE 009872330-05 $P=524.127625$ Days $T_0=487.562286$ (BKJD)



DV Model-Shift Uniqueness Test

009872330-05, P = 524.128729 Days, E = 487.558404 Days

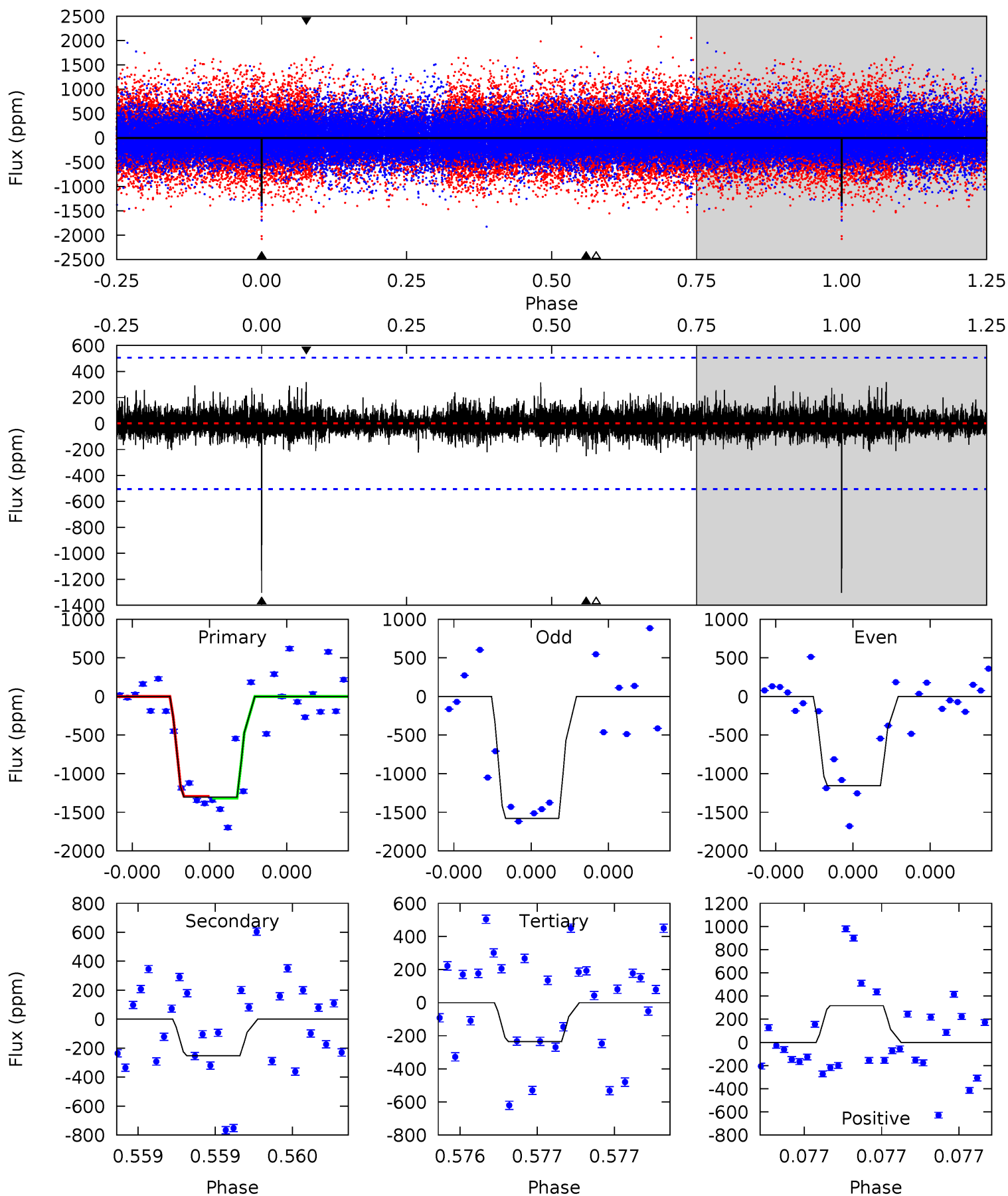
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.84	10.7	9.51	12.6	5.66	3.62	2.35	0.33	-2.77	1.24	-1.86	1.22	1.01	0.54	0.98



Alt Model-Shift Uniqueness Test

009872330-05, P = 524.127625 Days, E = 487.562286 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.6	2.83	2.64	3.55	5.67	3.63	0.64	12.0	11.1	0.19	-0.73	2.12	0.84	0.20	0.12



Stellar Parameters For KIC 009872330

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5752^{+143}_{-158}	$4.571^{+0.042}_{-0.178}$	$-0.340^{+0.300}_{-0.300}$	$0.806^{+0.212}_{-0.071}$	$0.882^{+0.091}_{-0.100}$	$2.370^{+0.521}_{-1.058}$
	+2%/-3%	+1%/-4%	+88%/-88%	+26%/-9%	+10%/-11%	+22%/-45%
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 009872330-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1599 ± 149	$4.70^{+4.18}_{-3.16}$	294^{+17}_{-12}	5112^{+4333}_{-1105}	$57544^{+477318}_{-41292}$
Alt.	-252 ± 89	$4.81^{+4.07}_{-3.22}$	294^{+18}_{-13}	3567^{+1912}_{-649}	8050^{+71671}_{-5866}

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 $A_{obs} \gg 1.0$

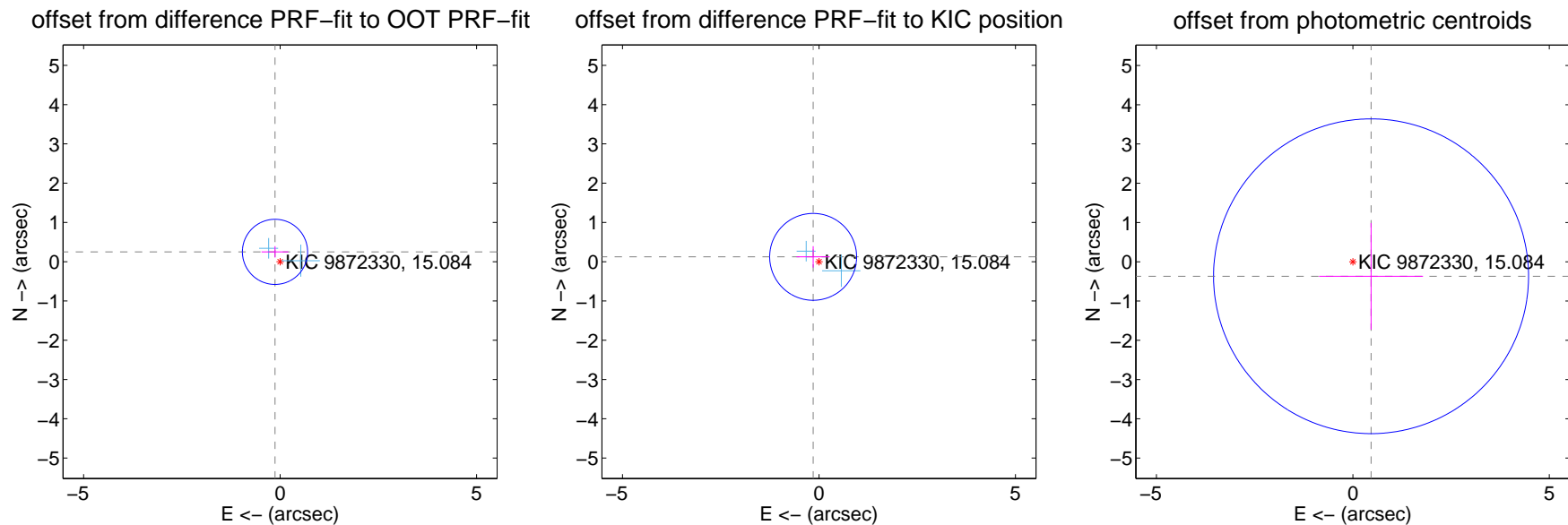
DV Centroid Data

Supplemental centroid analysis for 009872330-05. Kepler magnitude: 15.08. Transit SNR 5.72

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	0.282 ± 0.277	1.02	0.130 ± 0.341	0.250 ± 0.145
PRF-fit source offset from KIC position	0.193 ± 0.369	0.52	0.149 ± 0.422	0.123 ± 0.273
photometric centroid source offset	0.59 ± 1.34	0.44	-0.46 ± 1.32	-0.37 ± 1.36

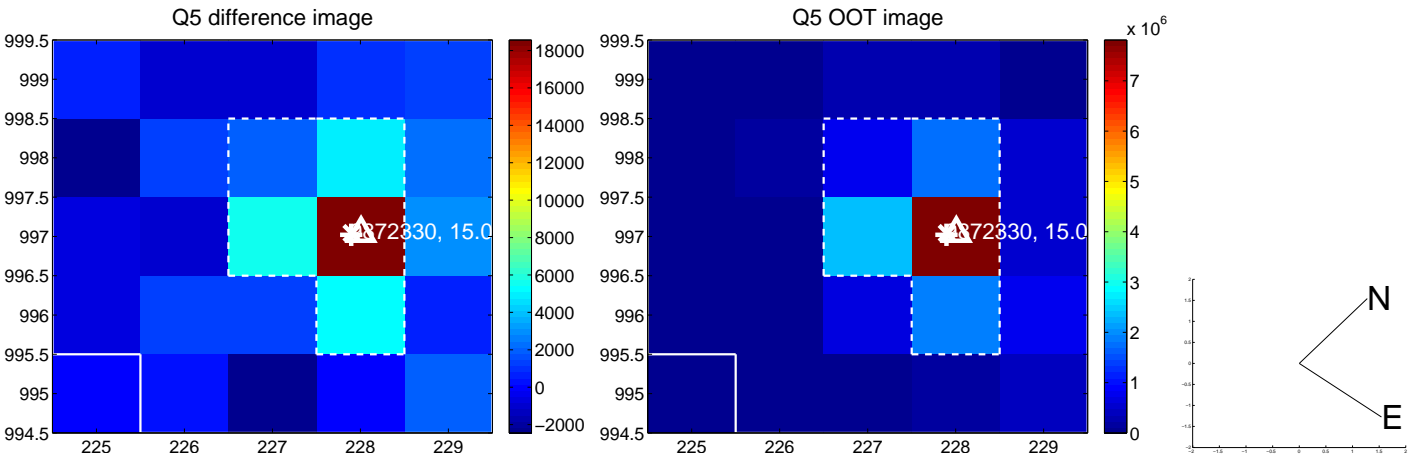


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

Q9 no difference image



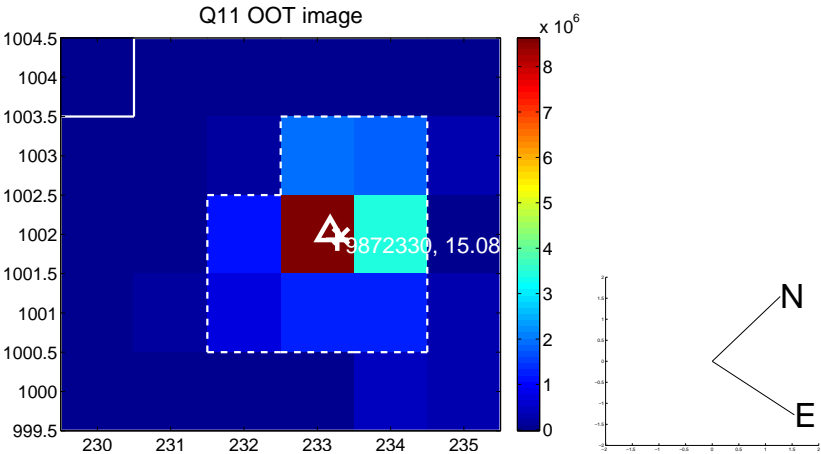
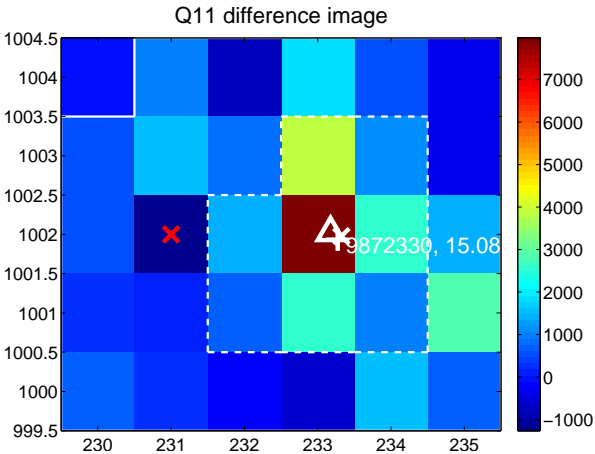
Q9 no OOT image



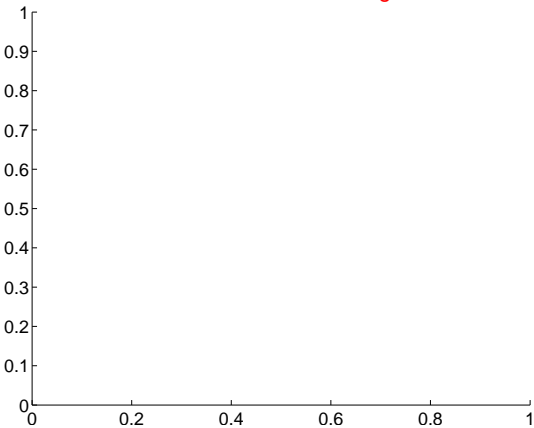
Q10 no difference image



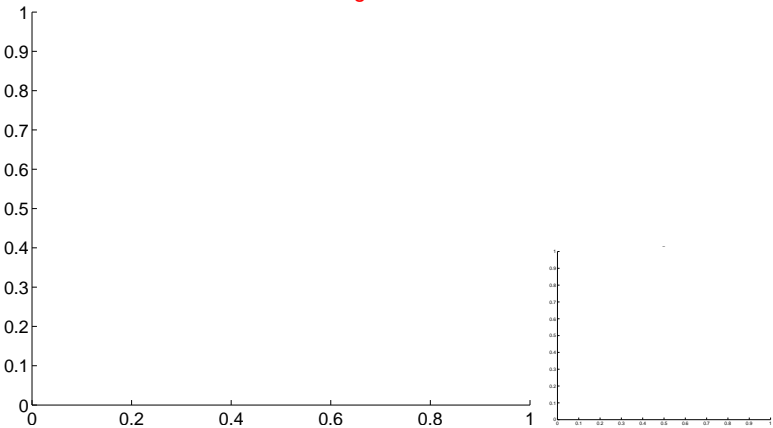
Q10 no OOT image



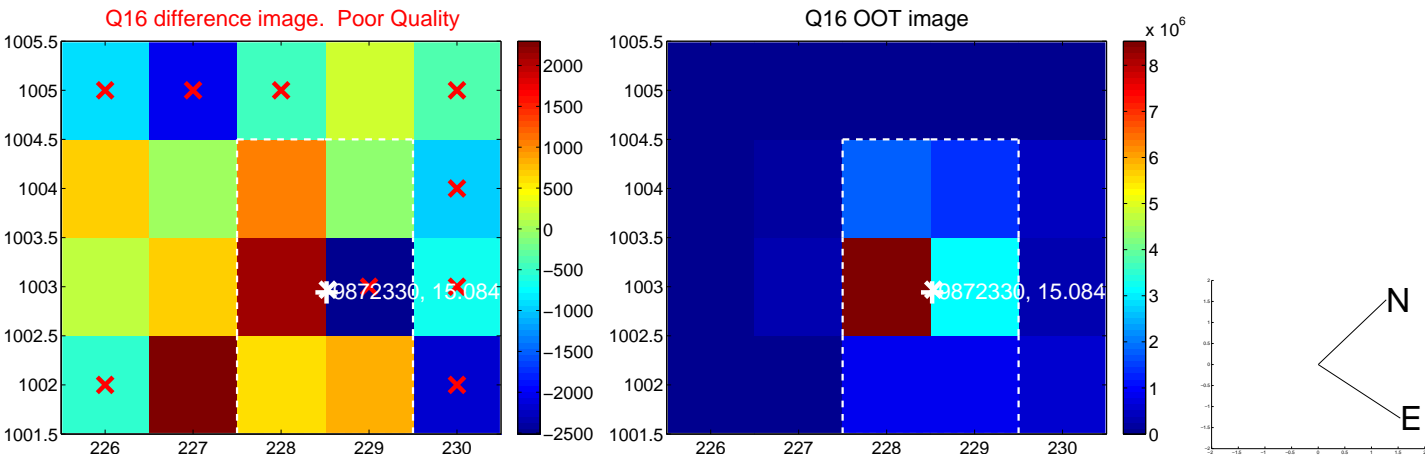
Q12 no difference image



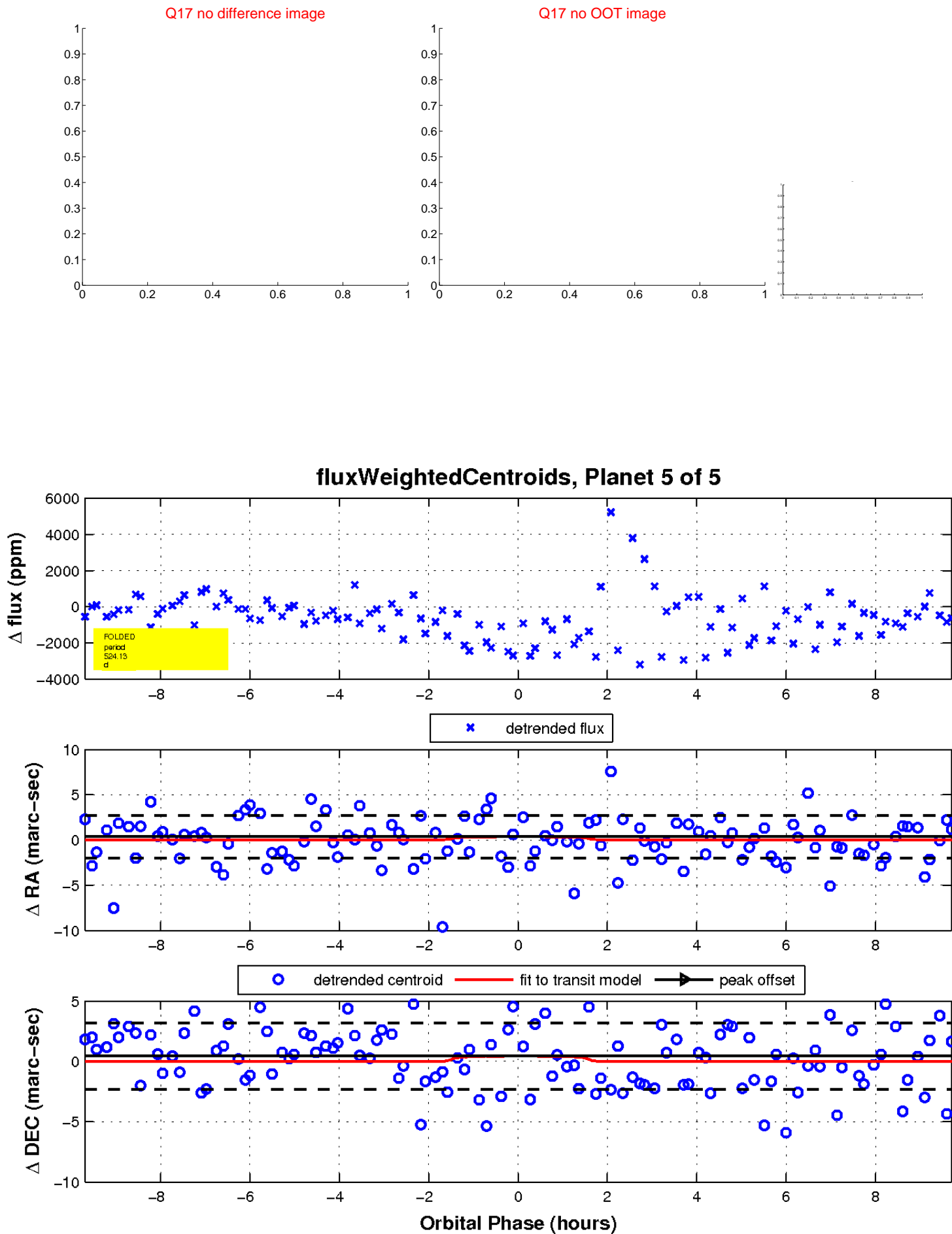
Q12 no OOT image



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

