

KIC 008481420

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})
008481420-01	OBS	No	310.488379	237.690450	1077.4	3.556	17.7	6.1	0.76	4809	2.41	0.42
008481420-02	OBS	No	207.004219	186.480239	1123.9	2.995	16.0	7.2	0.76	4809	2.46	0.72
008481420-03	OBS	No	565.125880	217.225422	2520.9	2.126	18.4	12.9	0.76	4809	3.94	0.19
008481420-04	OBS	No	305.479549	156.134428	3721.4	9.230	15.7	12.8	0.76	4809	4.47	0.43

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008481420-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008481420-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
008481420-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008481420-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

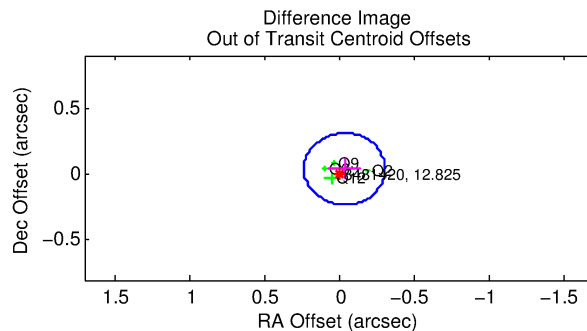
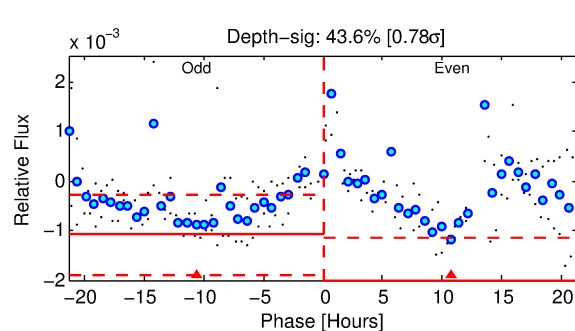
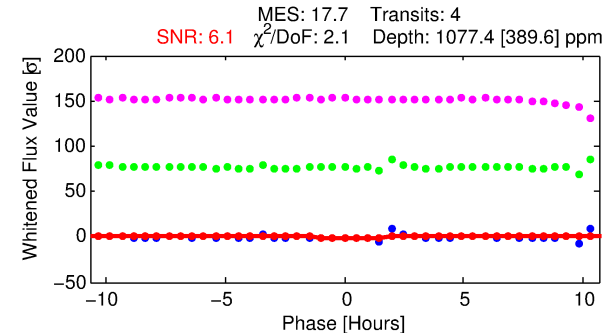
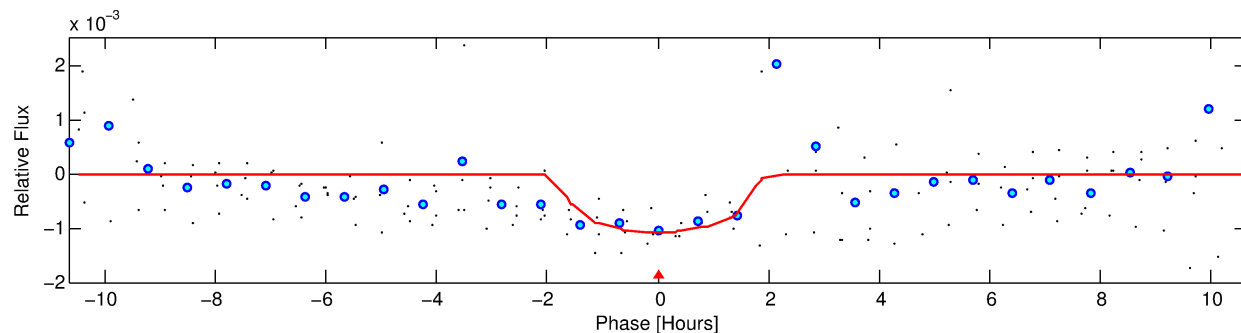
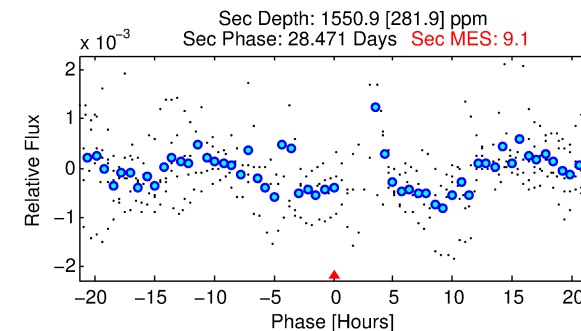
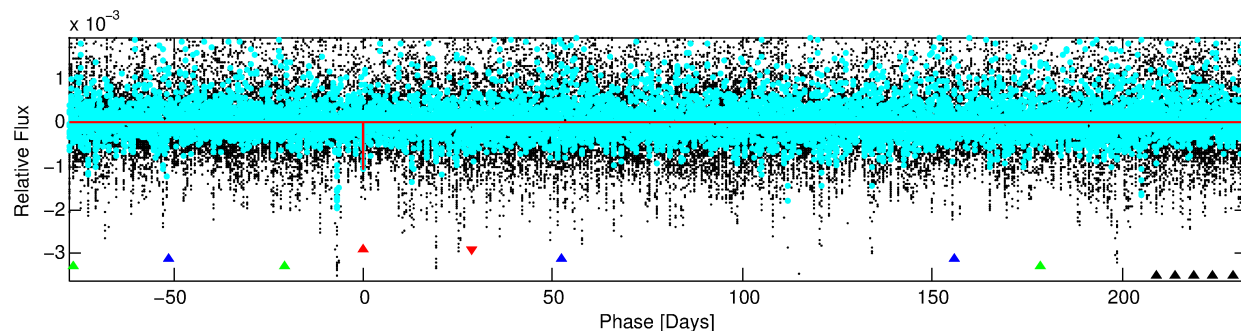
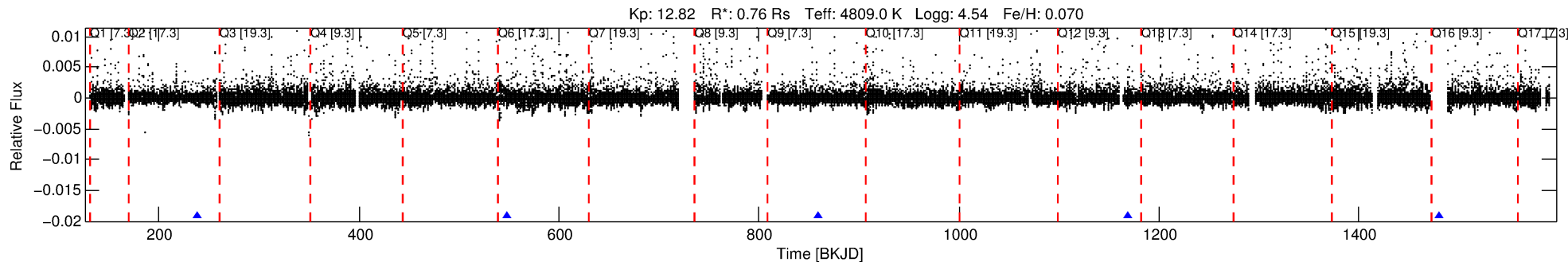
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008481420-01

No Significant Match Found

DV One-Page Summary

KIC: 8481420 Candidate: 1 of 4 Period: 310.488 d



DV Fit Results:

Period = 310.48838 [0.00582] d
Epoch = 237.6905 [0.0104] BKJD
Rp/R* = 0.0289 [0.0574]
a/R* = 686.37 [4330.63]
b = 0.00 [24151.40]
Seff = 0.42 [0.08]
Teq = 205 [10] K
Rp = 2.41 [4.79] Re
a = 0.8136 [0.0668] AU
Ag = 97428.38 [387595.78] [0.25 σ]
Teffp = 5612 [5583] K [0.97 σ]

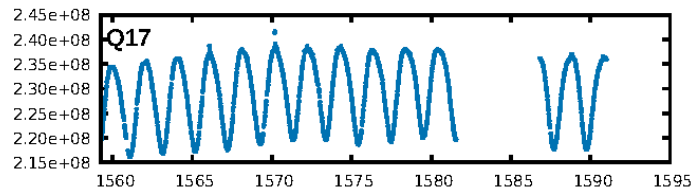
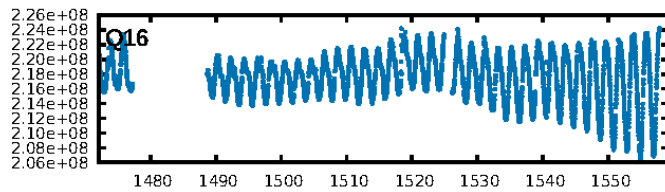
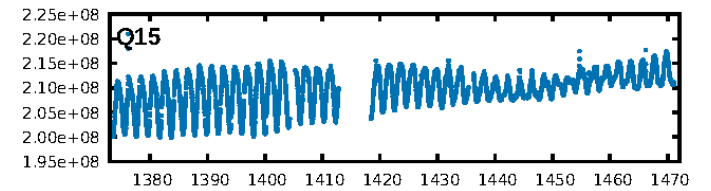
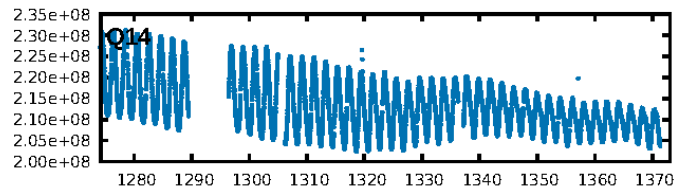
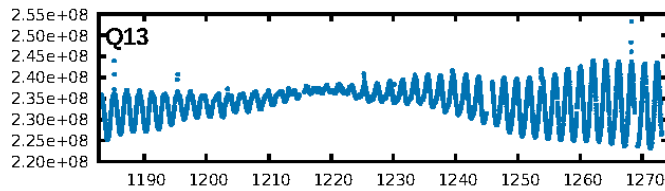
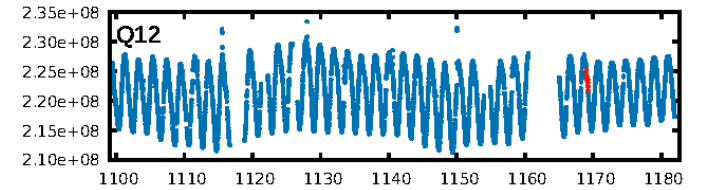
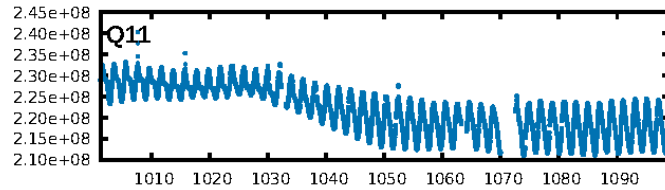
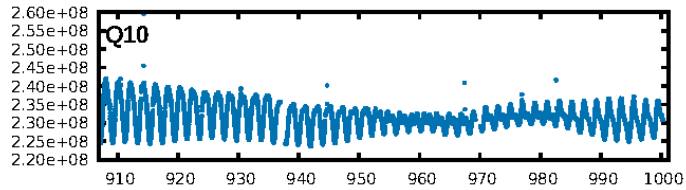
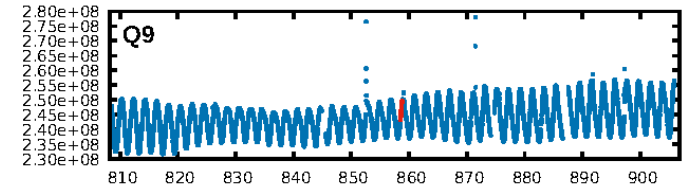
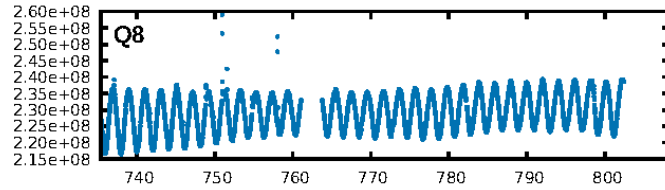
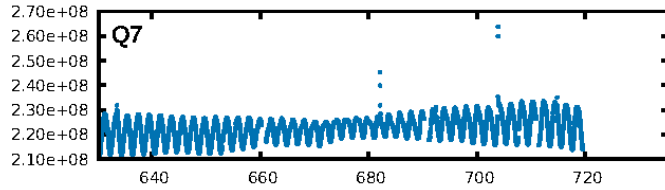
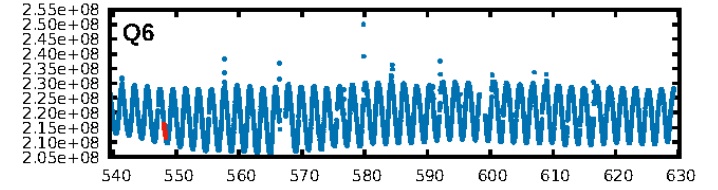
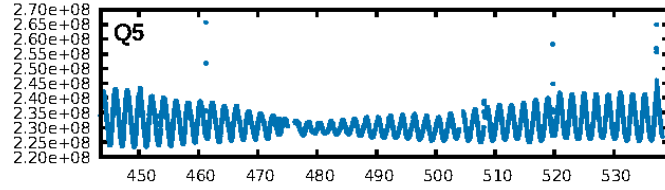
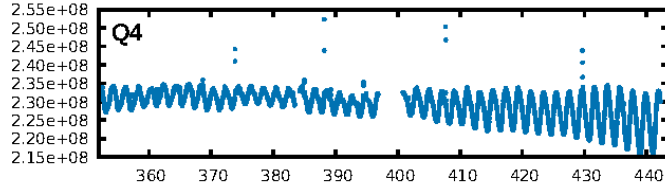
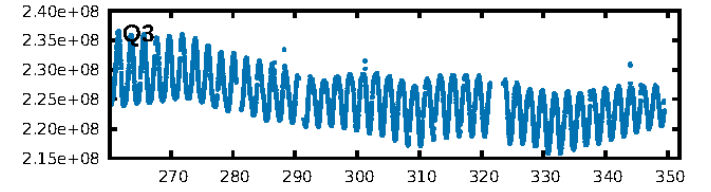
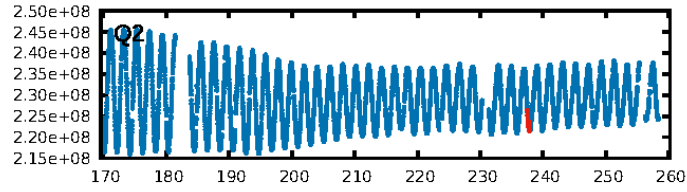
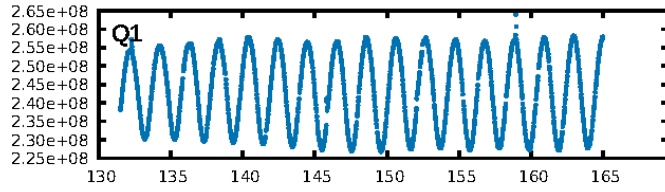
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [12.15 σ]
LongPeriod-sig: 100.0% [1475.12 σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 17.6%
Bootstrap-pfa: 2.52e-12
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 1.106
Centroid-sig: 97.0%
Centroid-so: 0.124 arcsec [0.47 σ]
OotOffset-rm: 0.056 arcsec [0.62 σ]
KicOffset-rm: 0.187 arcsec [1.64 σ]
OotOffset-st: 2/0/1/1 [4]
KicOffset-st: 2/0/1/1 [4]
DiffImageQuality-fgm: 0.50 [2/4]
DiffImageOverlap-fno: 1.00 [4/4]

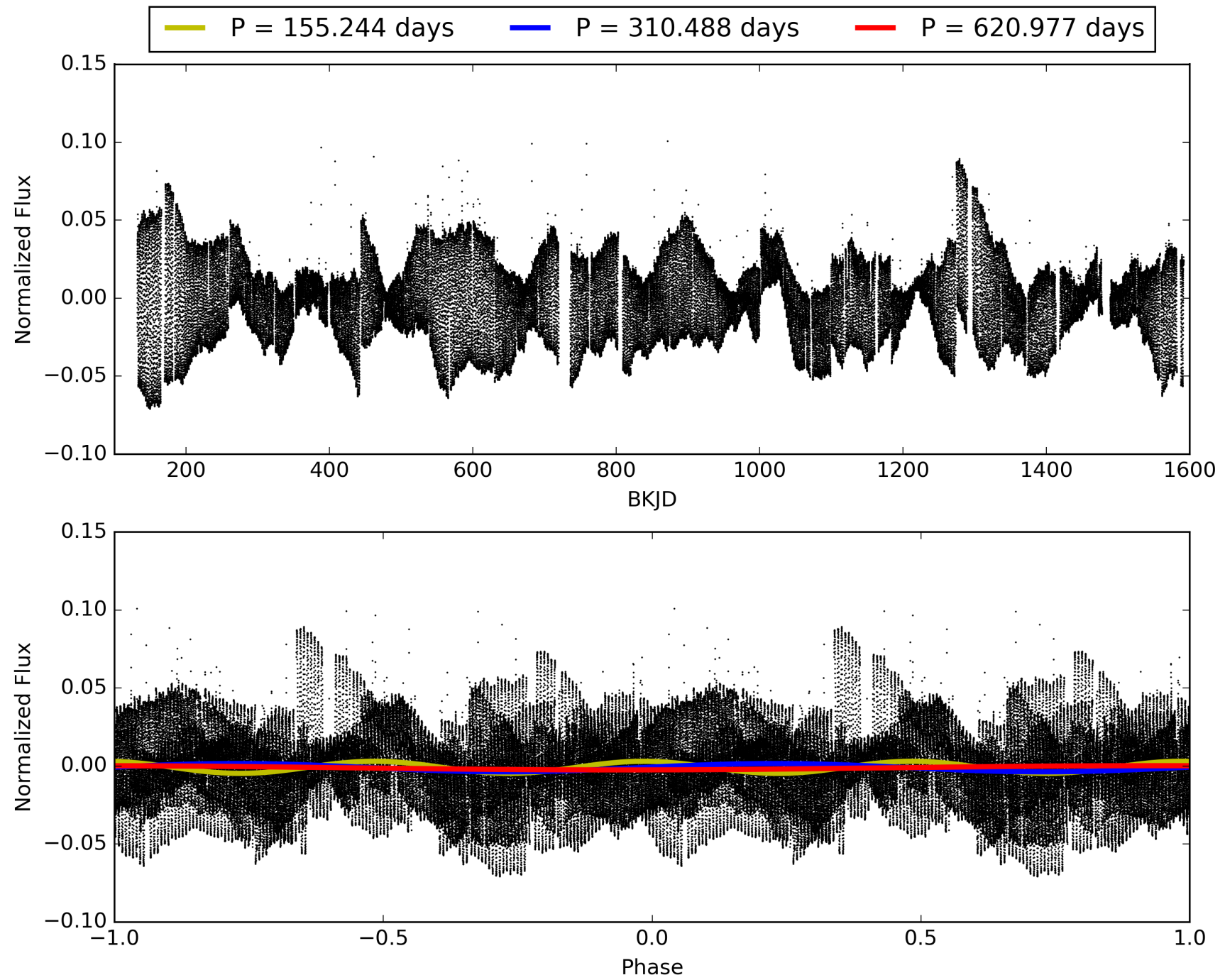
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 008481420-01, PDC Light Curves

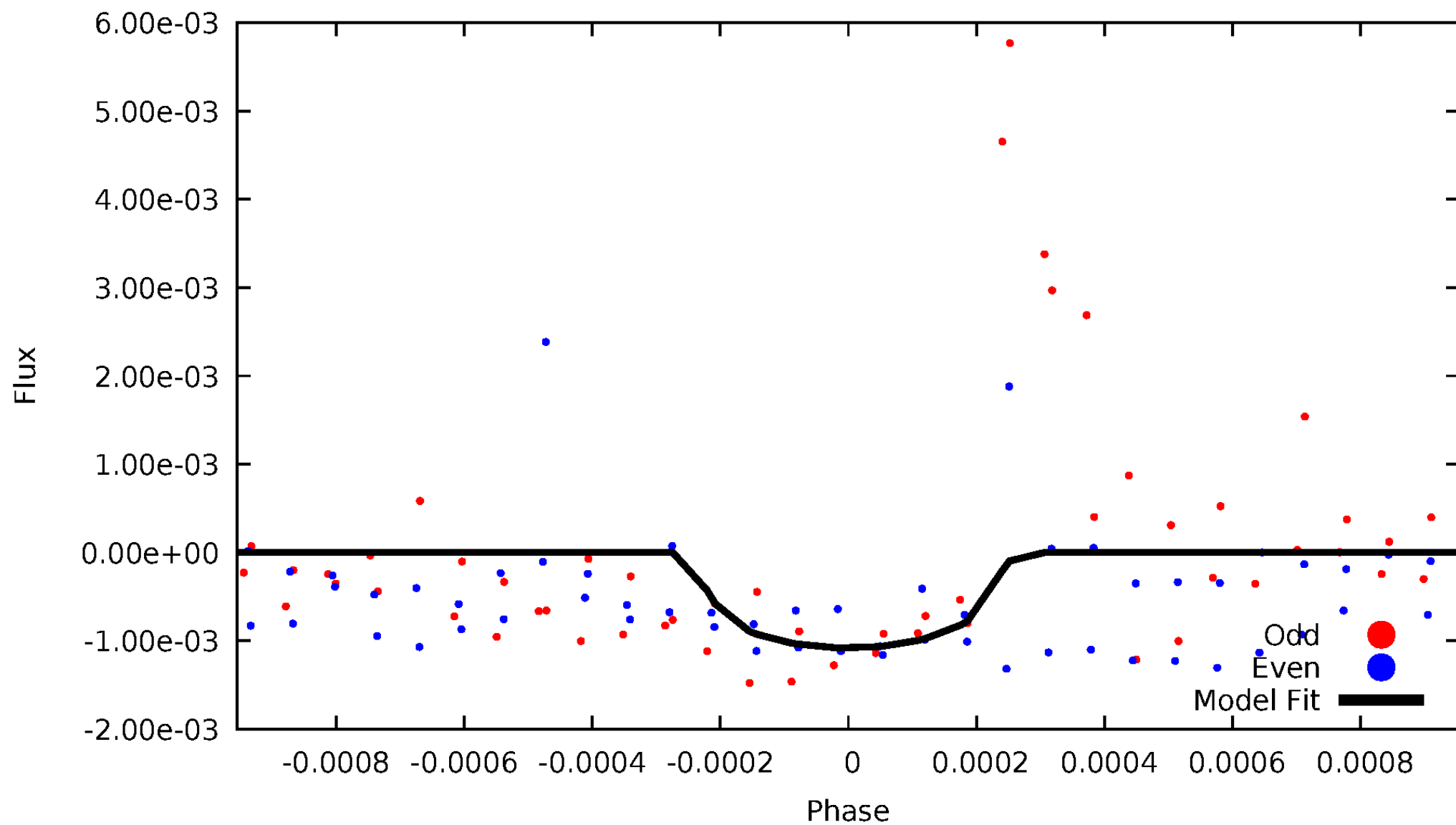


TCE 008481420-01



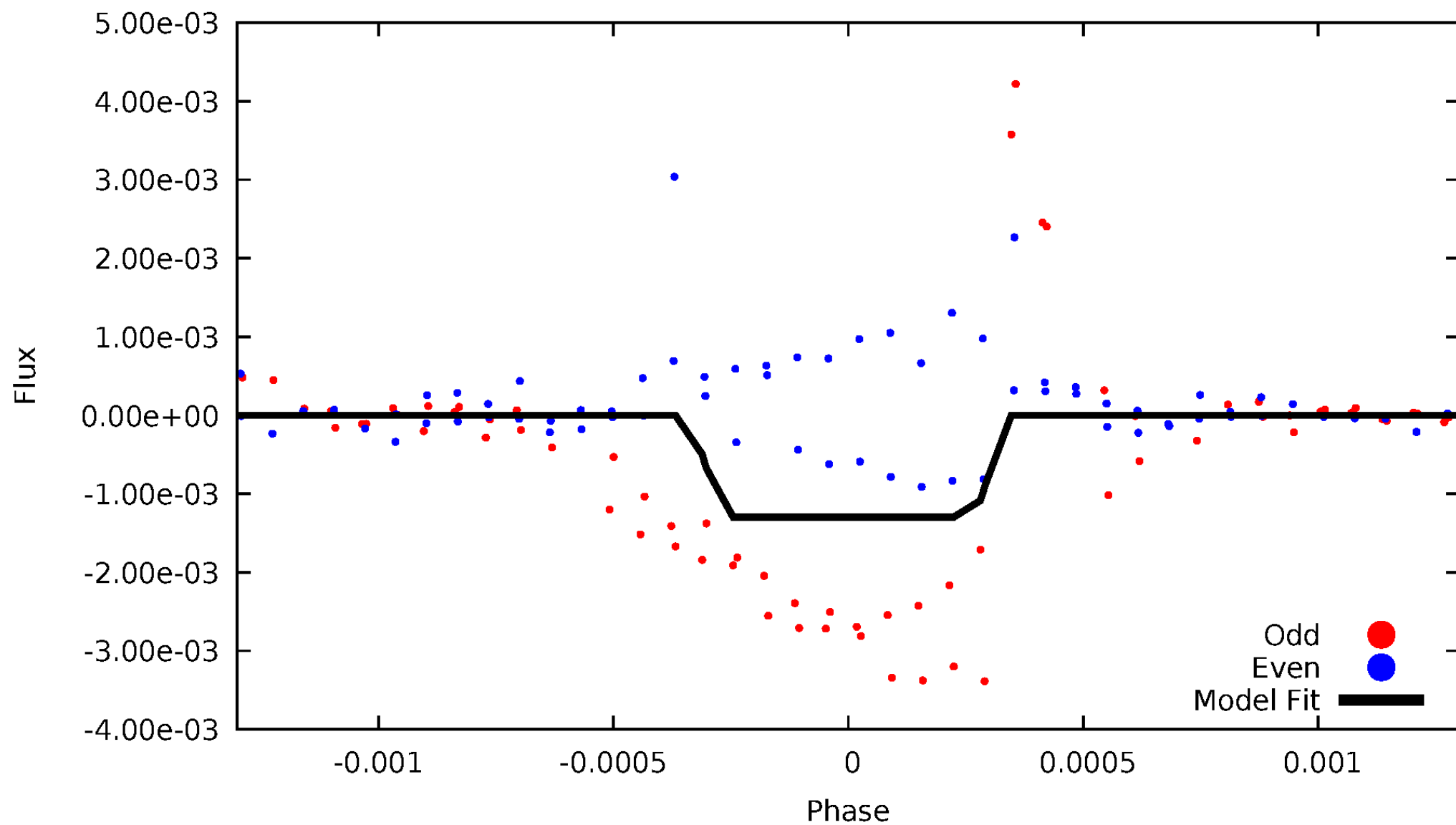
DV Odd/Even

TCE 008481420-01



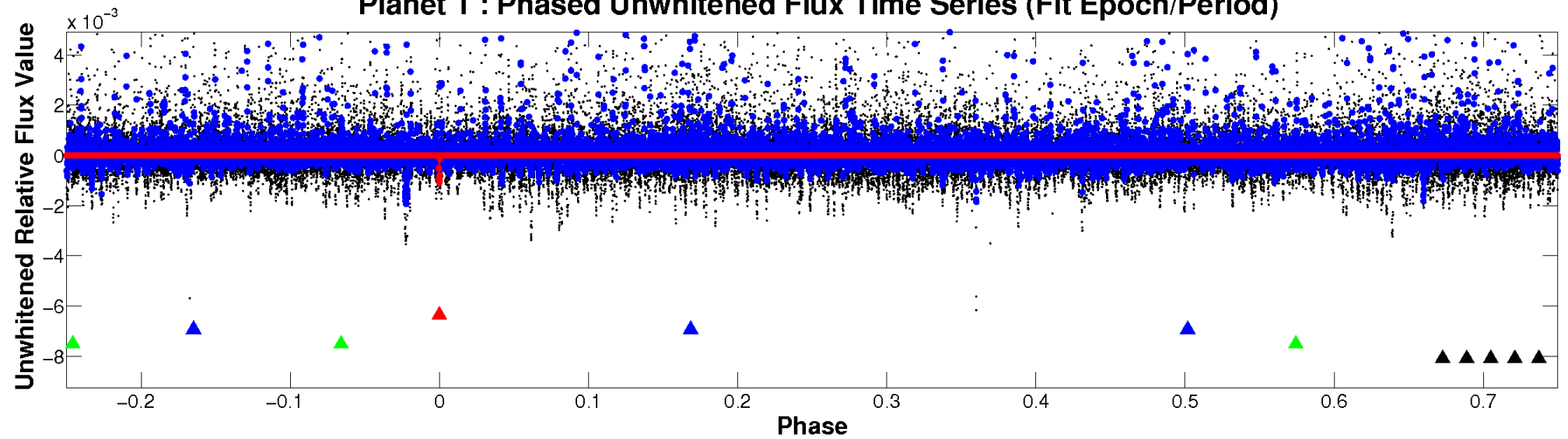
ALT Odd/Even

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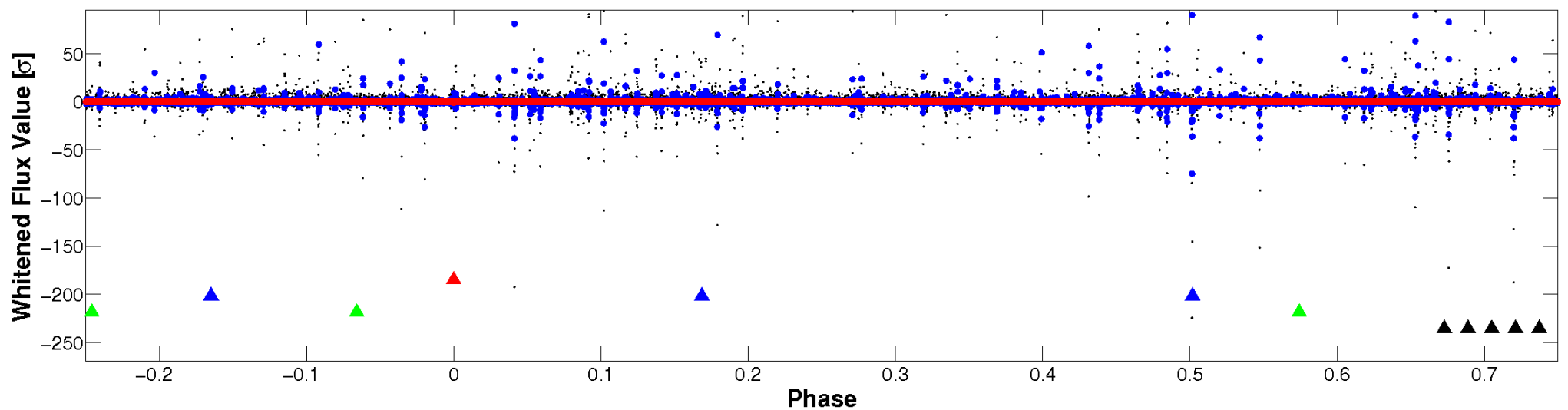


Non-Whitened Vs. Whitened Light Curve

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

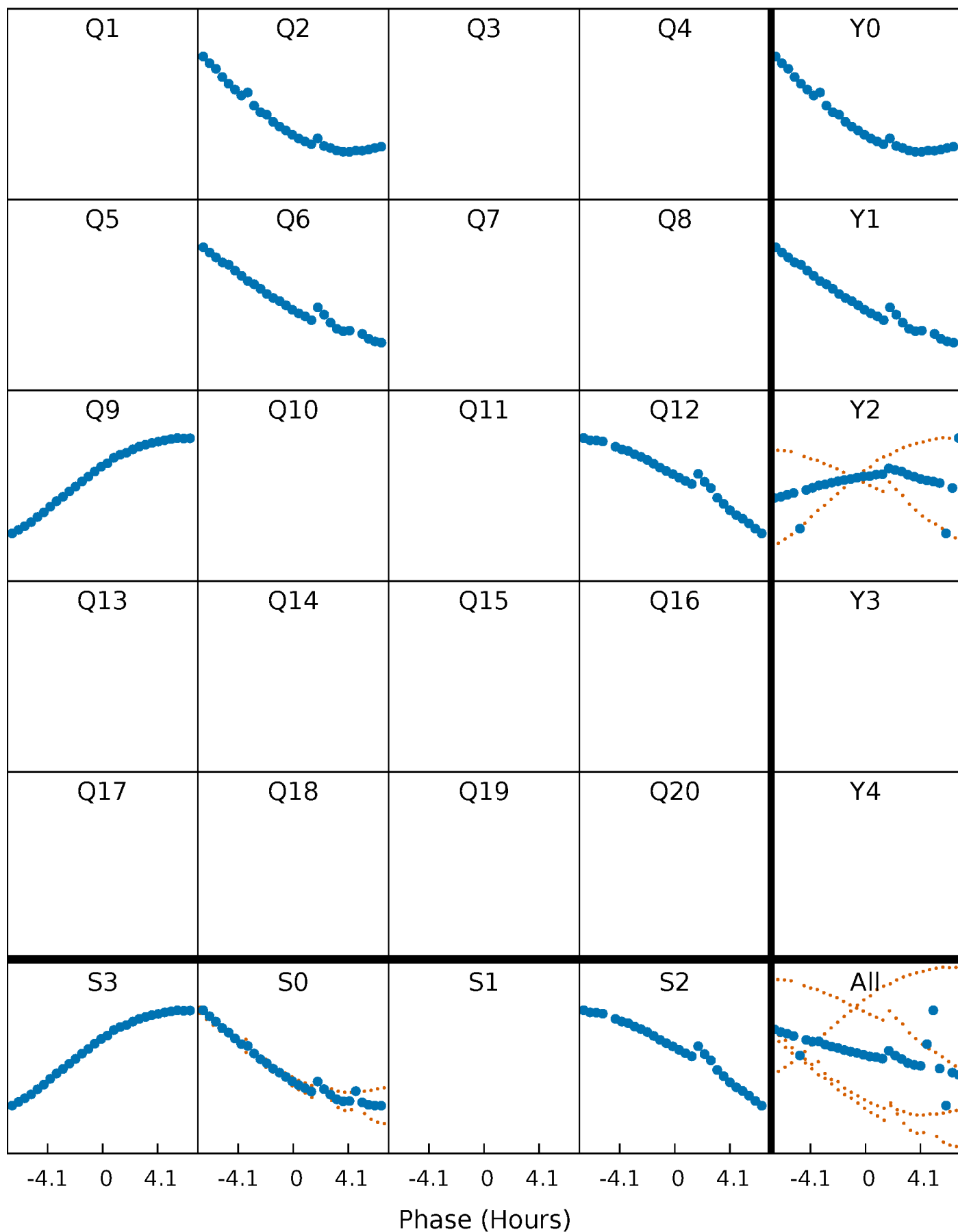


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



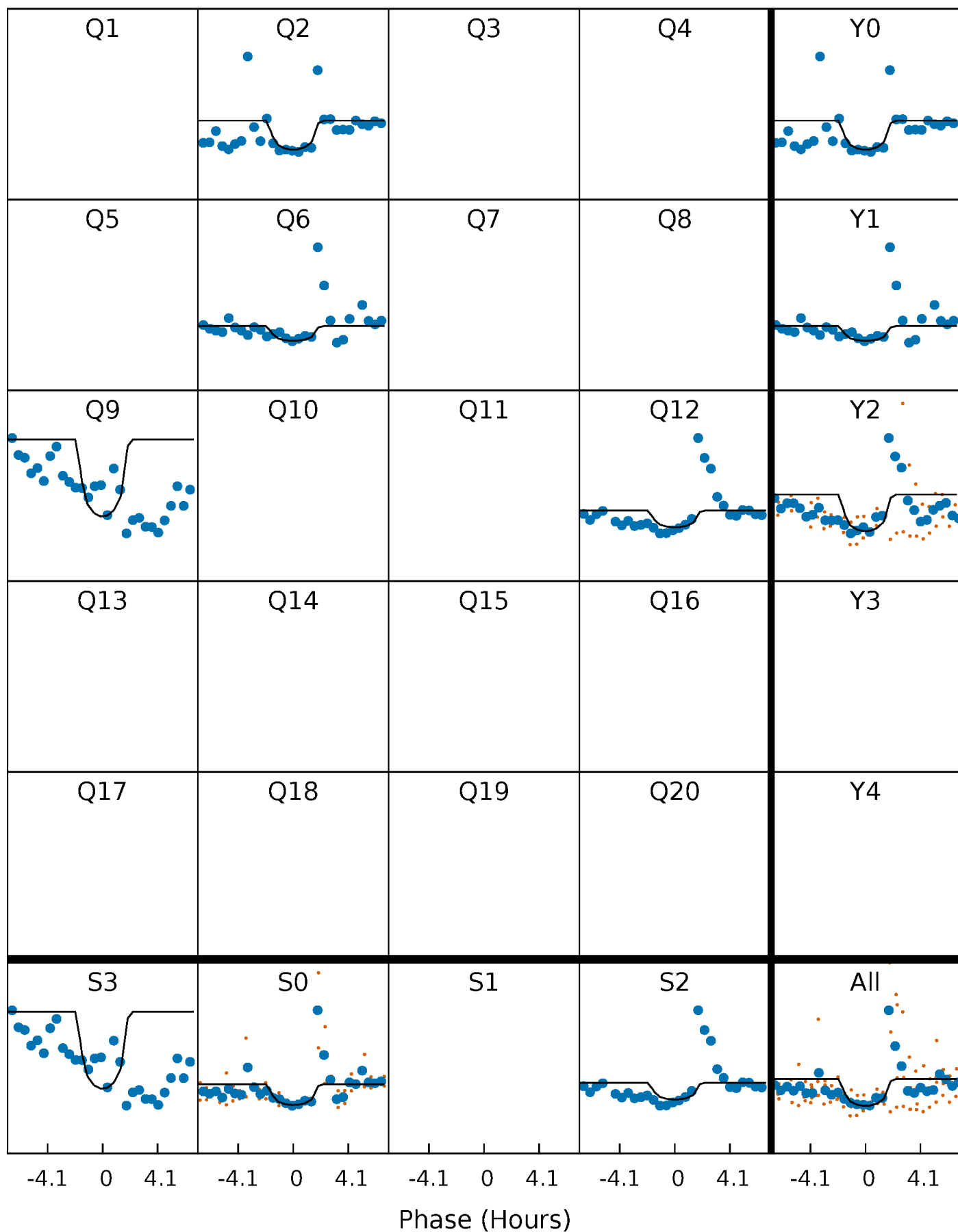
PDC Quarter-Phased Transit Curves

TCE 008481420-01 P=310.488379 Days $T_0=237.690450$ (BKJD)



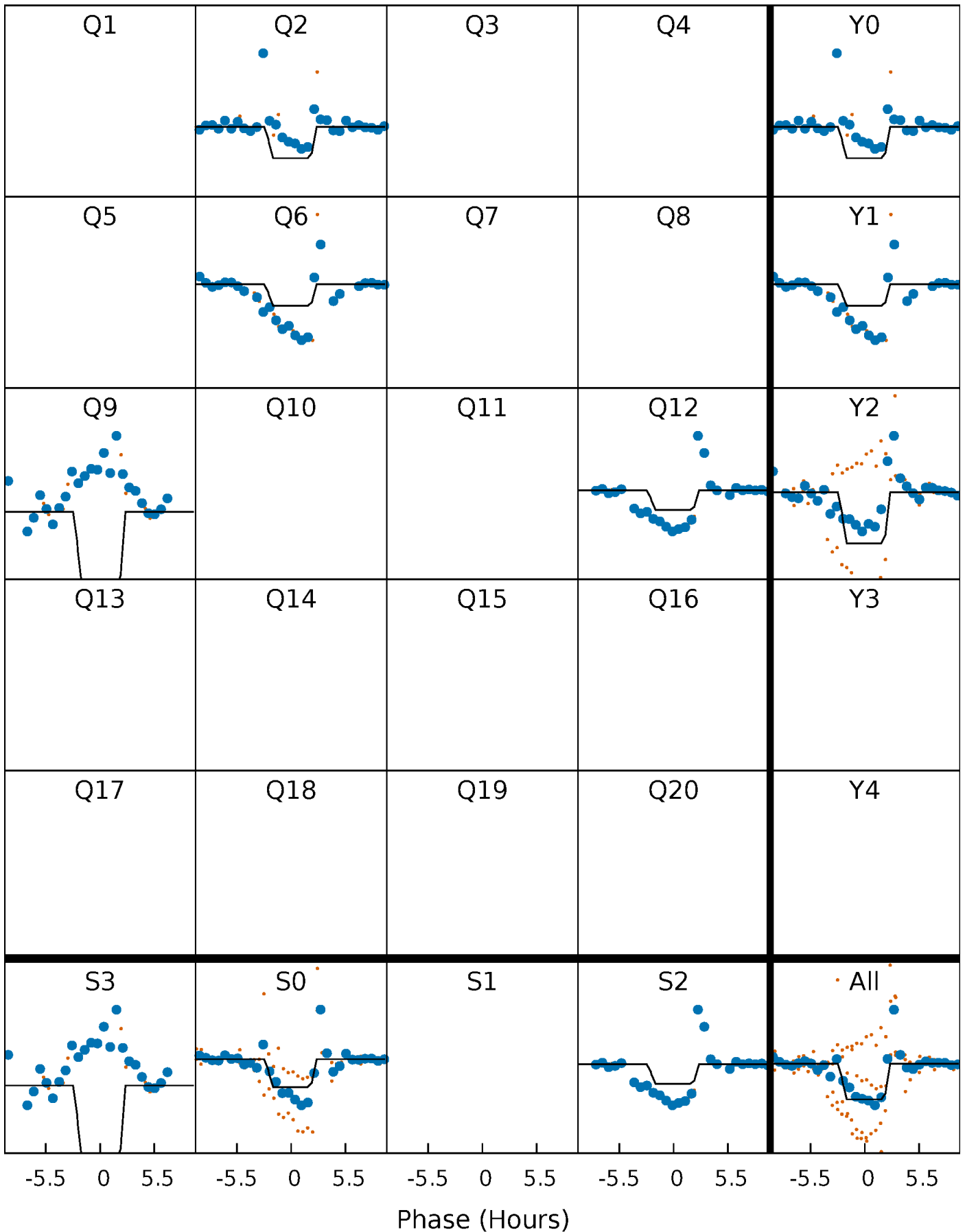
DV Quarter-Phased Transit Curves

TCE 008481420-01 P=310.488379 Days $T_0=237.690450$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

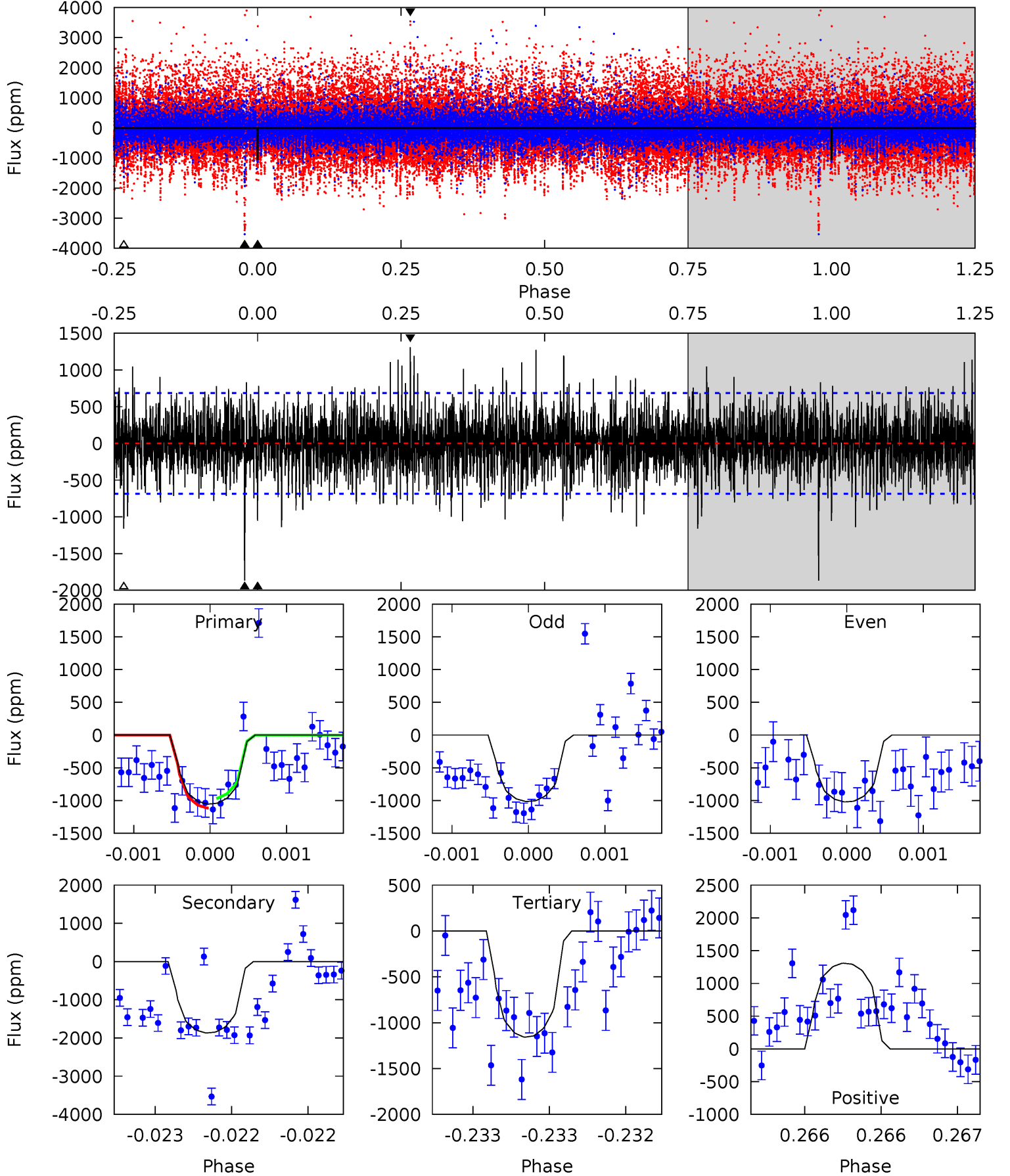
TCE 008481420-01 P=310.487944 Days $T_0=237.658669$ (BKJD)



DV Model-Shift Uniqueness Test

008481420-01, P = 310.488379 Days, E = 237.690450 Days

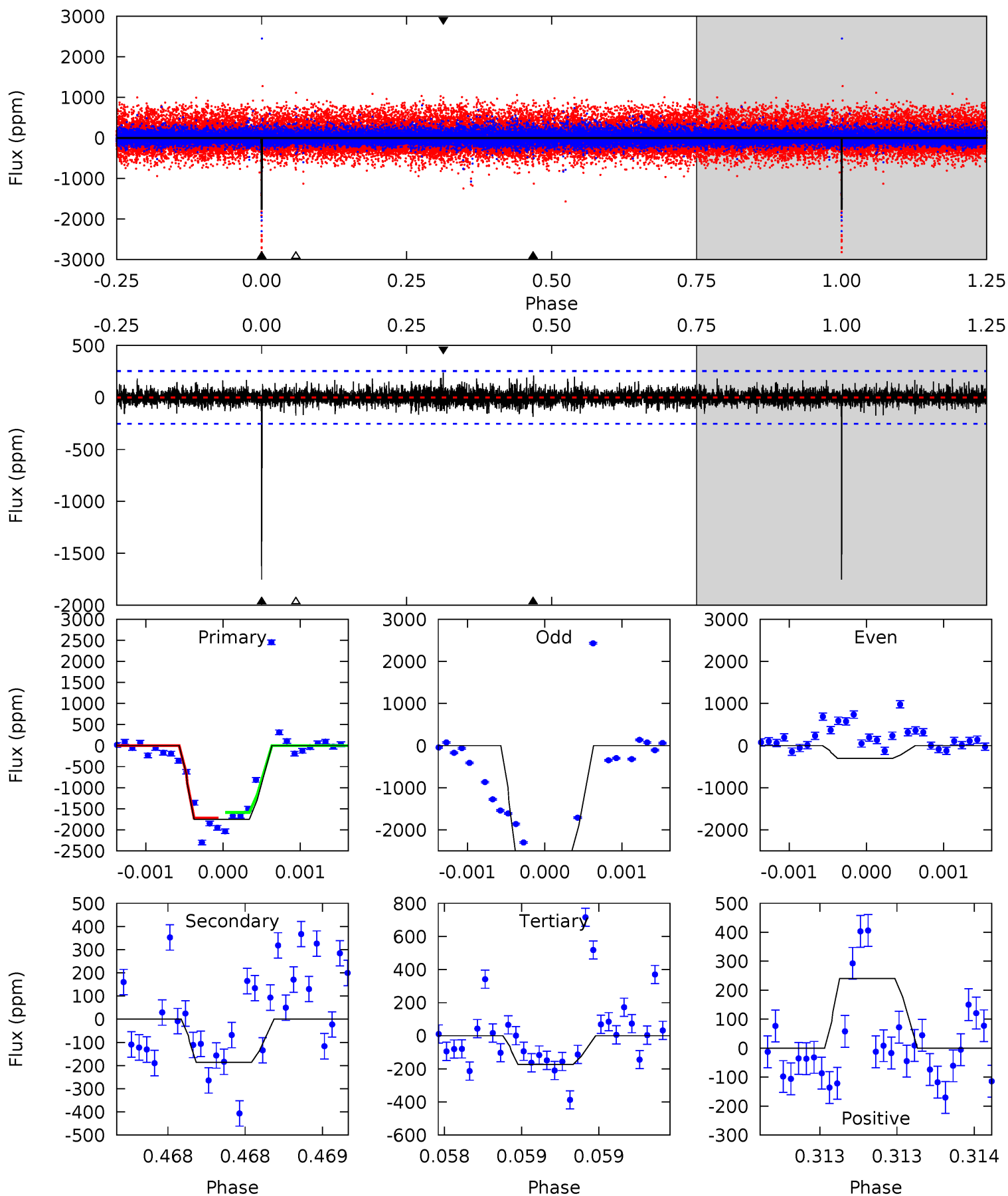
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.54	15.1	9.38	10.6	5.57	3.47	2.37	-0.84	-2.07	5.76	4.53	0.02	1.01	0.41	0.60



Alt Model-Shift Uniqueness Test

008481420-01, $P = 310.487944$ Days, $E = 237.658669$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
38.2	4.06	3.76	5.23	5.53	3.41	0.95	34.4	32.9	0.30	-1.17	26.8	0.85	0.12	1.33



Stellar Parameters For KIC 008481420

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4809^{+172}_{-172}	$4.545^{+0.066}_{-0.039}$	$0.070^{+0.250}_{-0.300}$	$0.763^{+0.049}_{-0.074}$	$0.746^{+0.075}_{-0.061}$	$2.362^{+0.684}_{-0.342}$
	+4%/-4%	+1%/-1%	+357%/-429%	+6%/-10%	+10%/-8%	+29%/-14%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 008481420-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-1868 ± 123	$4.02^{+4.10}_{-2.87}$	285^{+12}_{-12}	4574^{+4216}_{-991}	$42527^{+477630}_{-31930}$
Alt.	-187 ± 46	$4.84^{+3.91}_{-2.95}$	285^{+12}_{-11}	2970^{+1054}_{-438}	2846^{+16992}_{-1995}

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

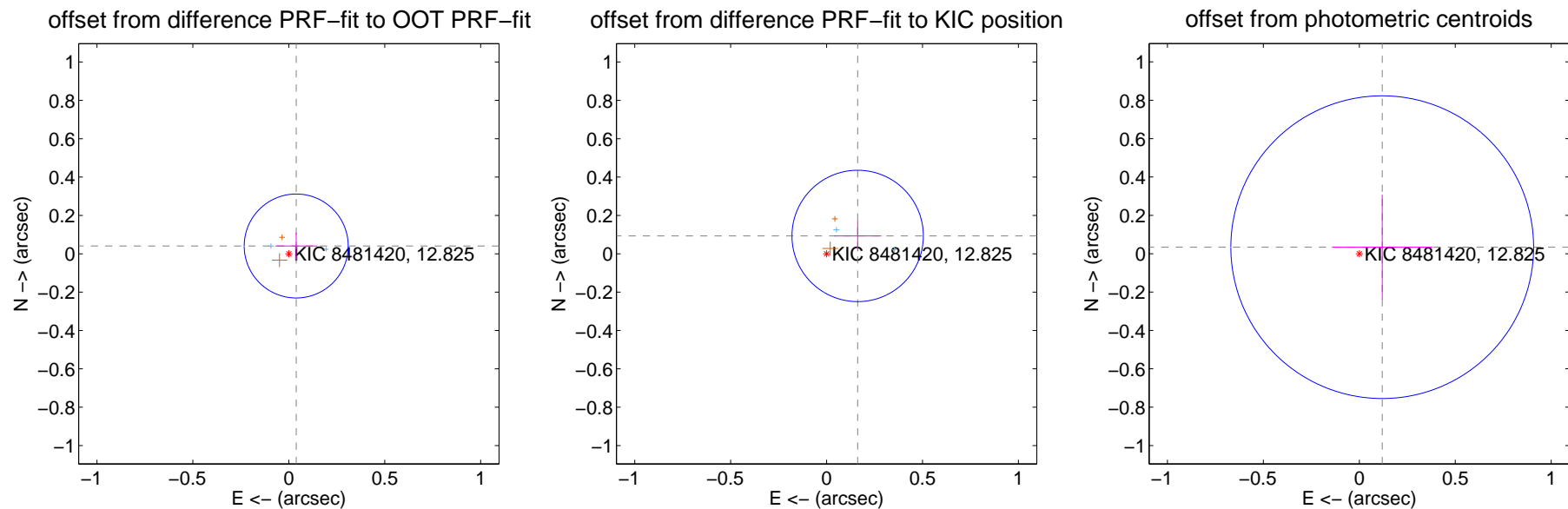
DV Centroid Data

Supplemental centroid analysis for 008481420-01. Kepler magnitude: 12.82. Transit SNR 6.15

There are 2 quarters with good PRF difference image offsets

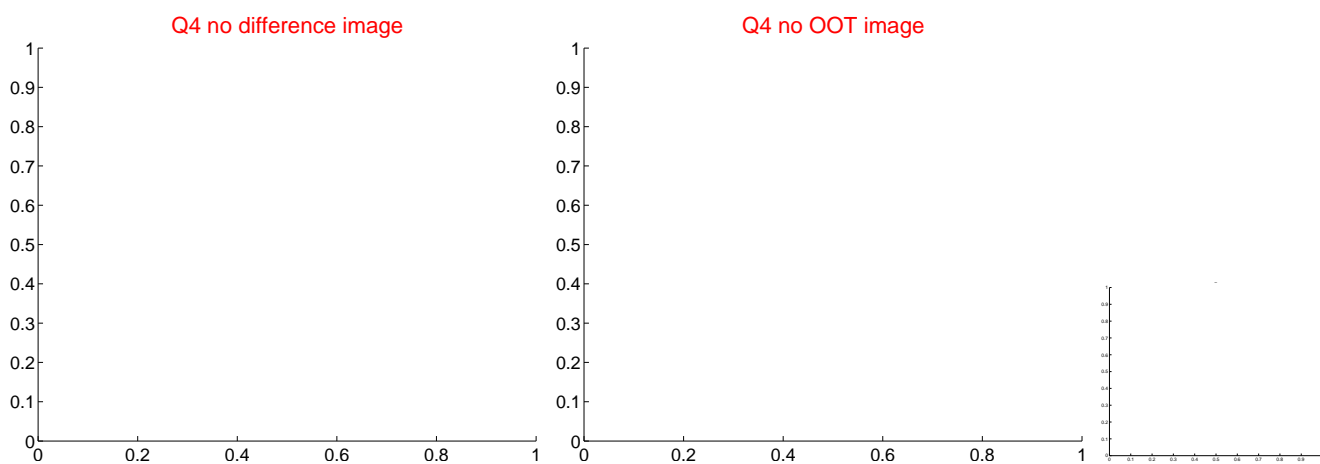
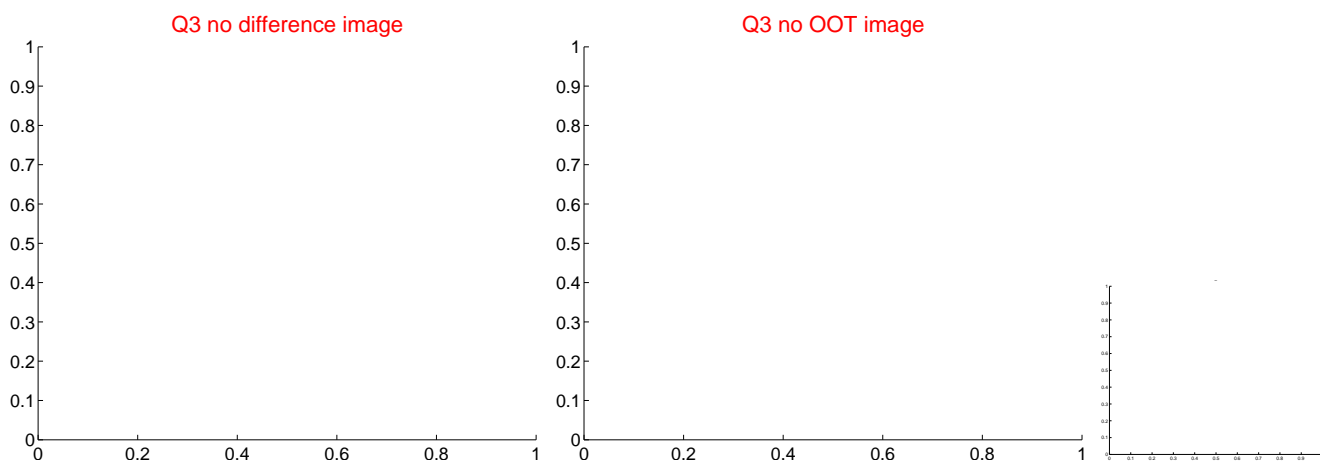
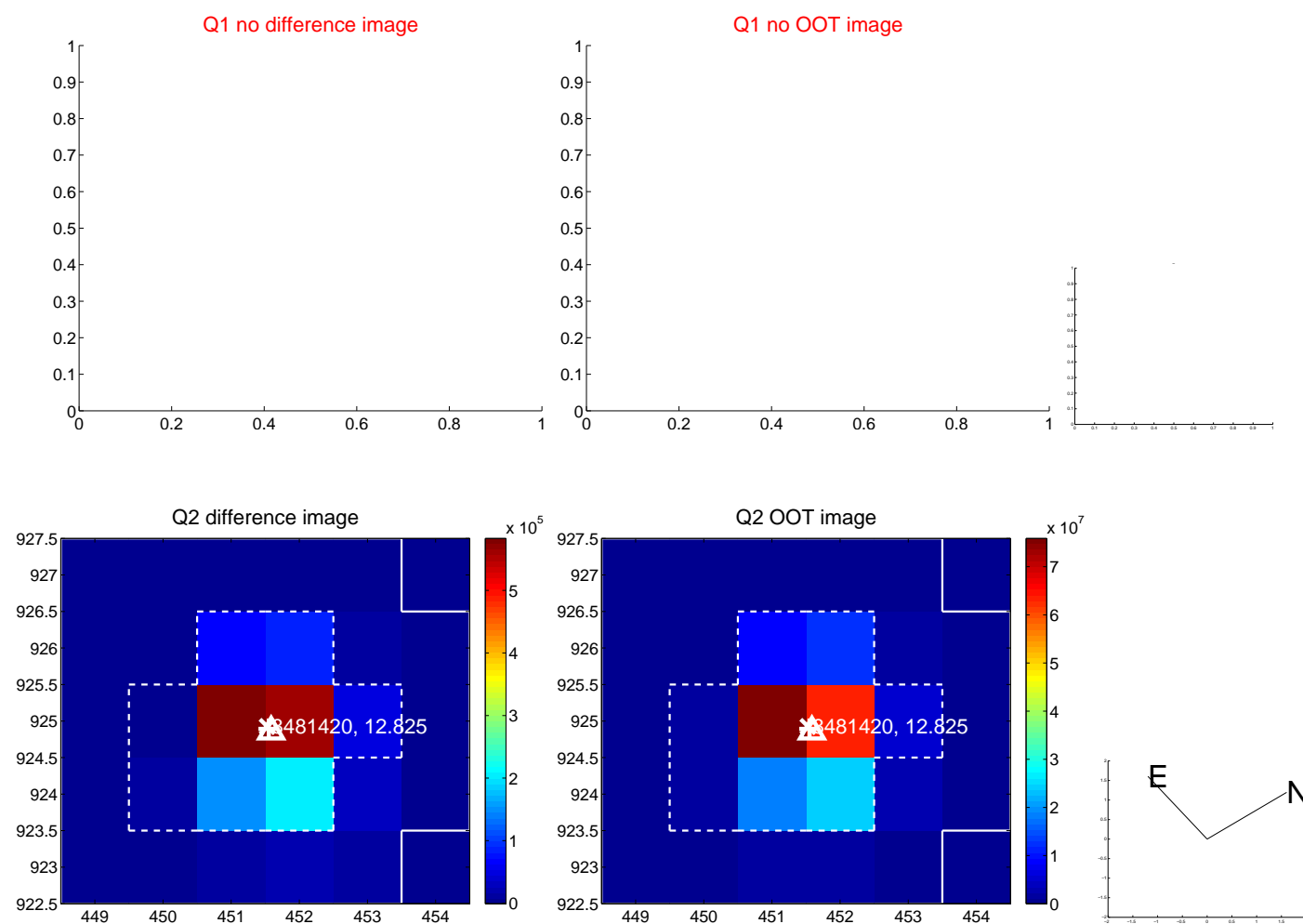
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.056 ± 0.090	0.62	-0.039 ± 0.109	0.041 ± 0.069
PRF-fit source offset from KIC position	0.187 ± 0.114	1.64	-0.162 ± 0.123	0.093 ± 0.080
photometric centroid source offset	0.12 ± 0.26	0.47	-0.12 ± 0.26	0.03 ± 0.27

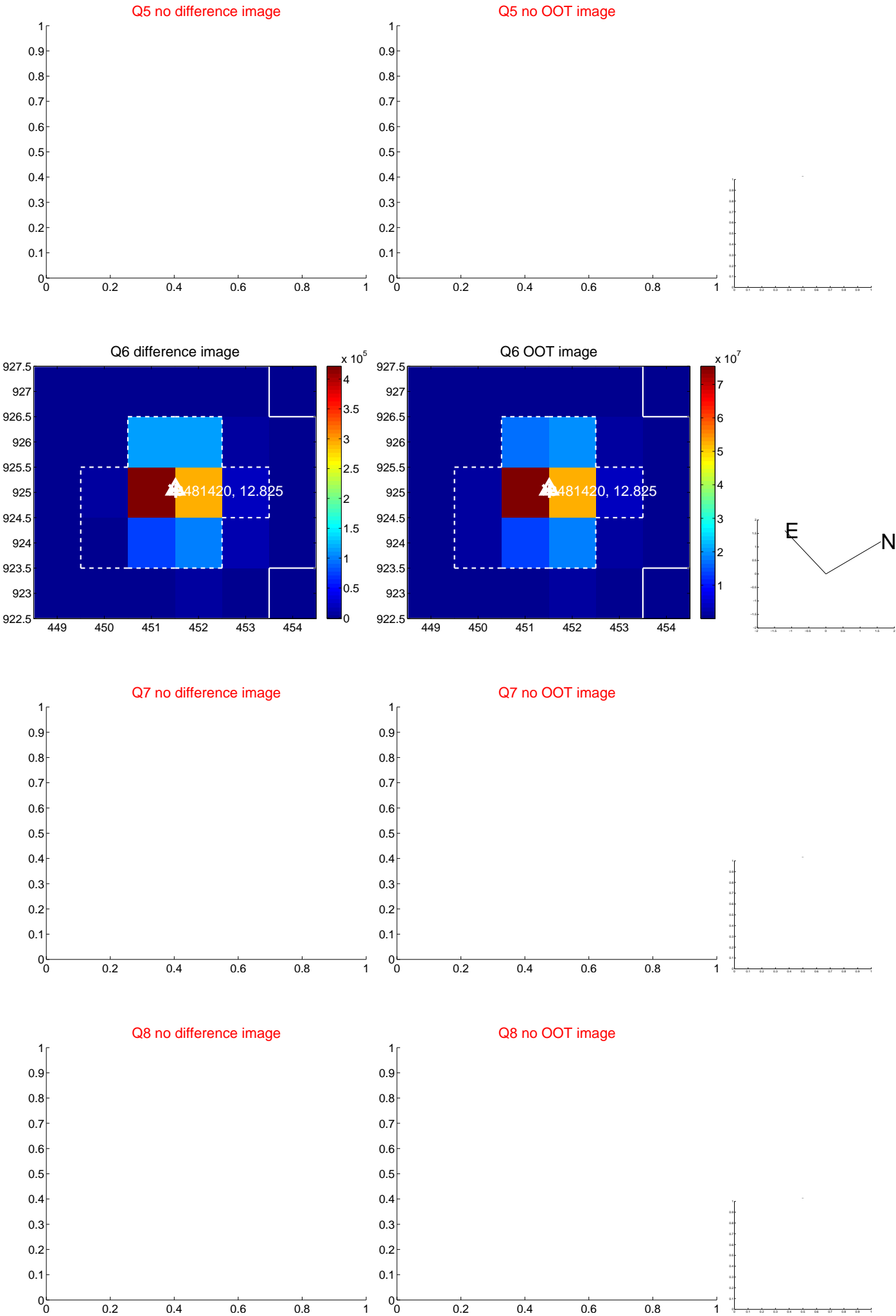


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

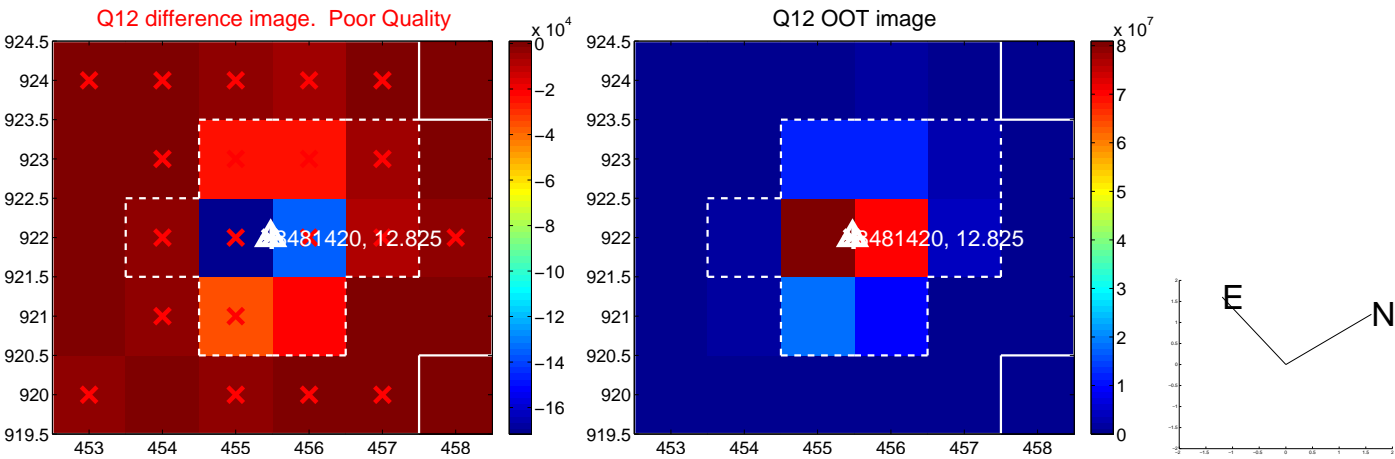
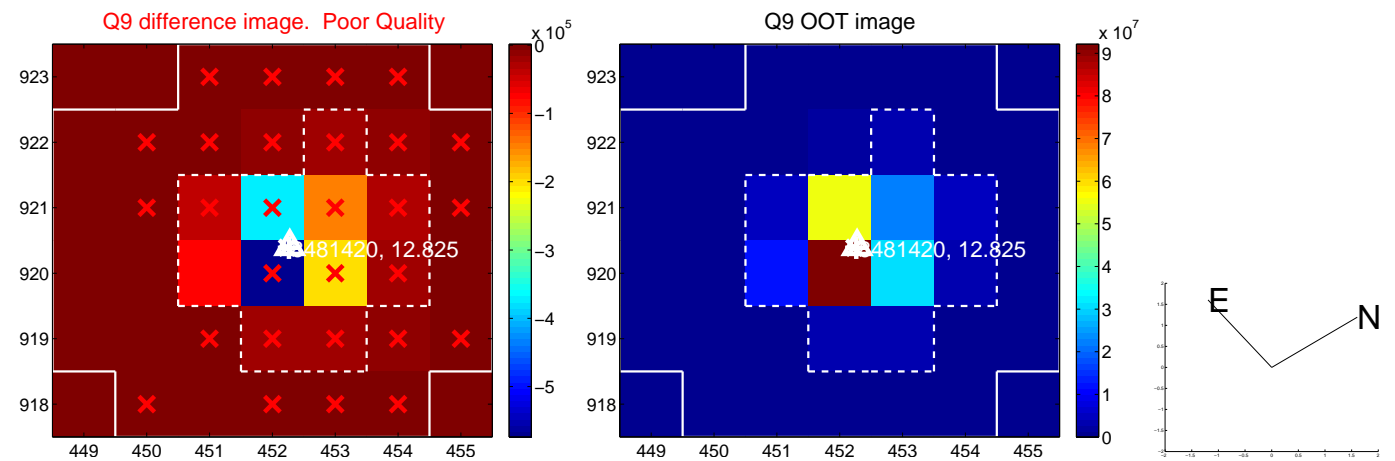
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



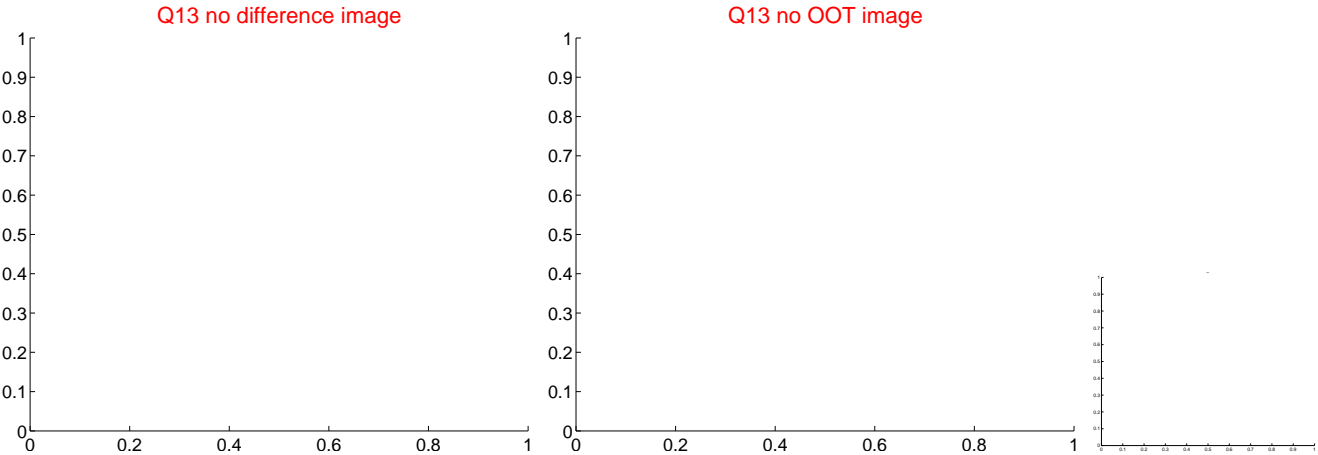
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



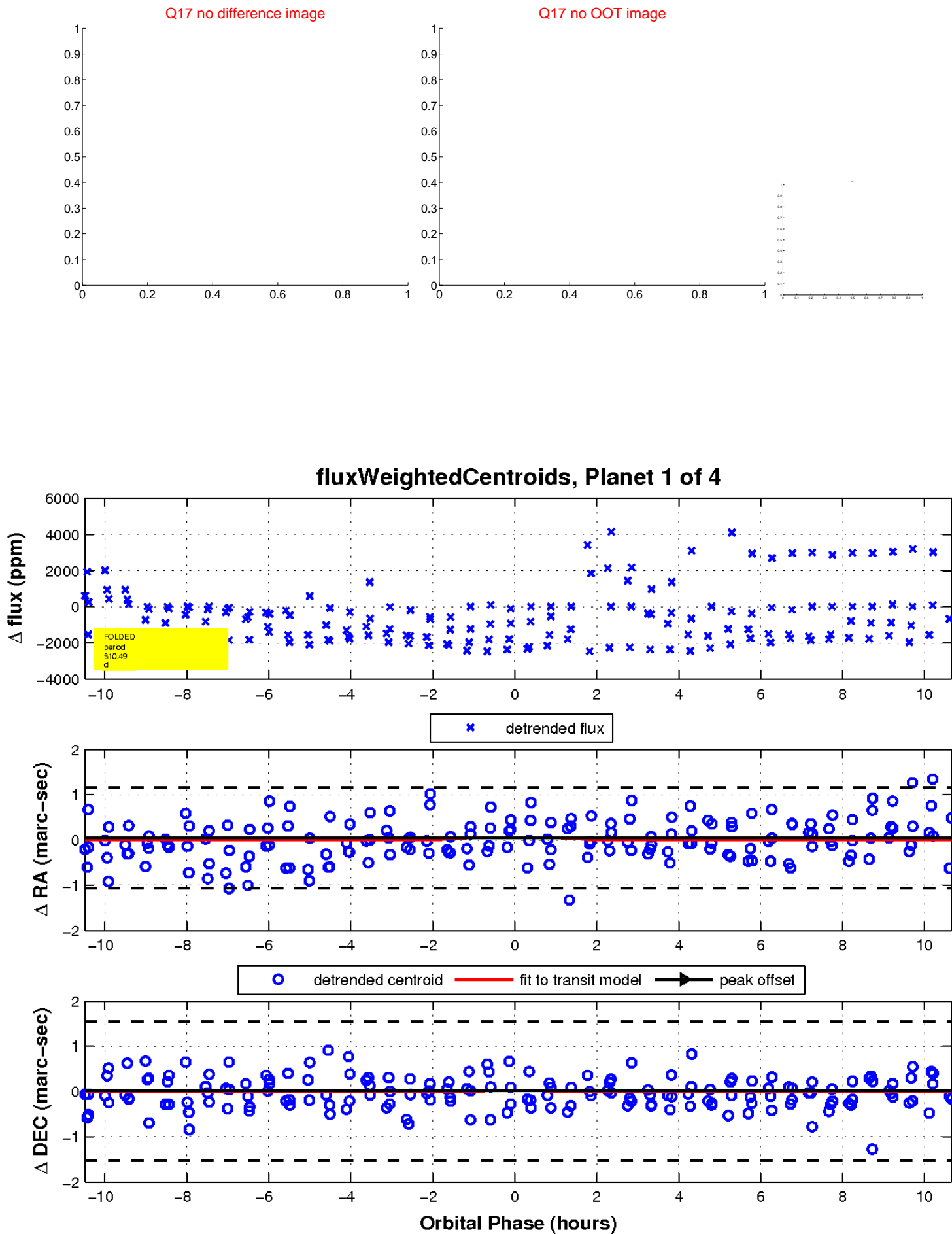
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



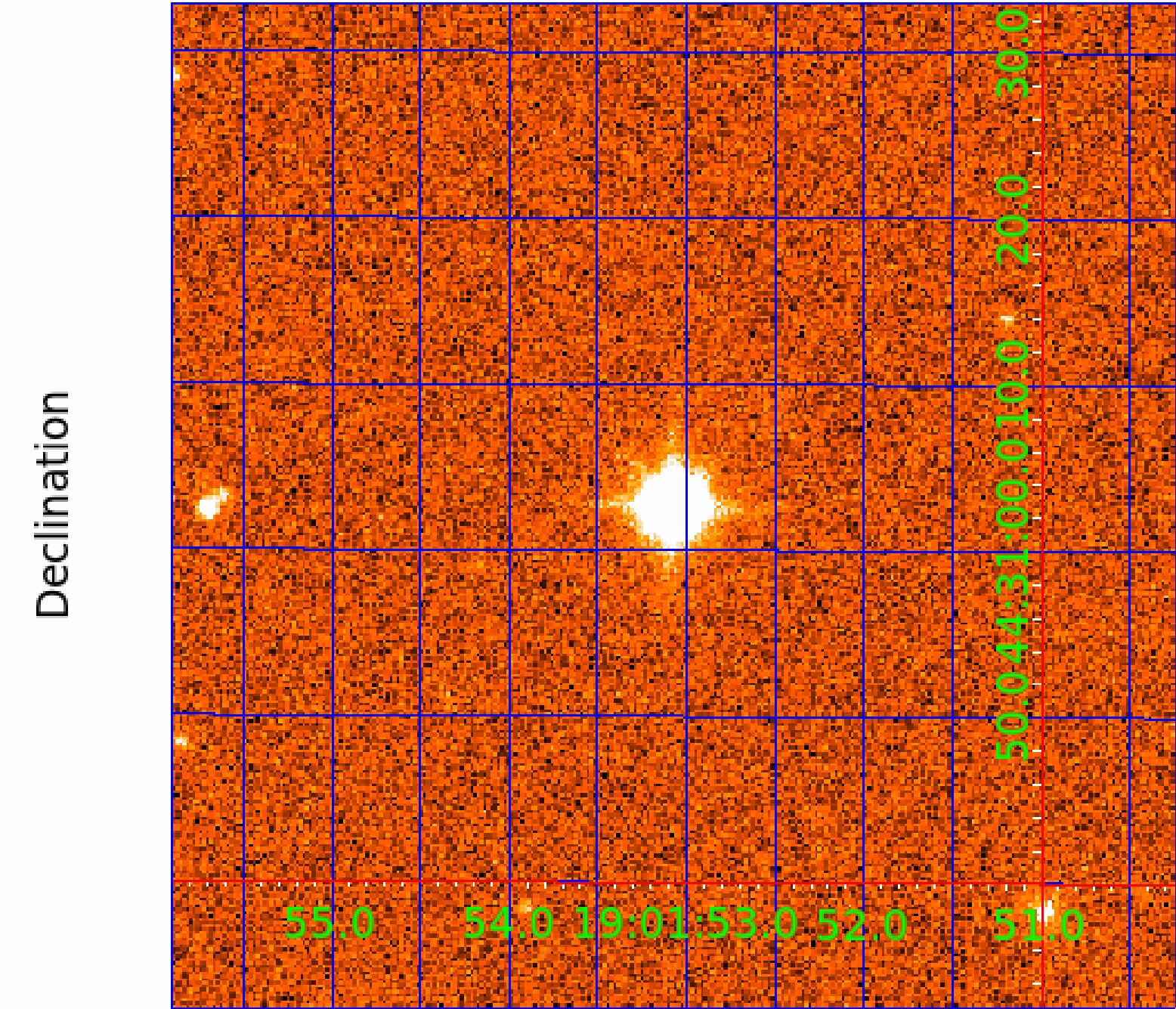
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white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image



KIC 008481420

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})
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Robovetter Results

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008481420-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
008481420-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008481420-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

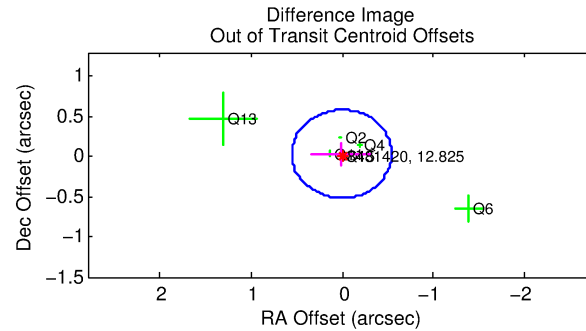
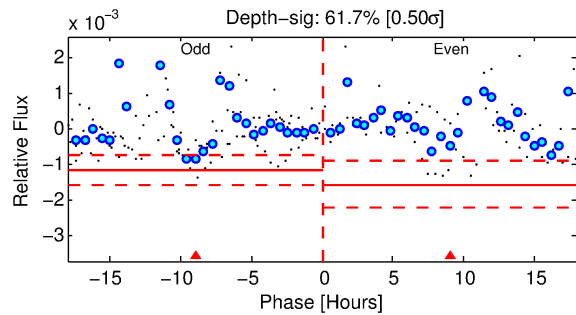
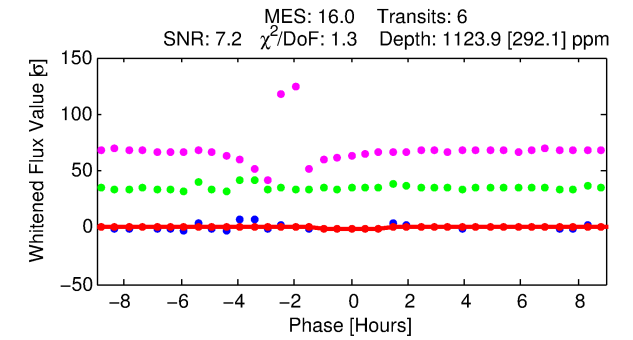
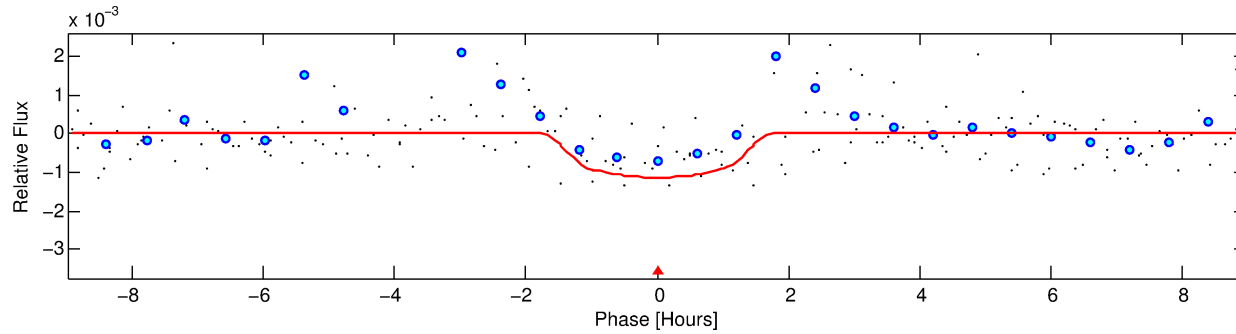
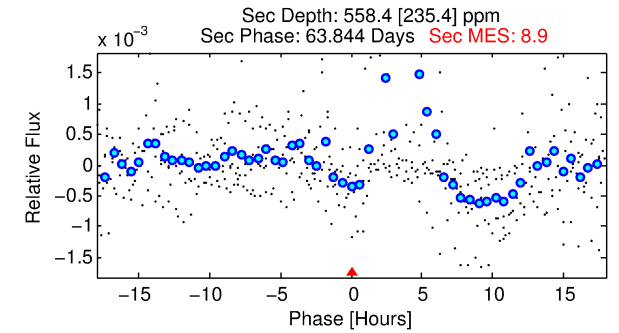
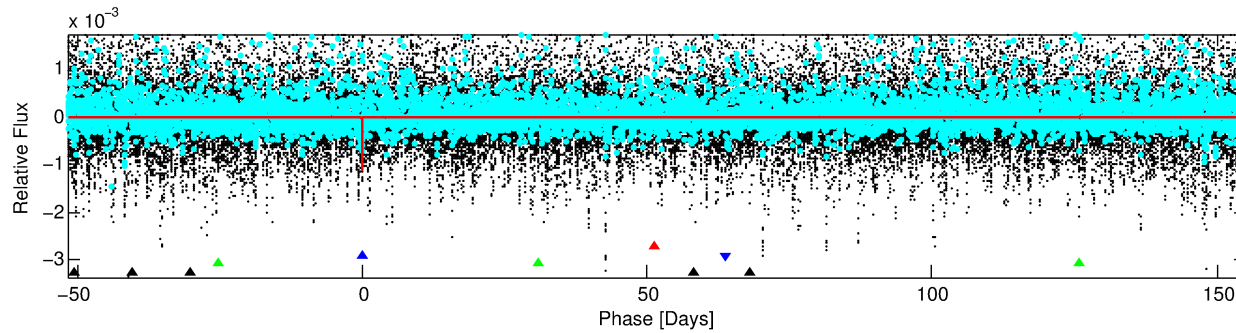
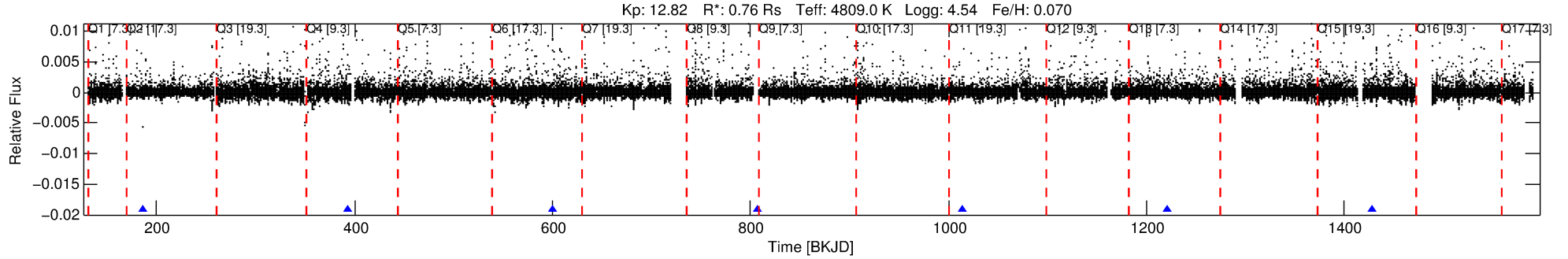
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008481420-02

No Significant Match Found

DV One-Page Summary

KIC: 8481420 Candidate: 2 of 4 Period: 207.004 d



DV Fit Results:

Period = 207.00422 [0.00192] d
Epoch = 186.4802 [0.0069] BKJD
Rp/R* = 0.0295 [0.0726]
a/R* = 543.67 [4220.13]
b = 0.00 [1631.88]
Seff = 0.72 [0.14]
Teq = 235 [11] K
Rp = 2.46 [6.05] Re
a = 0.6209 [0.0510] AU
Ag = 19582.74 [96678.42] [0.20 σ]
Teff = 4301 [5310] K [0.77 σ]

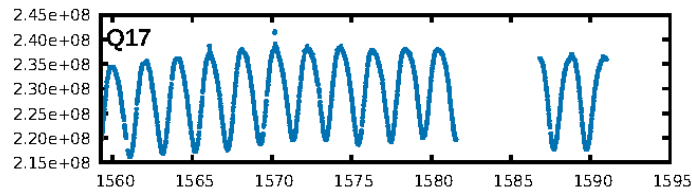
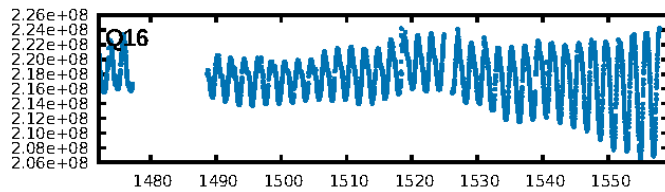
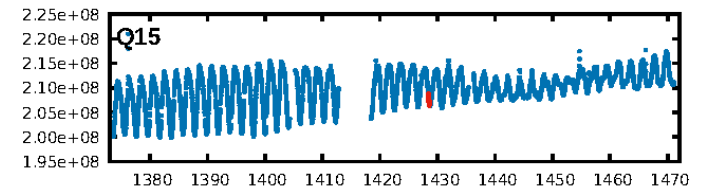
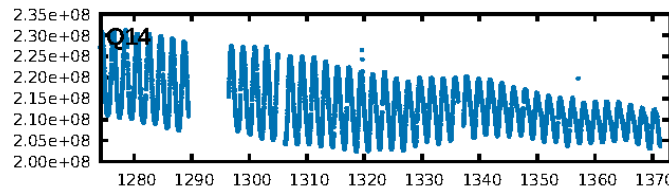
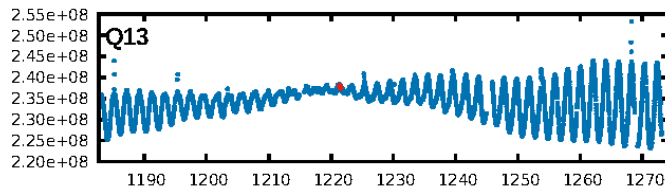
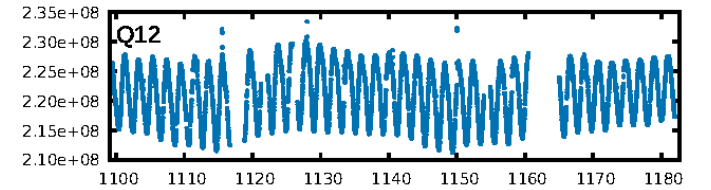
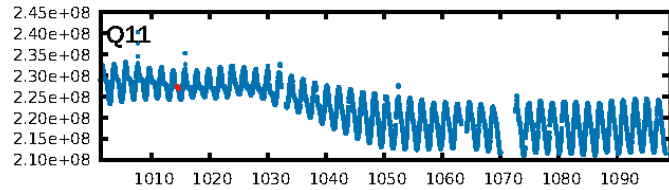
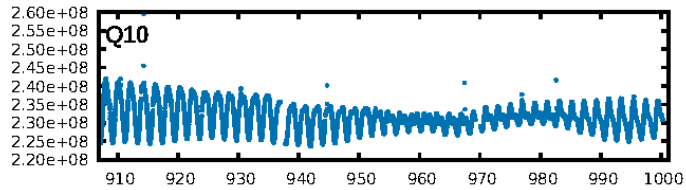
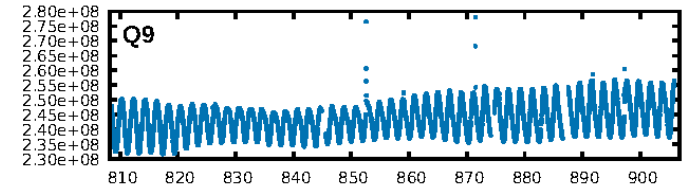
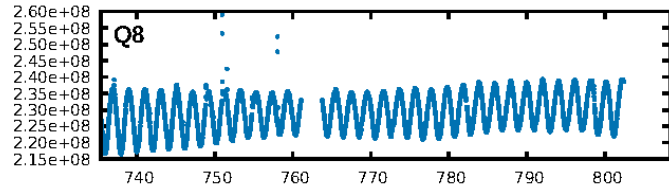
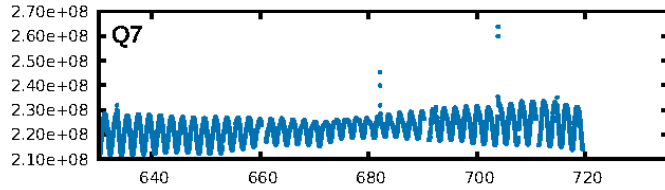
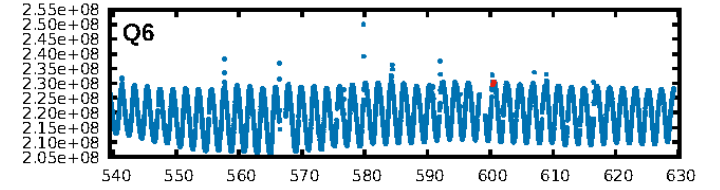
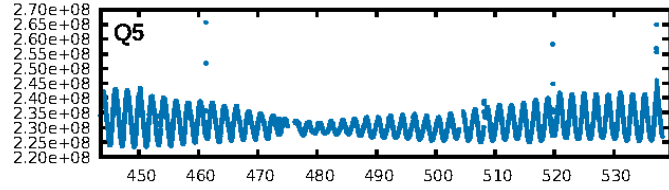
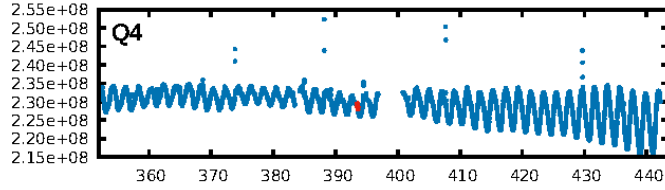
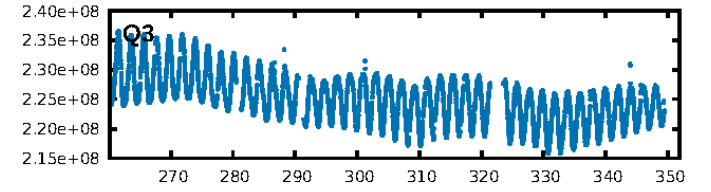
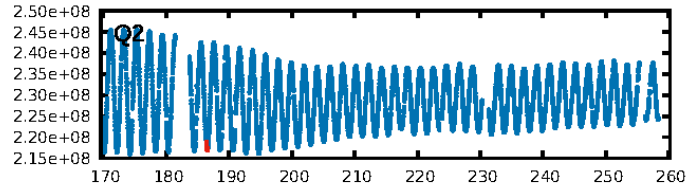
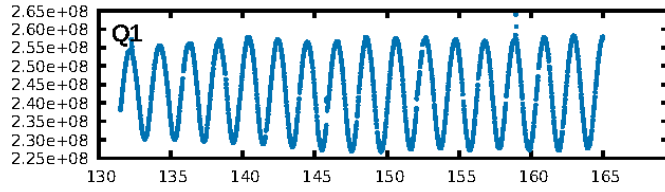
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [243.55 σ]
ModelChiSquare2-sig: 5.0%
ModelChiSquareGof-sig: 92.0%
Bootstrap-pfa: 7.02e-12
RollingBand-fgt: 1.00 [6/6]
GhostDiagnostic-chr: 3.34
Centroid-sig: 93.5%
Centroid-so: 0.131 arcsec [0.63 σ]
OotOffset-rm: 0.034 arcsec [0.18 σ]
KicOffset-rm: 0.170 arcsec [0.88 σ]
OotOffset-st: 2/2/1/1 [6]
KicOffset-st: 2/2/1/1 [6]
DiffImageQuality-fgm: 0.50 [3/6]
DiffImageOverlap-fno: 1.00 [6/6]

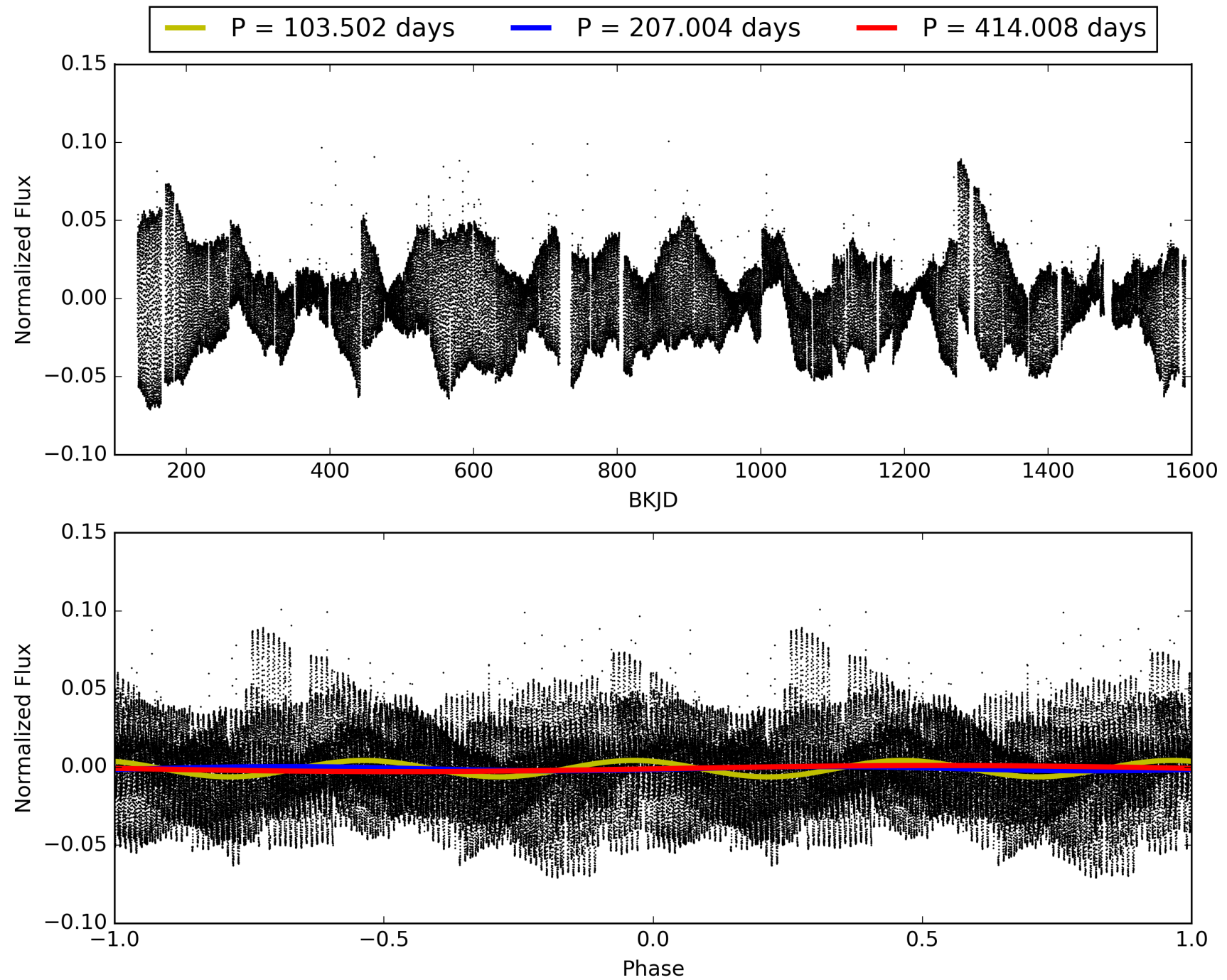
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 06:10:24 Z

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

TCE 008481420-02, PDC Light Curves

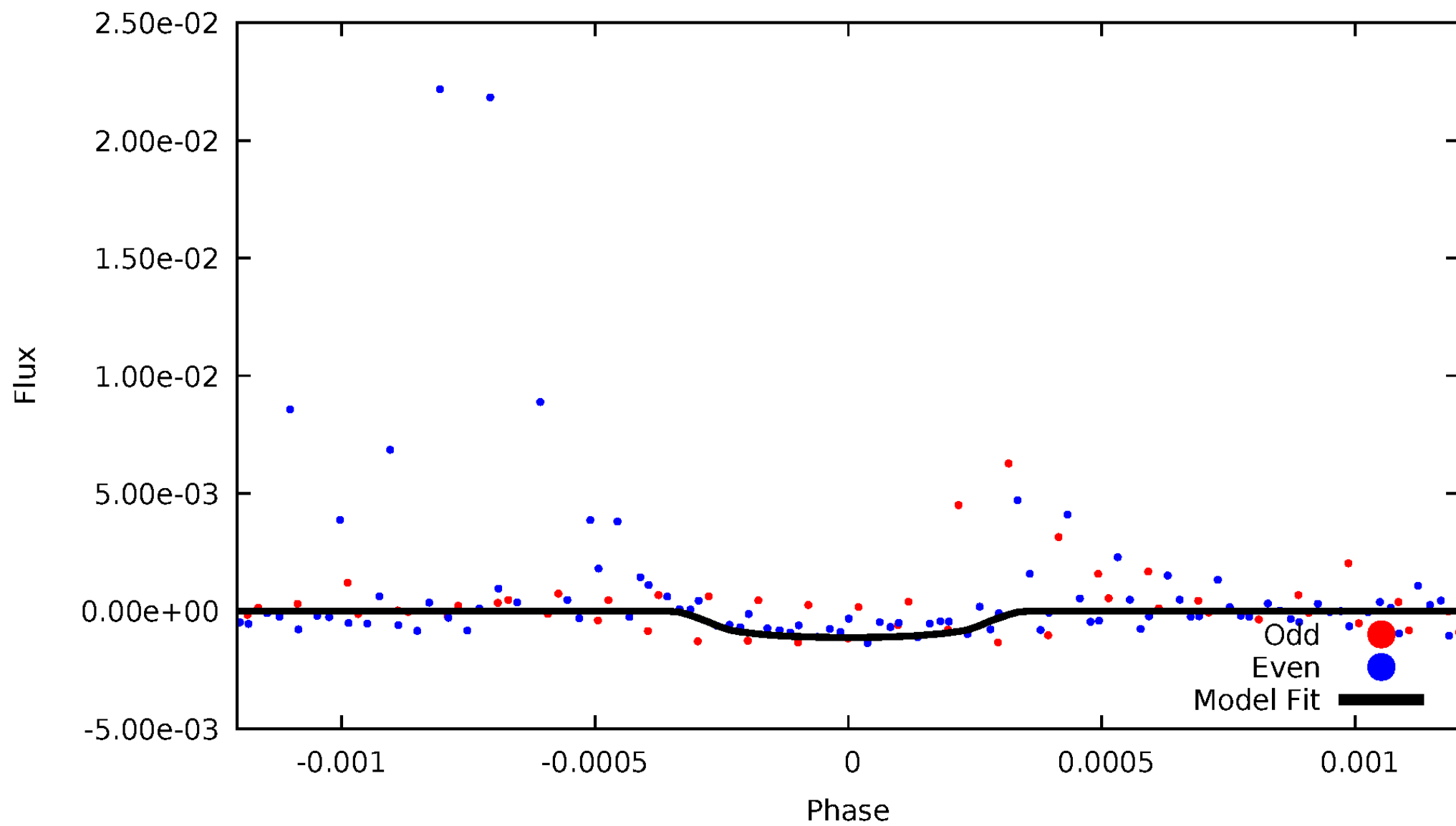


TCE 008481420-02



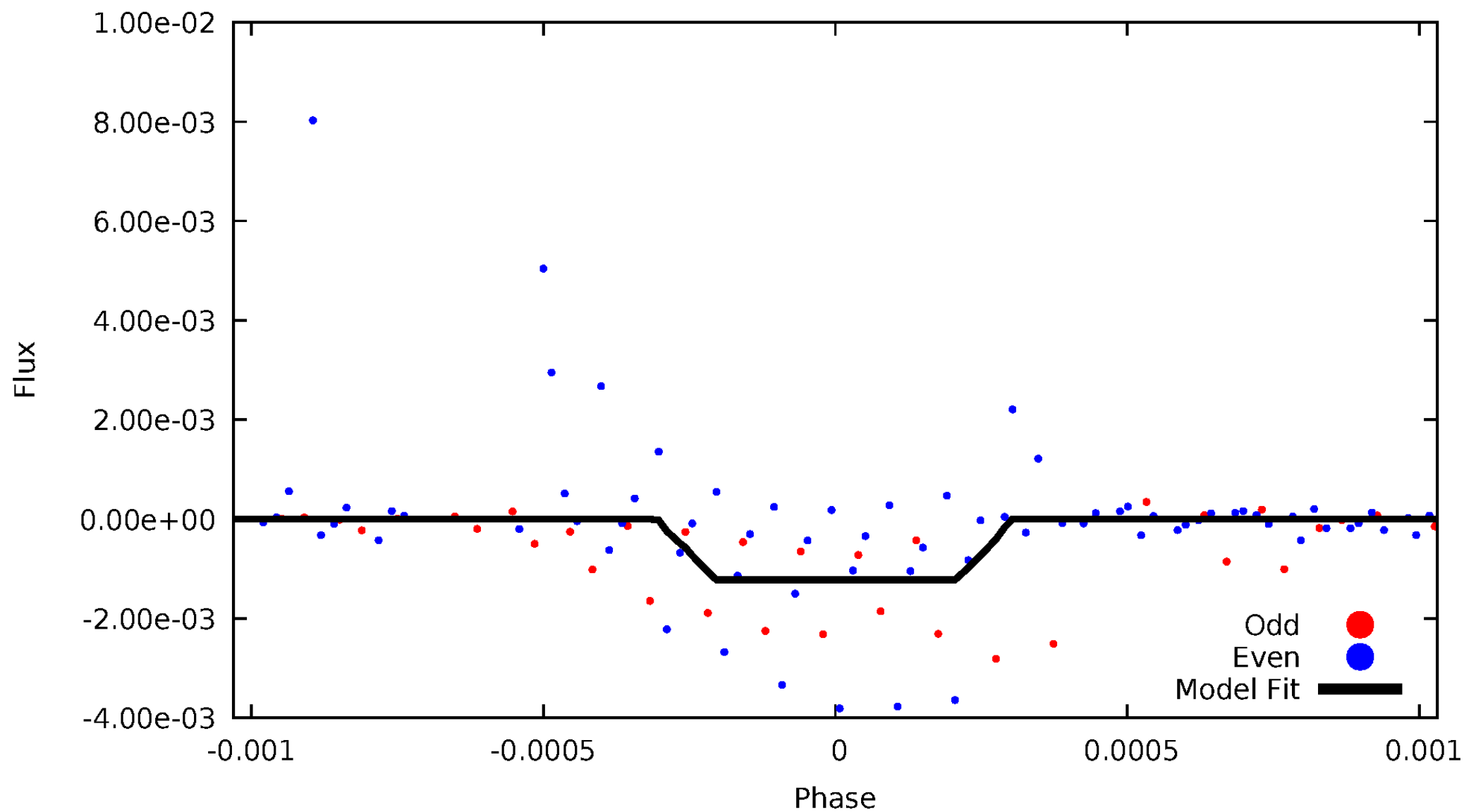
DV Odd/Even

TCE 008481420-02



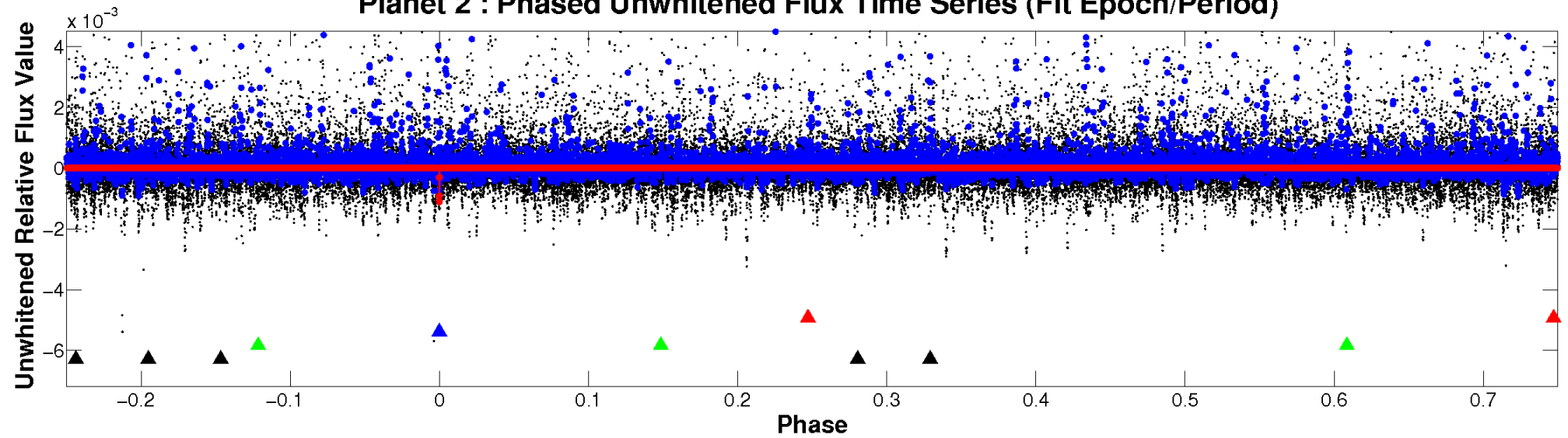
ALT Odd/Even

TCE 008481420-02

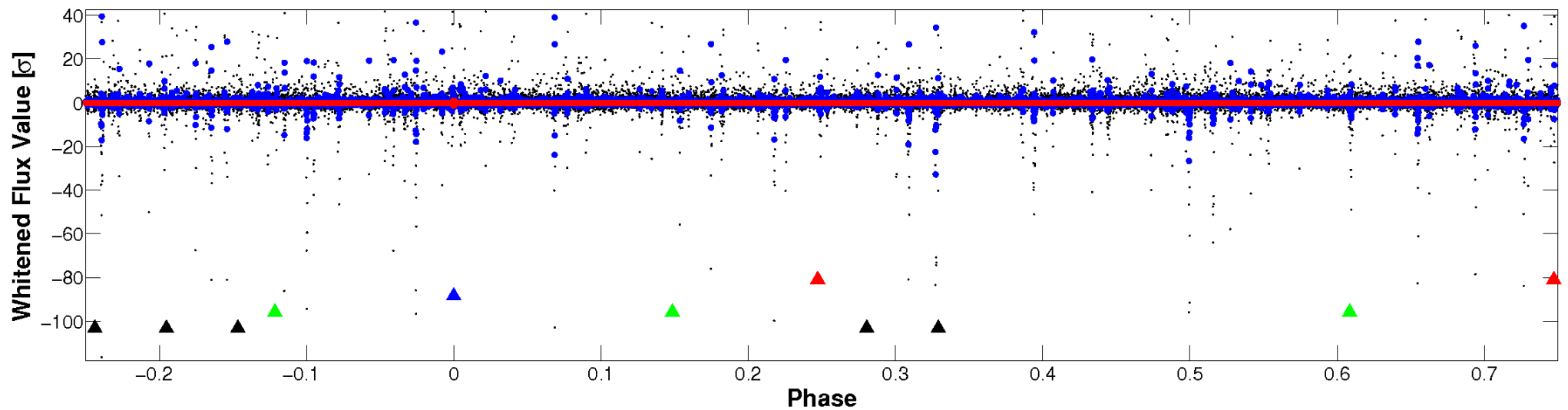


Non-Whitened Vs. Whitened Light Curve

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

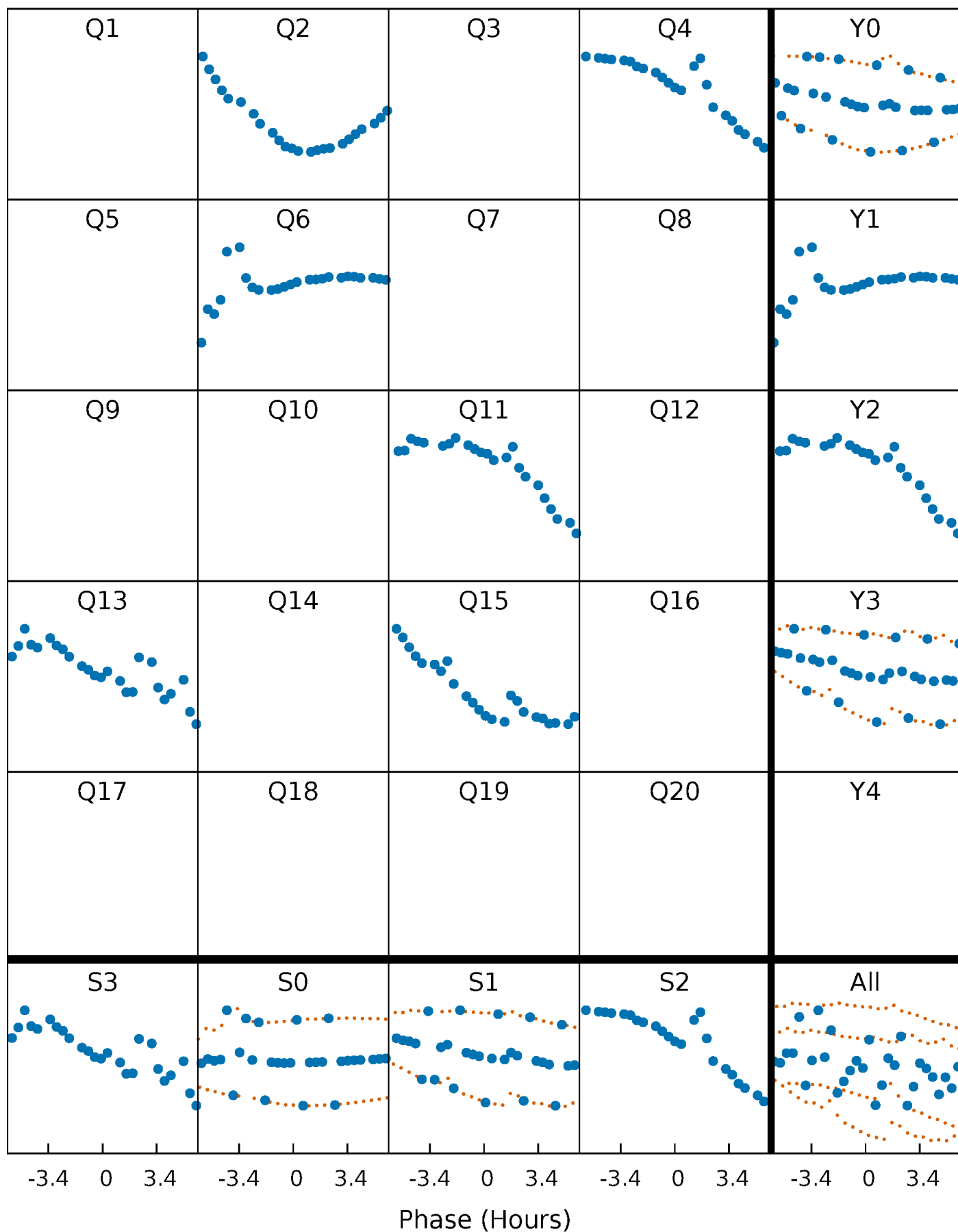


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



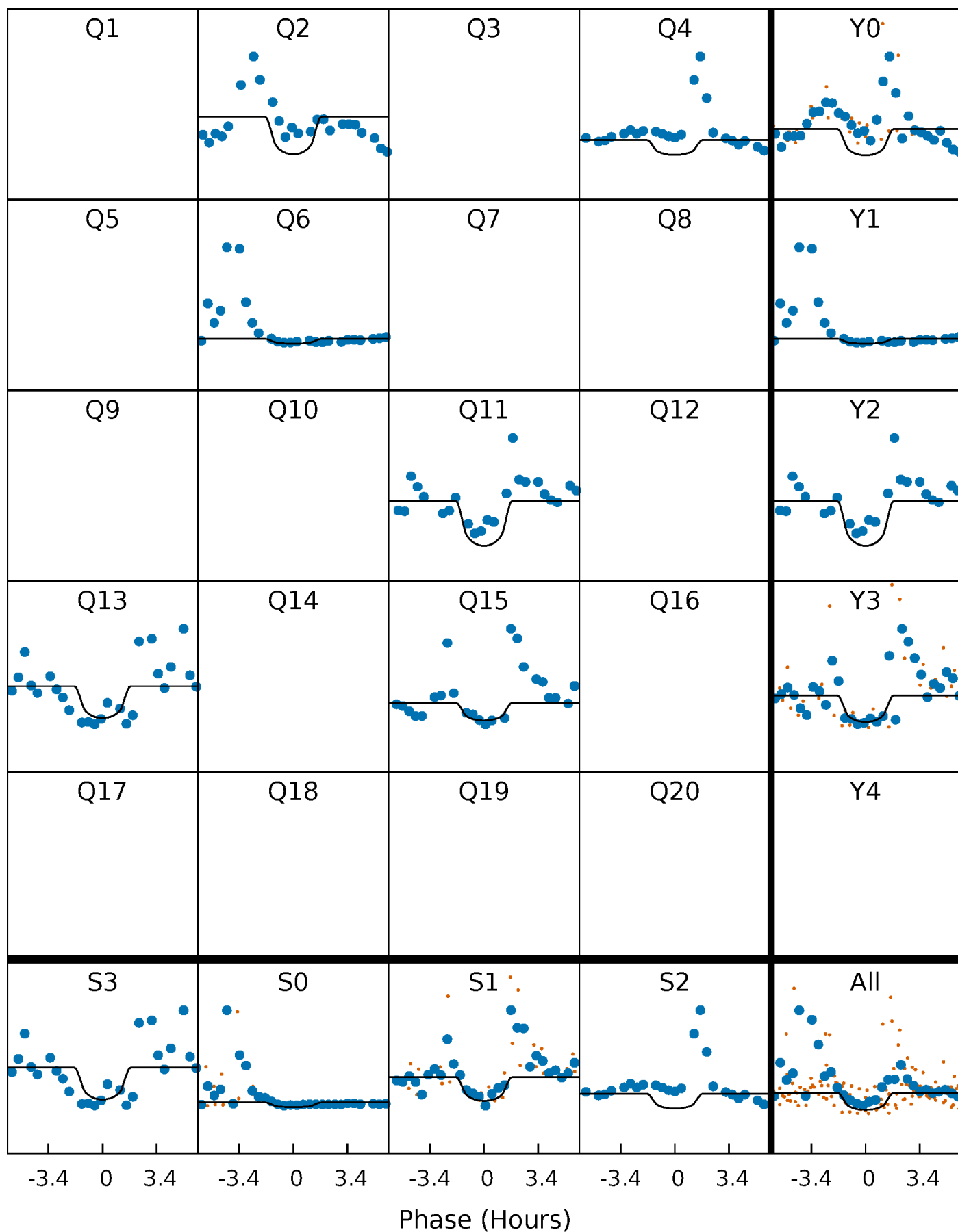
PDC Quarter-Phased Transit Curves

TCE 008481420-02 P=207.004219 Days $T_0=186.480239$ (BKJD)



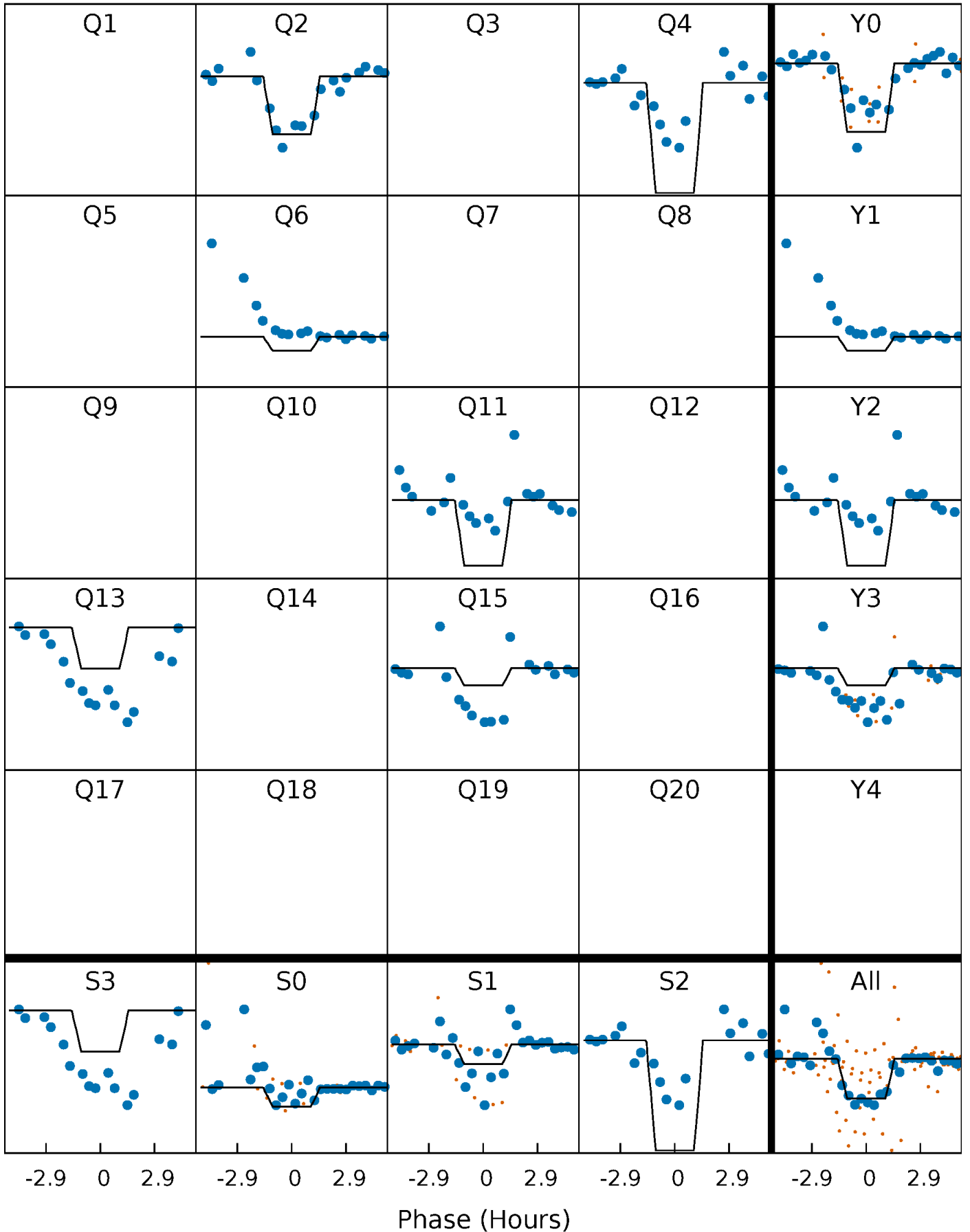
DV Quarter-Phased Transit Curves

TCE 008481420-02 $P=207.004219$ Days $T_0=186.480239$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

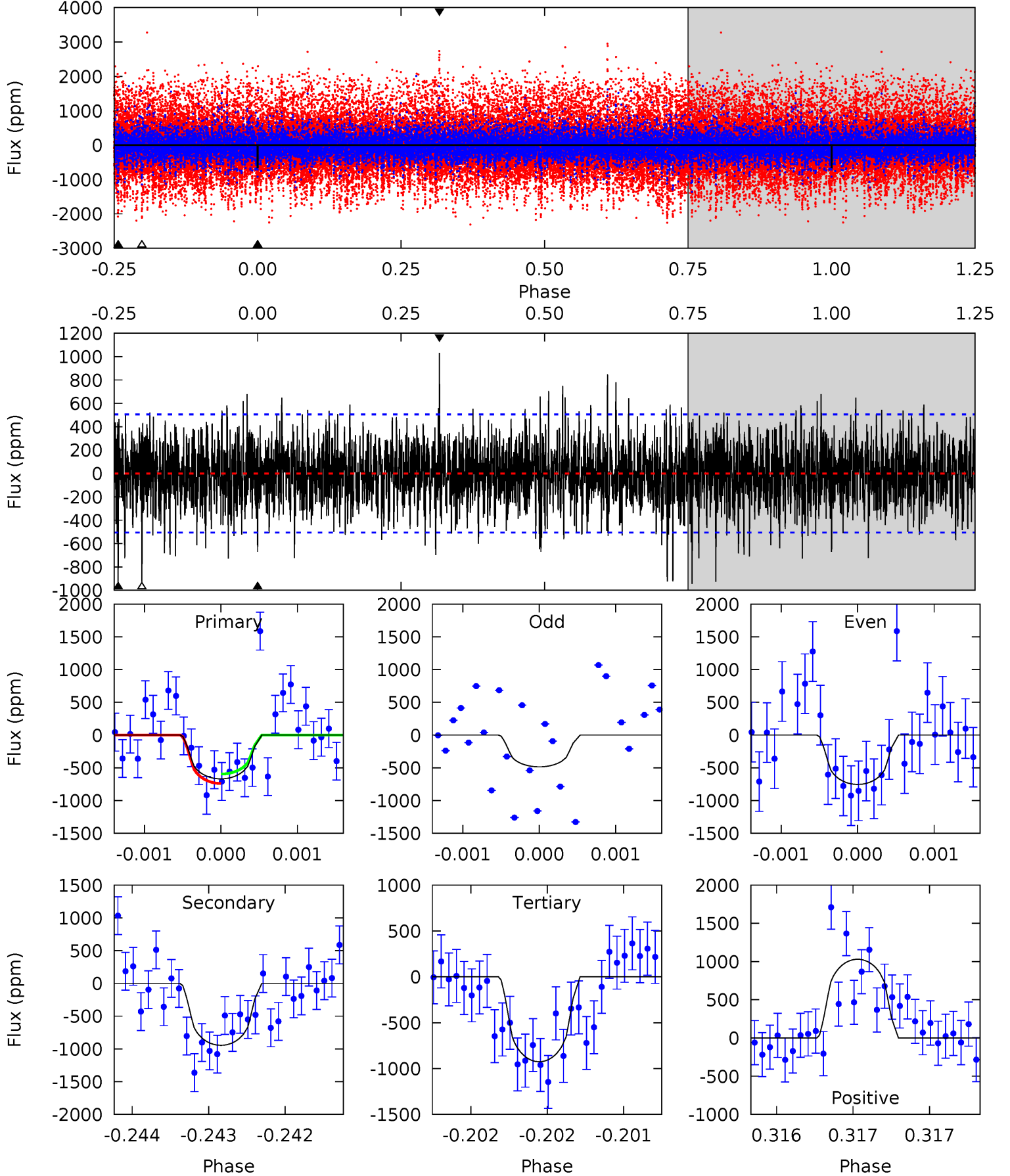
TCE 008481420-02 P=207.006274 Days $T_0=186.474183$ (BKJD)



DV Model-Shift Uniqueness Test

008481420-02, P = 207.004219 Days, E = 186.480239 Days

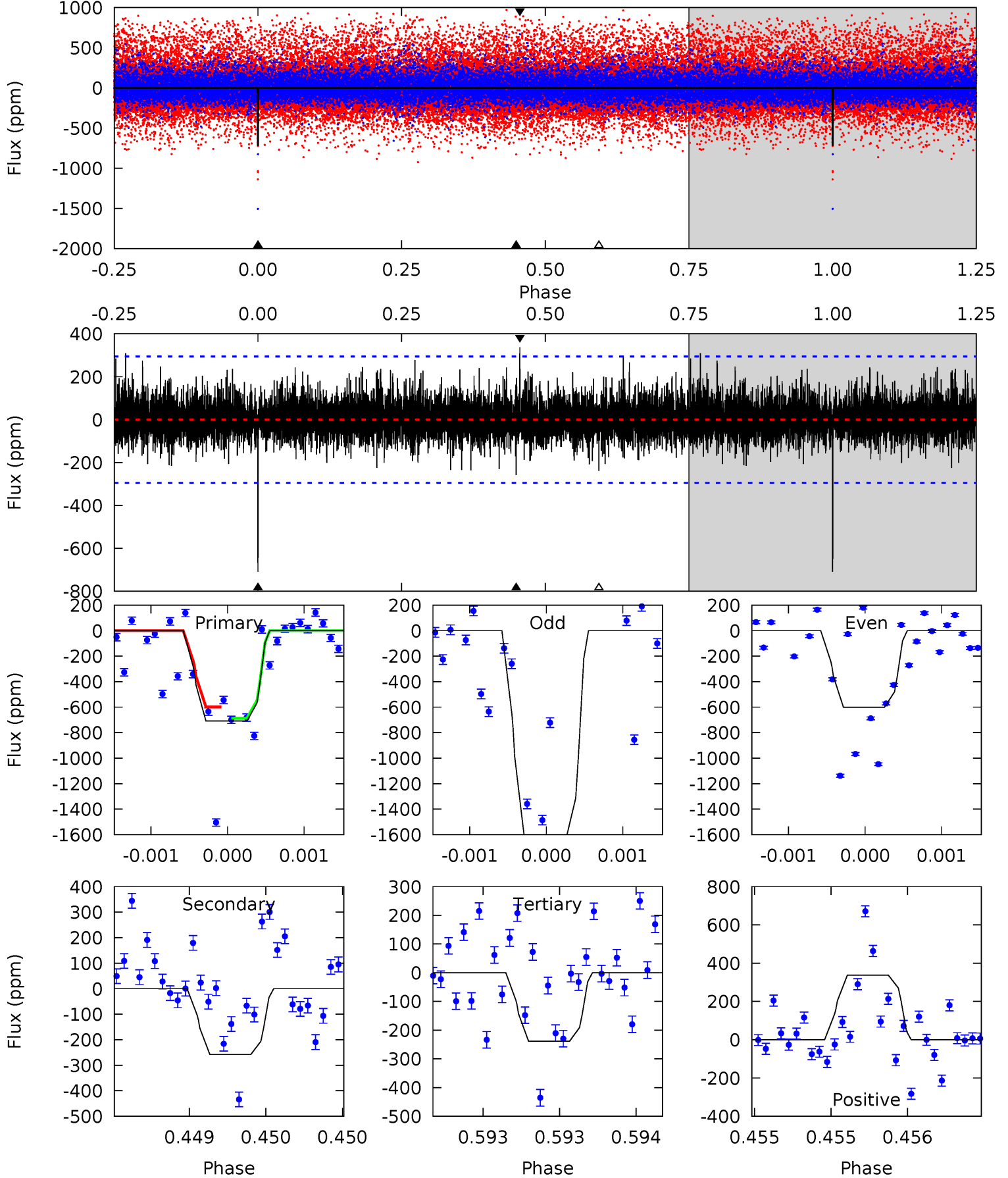
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.31	10.3	10.1	11.3	5.52	3.40	2.31	-2.80	-3.94	0.21	-0.92	1.33	0.67	0.52	0.80



Alt Model-Shift Uniqueness Test

008481420-02, P = 207.006274 Days, E = 186.474183 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.3	4.85	4.49	6.35	5.54	3.44	1.23	8.85	6.99	0.36	-1.50	11.2	1.45	0.32	0



Stellar Parameters For KIC 008481420

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4809^{+172}_{-172}	$4.545^{+0.066}_{-0.039}$	$0.070^{+0.250}_{-0.300}$	$0.763^{+0.049}_{-0.074}$	$0.746^{+0.075}_{-0.061}$	$2.362^{+0.684}_{-0.342}$
	+4%/-4%	+1%/-1%	+357%/-429%	+6%/-10%	+10%/-8%	+29%/-14%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 008481420-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-946 ± 92	$5.23^{+4.80}_{-3.49}$	327^{+13}_{-14}	3688^{+2016}_{-671}	7136^{+58880}_{-5124}
Alt.	-258 ± 53	$5.08^{+5.32}_{-3.65}$	327^{+14}_{-13}	3040^{+1562}_{-522}	2097^{+24277}_{-1601}

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

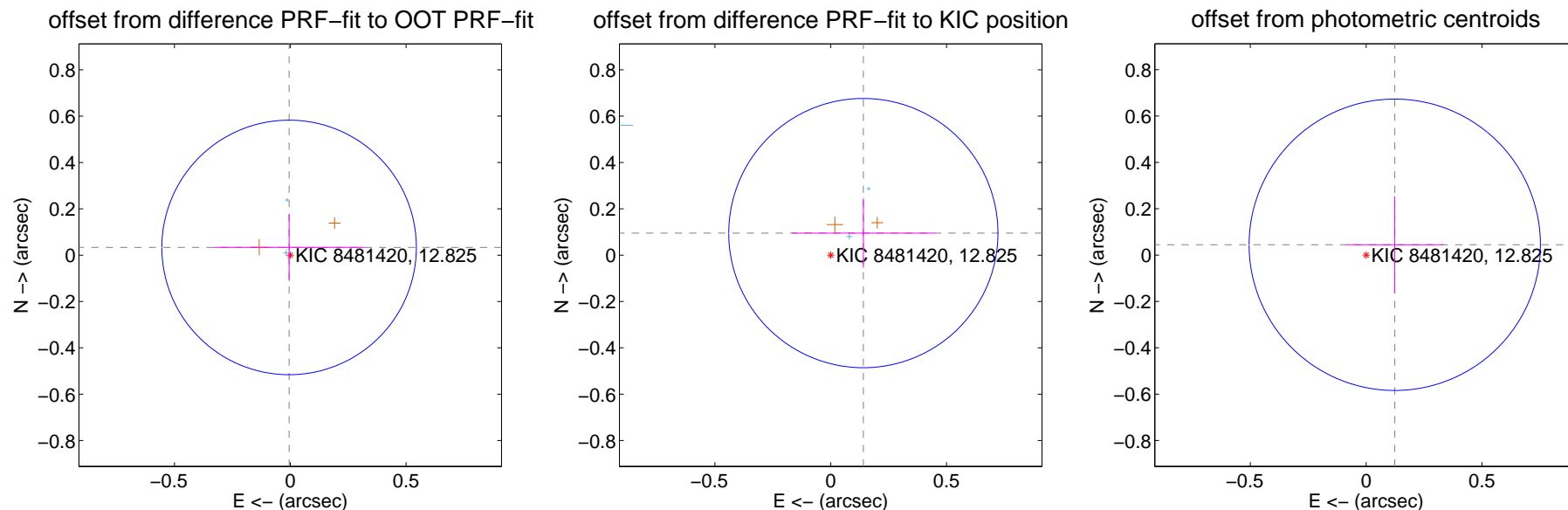
DV Centroid Data

Supplemental centroid analysis for 008481420-02. Kepler magnitude: 12.82. Transit SNR 7.22

There are 3 quarters with good PRF difference image offsets

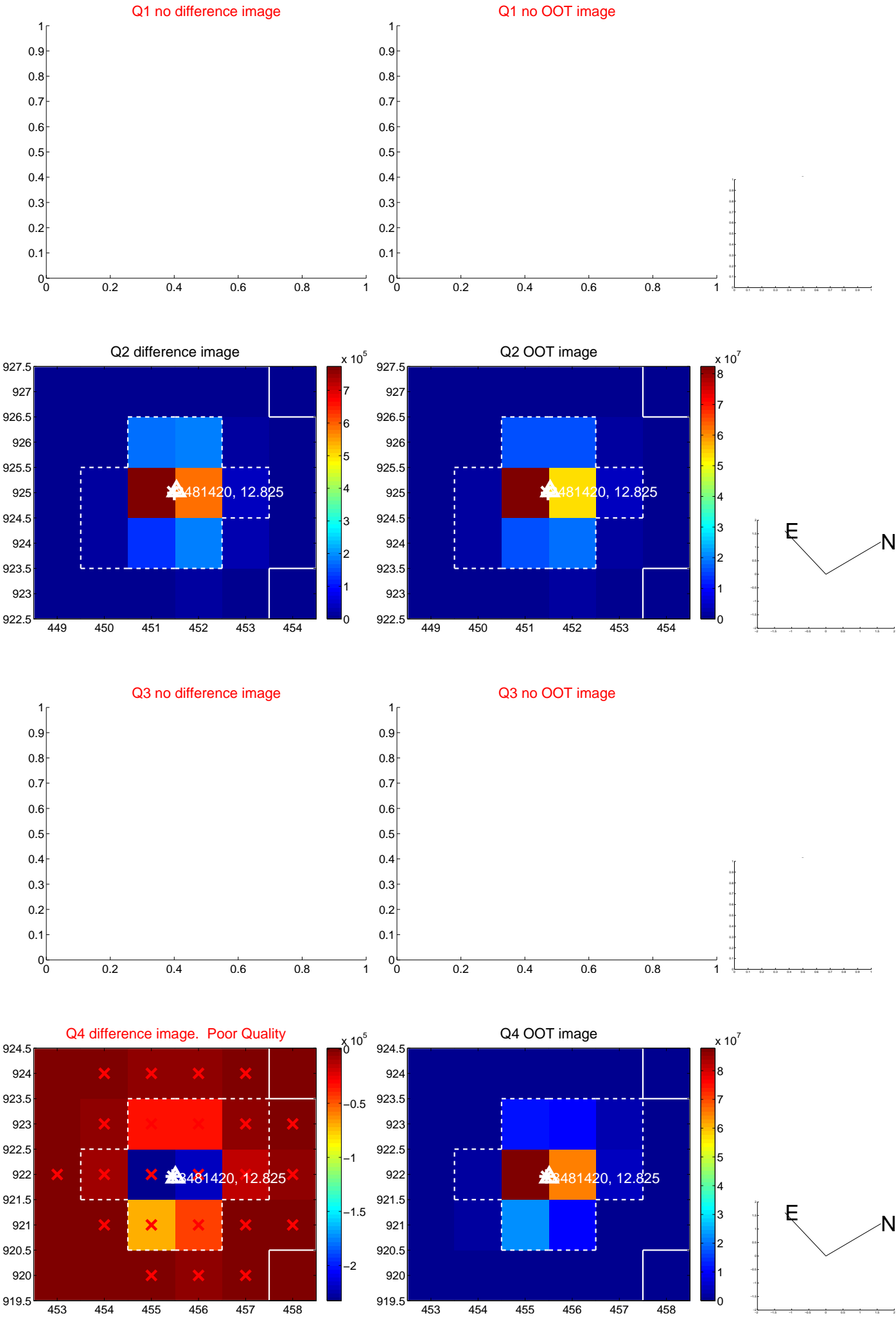
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.034 ± 0.183	0.18	0.005 ± 0.326	0.033 ± 0.144
PRF-fit source offset from KIC position	0.170 ± 0.194	0.88	-0.141 ± 0.309	0.095 ± 0.150
photometric centroid source offset	0.13 ± 0.21	0.63	-0.12 ± 0.21	0.04 ± 0.21

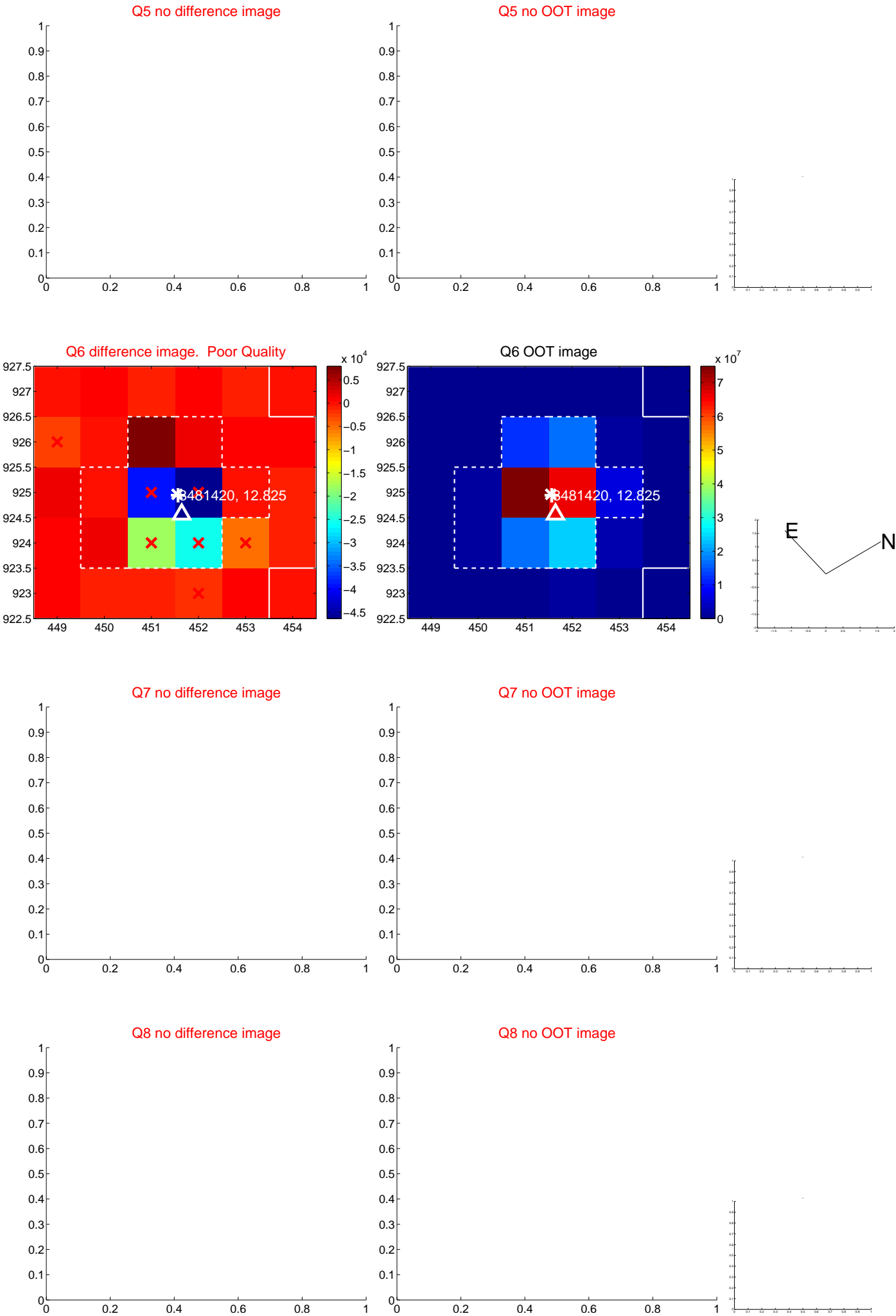


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

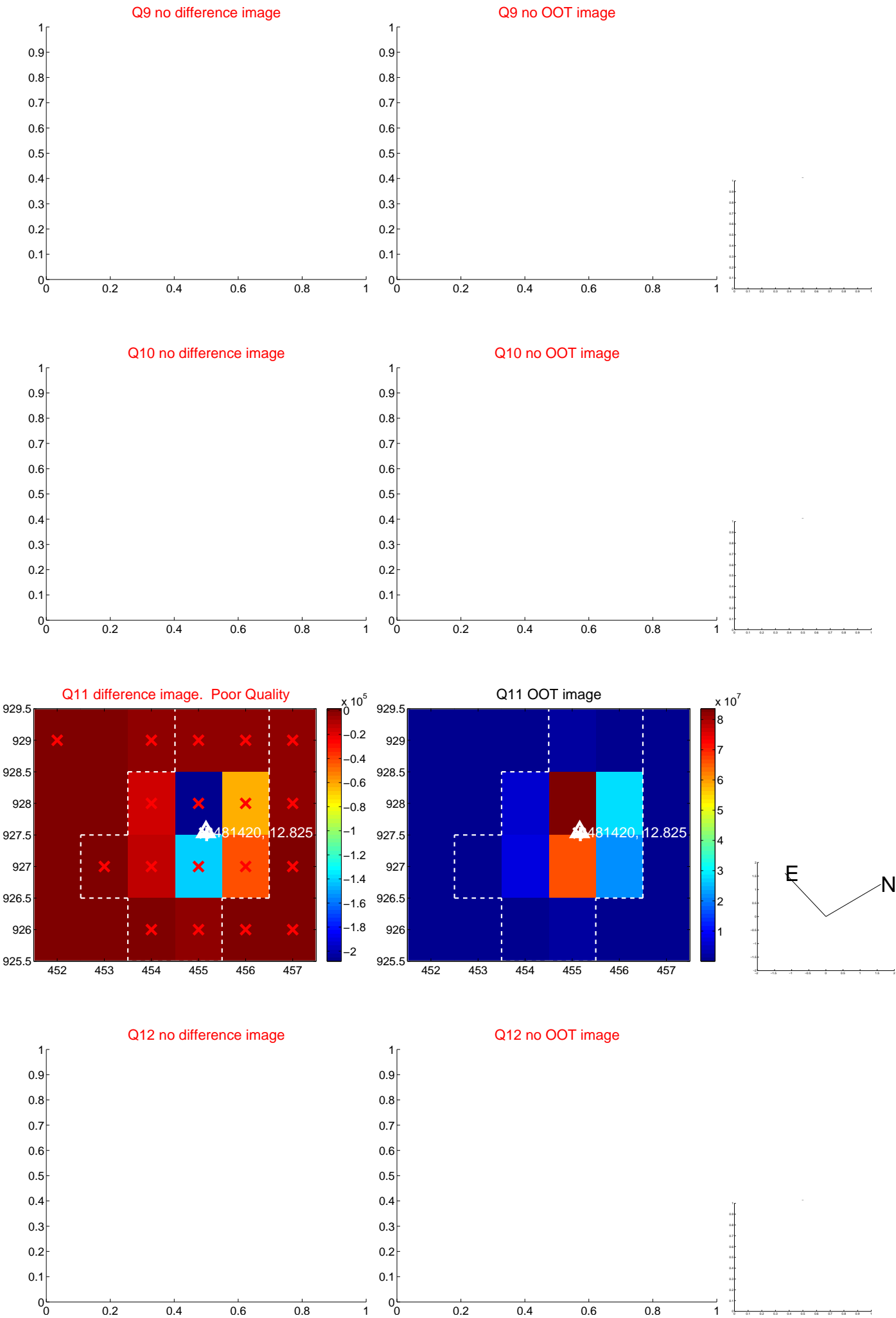
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



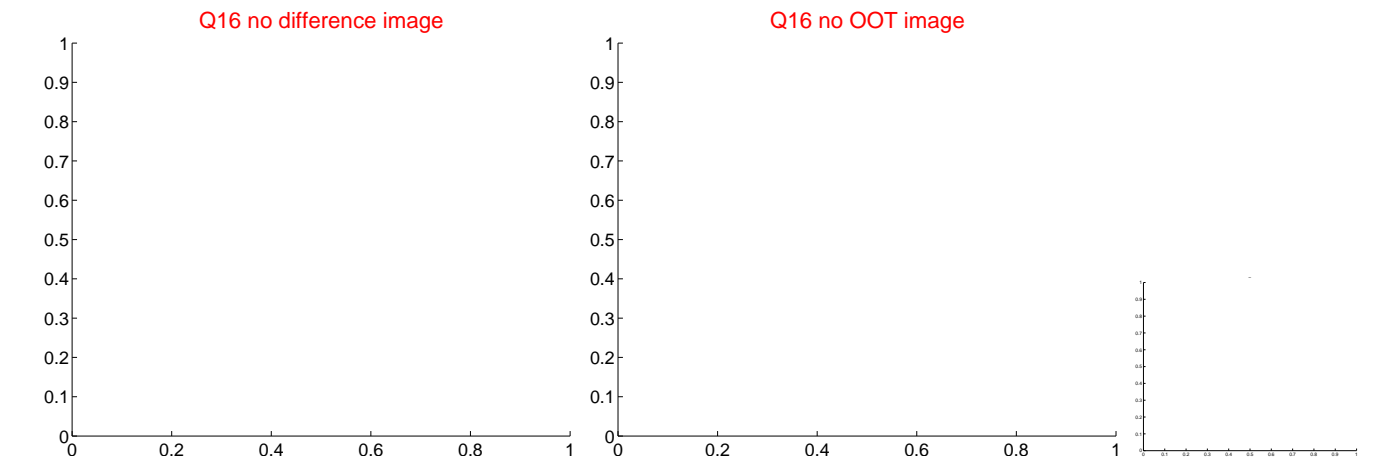
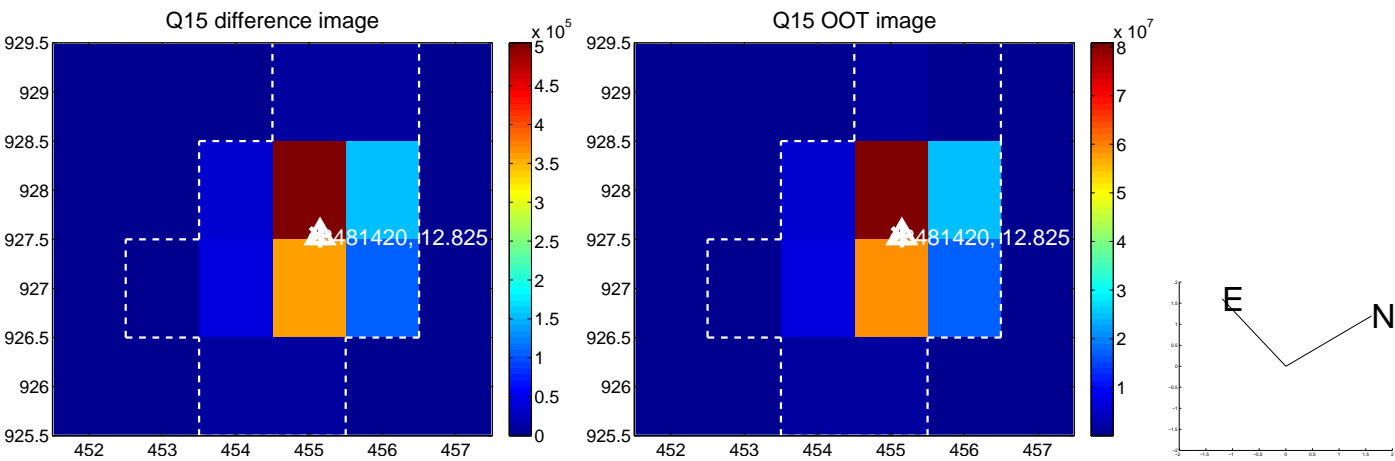
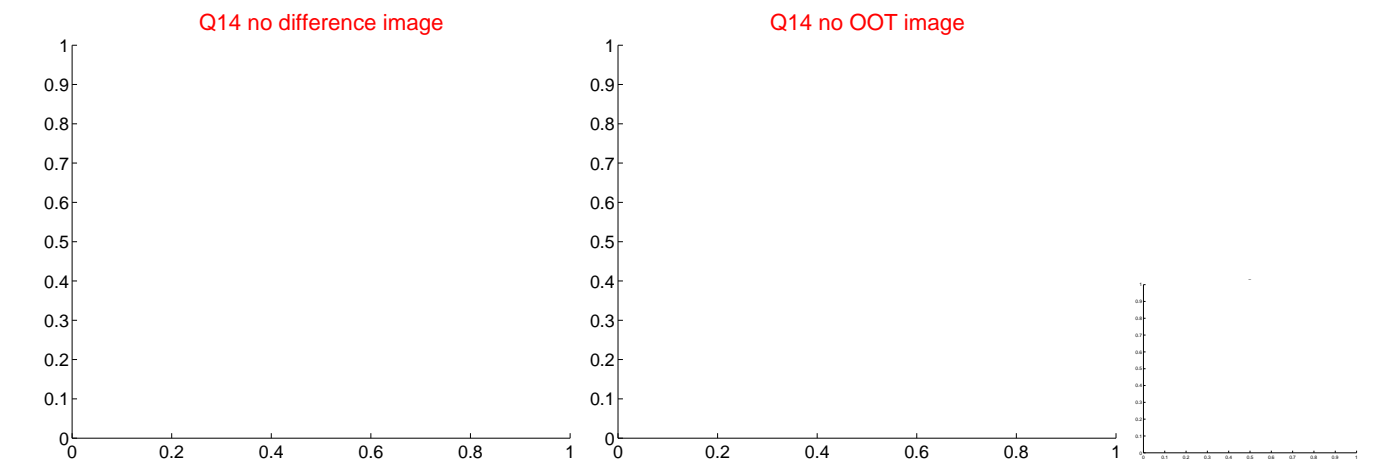
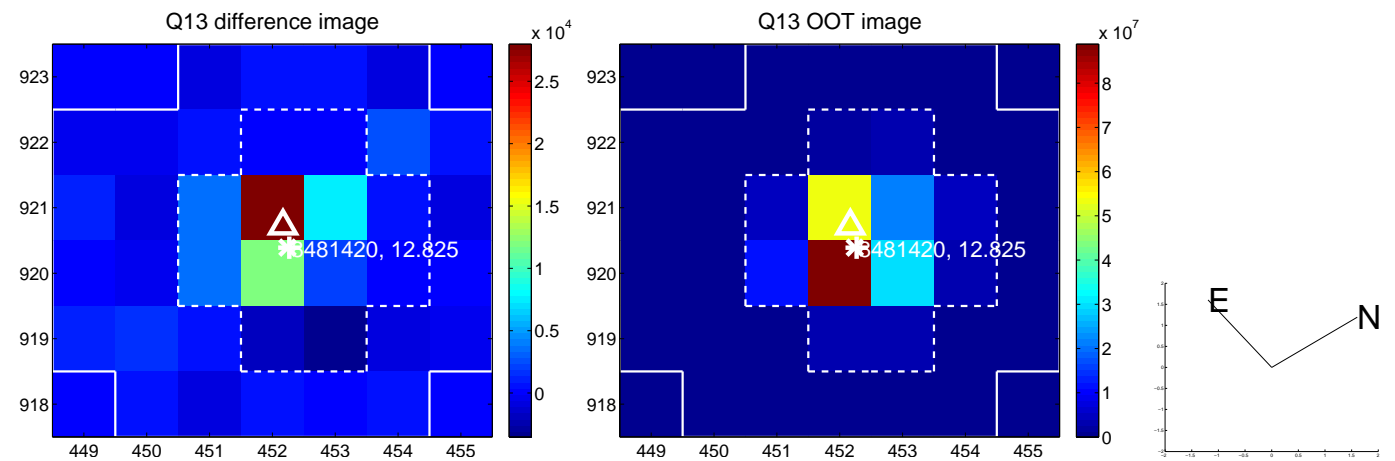
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



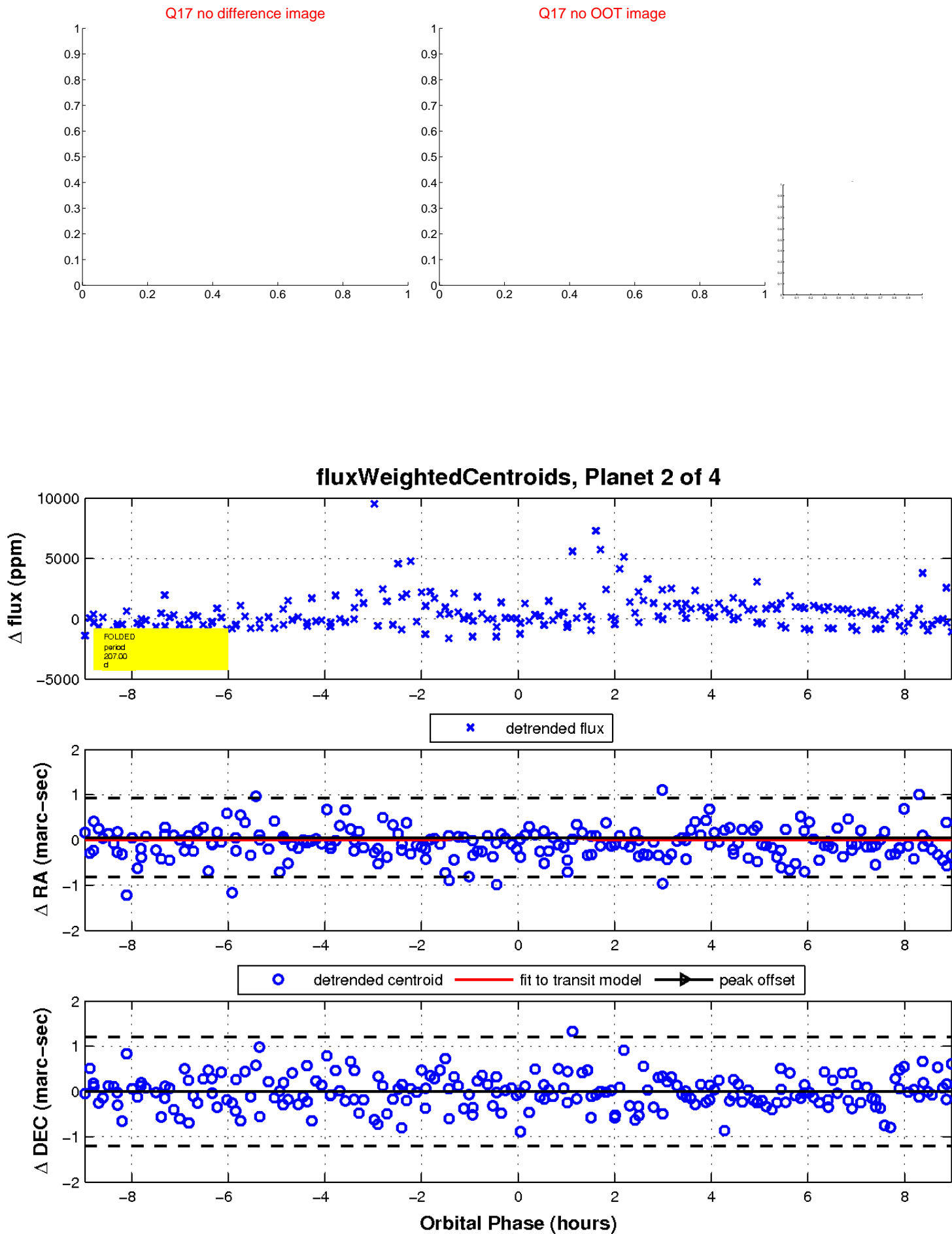
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

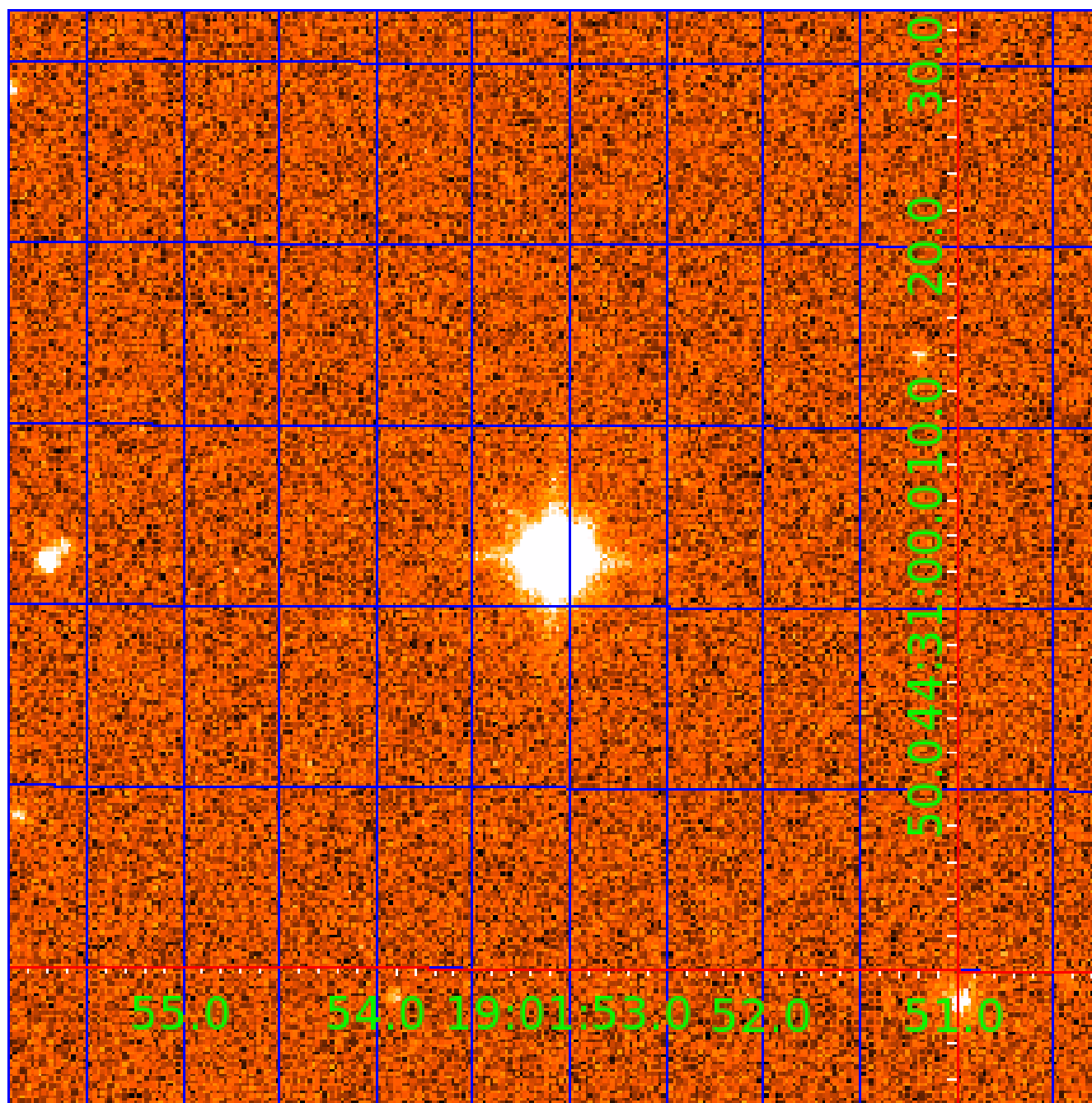


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008481420

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})
008481420-01	OBS	No	310.488379	237.690450	1077.4	3.556	17.7	6.1	0.76	4809	2.41	0.42
008481420-02	OBS	No	207.004219	186.480239	1123.9	2.995	16.0	7.2	0.76	4809	2.46	0.72
008481420-03	OBS	No	565.125880	217.225422	2520.9	2.126	18.4	12.9	0.76	4809	3.94	0.19
008481420-04	OBS	No	305.479549	156.134428	3721.4	9.230	15.7	12.8	0.76	4809	4.47	0.43

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008481420-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008481420-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
008481420-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008481420-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

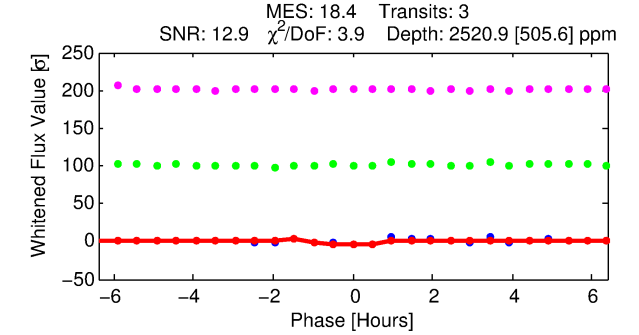
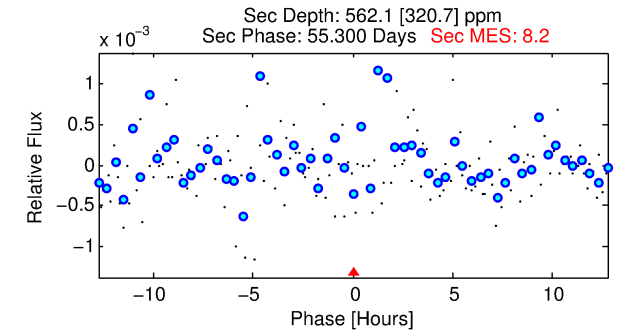
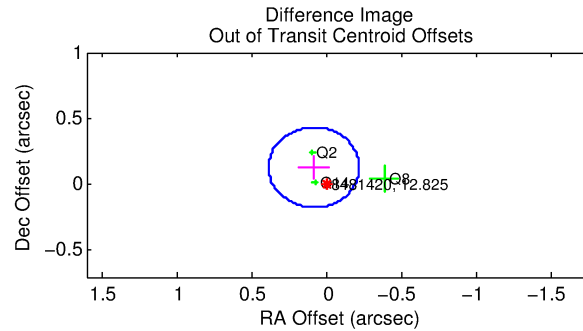
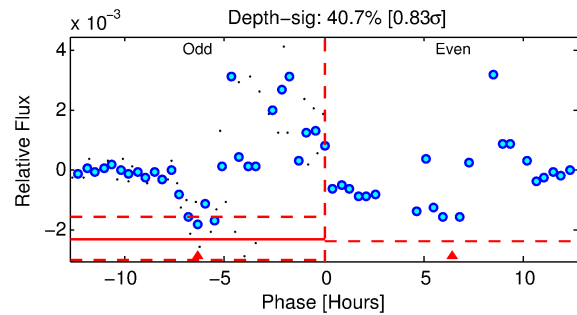
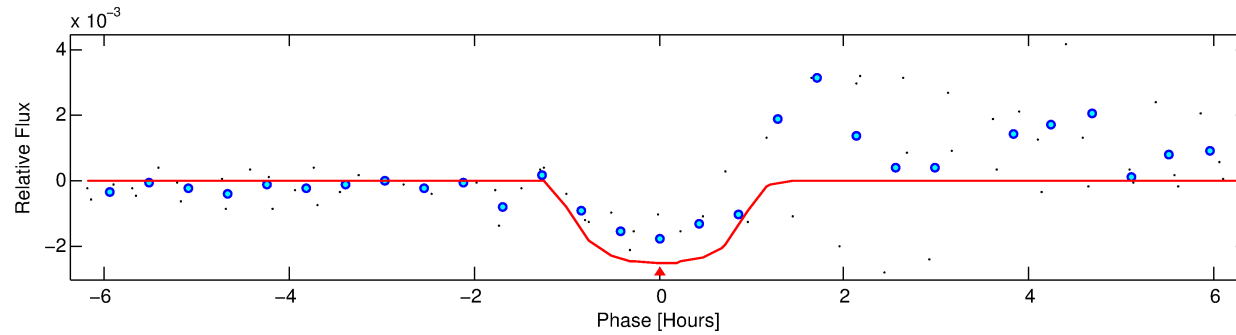
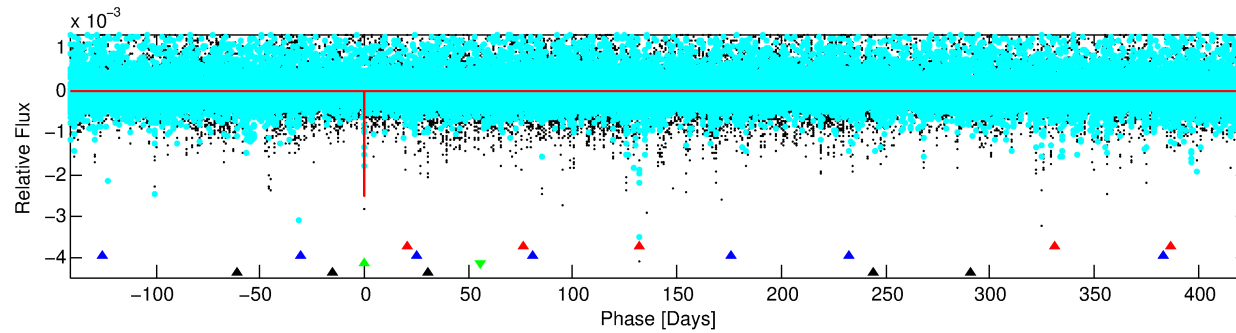
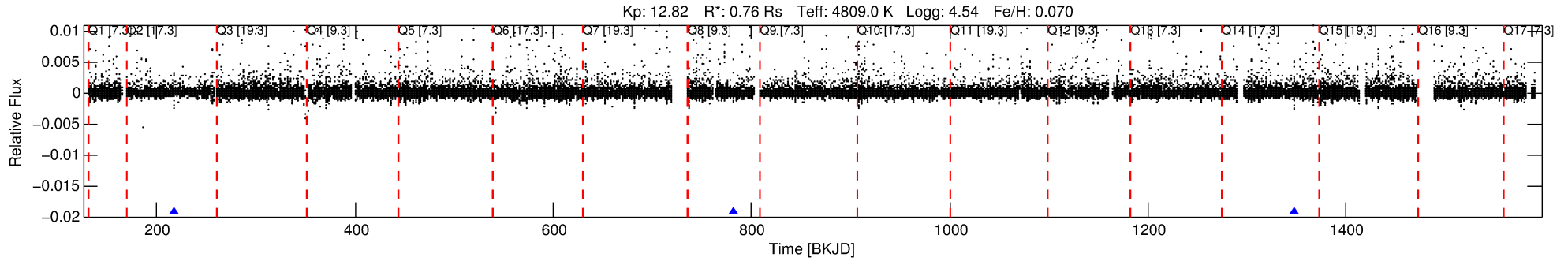
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008481420-03

No Significant Match Found

DV One-Page Summary

KIC: 8481420 Candidate: 3 of 4 Period: 565.126 d



DV Fit Results:

Period = 565.12588 [0.00463] d
Epoch = 217.2254 [0.0054] BKJD
Rp/R* = 0.0474 [0.0756]
a/R* = 1760.39 [8726.83]
b = 0.59 [5.66]
Seff = 0.19 [0.04]
Teq = 168 [8] K
Rp = 3.94 [6.30] Re
a = 1.2129 [0.0996] AU
Ag = 29237.32 [94835.95] [0.31 σ]
Teffp = 3402 [2760] K [1.17 σ]

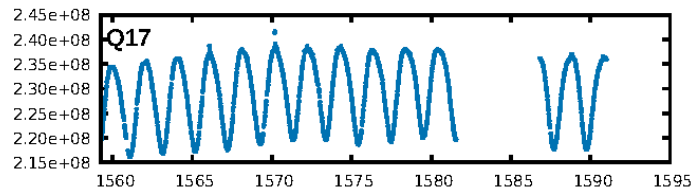
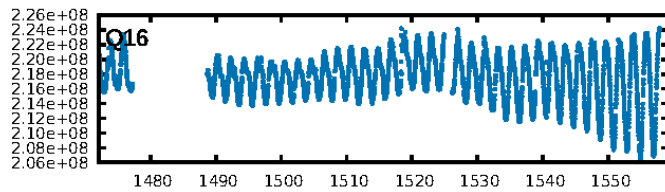
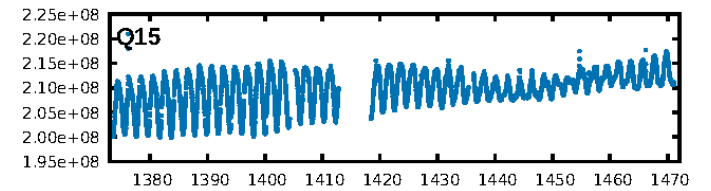
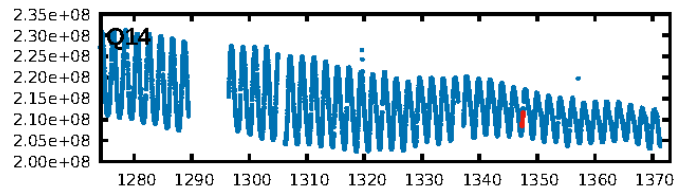
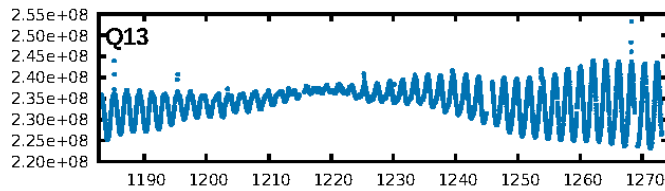
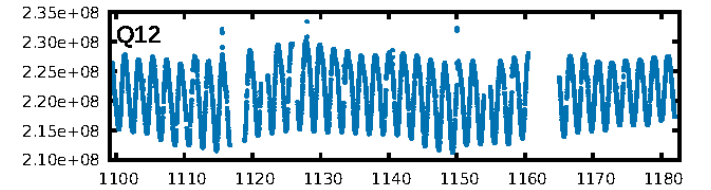
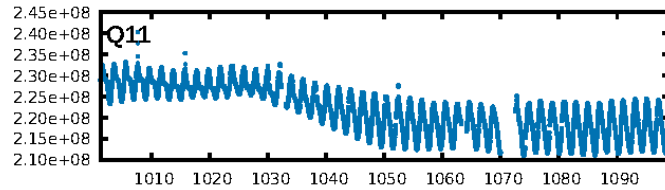
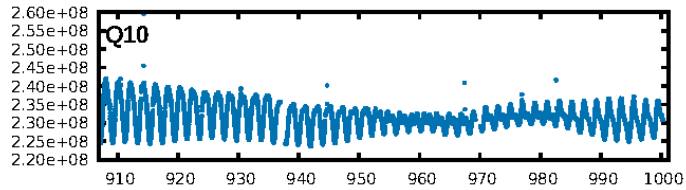
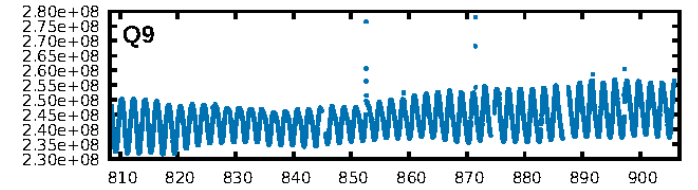
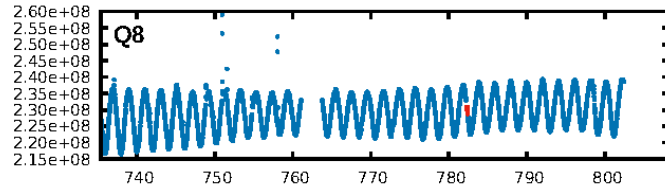
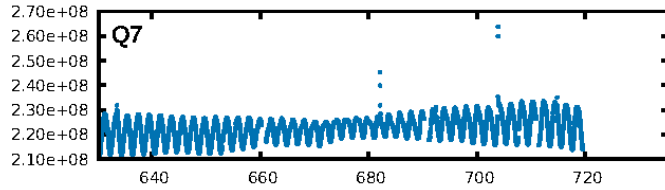
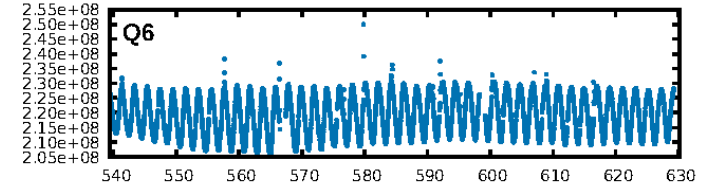
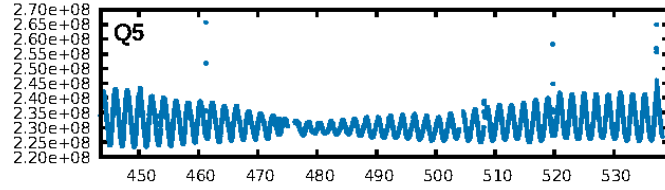
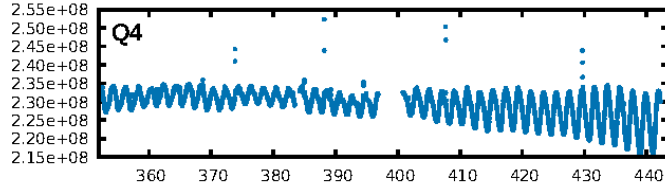
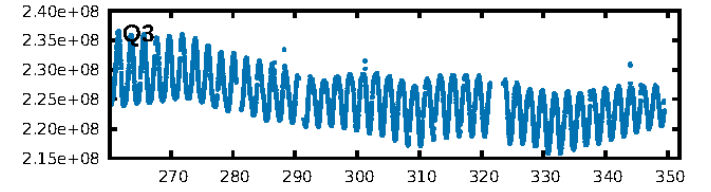
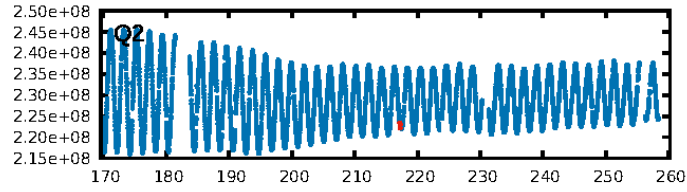
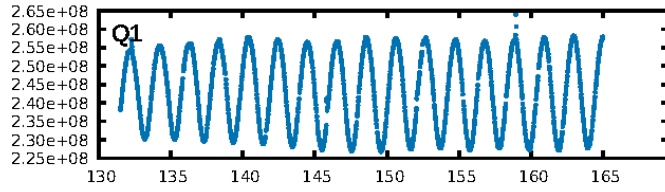
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1475.12 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 1.5%
Bootstrap-pfa: 4.49e-13
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 2.099
Centroid-sig: 33.7%
Centroid-so: 0.181 arcsec [1.20 σ]
OotOffset-rm: 0.153 arcsec [1.51 σ]
KicOffset-rm: 0.167 arcsec [1.72 σ]
OotOffset-st: 2/0/1/0 [3]
KicOffset-st: 2/0/1/0 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

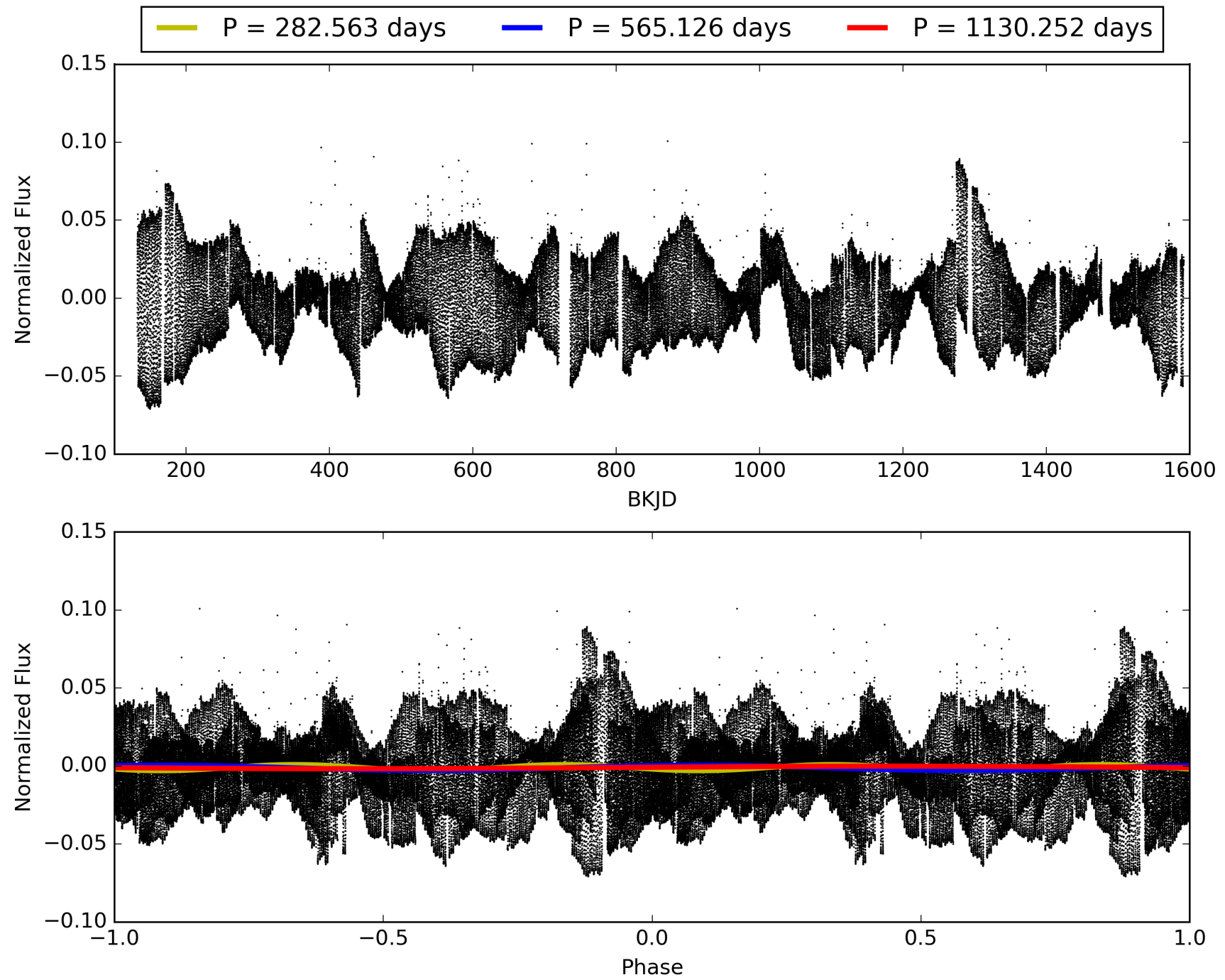
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 06:10:56 Z

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

TCE 008481420-03, PDC Light Curves

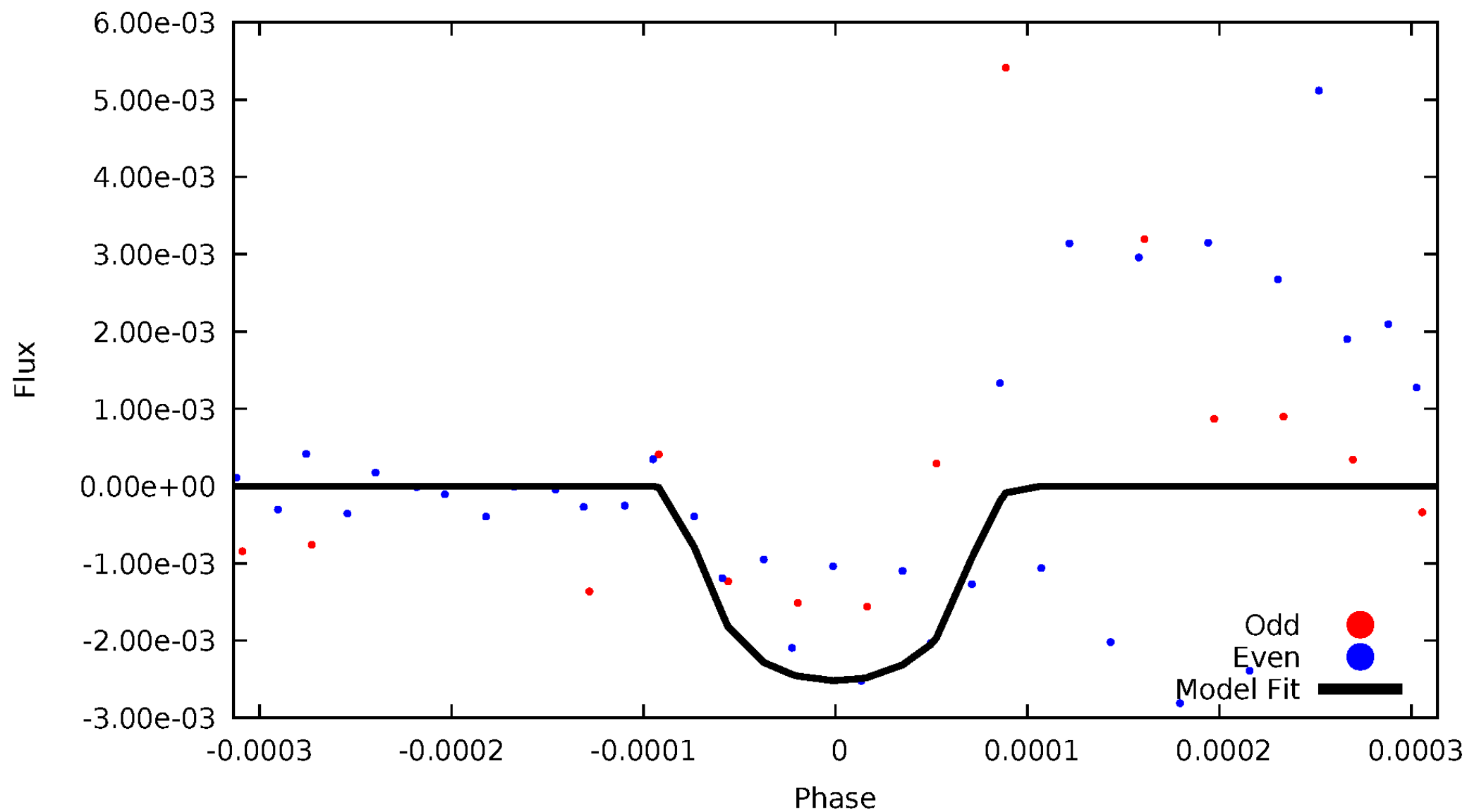


TCE 008481420-03



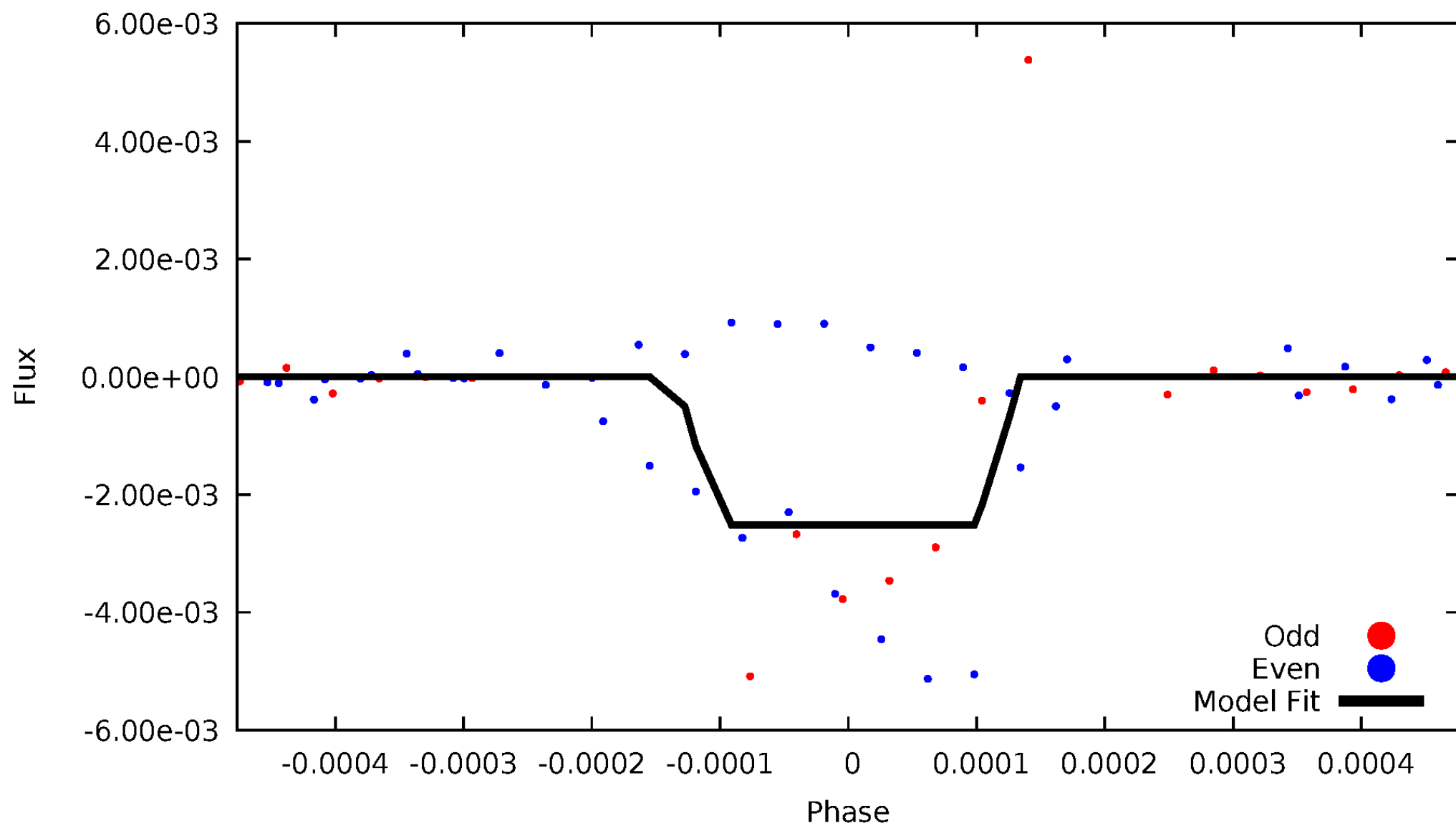
DV Odd/Even

TCE 008481420-03



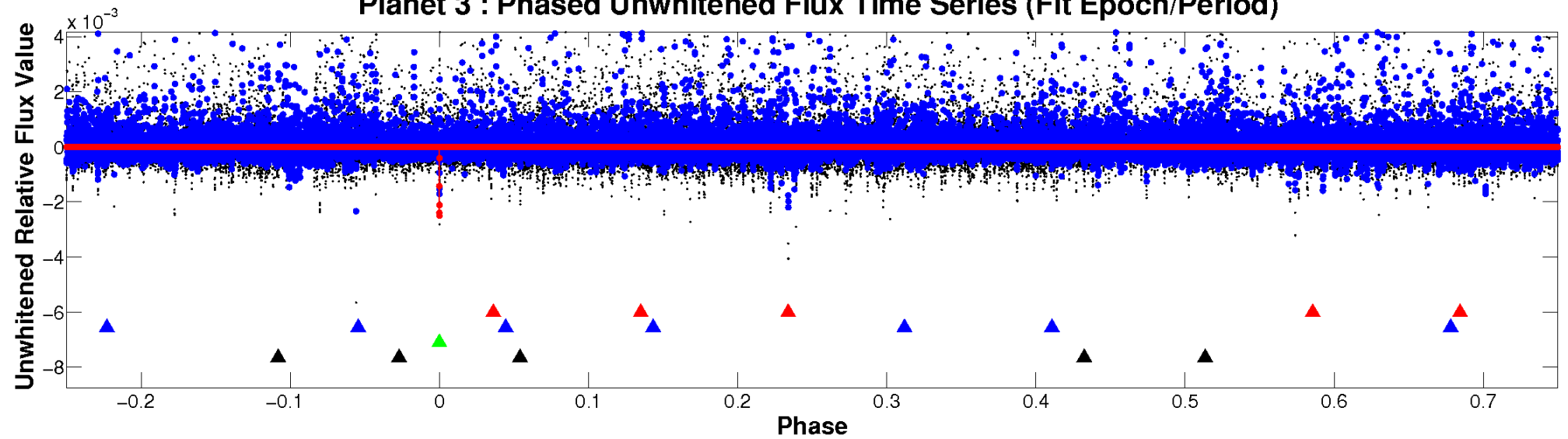
ALT Odd/Even

TCE 008481420-03

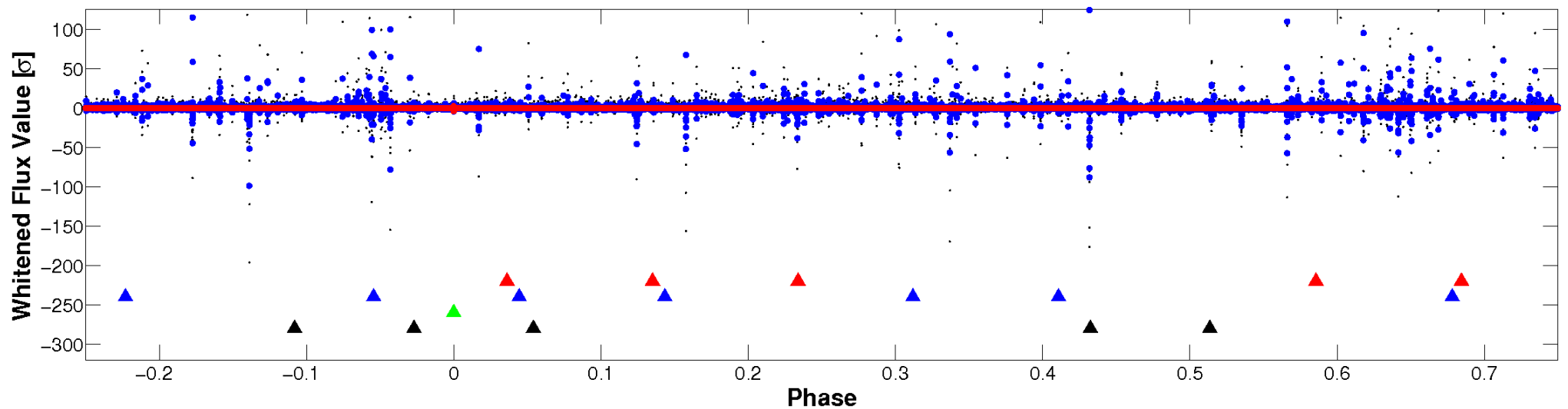


Non-Whitened Vs. Whitened Light Curve

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

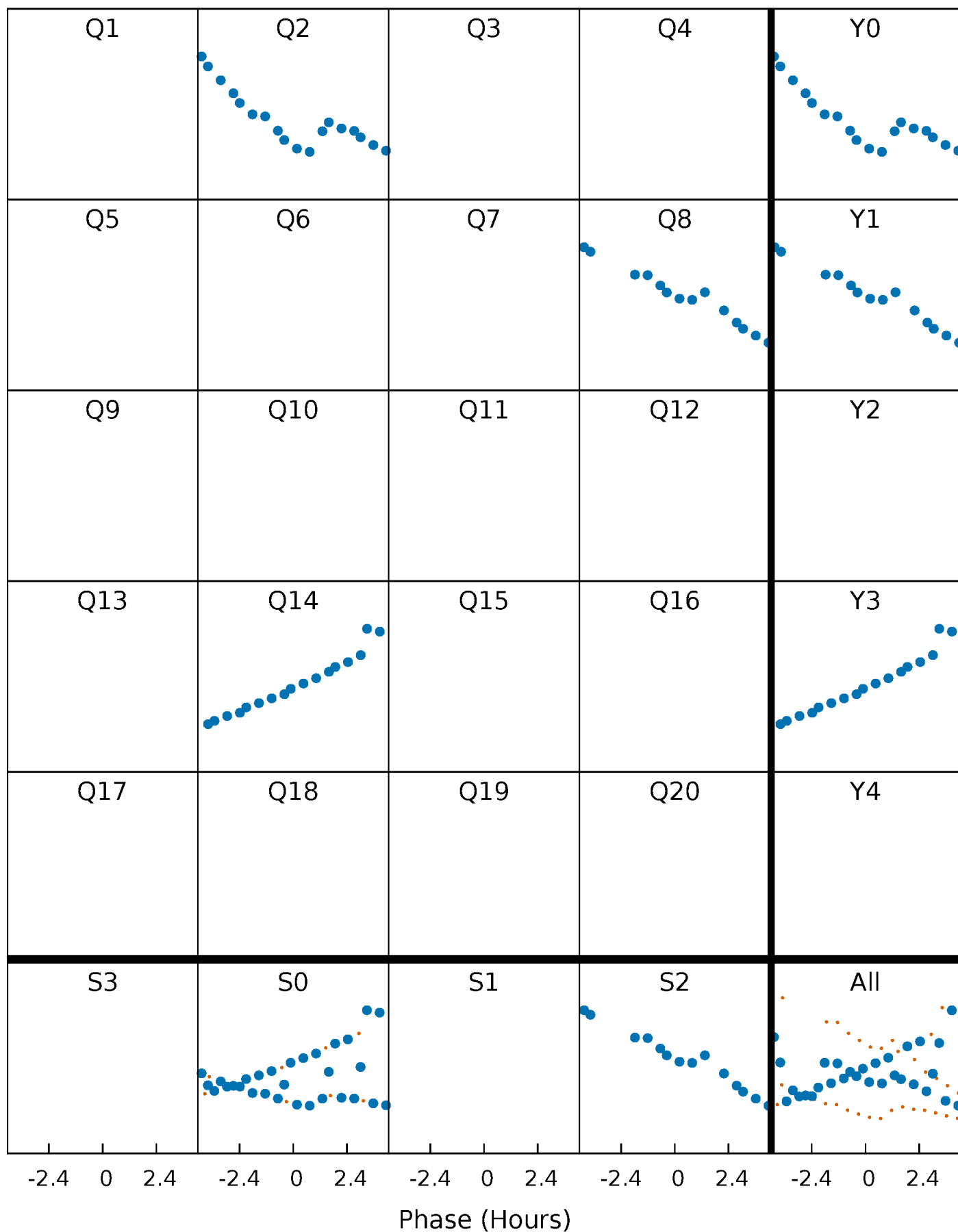


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



PDC Quarter-Phased Transit Curves

TCE 008481420-03 $P=565.125880$ Days $T_0=217.225422$ (BKJD)



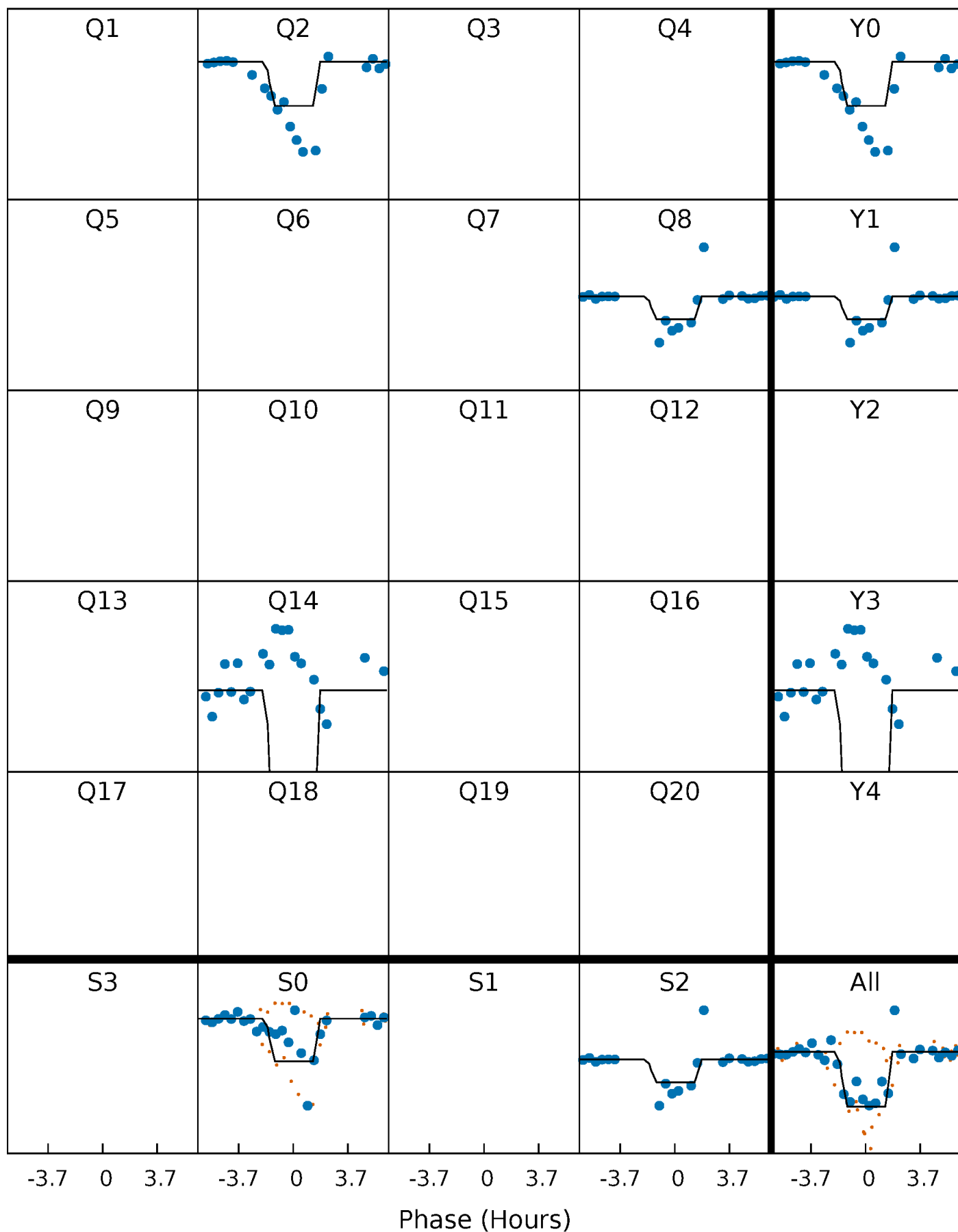
DV Quarter-Phased Transit Curves

TCE 008481420-03 P=565.125880 Days $T_0=217.225422$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

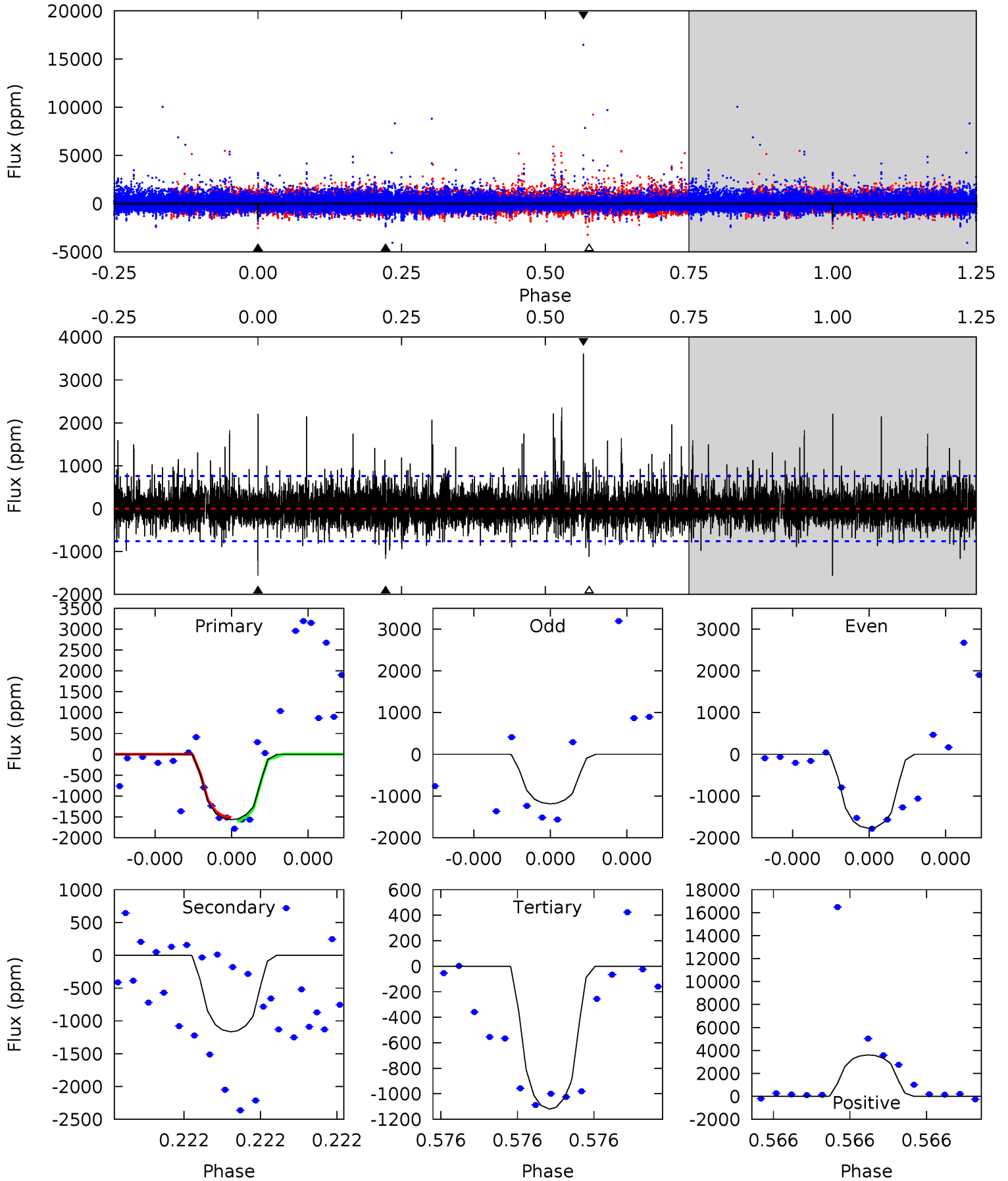
TCE 008481420-03 P=565.124158 Days $T_0=217.198001$ (BKJD)



DV Model-Shift Uniqueness Test

008481420-03, P = 565.125880 Days, E = 217.225422 Days

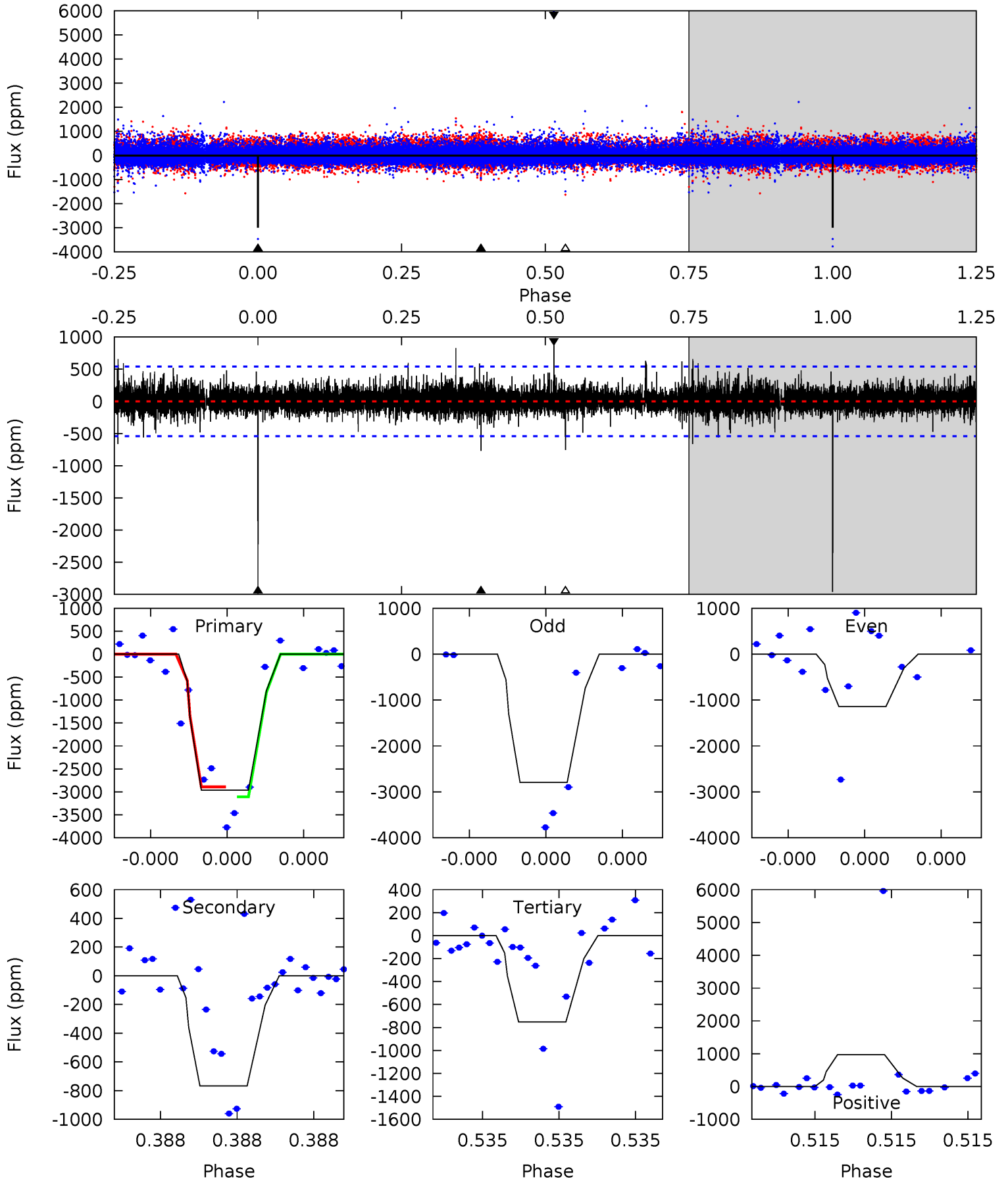
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.9	8.83	8.48	27.3	5.75	3.74	2.07	3.39	-15.5	0.35	-18.5	0.52	1.28	0.70	0.36



Alt Model-Shift Uniqueness Test

008481420-03, P = 565.124158 Days, E = 217.198001 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
31.2	8.08	7.92	10.2	5.70	3.67	1.04	23.2	21.0	0.16	-2.10	8.34	0.68	0.25	1.08



Stellar Parameters For KIC 008481420

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4809^{+172}_{-172}	$4.545^{+0.066}_{-0.039}$	$0.070^{+0.250}_{-0.300}$	$0.763^{+0.049}_{-0.074}$	$0.746^{+0.075}_{-0.061}$	$2.362^{+0.684}_{-0.342}$
	+4%/-4%	+1%/-1%	+357%/-429%	+6%/-10%	+10%/-8%	+29%/-14%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 008481420-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-1166 ± 132	$6.15^{+5.31}_{-4.07}$	234^{+10}_{-10}	3627^{+1735}_{-636}	$25539^{+175345}_{-18427}$
Alt.	-768 ± 95	$6.17^{+5.37}_{-4.02}$	234^{+9}_{-9}	3378^{+1570}_{-558}	$16272^{+125718}_{-11688}$

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

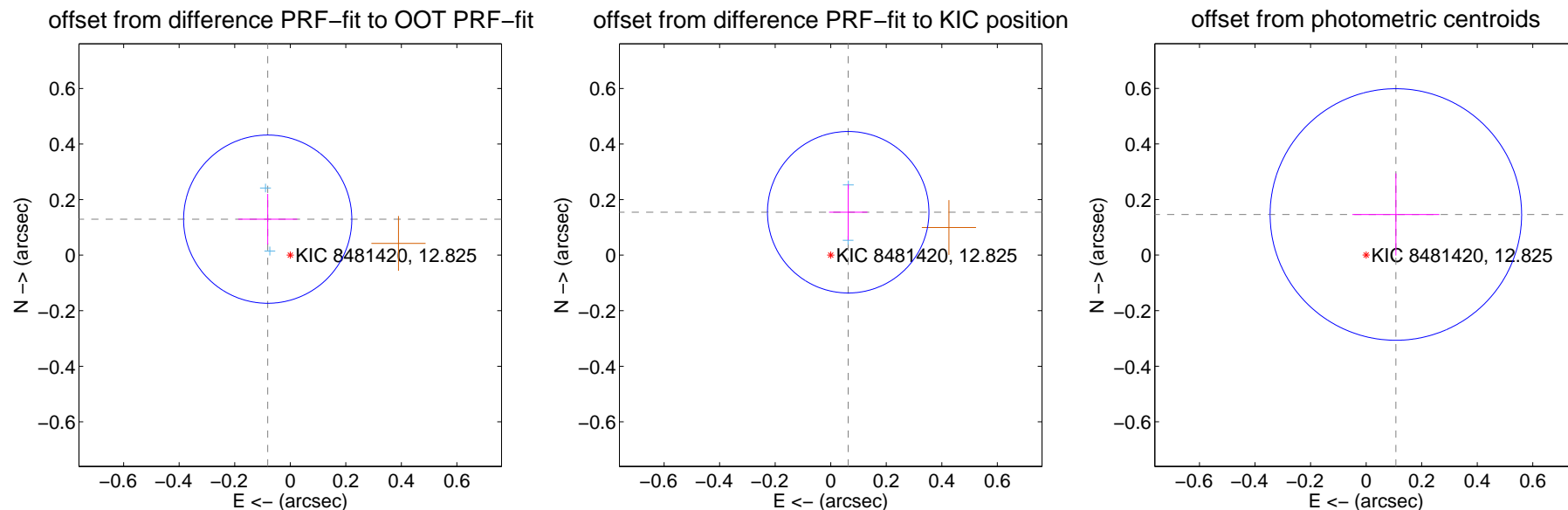
DV Centroid Data

Supplemental centroid analysis for 008481420-03. Kepler magnitude: 12.82. Transit SNR 12.94

There are 2 quarters with good PRF difference image offsets

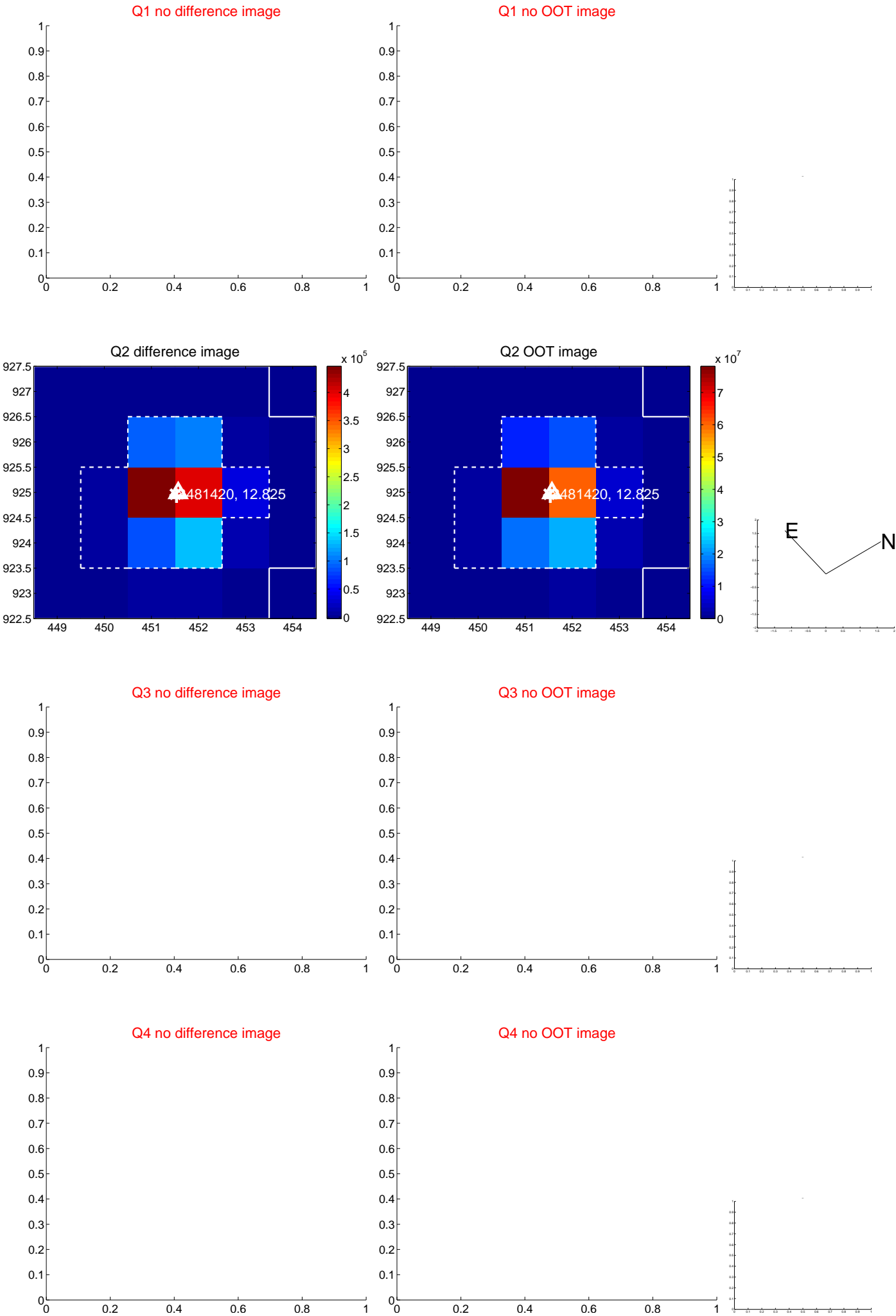
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.153 ± 0.101	1.51	0.081 ± 0.106	0.130 ± 0.091
PRF-fit source offset from KIC position	0.167 ± 0.097	1.72	-0.063 ± 0.069	0.155 ± 0.101
photometric centroid source offset	0.18 ± 0.15	1.20	-0.11 ± 0.16	0.15 ± 0.15

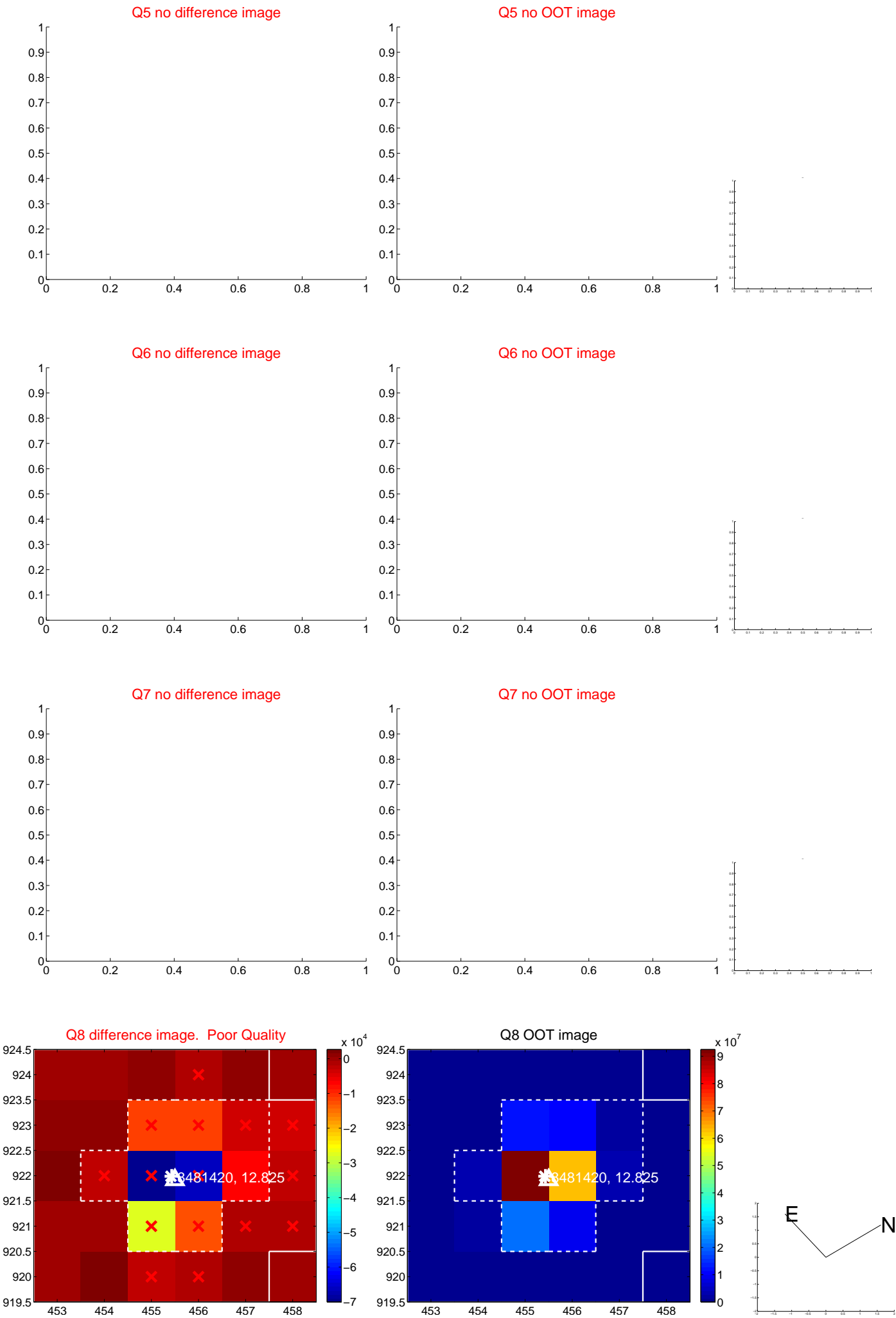


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

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



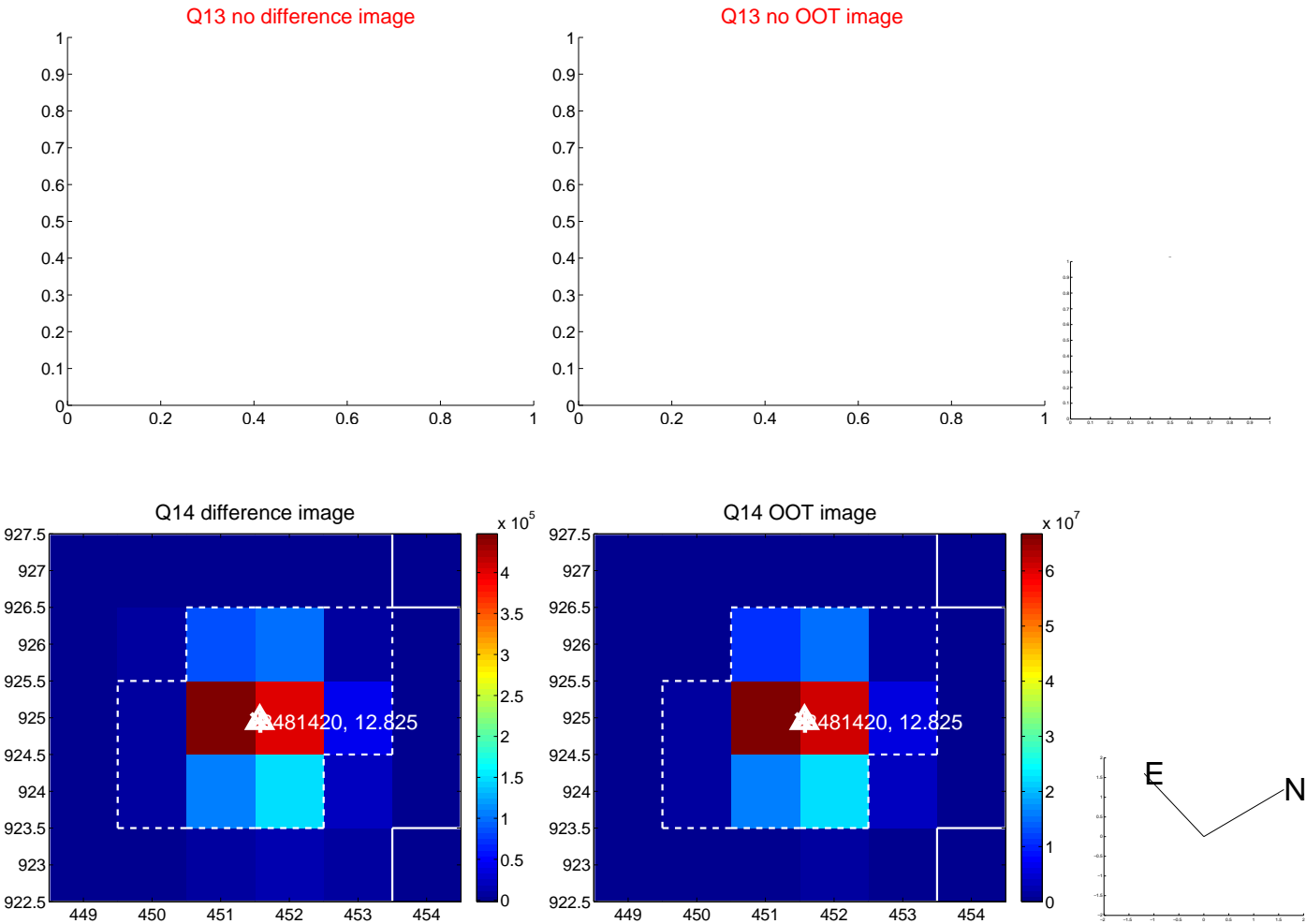
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



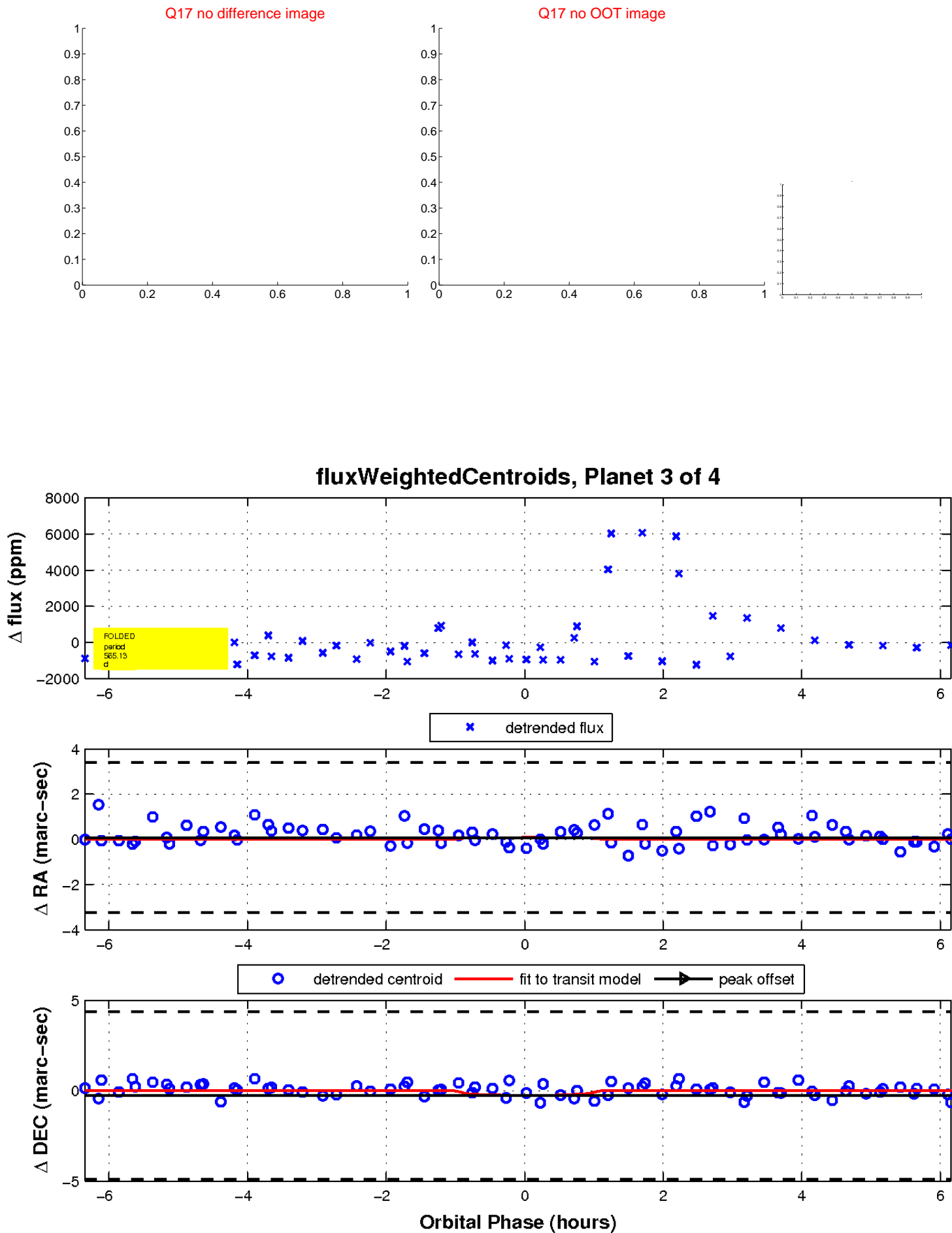
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

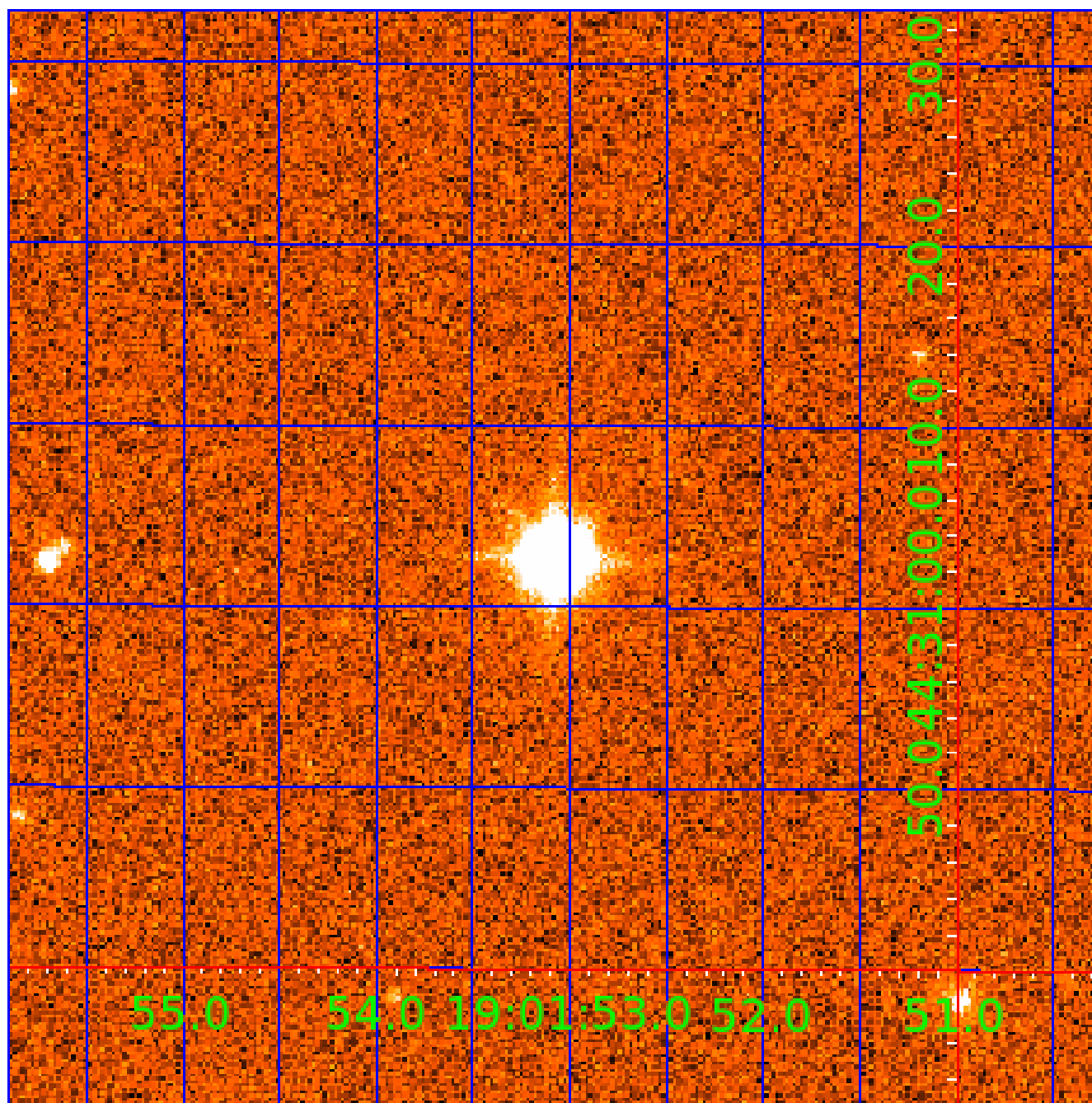


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008481420

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})
008481420-01	OBS	No	310.488379	237.690450	1077.4	3.556	17.7	6.1	0.76	4809	2.41	0.42
008481420-02	OBS	No	207.004219	186.480239	1123.9	2.995	16.0	7.2	0.76	4809	2.46	0.72
008481420-03	OBS	No	565.125880	217.225422	2520.9	2.126	18.4	12.9	0.76	4809	3.94	0.19
008481420-04	OBS	No	305.479549	156.134428	3721.4	9.230	15.7	12.8	0.76	4809	4.47	0.43

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008481420-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008481420-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
008481420-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008481420-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

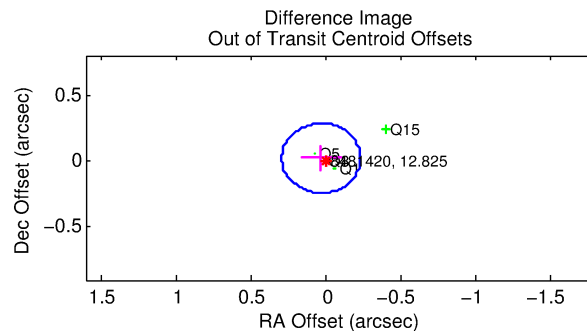
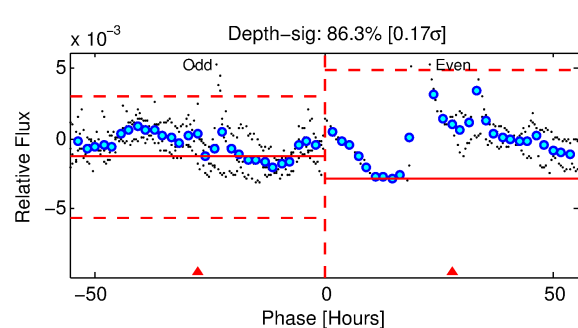
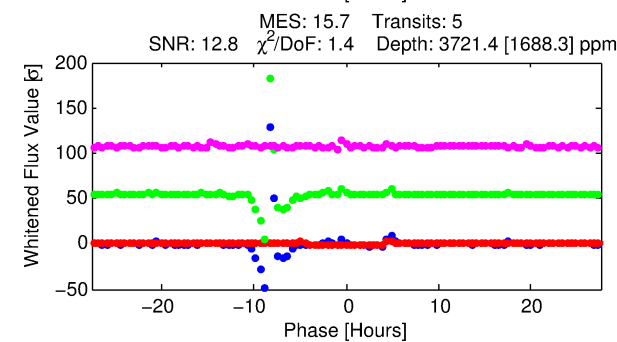
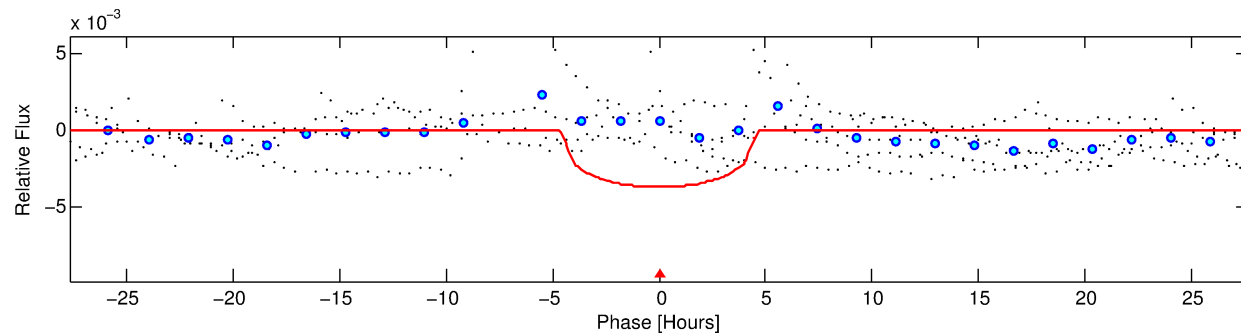
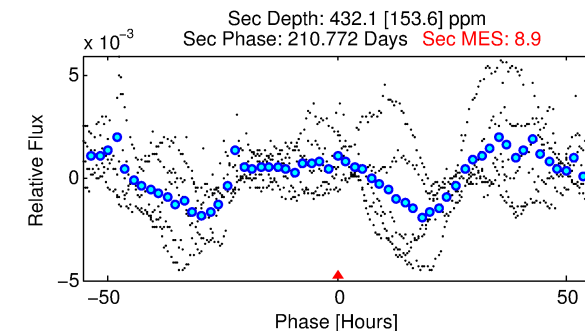
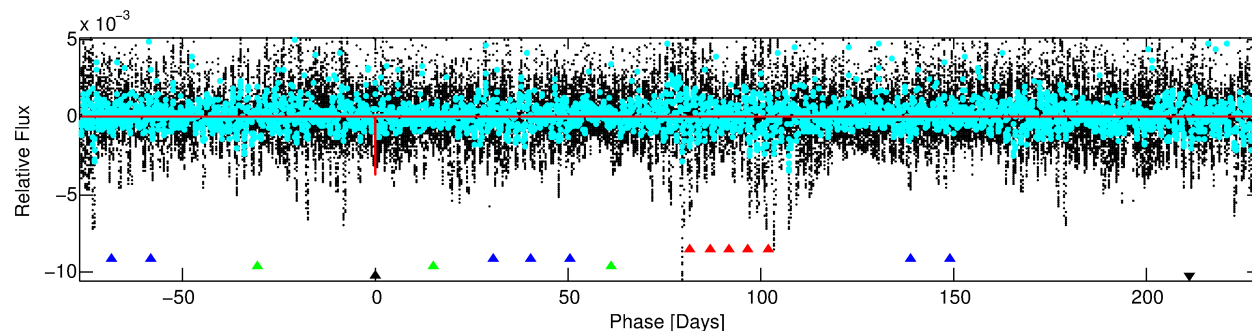
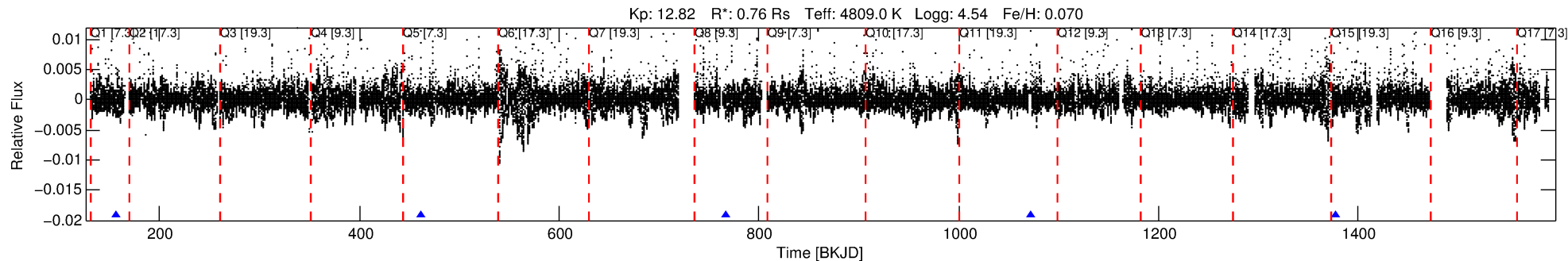
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008481420-04

No Significant Match Found

DV One-Page Summary

KIC: 8481420 Candidate: 4 of 4 Period: 305.480 d



DV Fit Results:

Period = 305.47955 [0.00764] d
Epoch = 156.1344 [0.0143] BKJD
Rp/R* = 0.0537 [0.0493]
a/R* = 266.40 [716.17]
b = 0.00 [3256.36]
Seff = 0.43 [0.08]
Teq = 207 [10] K
Rp = 4.47 [4.12] Re
a = 0.8048 [0.0661] AU
Ag = 7706.94 [14436.35] [0.53σ]
Teffp = 2992 [1403] K [1.99σ]

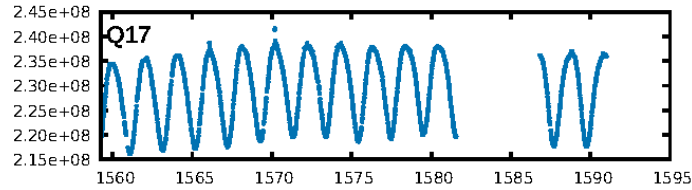
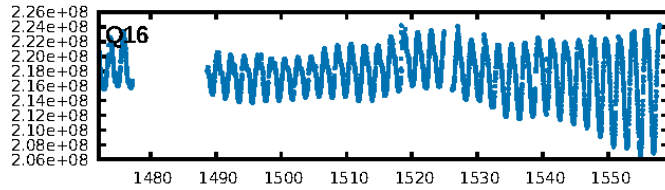
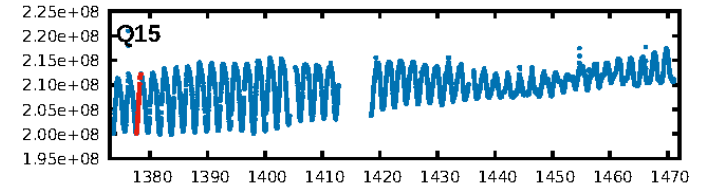
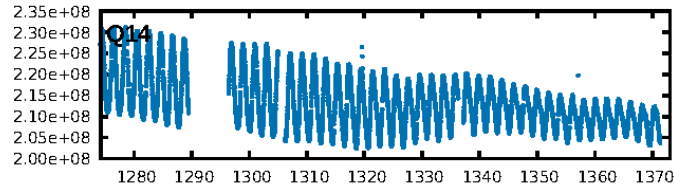
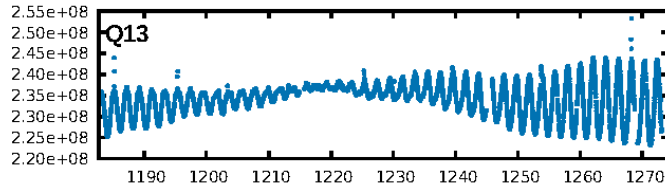
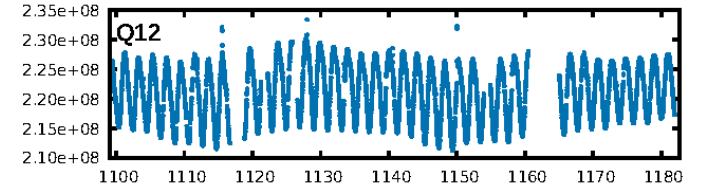
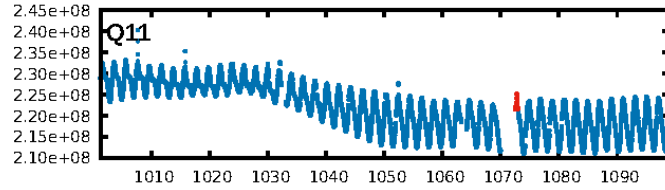
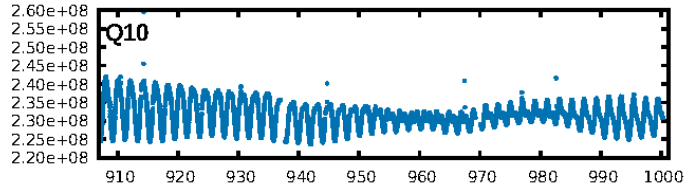
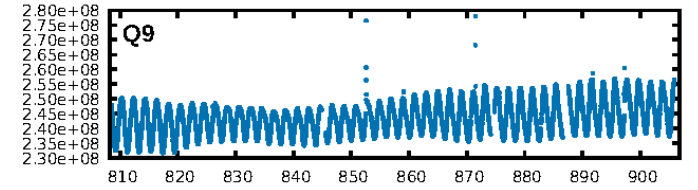
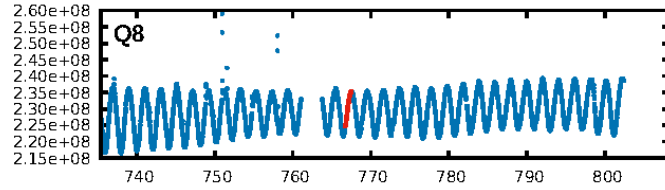
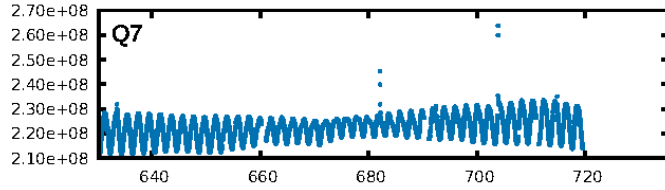
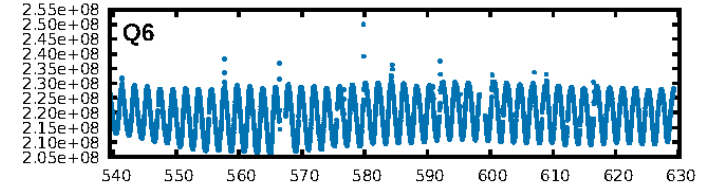
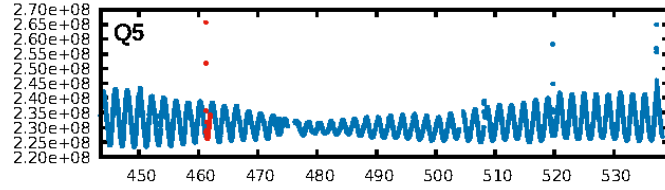
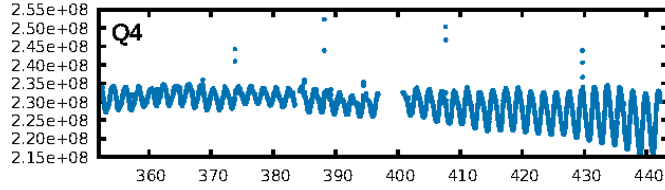
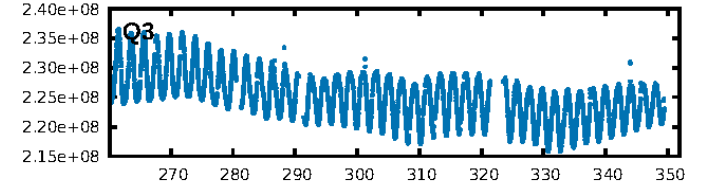
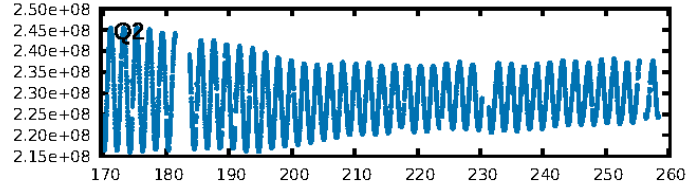
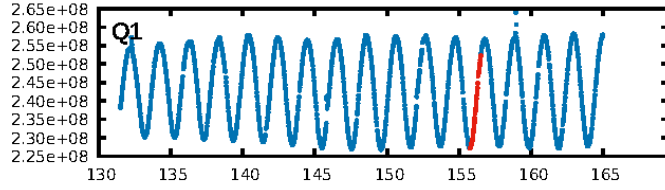
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [243.55σ]
LongPeriod-sig: 100.0% [12.15σ]
ModelChiSquare2-sig: 7.1%
ModelChiSquareGof-sig: 54.5%
Bootstrap-pfa: 1.88e-11
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 0.6623
Centroid-sig: 52.9%
Centroid-so: 0.112 arcsec [1.98σ]
OotOffset-rm: 0.034 arcsec [0.39σ]
OotOffset-st: 0/1/1/2 [4]
KicOffset-rm: 0.095 arcsec [0.70σ]
KicOffset-st: 0/1/1/2 [4]
DiffImageQuality-fgm: 0.50 [2/4]
DiffImageOverlap-fno: 1.00 [4/4]

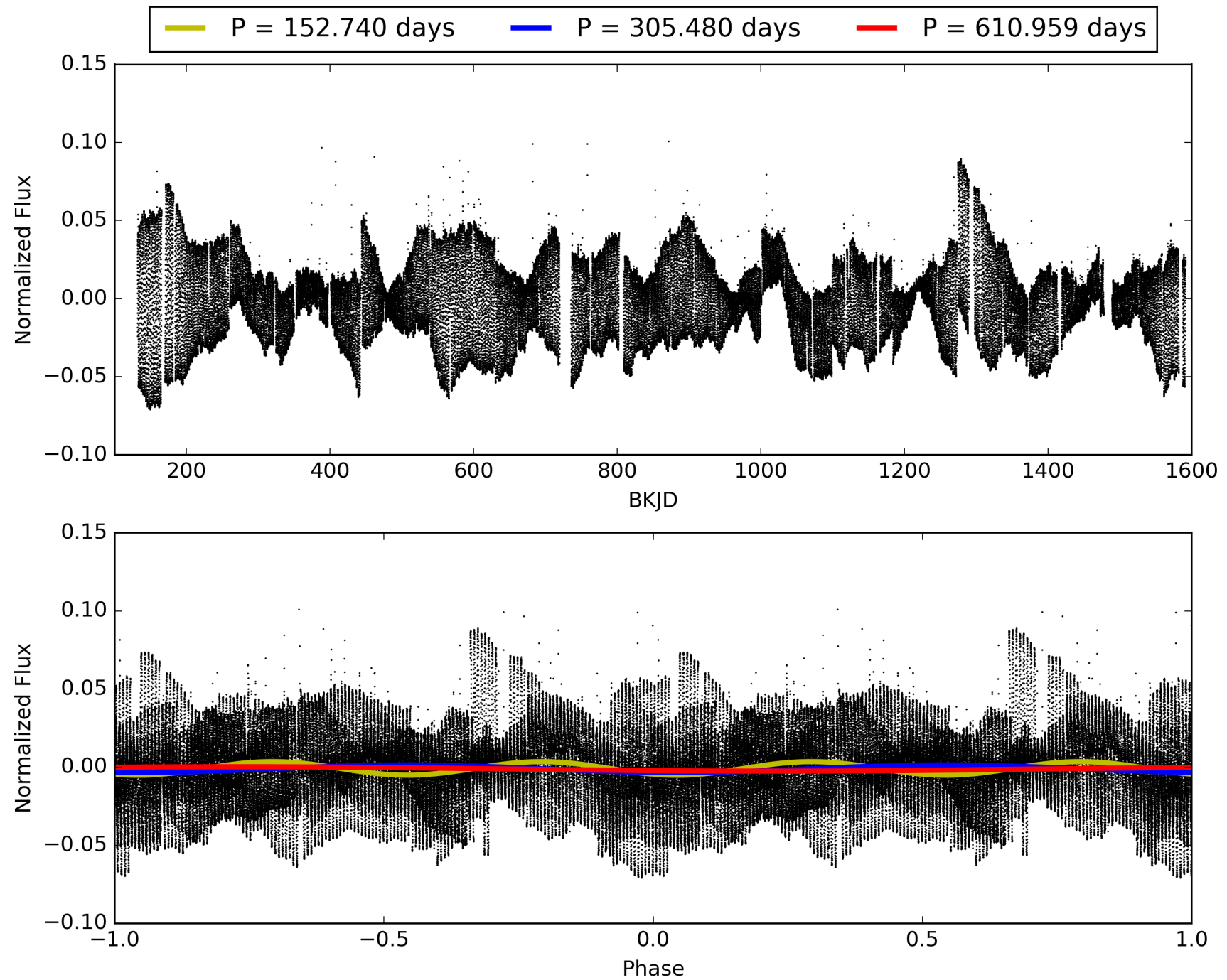
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 06:11:05 Z

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

TCE 008481420-04, PDC Light Curves

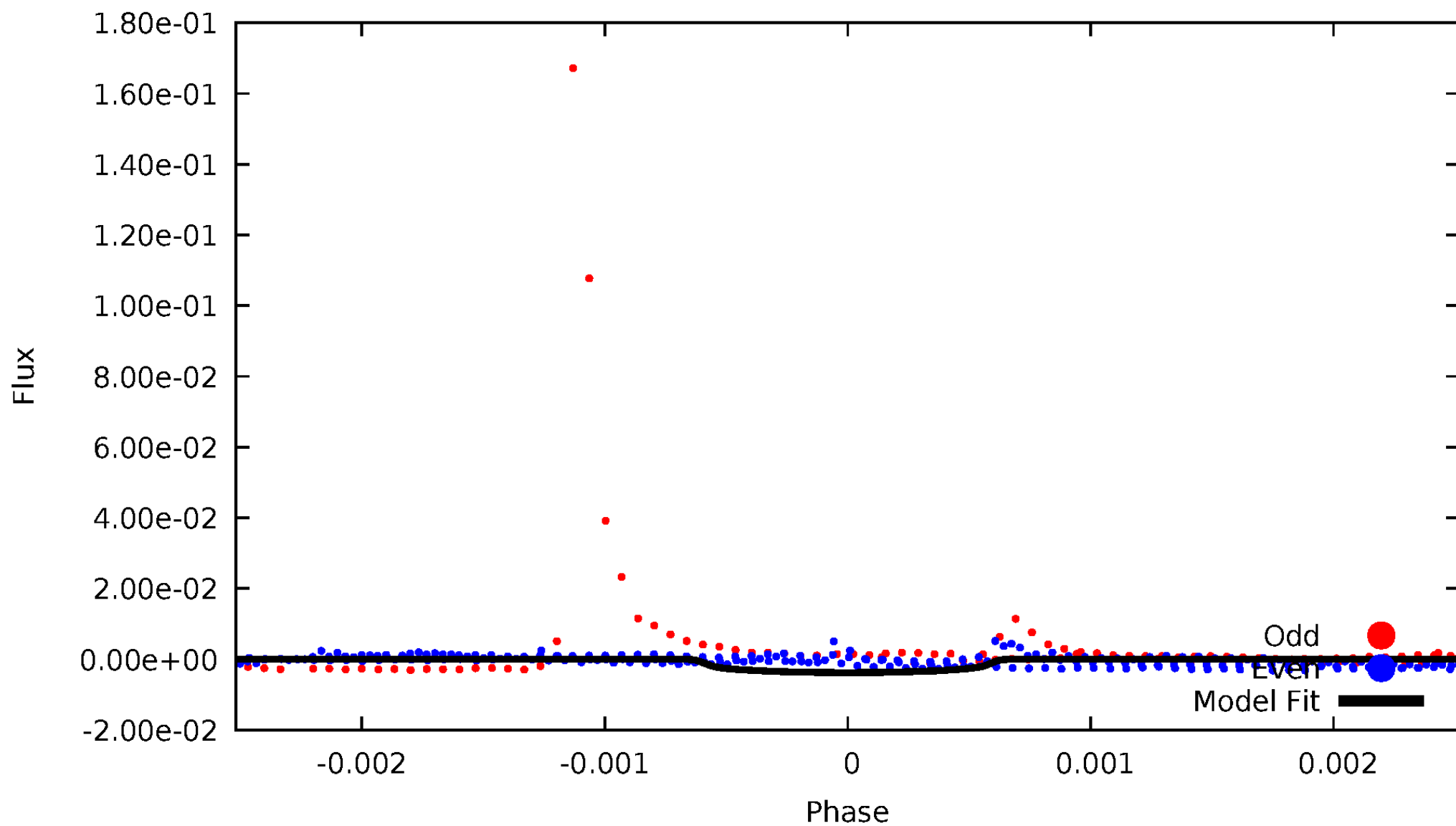


TCE 008481420-04



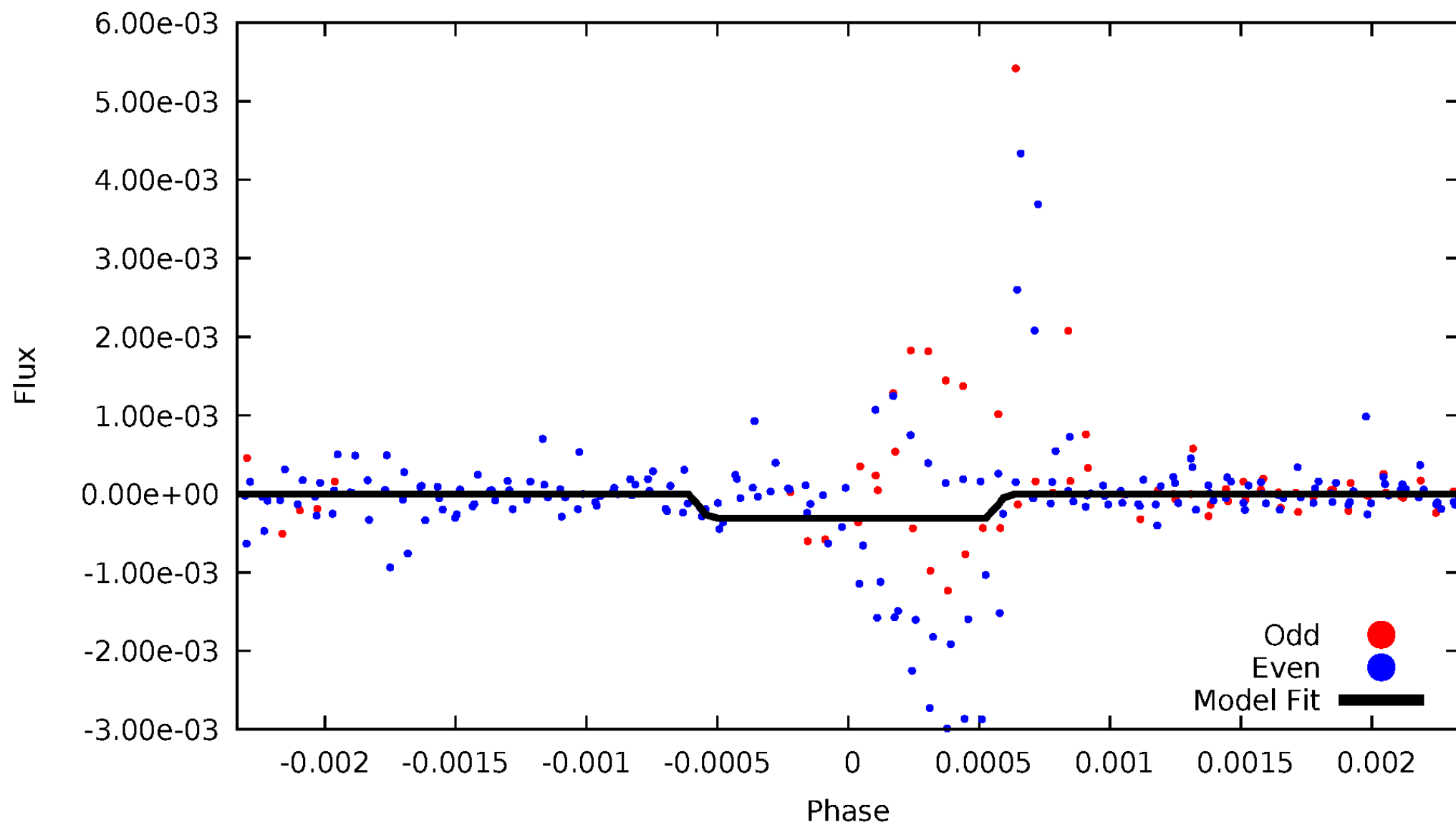
DV Odd/Even

TCE 008481420-04



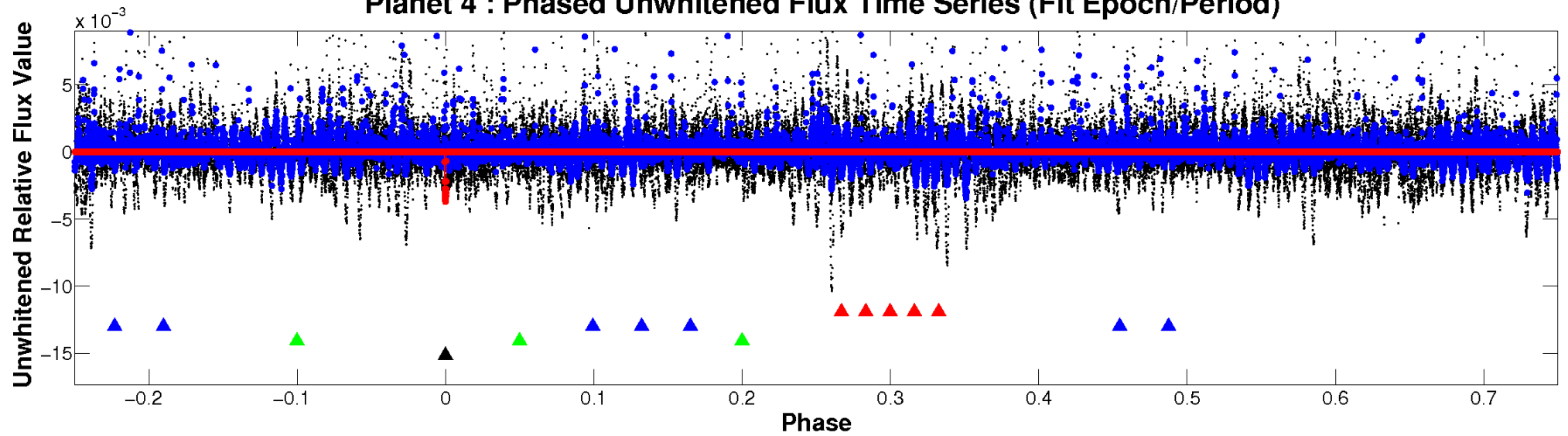
ALT Odd/Even

TCE 008481420-04

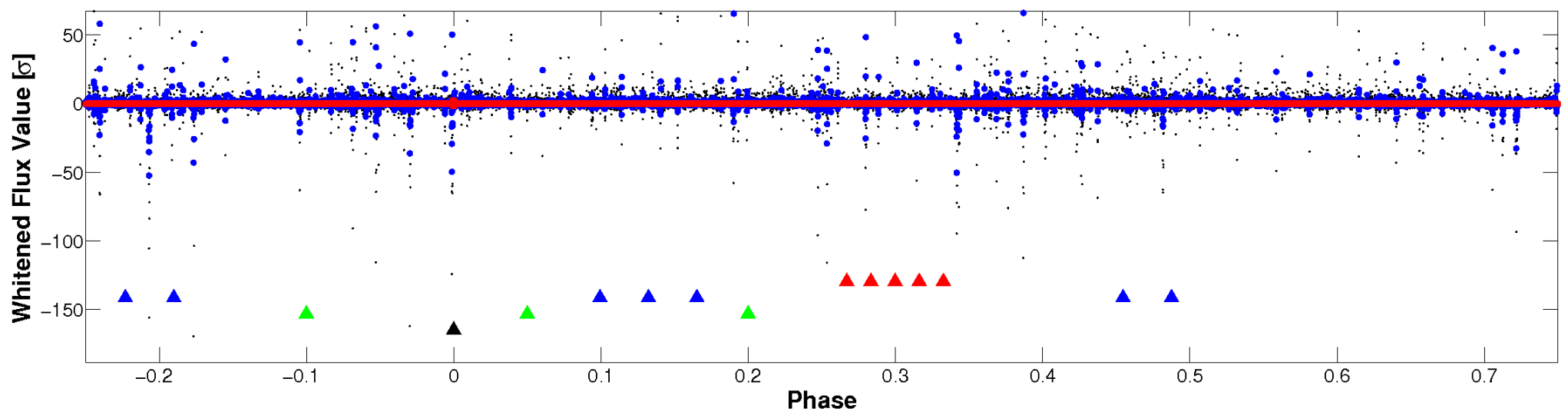


Non-Whitened Vs. Whitened Light Curve

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

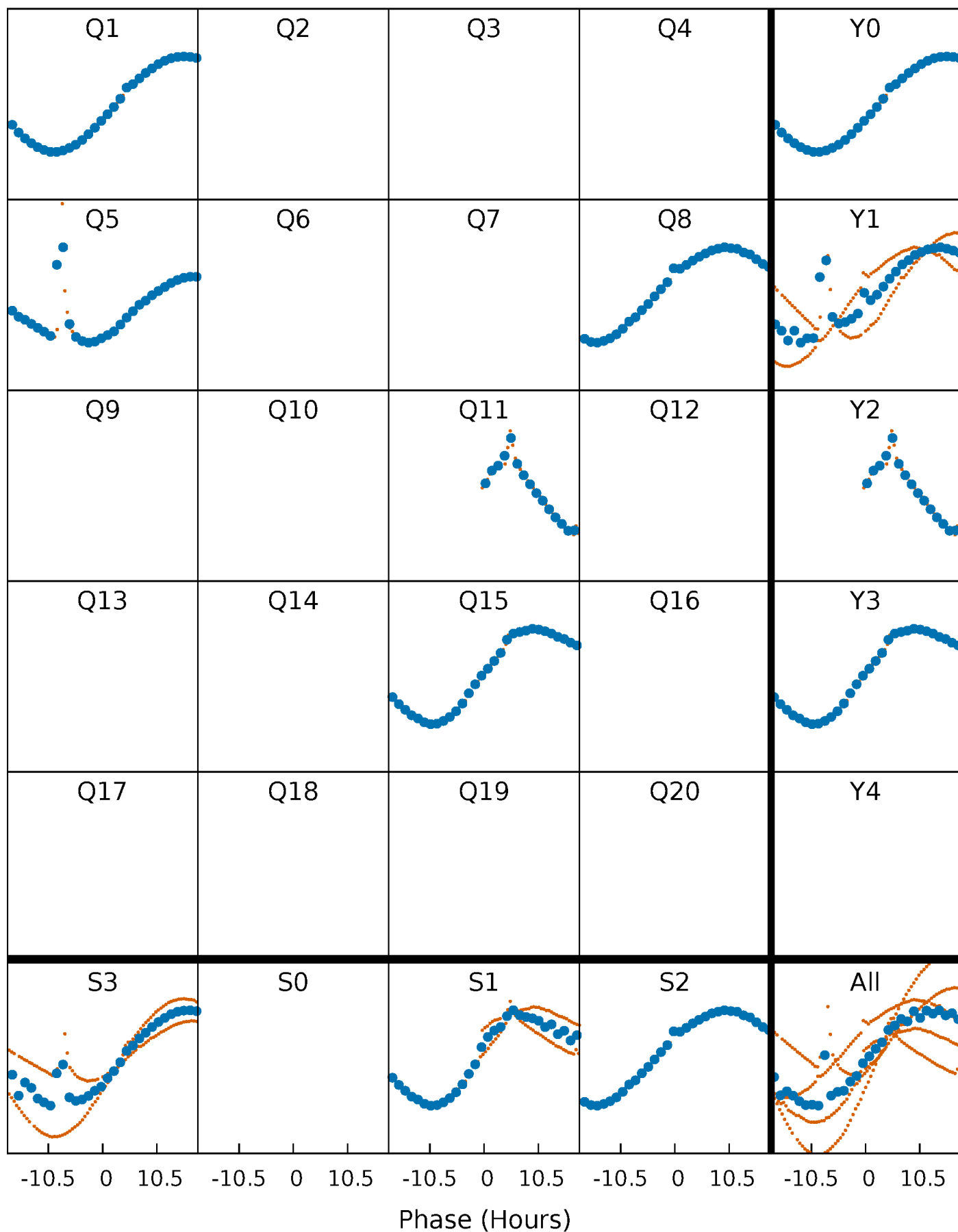


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



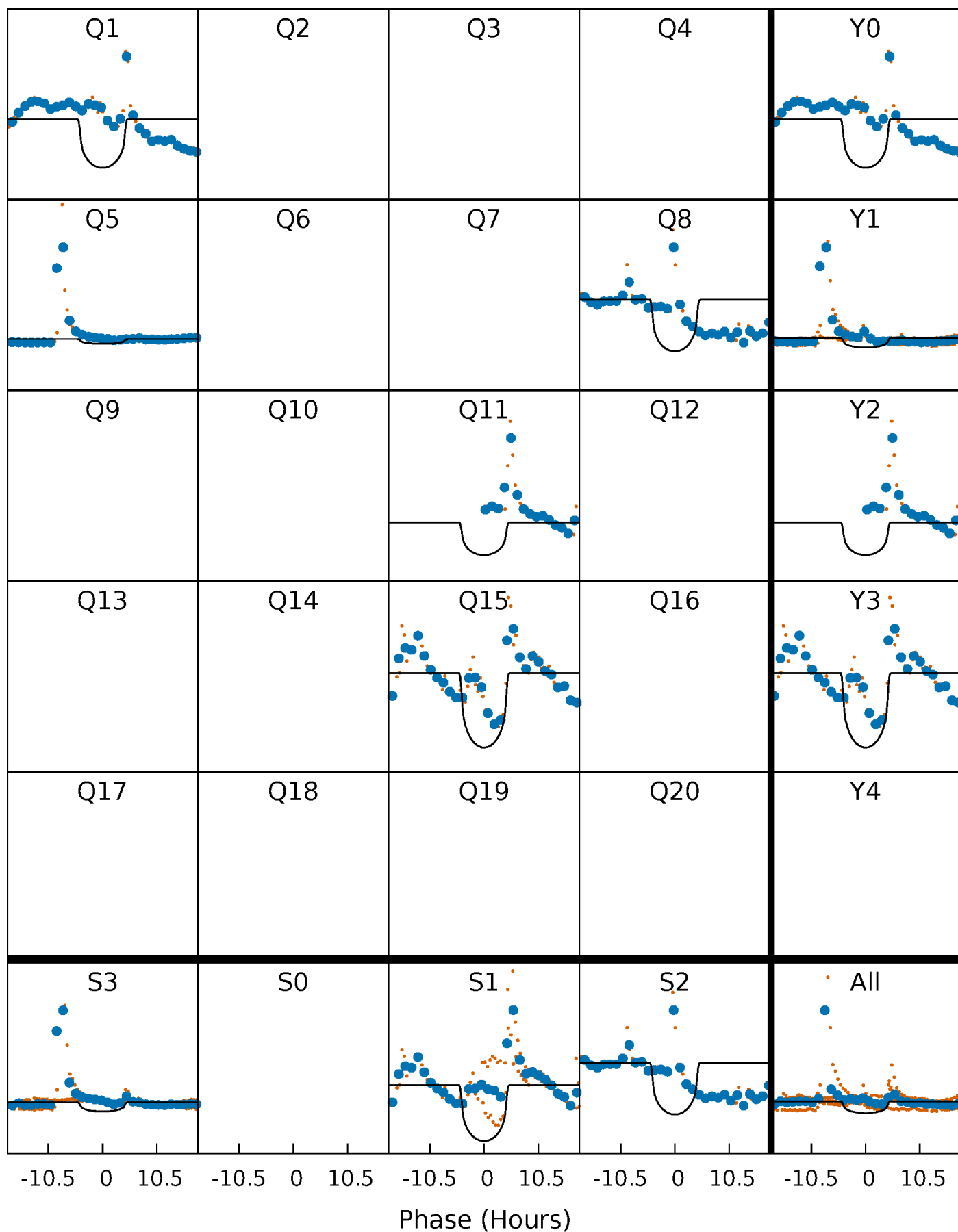
PDC Quarter-Phased Transit Curves

TCE 008481420-04 $P=305.479549$ Days $T_0=156.134428$ (BKJD)



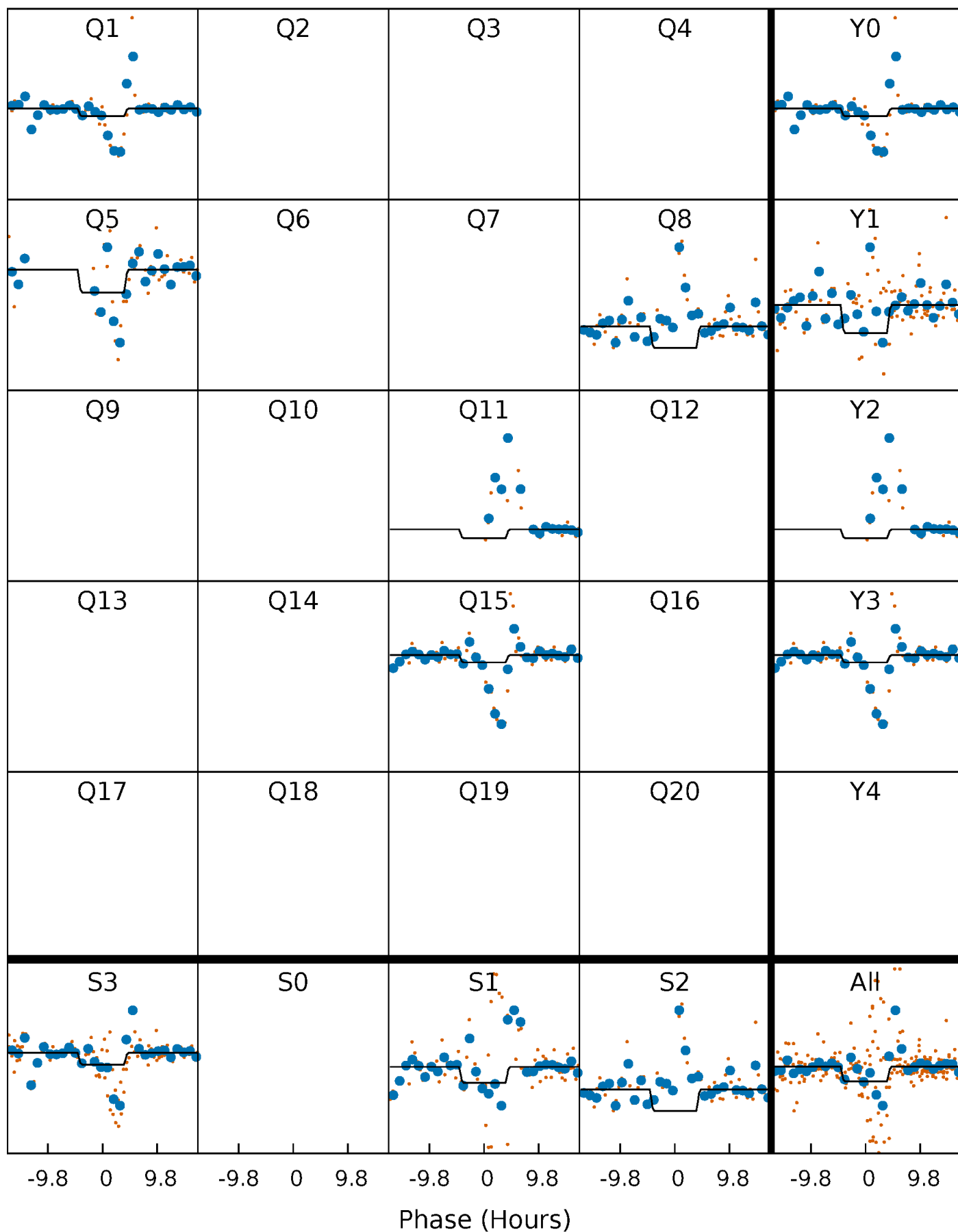
DV Quarter-Phased Transit Curves

TCE 008481420-04 $P=305.479549$ Days $T_0=156.134428$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

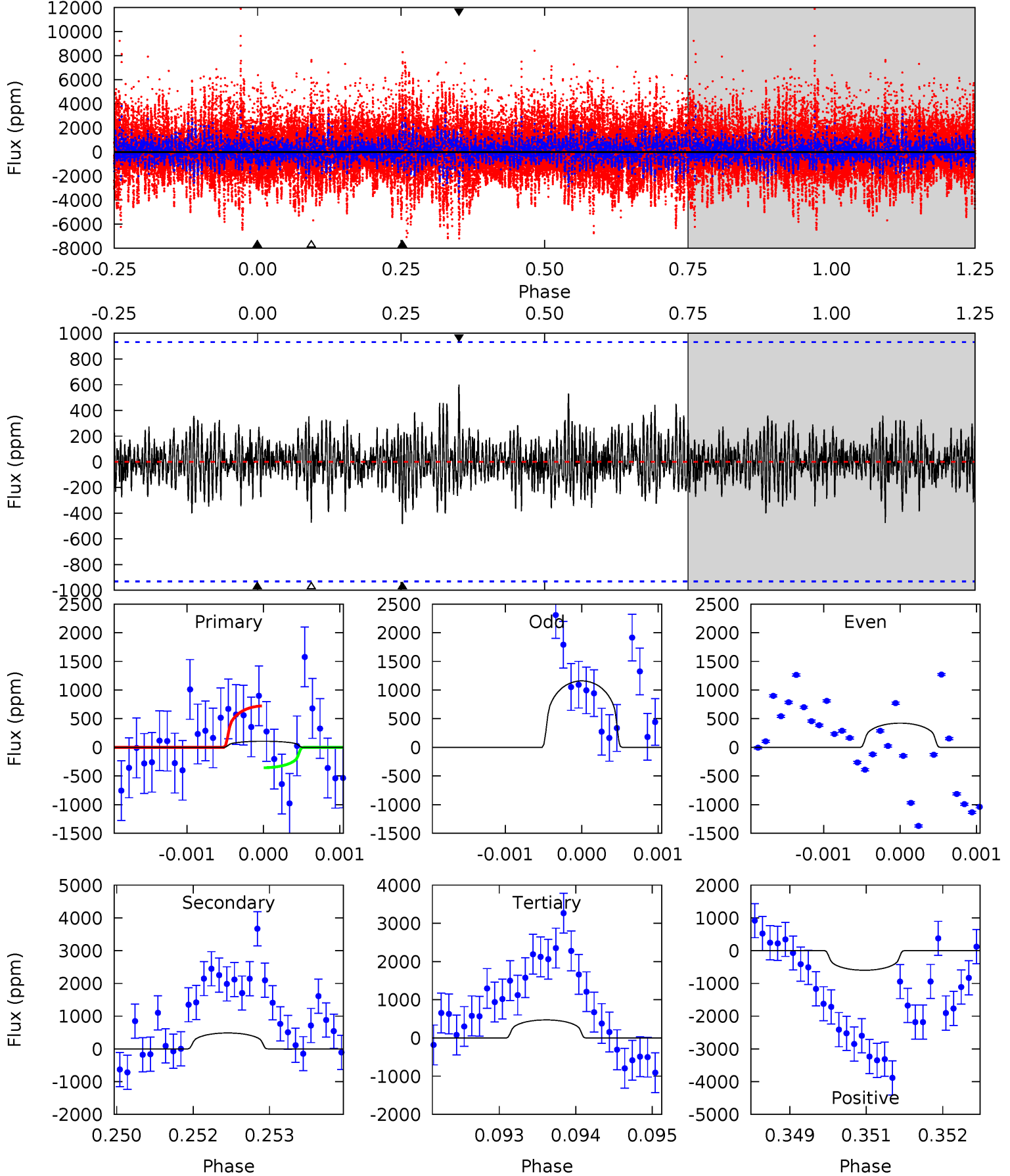
TCE 008481420-04 P=305.483233 Days $T_0=156.118747$ (BKJD)



DV Model-Shift Uniqueness Test

008481420-04, P = 305.479549 Days, E = 156.134428 Days

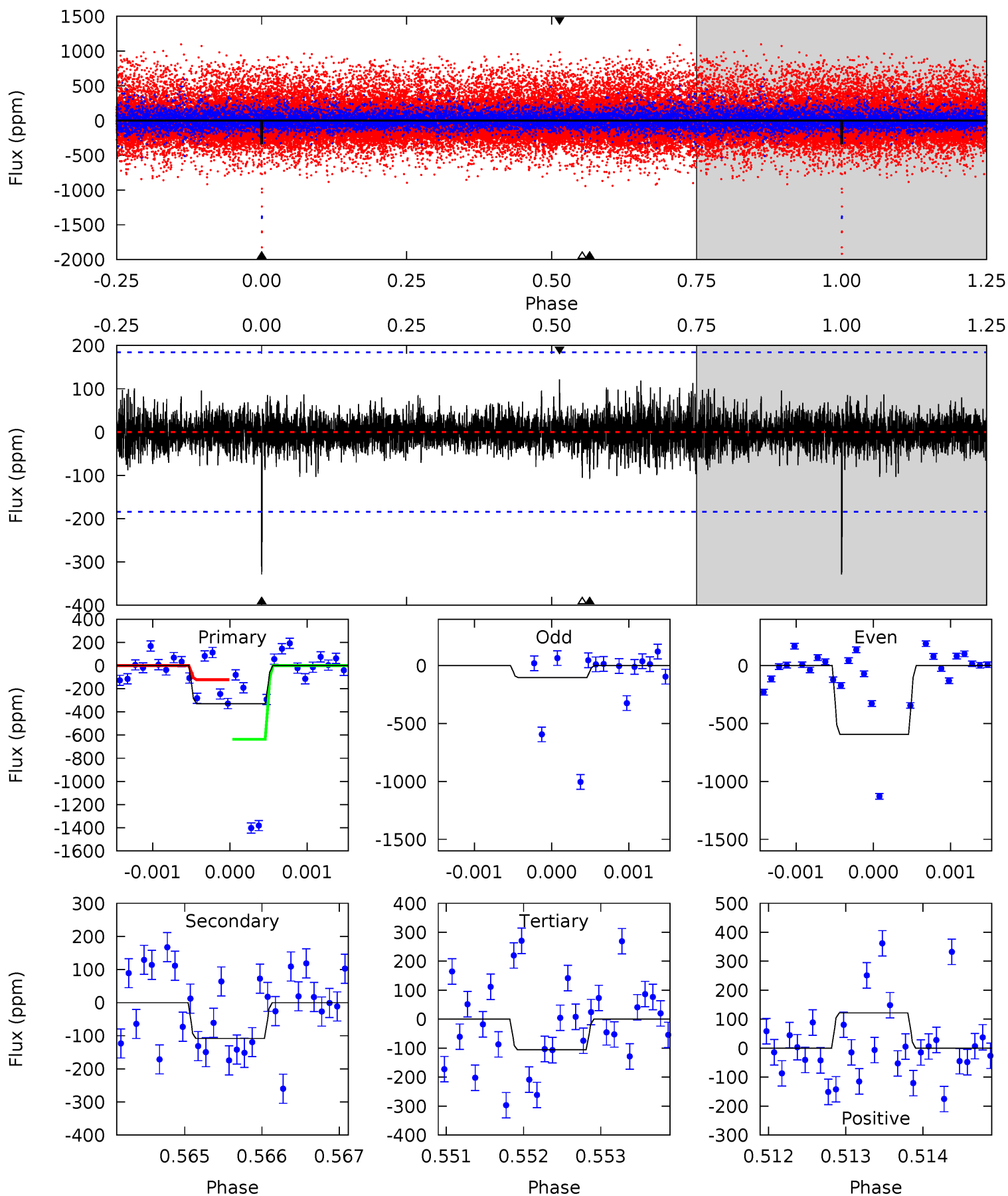
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.62	2.82	2.74	3.48	5.41	3.22	0.83	-2.13	-2.86	0.08	-0.66	1.82	0.48	0.55	1.05



Alt Model-Shift Uniqueness Test

008481420-04, P = 305.483233 Days, E = 156.118747 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.69	3.19	3.11	3.58	5.43	3.25	0.78	6.57	6.10	0.07	-0.40	7.10	0.54	0.27	7.55



Stellar Parameters For KIC 008481420

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4809^{+172}_{-172}	$4.545^{+0.066}_{-0.039}$	$0.070^{+0.250}_{-0.300}$	$0.763^{+0.049}_{-0.074}$	$0.746^{+0.075}_{-0.061}$	$2.362^{+0.684}_{-0.342}$
	+4%/-4%	+1%/-1%	+357%/-429%	+6%/-10%	+10%/-8%	+29%/-14%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 008481420-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-486 ± 172	$5.11^{+3.67}_{-3.21}$	287^{+13}_{-11}	3345^{+1477}_{-548}	6473^{+44130}_{-4466}
Alt.	-108 ± 34	$3.41^{+3.33}_{-2.31}$	287^{+12}_{-12}	3019^{+1262}_{-521}	3285^{+27039}_{-2484}

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

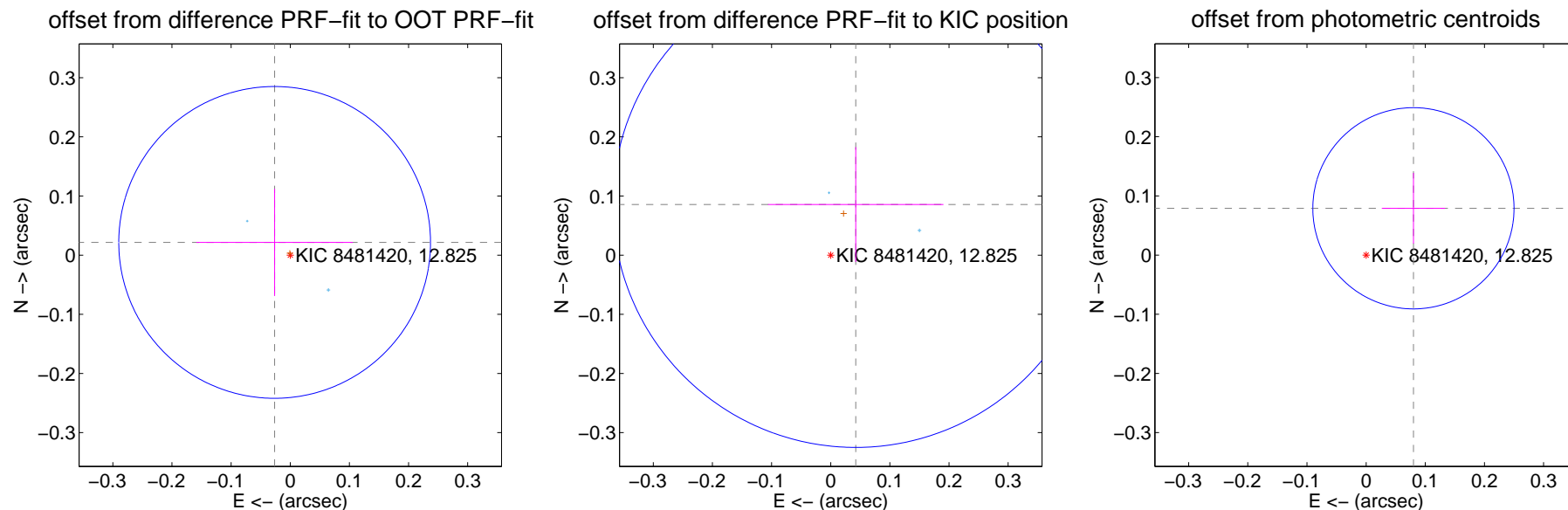
DV Centroid Data

Supplemental centroid analysis for 008481420-04. Kepler magnitude: 12.82. Transit SNR 12.83

There are 2 quarters with good PRF difference image offsets

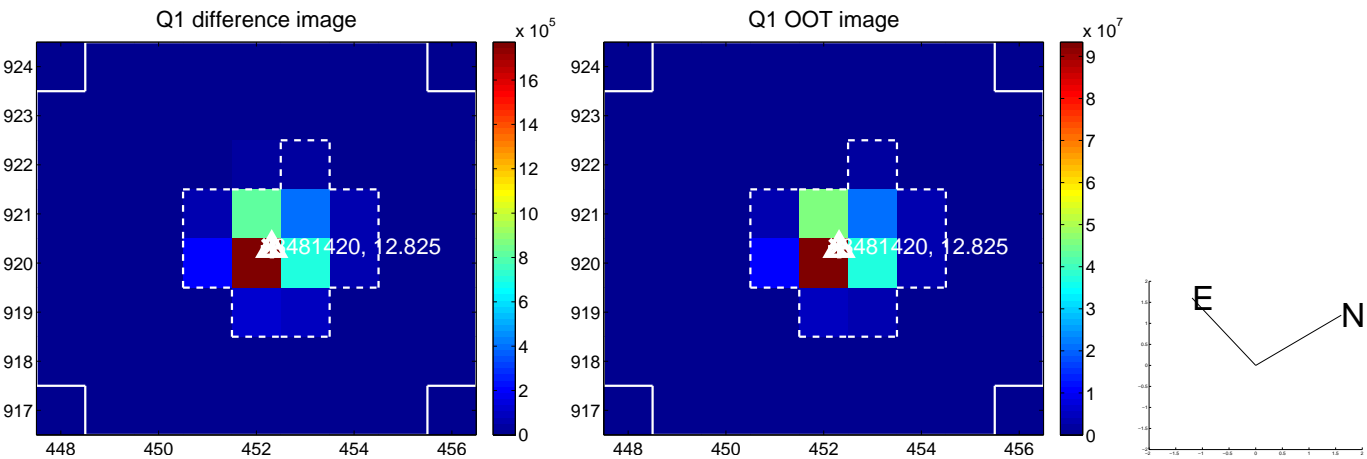
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.034 ± 0.088	0.39	0.026 ± 0.132	0.022 ± 0.091
PRF-fit source offset from KIC position	0.095 ± 0.137	0.70	-0.042 ± 0.148	0.086 ± 0.097
photometric centroid source offset	0.11 ± 0.06	1.98	-0.08 ± 0.05	0.08 ± 0.06

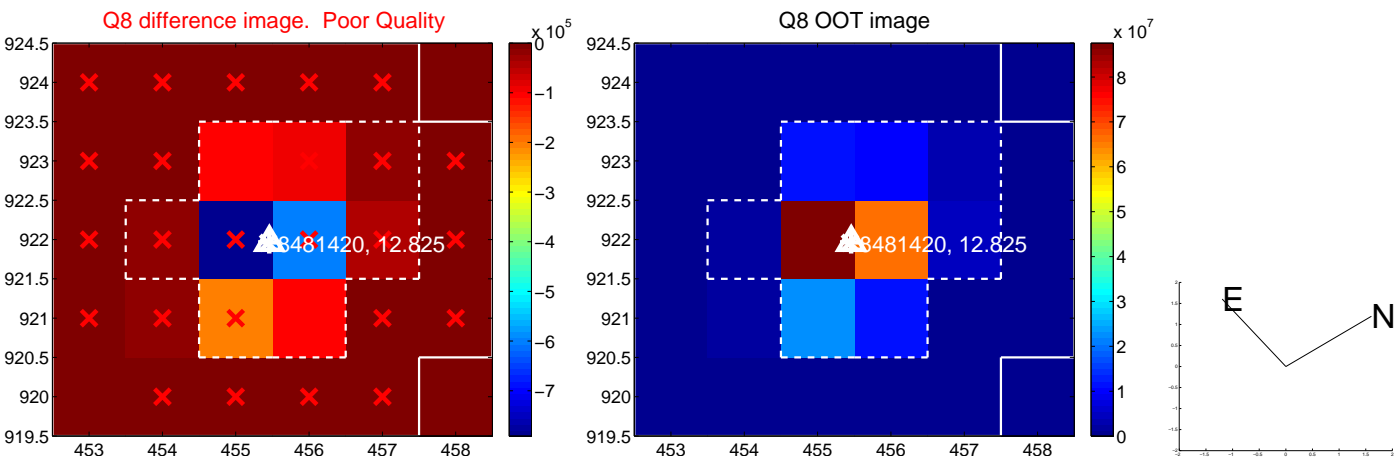
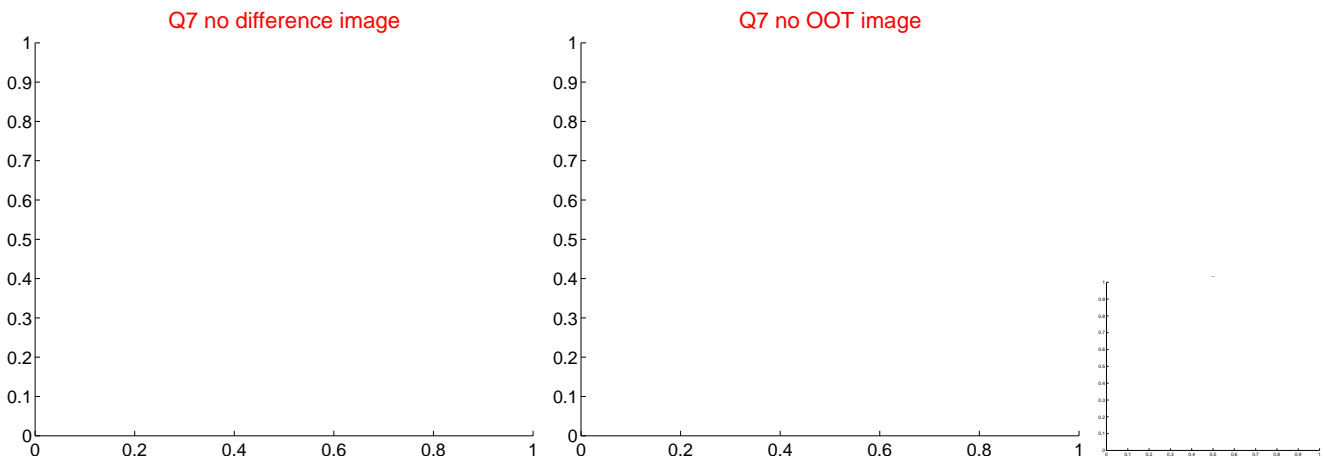
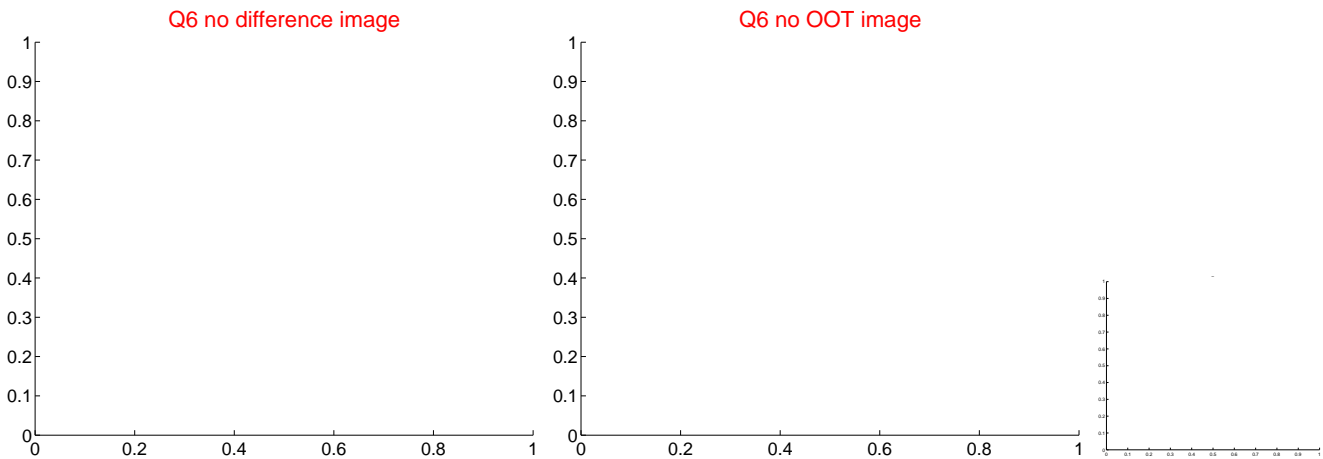
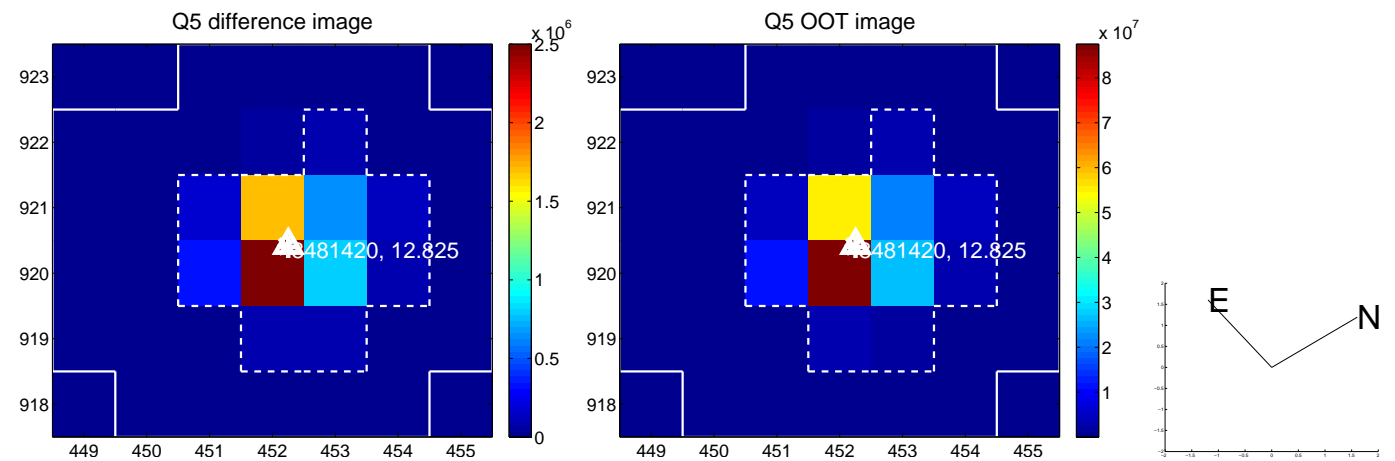


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



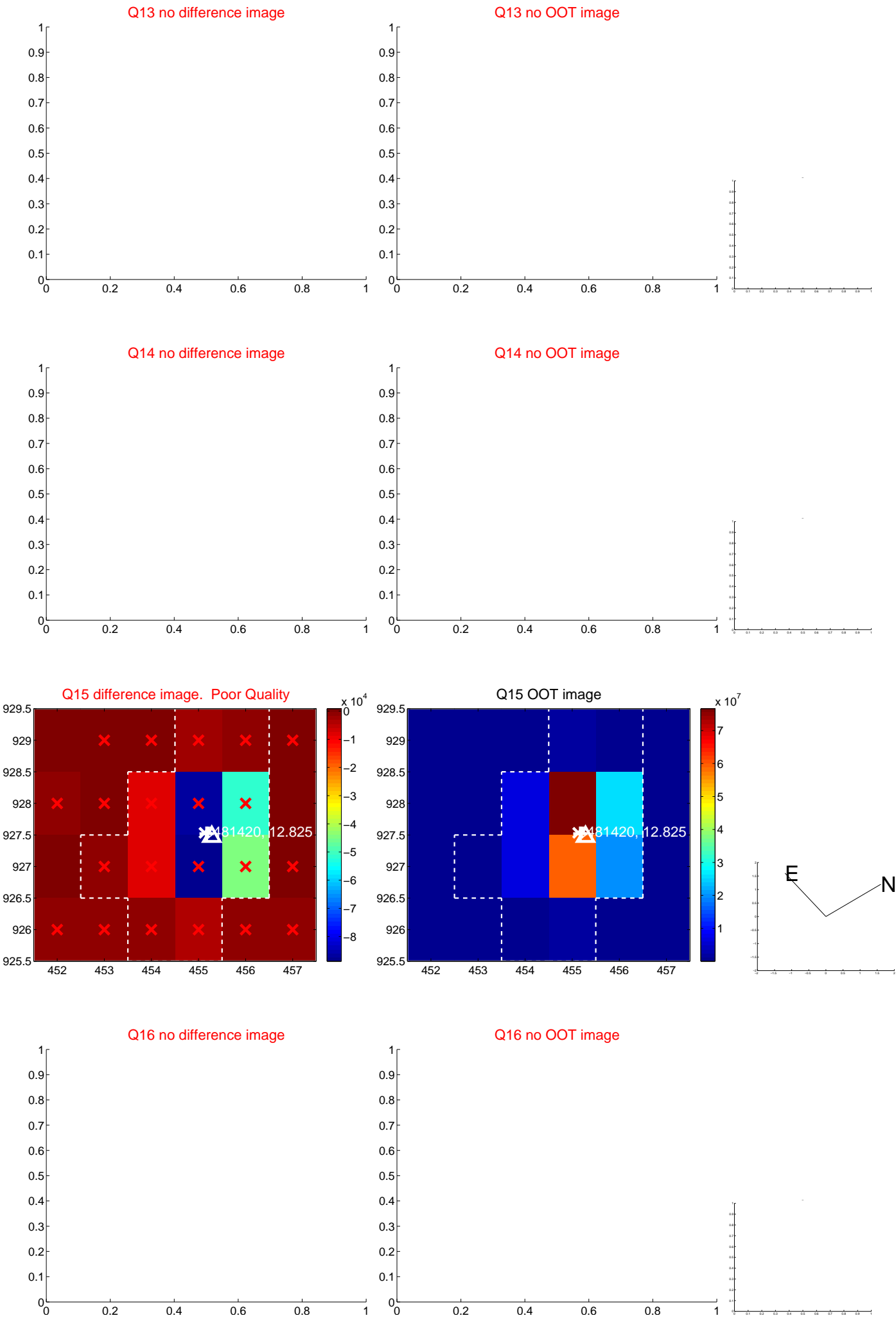
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



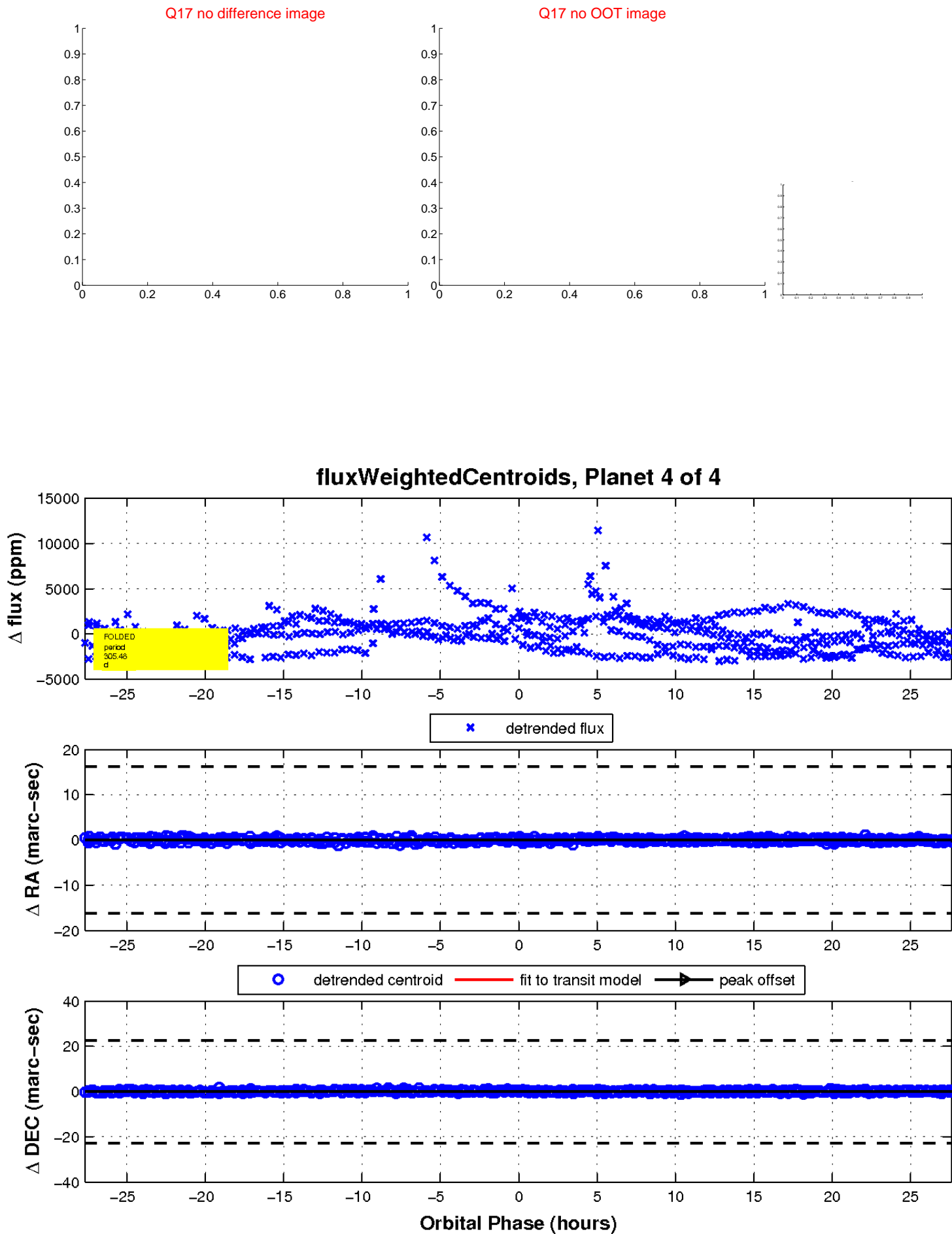
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

