

KIC 010528093

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})
010528093-01	OBS	No	444.098646	468.272291	826.1	6.718	15.5	8.0	0.75	5334	2.79	0.40
010528093-02	OBS	No	386.810175	183.093712	431.4	5.849	13.4	4.8	0.75	5334	1.53	0.47
010528093-03	OBS	No	248.701428	230.987729	406.5	4.099	13.7	4.6	0.75	5334	1.65	0.86
010528093-04	OBS	No	497.839674	390.797322	798.3	5.942	12.4	9.3	0.75	5334	2.27	0.34

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010528093-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010528093-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010528093-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010528093-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_POS_DV—INCONSISTENT_TRANS

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

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

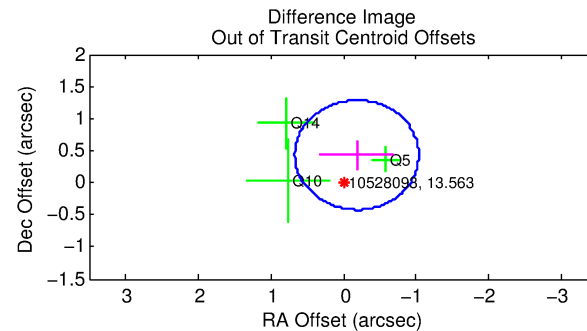
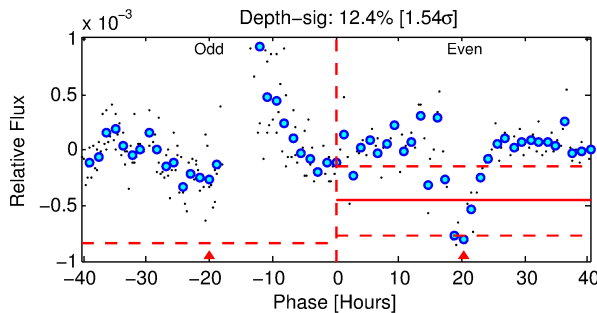
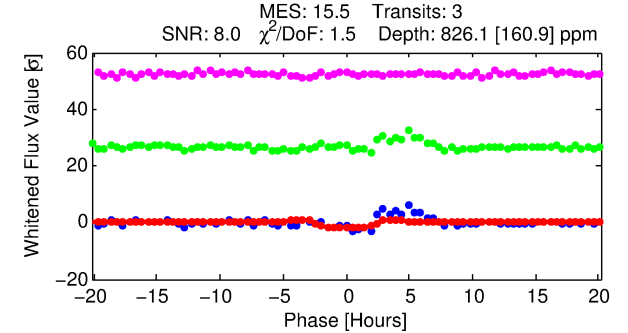
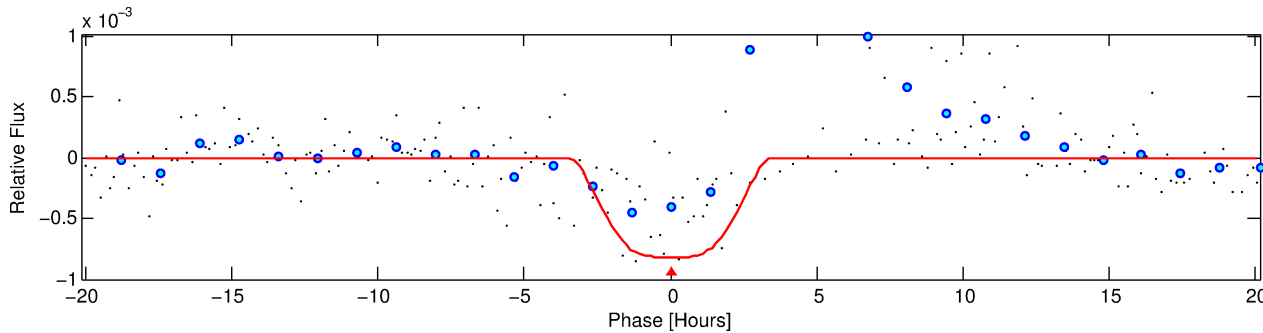
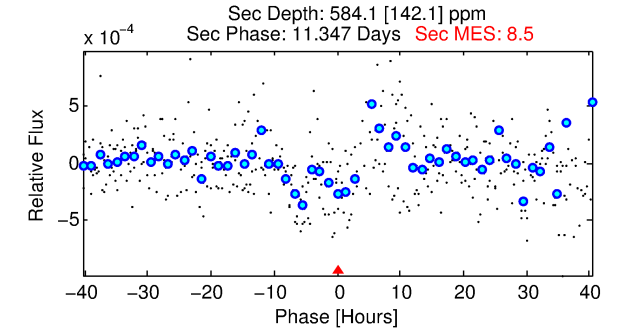
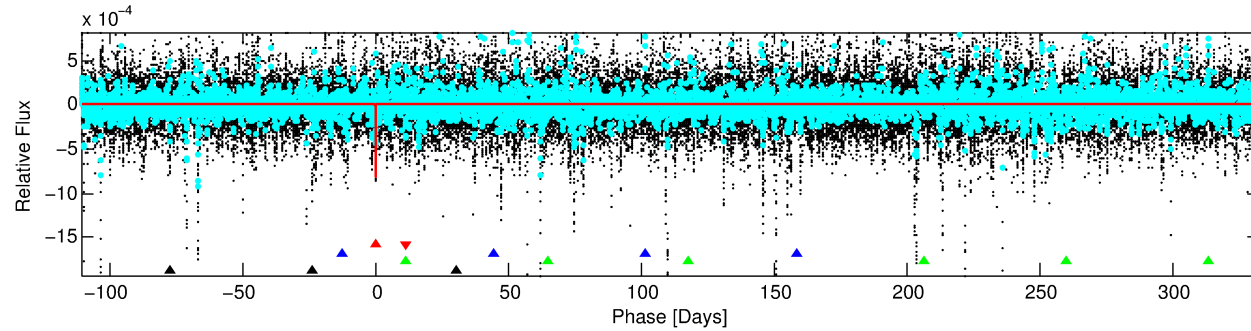
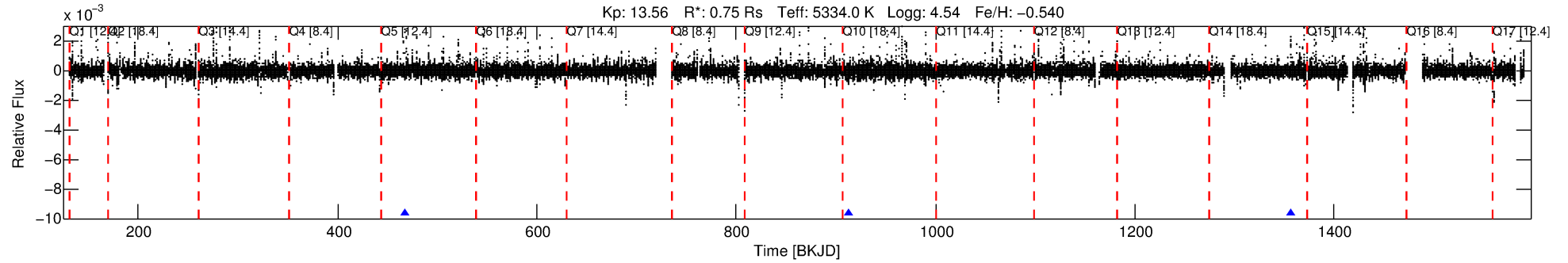
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010528093-01

No Significant Match Found

DV One-Page Summary

KIC: 10528093 Candidate: 1 of 4 Period: 444.099 d



DV Fit Results:

Period = 444.09865 [0.01007] d
Epoch = 468.2723 [0.0133] BKJD
Rp/R* = 0.0342 [0.0041]
a/R* = 200.26 [37.56]
b = 0.96 [0.02]
Seff = 0.40 [0.08]
Teq = 202 [11] K
Rp = 2.79 [0.46] Re
a = 1.0104 [0.1096] AU
Ag = 42238.44 [16115.55] [2.62σ]
Teffp = 4482 [403] K [10.60σ]

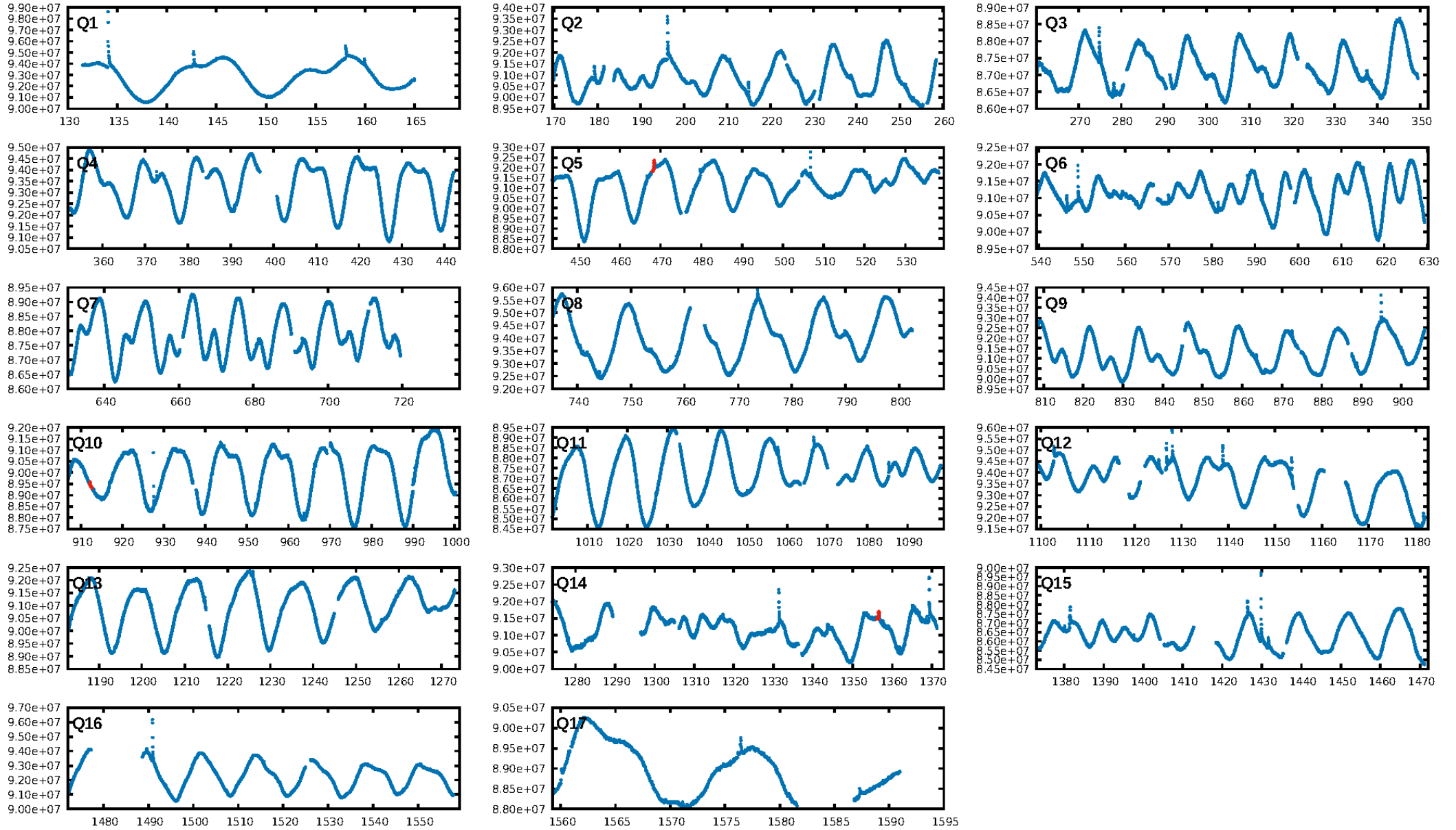
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [154.35σ]
LongPeriod-sig: 100.0% [143.81σ]
ModelChiSquare2-sig: 15.5%
ModelChiSquareGof-sig: 65.4%
Bootstrap-pfa: 1.02e-10
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.9872
Centroid-sig: 33.9%
Centroid-so: 0.404 arcsec [0.70σ]
OotOffset-rm: 0.468 arcsec [1.65σ]
OotOffset-st: 2/0/0/1 [3]
KicOffset-rm: 0.416 arcsec [1.33σ]
KicOffset-st: 2/0/0/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

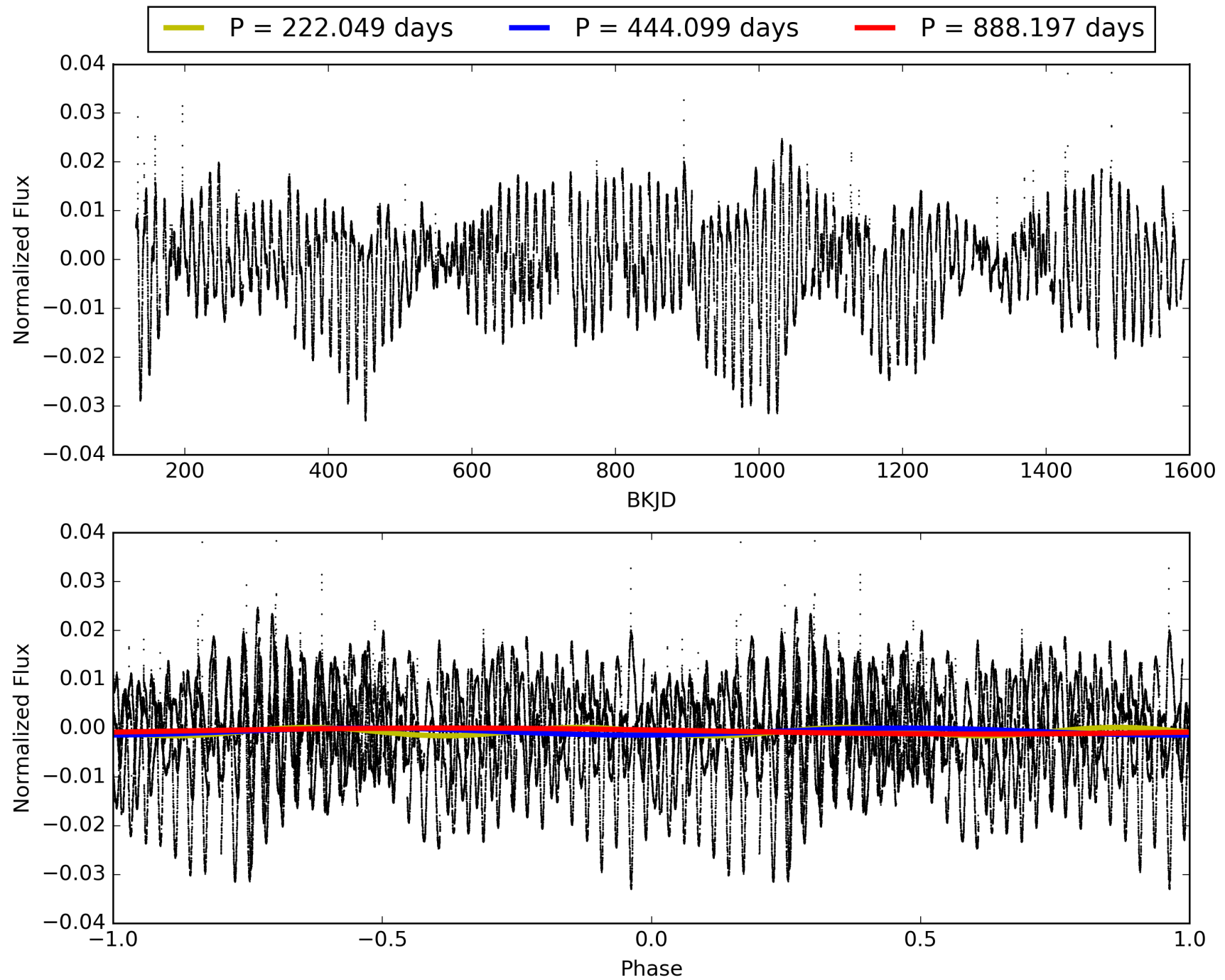
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:51:45 Z

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

TCE 010528093-01, PDC Light Curves

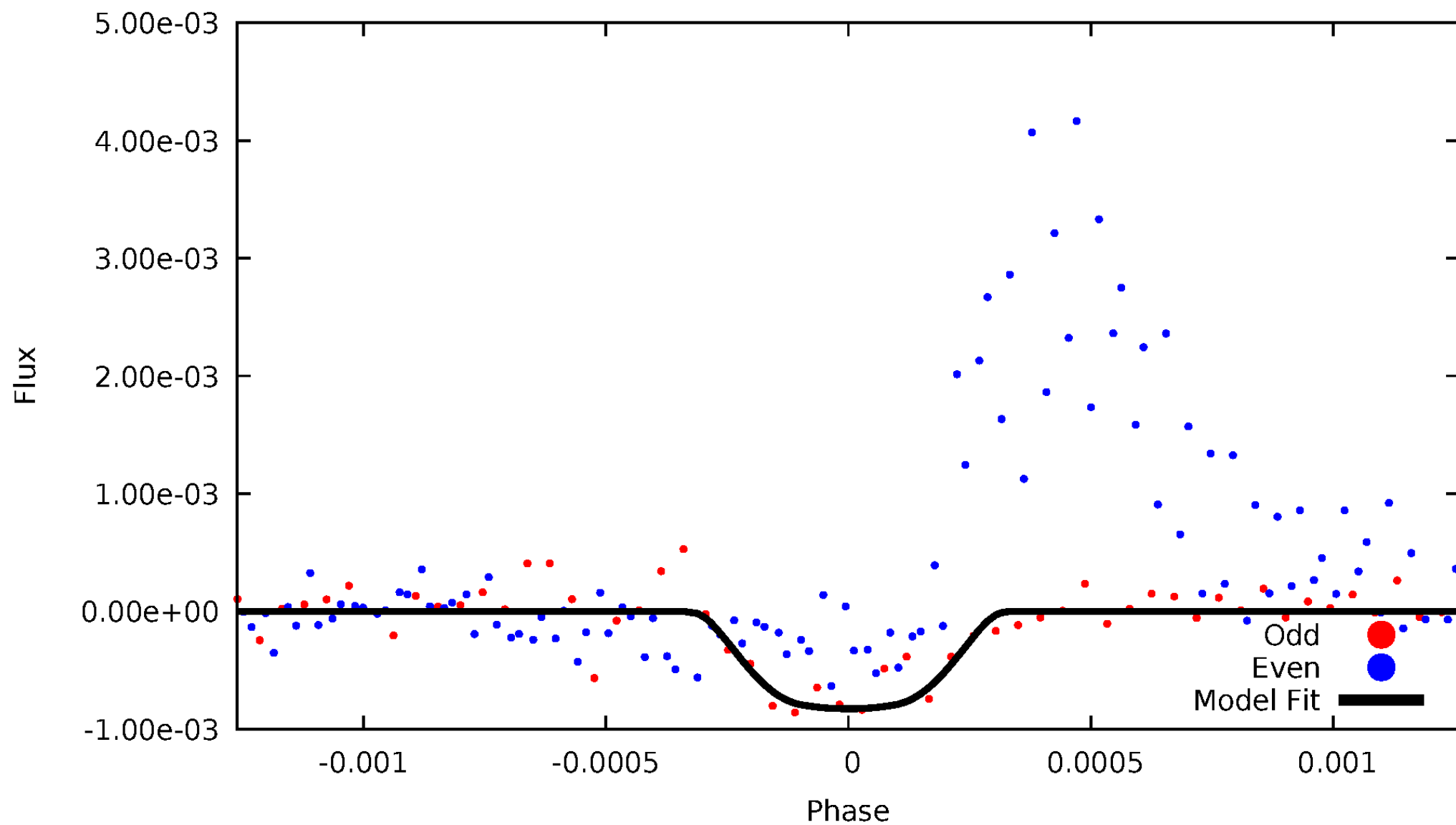


TCE 010528093-01



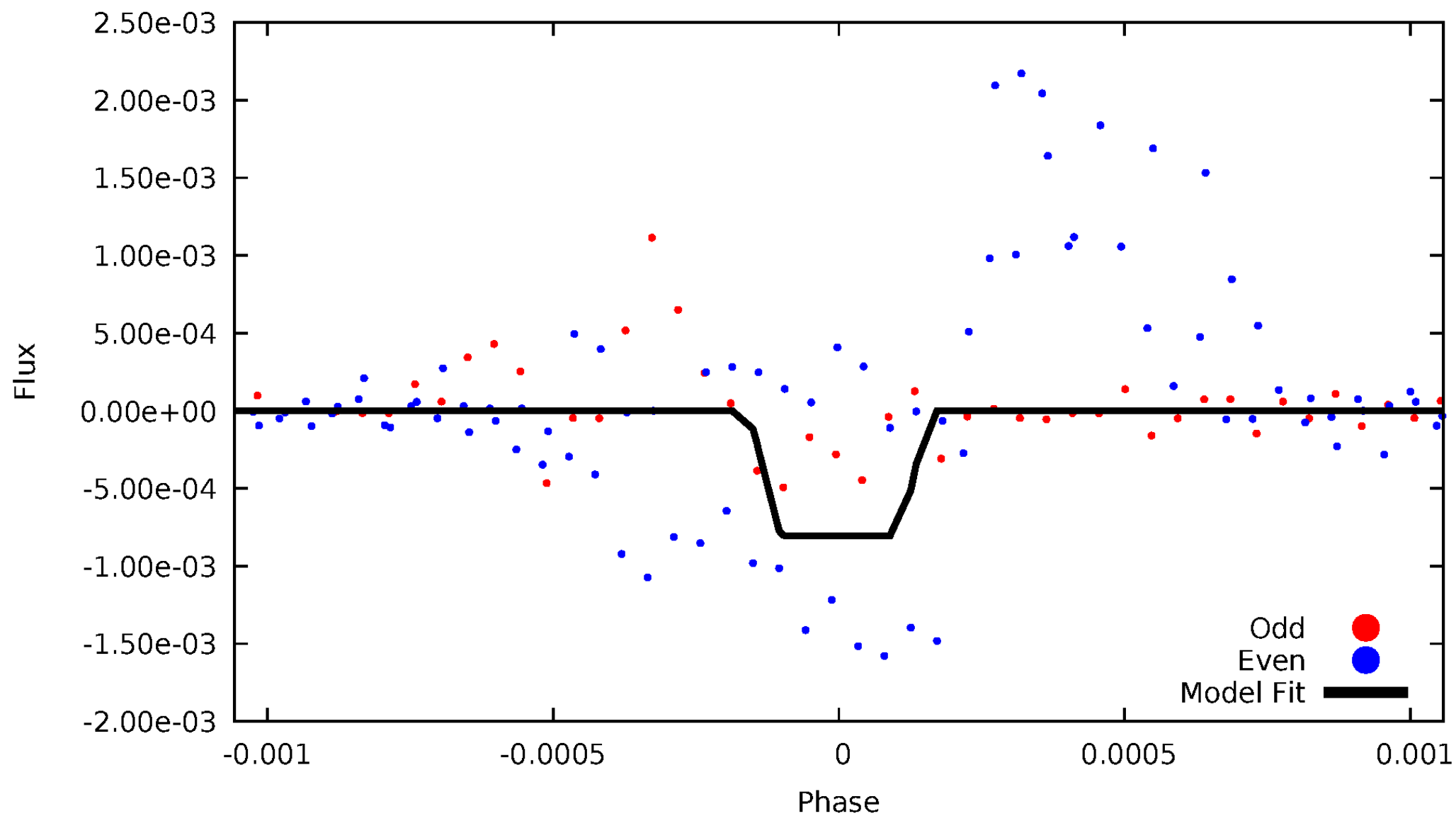
DV Odd/Even

TCE 010528093-01



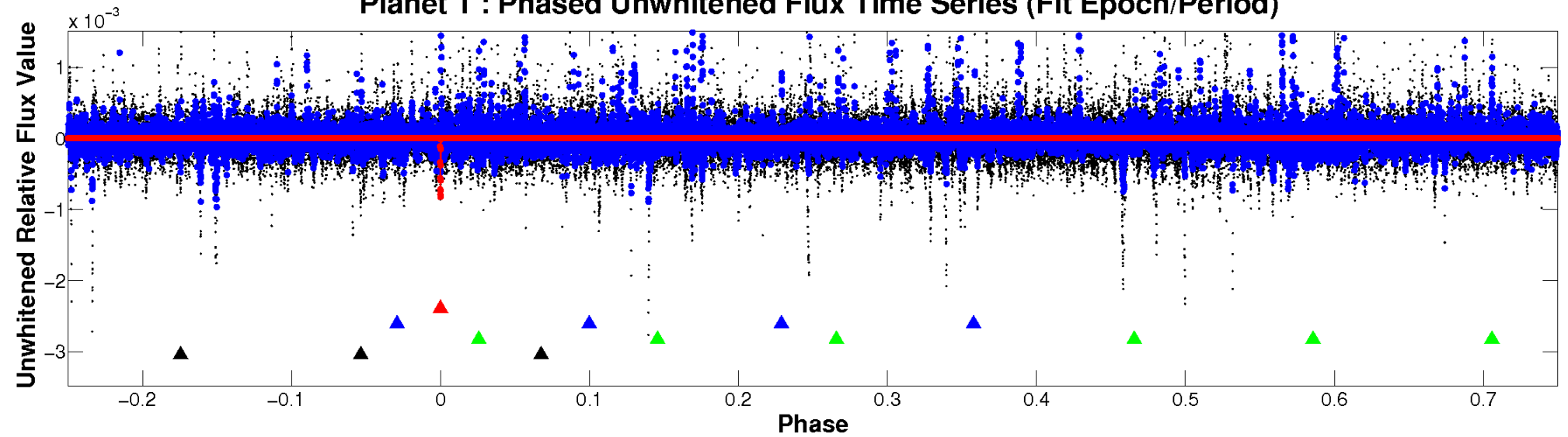
ALT Odd/Even

TCE 010528093-01

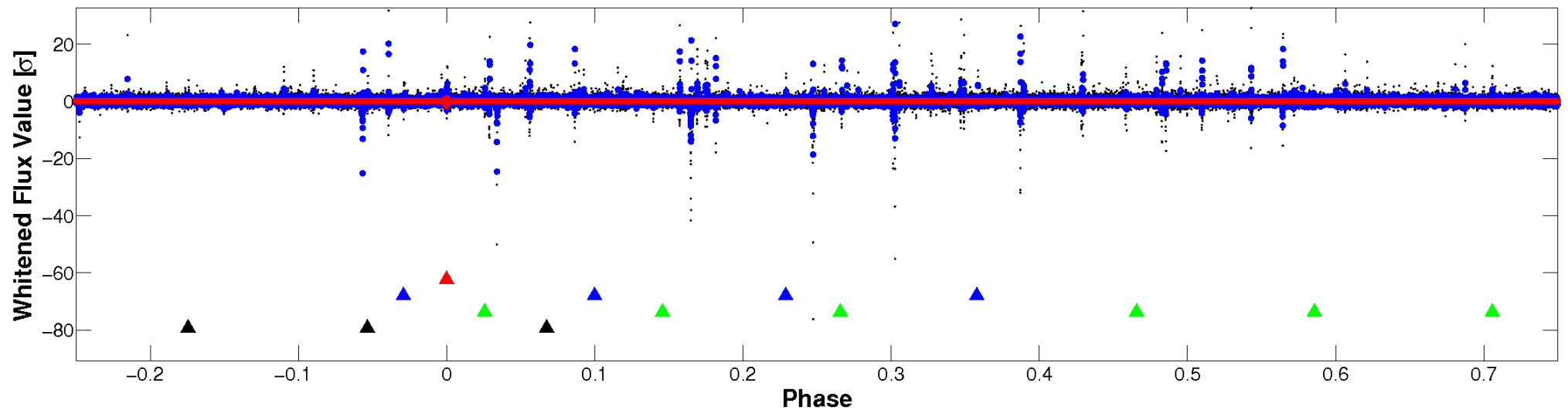


Non-Whitened Vs. Whitened Light Curve

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

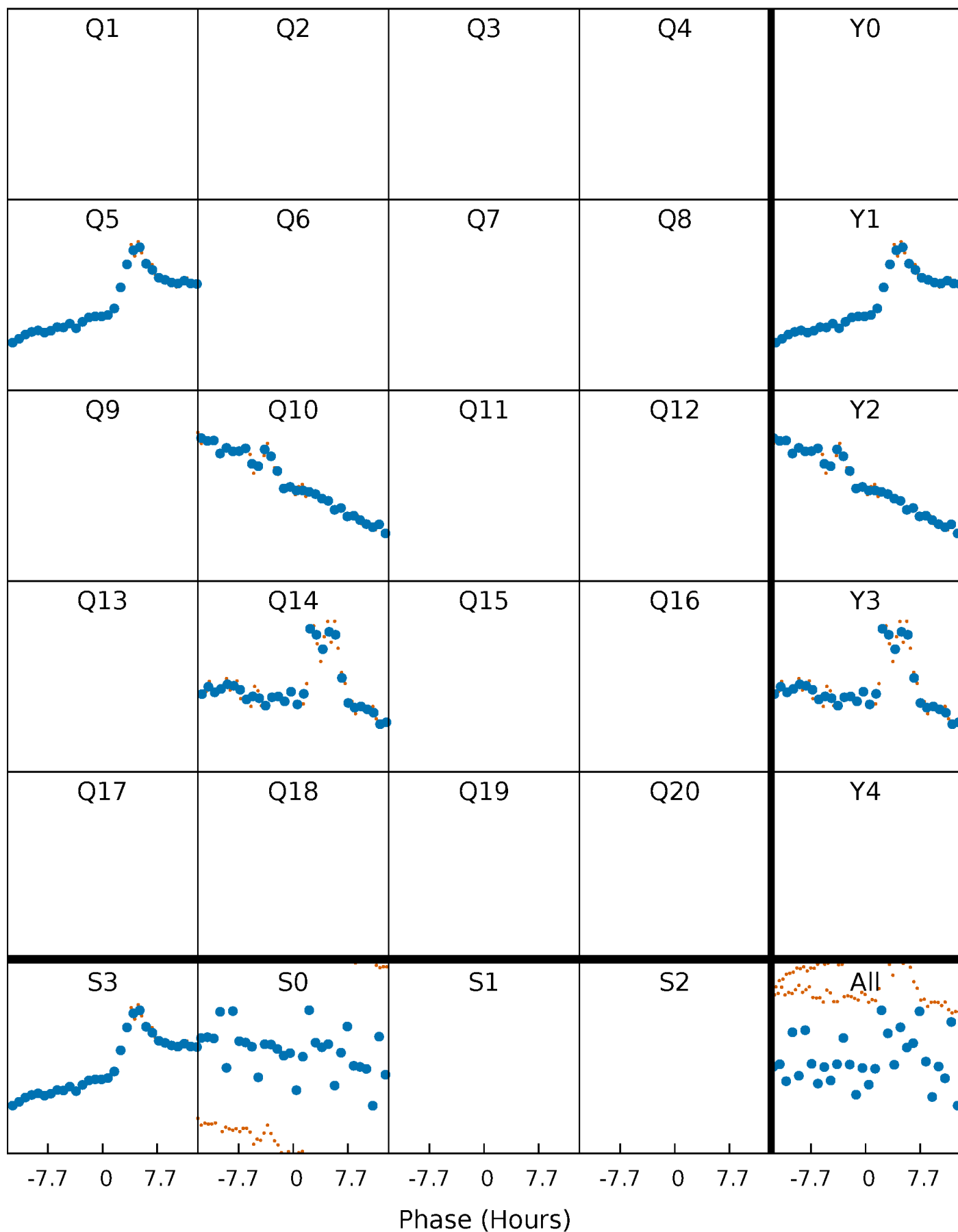


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



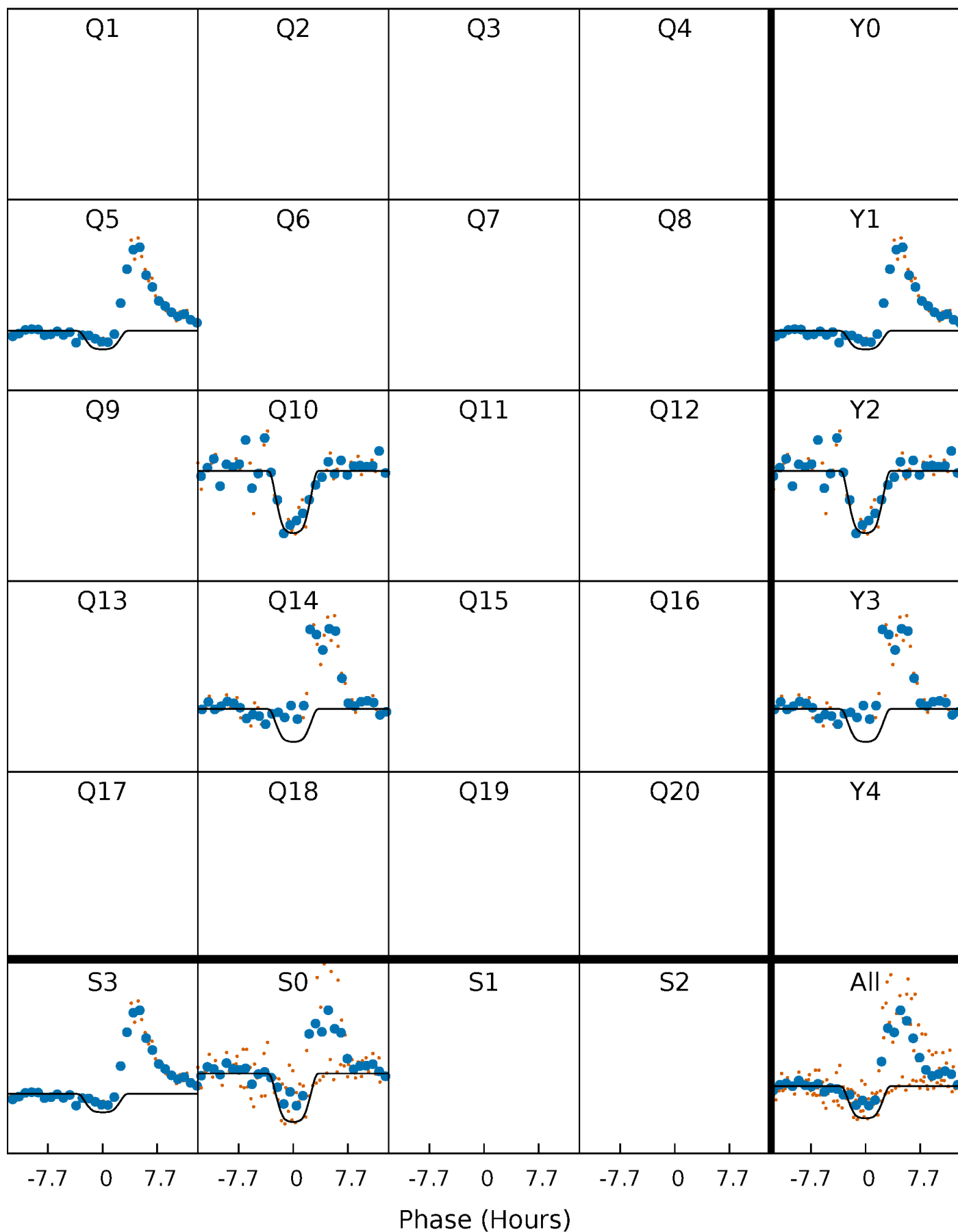
PDC Quarter-Phased Transit Curves

TCE 010528093-01 P=444.098646 Days $T_0=468.272291$ (BKJD)



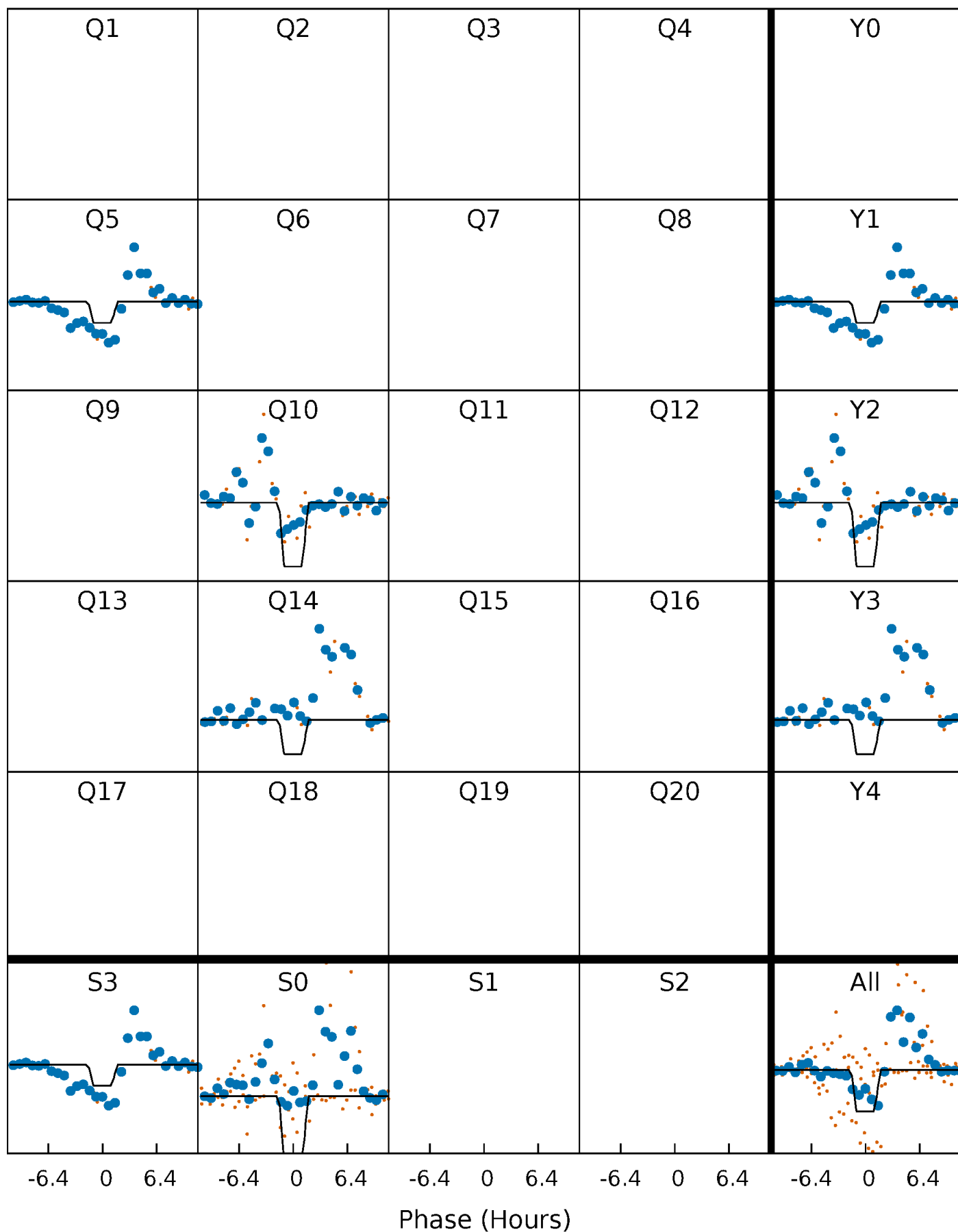
DV Quarter-Phased Transit Curves

TCE 010528093-01 P=444.098646 Days $T_0=468.272291$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

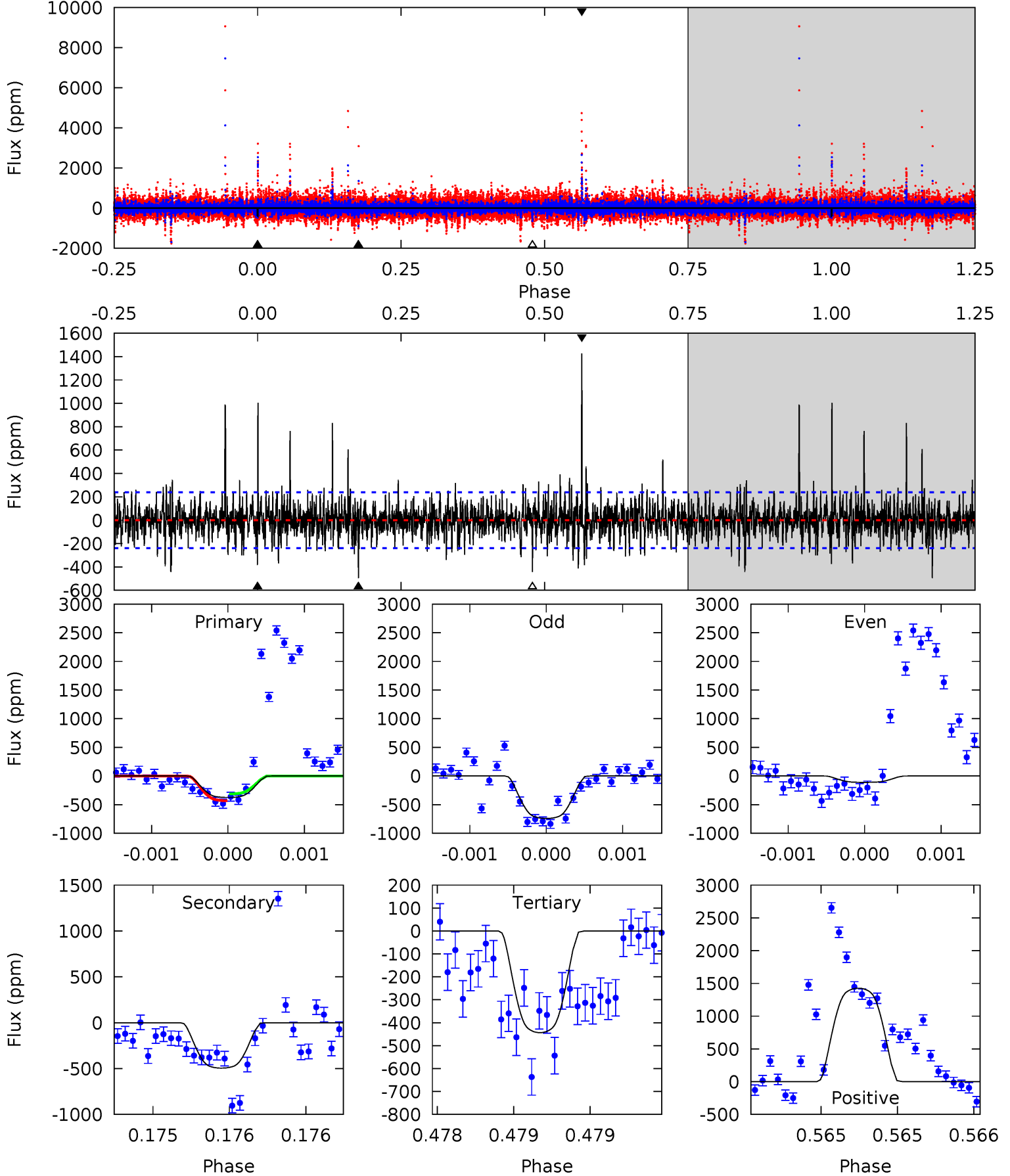
TCE 010528093-01 P=444.082560 Days $T_0=468.282653$ (BKJD)



DV Model-Shift Uniqueness Test

010528093-01, P = 444.098646 Days, E = 24.173645 Days

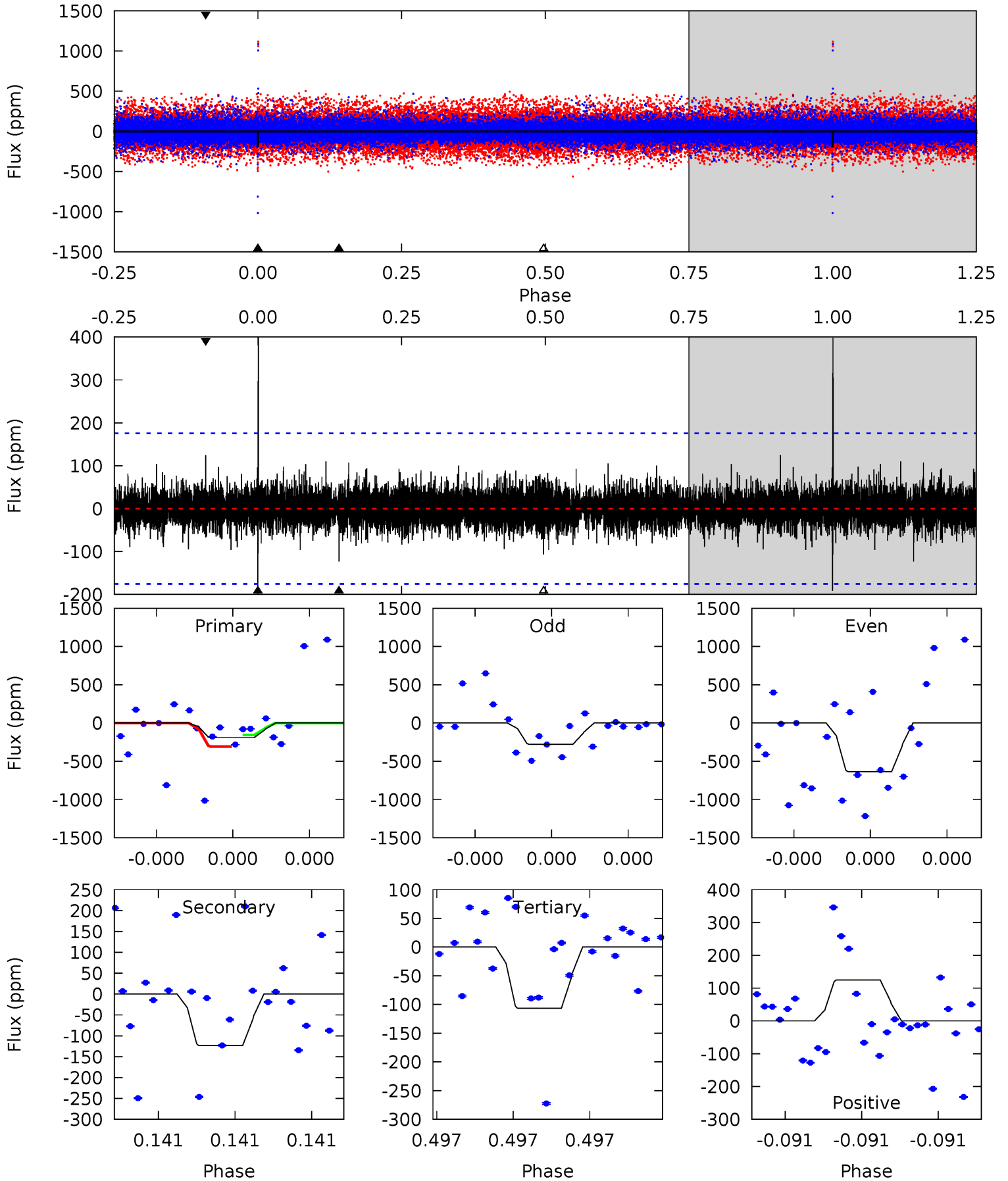
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.68	11.5	10.3	33.0	5.53	3.42	2.60	-1.57	-24.3	1.21	-21.5	4.79	1.05	0.74	1.38



Alt Model-Shift Uniqueness Test

010528093-01, P = 444.082560 Days, E = 24.200093 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.14	3.96	3.43	4.02	5.65	3.60	0.76	2.72	2.13	0.54	-0.05	6.50	1.87	0.68	0



Stellar Parameters For KIC 010528093

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5334^{+159}_{-143}	$4.536^{+0.102}_{-0.068}$	$-0.540^{+0.350}_{-0.300}$	$0.746^{+0.084}_{-0.084}$	$0.697^{+0.099}_{-0.039}$	$2.366^{+0.936}_{-0.567}$
	+3%/-3%	+2%/-1%	+65%/-56%	+11%/-11%	+14%/-6%	+40%/-24%
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 010528093-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-496 ± 43	$2.77^{+0.41}_{-0.37}$	281^{+12}_{-11}	4457^{+279}_{-218}	36863^{+12521}_{-8552}
Alt.	-123 ± 31	$2.31^{+0.40}_{-0.34}$	282^{+12}_{-12}	3719^{+255}_{-234}	13431^{+6086}_{-4819}

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

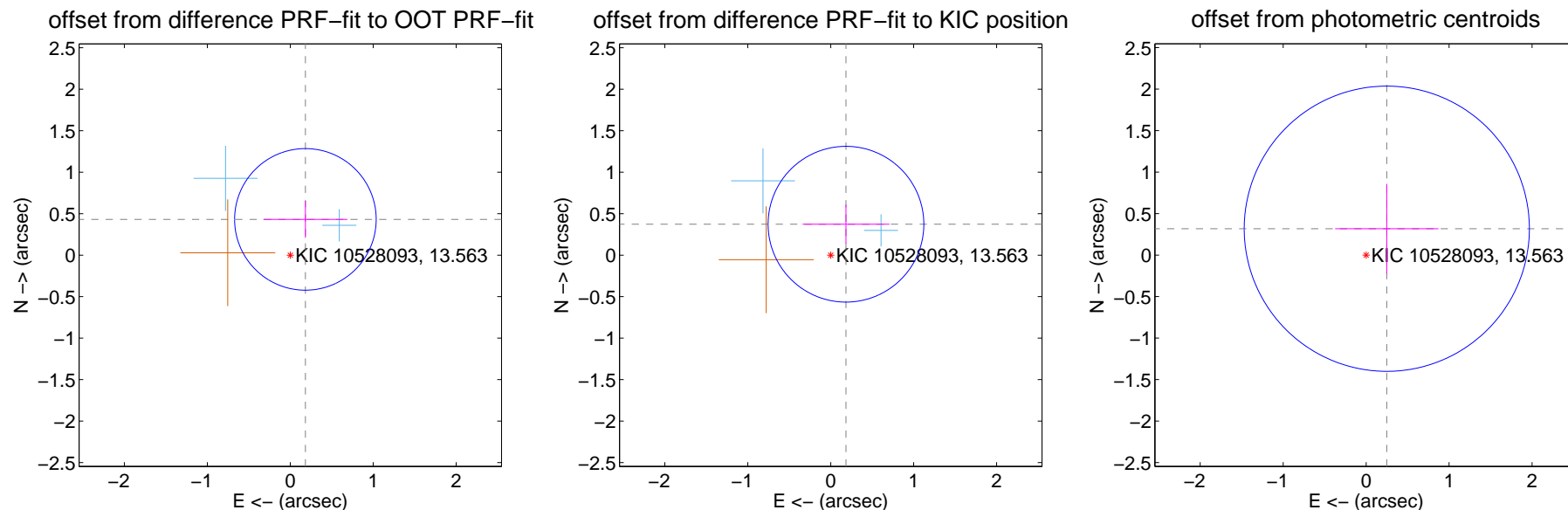
DV Centroid Data

Supplemental centroid analysis for 010528093-01. Kepler magnitude: 13.56. Transit SNR 7.98

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.468 ± 0.284	1.65	-0.182 ± 0.507	0.431 ± 0.222
PRF-fit source offset from KIC position	0.416 ± 0.313	1.33	-0.184 ± 0.524	0.373 ± 0.235
photometric centroid source offset	0.40 ± 0.57	0.70	-0.25 ± 0.62	0.32 ± 0.54

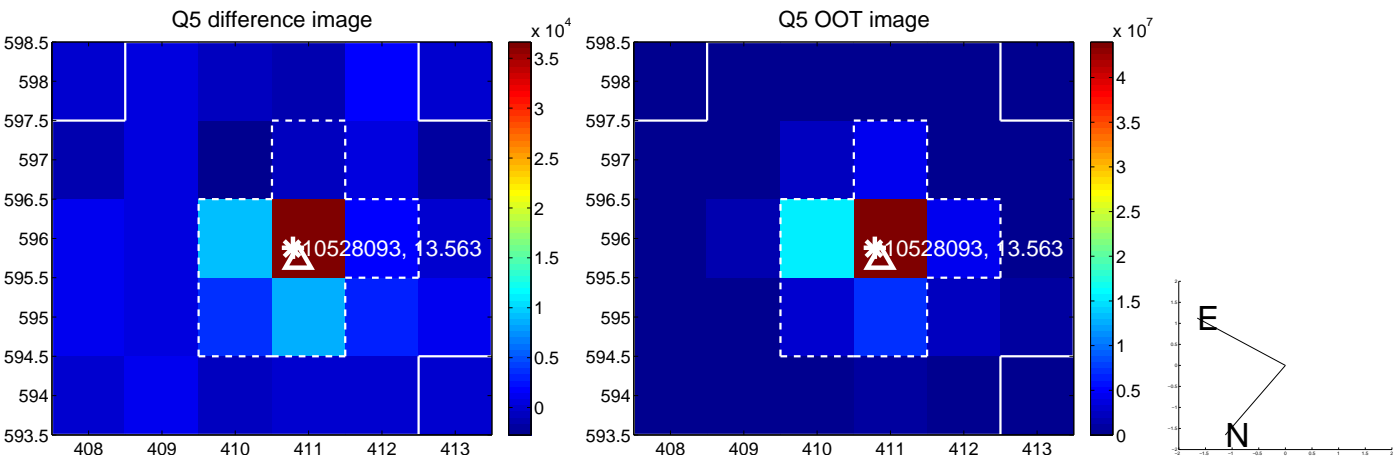


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

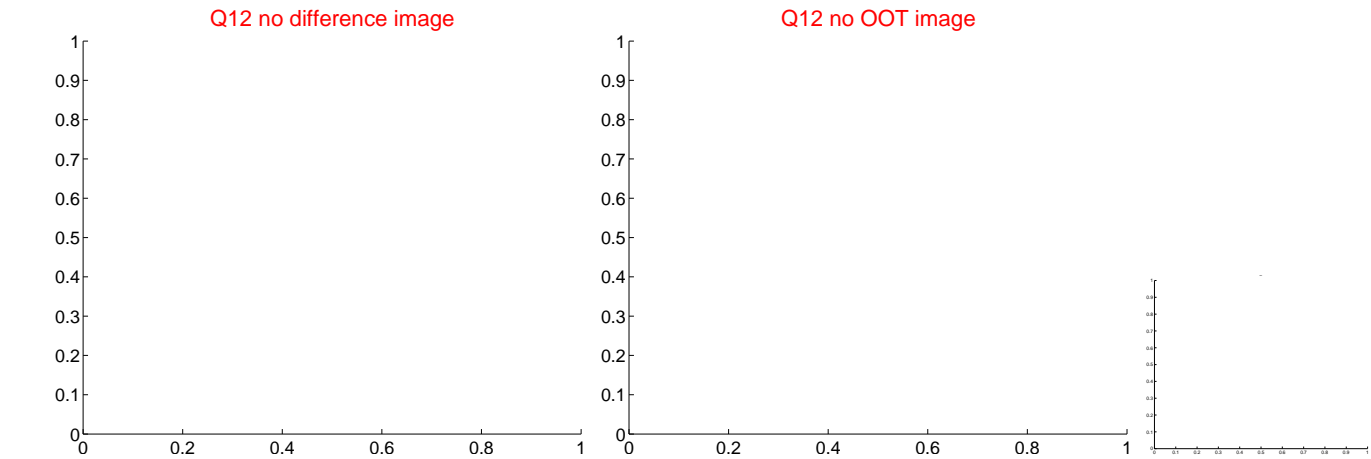
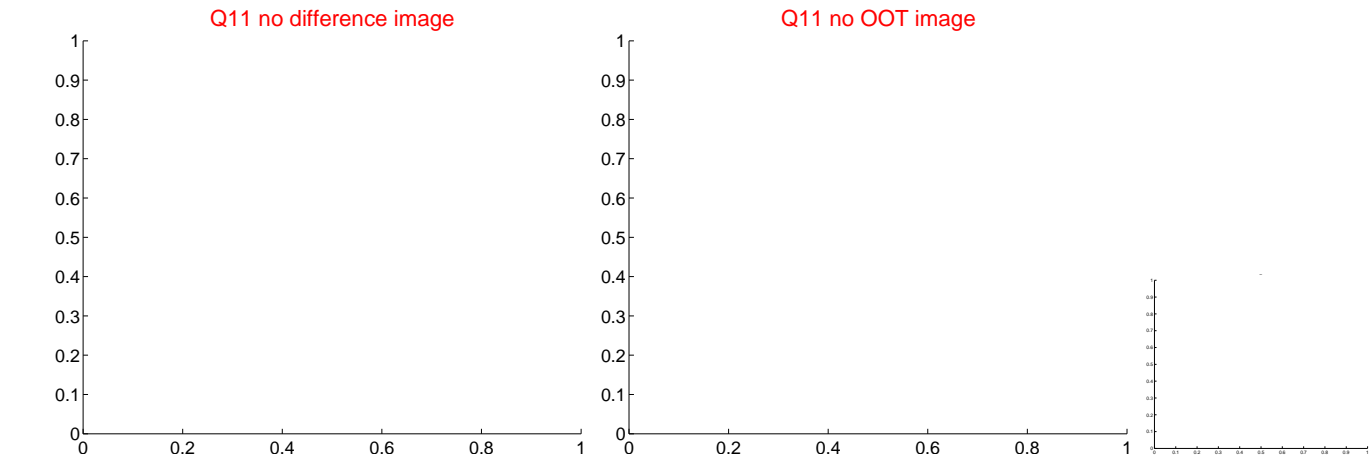
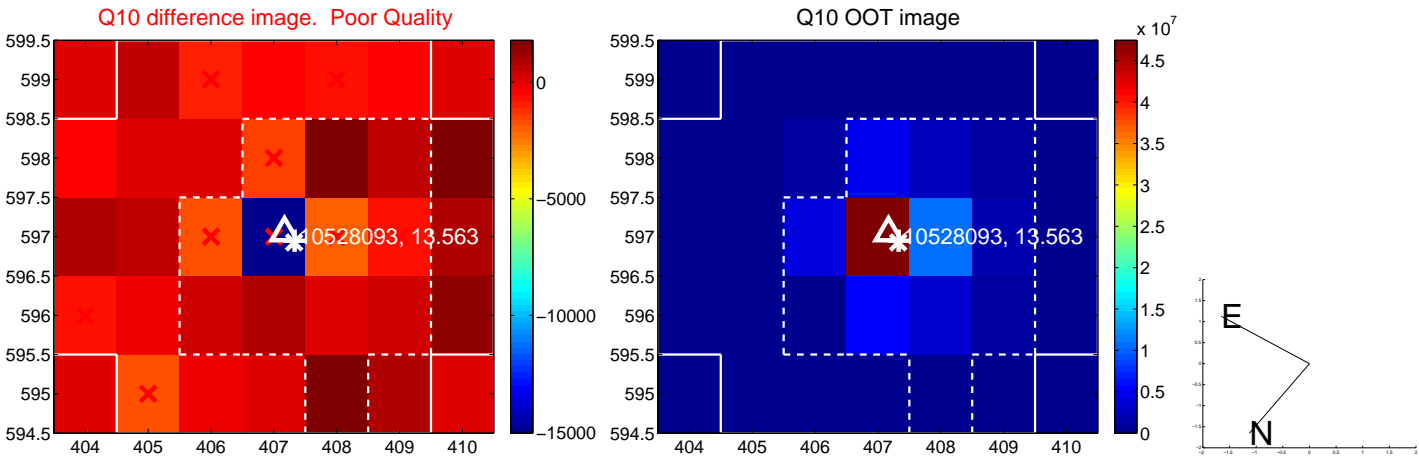
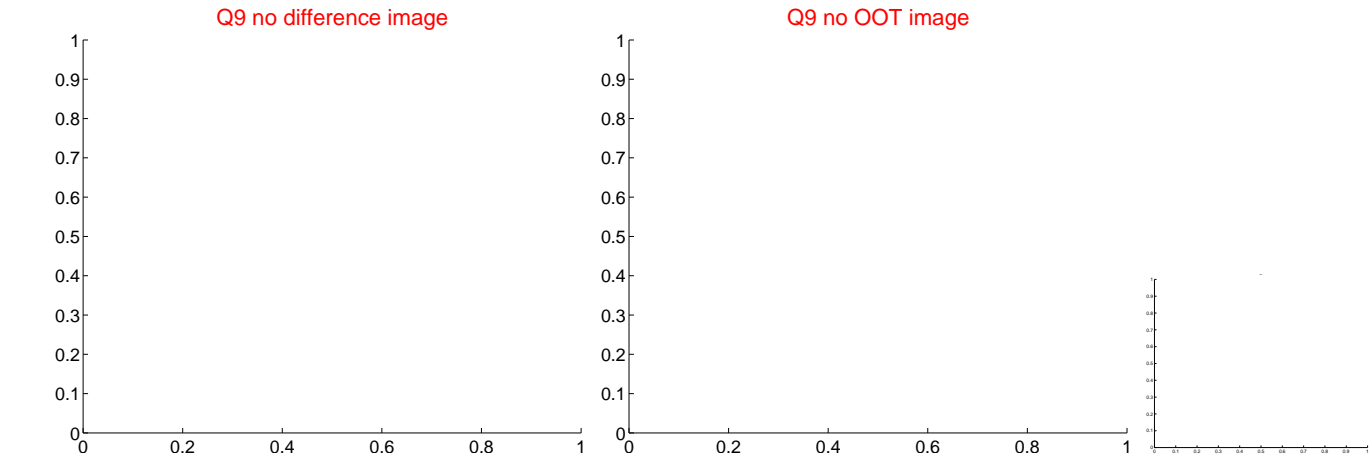
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



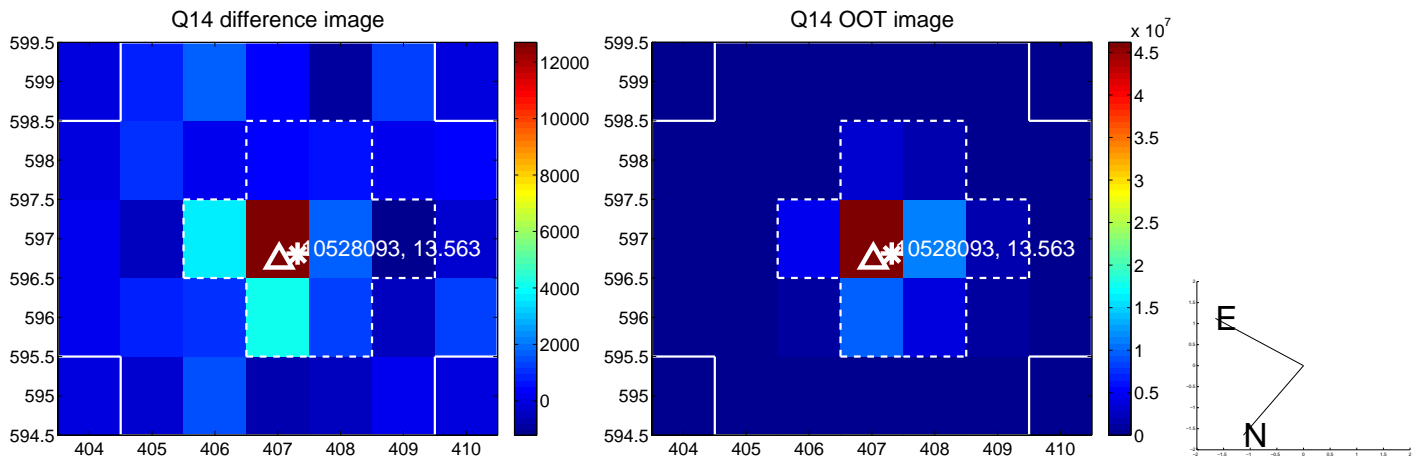
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



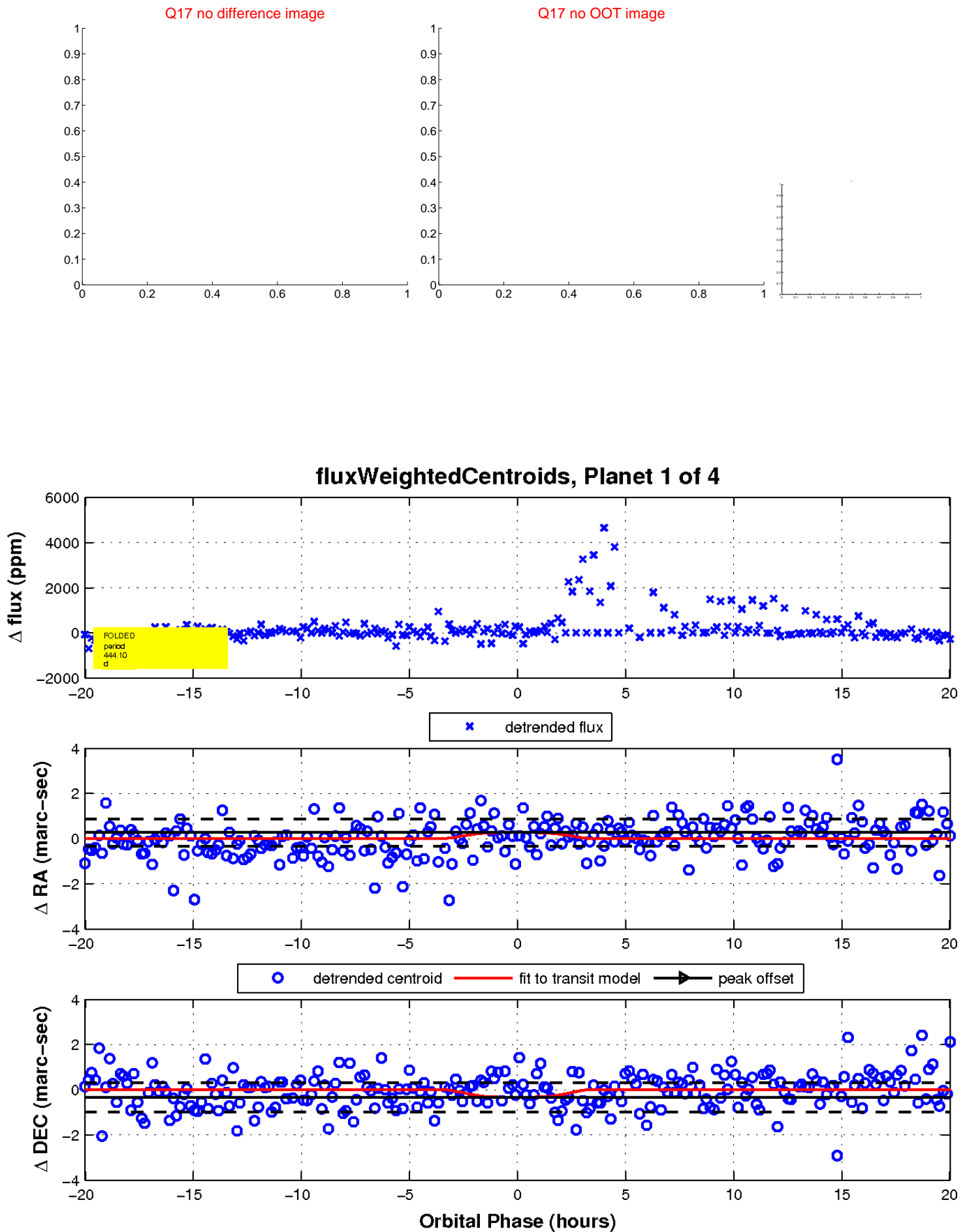
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

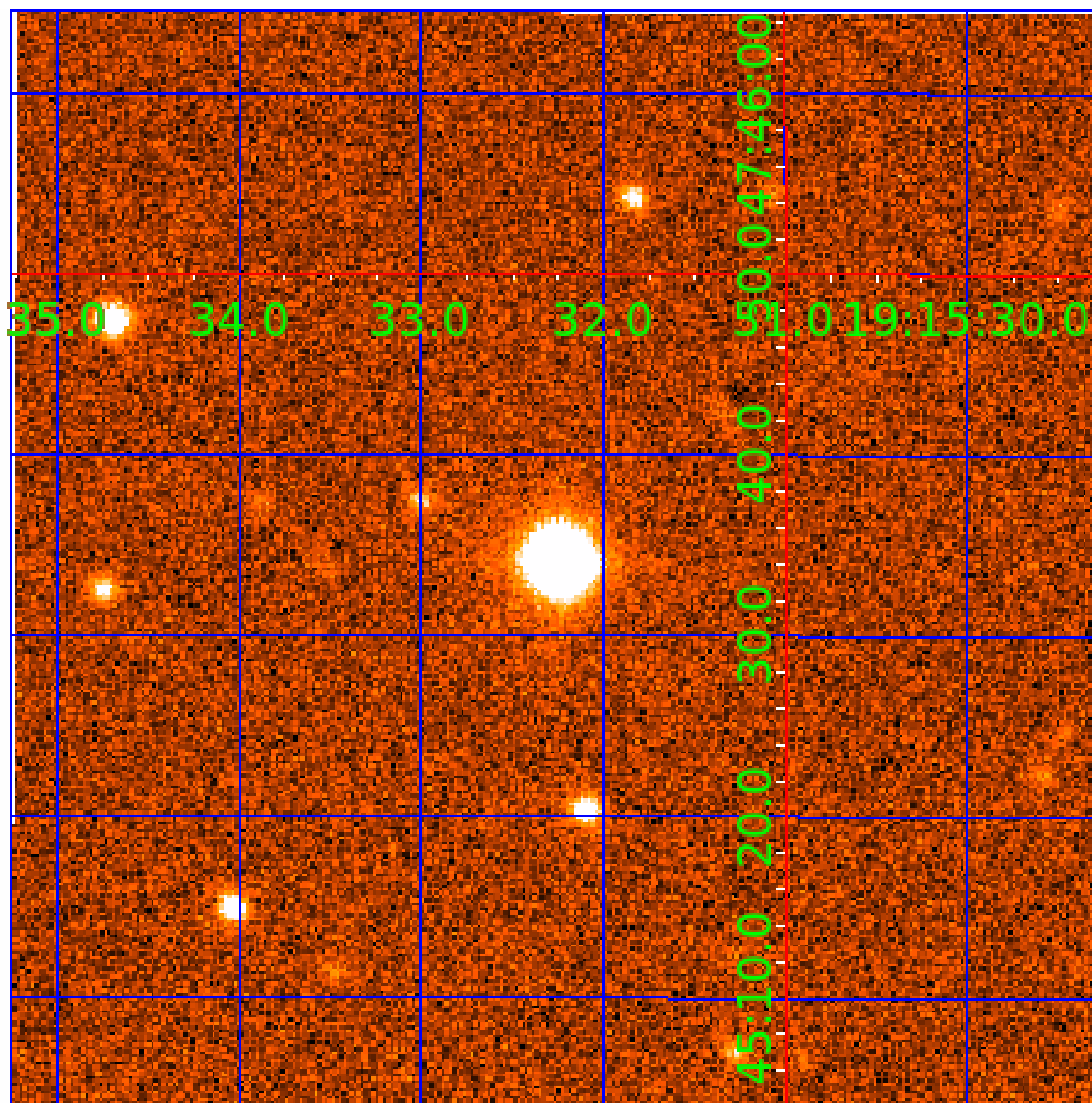


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010528093

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})
010528093-01	OBS	No	444.098646	468.272291	826.1	6.718	15.5	8.0	0.75	5334	2.79	0.40
010528093-02	OBS	No	386.810175	183.093712	431.4	5.849	13.4	4.8	0.75	5334	1.53	0.47
010528093-03	OBS	No	248.701428	230.987729	406.5	4.099	13.7	4.6	0.75	5334	1.65	0.86
010528093-04	OBS	No	497.839674	390.797322	798.3	5.942	12.4	9.3	0.75	5334	2.27	0.34

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010528093-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010528093-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010528093-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010528093-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_POS_DV—INCONSISTENT_TRANS

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

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

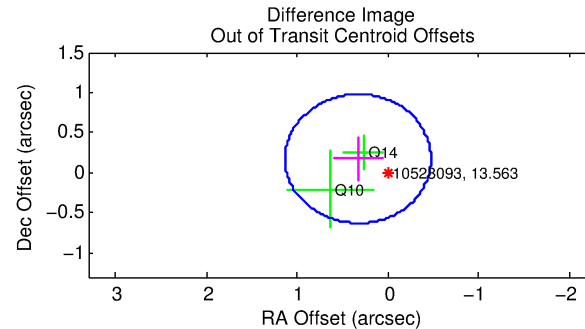
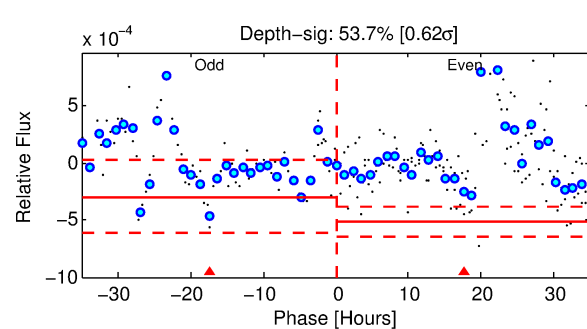
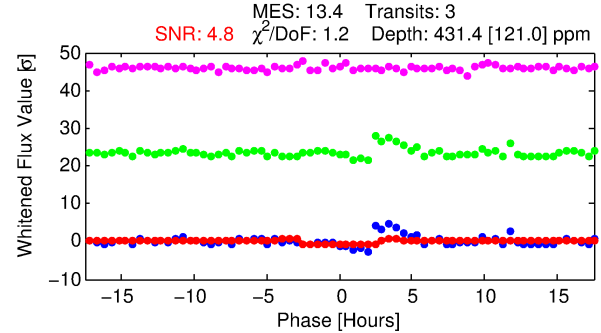
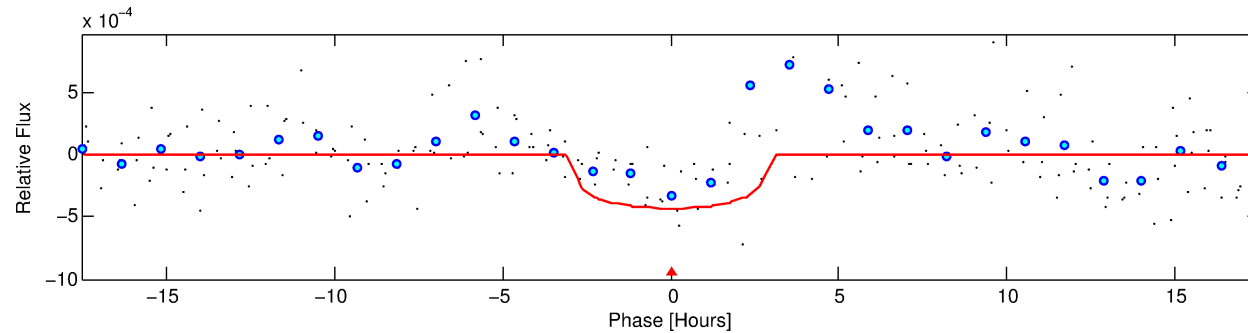
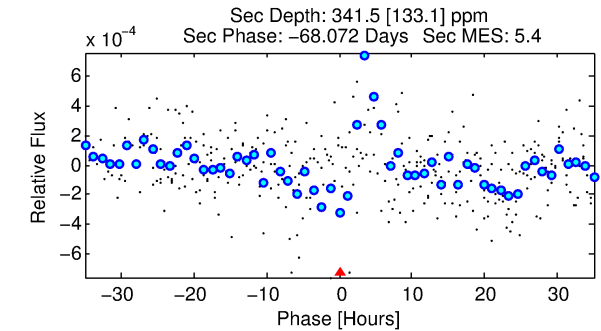
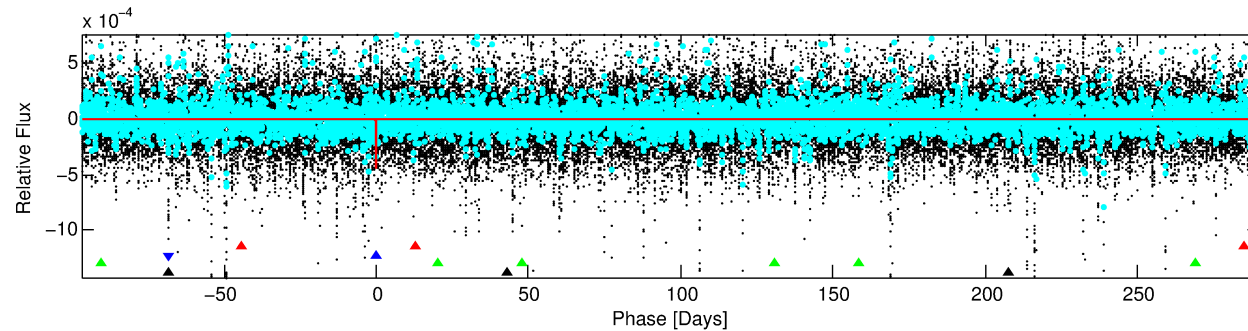
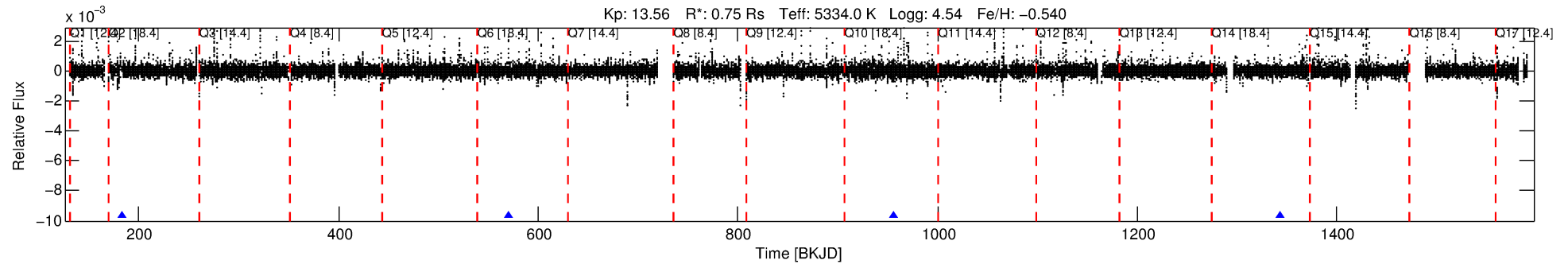
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010528093-02

No Significant Match Found

DV One-Page Summary

KIC: 10528093 Candidate: 2 of 4 Period: 386.810 d



DV Fit Results:

Period = 386.81017 [0.00608] d
Epoch = 183.0937 [0.0150] BKJD
Rp/R* = 0.0188 [0.0968]
a/R* = 511.30 [10974.32]
b = 0.12 [183.20]
Seff = 0.48 [0.10]
Teq = 212 [11] K
Rp = 1.53 [7.88] Re
a = 0.9216 [0.1000] AU
Ag = 68289.18 [704710.15] [0.10 sigma]
Teffp = 5292 [13651] K [0.37 sigma]

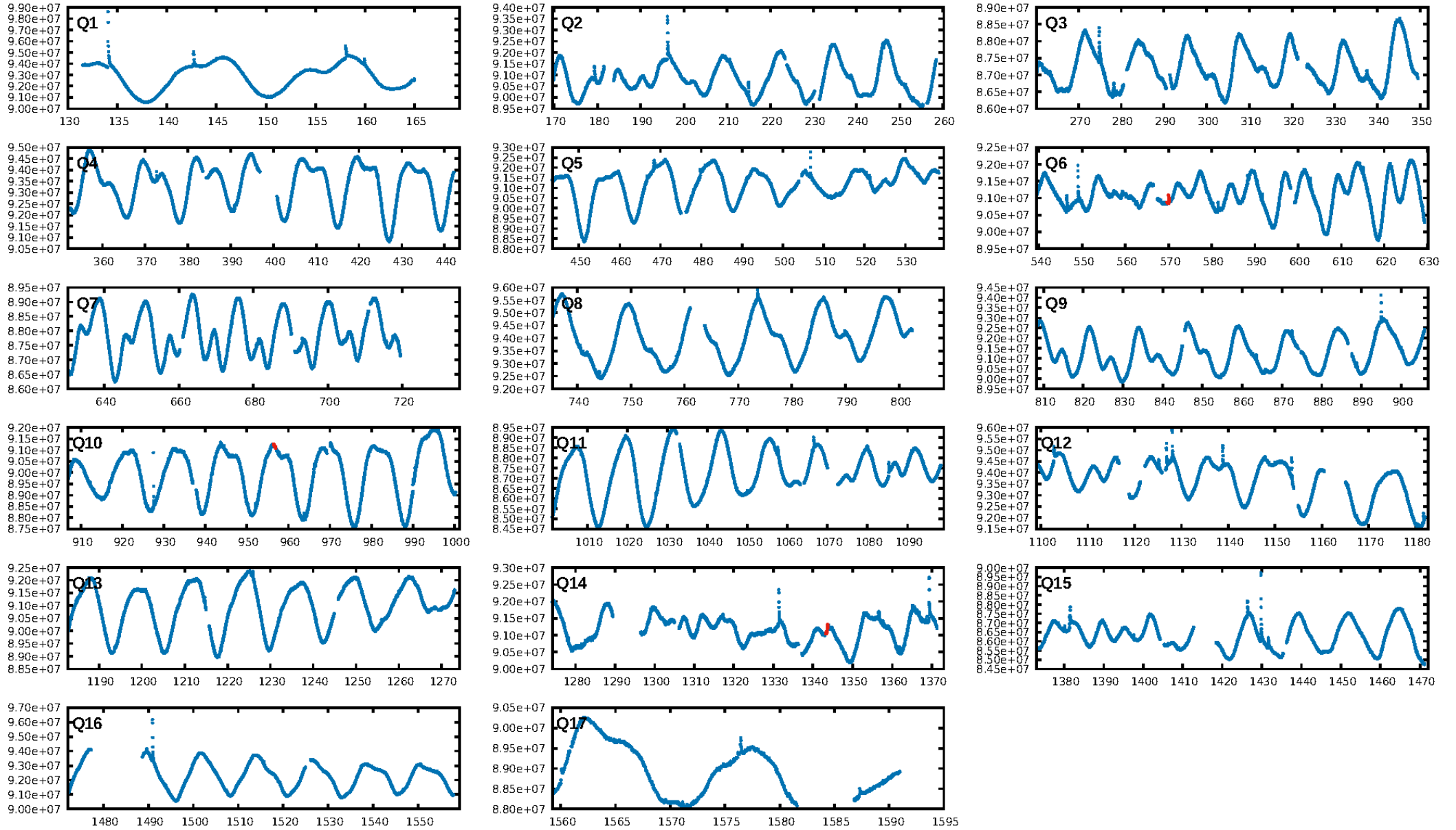
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [464.08 sigma]
LongPeriod-sig: 100.0% [154.35 sigma]
ModelChiSquare2-sig: 2.5%
ModelChiSquareGof-sig: 95.3%
Bootstrap-pfa: 1.45e-12
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.2642
Centroid-sig: 55.2%
Centroid-so: 0.576 arcsec [0.64 sigma]
OotOffset-rm: 0.374 arcsec [1.39 sigma]
KicOffset-rm: 0.390 arcsec [1.46 sigma]
OotOffset-st: 2/0/0/0 [2]
KicOffset-st: 2/0/0/0 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 1.00 [3/3]

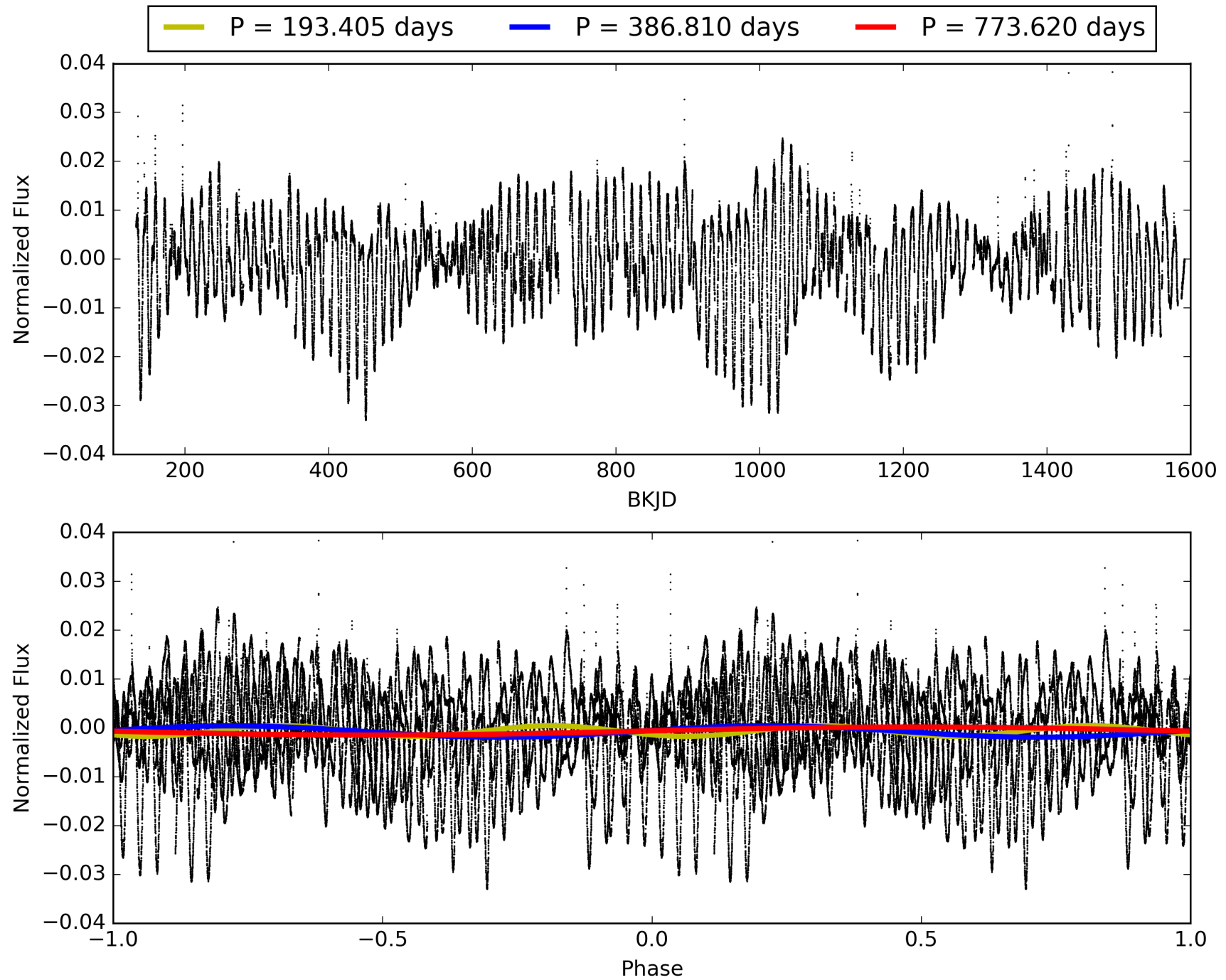
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:51:58 Z

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

TCE 010528093-02, PDC Light Curves

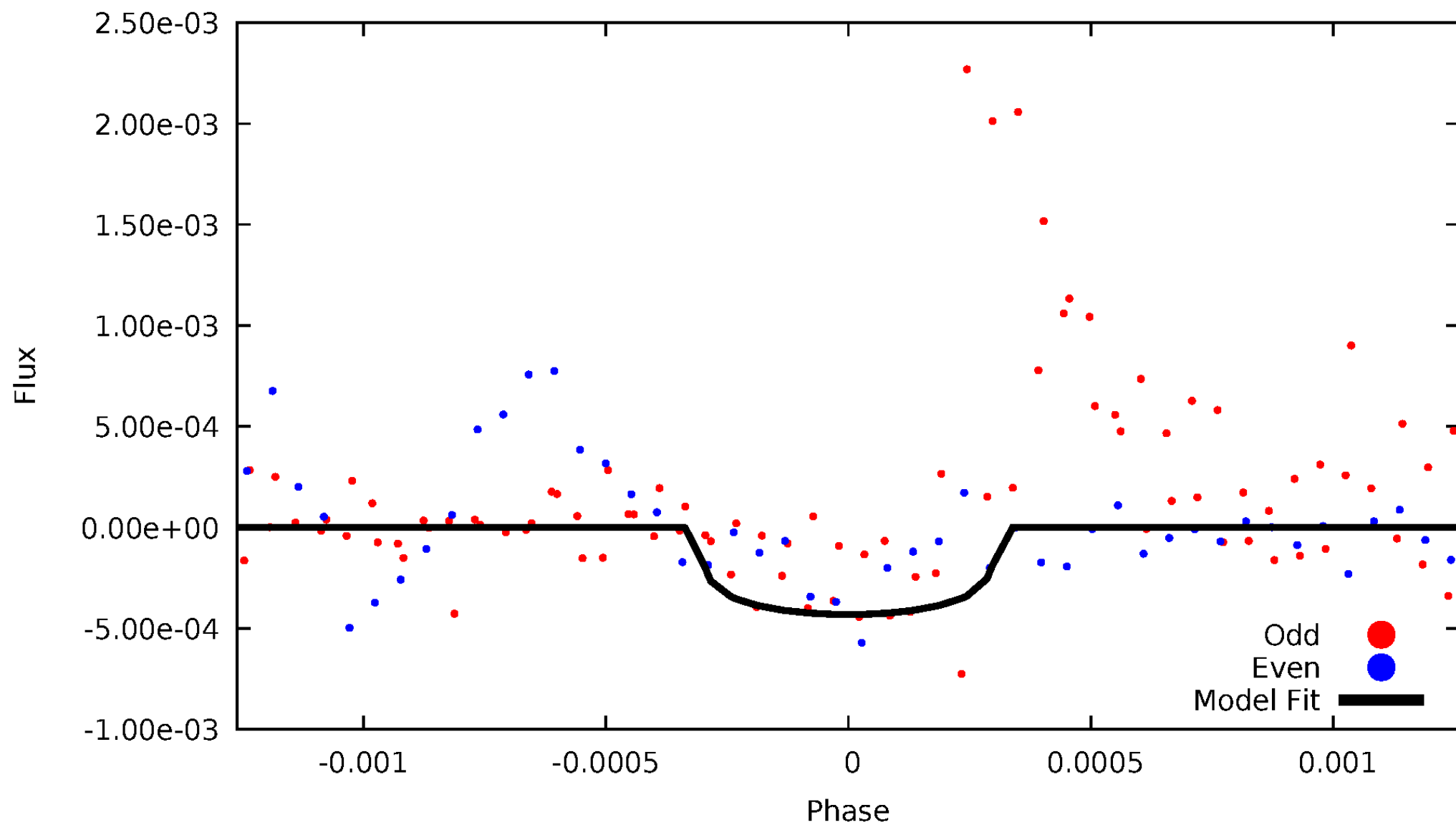


TCE 010528093-02



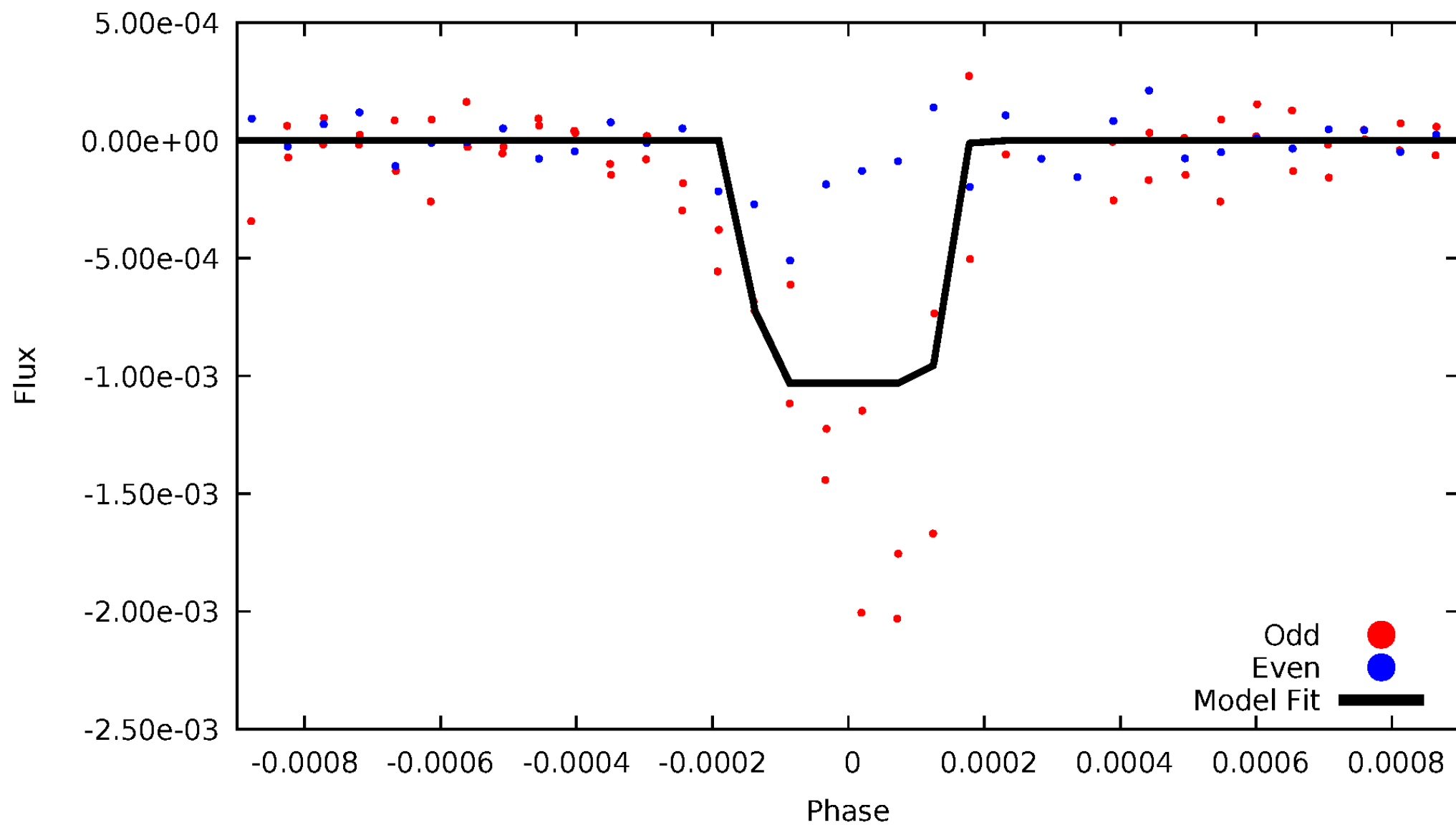
DV Odd/Even

TCE 010528093-02



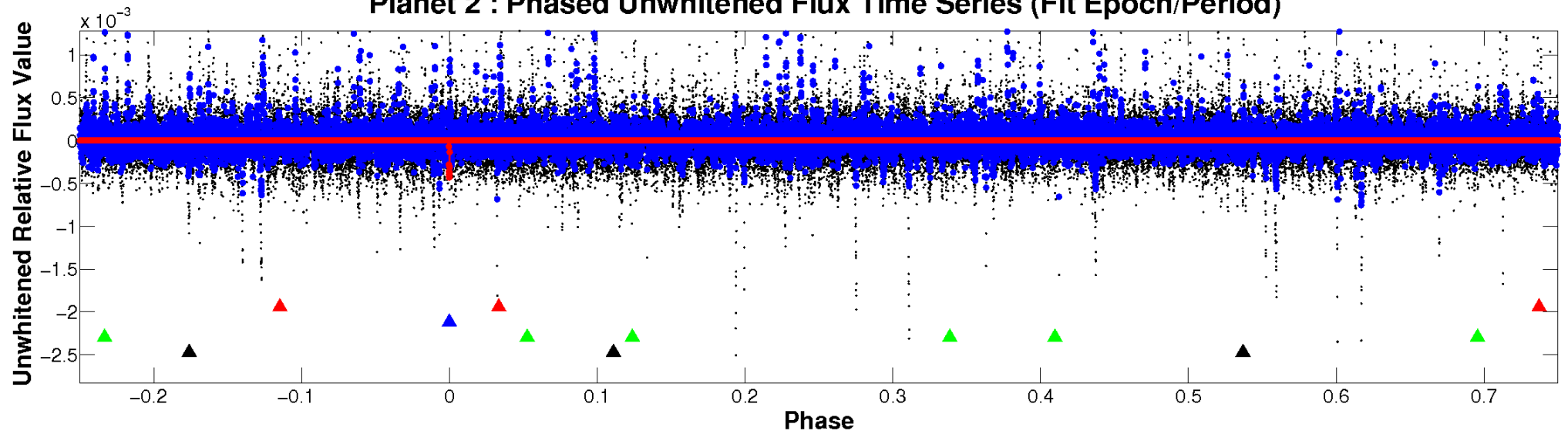
ALT Odd/Even

TCE 010528093-02

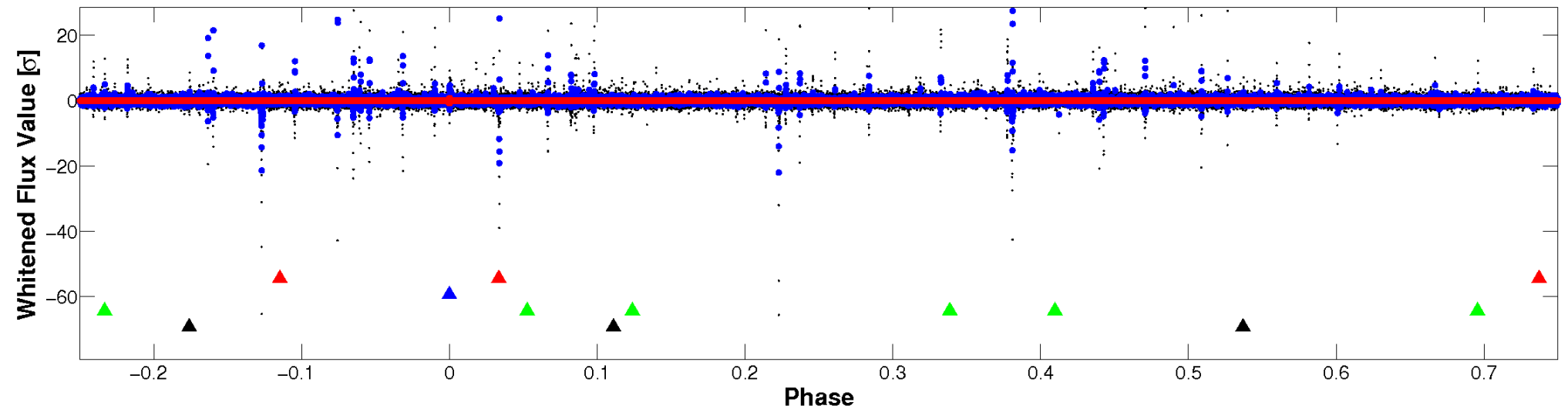


Non-Whitened Vs. Whitened Light Curve

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

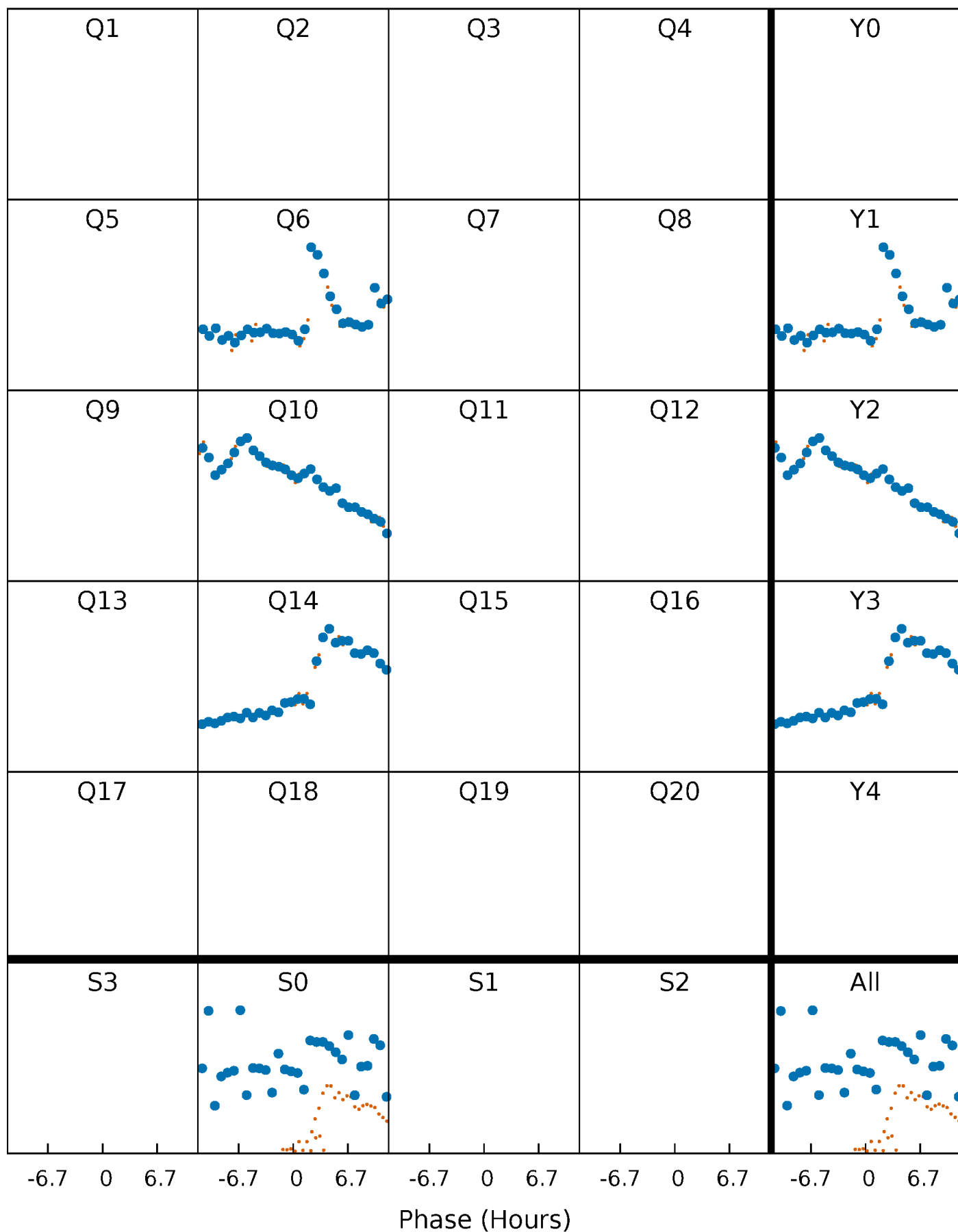


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



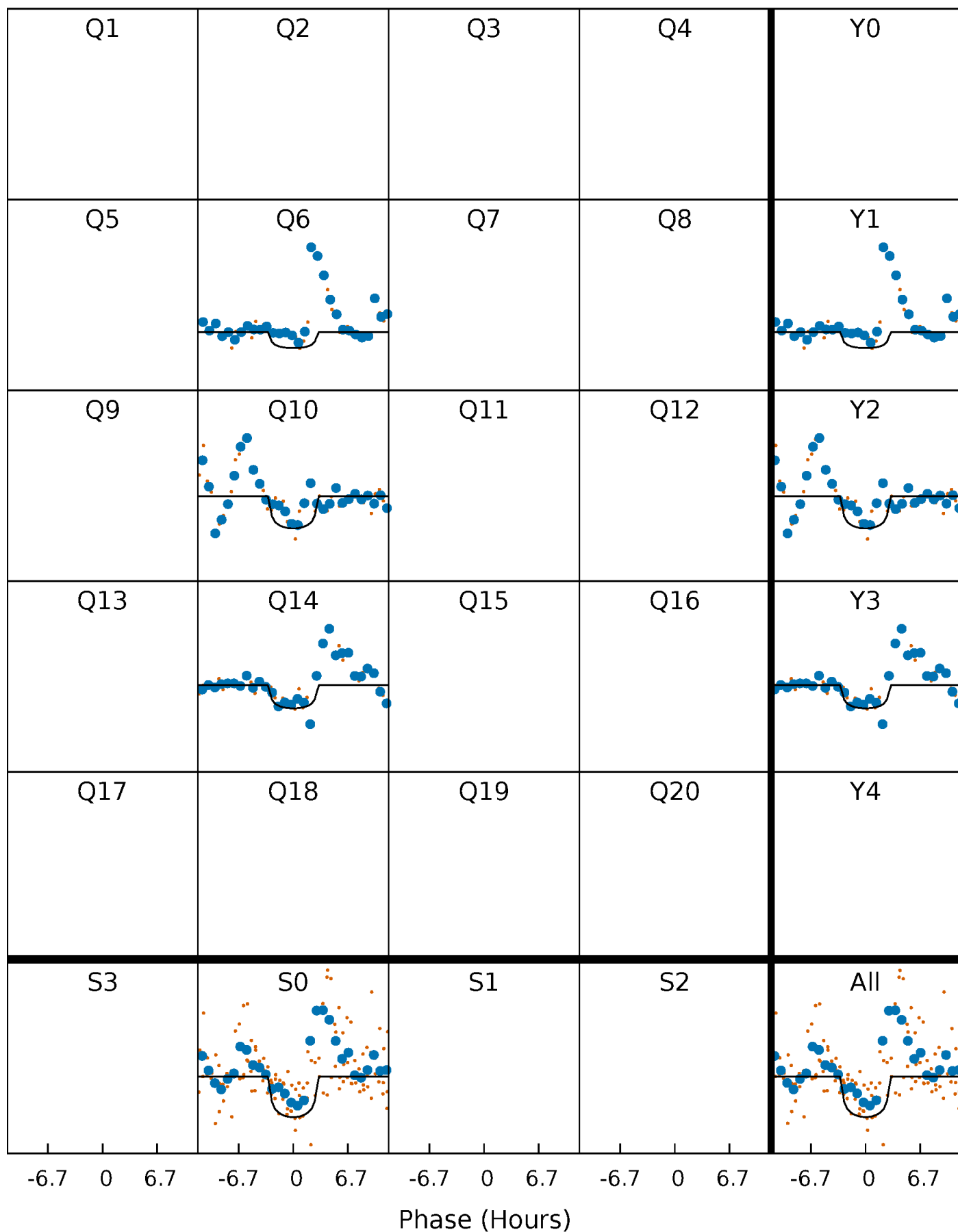
PDC Quarter-Phased Transit Curves

TCE 010528093-02 $P=386.810175$ Days $T_0=183.093712$ (BKJD)



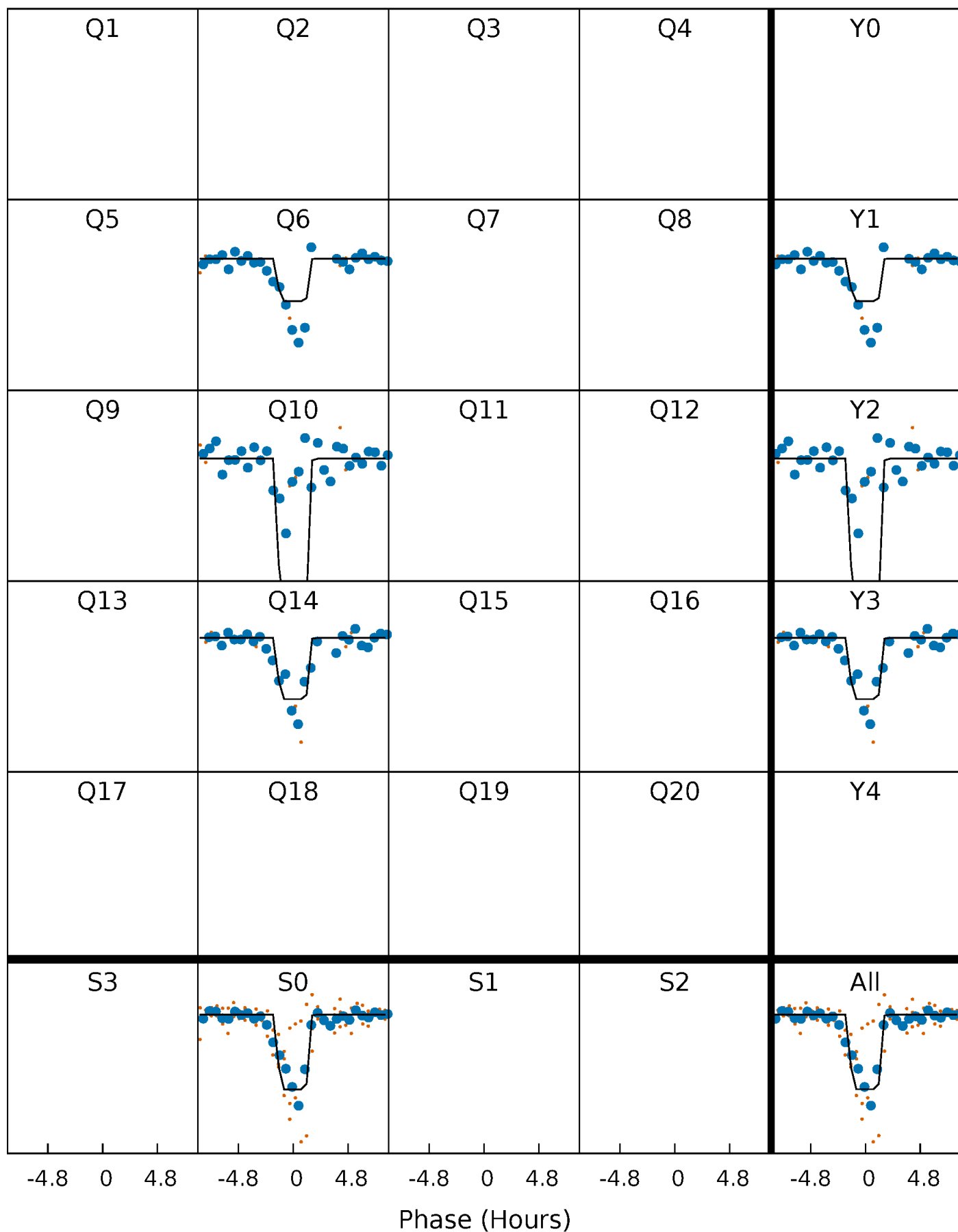
DV Quarter-Phased Transit Curves

TCE 010528093-02 P=386.810175 Days $T_0=183.093712$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

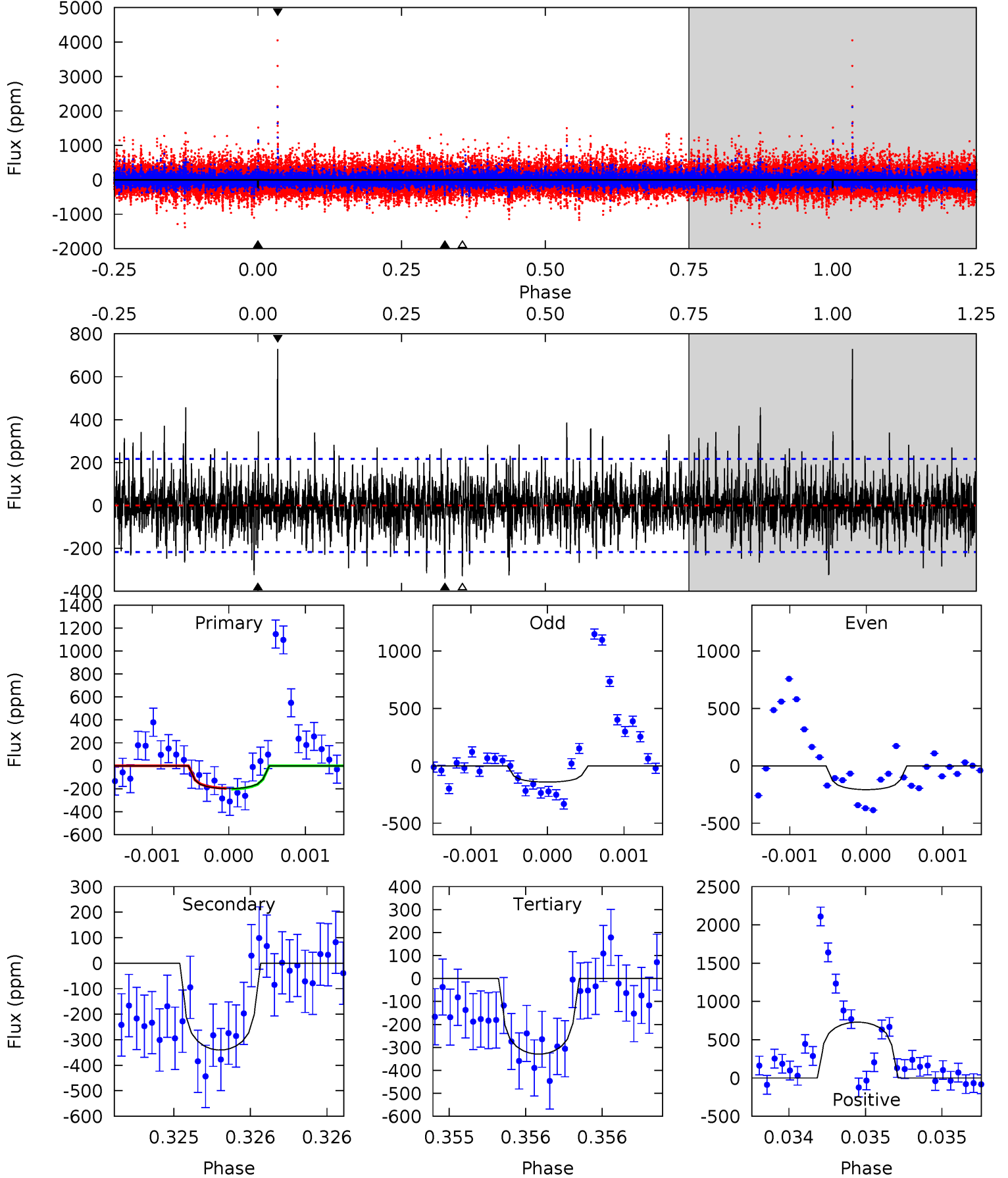
TCE 010528093-02 P=386.828192 Days $T_0=183.101530$ (BKJD)



DV Model-Shift Uniqueness Test

010528093-02, P = 386.810175 Days, E = 183.093712 Days

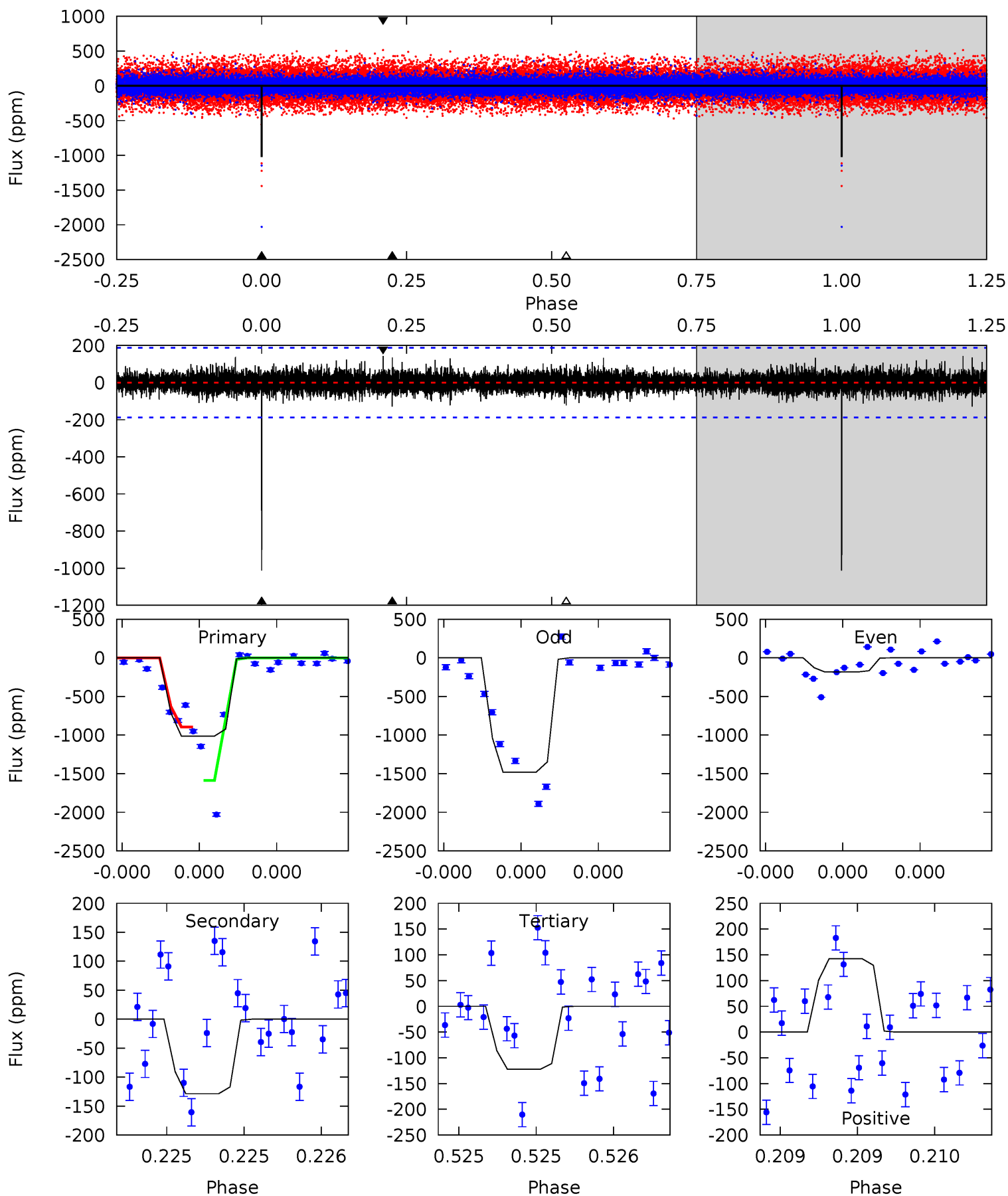
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.07	8.66	8.38	18.6	5.53	3.41	2.10	-3.31	-13.5	0.28	-9.91	0.60	0.55	0.68	0.10



Alt Model-Shift Uniqueness Test

010528093-02, P = 386.828192 Days, E = 183.101530 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.4	3.85	3.66	4.27	5.63	3.56	0.82	26.7	26.1	0.19	-0.42	22.4	0.87	0.12	8.97



Stellar Parameters For KIC 010528093

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5334^{+159}_{-143}	$4.536^{+0.102}_{-0.068}$	$-0.540^{+0.350}_{-0.300}$	$0.746^{+0.084}_{-0.084}$	$0.697^{+0.099}_{-0.039}$	$2.366^{+0.936}_{-0.567}$
	+3%/-3%	+2%/-1%	+65%/-56%	+11%/-11%	+14%/-6%	+40%/-24%
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 010528093-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-340 ± 39	$5.79^{+6.74}_{-3.80}$	293^{+12}_{-12}	3234^{+1537}_{-603}	4724^{+37508}_{-3710}
Alt.	-129 ± 33	$6.63^{+6.31}_{-4.56}$	295^{+13}_{-13}	2747^{+1122}_{-438}	1424^{+12664}_{-1088}

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

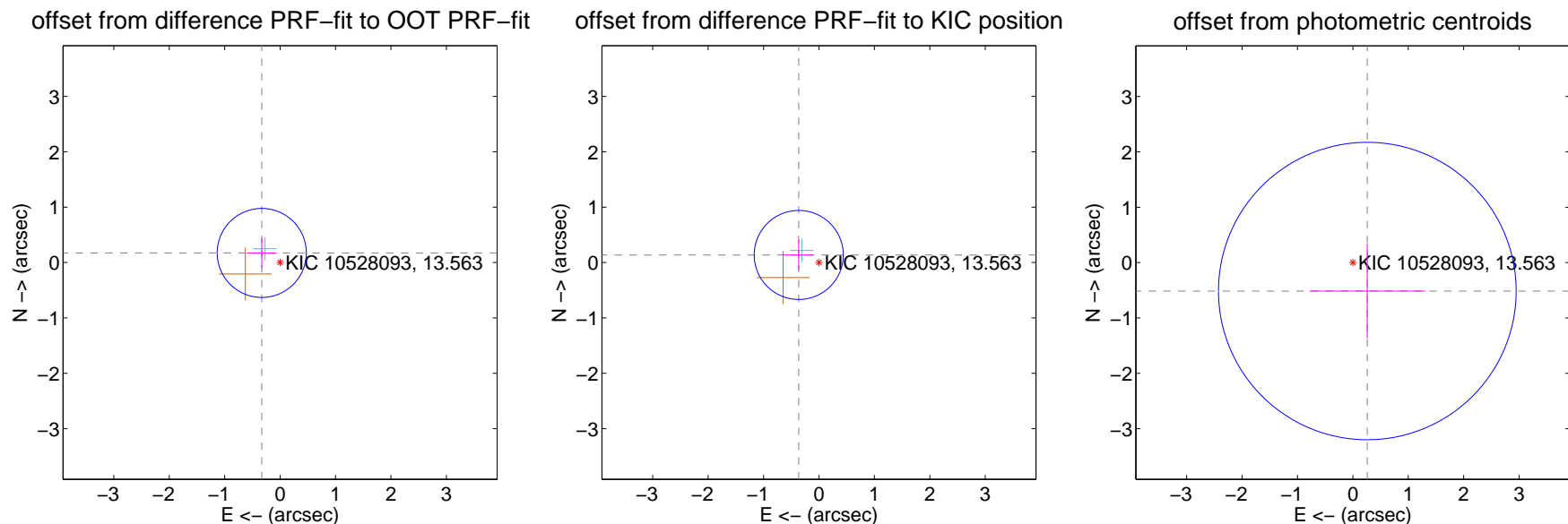
DV Centroid Data

Supplemental centroid analysis for 010528093-02. Kepler magnitude: 13.56. Transit SNR 4.80

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.374 ± 0.268	1.39	0.331 ± 0.268	0.173 ± 0.268
PRF-fit source offset from KIC position	0.390 ± 0.268	1.46	0.365 ± 0.268	0.137 ± 0.268
photometric centroid source offset	0.58 ± 0.90	0.64	-0.26 ± 1.04	-0.51 ± 0.85

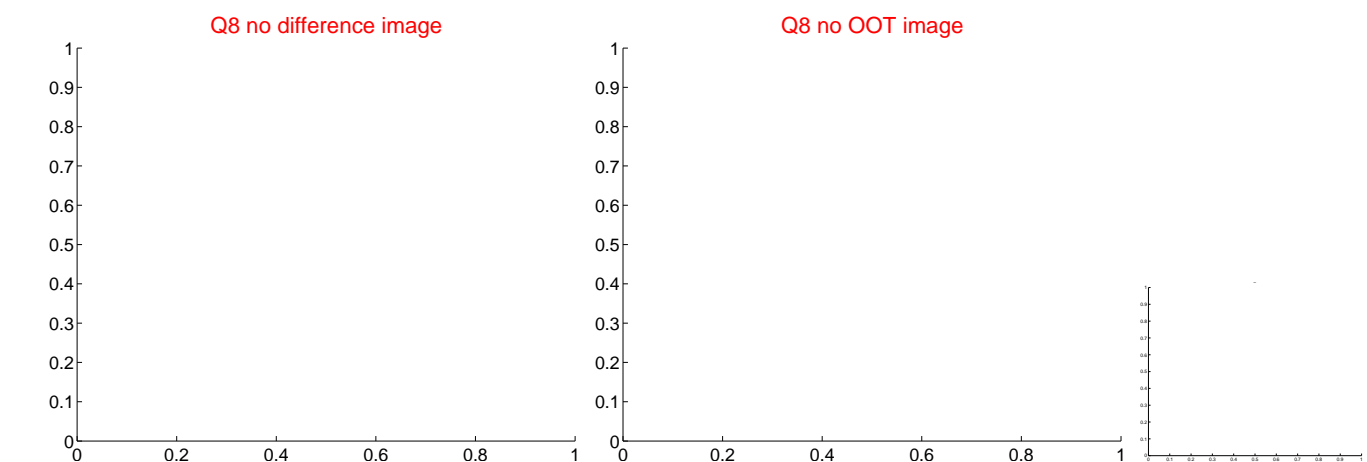
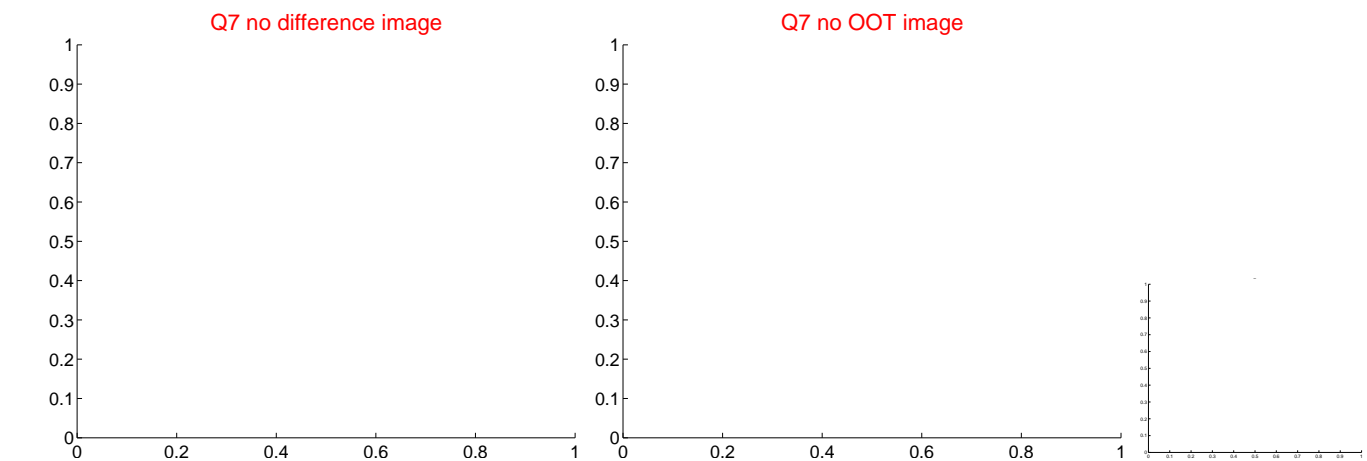
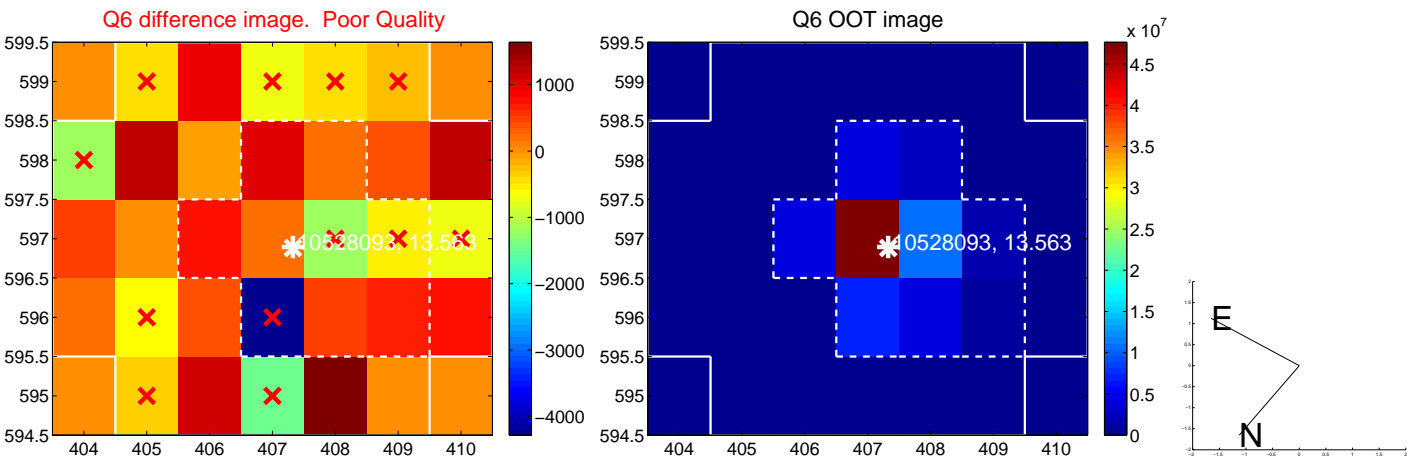
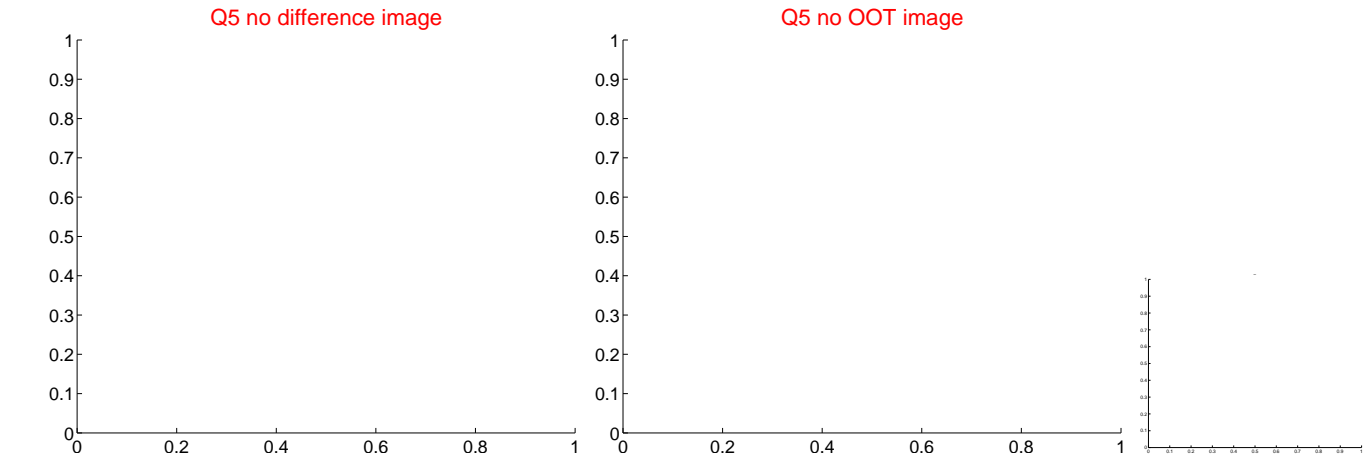


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

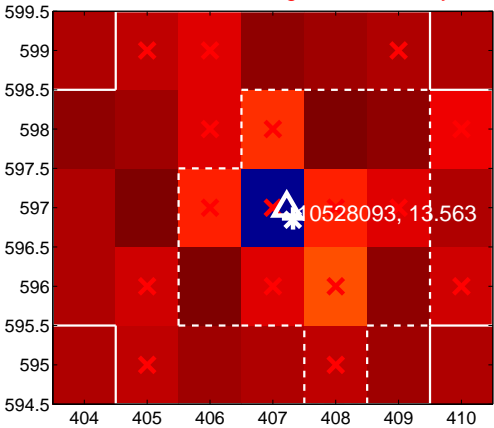
Q9 no difference image



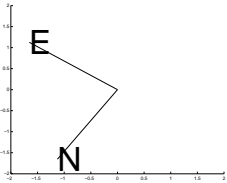
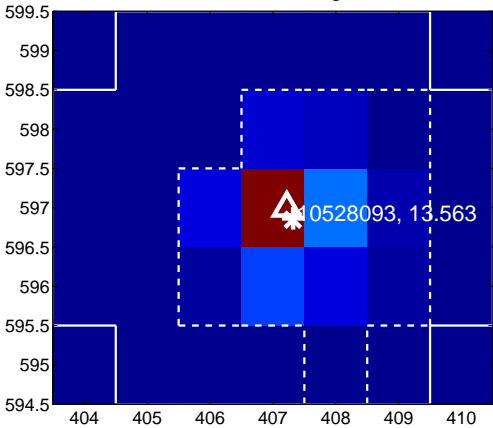
Q9 no OOT image



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.

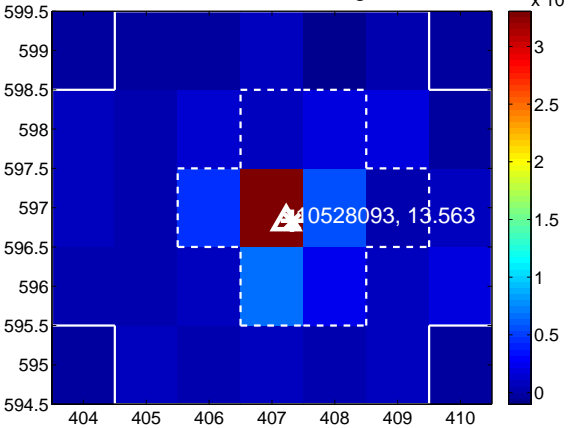
Q13 no difference image



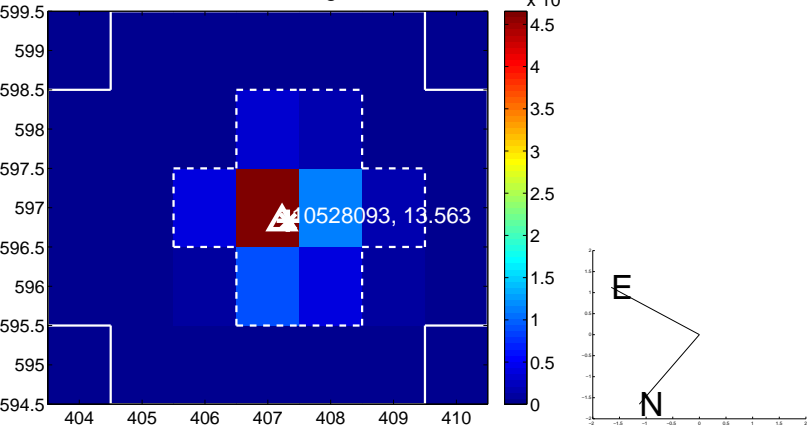
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



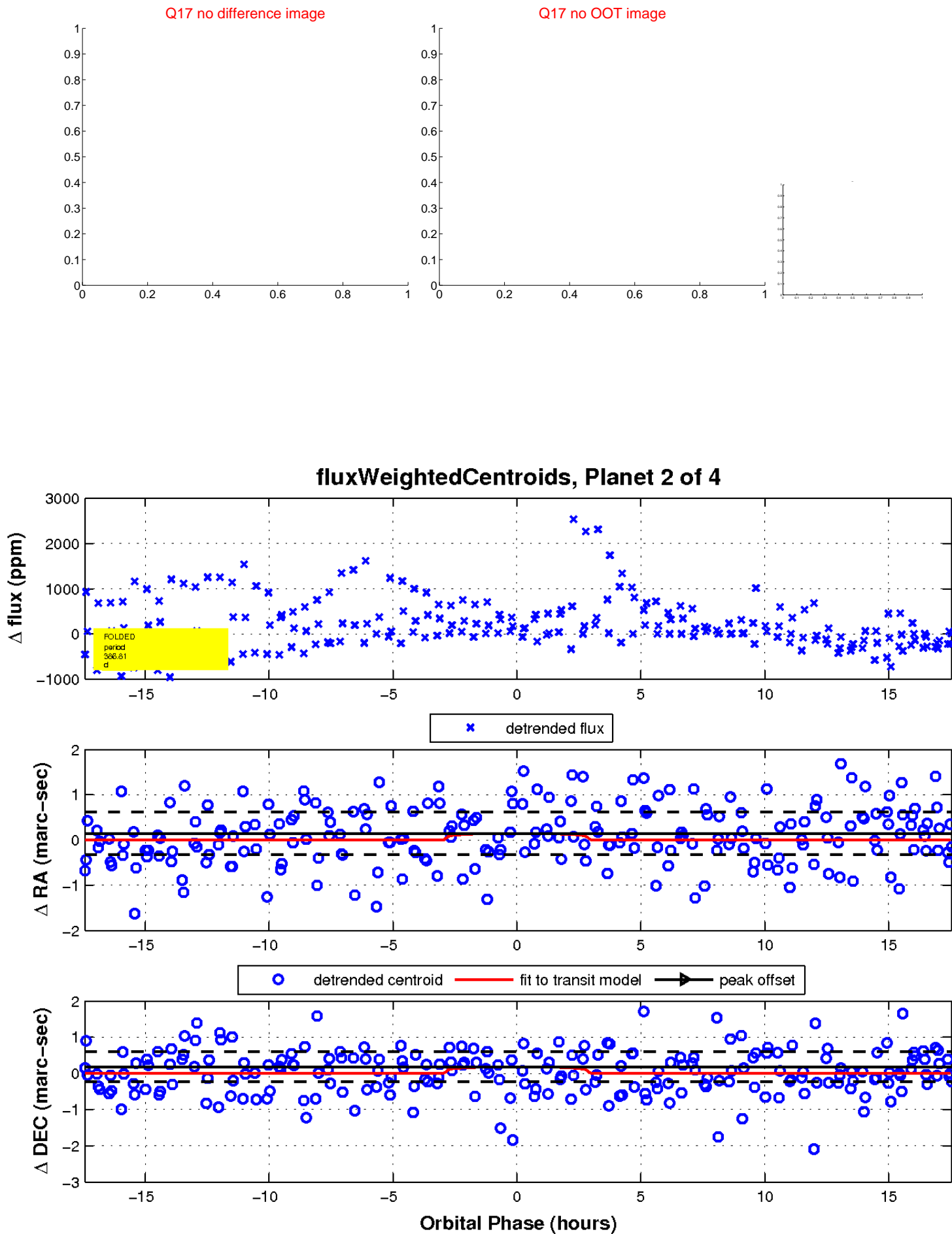
Q16 no difference image



Q16 no OOT image

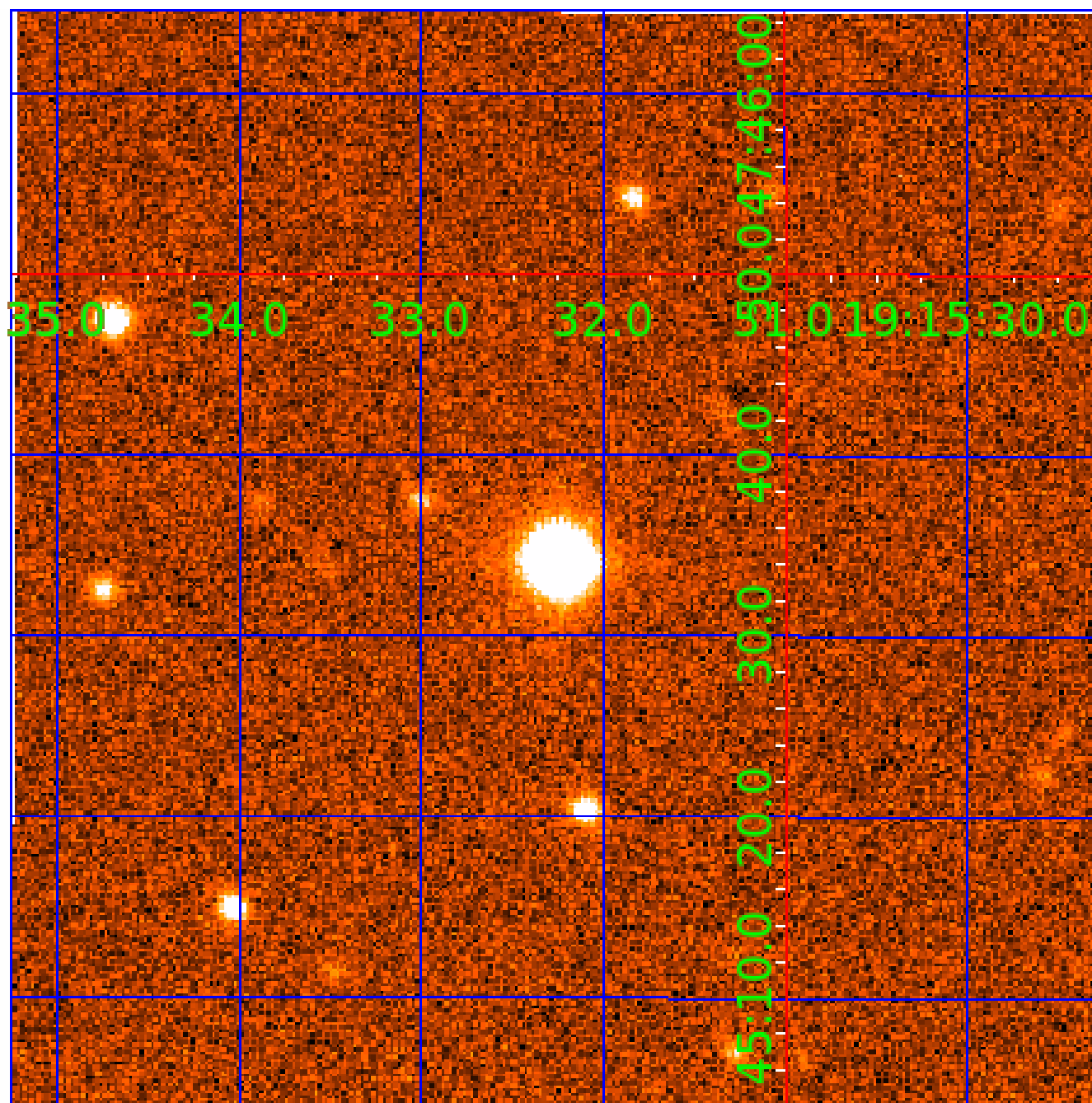


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010528093

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})
010528093-01	OBS	No	444.098646	468.272291	826.1	6.718	15.5	8.0	0.75	5334	2.79	0.40
010528093-02	OBS	No	386.810175	183.093712	431.4	5.849	13.4	4.8	0.75	5334	1.53	0.47
010528093-03	OBS	No	248.701428	230.987729	406.5	4.099	13.7	4.6	0.75	5334	1.65	0.86
010528093-04	OBS	No	497.839674	390.797322	798.3	5.942	12.4	9.3	0.75	5334	2.27	0.34

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010528093-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010528093-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010528093-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010528093-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_POS_DV—INCONSISTENT_TRANS

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

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

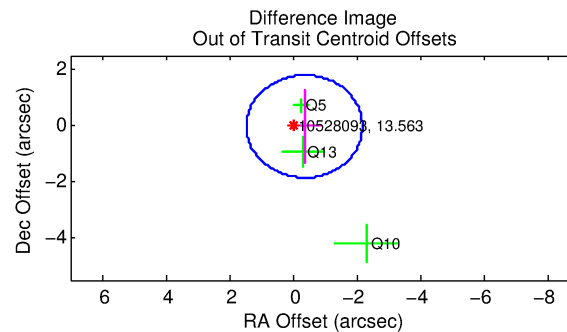
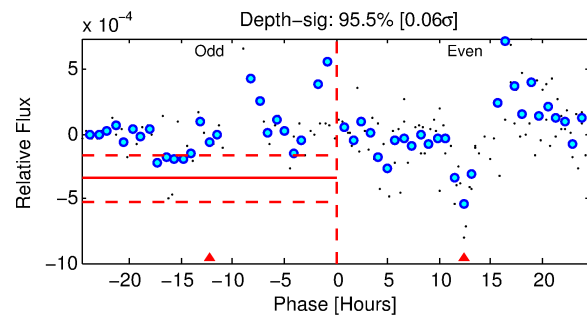
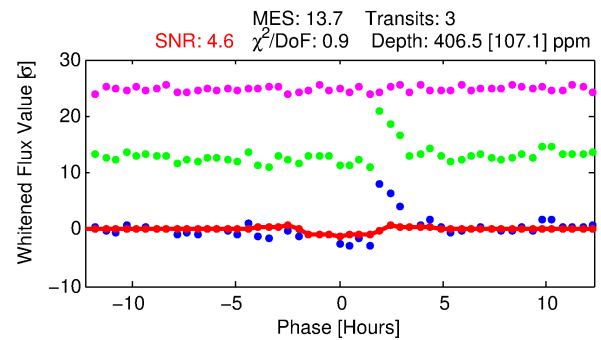
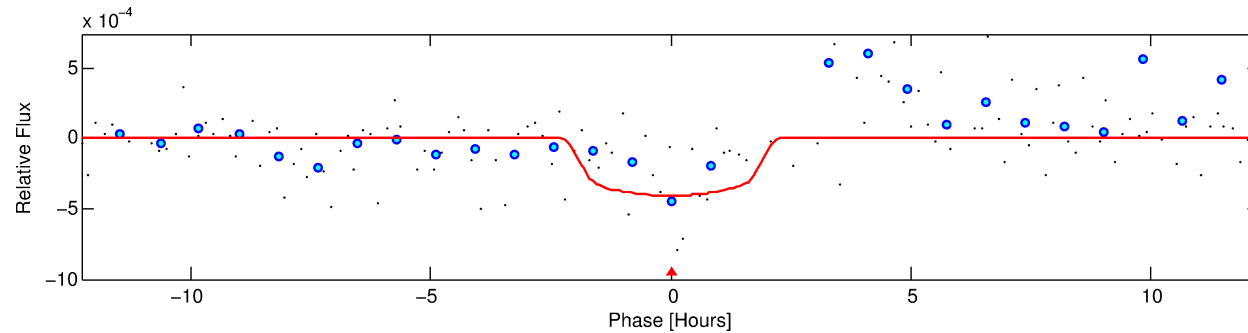
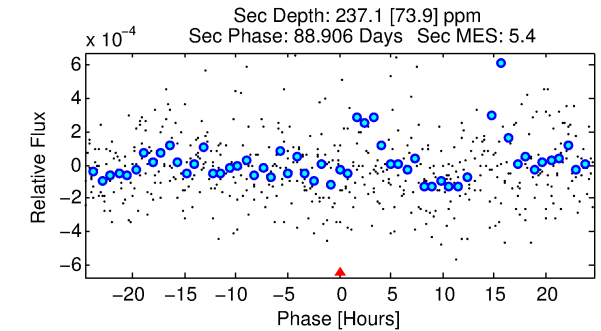
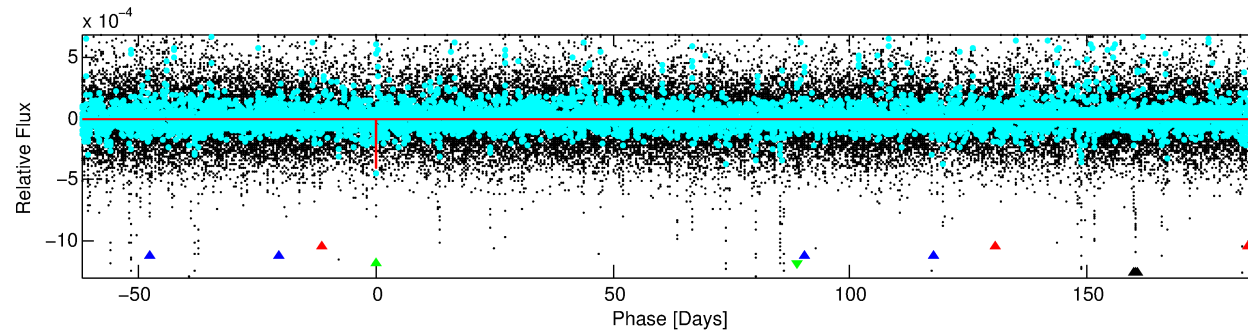
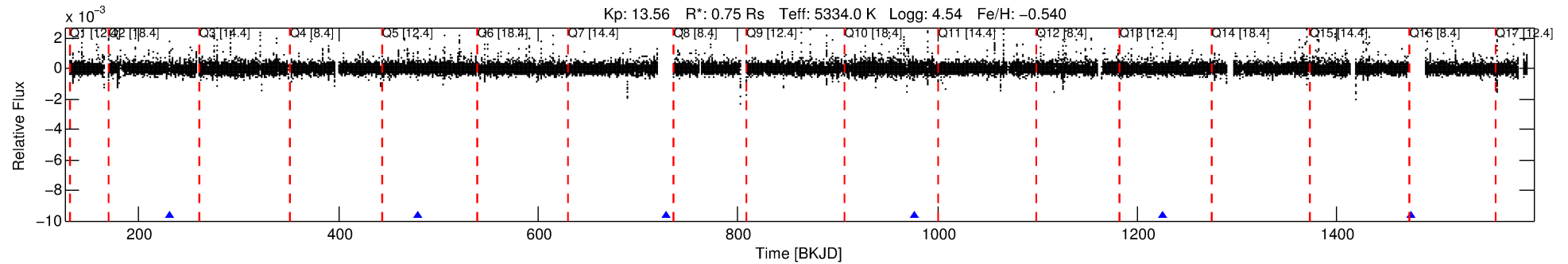
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010528093-03

No Significant Match Found

DV One-Page Summary

KIC: 10528093 Candidate: 3 of 4 Period: 248.701 d



DV Fit Results:

Period = 248.70143 [0.00617] d
Epoch = 230.9877 [0.0194] BKJD
Rp/R* = 0.0203 [0.0257]
a/R* = 309.58 [1647.37]
b = 0.77 [2.83]
Seff = 0.86 [0.18]
Teq = 245 [13] K
Rp = 1.65 [2.10] Re
a = 0.6865 [0.0745] AU
Ag = 22599.72 [57849.61] [0.39σ]
Teffp = 4650 [2972] K [1.48σ]

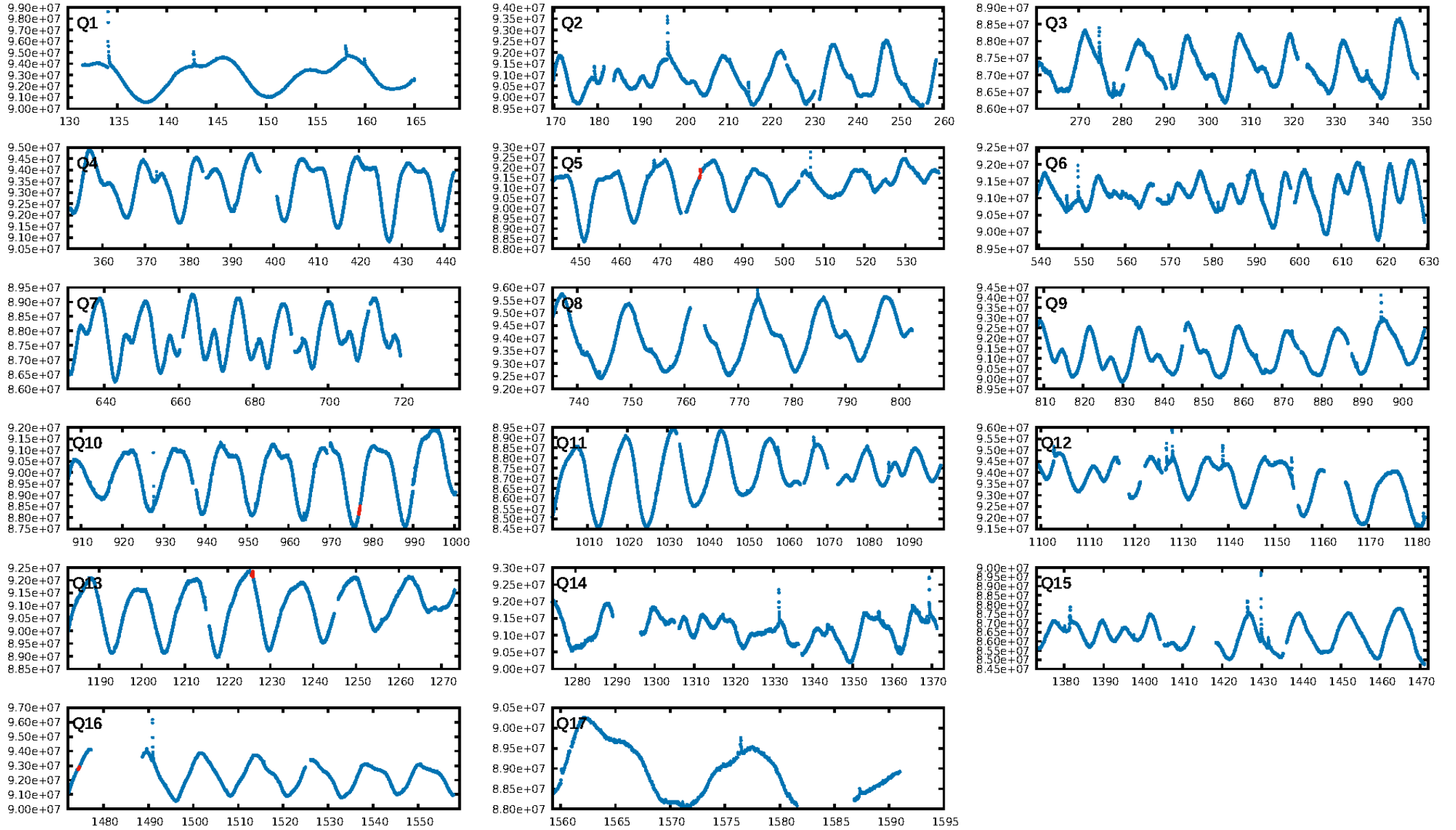
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [464.08σ]
ModelChiSquare2-sig: 12.6%
ModelChiSquareGof-sig: 97.2%
Bootstrap-pfa: 4.13e-12
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 4.26
Centroid-sig: 31.2%
Centroid-so: 1.587 arcsec [1.14σ]
OotOffset-rm: 0.364 arcsec [0.60σ]
OotOffset-st: 1/0/0/2 [3]
KicOffset-rm: 0.392 arcsec [0.57σ]
KicOffset-st: 1/0/0/2 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

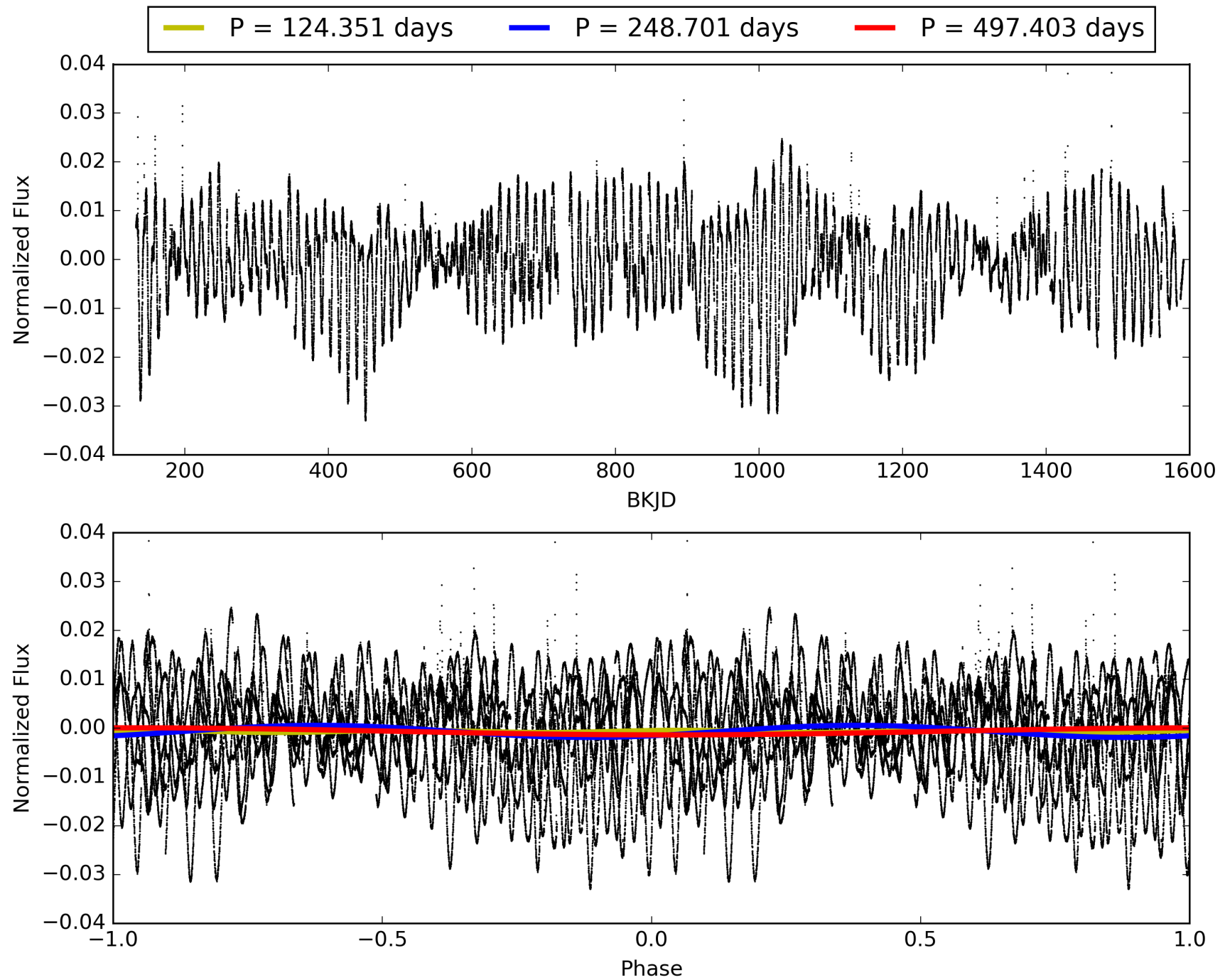
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:52:09 Z

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

TCE 010528093-03, PDC Light Curves

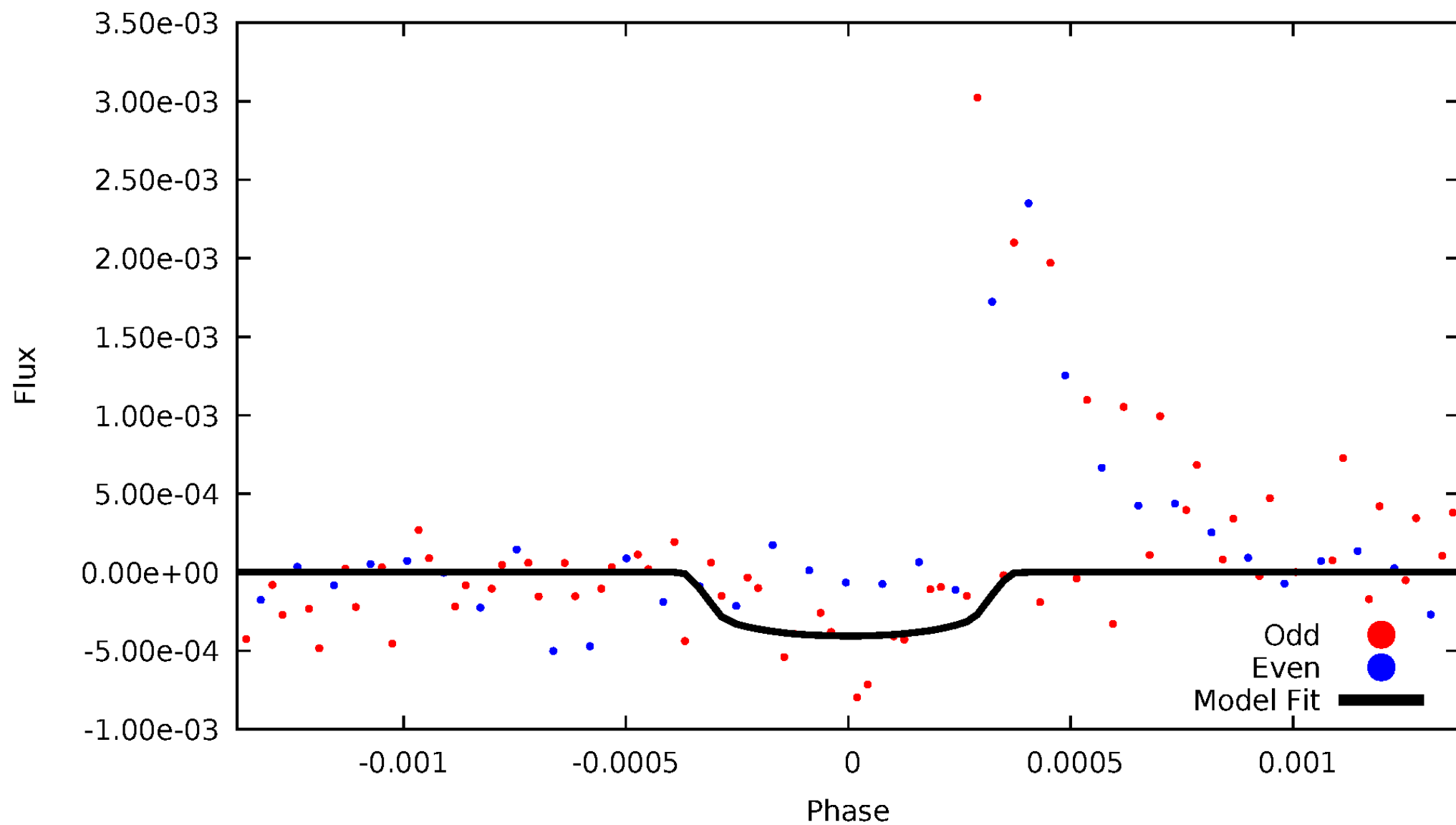


TCE 010528093-03



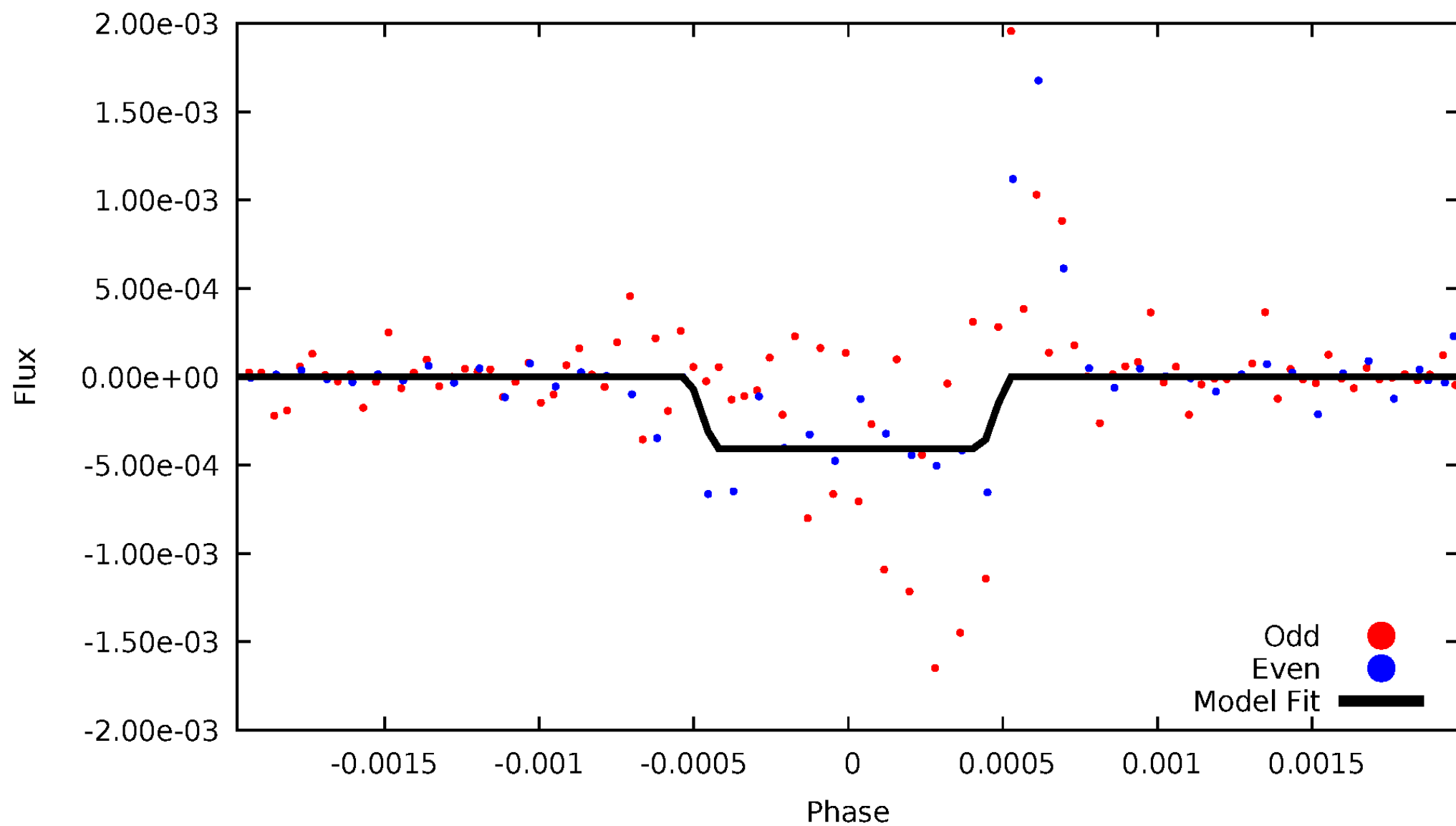
DV Odd/Even

TCE 010528093-03

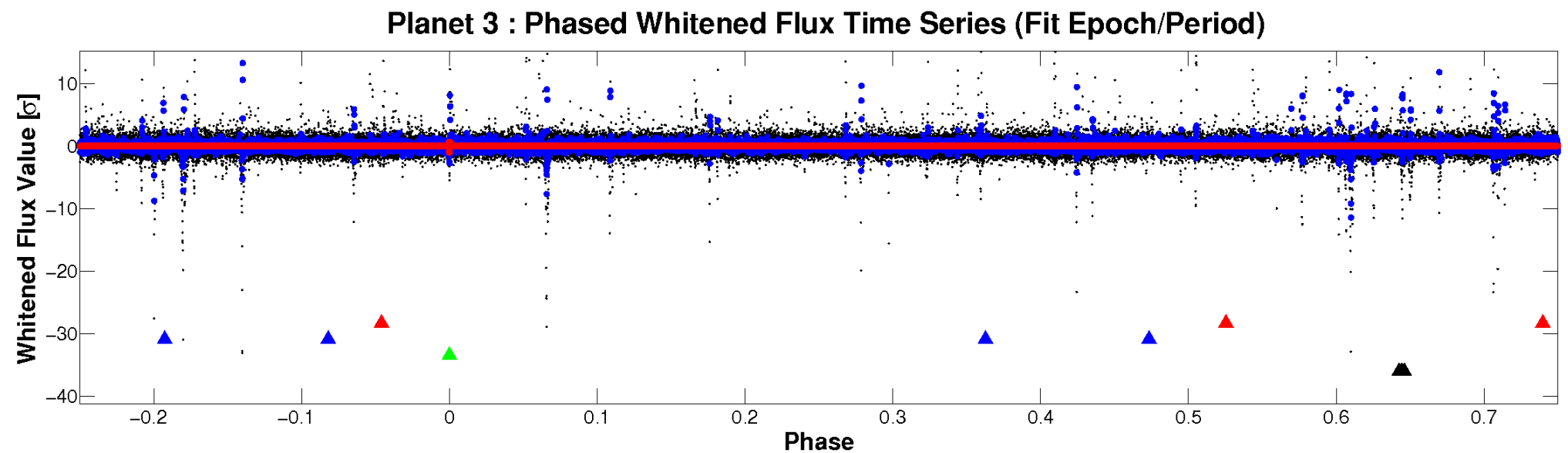
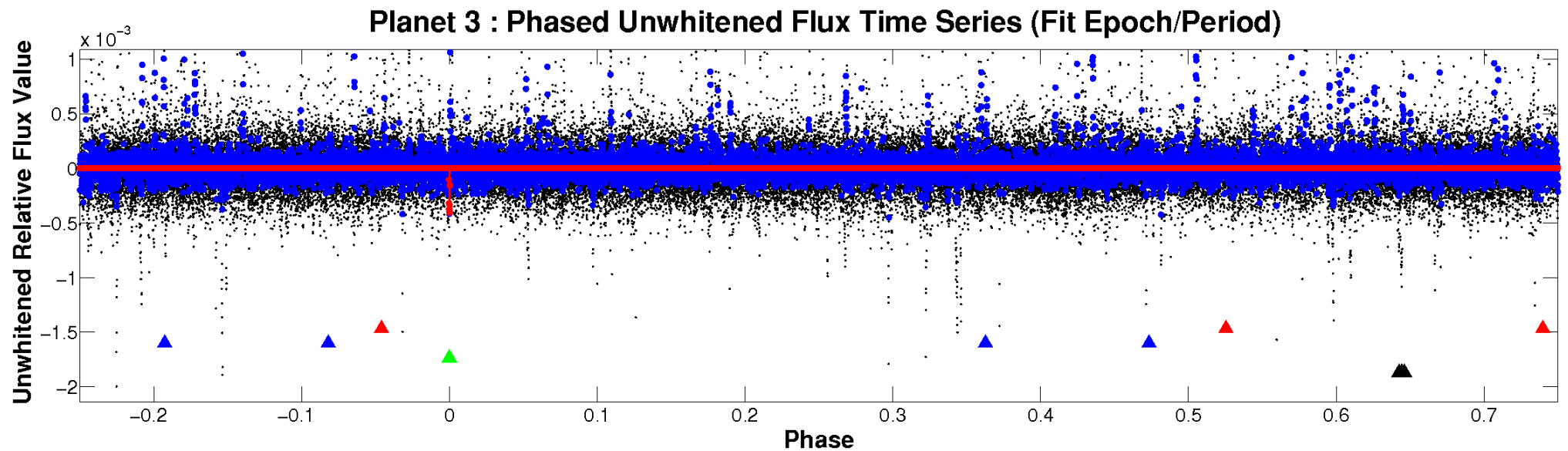


ALT Odd/Even

TCE 010528093-03

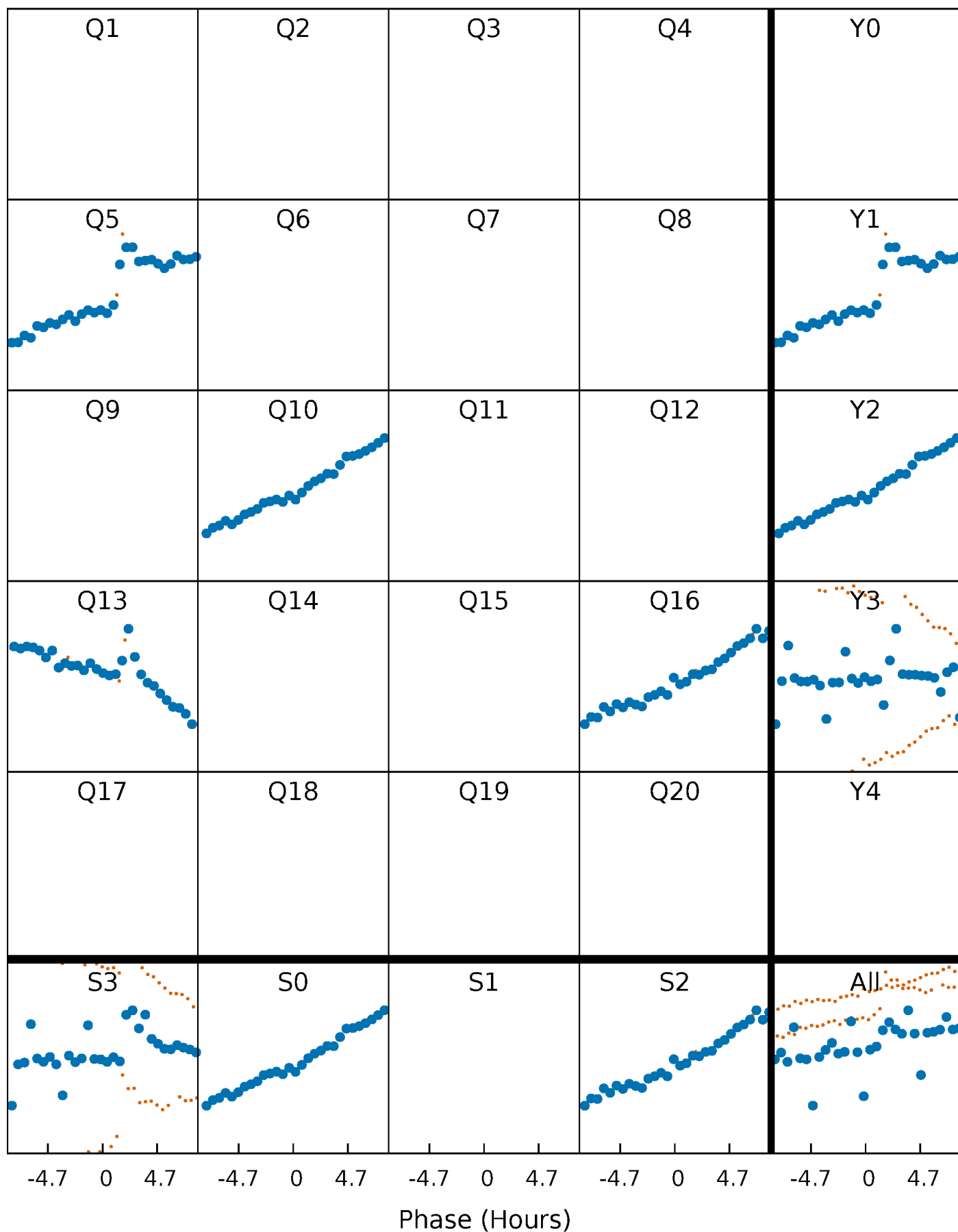


Non-Whitened Vs. Whitened Light Curve



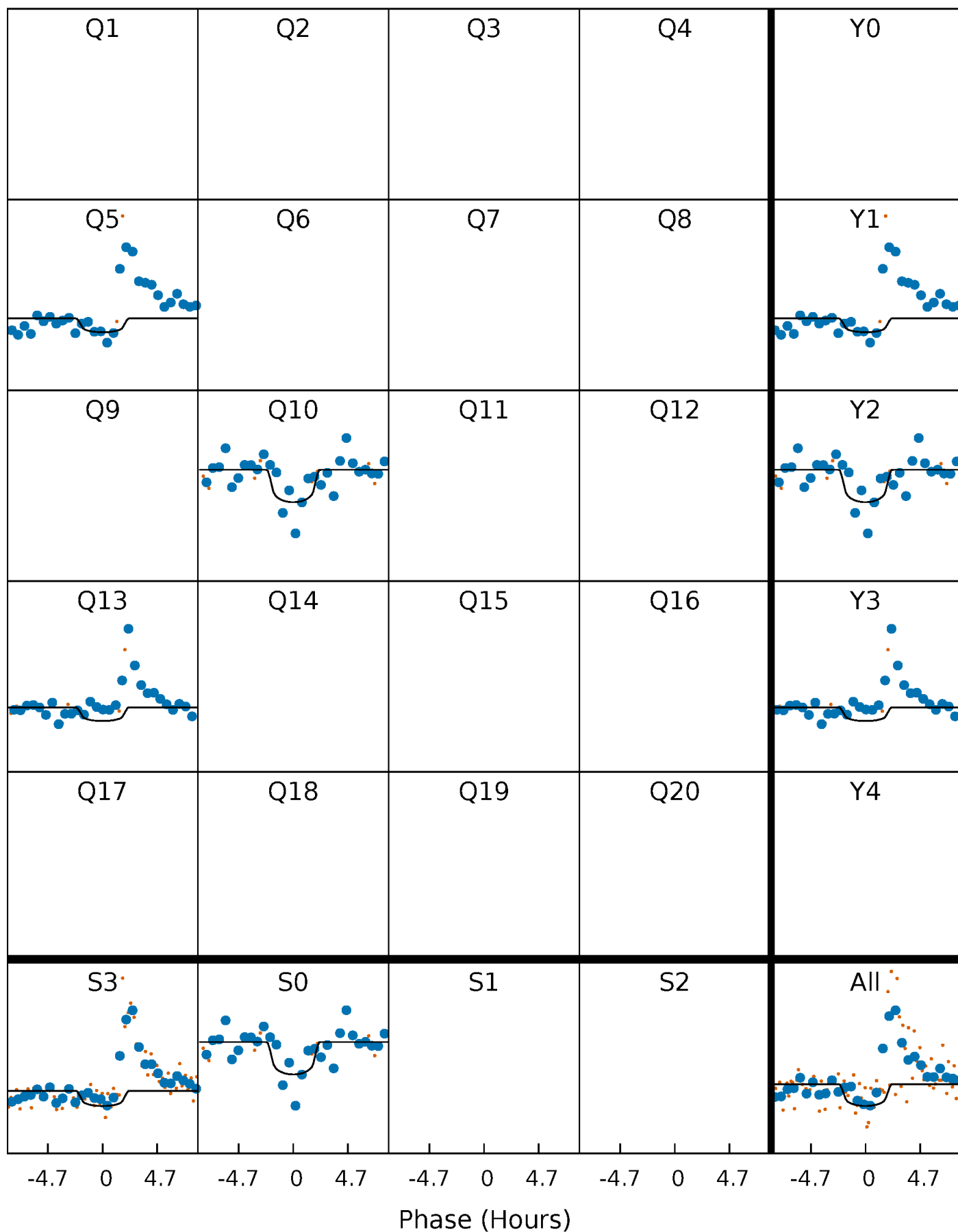
PDC Quarter-Phased Transit Curves

TCE 010528093-03 P=248.701428 Days $T_0=230.987729$ (BKJD)



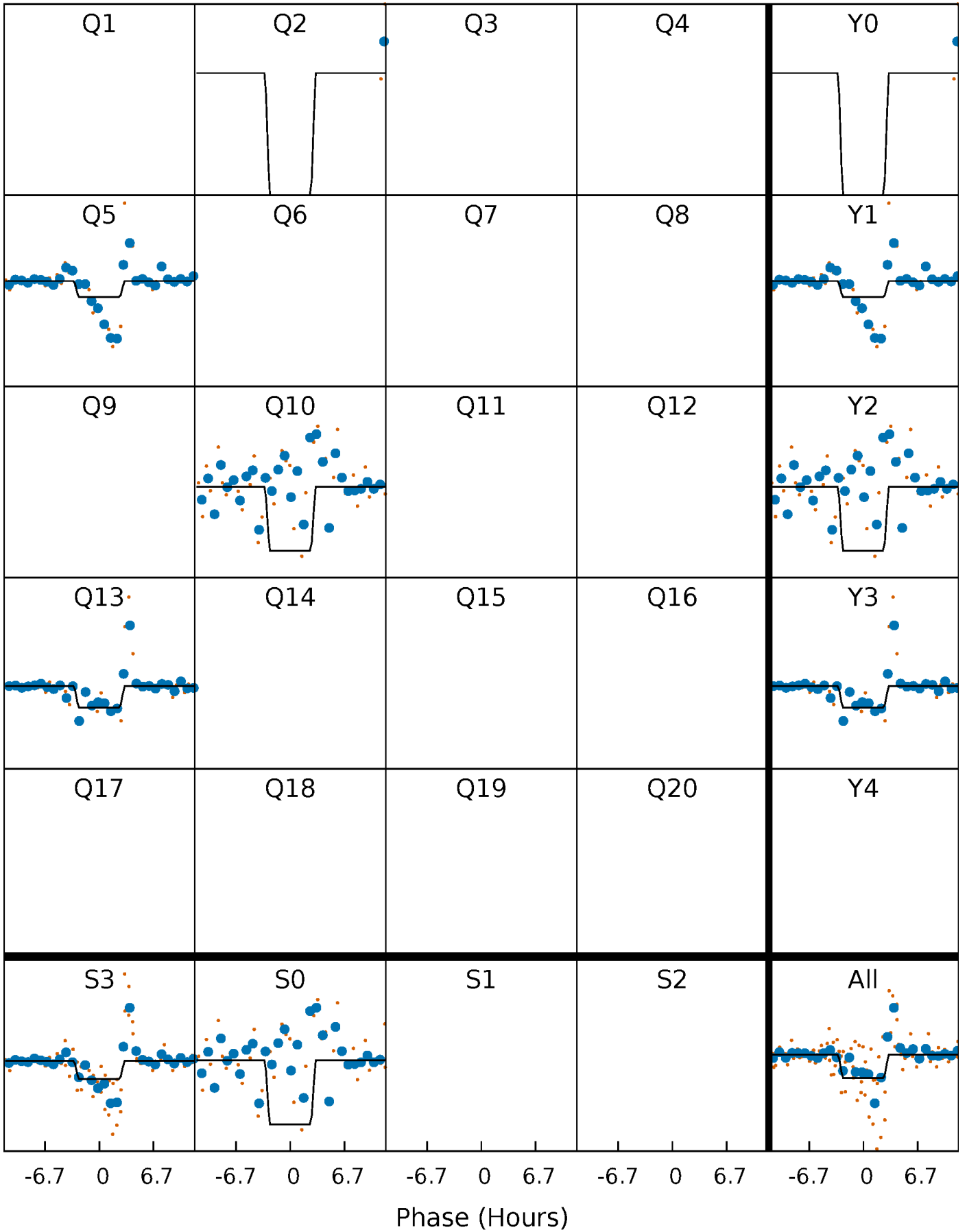
DV Quarter-Phased Transit Curves

TCE 010528093-03 $P=248.701428$ Days $T_0=230.987729$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

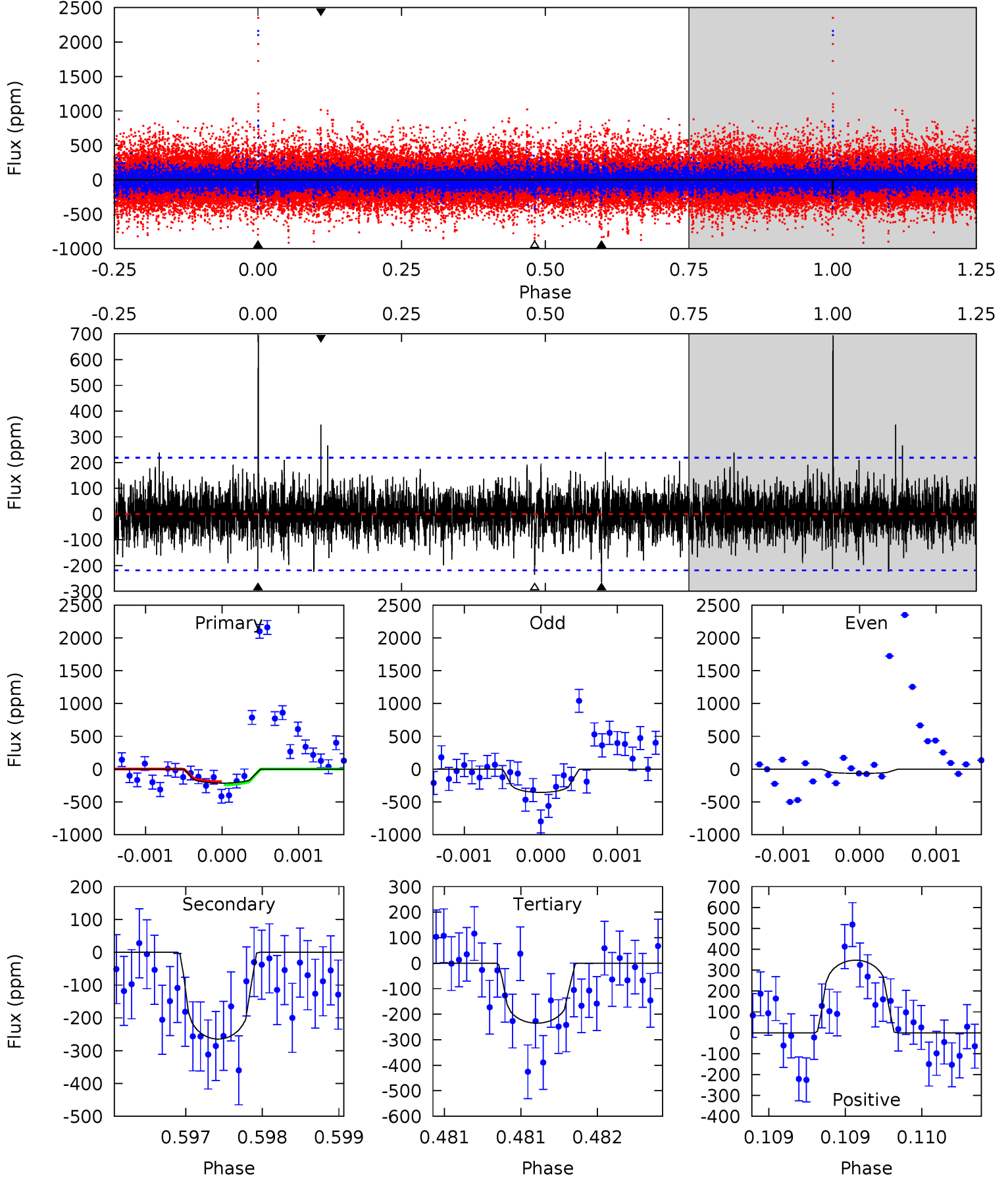
TCE 010528093-03 $P=248.703670$ Days $T_0=230.926709$ (BKJD)



DV Model-Shift Uniqueness Test

010528093-03, P = 248.701428 Days, E = 230.987729 Days

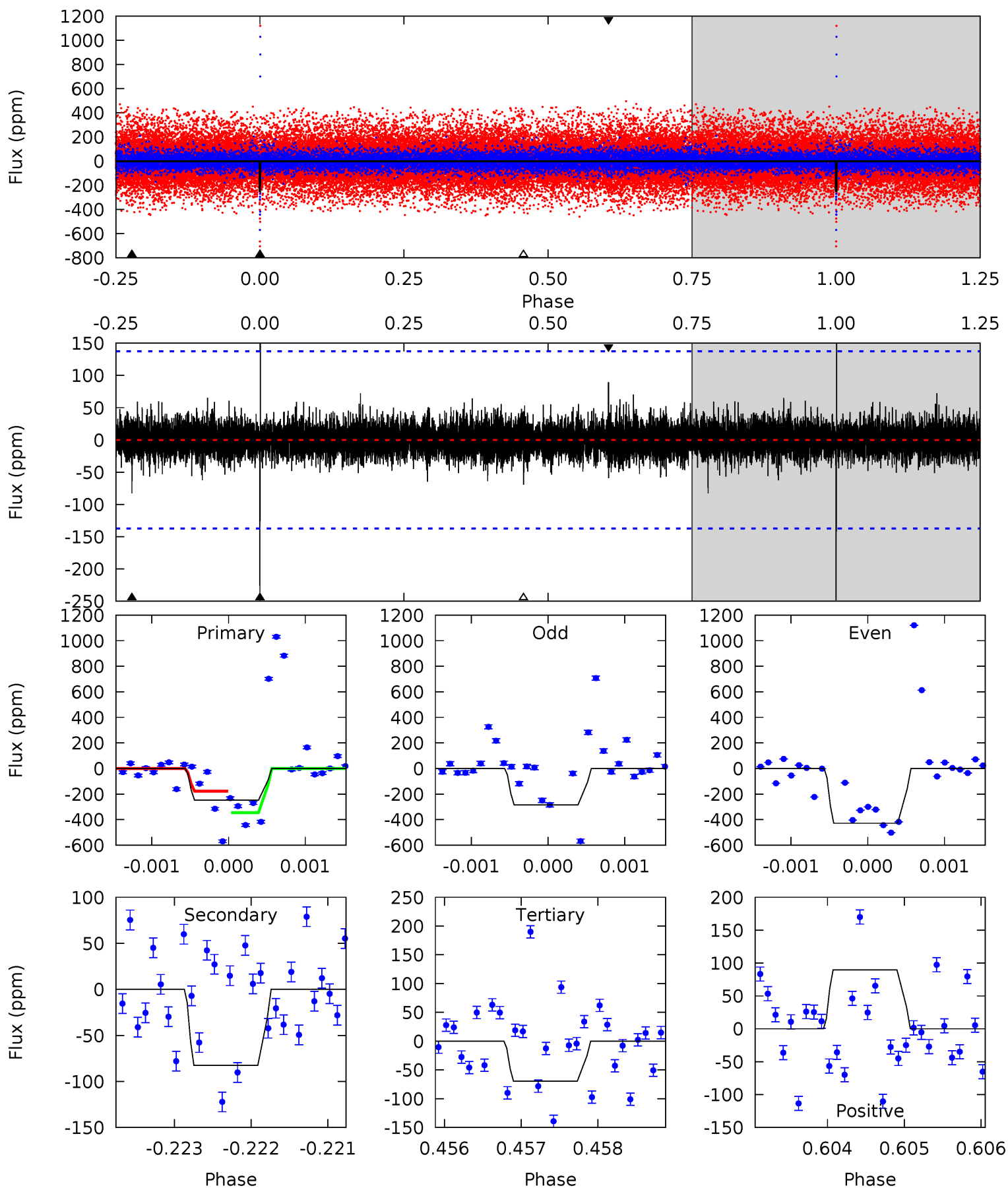
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.37	6.66	5.92	8.75	5.50	3.37	1.40	-0.55	-3.38	0.74	-2.09	3.33	4.12	0.72	0.62



Alt Model-Shift Uniqueness Test

010528093-03, P = 248.703670 Days, E = 230.926709 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.87	3.28	2.76	3.56	5.46	3.31	0.63	7.11	6.31	0.52	-0.28	3.37	0.93	0.37	3.33



Stellar Parameters For KIC 010528093

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5334^{+159}_{-143}	$4.536^{+0.102}_{-0.068}$	$-0.540^{+0.350}_{-0.300}$	$0.746^{+0.084}_{-0.084}$	$0.697^{+0.099}_{-0.039}$	$2.366^{+0.936}_{-0.567}$
	+3%/-3%	+2%/-1%	+65%/-56%	+11%/-11%	+14%/-6%	+40%/-24%
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 010528093-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-265 ± 40	$2.17^{+1.85}_{-1.42}$	341^{+13}_{-14}	4335^{+2718}_{-832}	$14656^{+104099}_{-10403}$
Alt.	-82 ± 25	$2.21^{+1.99}_{-1.40}$	341^{+15}_{-13}	3484^{+1611}_{-591}	4302^{+27422}_{-3121}

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

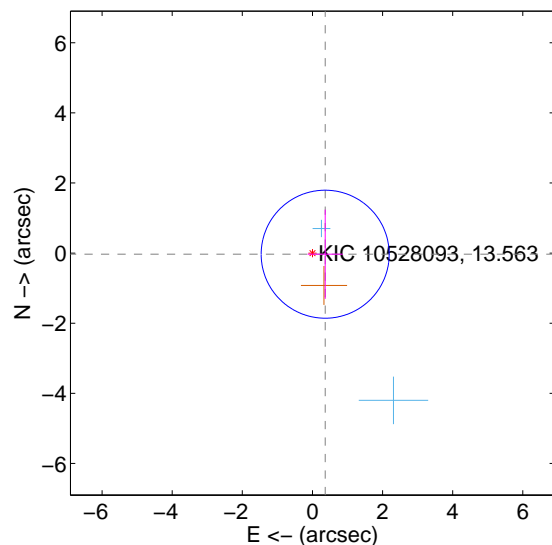
Supplemental centroid analysis for 010528093-03. Kepler magnitude: 13.56. Transit SNR 4.59

There are 2 quarters with good PRF difference image offsets

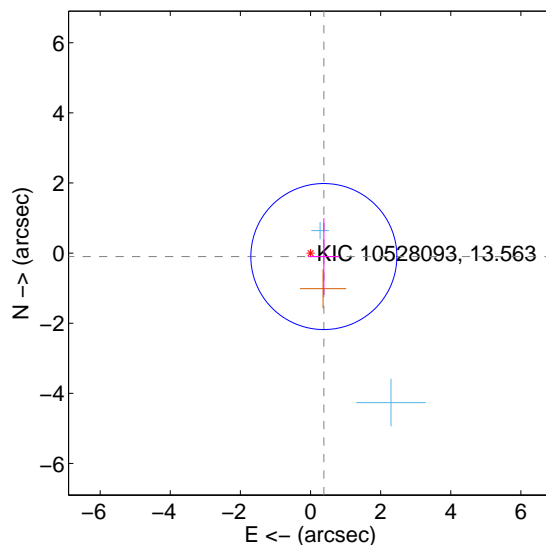
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.364 ± 0.608	0.60	-0.363 ± 0.503	-0.032 ± 1.272
PRF-fit source offset from KIC position	0.392 ± 0.694	0.57	-0.380 ± 0.450	-0.098 ± 1.093
photometric centroid source offset	1.59 ± 1.39	1.14	-1.59 ± 1.39	0.05 ± 1.33

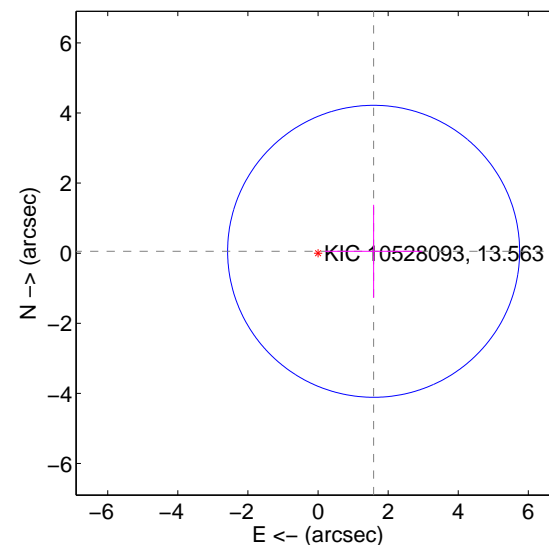
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

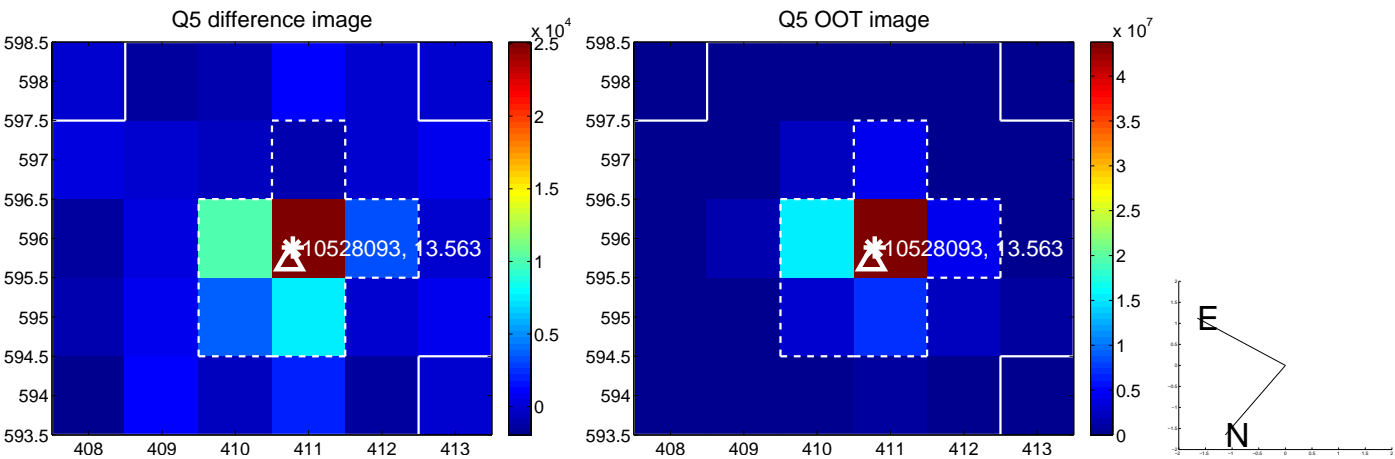


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

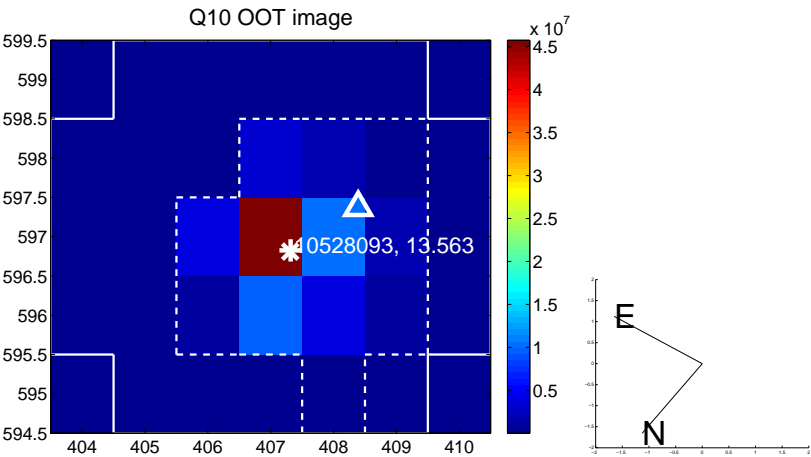
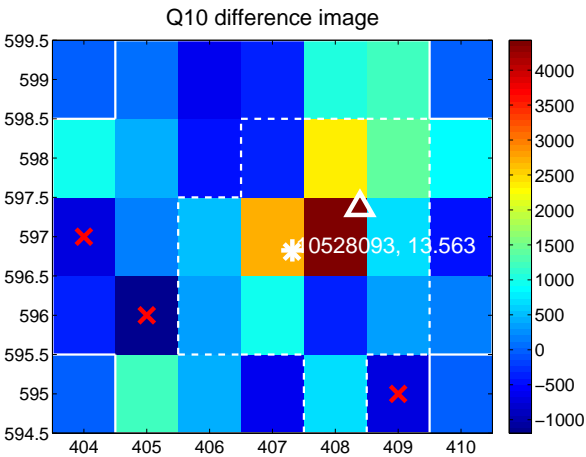


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

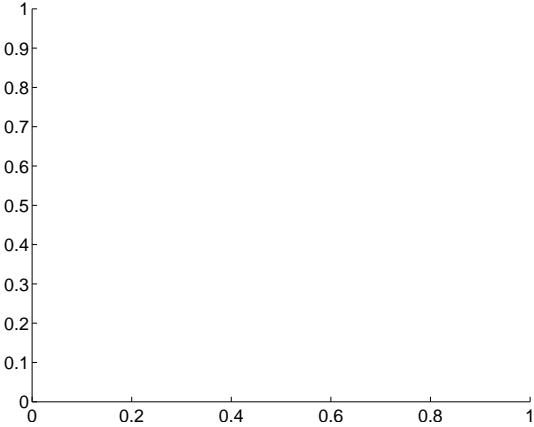
Q9 no difference image



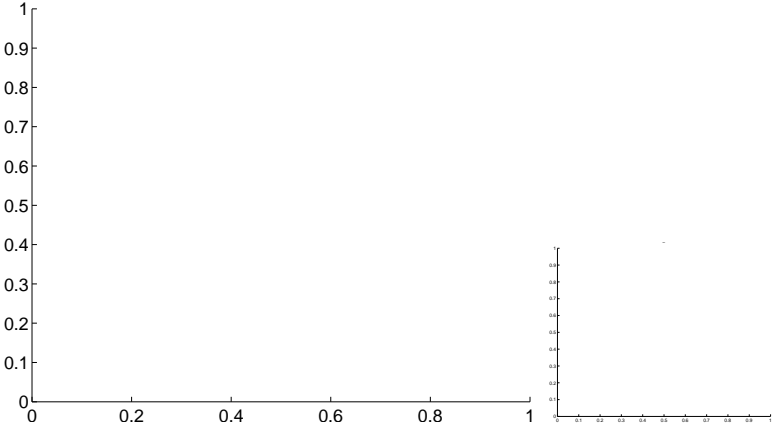
Q9 no OOT image



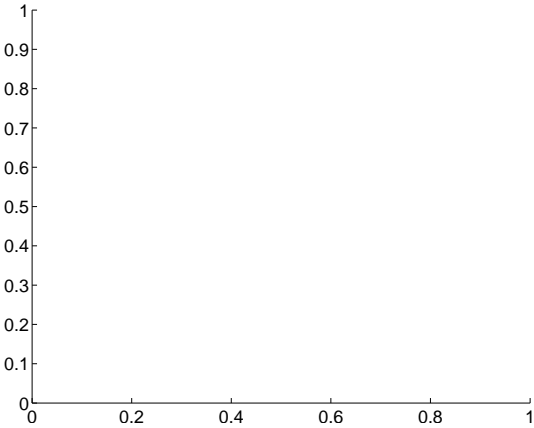
Q11 no difference image



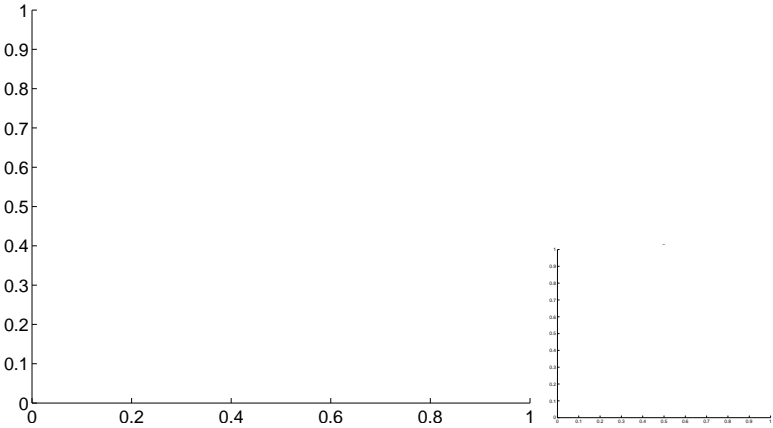
Q11 no OOT image



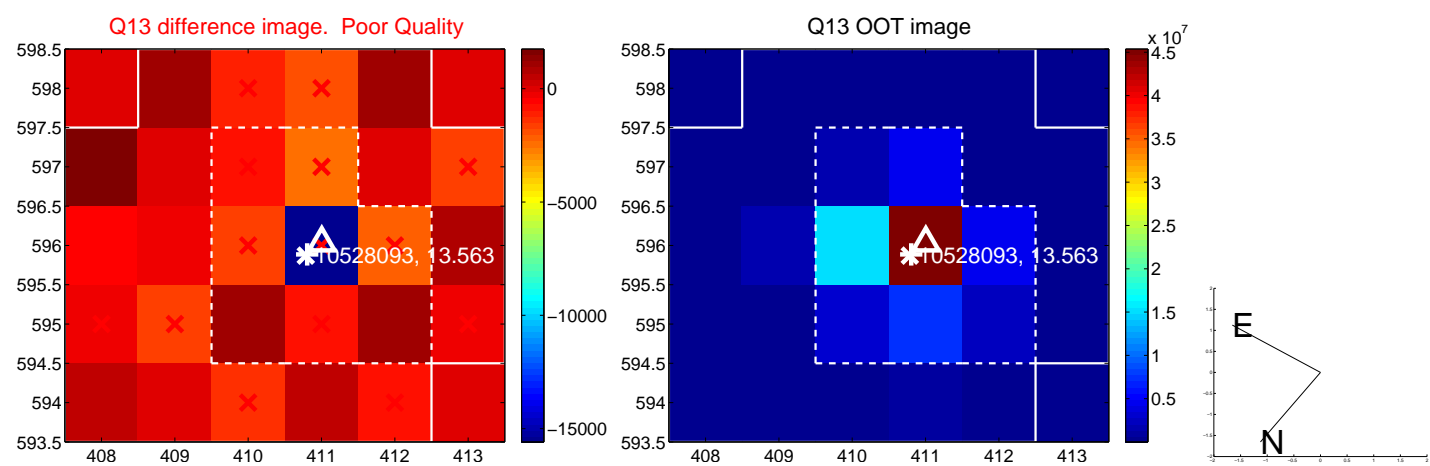
Q12 no difference image



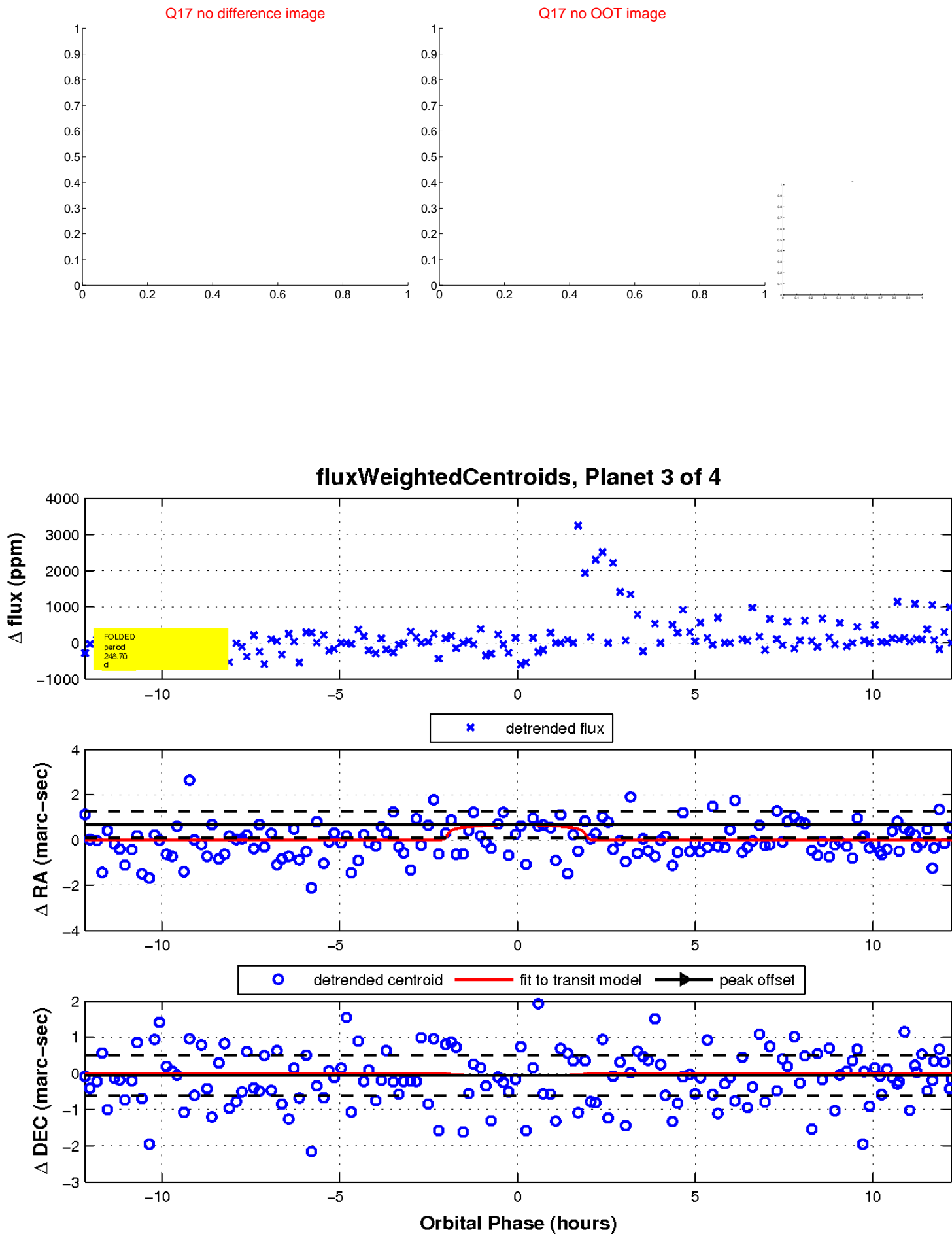
Q12 no OOT image



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

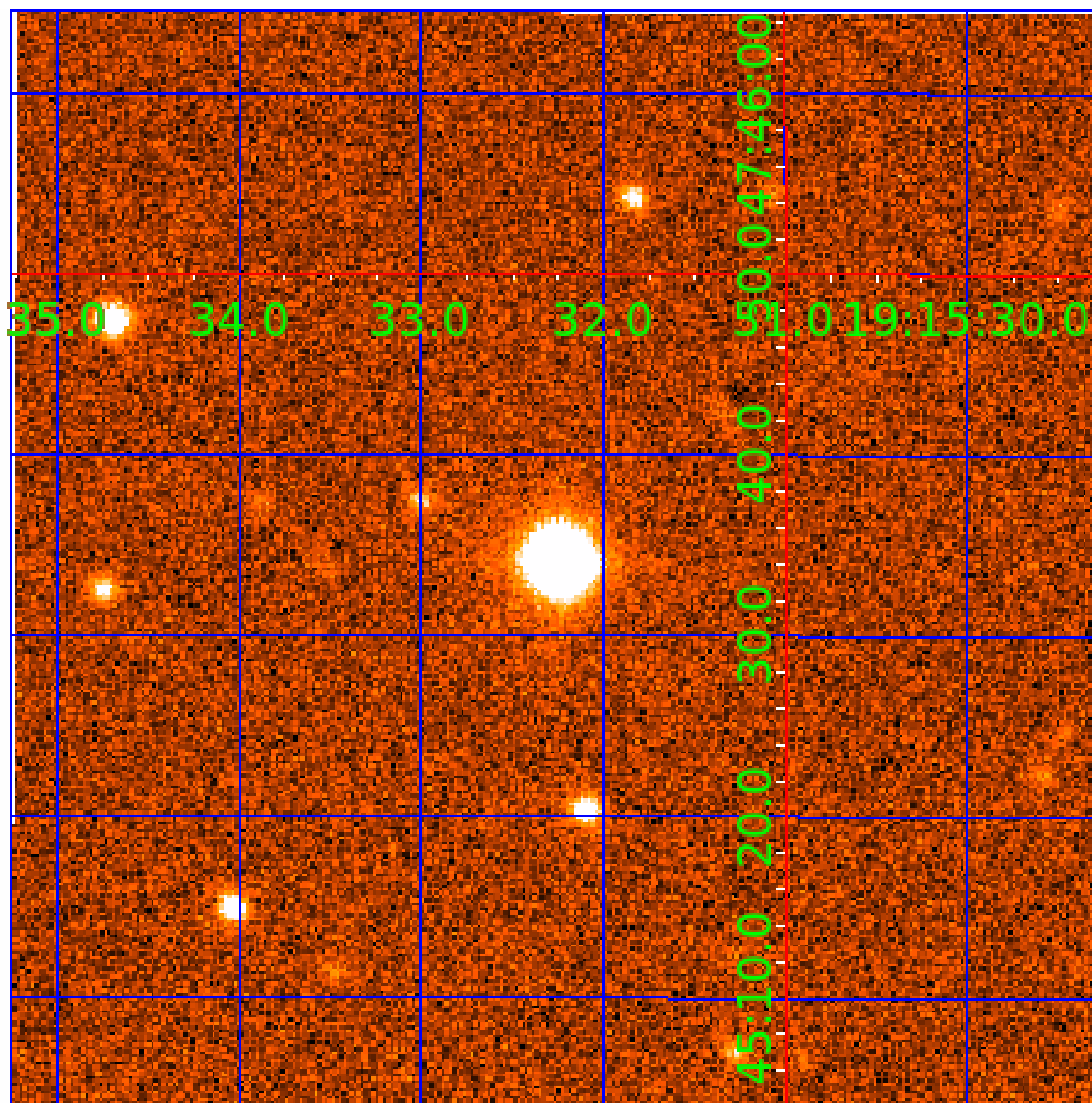


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010528093

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})
010528093-01	OBS	No	444.098646	468.272291	826.1	6.718	15.5	8.0	0.75	5334	2.79	0.40
010528093-02	OBS	No	386.810175	183.093712	431.4	5.849	13.4	4.8	0.75	5334	1.53	0.47
010528093-03	OBS	No	248.701428	230.987729	406.5	4.099	13.7	4.6	0.75	5334	1.65	0.86
010528093-04	OBS	No	497.839674	390.797322	798.3	5.942	12.4	9.3	0.75	5334	2.27	0.34

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010528093-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010528093-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010528093-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010528093-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_POS_DV—INCONSISTENT_TRANS

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

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

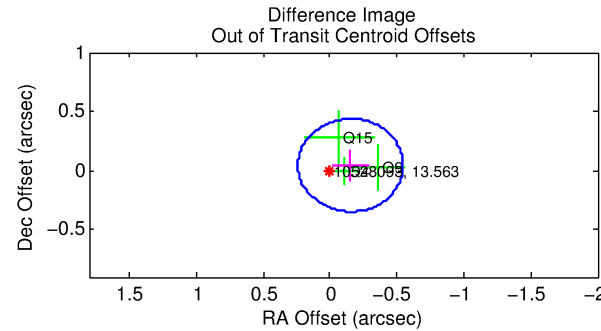
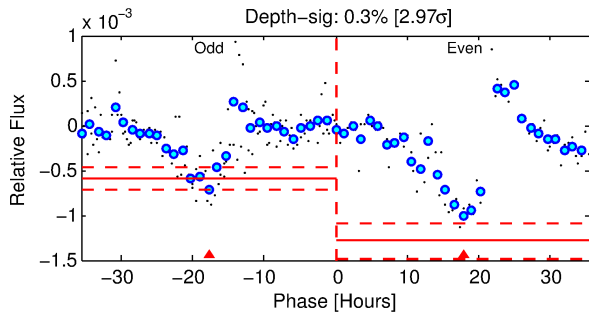
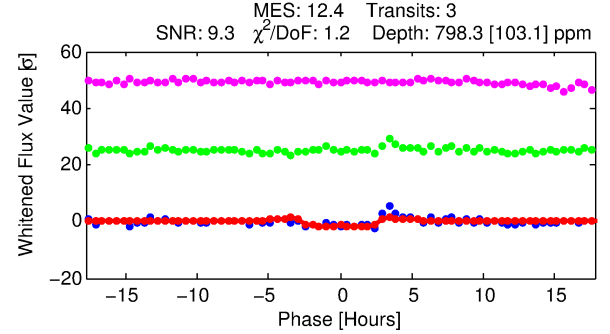
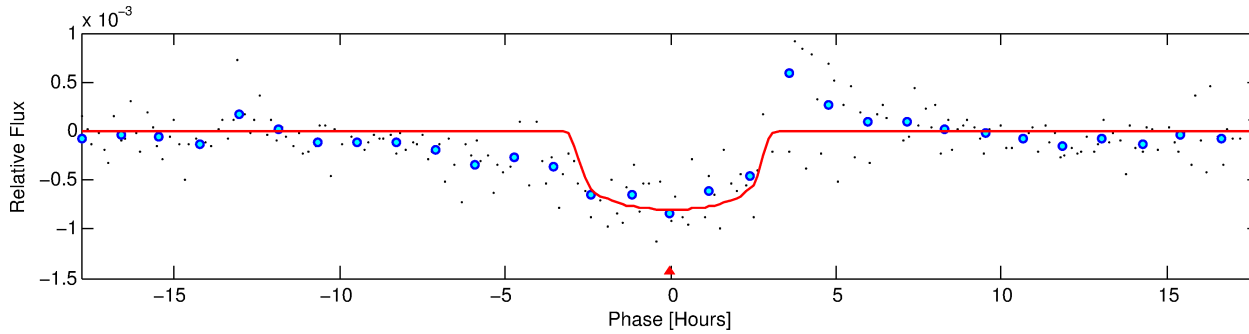
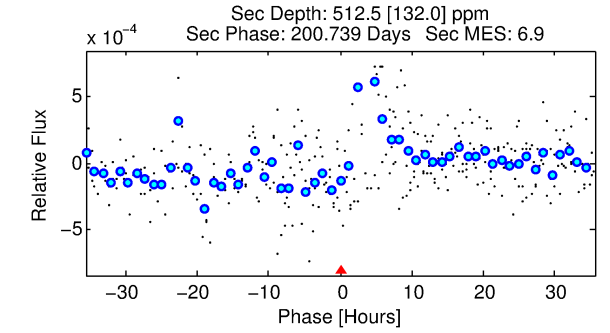
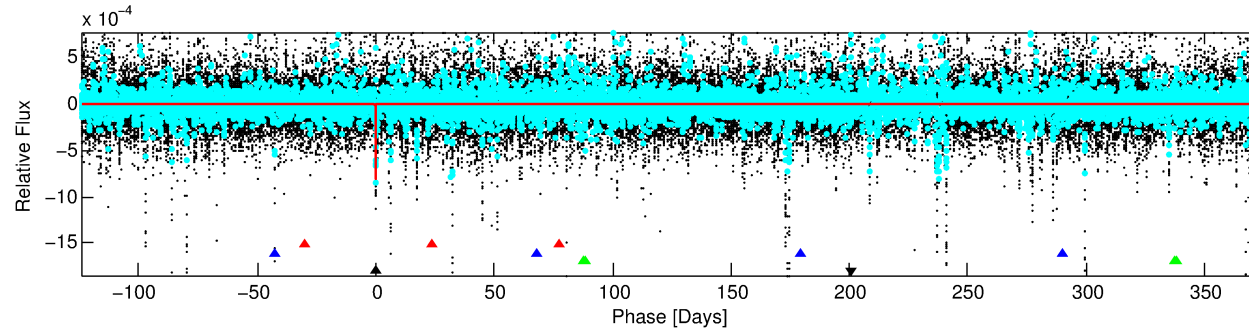
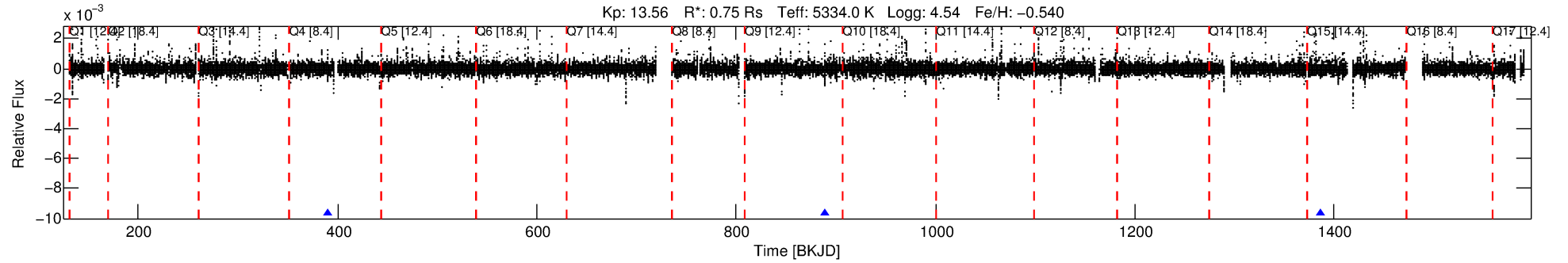
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010528093-04

No Significant Match Found

DV One-Page Summary

KIC: 10528093 Candidate: 4 of 4 Period: 497.840 d



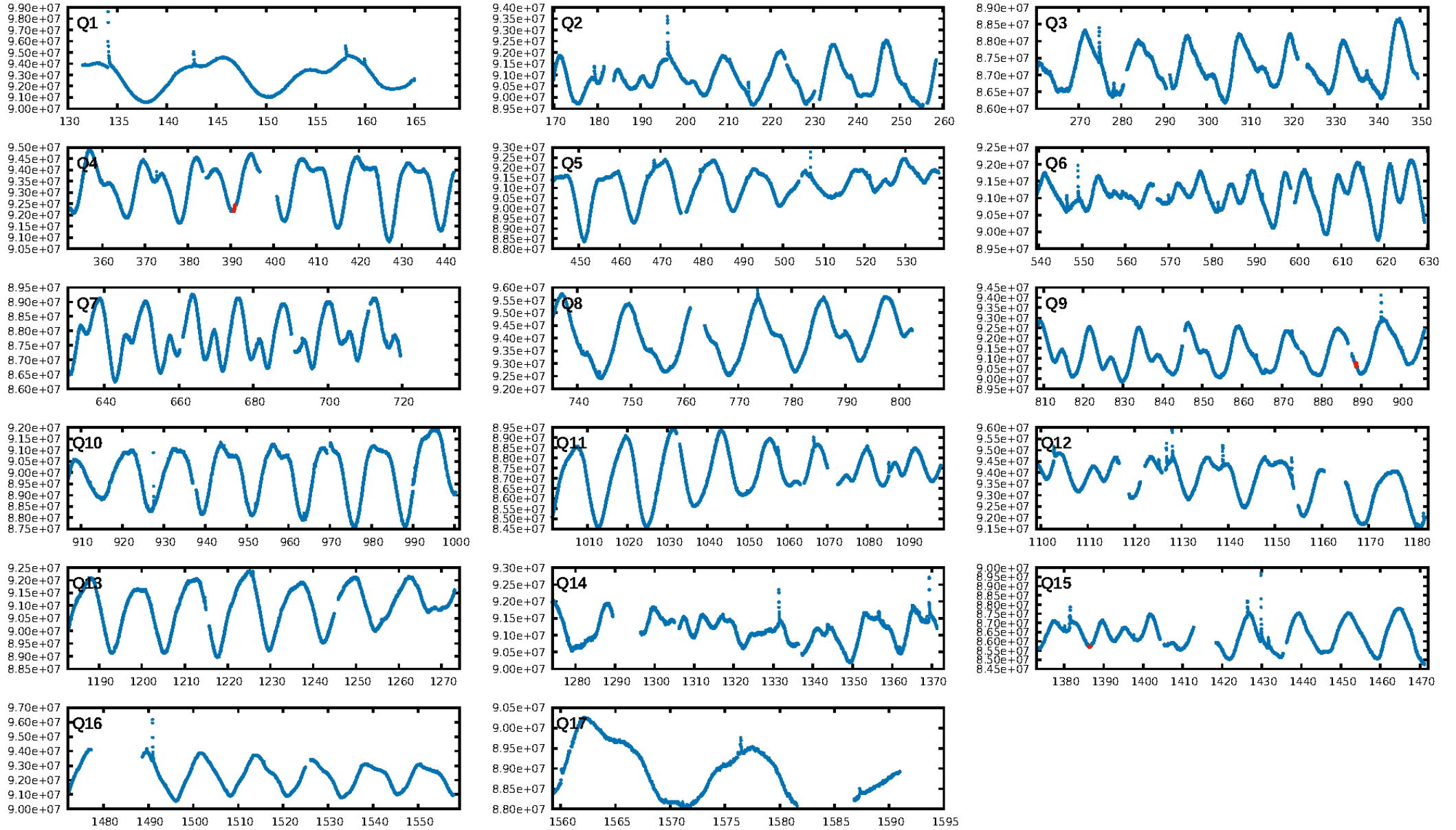
DV Fit Results:

Period = 497.83967 [0.00472] d
Epoch = 390.7973 [0.0061] BKJD
Rp/R* = 0.0279 [0.0107]
a/R* = 467.00 [726.41]
b = 0.72 [1.03]
Seff = 0.34 [0.07]
Teff = 195 [10] K
Rp = 2.27 [0.91] Re
a = 1.0904 [0.1183] AU
Ag = 65203.25 [54216.88] [1.20σ]
Teffp = 4809 [988] K [4.67σ]

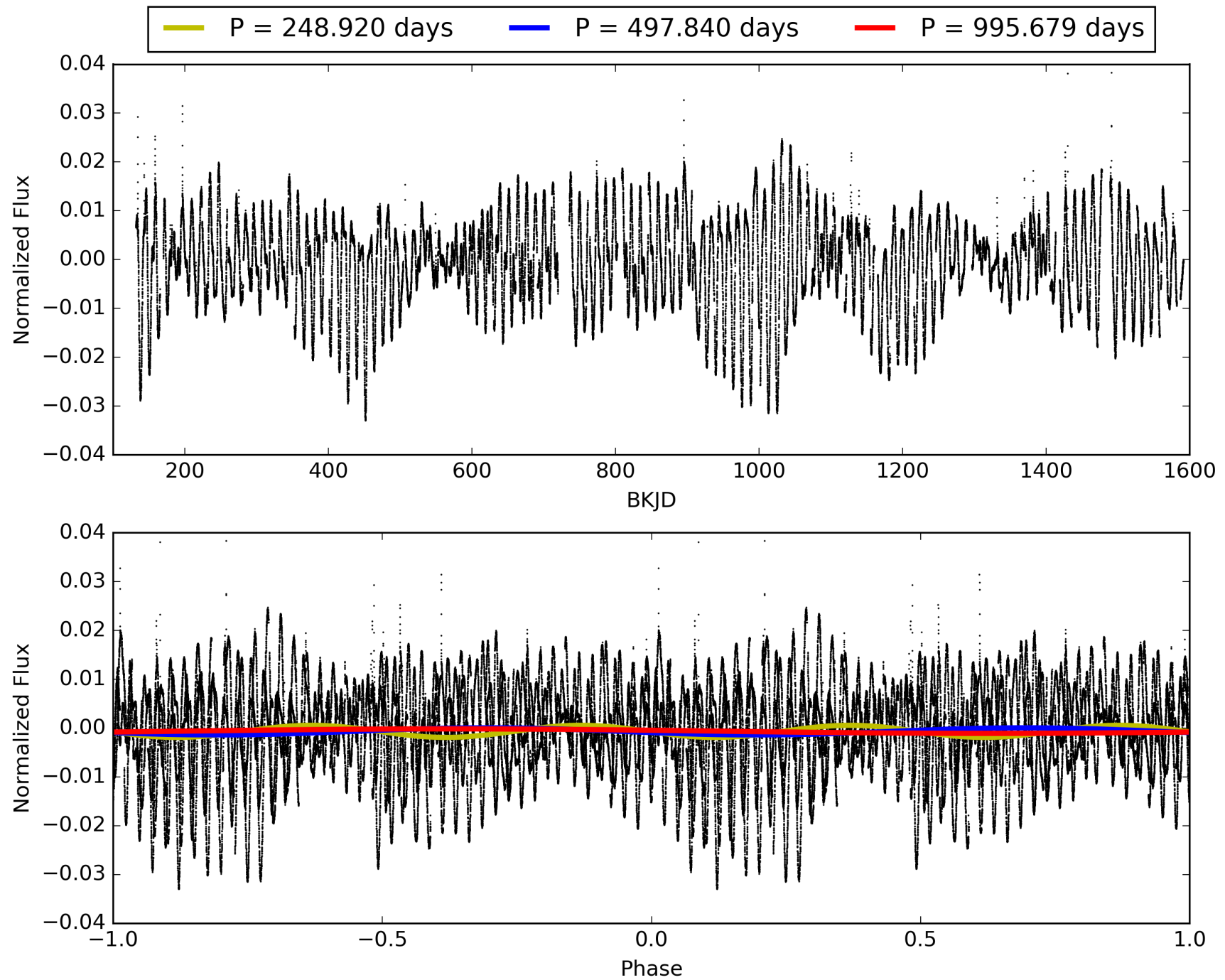
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [143.81σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.3%
ModelChiSquareGof-sig: 92.4%
Bootstrap-pfa: 6.19e-09
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 8.417
Centroid-sig: 2.5%
Centroid-so: 0.780 arcsec [1.50σ]
OotOffset-rm: 0.159 arcsec [1.21σ]
KicOffset-rm: 0.164 arcsec [1.26σ]
OotOffset-st: 0/1/1/1 [3]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

TCE 010528093-04, PDC Light Curves

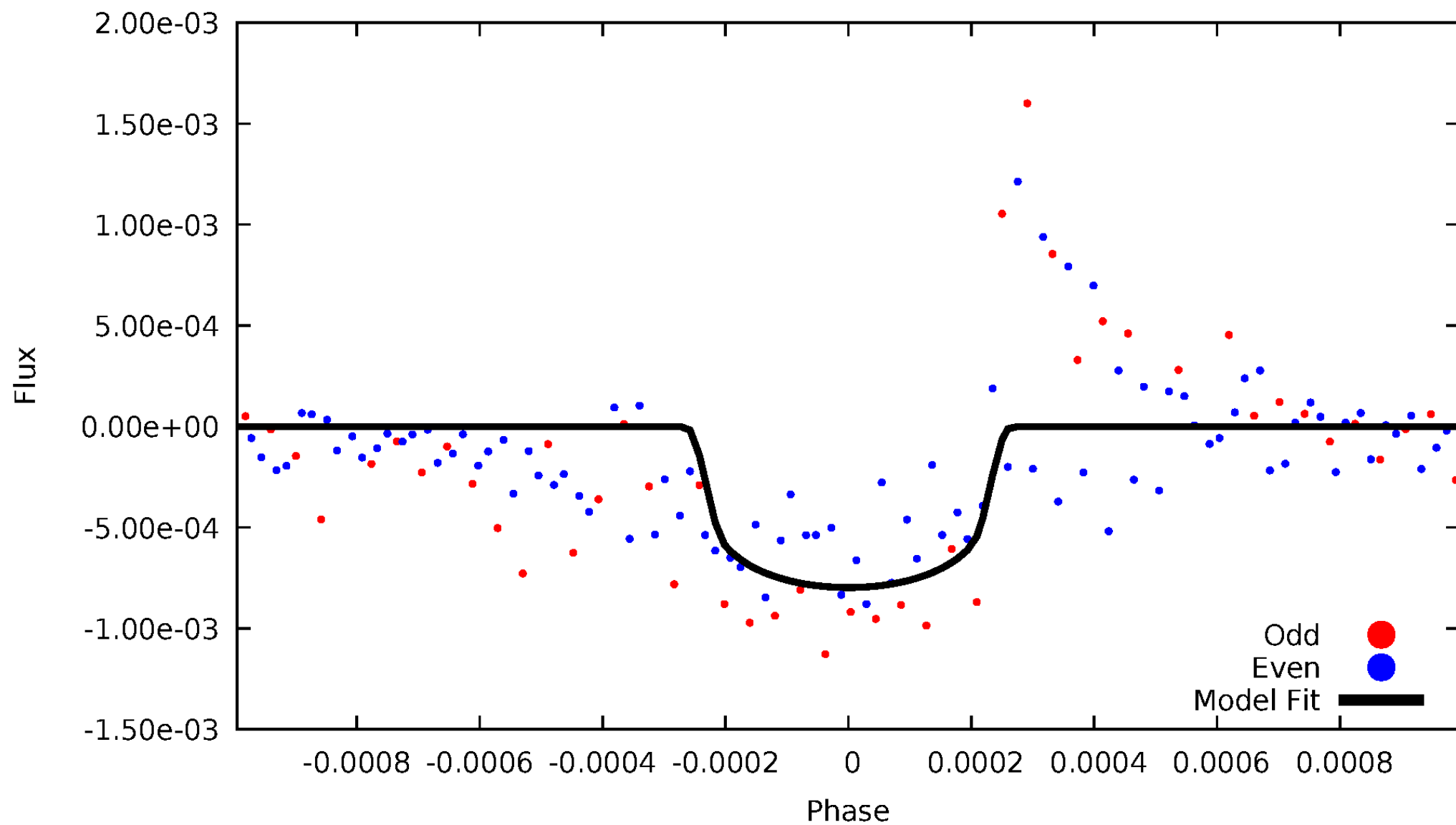


TCE 010528093-04



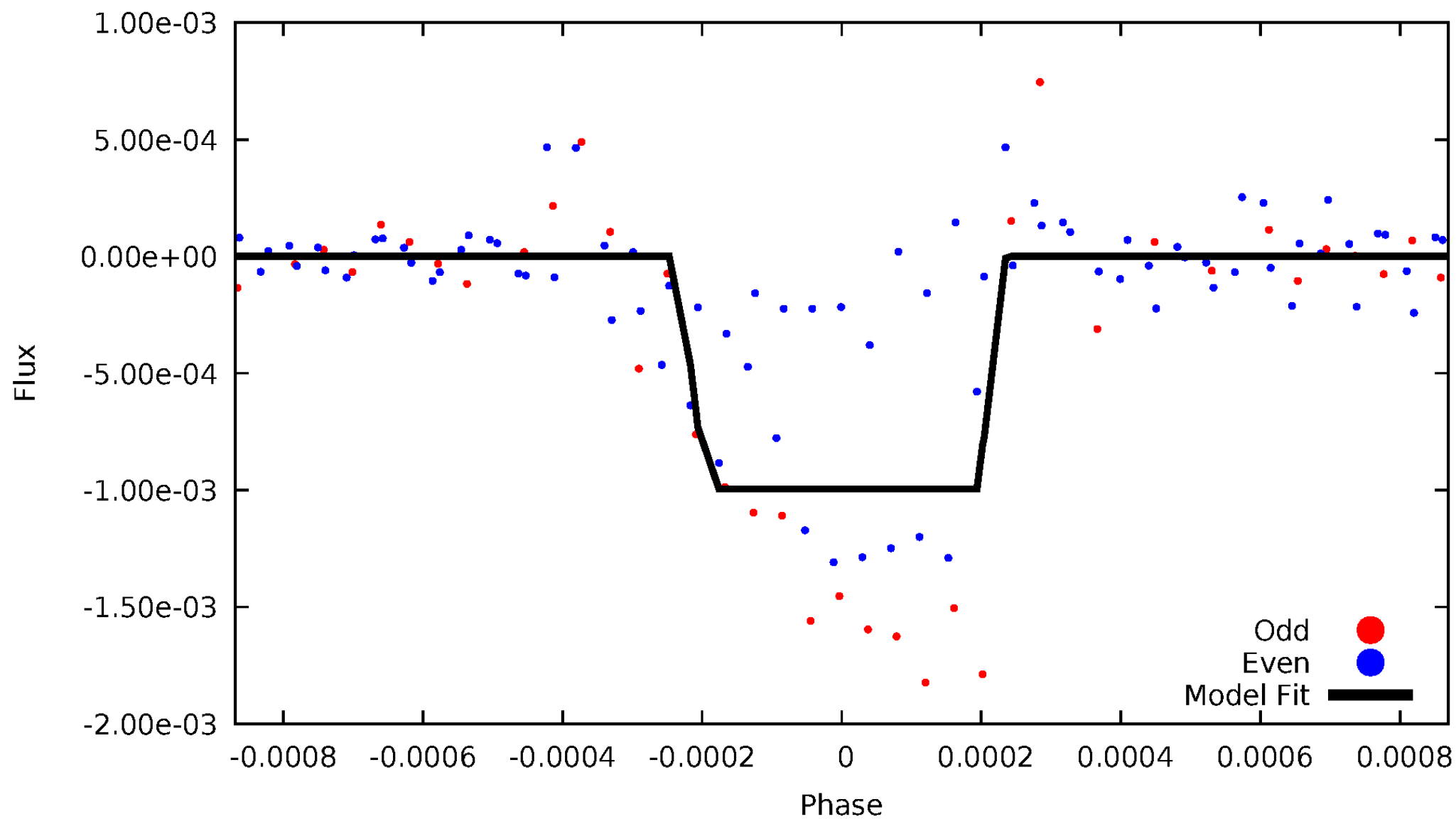
DV Odd/Even

TCE 010528093-04



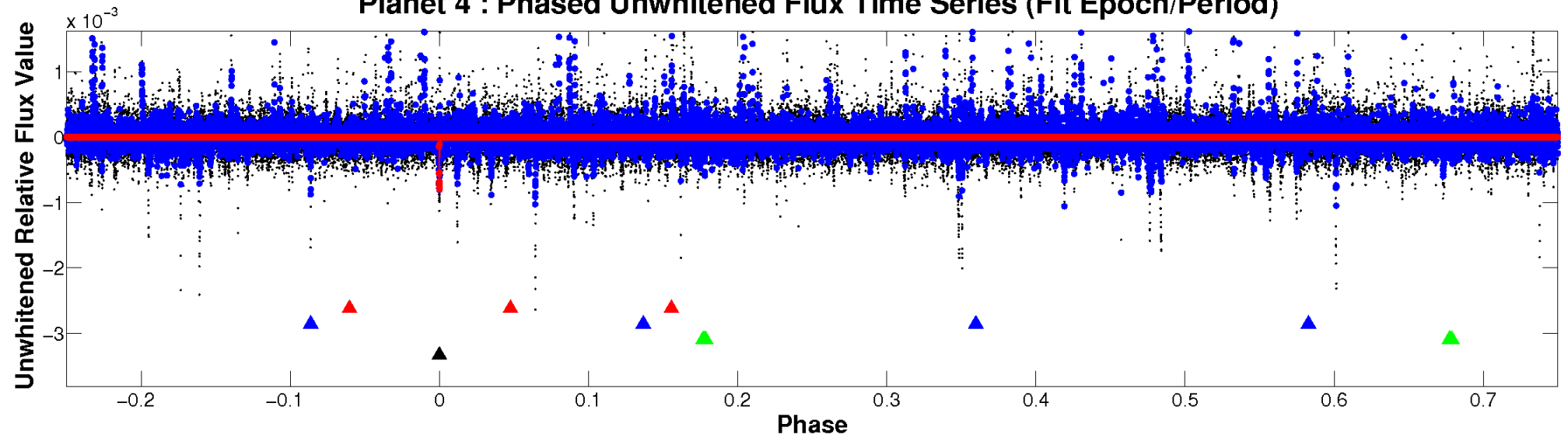
ALT Odd/Even

TCE 010528093-04

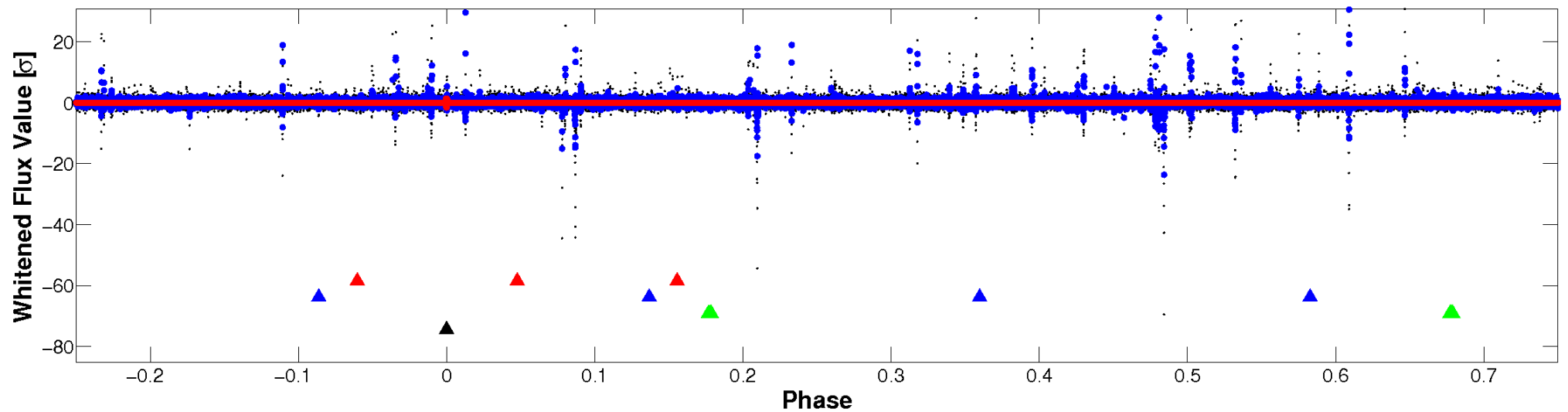


Non-Whitened Vs. Whitened Light Curve

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

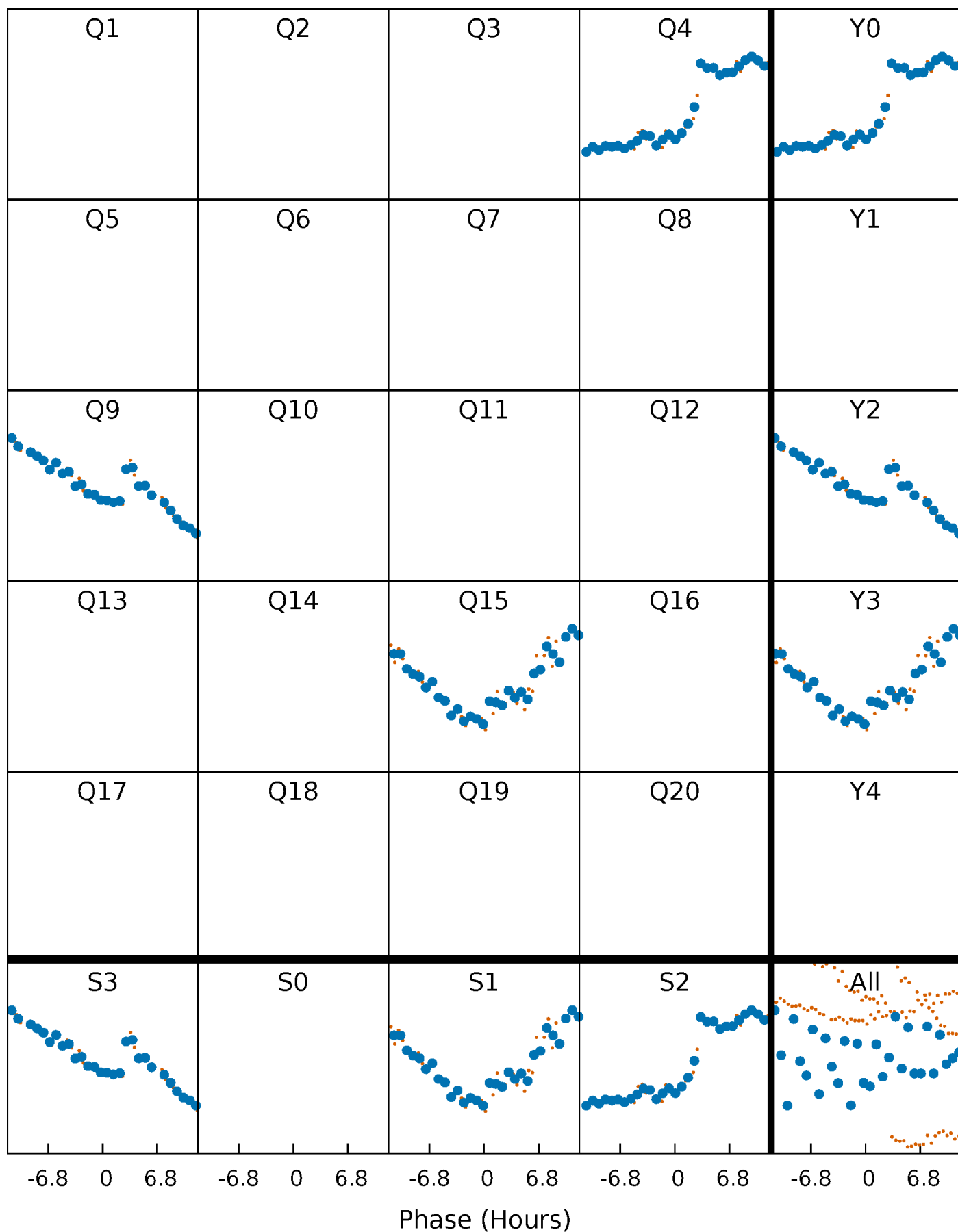


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



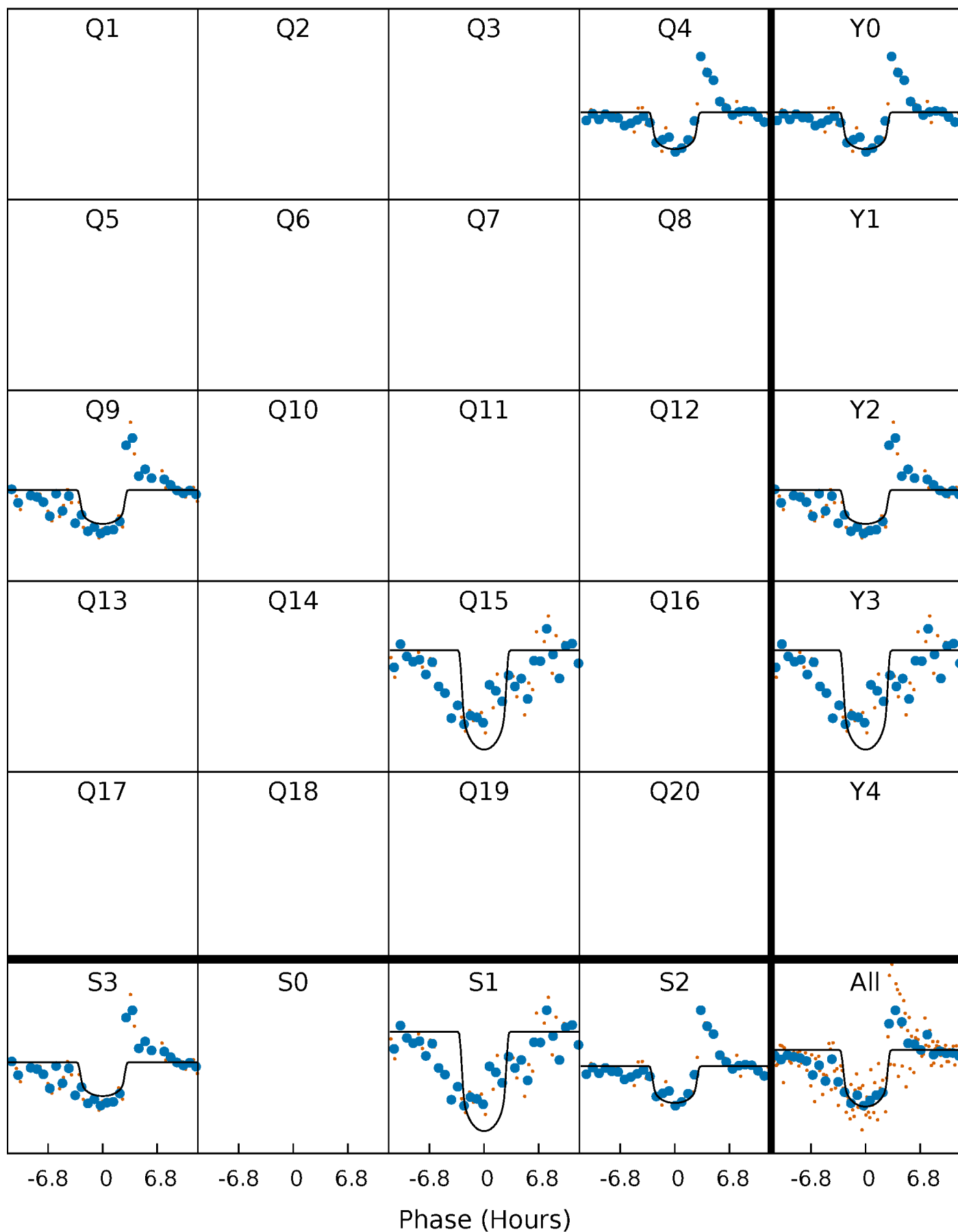
PDC Quarter-Phased Transit Curves

TCE 010528093-04 $P=497.839674$ Days $T_0=390.797322$ (BKJD)



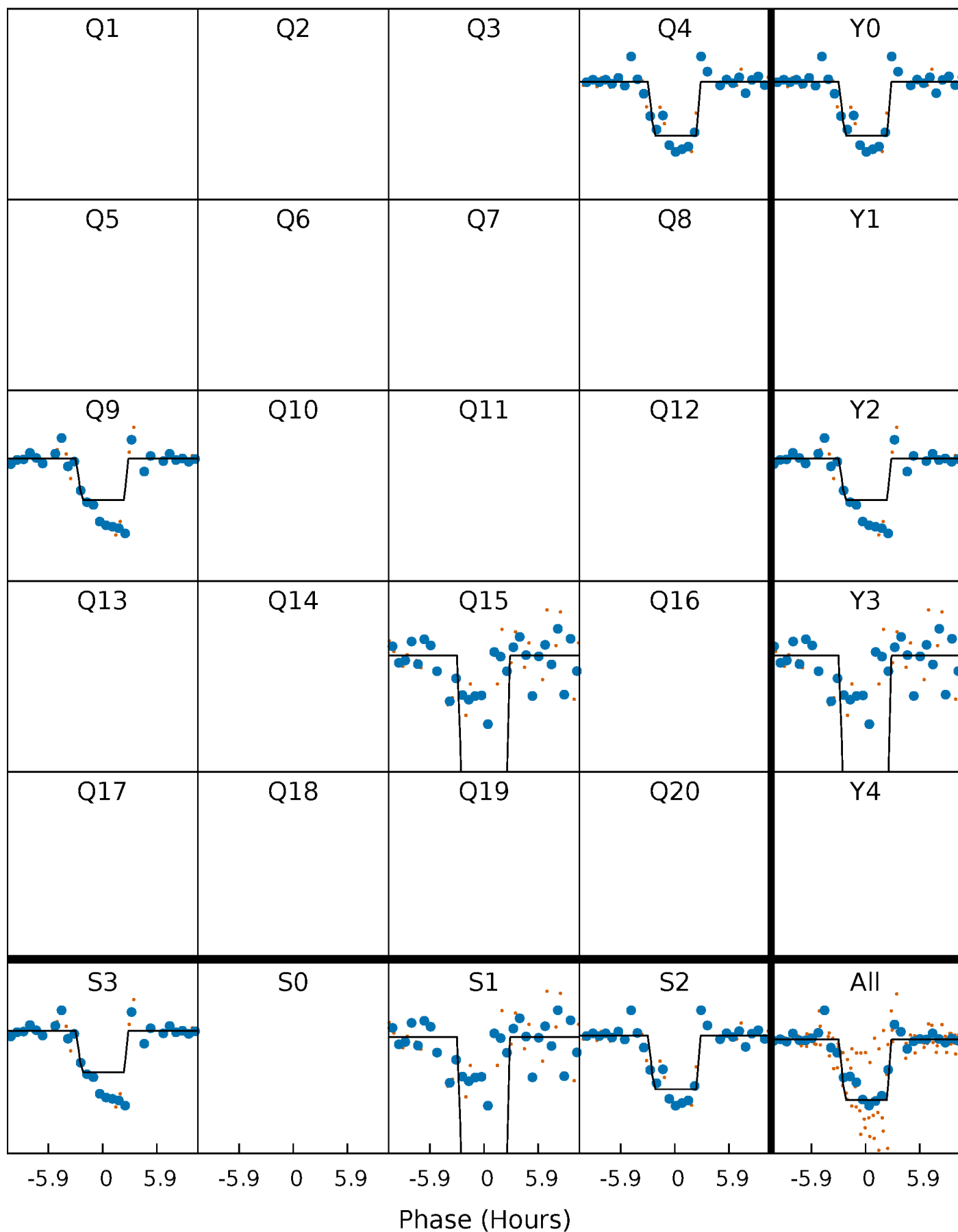
DV Quarter-Phased Transit Curves

TCE 010528093-04 P=497.839674 Days $T_0=390.797322$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

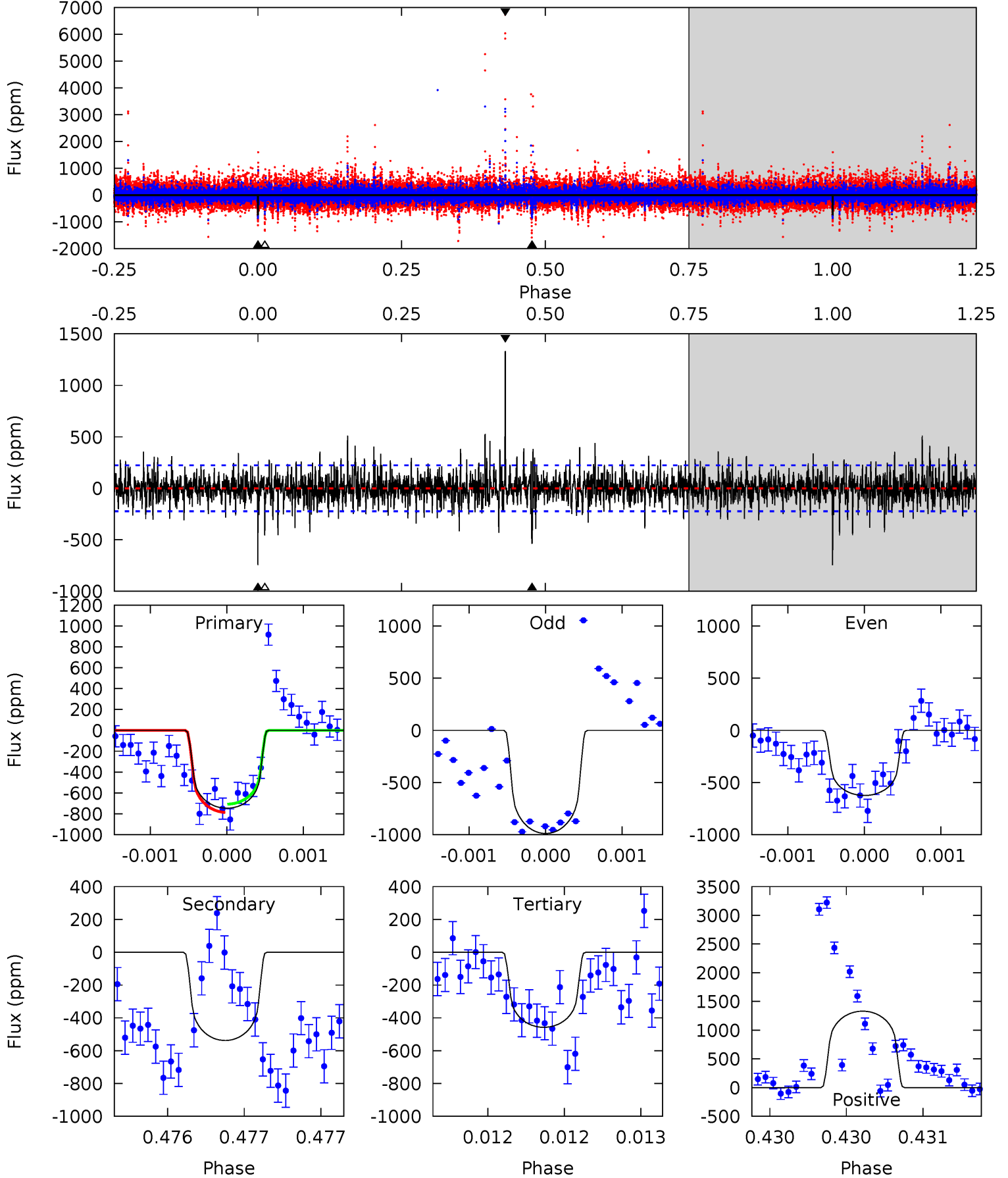
TCE 010528093-04 $P=497.822822$ Days $T_0=390.817733$ (BKJD)



DV Model-Shift Uniqueness Test

010528093-04, P = 497.839674 Days, E = 390.797322 Days

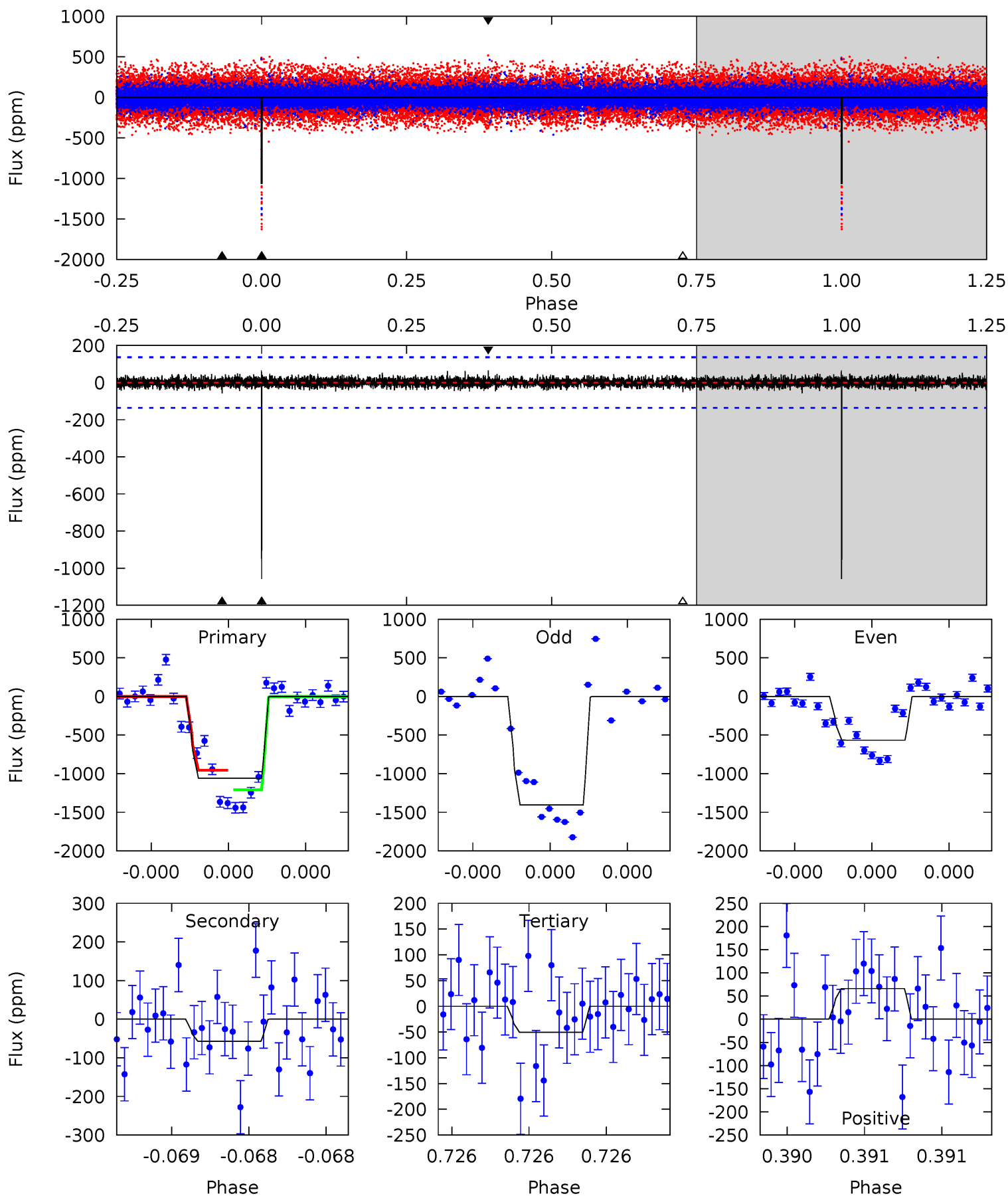
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.6	13.4	11.4	33.2	5.57	3.48	2.59	7.19	-14.6	2.00	-19.8	2.66	1.04	0.64	0.99



Alt Model-Shift Uniqueness Test

010528093-04, P = 497.822822 Days, E = 390.817733 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
43.4	2.34	2.07	2.70	5.59	3.51	0.51	41.3	40.7	0.28	-0.36	19.3	0.86	0.06	0



Stellar Parameters For KIC 010528093

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5334^{+159}_{-143}	$4.536^{+0.102}_{-0.068}$	$-0.540^{+0.350}_{-0.300}$	$0.746^{+0.084}_{-0.084}$	$0.697^{+0.099}_{-0.039}$	$2.366^{+0.936}_{-0.567}$
	+3%/-3%	+2%/-1%	+65%/-56%	+11%/-11%	+14%/-6%	+40%/-24%
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 010528093-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-538 ± 40	$2.21^{+0.96}_{-0.85}$	271^{+11}_{-12}	4953^{+1274}_{-626}	$73100^{+115988}_{-36774}$
Alt.	-57 ± 24	$2.54^{+0.89}_{-0.86}$	272^{+11}_{-12}	3177^{+445}_{-335}	5663^{+7814}_{-3176}

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 $A_{obs} \gg 1.0$

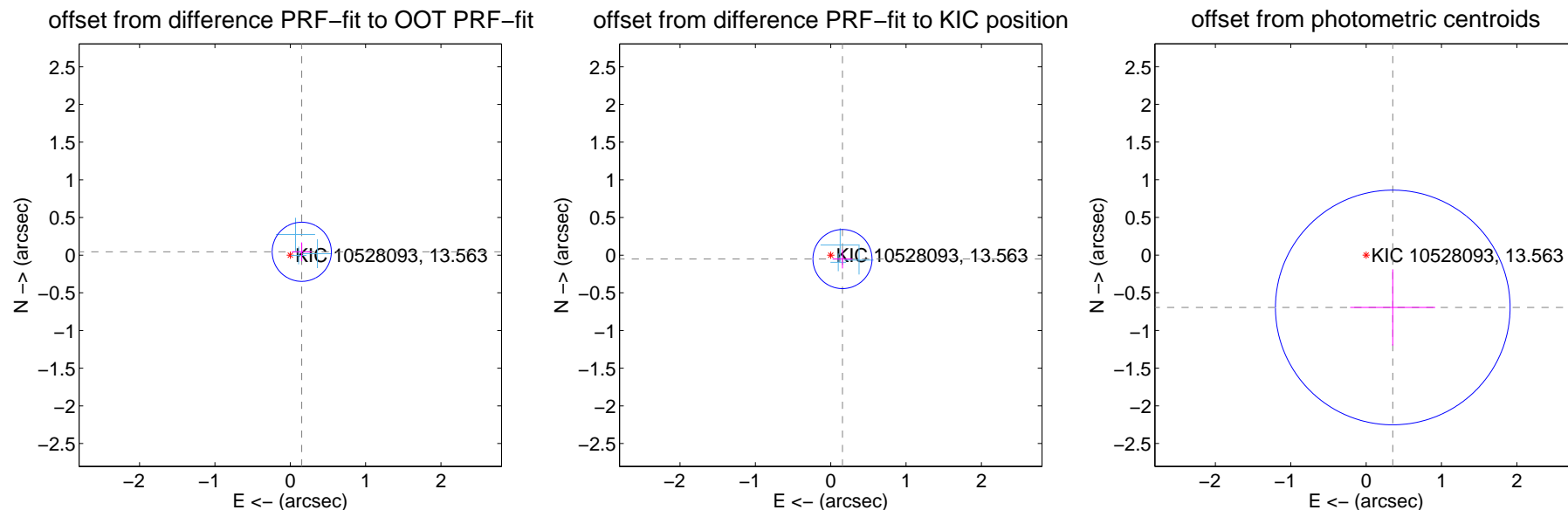
DV Centroid Data

Supplemental centroid analysis for 010528093-04. Kepler magnitude: 13.56. Transit SNR 9.33

There are 3 quarters with good PRF difference image offsets

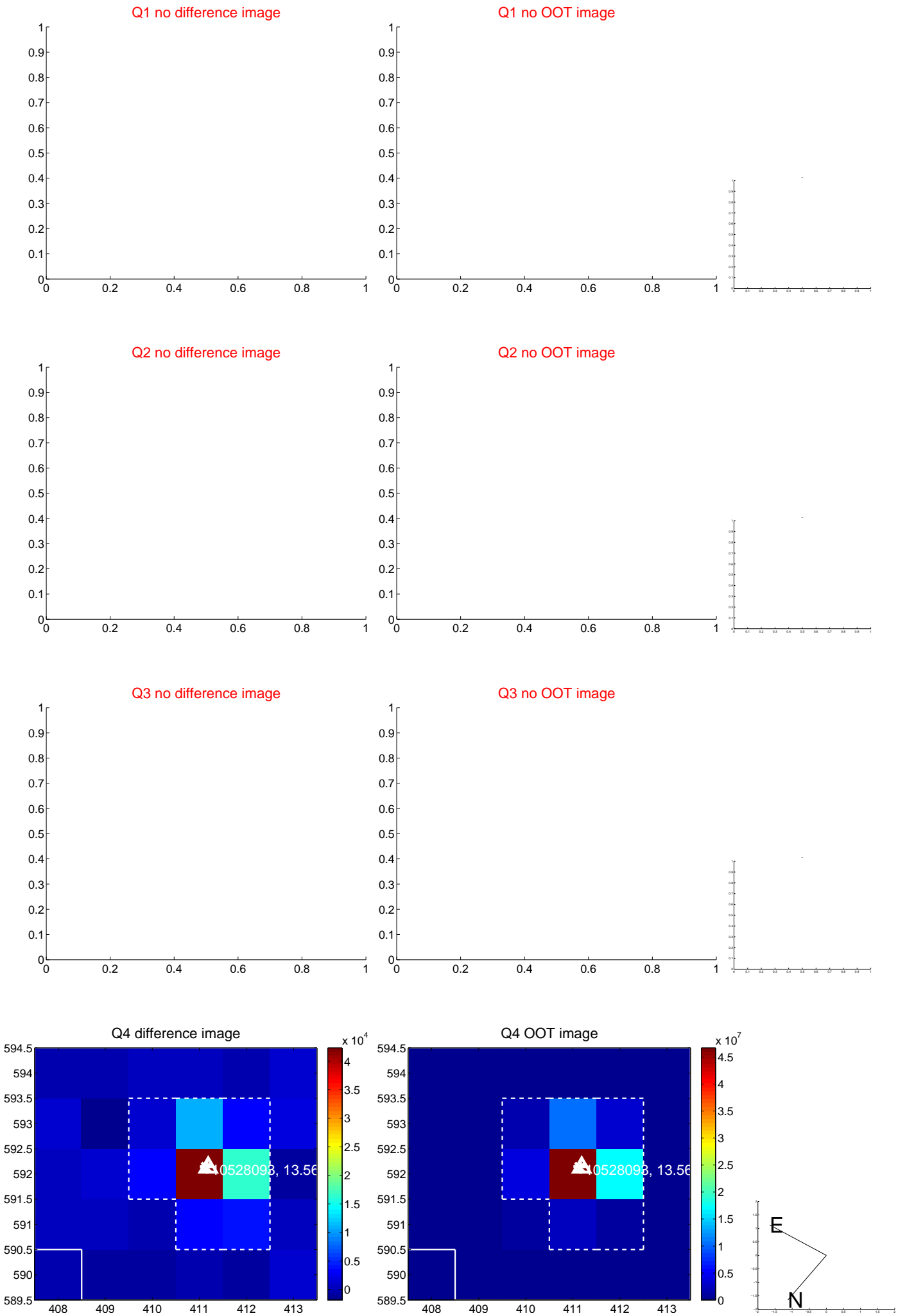
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.159 ± 0.131	1.21	-0.153 ± 0.131	0.045 ± 0.125
PRF-fit source offset from KIC position	0.164 ± 0.131	1.26	-0.156 ± 0.131	-0.052 ± 0.125
photometric centroid source offset	0.78 ± 0.52	1.50	-0.35 ± 0.56	-0.70 ± 0.51



Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

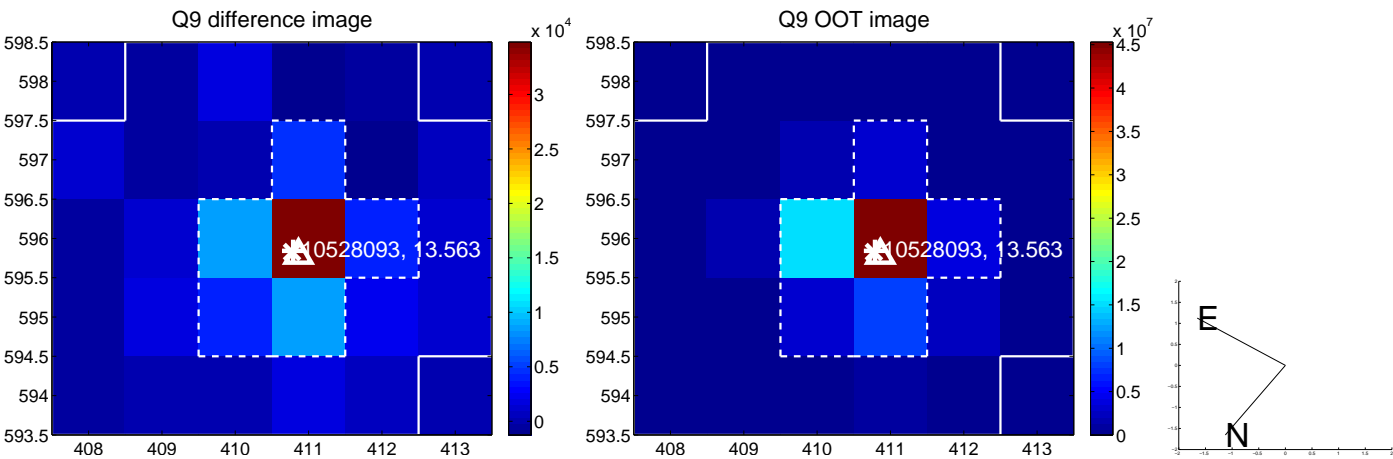
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



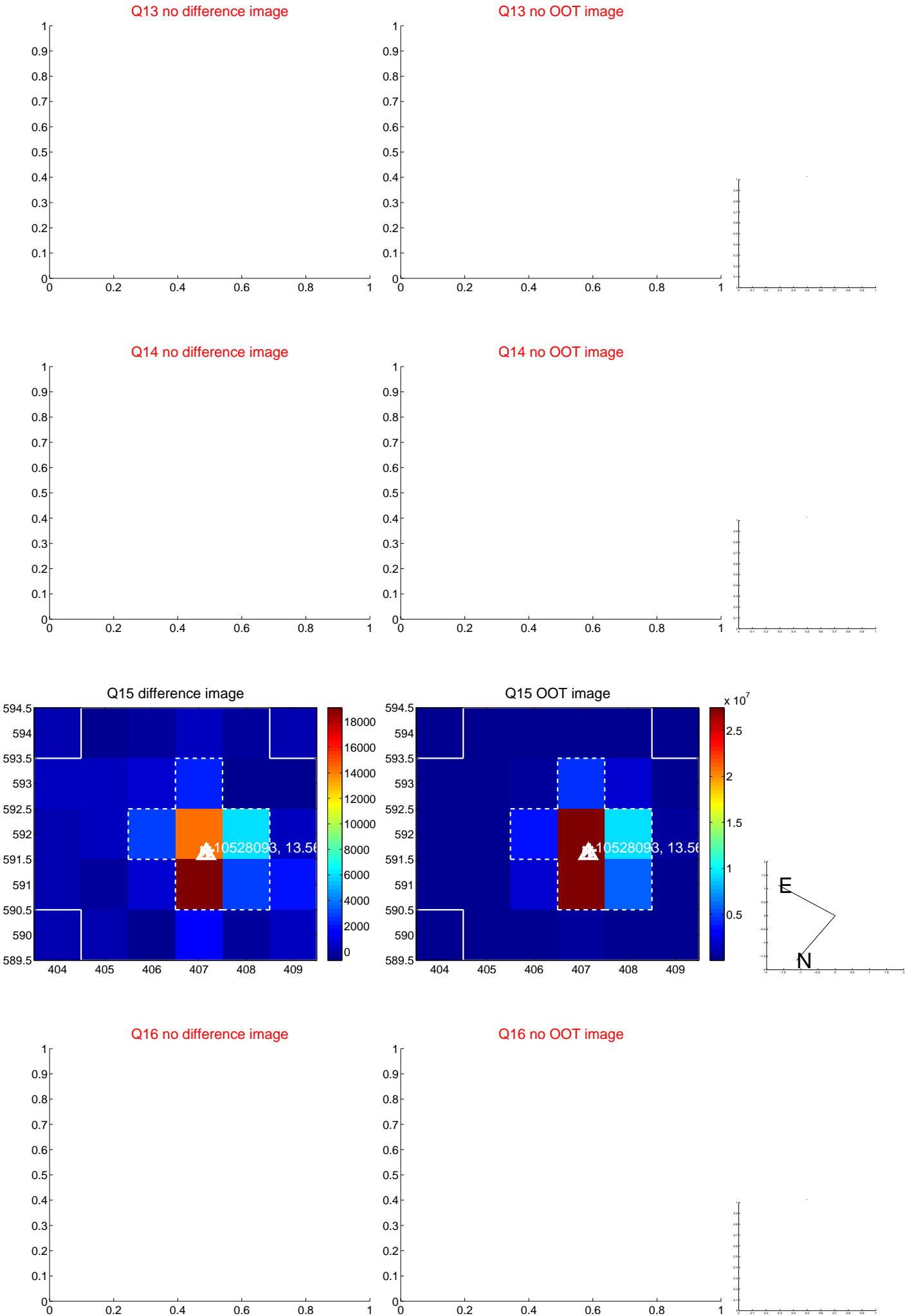
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



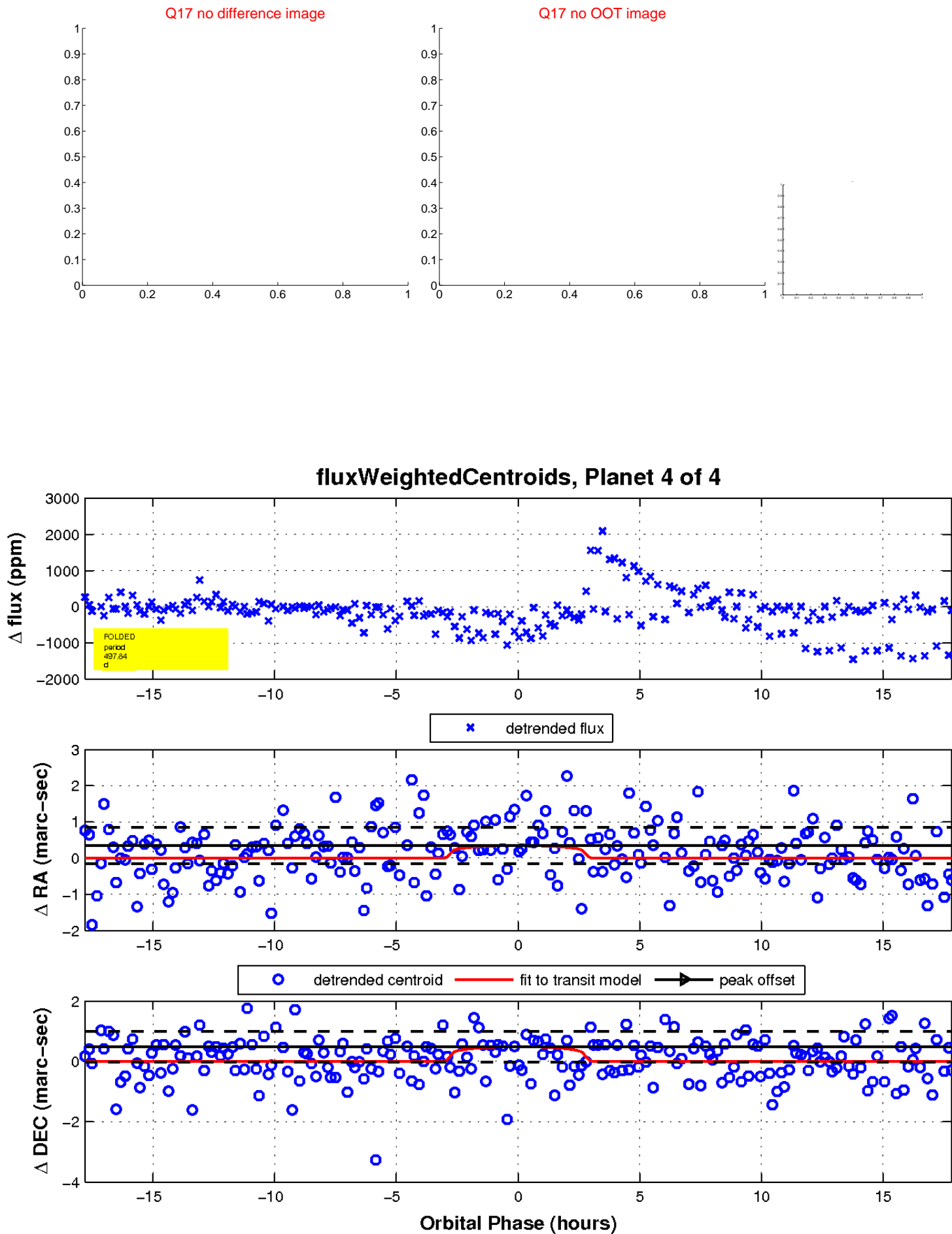
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



UKIRT Image

Declination

