

KIC 004476013

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})
004476013-01	OBS	No	3.111300	131.965214	87.6	12.343	7.9	7.2	0.70	5340	0.65	245.11
004476013-02	OBS	No	194.686816	286.324219	1834.8	4.706	9.3	8.5	0.70	5340	5.82	0.99
004476013-03	OBS	No	383.171892	135.986790	2122.1	7.624	8.9	7.9	0.70	5340	3.31	0.40
004476013-04	OBS	No	182.482170	287.571257	1122.5	2.928	8.6	7.9	0.70	5340	2.52	1.08
004476013-05	OBS	No	347.259060	146.038192	2401.0	6.883	8.6	9.7	0.70	5340	4.05	0.46
004476013-06	OBS	No	371.401491	142.216741	1899.3	8.826	7.9	8.1	0.70	5340	3.33	0.42
004476013-07	OBS	No	363.428264	168.875171	2172.9	4.775	8.2	7.4	0.70	5340	5.93	0.43
004476013-09	OBS	No	343.360397	154.816901	2157.6	6.228	8.3	8.2	0.70	5340	6.28	0.46

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004476013-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—CENT_KIC_POS
004476013-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

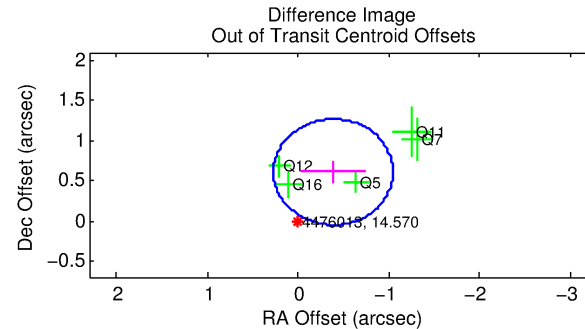
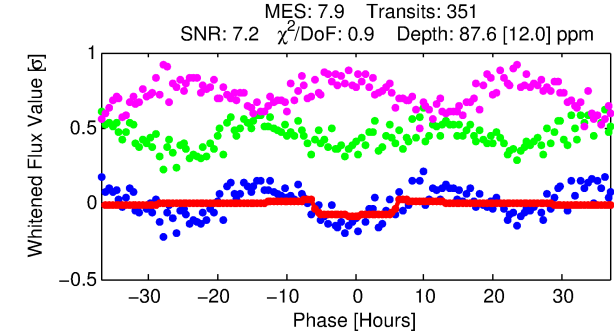
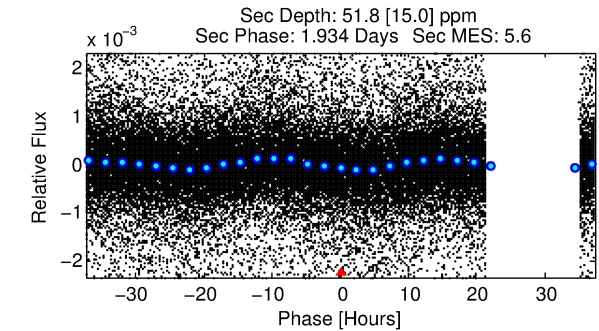
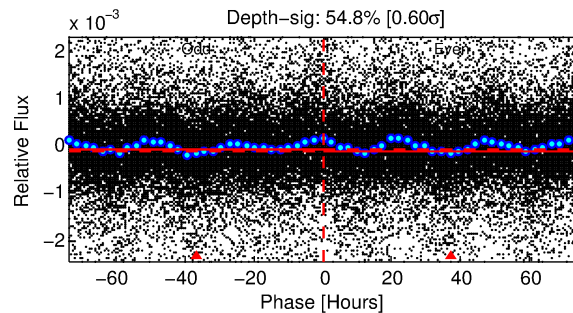
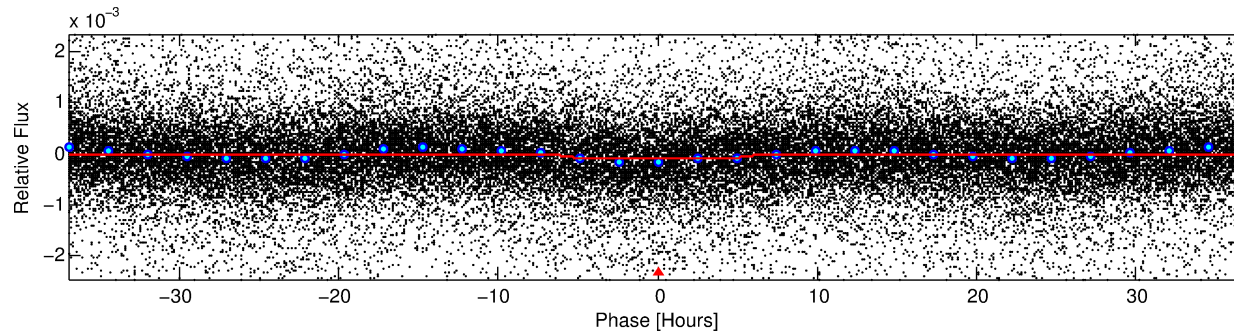
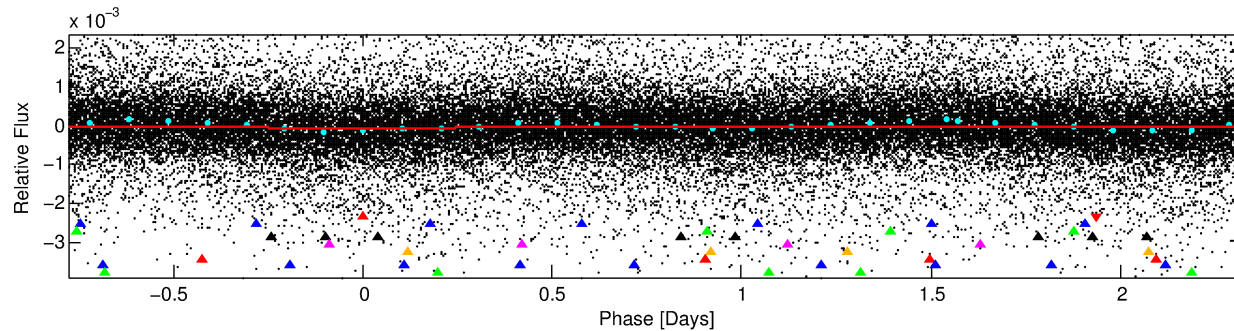
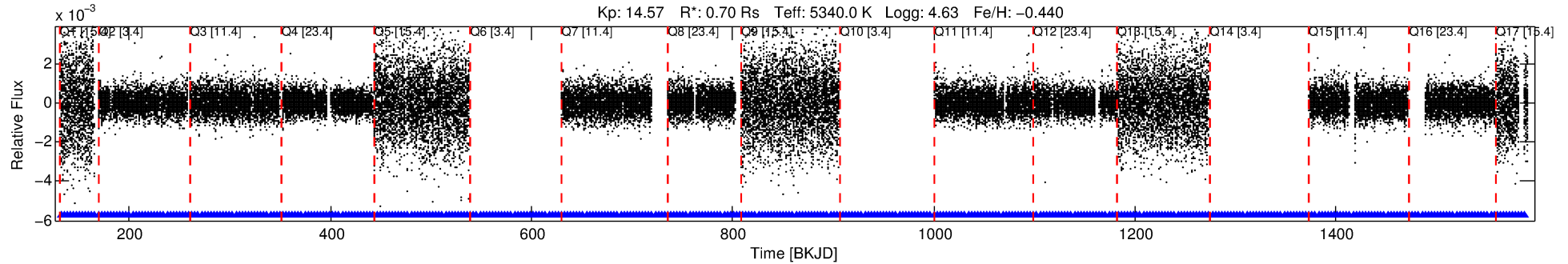
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004476013-01

No Significant Match Found

DV One-Page Summary

KIC: 4476013 Candidate: 1 of 9 Period: 3.111 d



DV Fit Results:

Period = 3.11130 [0.00006] d
Epoch = 131.9652 [0.0107] BKJD
Rp/R* = 0.0085 [0.0117]
a/R* = 1.97 [8.30]
b = 0.29 [17.98]
Seff = 245.11 [53.62]
Teq = 1009 [55] K
Rp = 0.65 [0.91] Re
a = 0.0383 [0.0050] AU
Ag = 97.83 [271.62] [0.36 σ]
Teffp = 4906 [3401] K [1.15 σ]

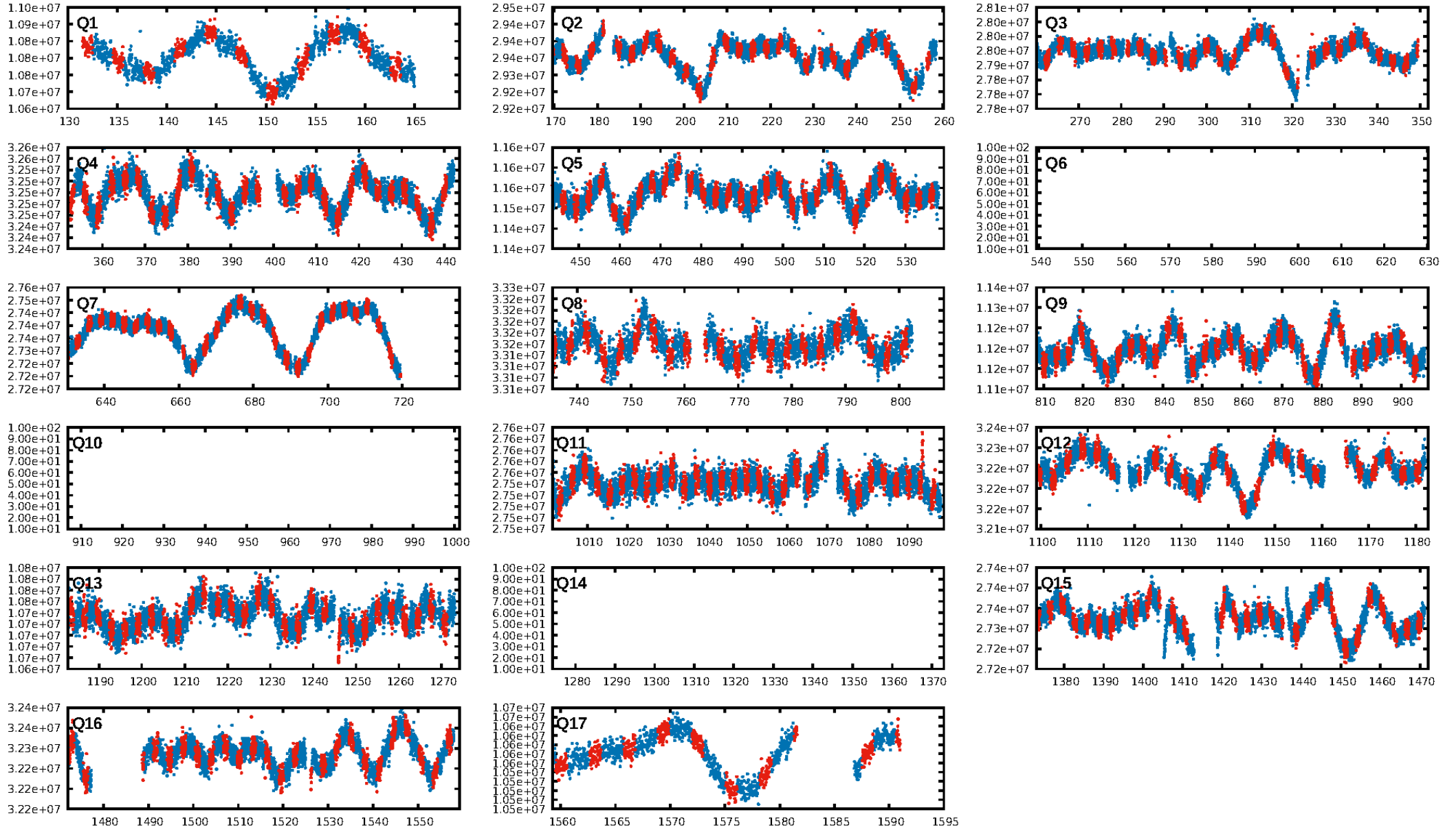
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [283.06 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [330/330]
GhostDiagnostic-chr: -0.5792
Centroid-sig: 0.1%
Centroid-so: 2.564 arcsec [4.41 σ]
OotOffset-rm: 0.720 arcsec [3.28 σ]
KicOffset-rm: 2.682 arcsec [4.25 σ]
OotOffset-st: 0/2/2/1 [5]
KicOffset-st: 0/2/2/1 [5]
DiffImageQuality-fgm: 1.00 [5/5]
DiffImageOverlap-fno: 1.00 [14/14]

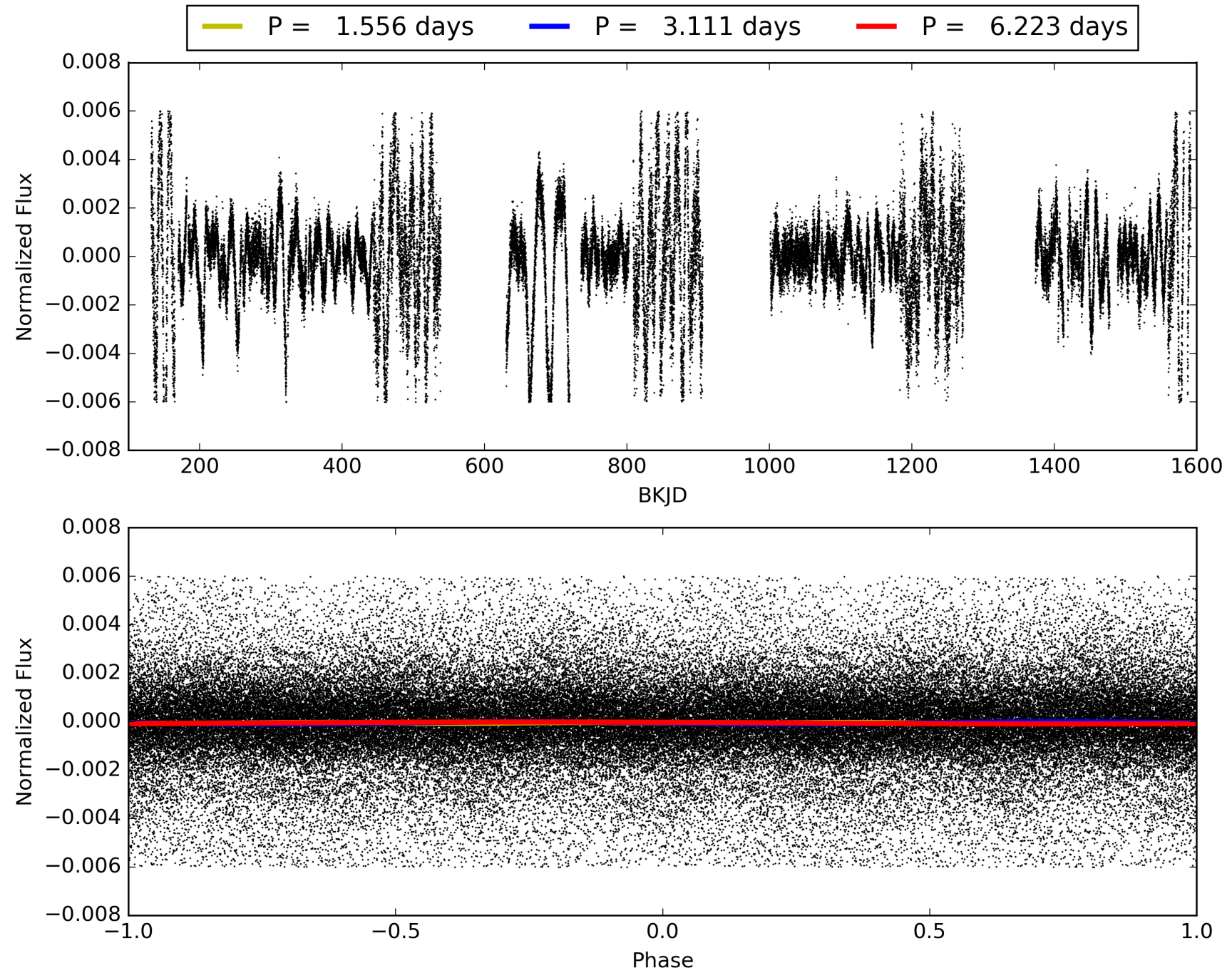
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 004476013-01, PDC Light Curves

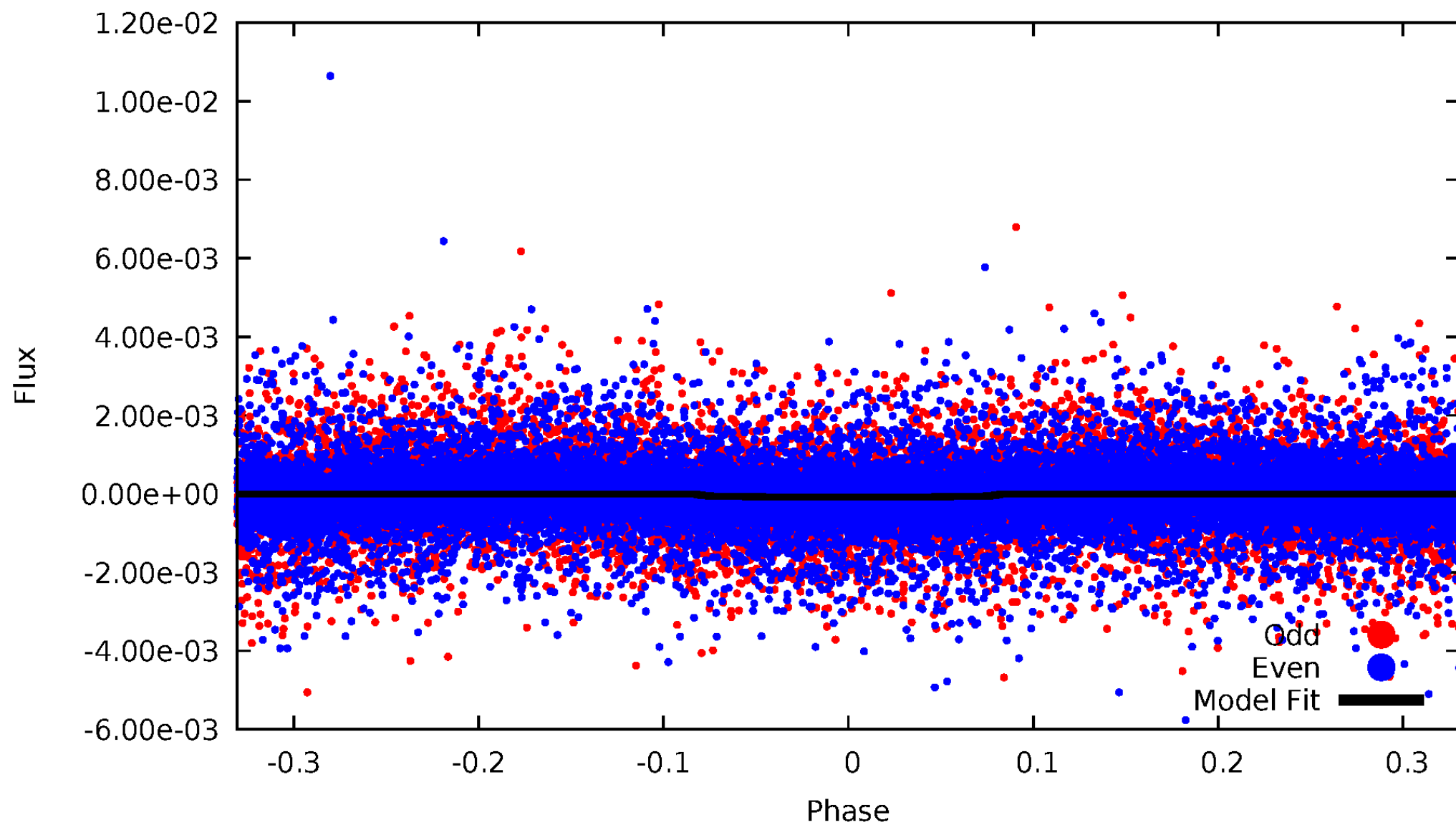


TCE 004476013-01



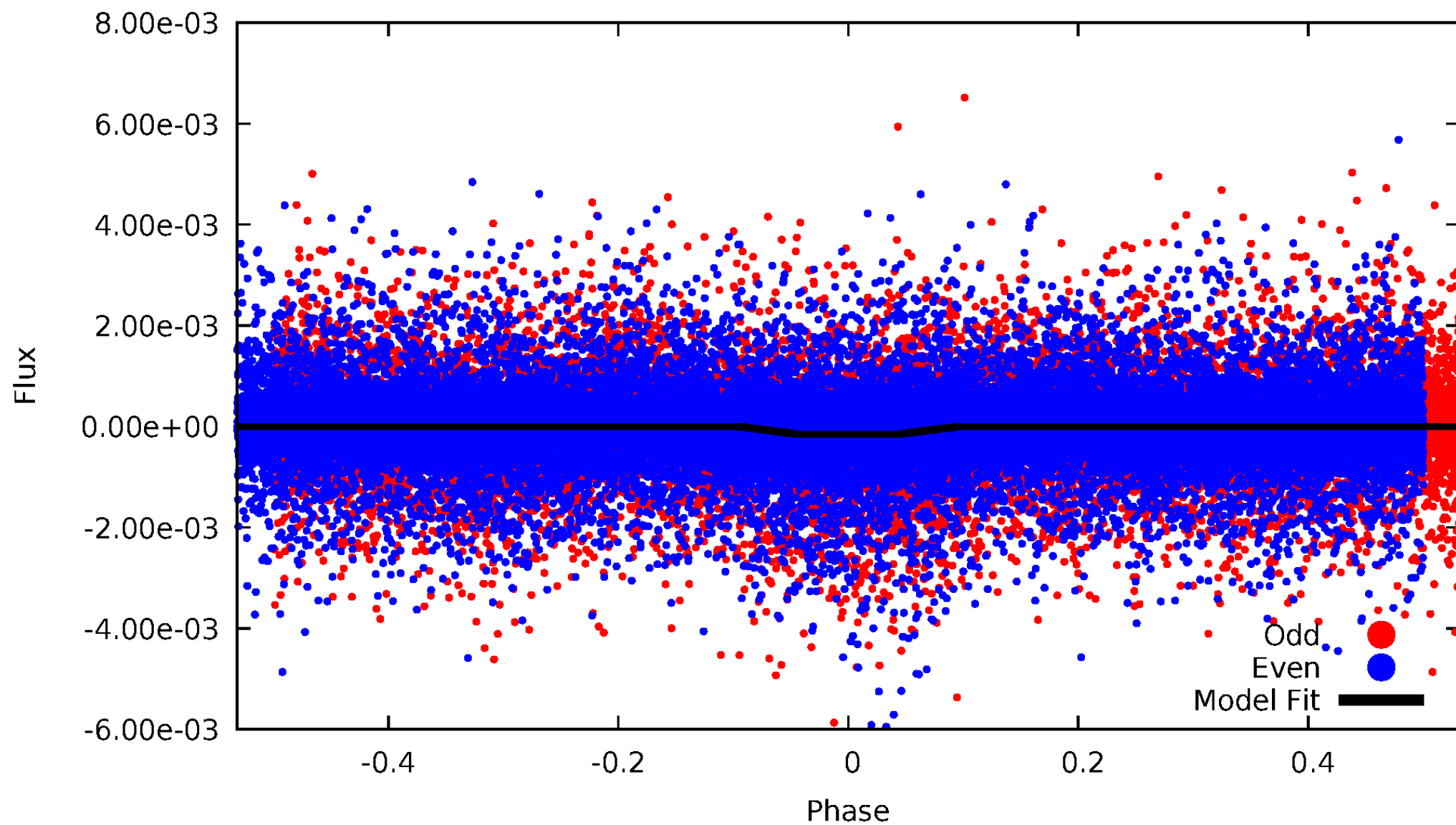
DV Odd/Even

TCE 004476013-01



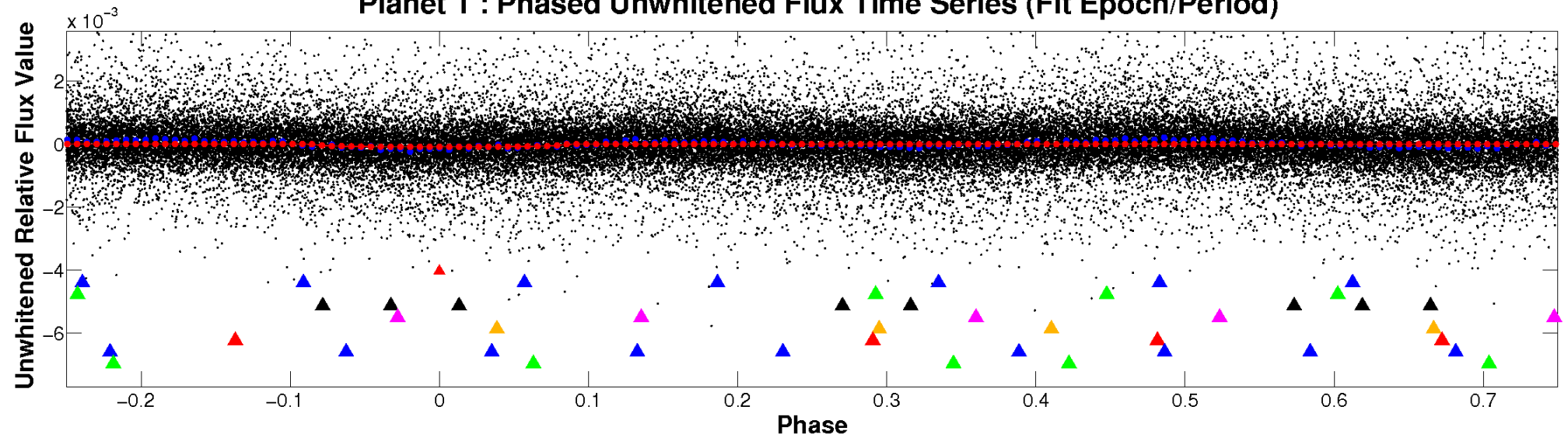
ALT Odd/Even

TCE 004476013-01

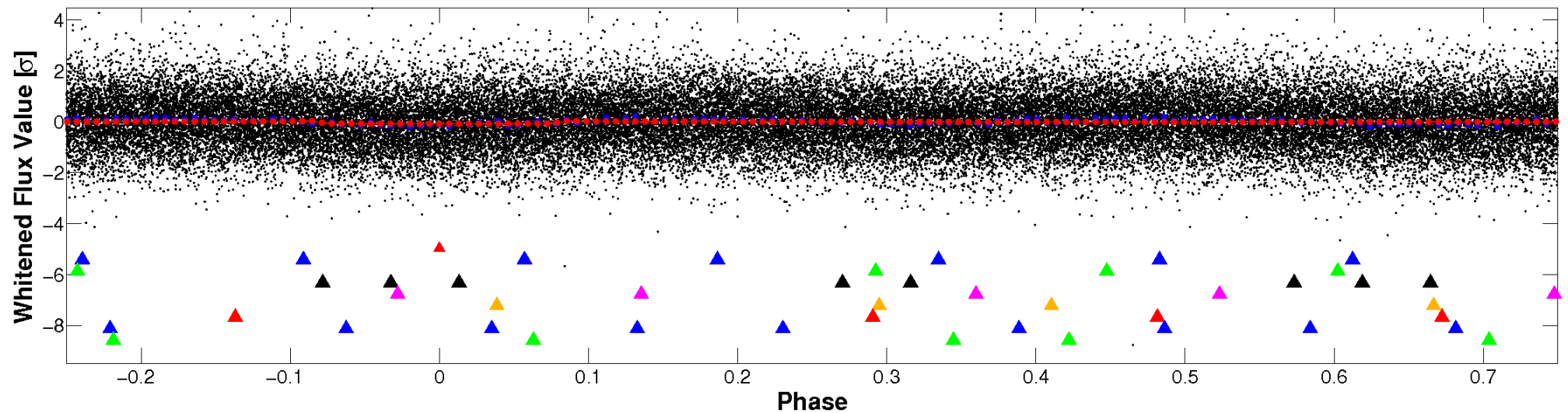


Non-Whitened Vs. Whitened Light Curve

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

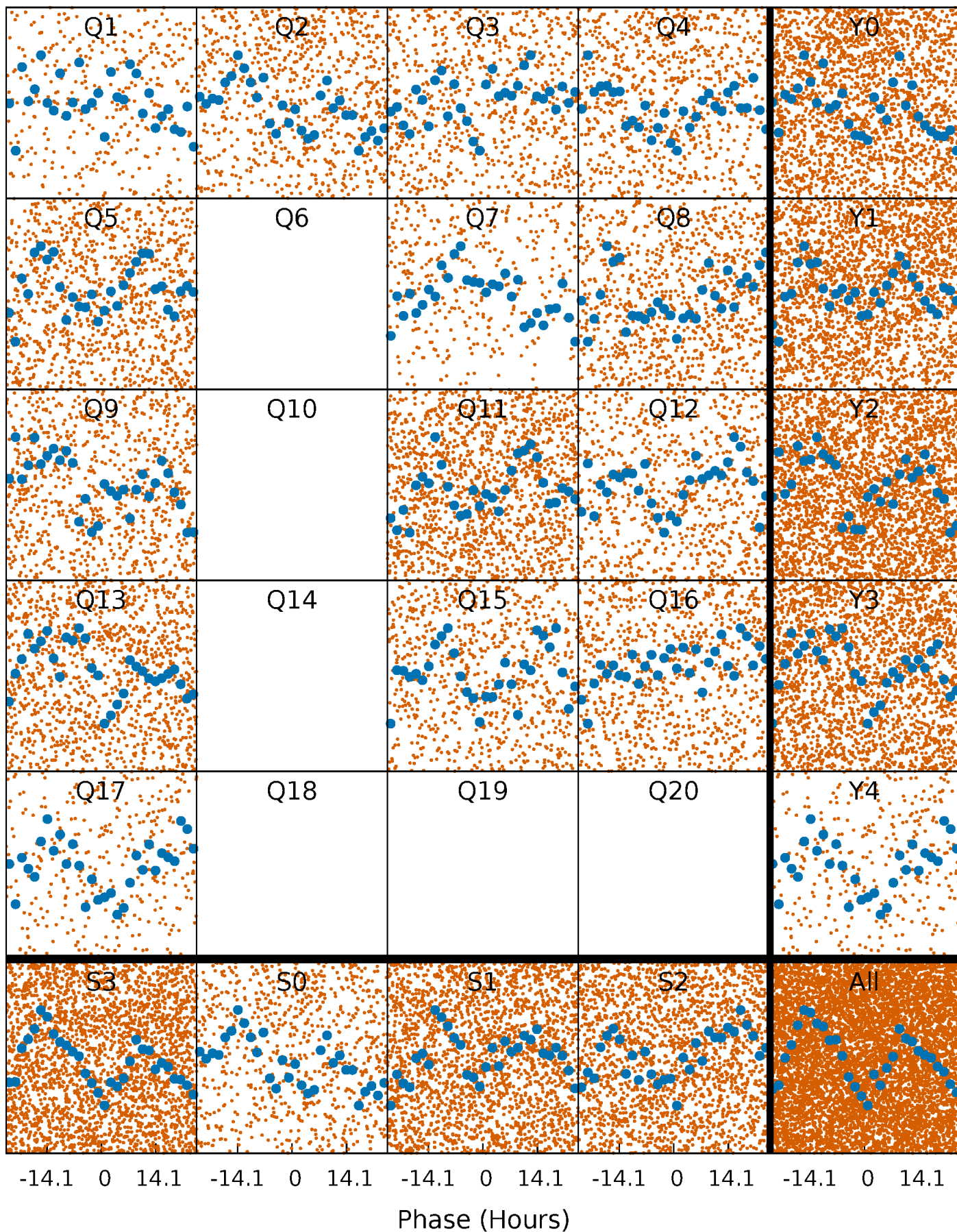


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



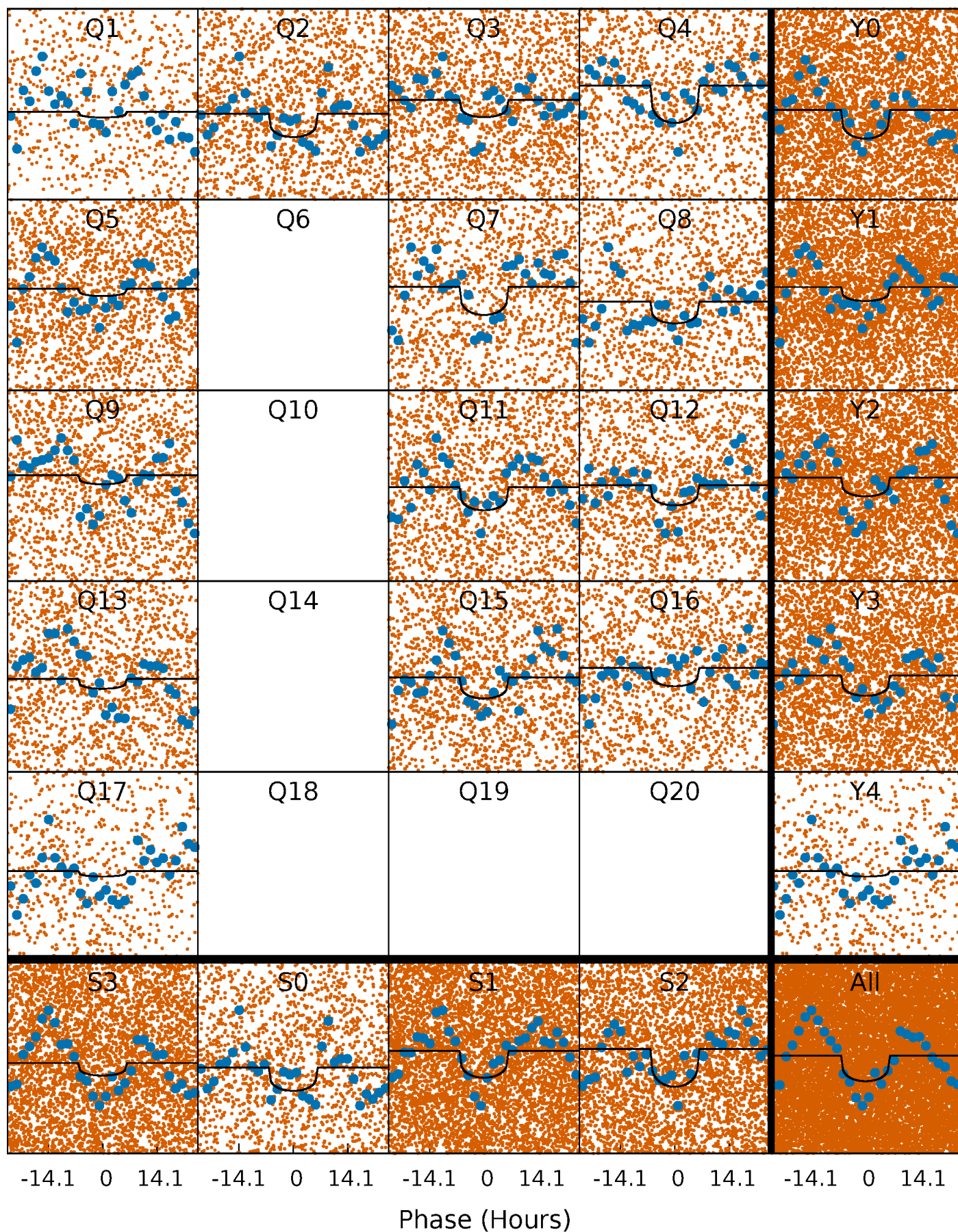
PDC Quarter-Phased Transit Curves

TCE 004476013-01 P= 3.111300 Days $T_0=131.965214$ (BKJD)



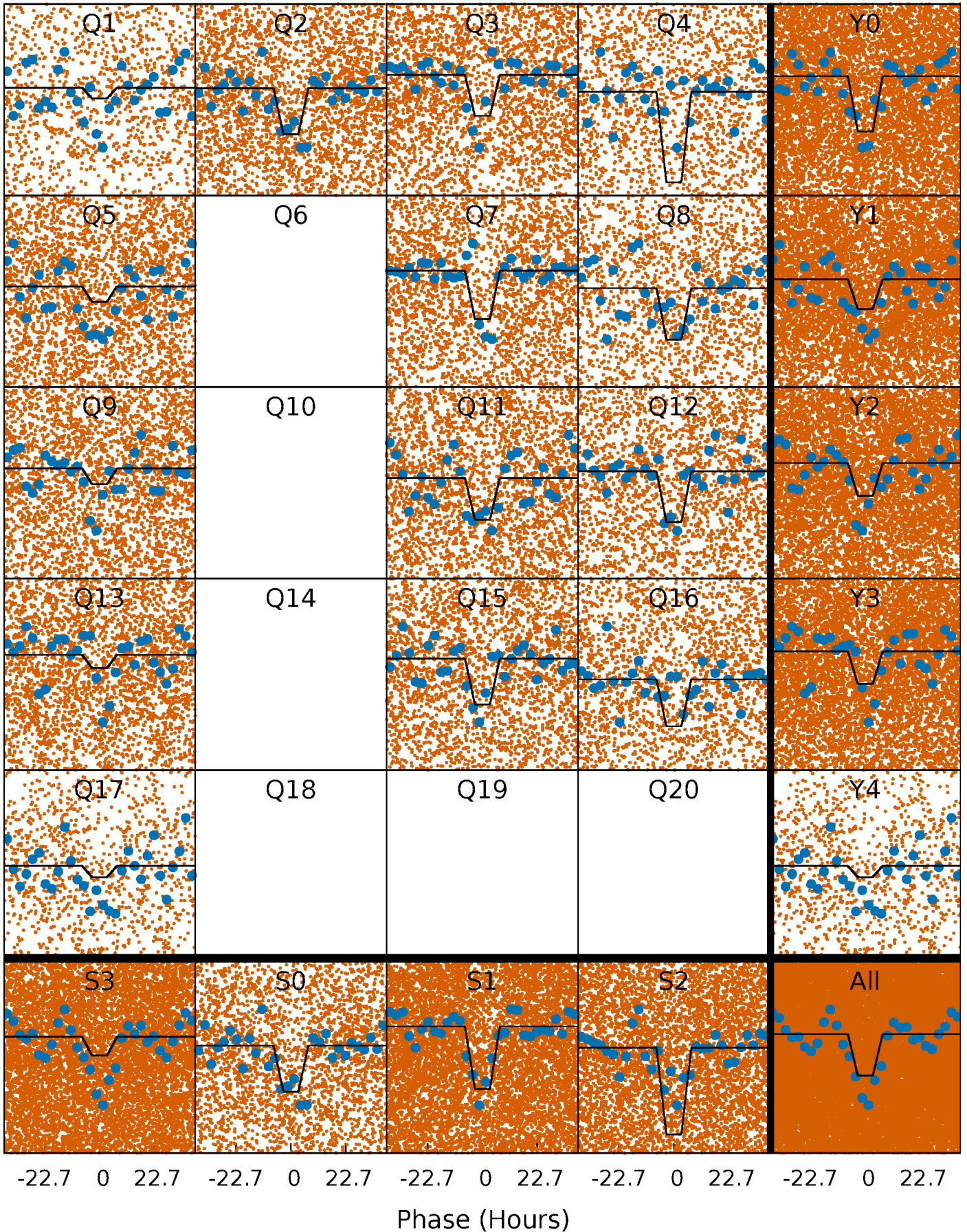
DV Quarter-Phased Transit Curves

TCE 004476013-01 P= 3.111300 Days $T_0=131.965214$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

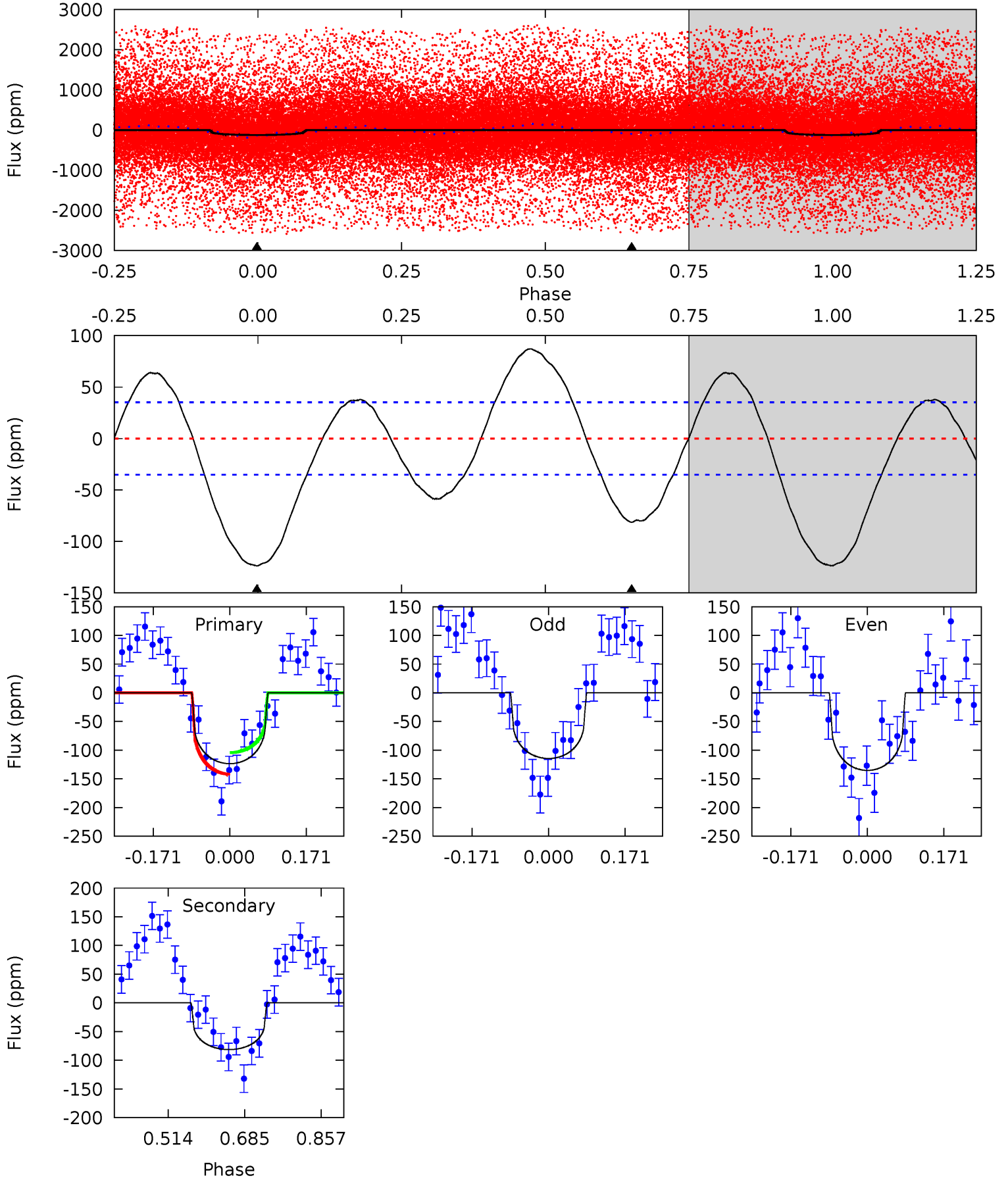
TCE 004476013-01 P= 3.111440 Days $T_0=131.901474$ (BKJD)



DV Model-Shift Uniqueness Test

004476013-01, P = 3.111300 Days, E = 128.853914 Days

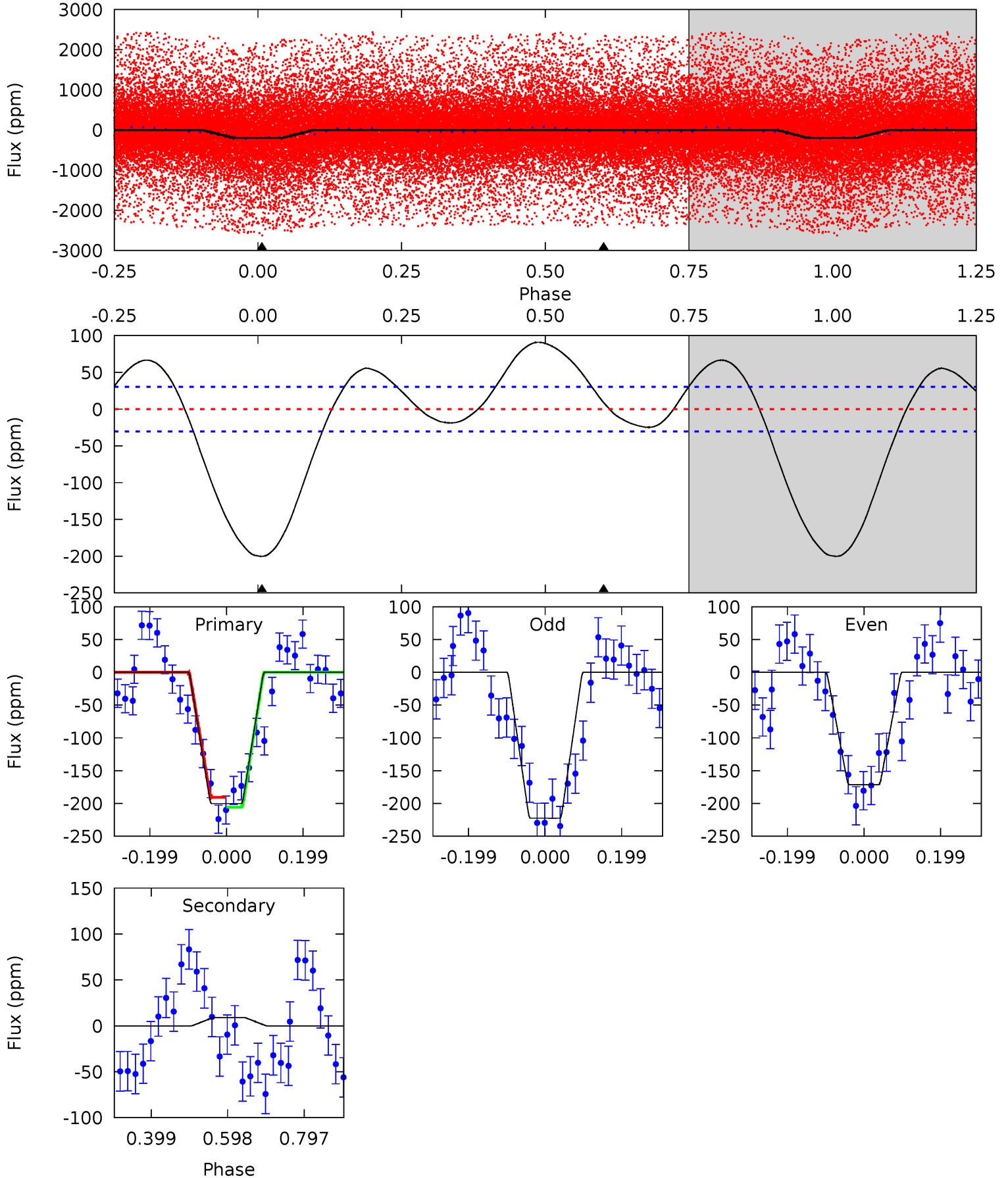
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.6	10.3	0	0	4.45	1.37	5.86	15.6	15.6	10.3	10.3	1.34	1.30	0.41	2.39



Alt Model-Shift Uniqueness Test

004476013-01, P = 3.111440 Days, E = 128.790034 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.1	-1.31	0	0	4.42	1.28	3.50	29.1	29.1	-1.31	-1.31	3.75	1.06	0.31	1.07



Stellar Parameters For KIC 004476013

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5340^{+160}_{-144}	$4.633^{+0.032}_{-0.097}$	$-0.440^{+0.300}_{-0.300}$	$0.702^{+0.112}_{-0.048}$	$0.783^{+0.076}_{-0.084}$	$3.193^{+0.519}_{-1.000}$
	+3%/-3%	+1%/-2%	+68%/-68%	+16%/-7%	+10%/-11%	+16%/-31%
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 004476013-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-81 ± 8	$0.96^{+0.83}_{-0.63}$	1431^{+62}_{-51}	4673^{+3339}_{-950}	72^{+534}_{-52}
Alt.	9 ± 7	$1.15^{+0.90}_{-0.71}$	1428^{+66}_{-51}	-2982^{+591}_{-1077}	$-4.143^{+3.620}_{-28.155}$

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 $A_{obs} \gg 1.0$

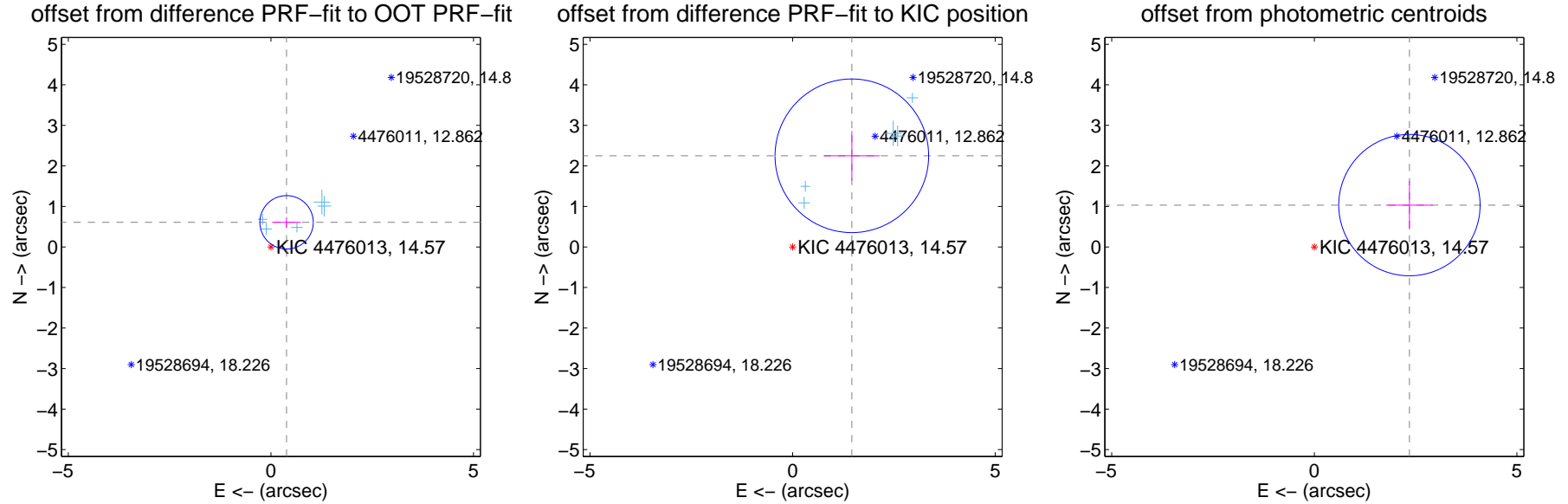
DV Centroid Data

Supplemental centroid analysis for 004476013-01. Kepler magnitude: 14.57. Transit SNR 7.23

There are 5 quarters with good PRF difference image offsets

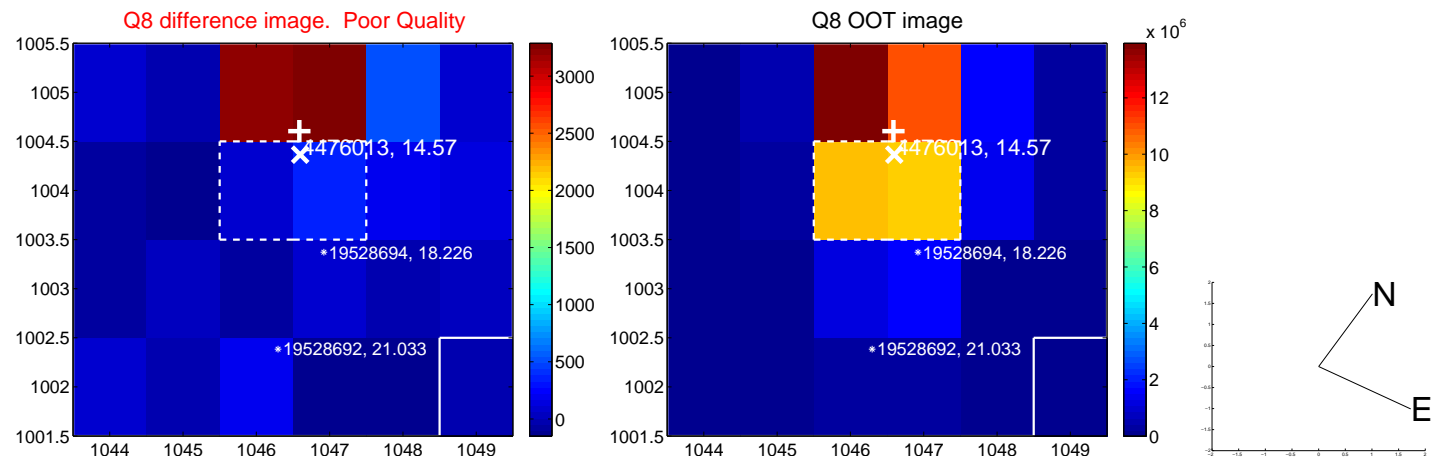
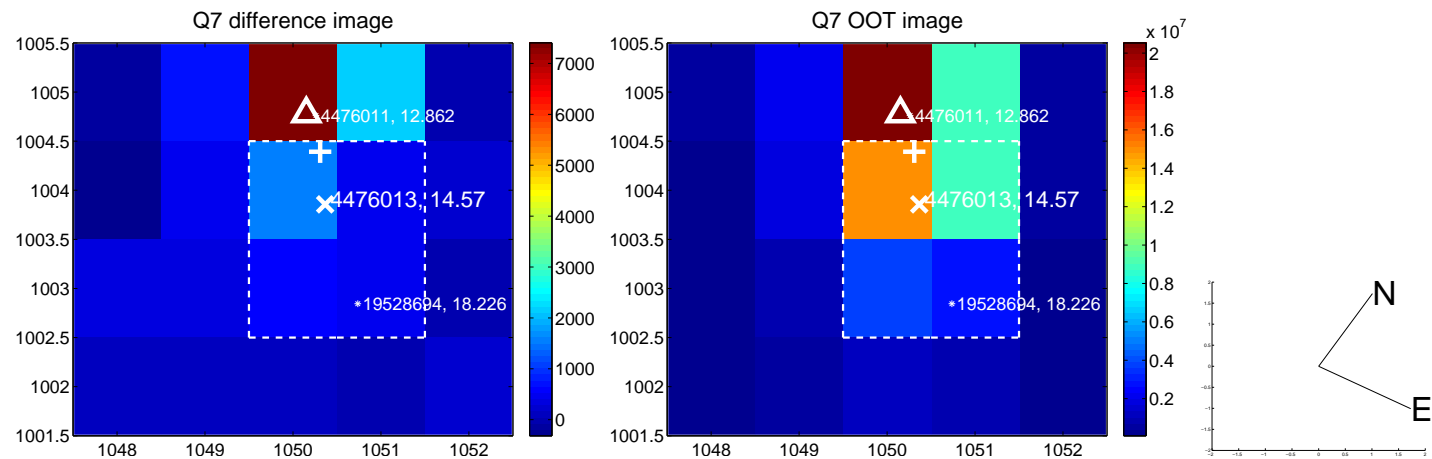
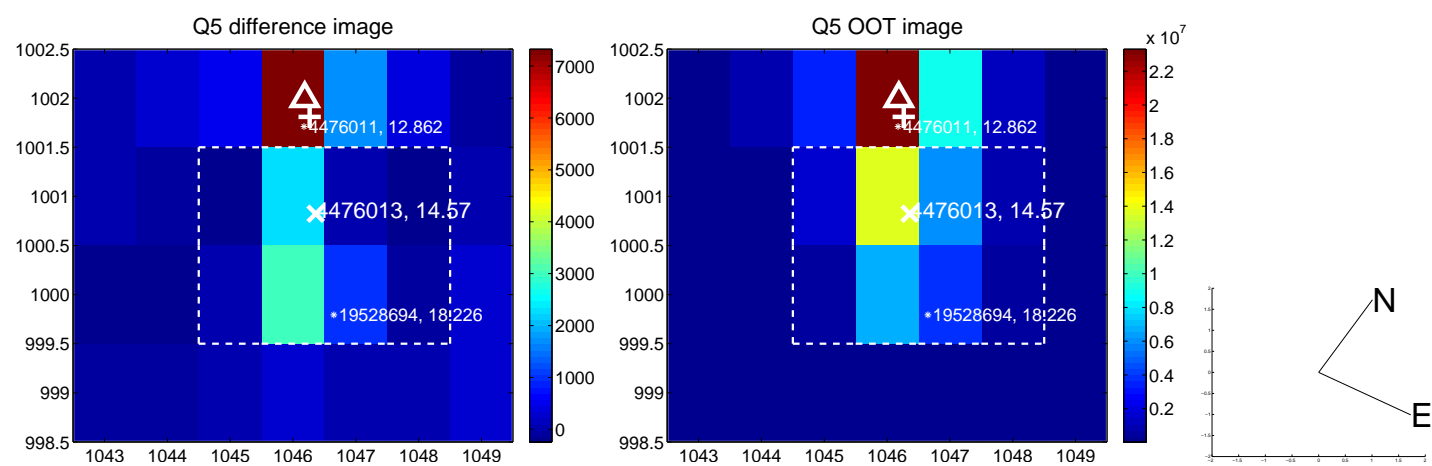
The direct PRF centroid is offset from the target star catalog position by about 0.76 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.720 ± 0.220	3.28	-0.386 ± 0.355	0.608 ± 0.130
PRF-fit source offset from KIC position	2.682 ± 0.632	4.25	-1.461 ± 0.685	2.249 ± 0.608
photometric centroid source offset	2.56 ± 0.58	4.41	-2.35 ± 0.58	1.03 ± 0.60

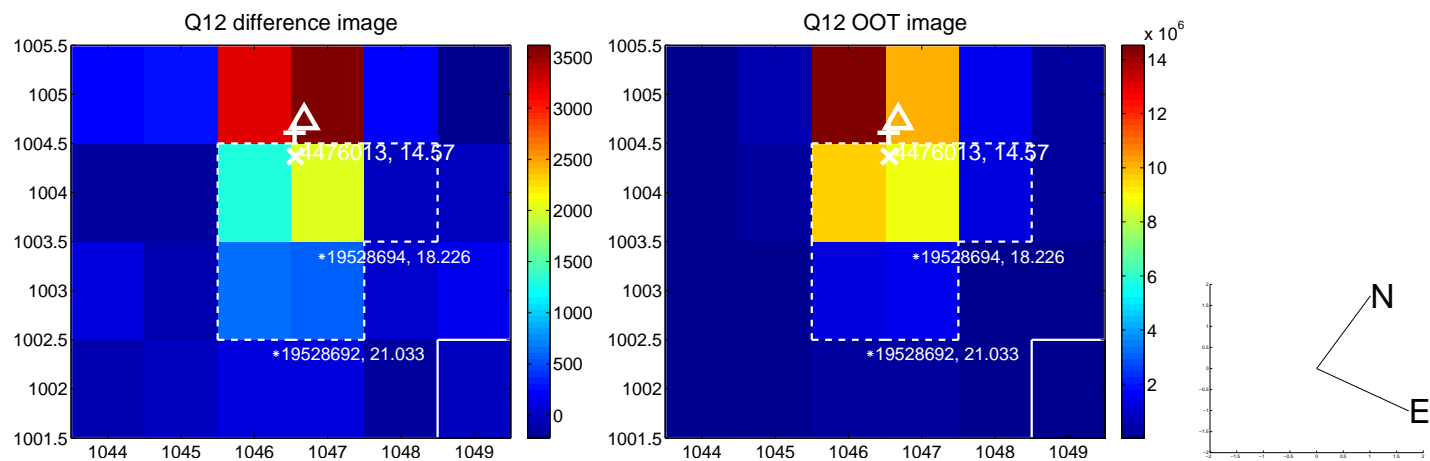
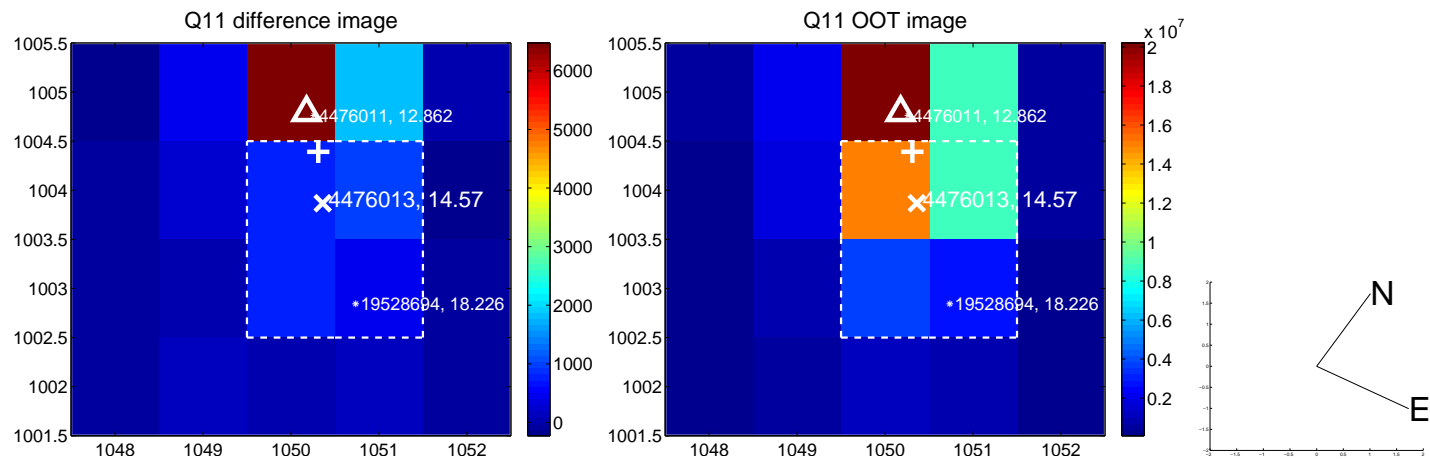
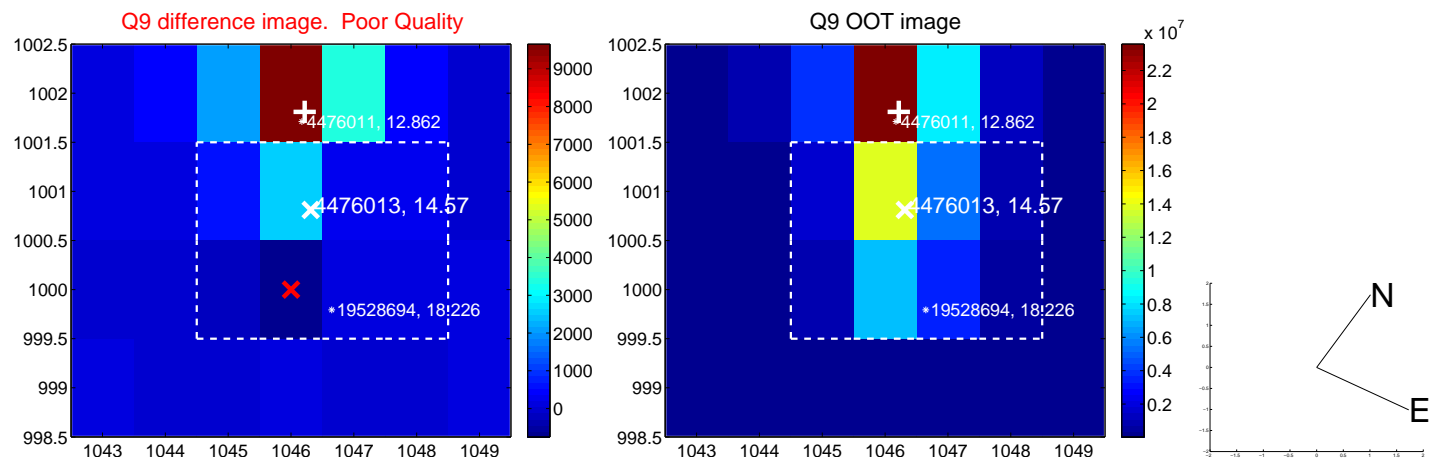


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

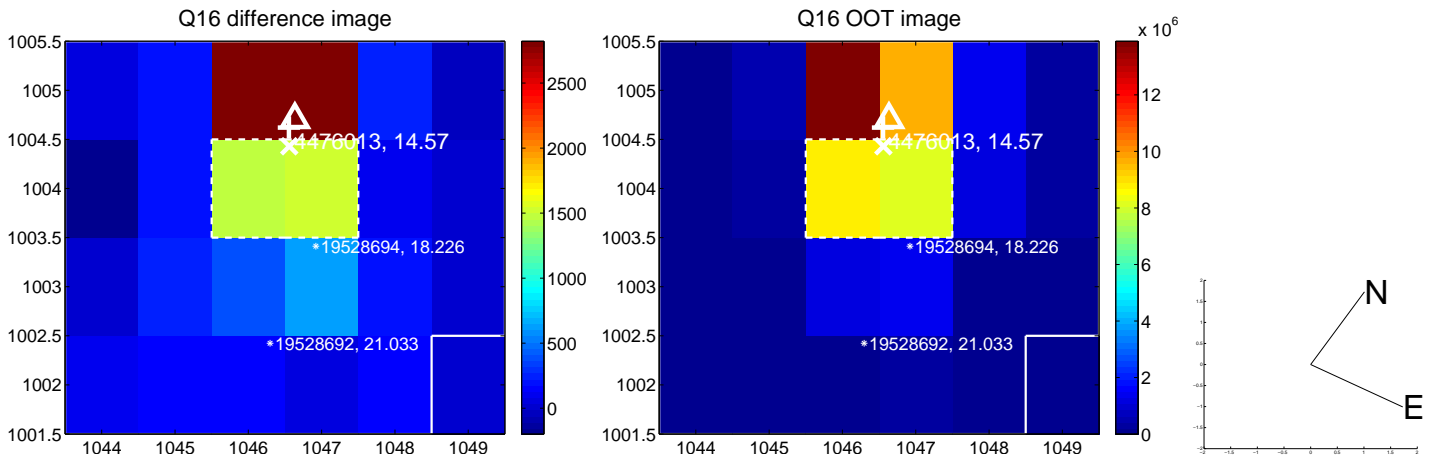
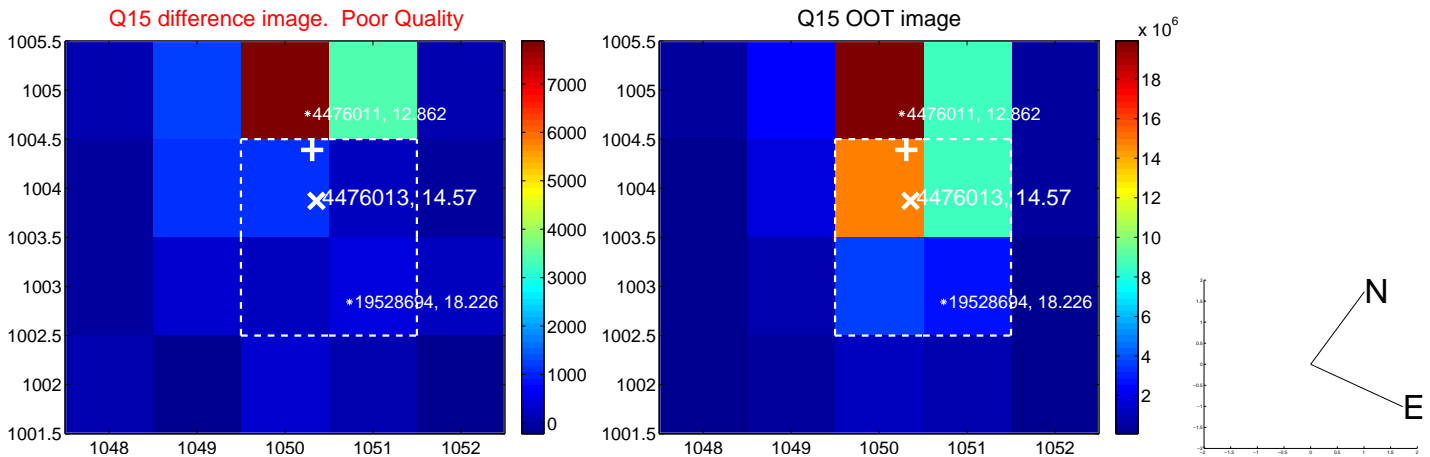
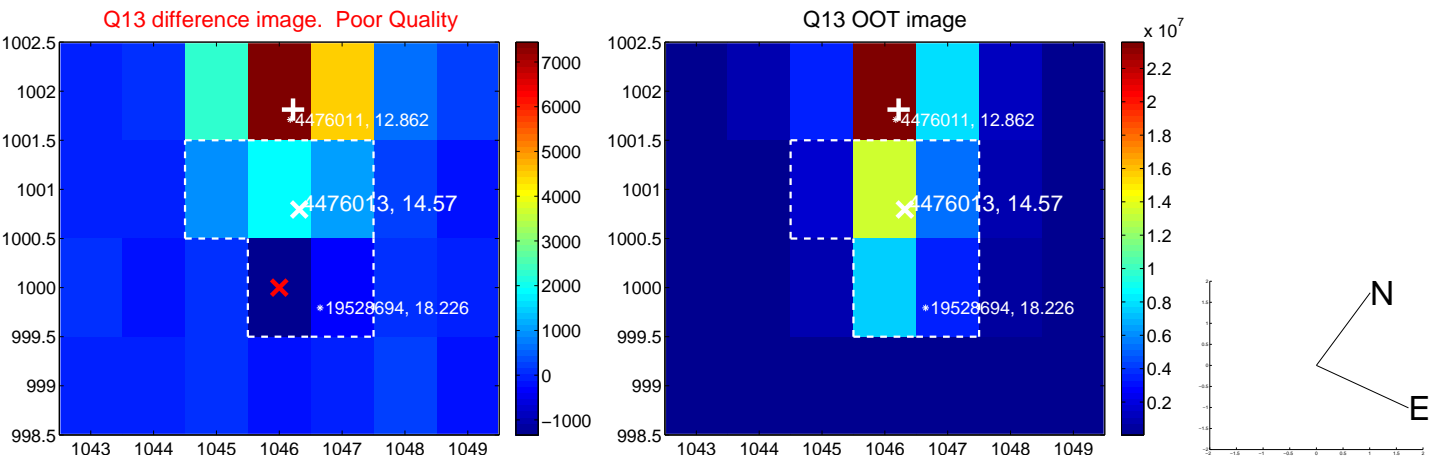
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



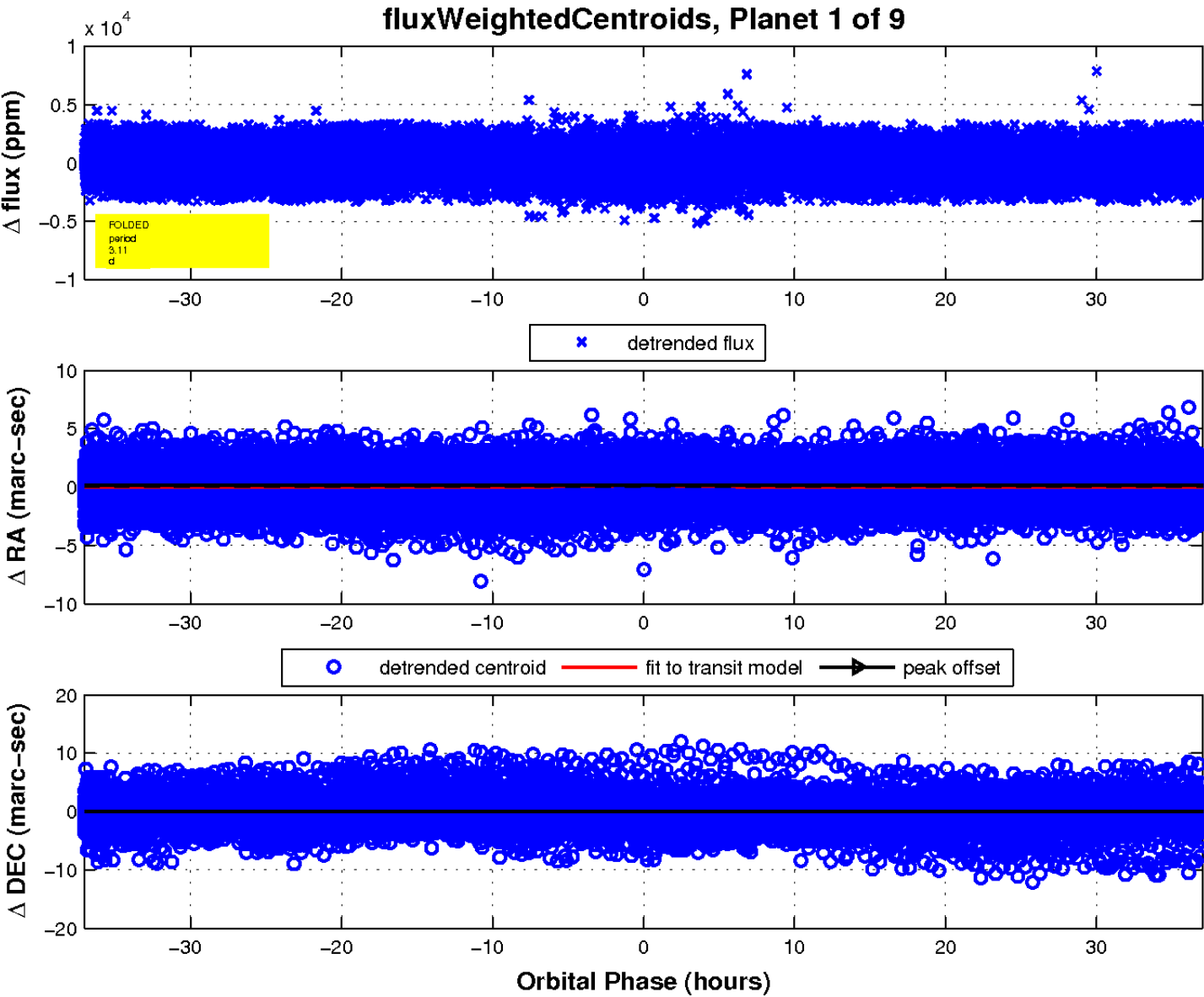
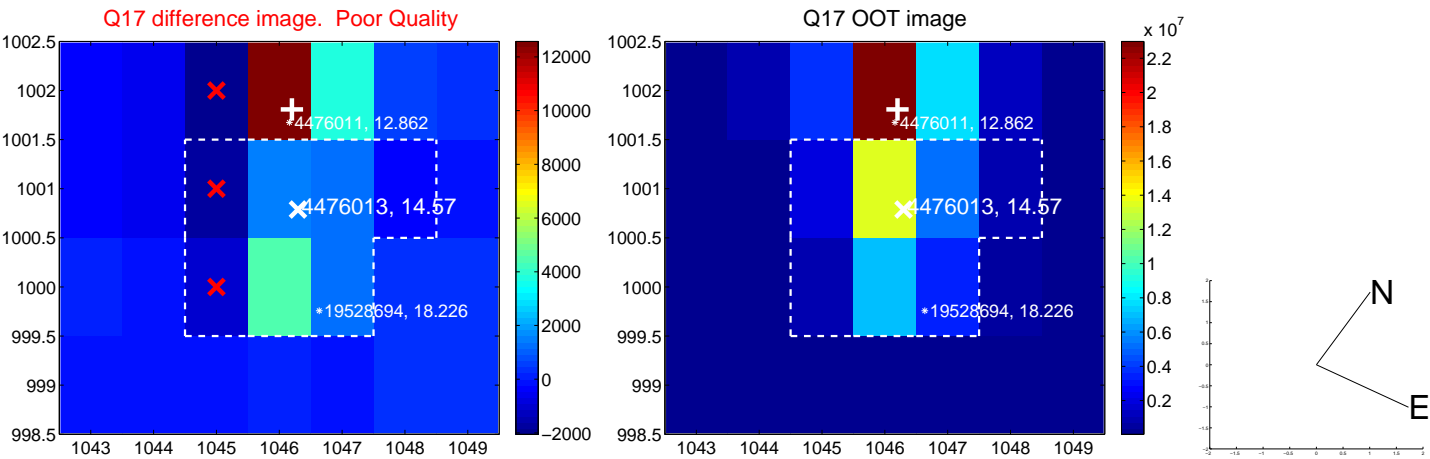
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

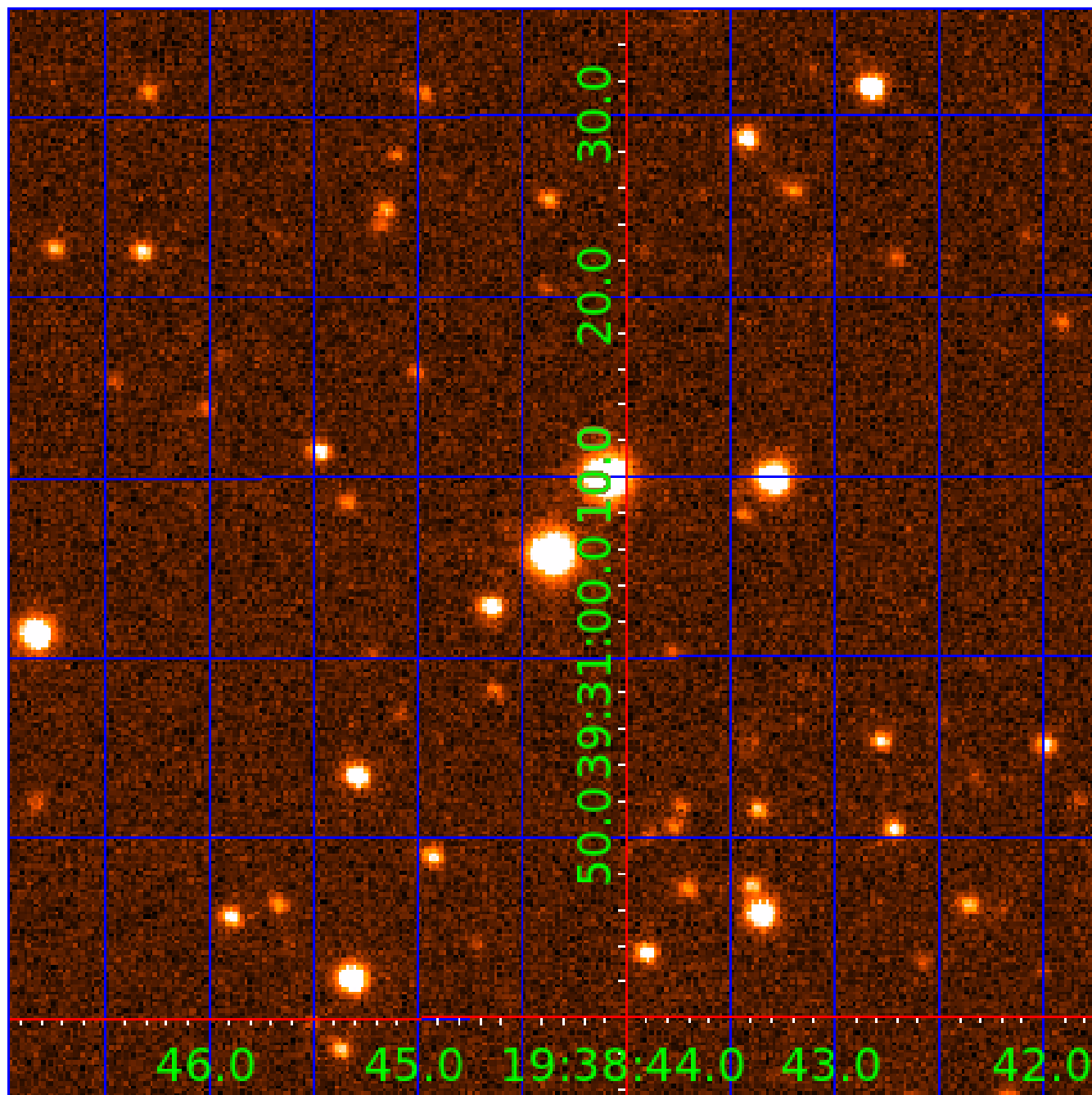


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004476013

Q1-17 DR25 TCE Parameters

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Robovetter Results

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004476013-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

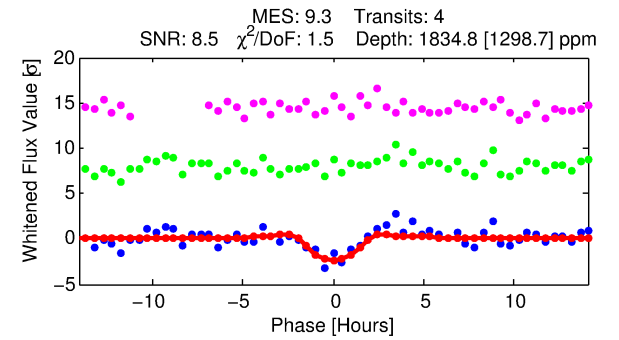
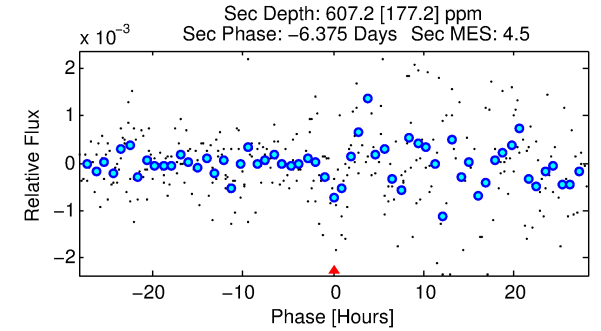
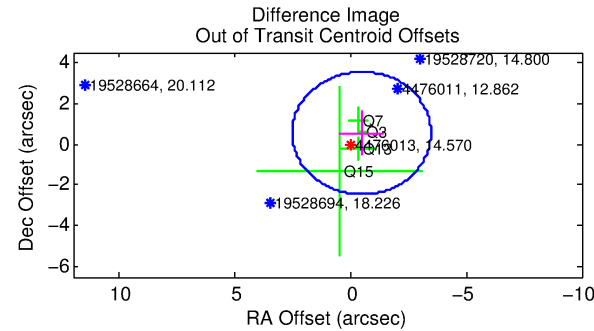
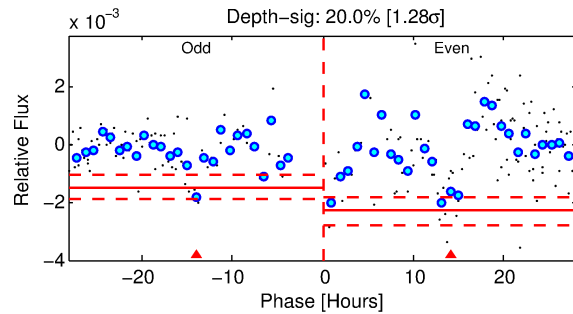
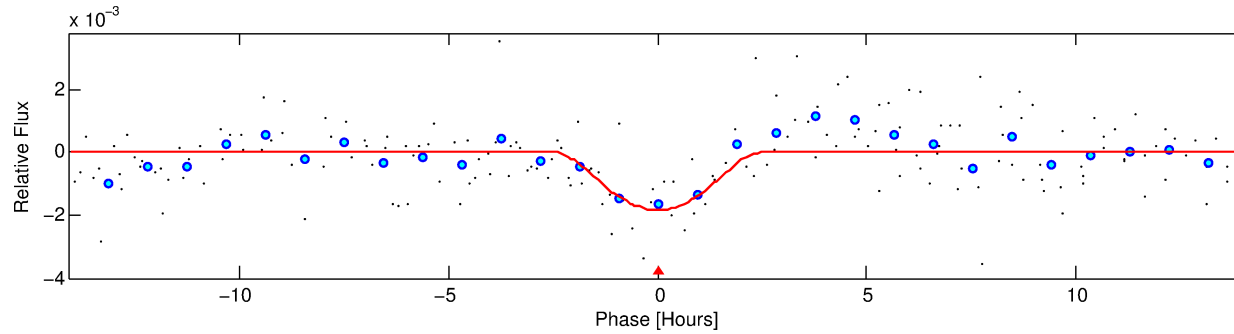
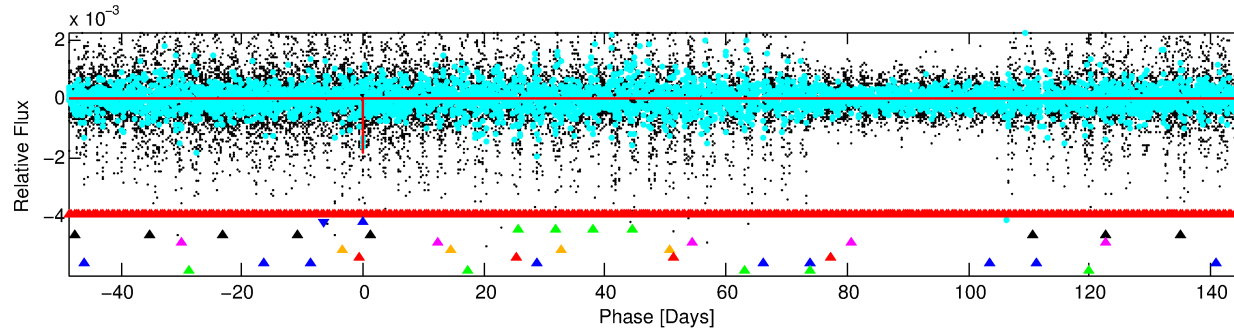
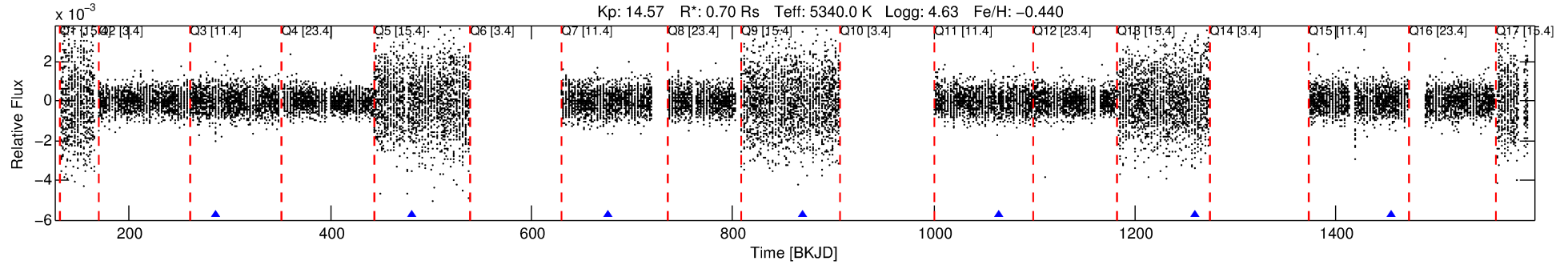
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004476013-02

No Significant Match Found

DV One-Page Summary

KIC: 4476013 Candidate: 2 of 9 Period: 194.687 d



DV Fit Results:

Period = 194.68682 [0.00356] d
Epoch = 286.3242 [0.0109] BKJD
Rp/R* = 0.0760 [0.4546]
a/R* = 125.71 [161.28]
b = 1.00 [0.68]
Seff = 0.99 [0.22]
Teq = 254 [14] K
Rp = 5.82 [34.84] Re
a = 0.6032 [0.0783] AU
Ag = 3584.64 [42896.61] [0.08 σ]
Teffp = 3040 [9095] K [0.31 σ]

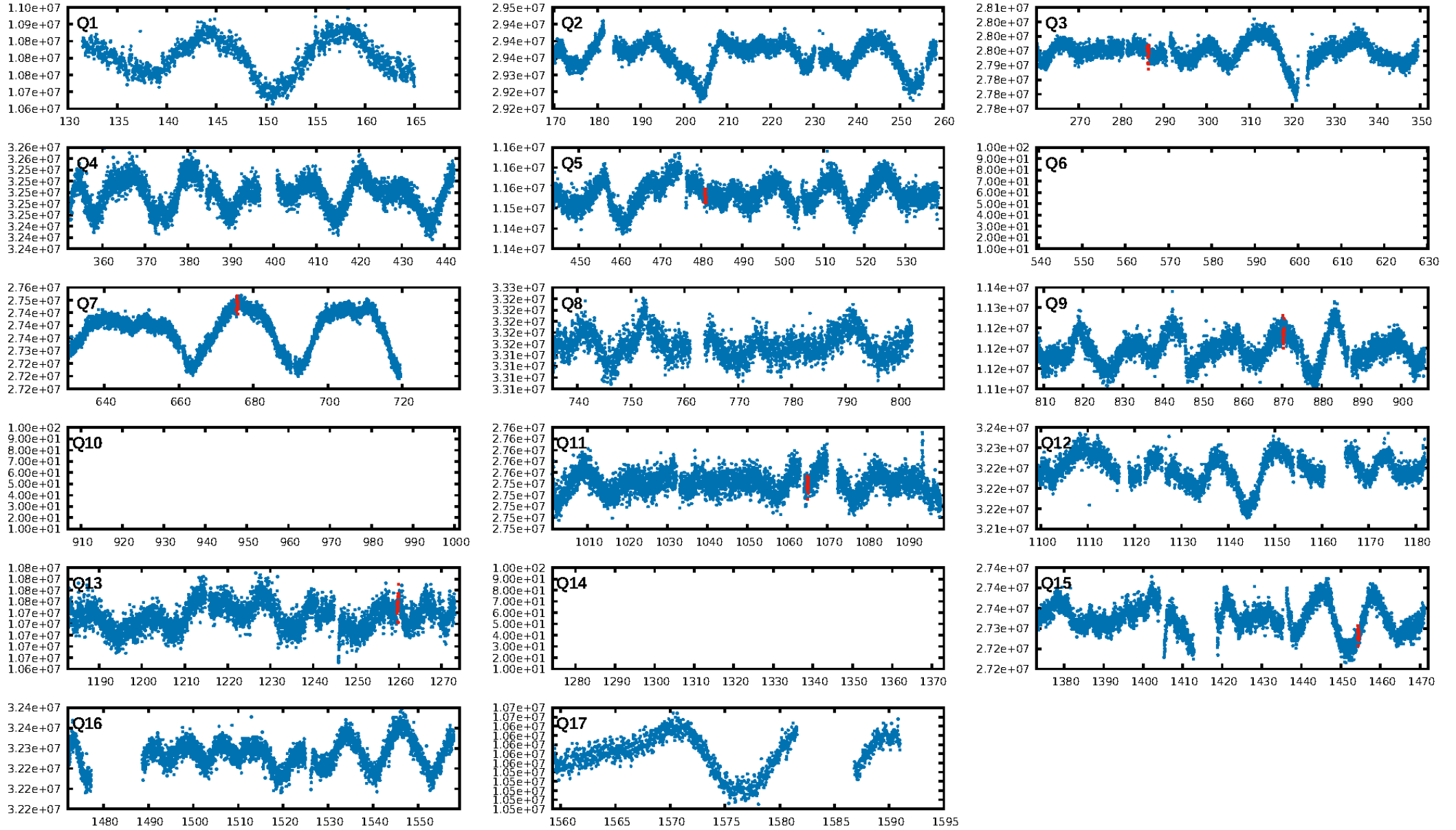
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [52.84 σ]
LongPeriod-sig: 100.0% [457.08 σ]
ModelChiSquare2-sig: 30.4%
ModelChiSquareGof-sig: 93.5%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 2.745
Centroid-sig: 22.7%
Centroid-so: 1.398 arcsec [3.50 σ]
OotOffset-rm: 0.719 arcsec [0.72 σ]
KicOffset-rm: 3.101 arcsec [3.06 σ]
OotOffset-st: 0/3/0/1 [4]
KicOffset-st: 0/3/0/1 [4]
DiffImageQuality-fgm: 0.50 [2/4]
DiffImageOverlap-fno: 0.67 [4/6]

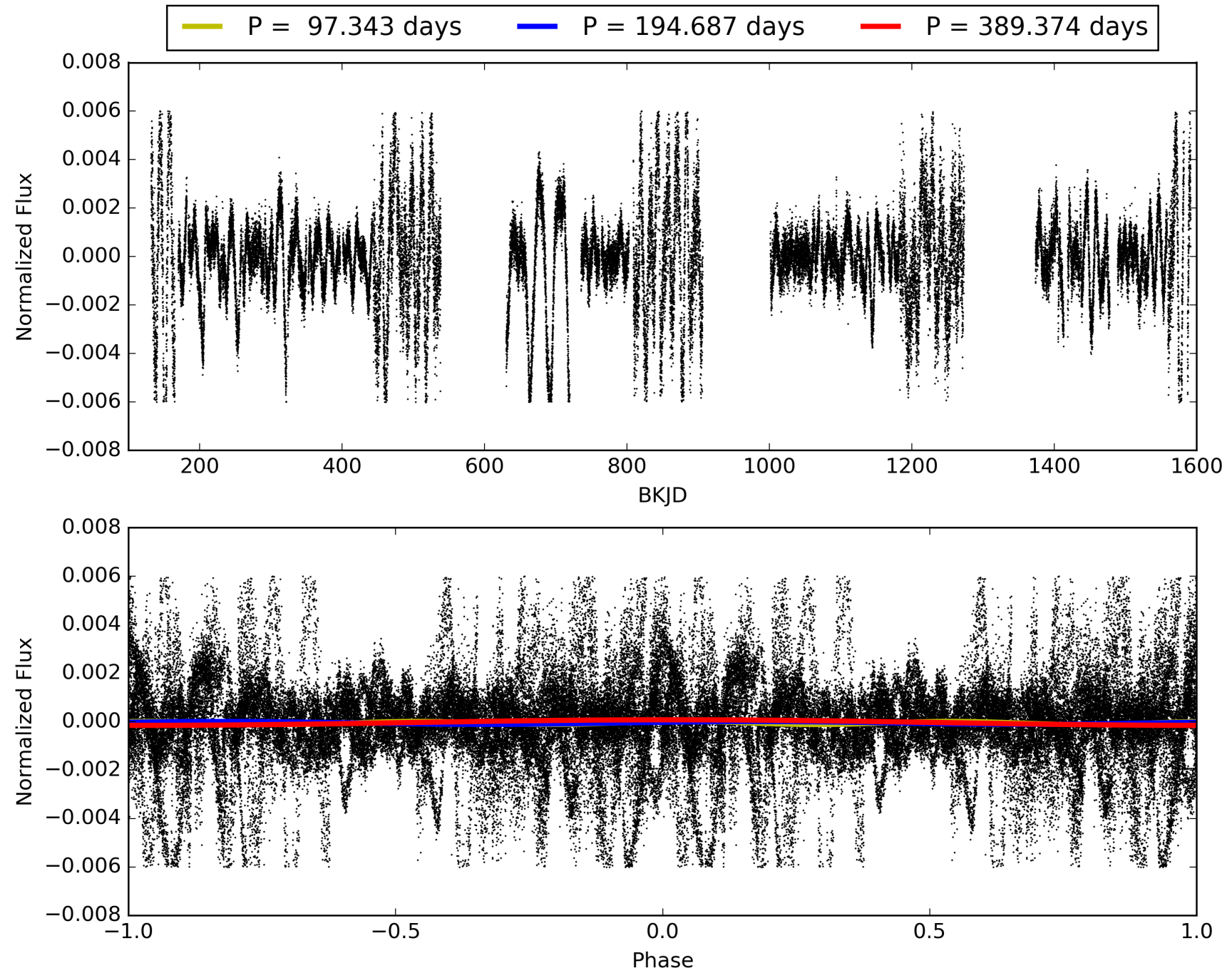
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:37:06 Z

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

TCE 004476013-02, PDC Light Curves

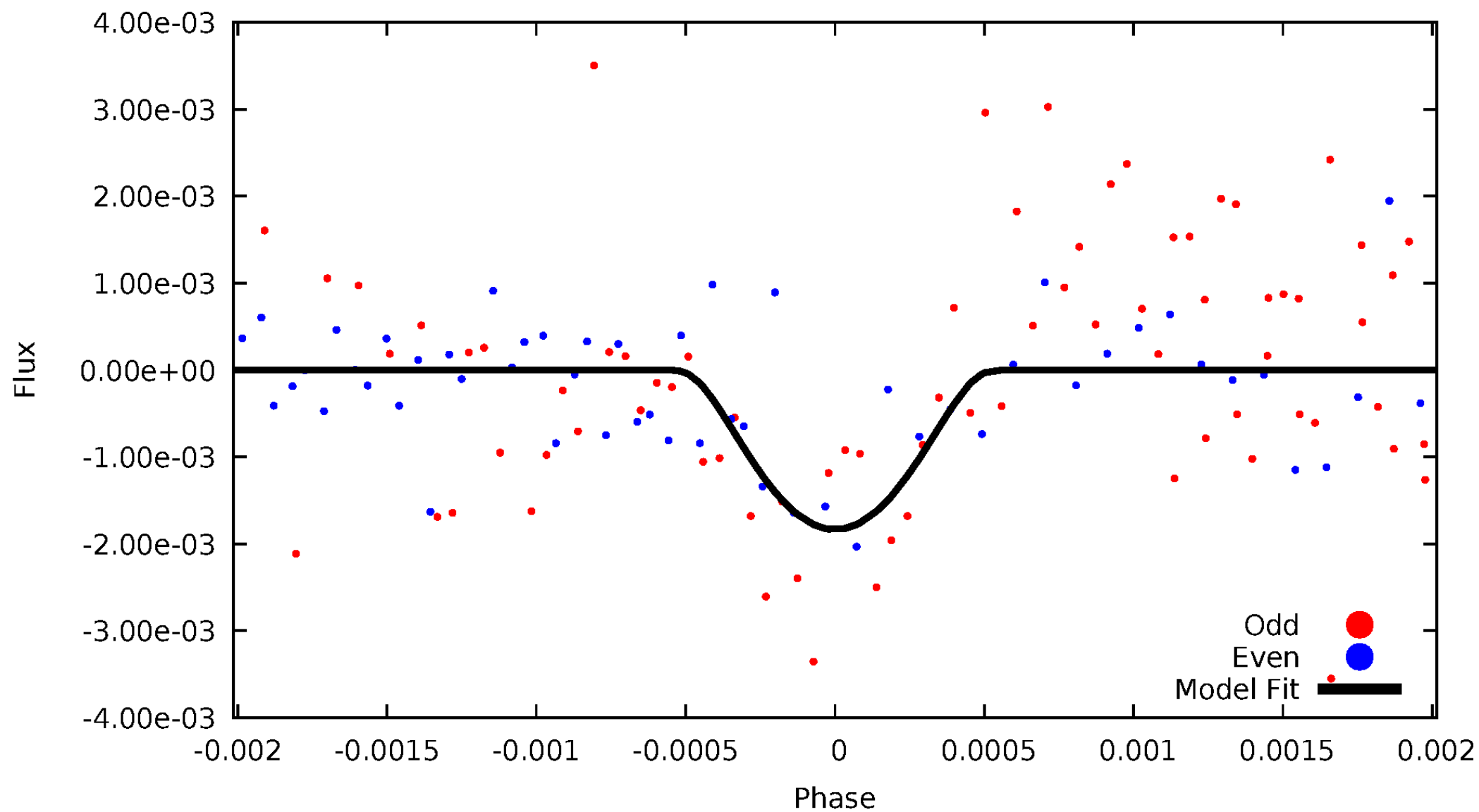


TCE 004476013-02



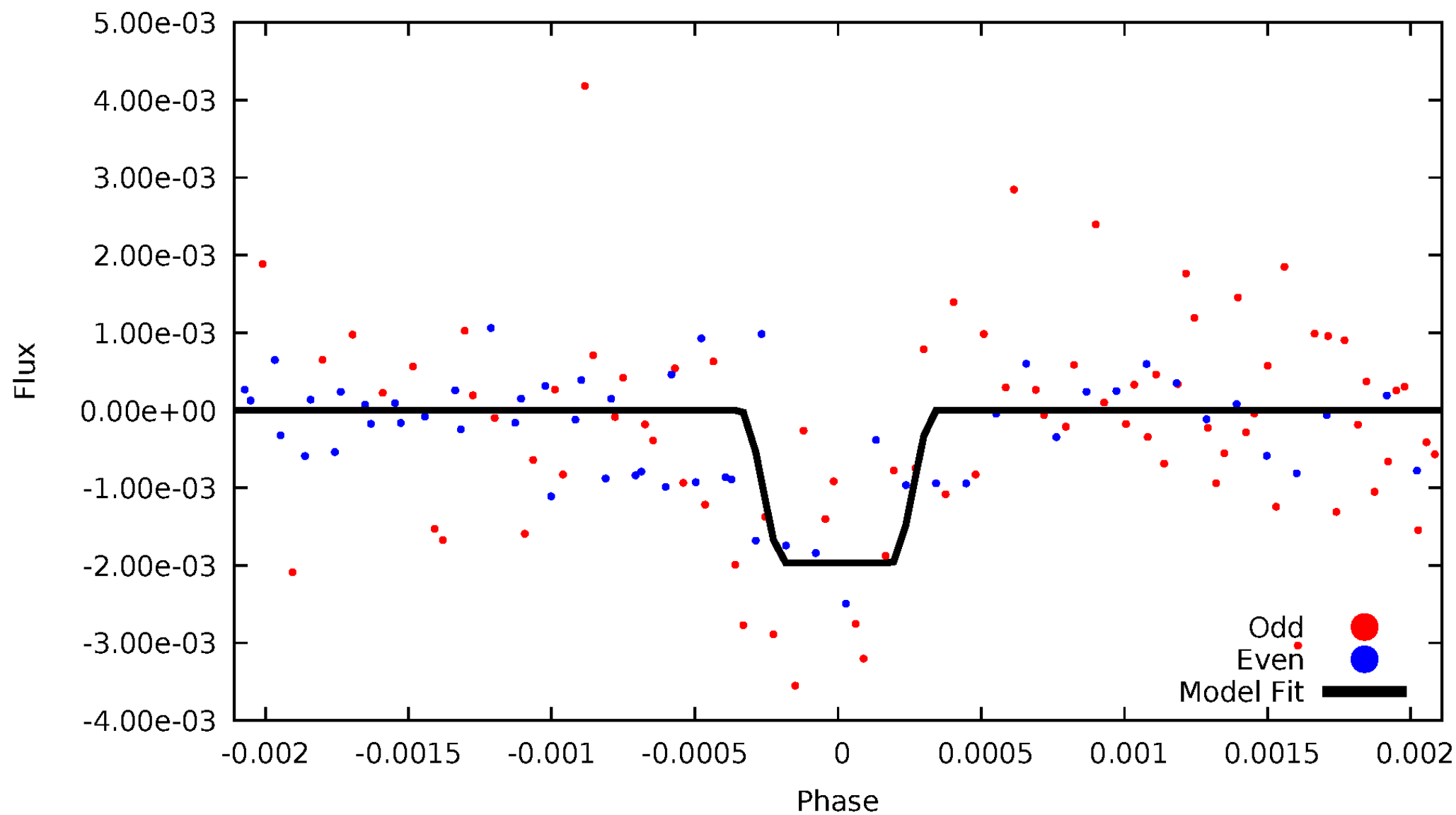
DV Odd/Even

TCE 004476013-02



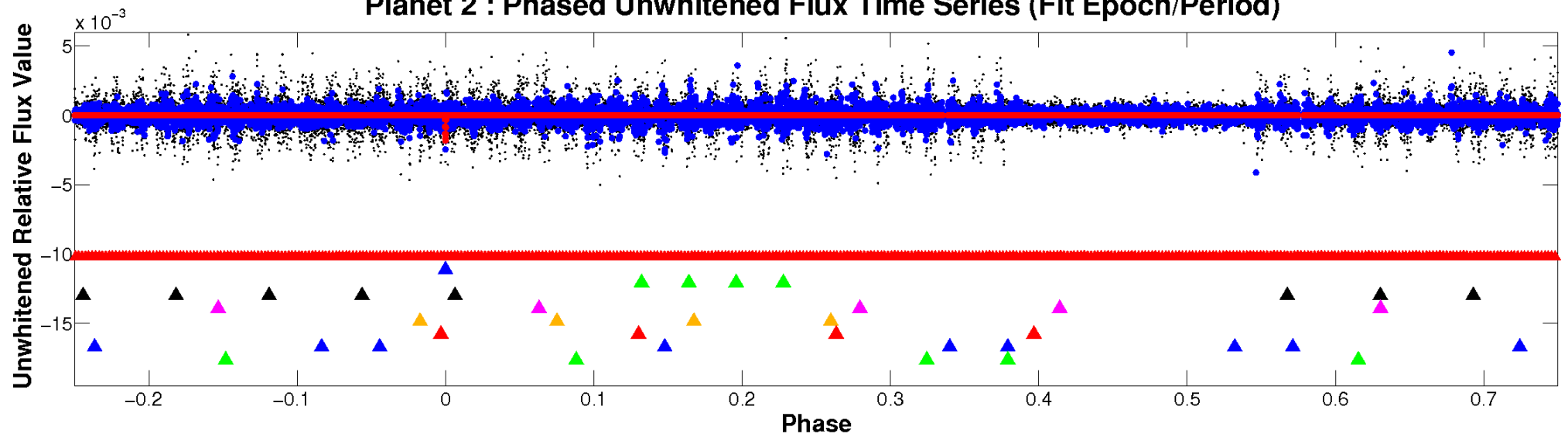
ALT Odd/Even

TCE 004476013-02

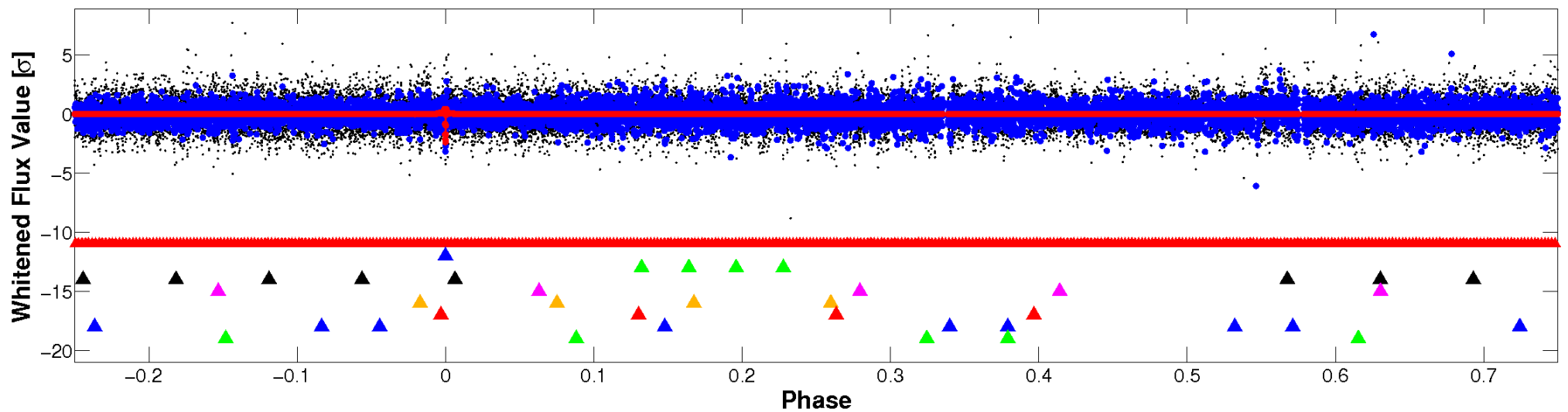


Non-Whitened Vs. Whitened Light Curve

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

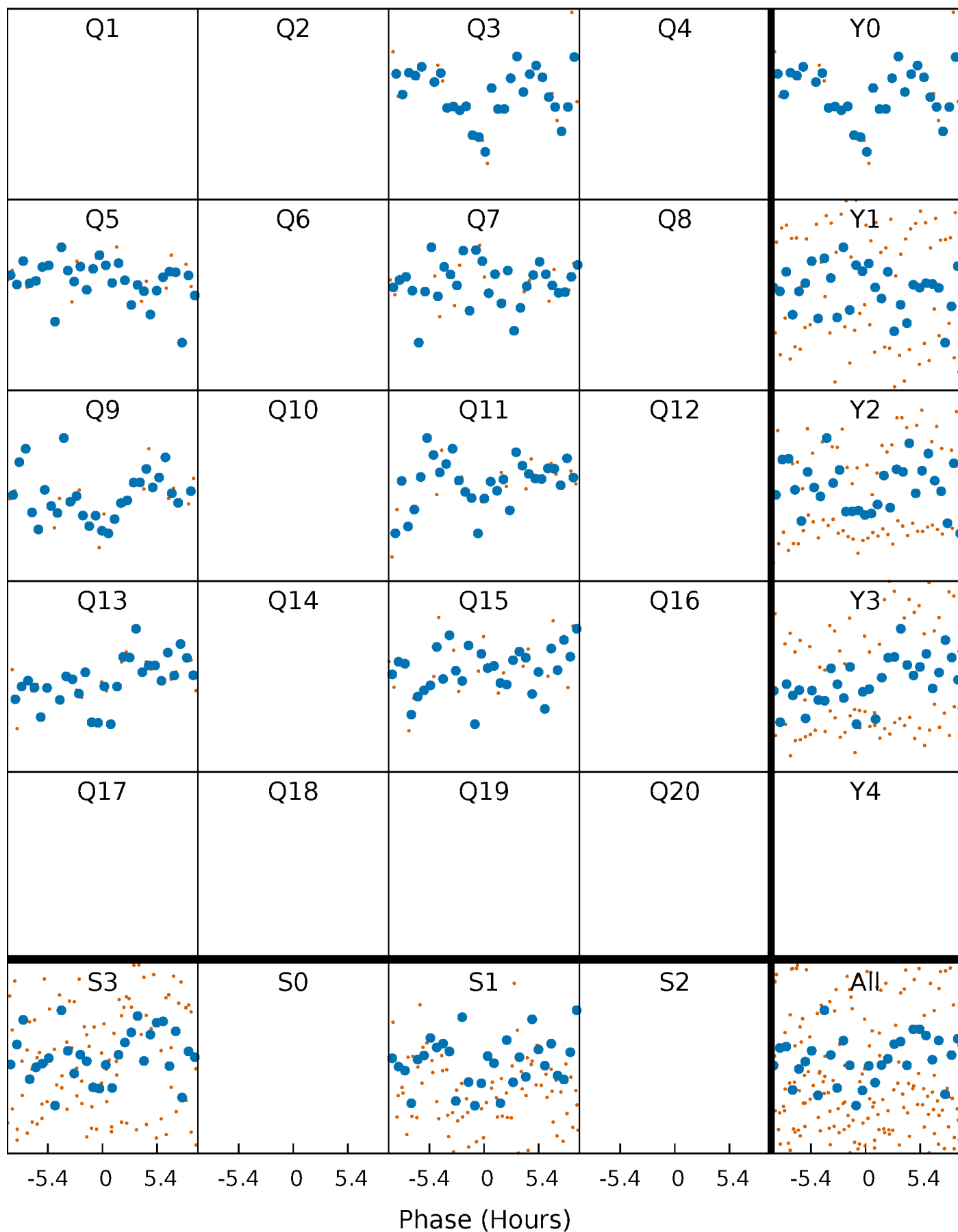


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



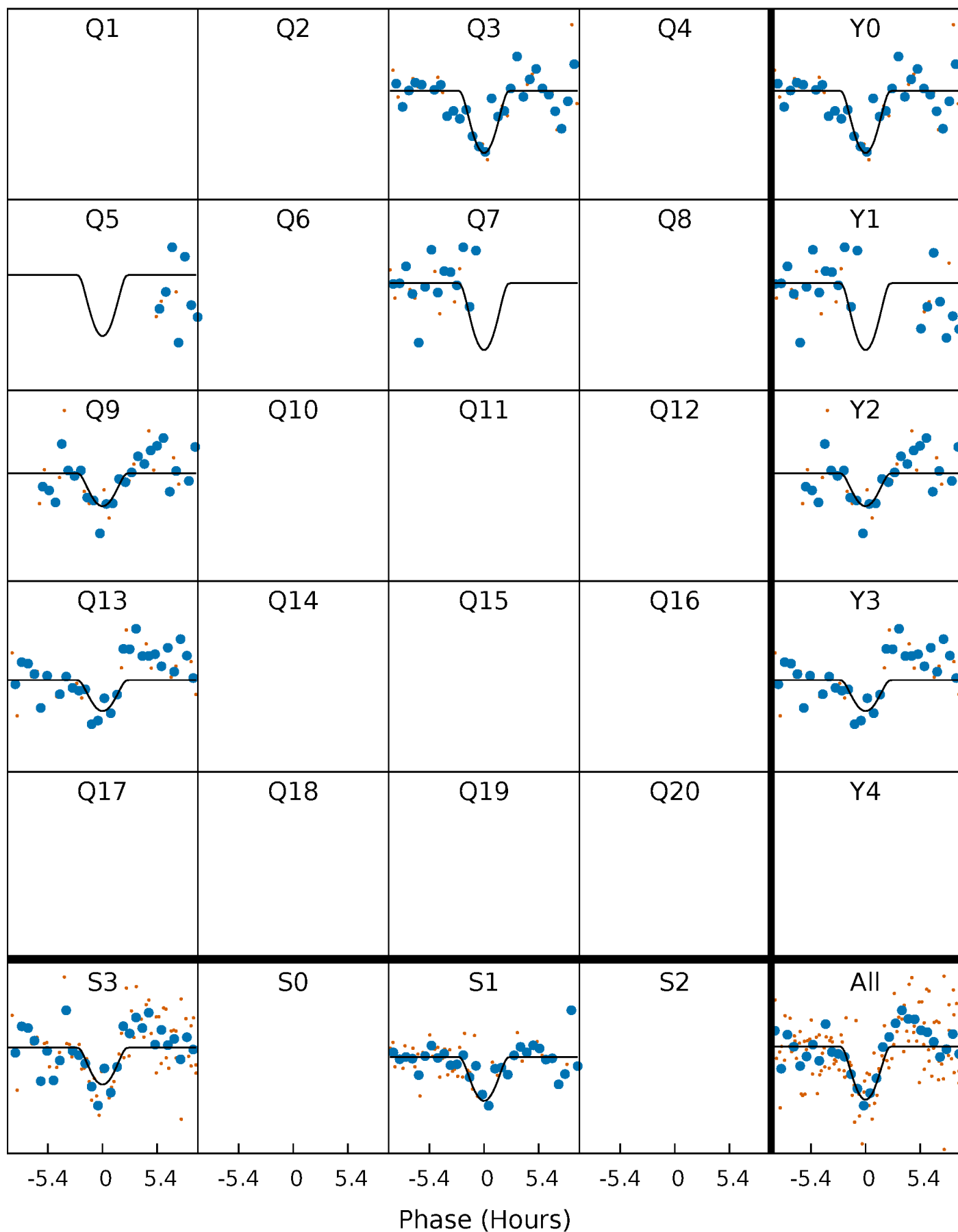
PDC Quarter-Phased Transit Curves

TCE 004476013-02 P=194.686815 Days $T_0=286.324219$ (BKJD)



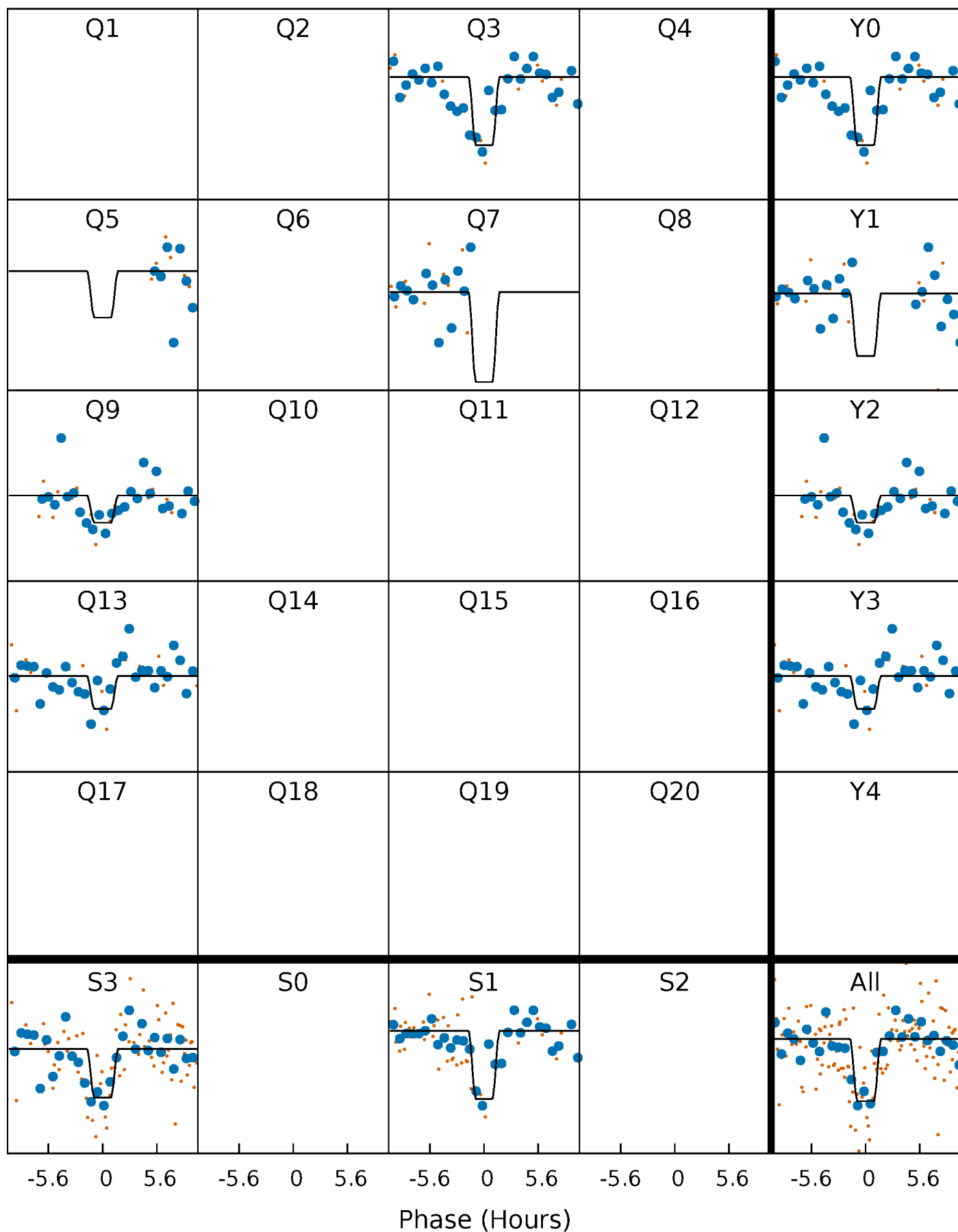
DV Quarter-Phased Transit Curves

TCE 004476013-02 P=194.686815 Days $T_0=286.324219$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

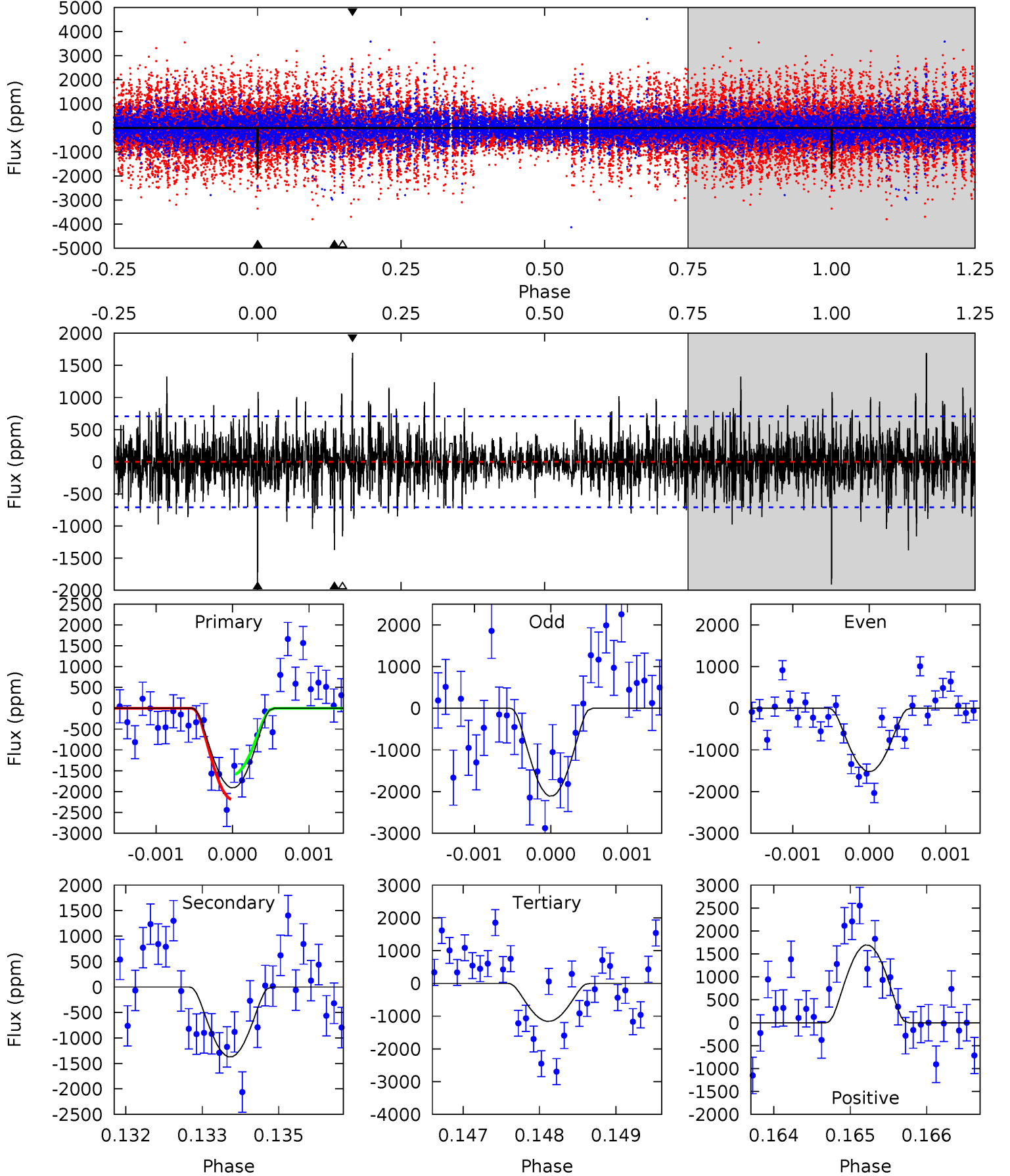
TCE 004476013-02 P=194.688934 Days $T_0=286.332915$ (BKJD)



DV Model-Shift Uniqueness Test

004476013-02, P = 194.686815 Days, E = 91.637404 Days

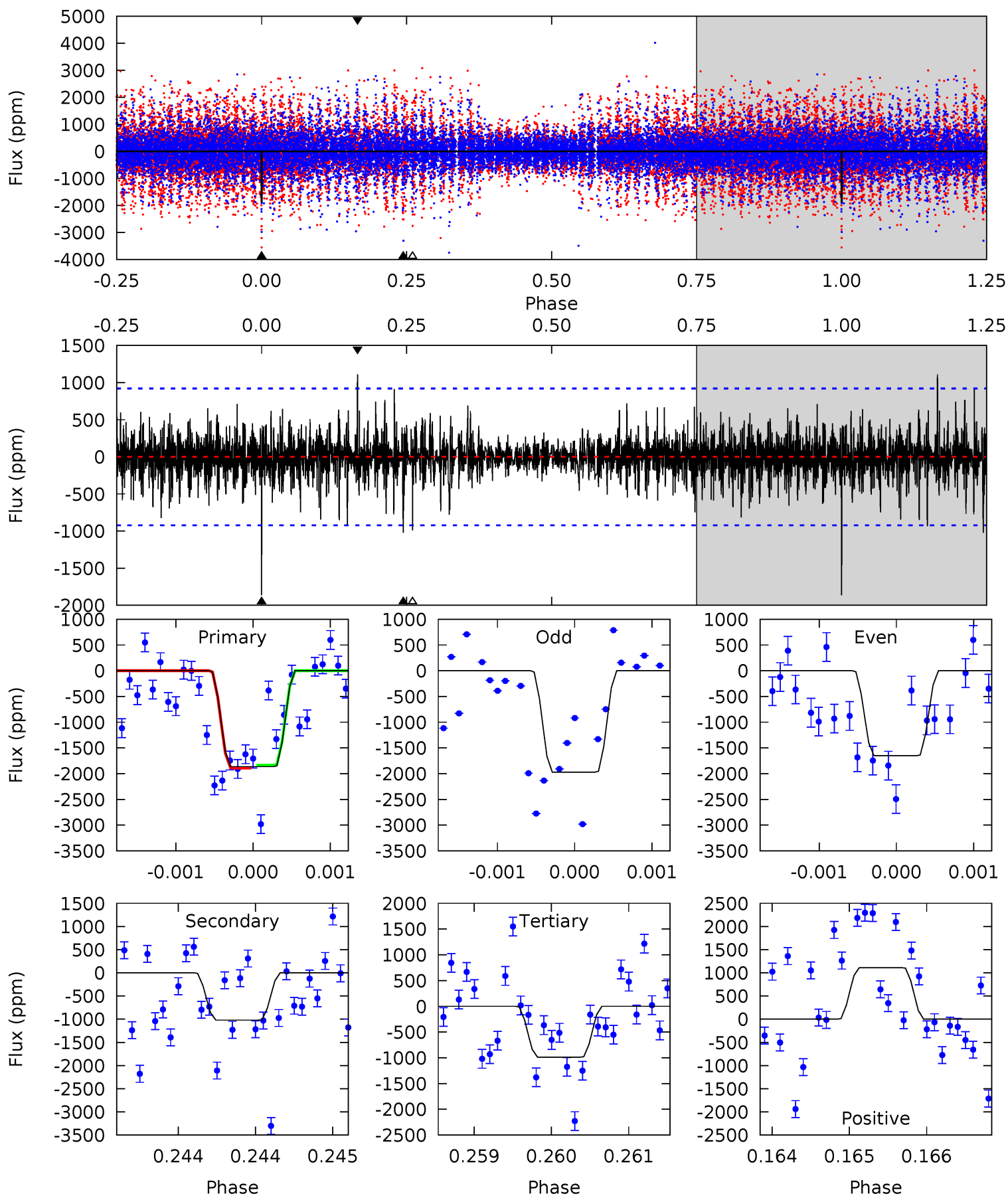
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.7	10.6	8.91	13.0	5.45	3.29	2.12	5.78	1.65	1.64	-2.49	2.02	0.74	0.47	2.34



Alt Model-Shift Uniqueness Test

004476013-02, $P = 194.688934$ Days, $E = 91.643981$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.2	6.12	5.93	6.67	5.53	3.42	1.17	5.25	4.52	0.19	-0.54	0.83	1.13	0.37	0.16



Stellar Parameters For KIC 004476013

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5340^{+160}_{-144}	$4.633^{+0.032}_{-0.097}$	$-0.440^{+0.300}_{-0.300}$	$0.702^{+0.112}_{-0.048}$	$0.783^{+0.076}_{-0.084}$	$3.193^{+0.519}_{-1.000}$
	+3%/-3%	+1%/-2%	+68%/-68%	+16%/-7%	+10%/-11%	+16%/-31%
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 004476013-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-1371 ± 130	$27.00^{+27.55}_{-17.59}$	360^{+14}_{-13}	2582^{+861}_{-416}	374^{+2720}_{-285}
Alt.	-1020 ± 167	$23.94^{+25.48}_{-16.24}$	360^{+14}_{-14}	2536^{+957}_{-390}	351^{+3016}_{-273}

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

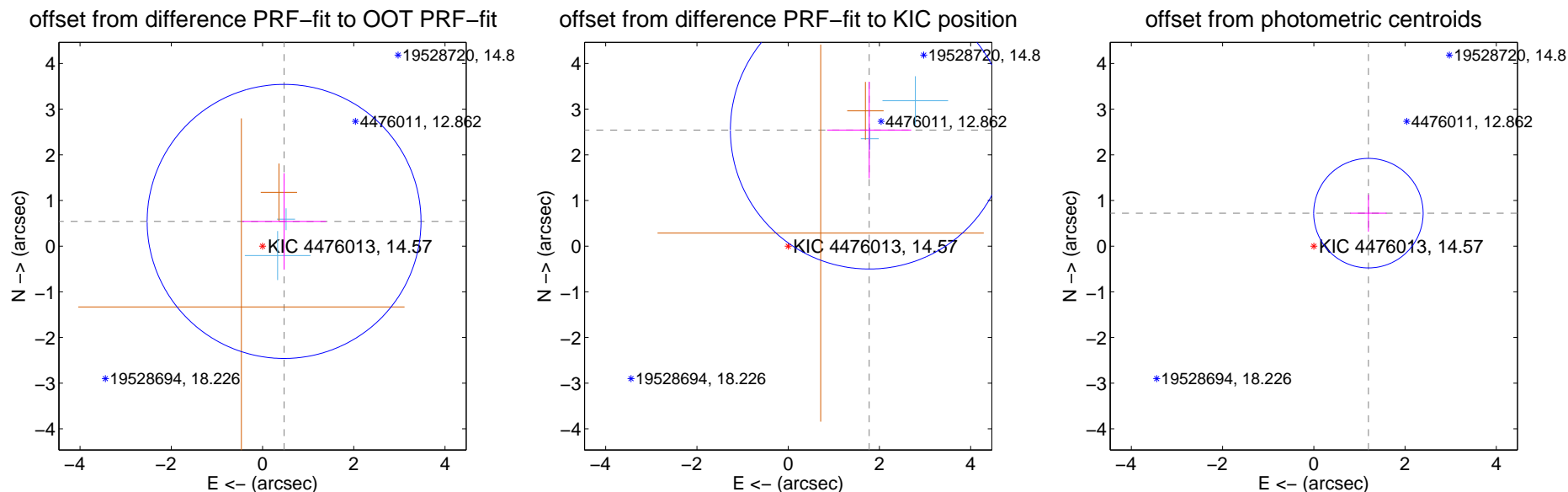
DV Centroid Data

Supplemental centroid analysis for 004476013-02. Kepler magnitude: 14.57. Transit SNR 8.54

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 2.00 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.719 ± 1.000	0.72	-0.472 ± 0.921	0.541 ± 1.057
PRF-fit source offset from KIC position	3.101 ± 1.014	3.06	-1.776 ± 0.921	2.542 ± 1.057
photometric centroid source offset	1.40 ± 0.40	3.50	-1.20 ± 0.40	0.72 ± 0.40



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

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

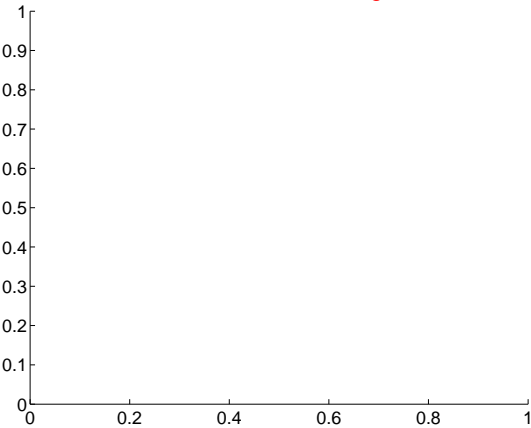
Q1 no difference image



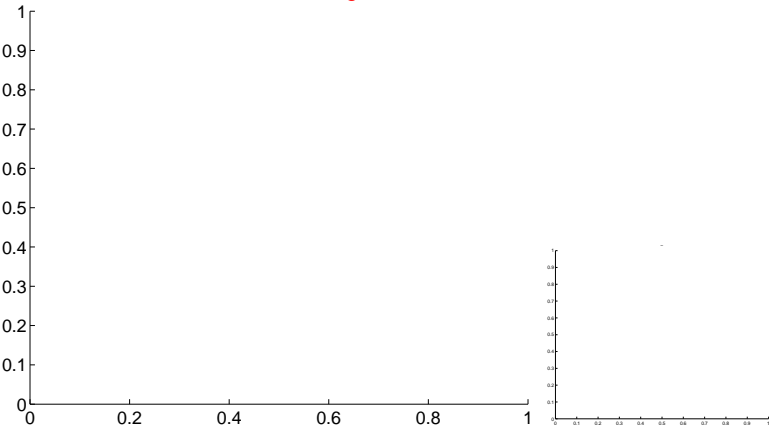
Q1 no OOT image



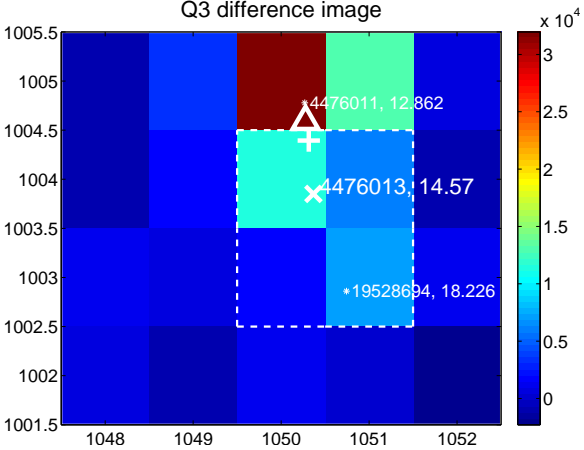
Q2 no difference image



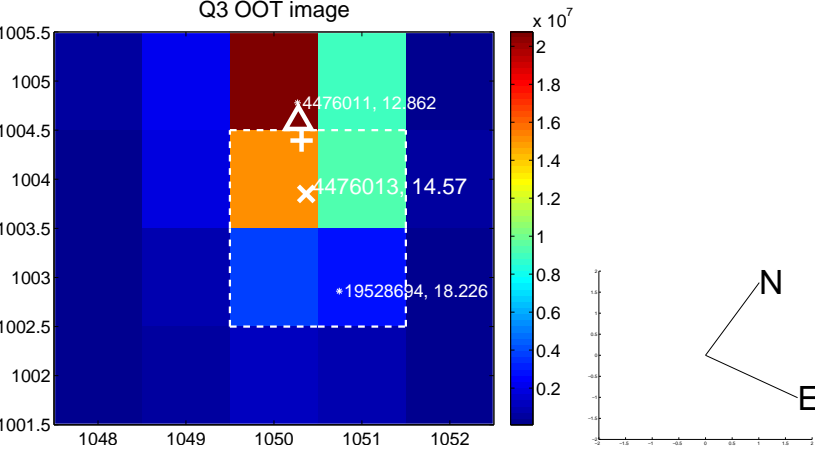
Q2 no OOT image



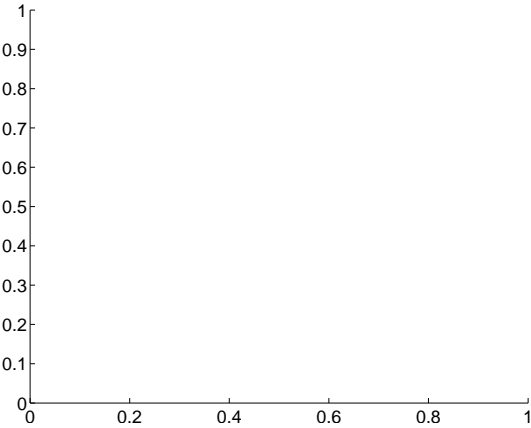
Q3 difference image



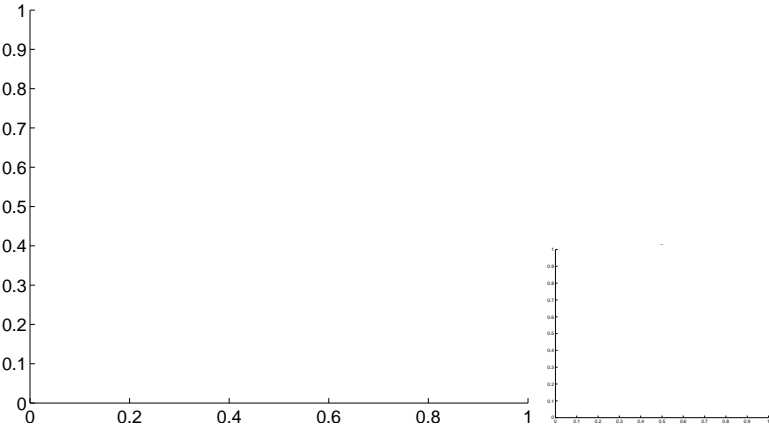
Q3 OOT image



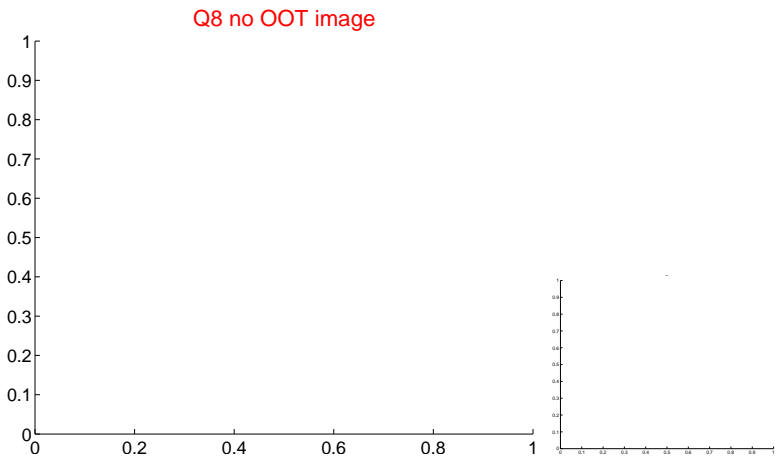
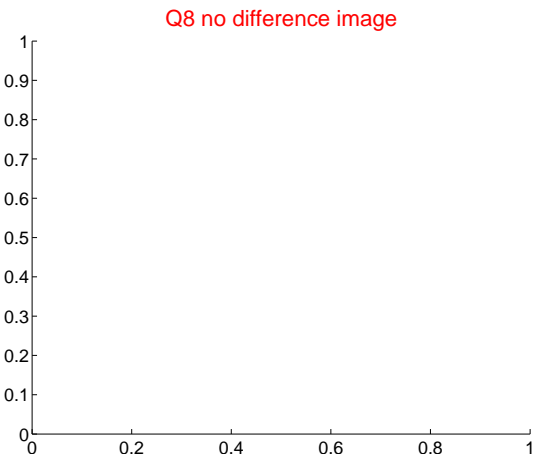
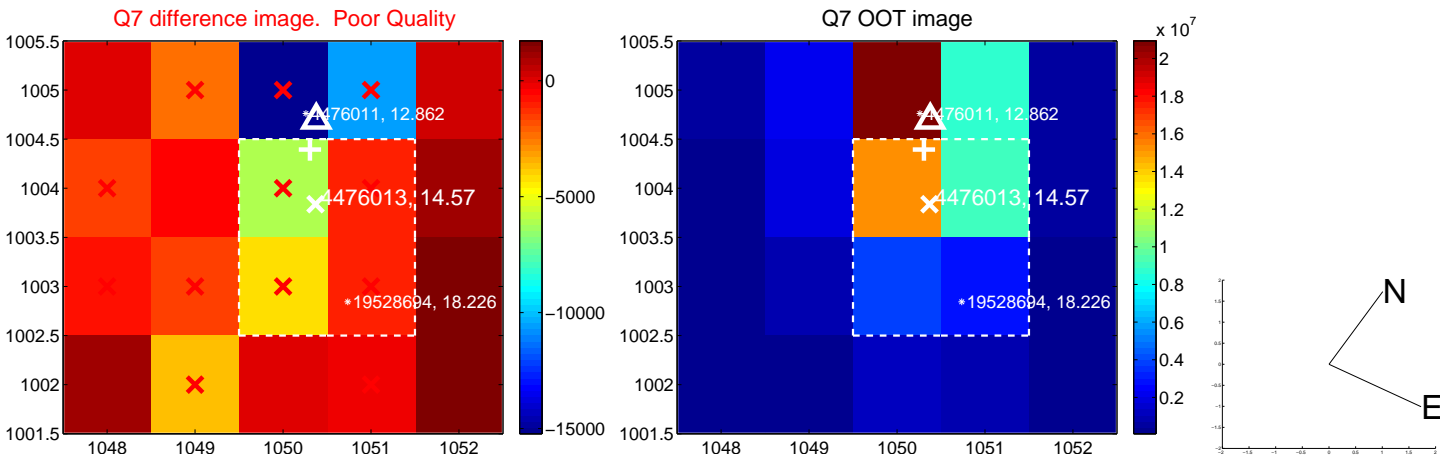
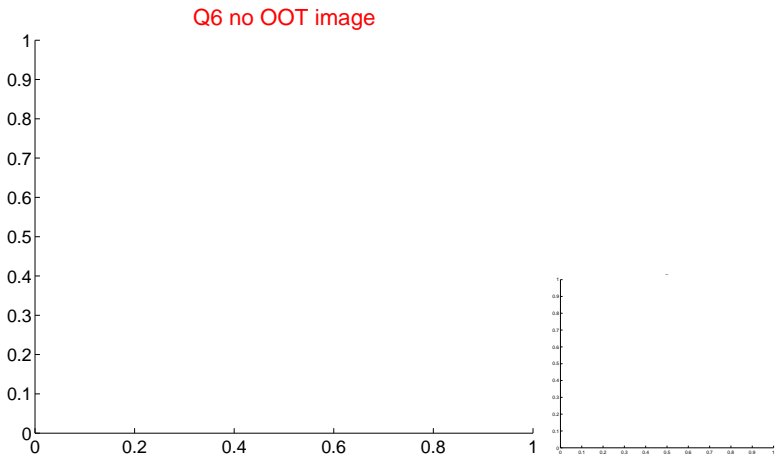
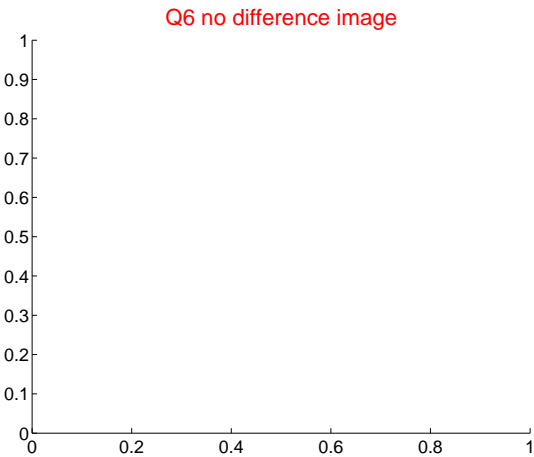
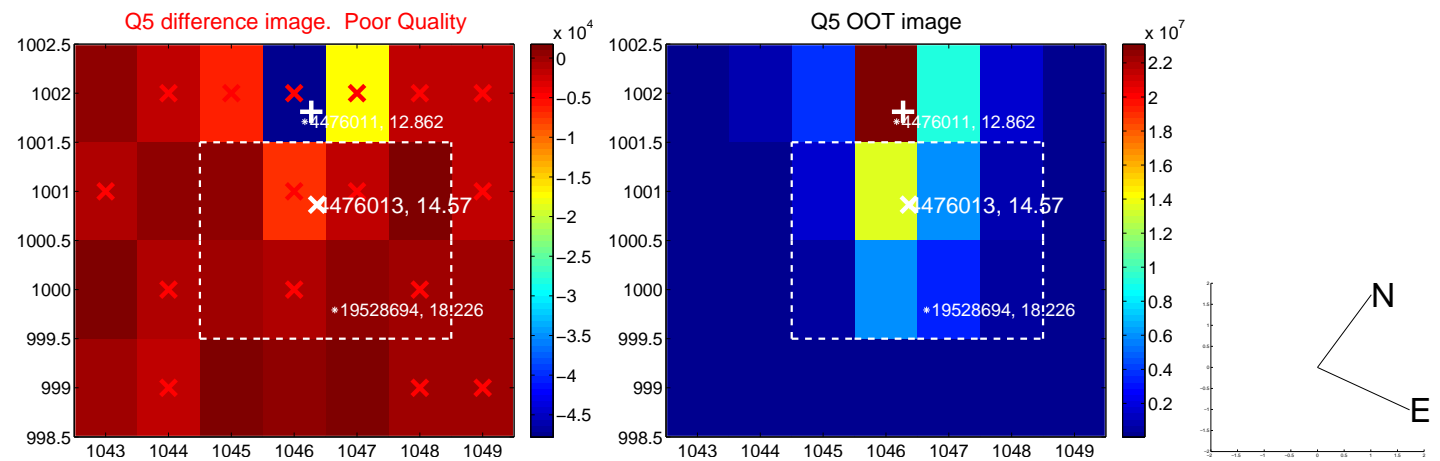
Q4 no difference image



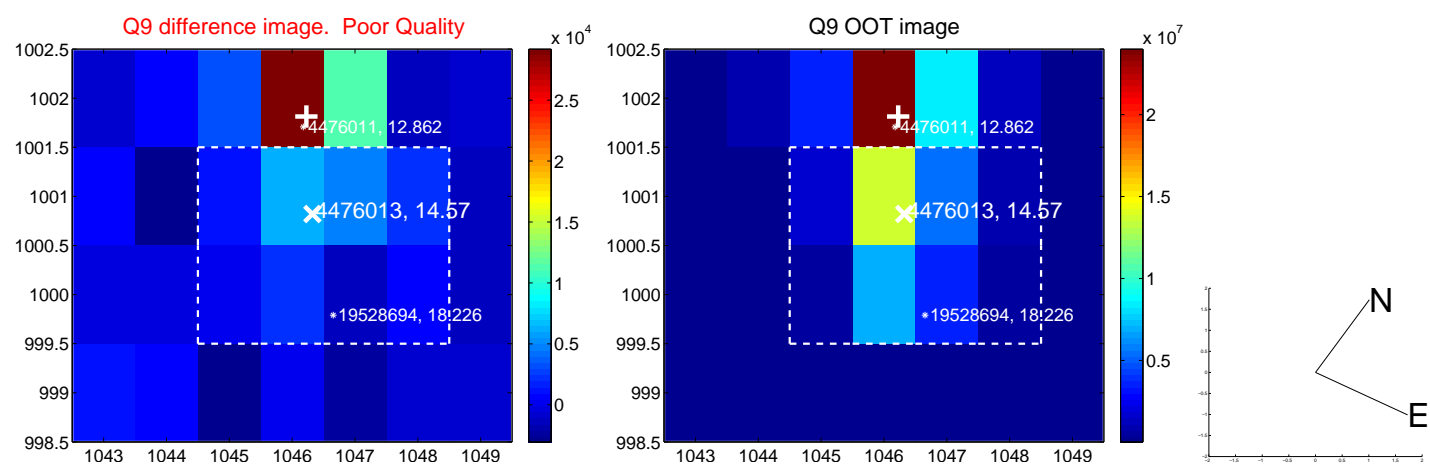
Q4 no OOT image



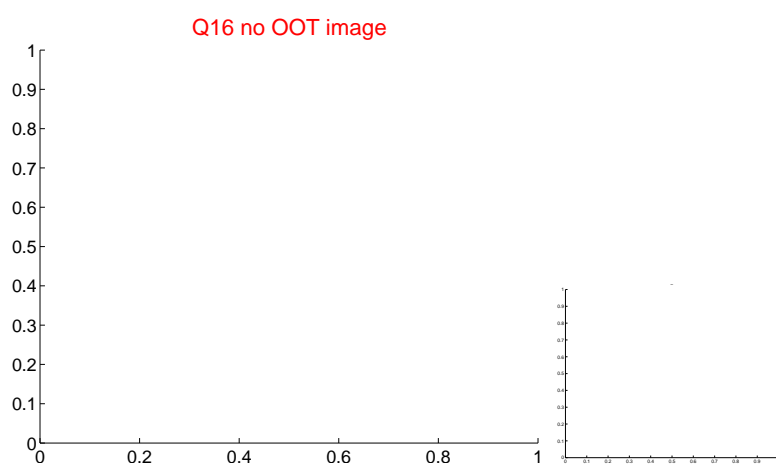
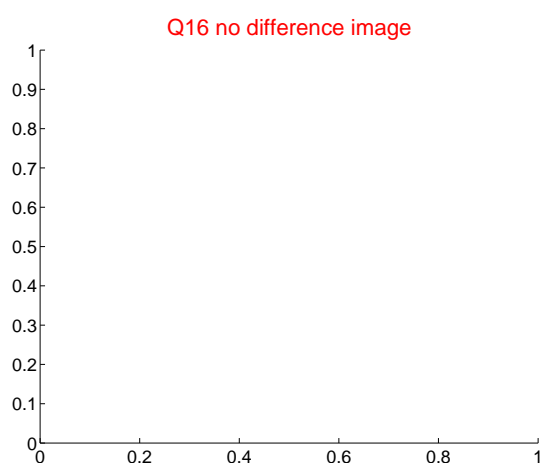
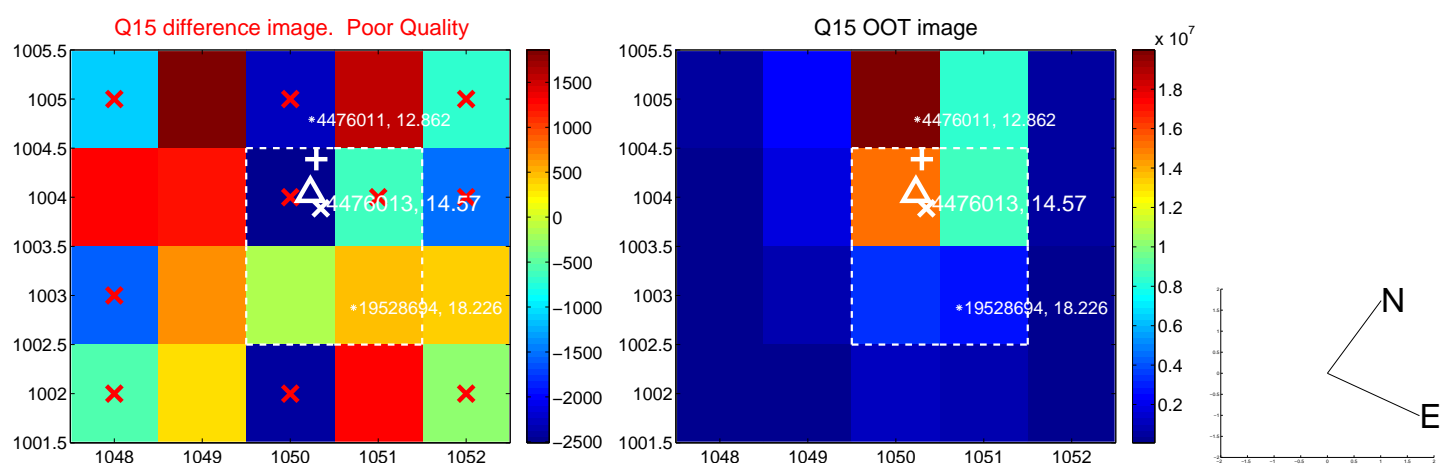
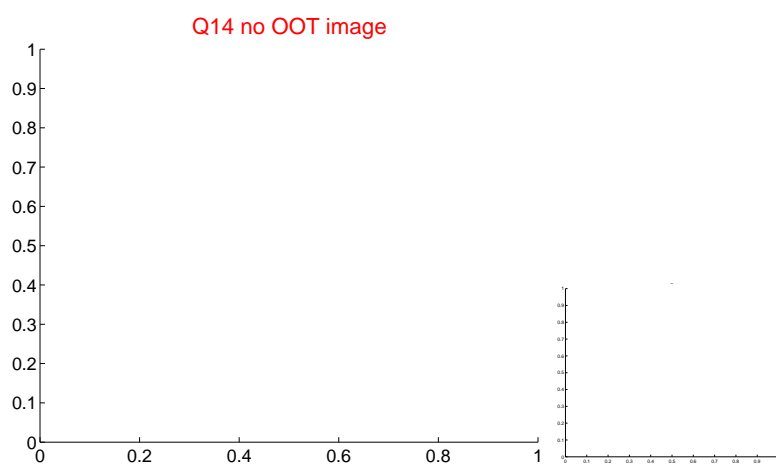
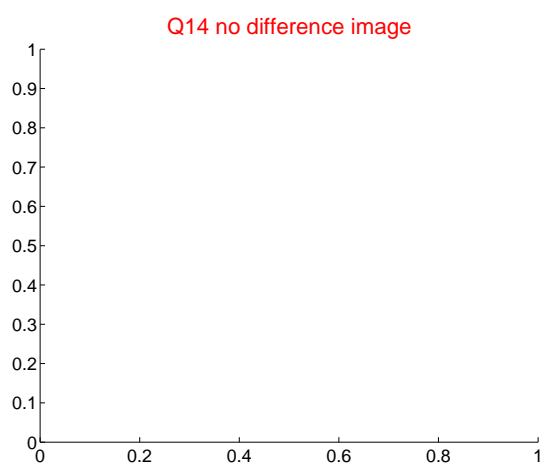
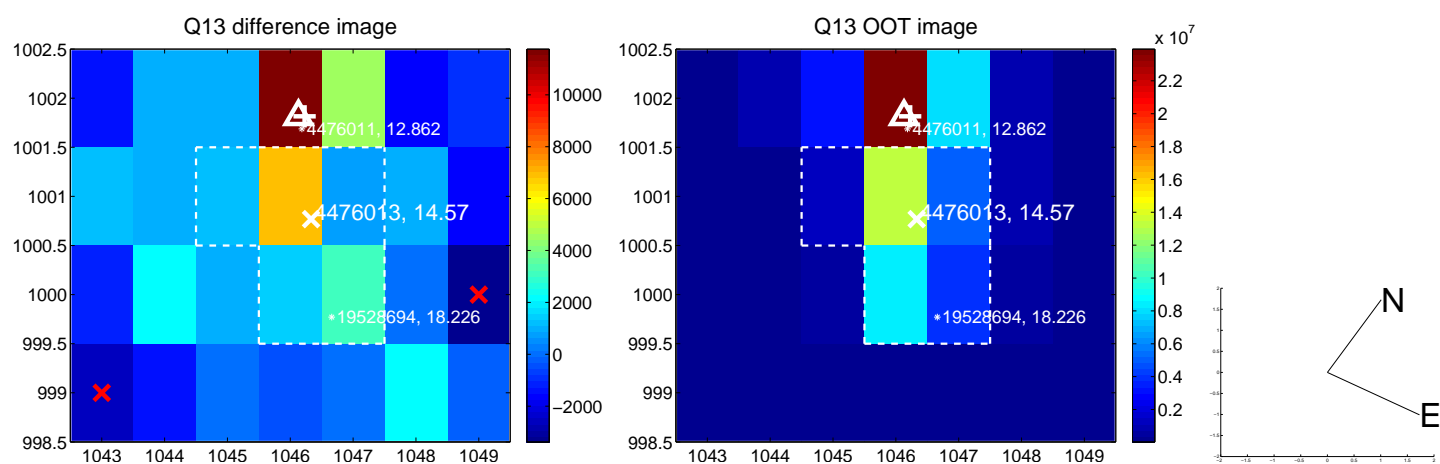
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



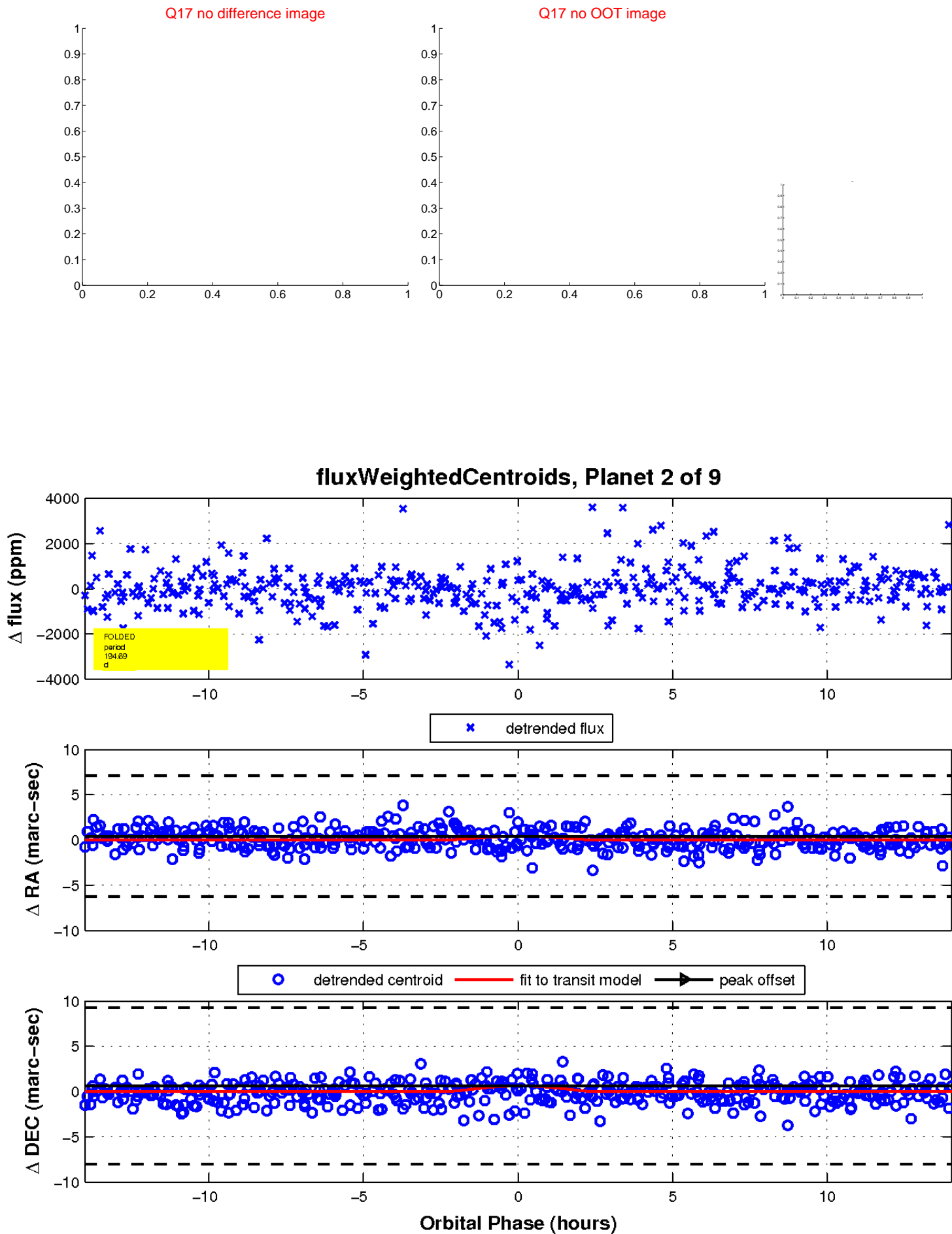
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

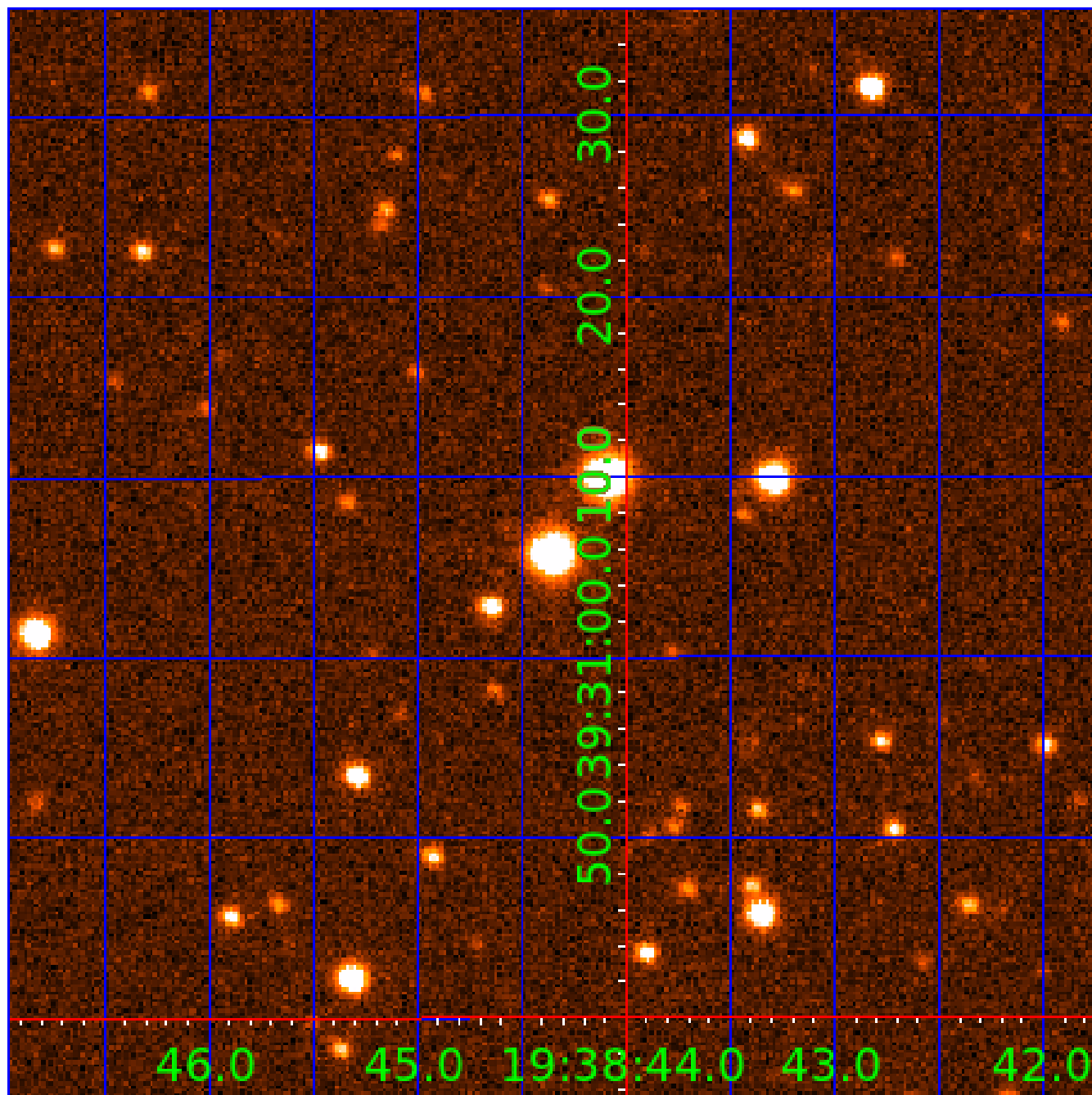


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004476013

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})
004476013-01	OBS	No	3.111300	131.965214	87.6	12.343	7.9	7.2	0.70	5340	0.65	245.11
004476013-02	OBS	No	194.686816	286.324219	1834.8	4.706	9.3	8.5	0.70	5340	5.82	0.99
004476013-03	OBS	No	383.171892	135.986790	2122.1	7.624	8.9	7.9	0.70	5340	3.31	0.40
004476013-04	OBS	No	182.482170	287.571257	1122.5	2.928	8.6	7.9	0.70	5340	2.52	1.08
004476013-05	OBS	No	347.259060	146.038192	2401.0	6.883	8.6	9.7	0.70	5340	4.05	0.46
004476013-06	OBS	No	371.401491	142.216741	1899.3	8.826	7.9	8.1	0.70	5340	3.33	0.42
004476013-07	OBS	No	363.428264	168.875171	2172.9	4.775	8.2	7.4	0.70	5340	5.93	0.43
004476013-09	OBS	No	343.360397	154.816901	2157.6	6.228	8.3	8.2	0.70	5340	6.28	0.46

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004476013-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—CENT_KIC_POS
004476013-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

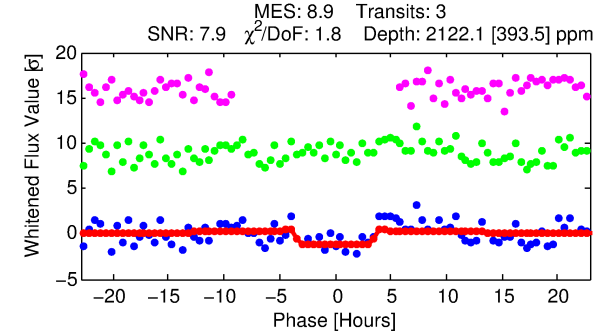
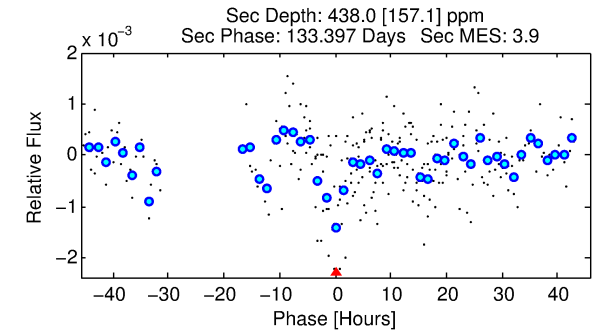
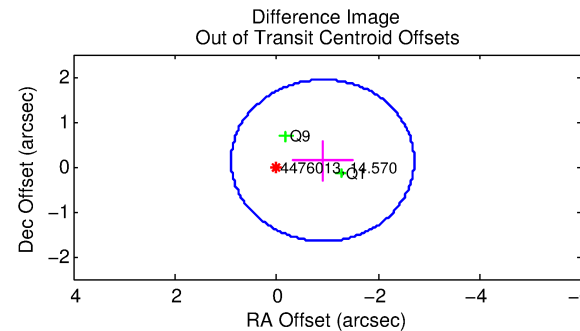
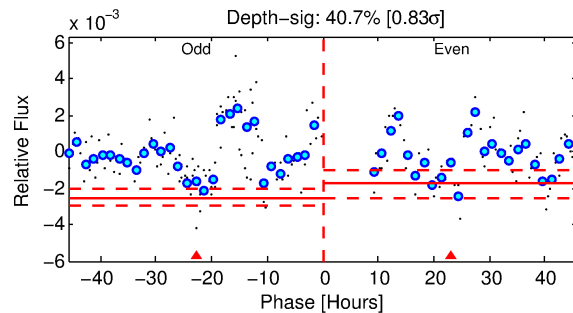
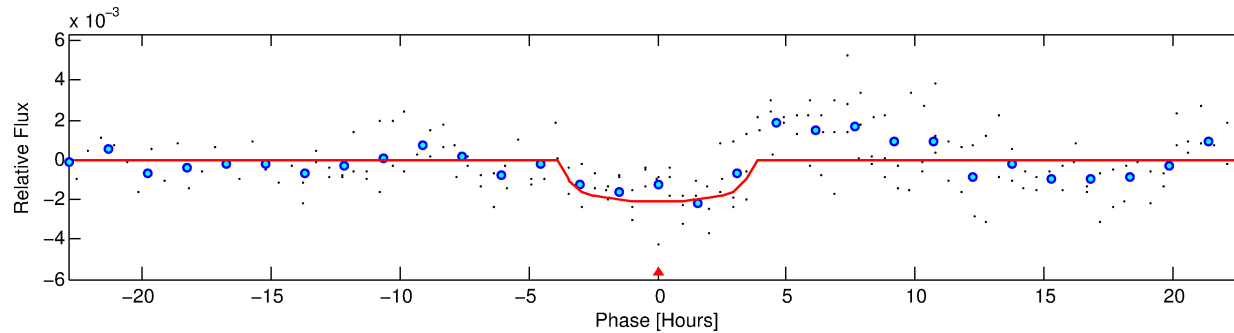
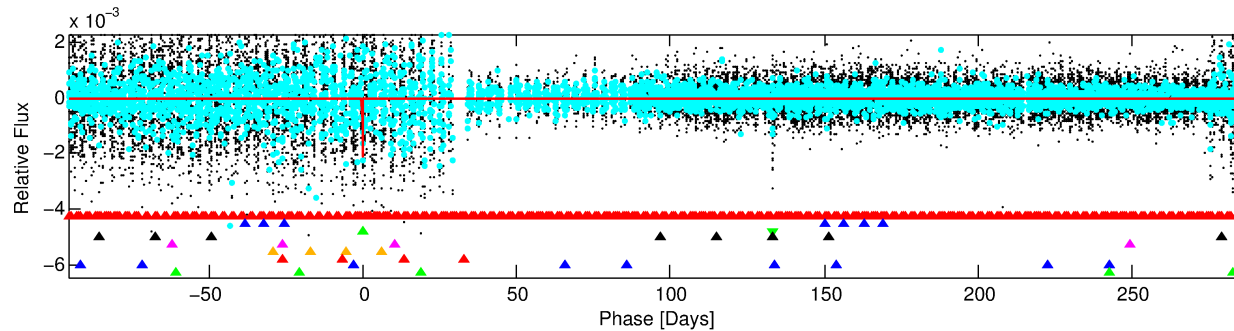
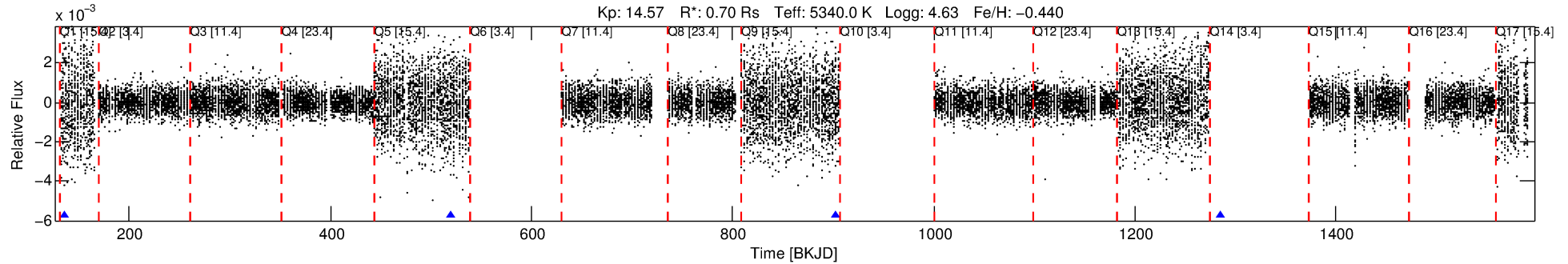
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004476013-03

No Significant Match Found

DV One-Page Summary

KIC: 4476013 Candidate: 3 of 9 Period: 383.172 d



DV Fit Results:

Period = 383.17189 [0.01402] d
Epoch = 135.9868 [0.0208] BKJD
Rp/R* = 0.0432 [0.0339]
a/R* = 345.73 [1095.53]
b = 0.53 [4.33]
Seff = 0.40 [0.09]
Teq = 203 [11] K
Rp = 3.31 [2.65] Re
a = 0.9474 [0.1230] AU
Ag = 19778.14 [32057.48] [0.62 σ]
Teffp = 3718 [1501] K [2.34 σ]

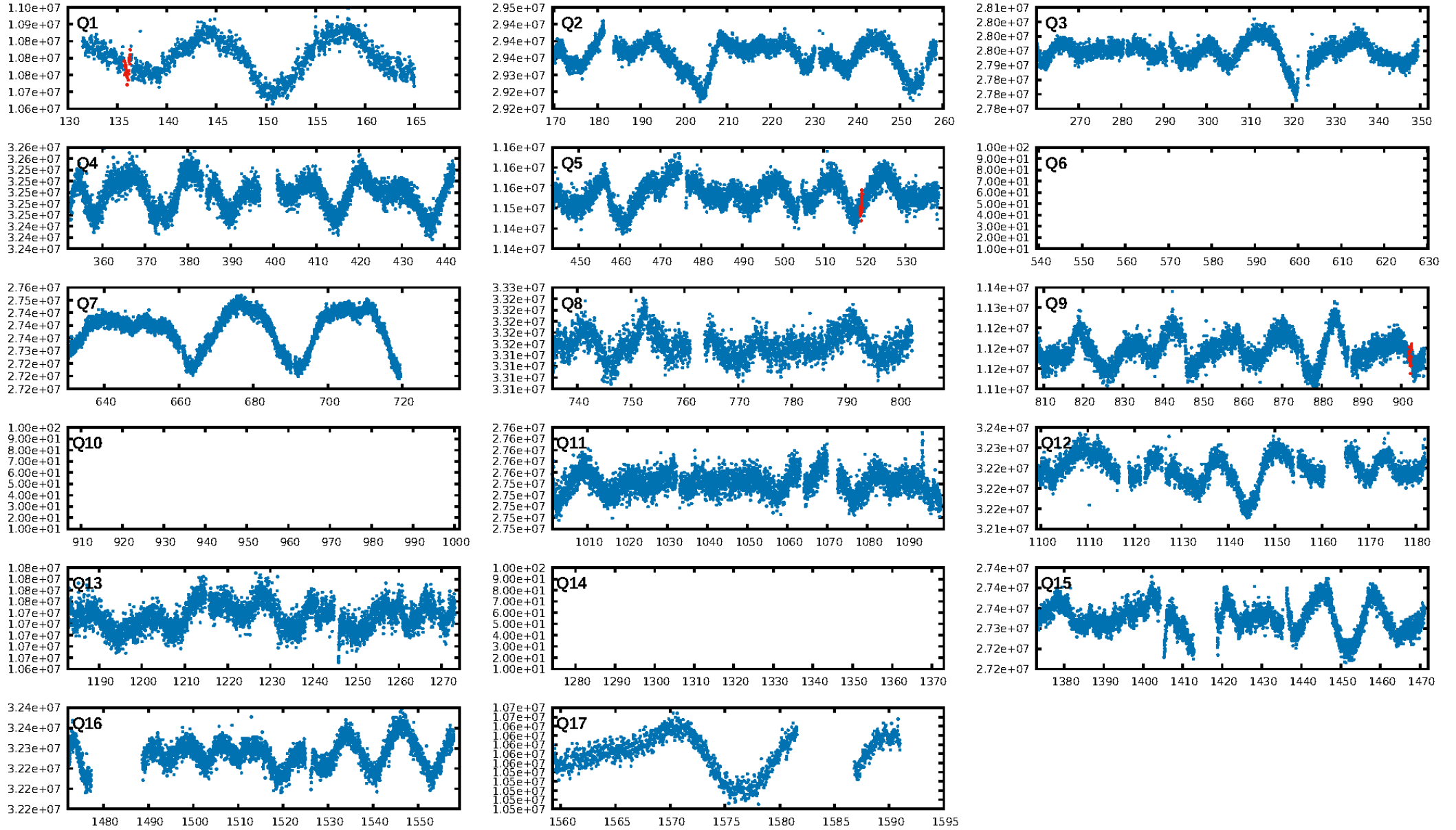
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [24.22 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 52.4%
ModelChiSquareGof-sig: 44.9%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: -3.53
Centroid-sig: 0.0%
Centroid-so: 2.173 arcsec [6.14 σ]
OotOffset-rm: 0.915 arcsec [1.53 σ]
OotOffset-st: 0/0/0/2 [2]
KicOffset-rm: 4.736 arcsec [8.99 σ]
KicOffset-st: 0/0/0/2 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 1.00 [3/3]

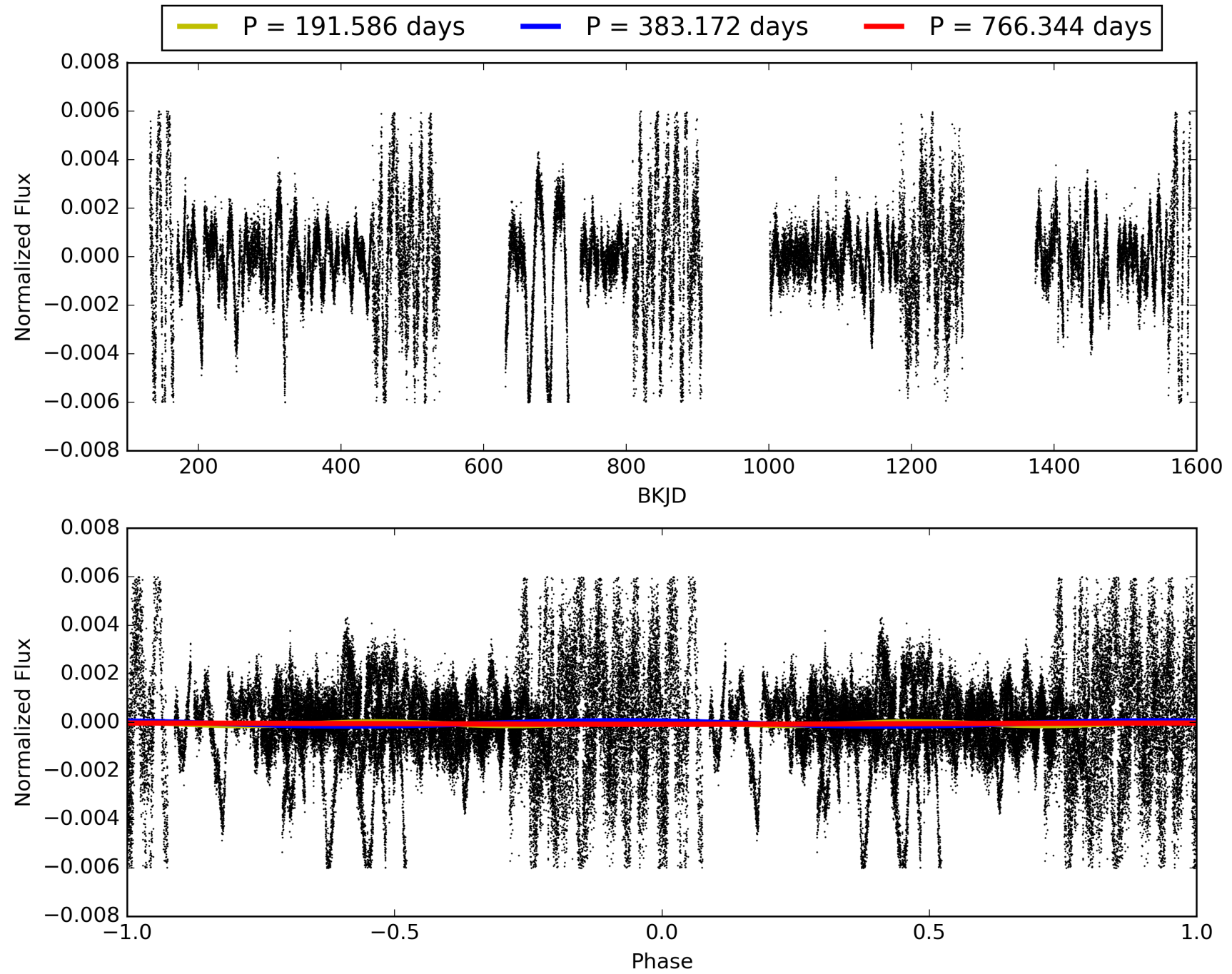
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:37:13 Z

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

TCE 004476013-03, PDC Light Curves

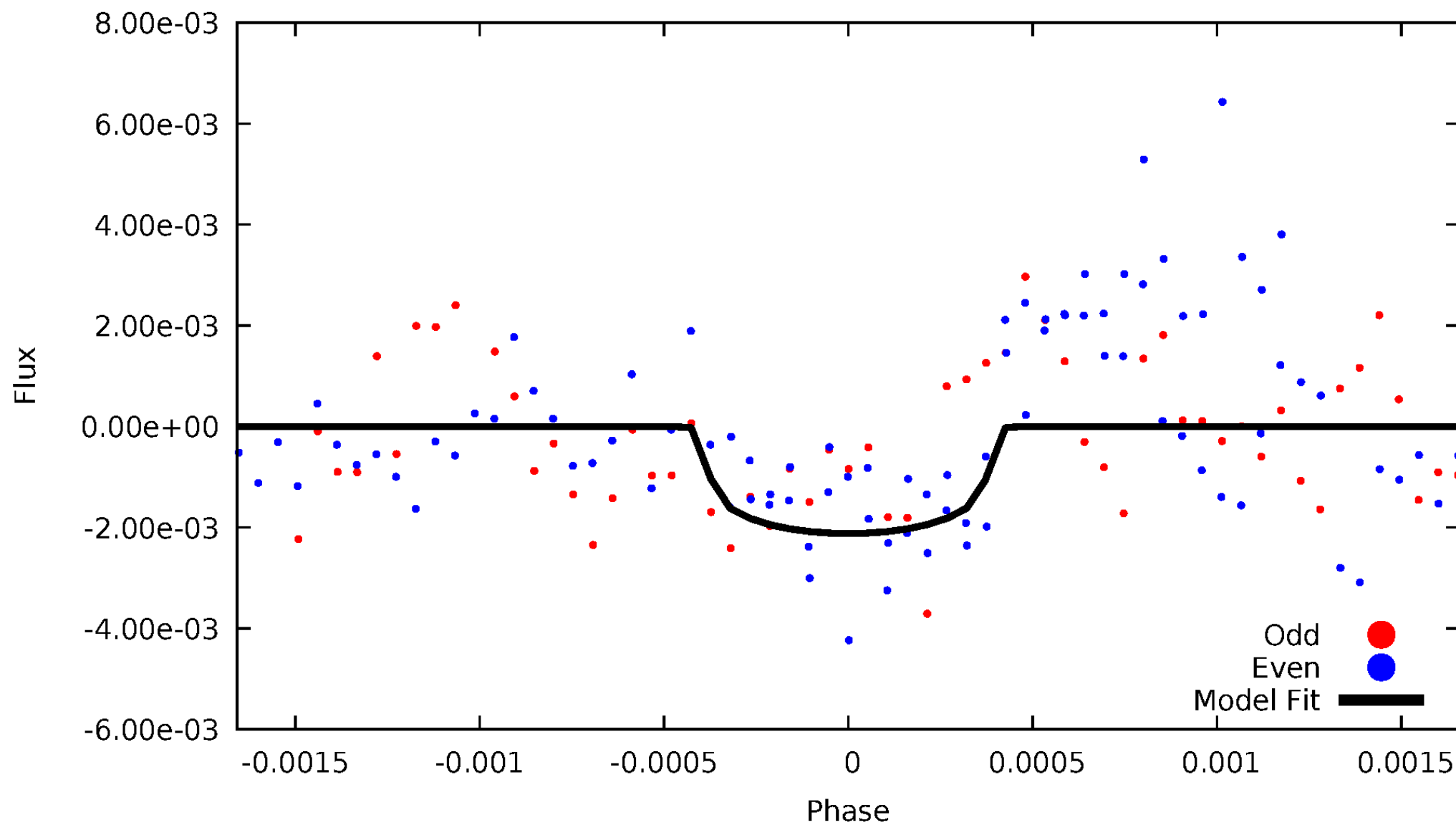


TCE 004476013-03



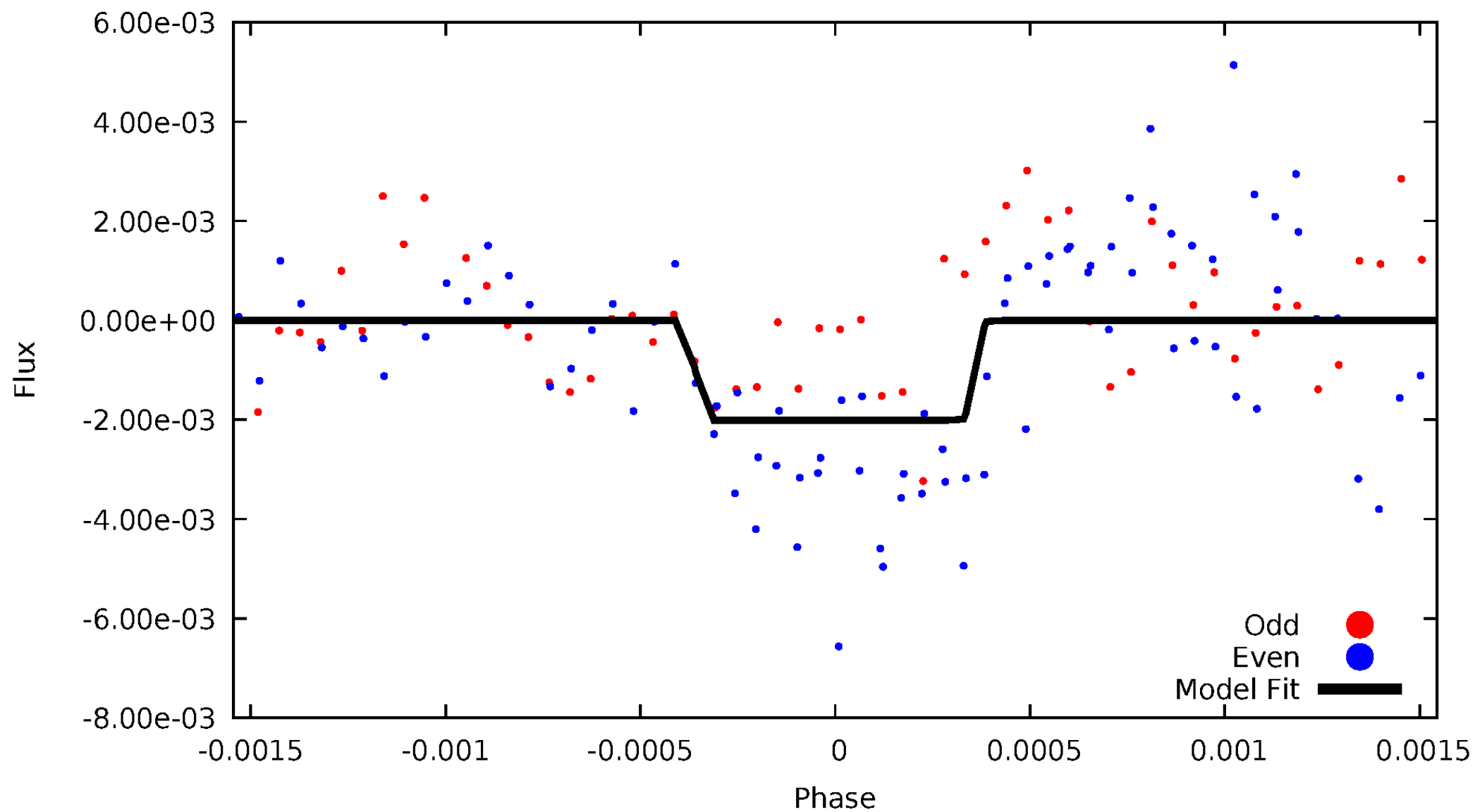
DV Odd/Even

TCE 004476013-03



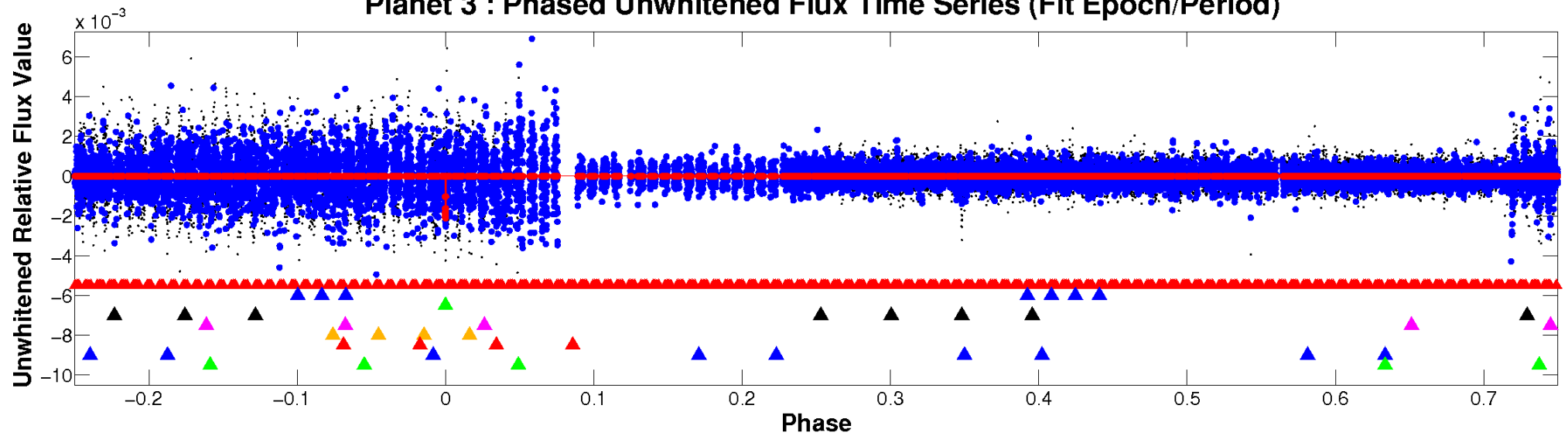
ALT Odd/Even

TCE 004476013-03

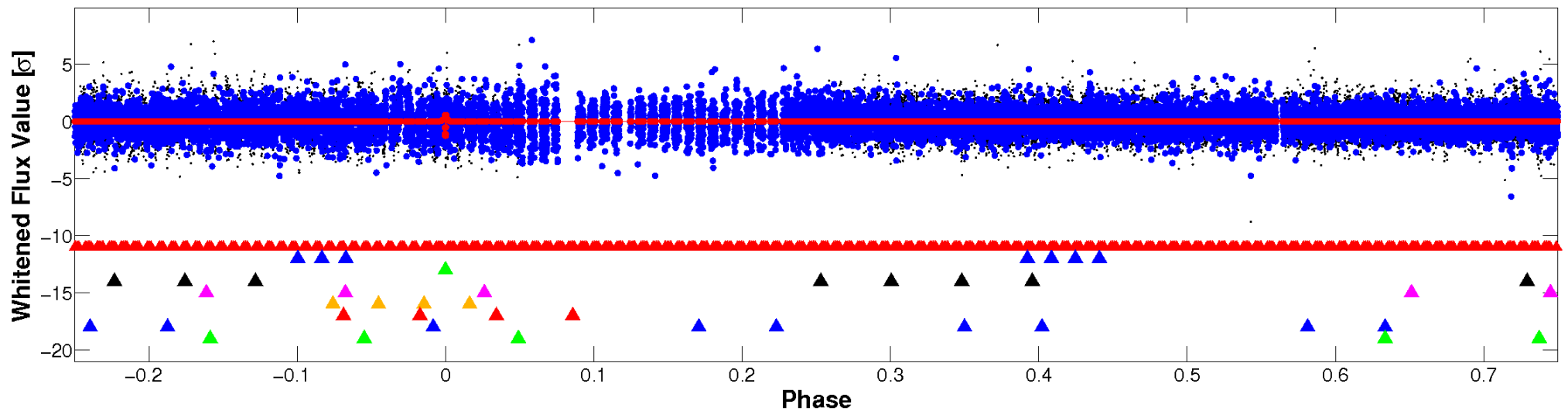


Non-Whitened Vs. Whitened Light Curve

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



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



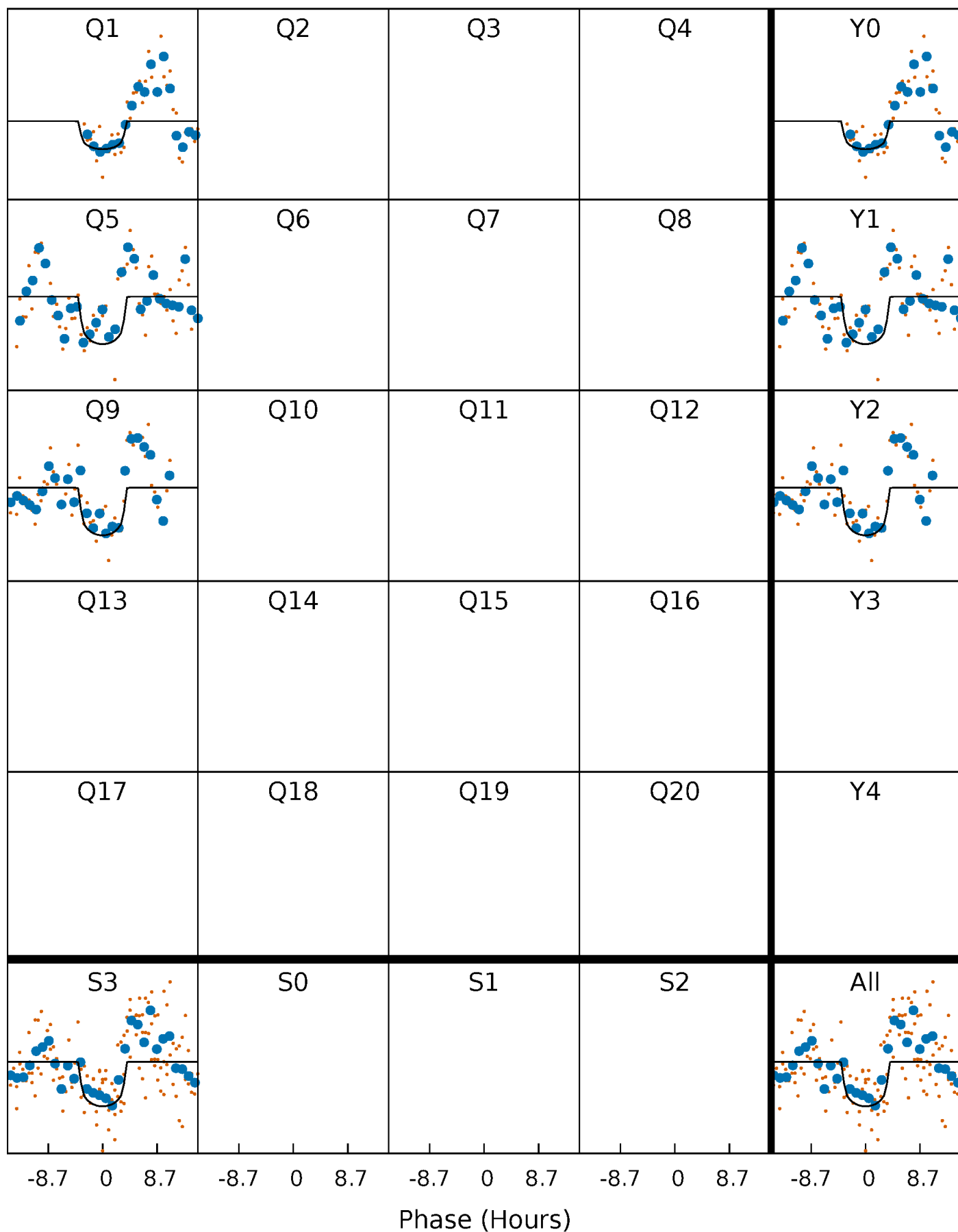
PDC Quarter-Phased Transit Curves

TCE 004476013-03 $P=383.171892$ Days $T_0=135.986790$ (BKJD)



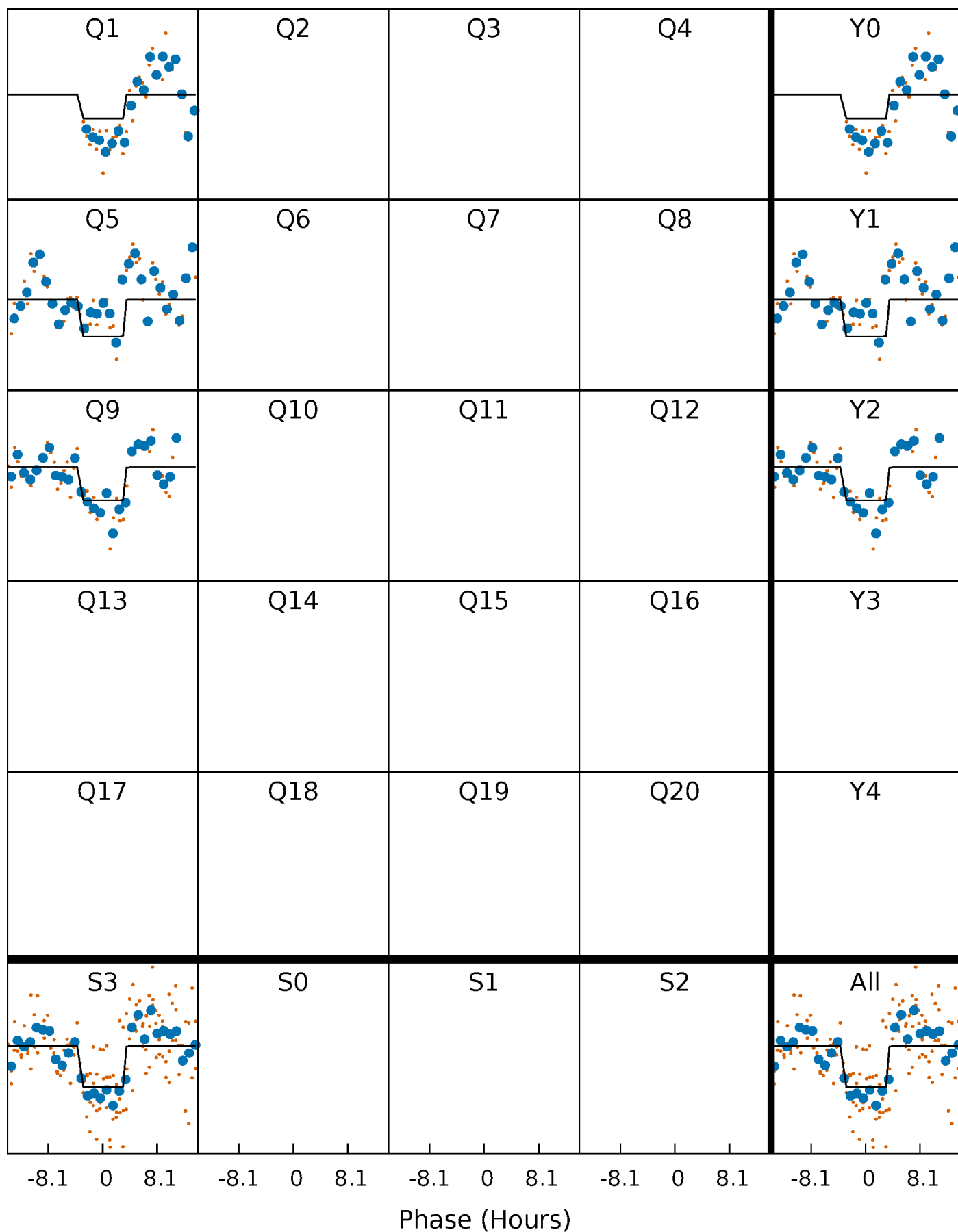
DV Quarter-Phased Transit Curves

TCE 004476013-03 $P=383.171892$ Days $T_0=135.986790$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

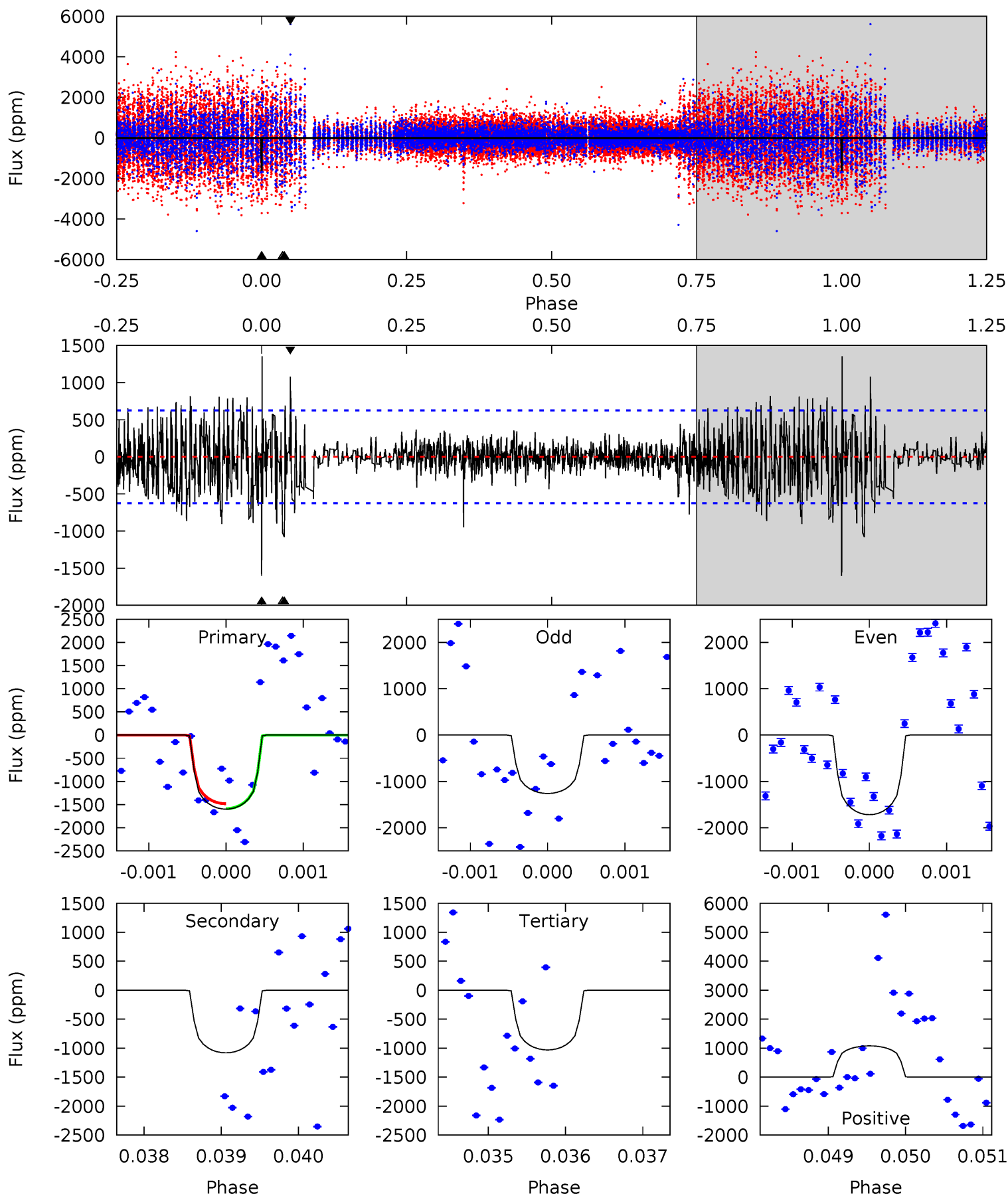
TCE 004476013-03 P=383.170117 Days $T_0=135.983943$ (BKJD)



DV Model-Shift Uniqueness Test

004476013-03, P = 383.171892 Days, E = 135.986790 Days

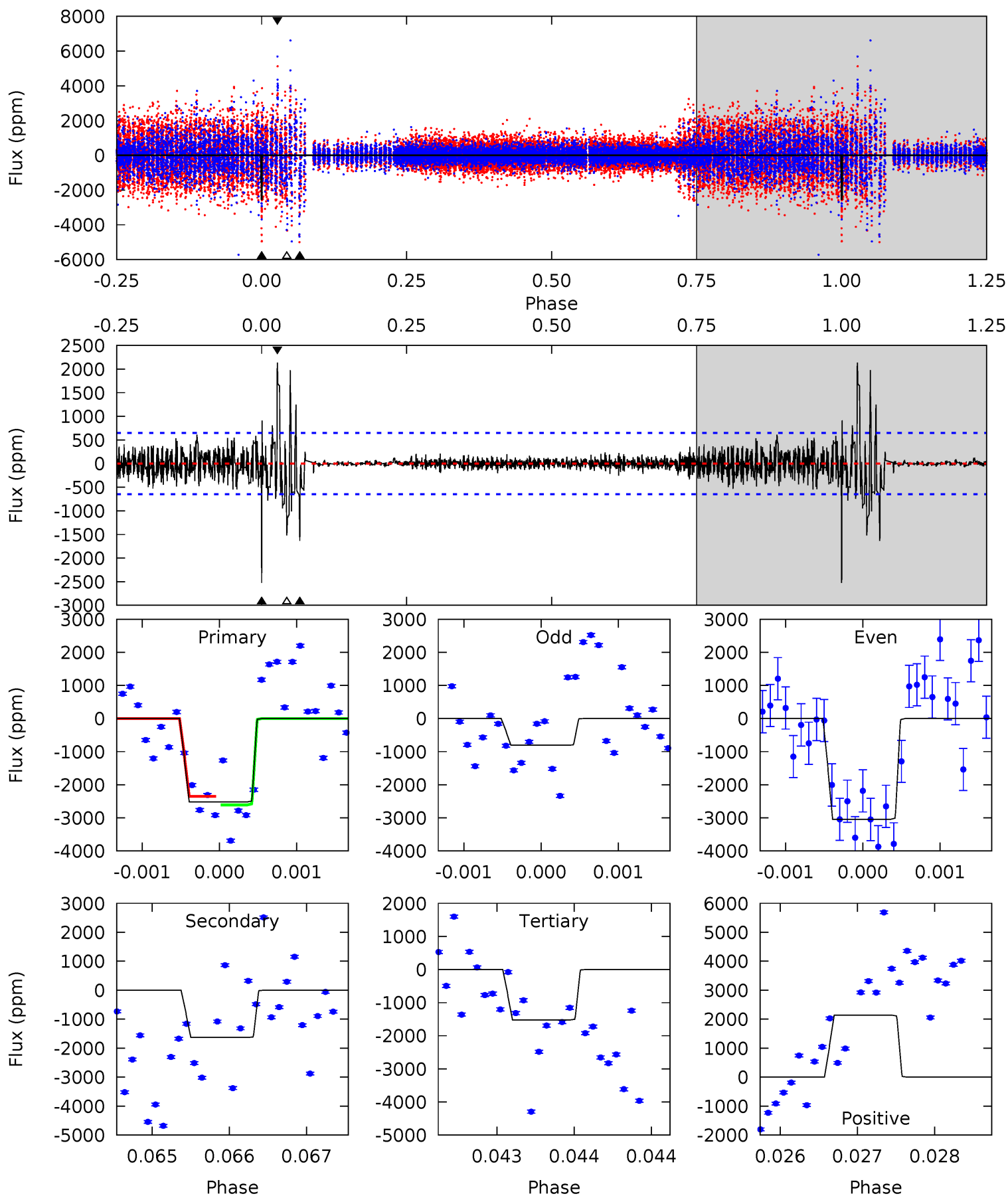
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.0	9.48	9.03	9.46	5.47	3.32	1.85	4.97	4.55	0.44	0.02	1.91	0.95	0.46	0.47



Alt Model-Shift Uniqueness Test

004476013-03, P = 383.170117 Days, E = 135.983943 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.4	13.8	12.9	18.1	5.49	3.36	1.44	8.49	3.26	0.94	-4.29	9.39	0.93	0.46	1.06



Stellar Parameters For KIC 004476013

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5340^{+160}_{-144}	$4.633^{+0.032}_{-0.097}$	$-0.440^{+0.300}_{-0.300}$	$0.702^{+0.112}_{-0.048}$	$0.783^{+0.076}_{-0.084}$	$3.193^{+0.519}_{-1.000}$
	+3%/-3%	+1%/-2%	+68%/-68%	+16%/-7%	+10%/-11%	+16%/-31%
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 004476013-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1082±114	$3.73^{+2.42}_{-2.11}$	287^{+13}_{-11}	4596^{+2158}_{-803}	$38880^{+167341}_{-25101}$
Alt.	-1632±118	$3.87^{+2.82}_{-2.34}$	288^{+11}_{-11}	4865^{+2974}_{-881}	$53614^{+302415}_{-35715}$

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

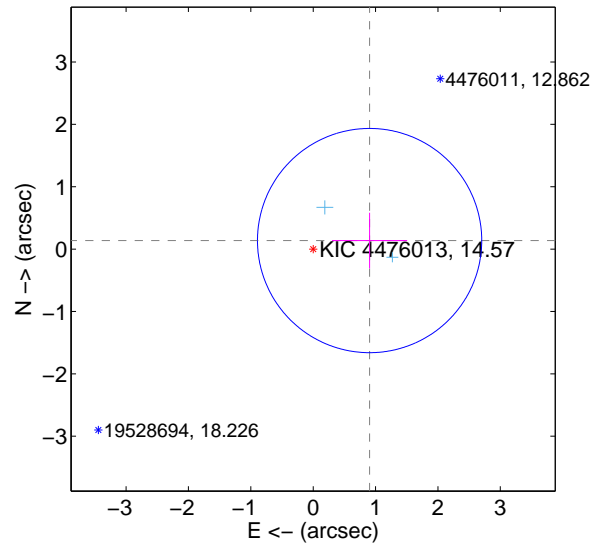
Supplemental centroid analysis for 004476013-03. Kepler magnitude: 14.57. Transit SNR 7.88

There are 2 quarters with good PRF difference image offsets

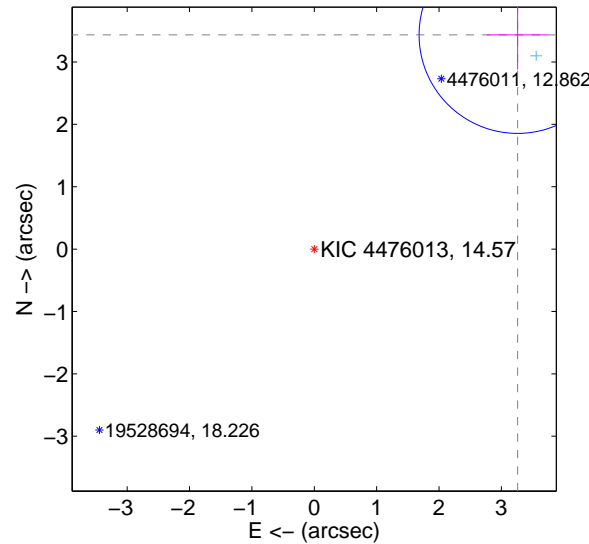
The OOT PRF centroid is offset from the target star catalog position by about 4.24 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.915 ± 0.599	1.53	-0.905 ± 0.602	0.137 ± 0.446
PRF-fit source offset from KIC position	4.736 ± 0.526	8.99	-3.260 ± 0.493	3.435 ± 0.555
photometric centroid source offset	2.17 ± 0.35	6.14	-1.23 ± 0.36	1.79 ± 0.35

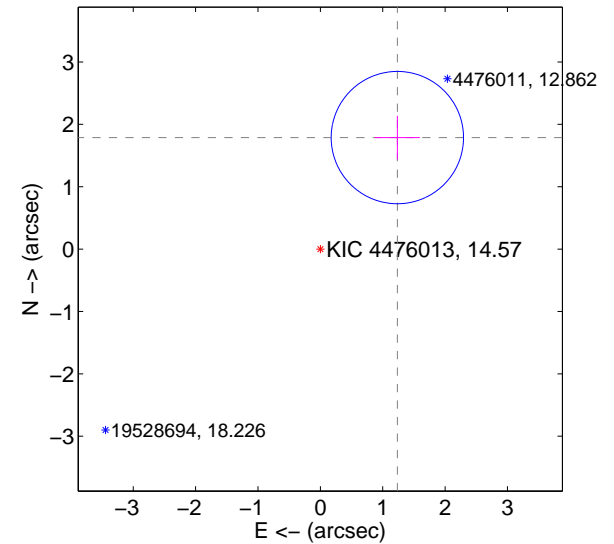
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

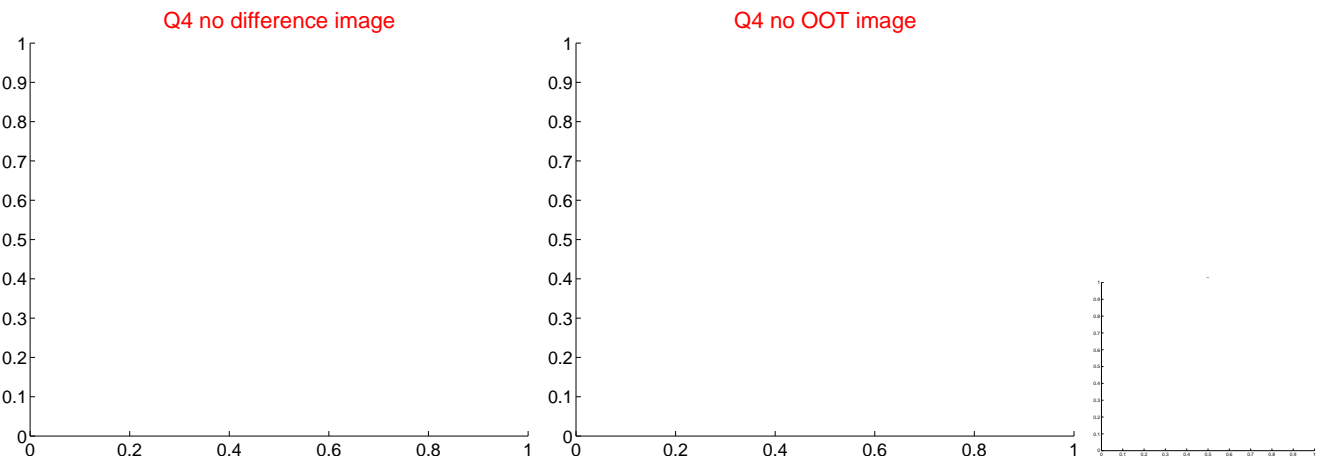
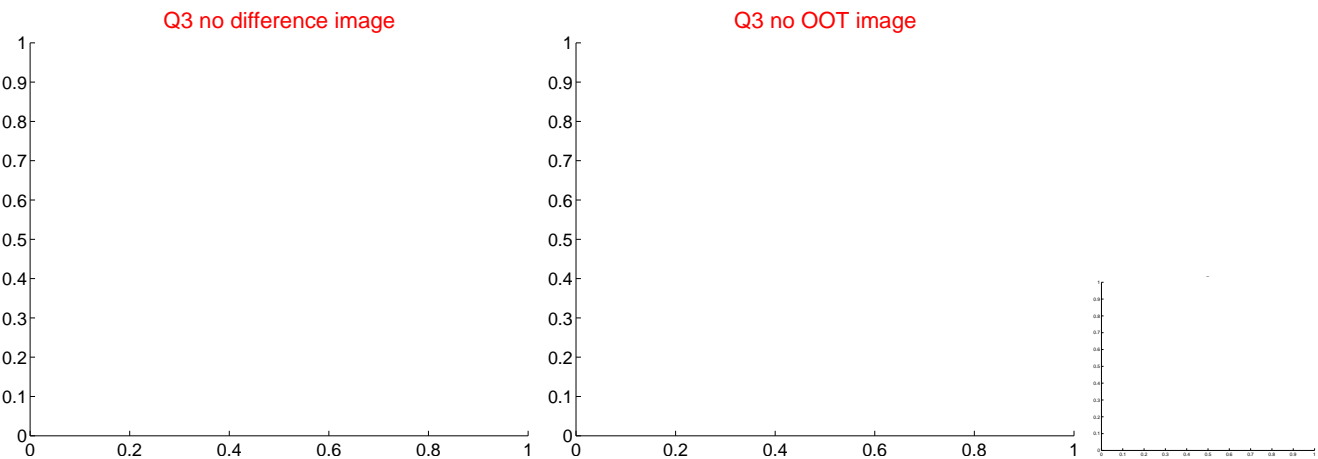
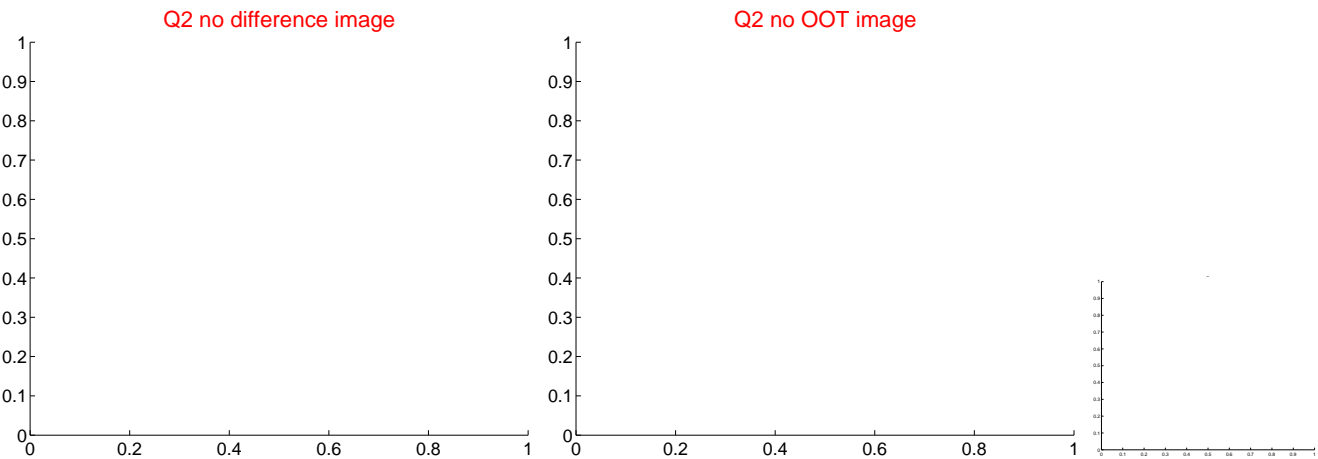
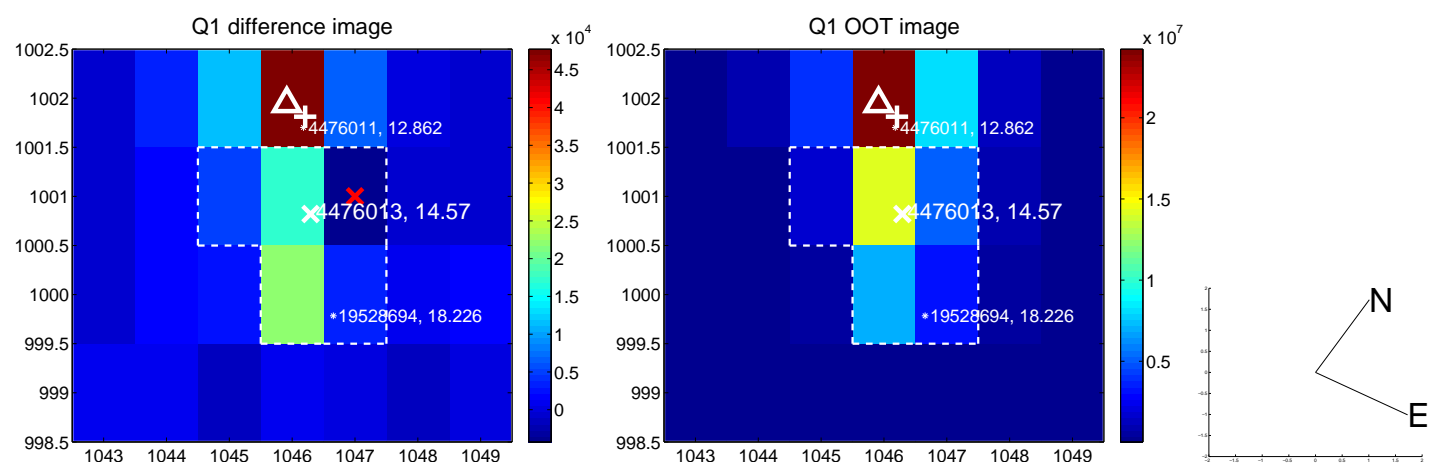


offset from photometric centroids

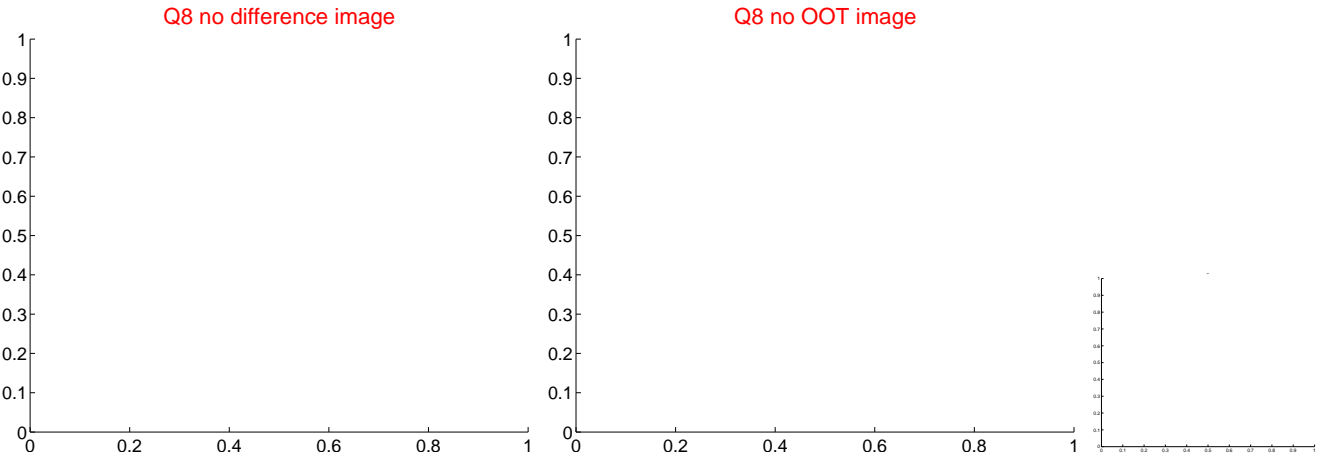
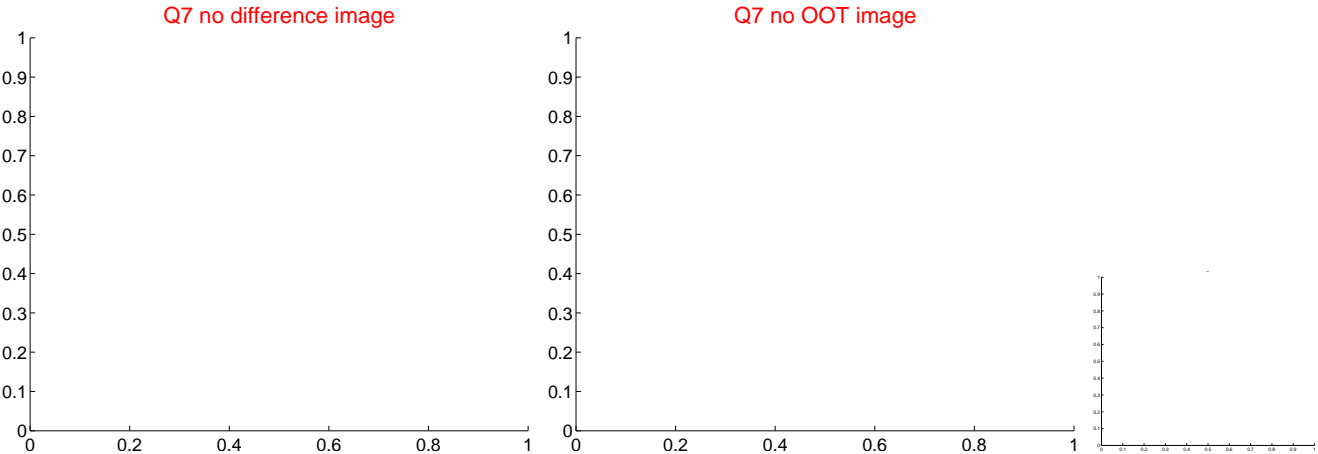
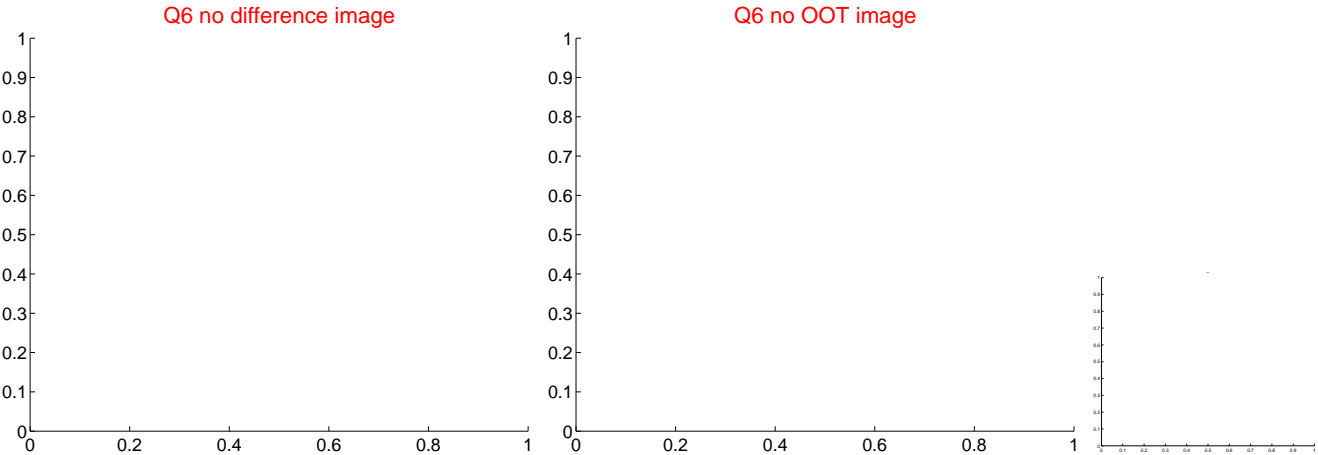
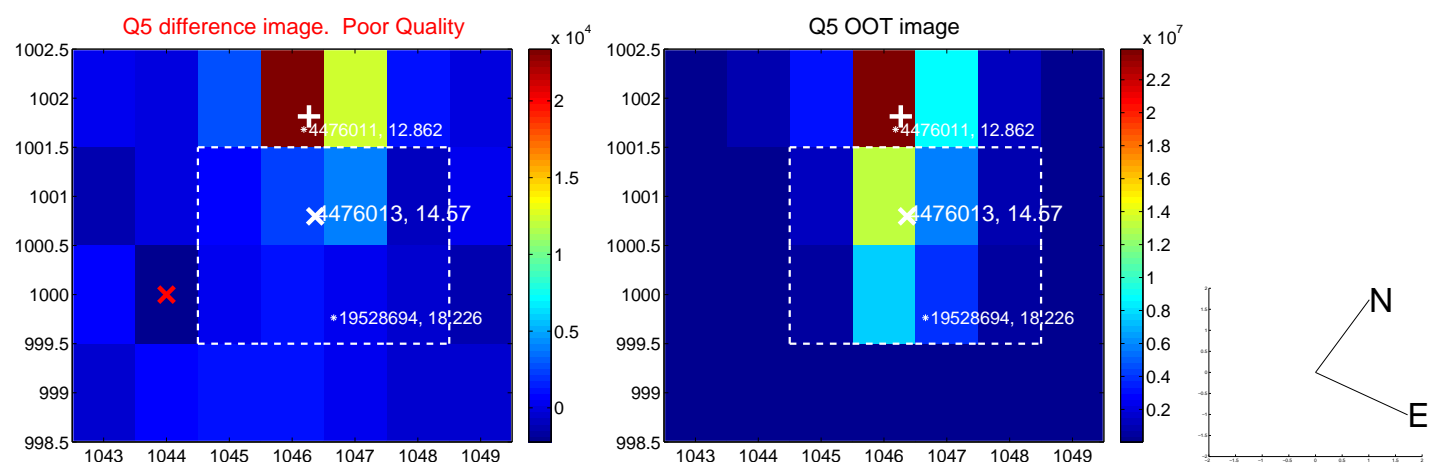


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

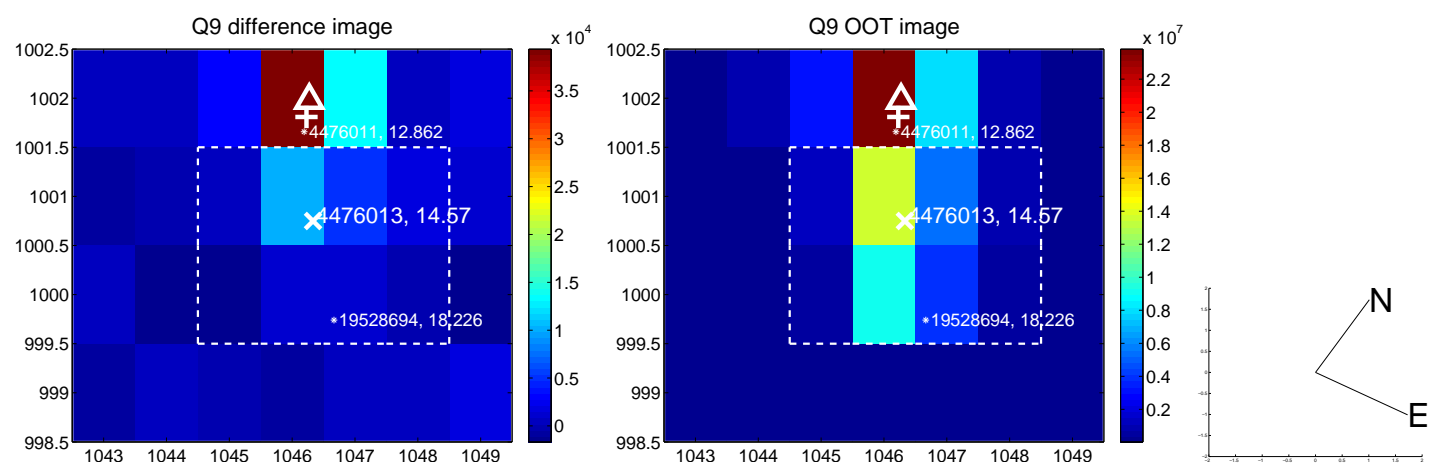
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



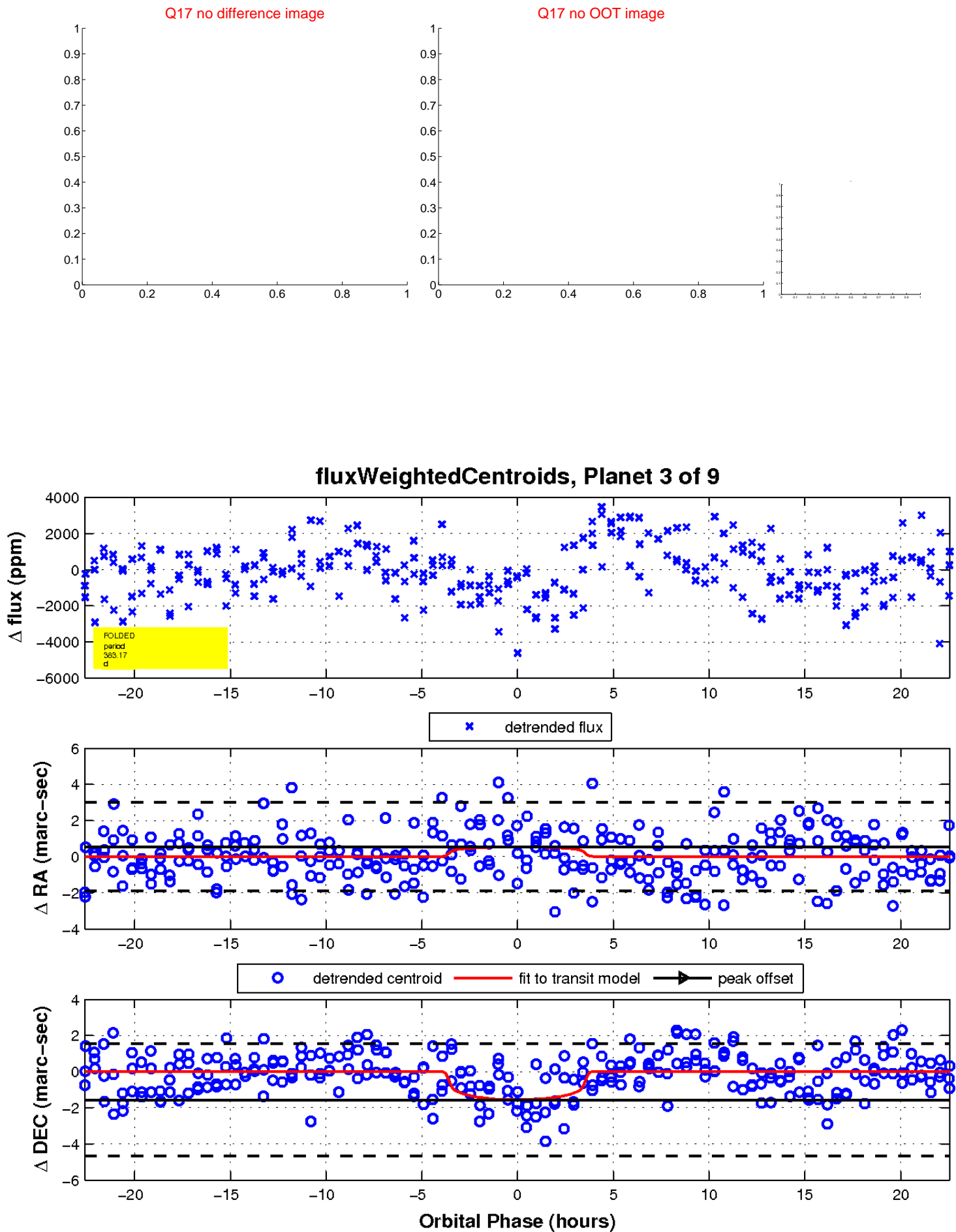
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

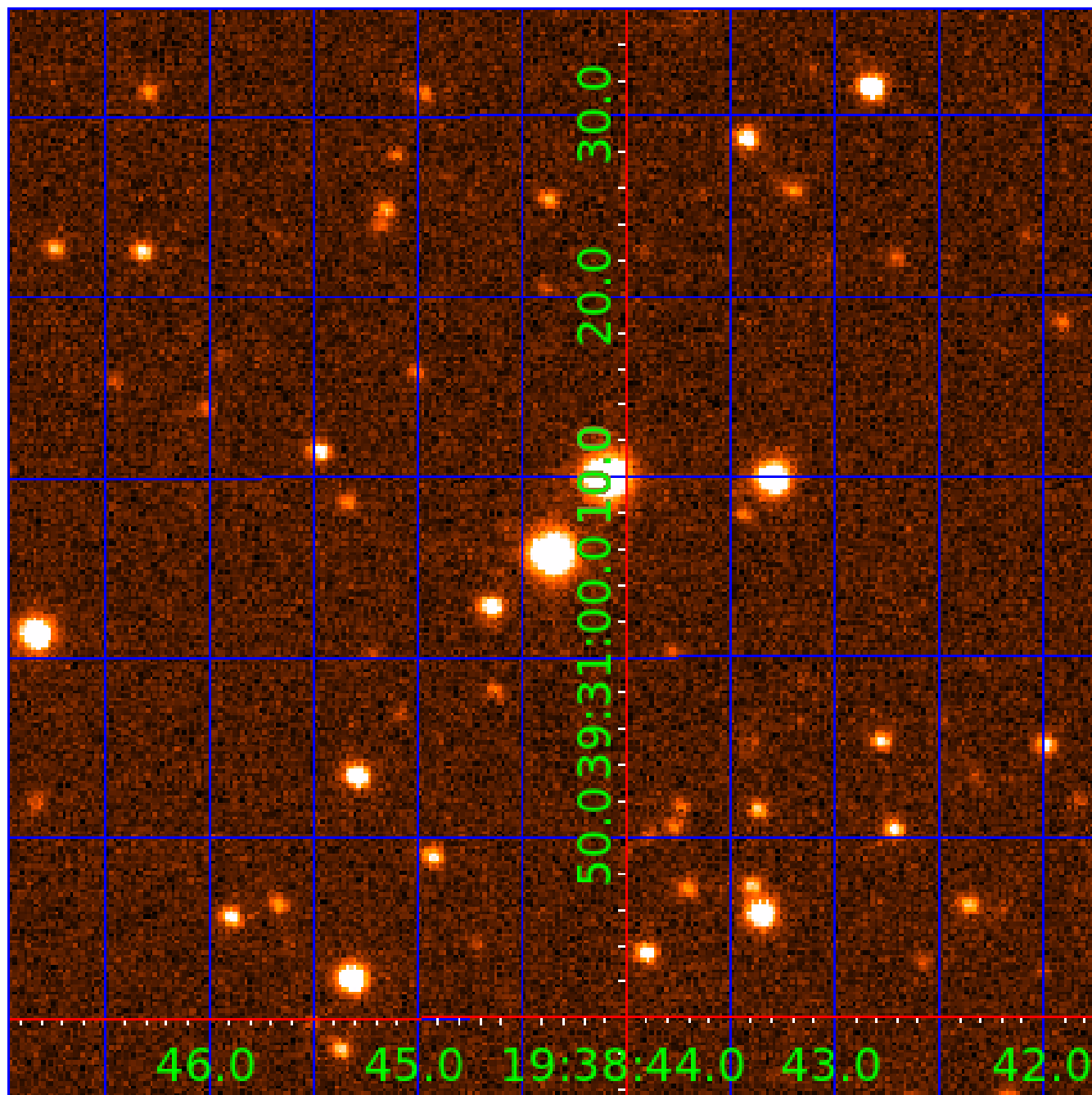


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004476013

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})
004476013-01	OBS	No	3.111300	131.965214	87.6	12.343	7.9	7.2	0.70	5340	0.65	245.11
004476013-02	OBS	No	194.686816	286.324219	1834.8	4.706	9.3	8.5	0.70	5340	5.82	0.99
004476013-03	OBS	No	383.171892	135.986790	2122.1	7.624	8.9	7.9	0.70	5340	3.31	0.40
004476013-04	OBS	No	182.482170	287.571257	1122.5	2.928	8.6	7.9	0.70	5340	2.52	1.08
004476013-05	OBS	No	347.259060	146.038192	2401.0	6.883	8.6	9.7	0.70	5340	4.05	0.46
004476013-06	OBS	No	371.401491	142.216741	1899.3	8.826	7.9	8.1	0.70	5340	3.33	0.42
004476013-07	OBS	No	363.428264	168.875171	2172.9	4.775	8.2	7.4	0.70	5340	5.93	0.43
004476013-09	OBS	No	343.360397	154.816901	2157.6	6.228	8.3	8.2	0.70	5340	6.28	0.46

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004476013-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—CENT_KIC_POS
004476013-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

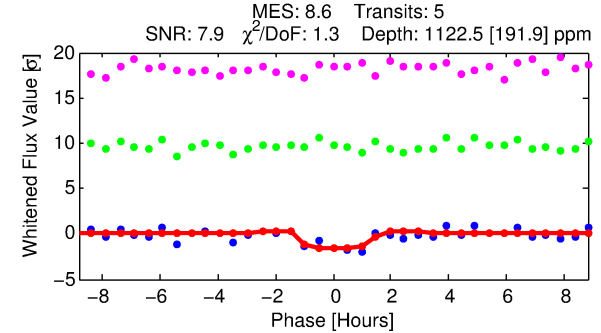
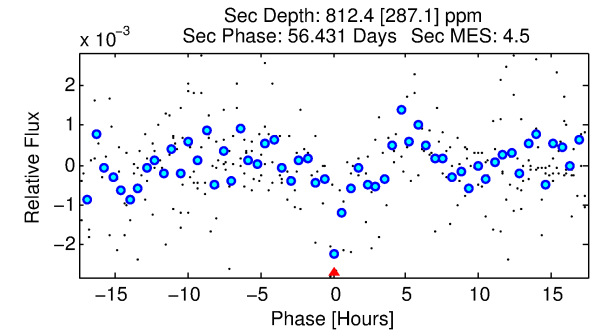
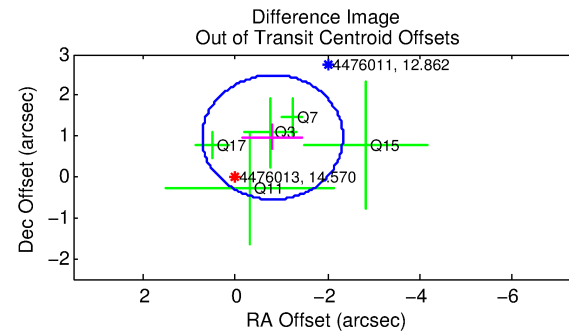
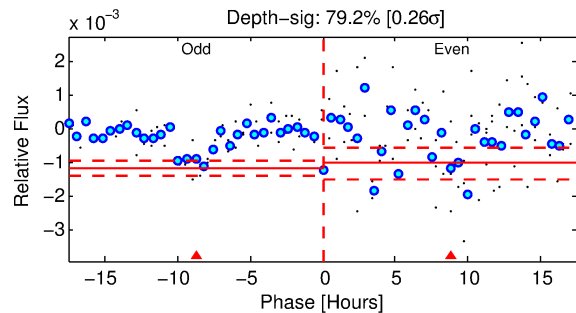
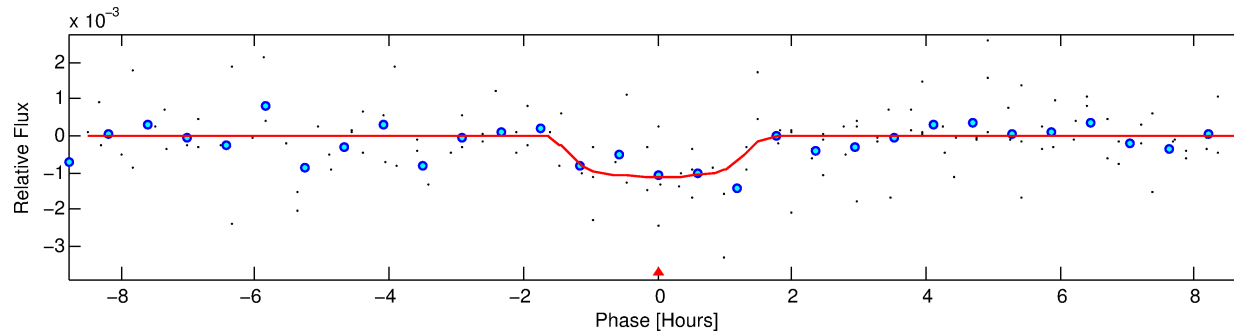
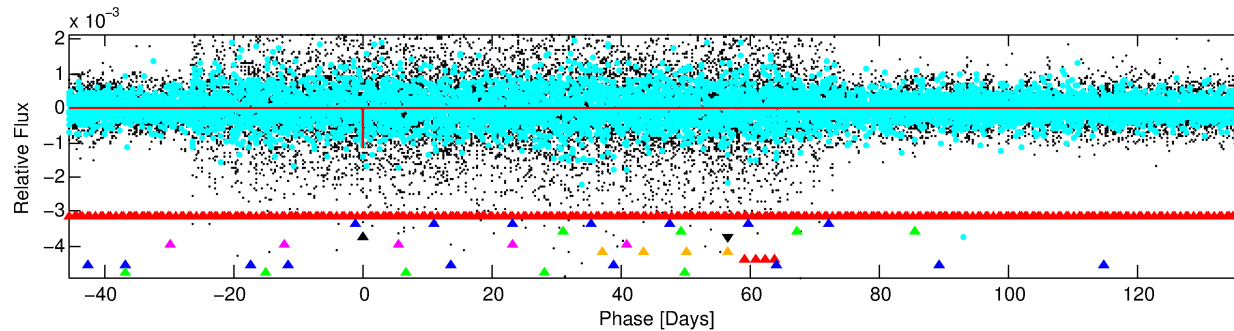
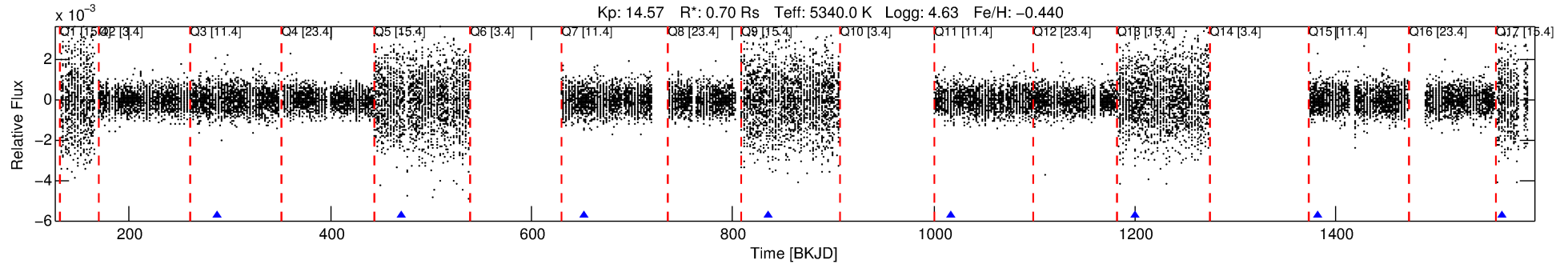
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004476013-04

No Significant Match Found

DV One-Page Summary

KIC: 4476013 Candidate: 4 of 9 Period: 182.482 d



DV Fit Results:

Period = 182.48217 [0.00378] d
Epoch = 287.5713 [0.0127] BKJD
Rp/R* = 0.0328 [0.0474]
a/R* = 359.97 [2091.57]
b = 0.70 [4.25]
Seff = 1.08 [0.24]
Teq = 260 [14] K
Rp = 2.51 [3.65] Re
a = 0.5777 [0.0750] AU
Ag = 23592.58 [68778.86] [0.34 σ]
Teffp = 4976 [3622] K [1.30 σ]

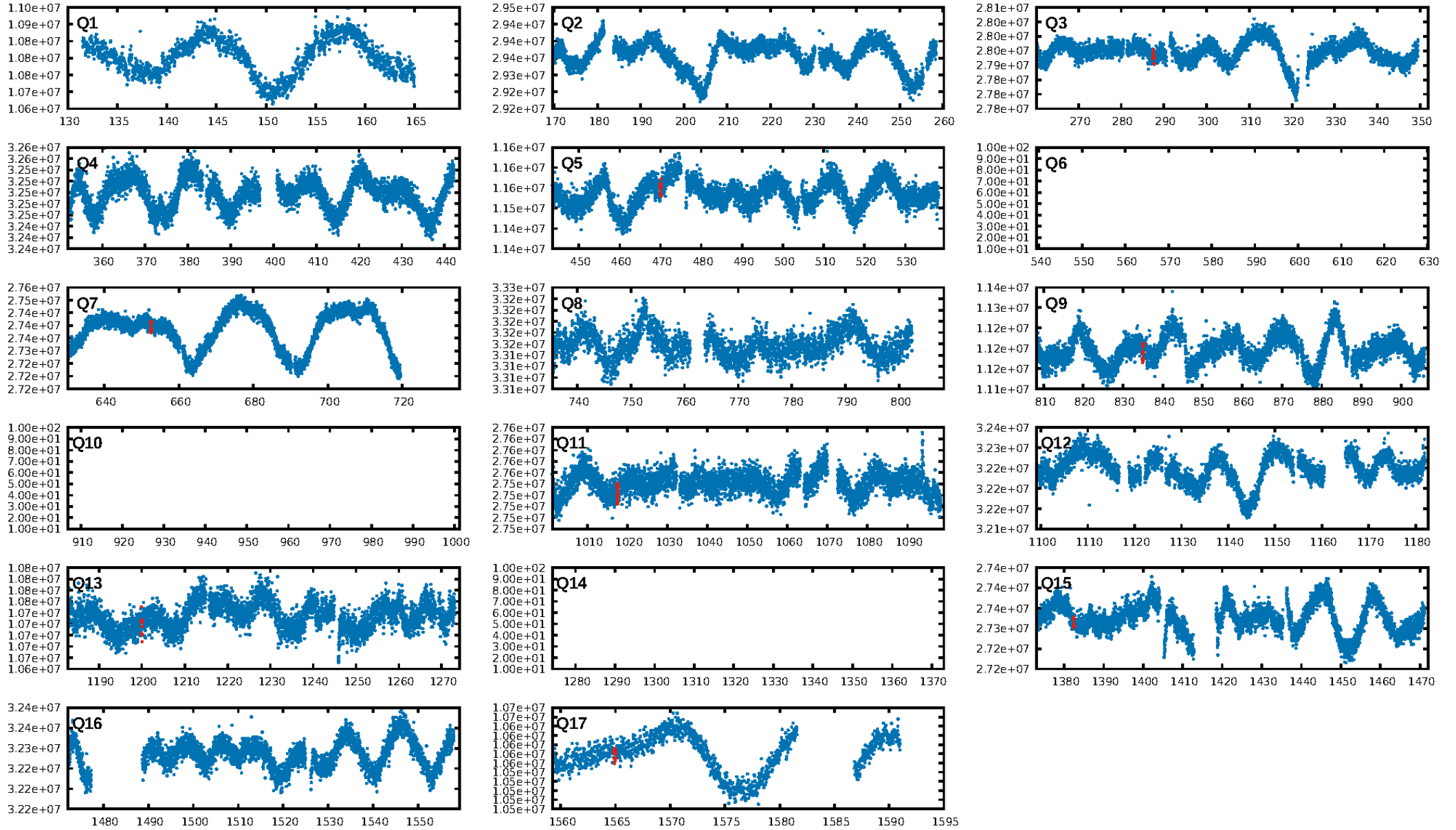
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [116.27 σ]
LongPeriod-sig: 100.0% [52.84 σ]
ModelChiSquare2-sig: 11.2%
ModelChiSquareGof-sig: 85.2%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 3.711
Centroid-sig: 24.1%
Centroid-so: 2.036 arcsec [3.38 σ]
OotOffset-rm: 1.265 arcsec [2.49 σ]
KicOffset-rm: 3.781 arcsec [8.03 σ]
OotOffset-st: 0/4/0/1 [5]
KicOffset-st: 0/4/0/1 [5]
DiffImageQuality-fgm: 0.60 [3/5]
DiffImageOverlap-fno: 0.57 [4/7]

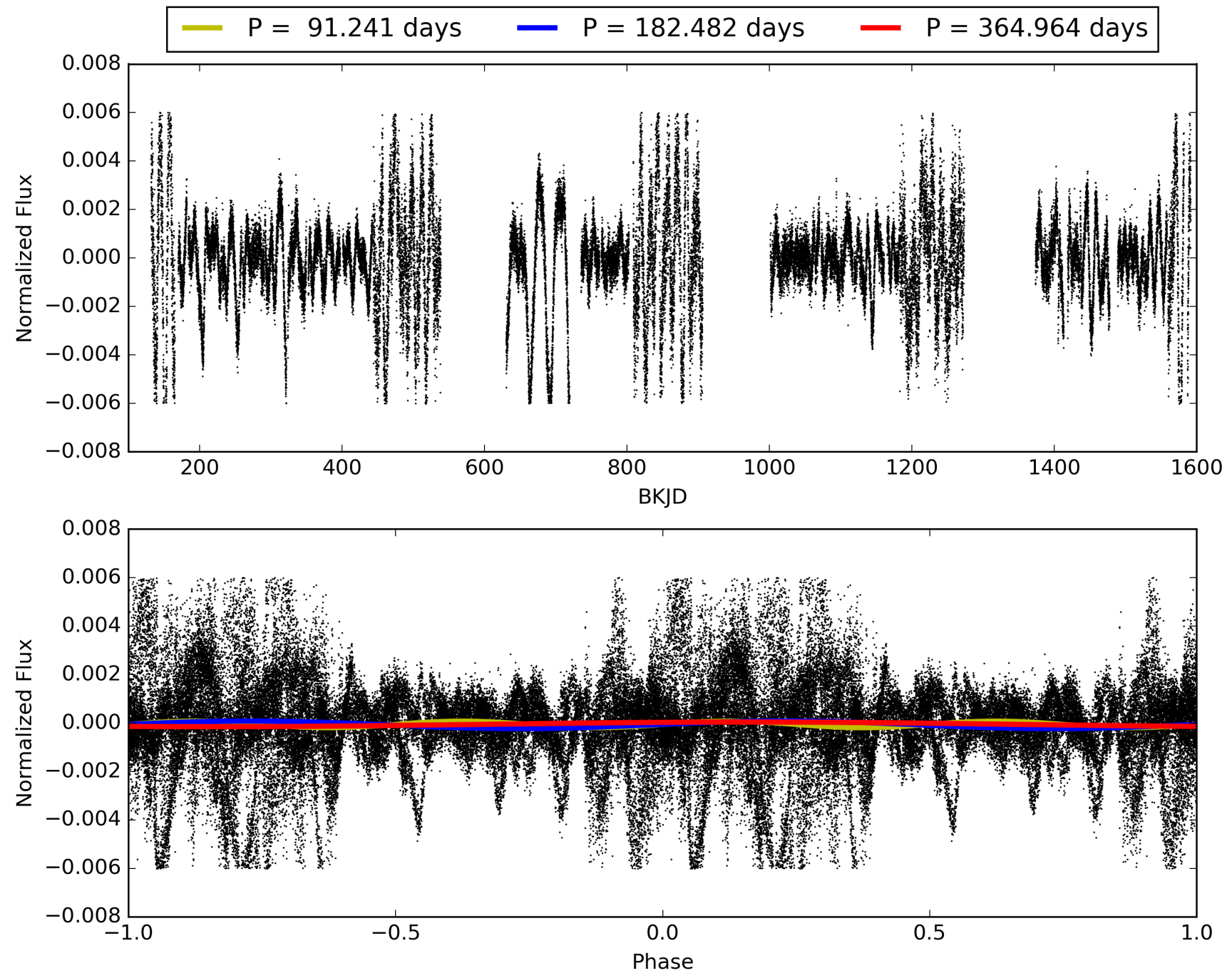
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:37:20 Z

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

TCE 004476013-04, PDC Light Curves

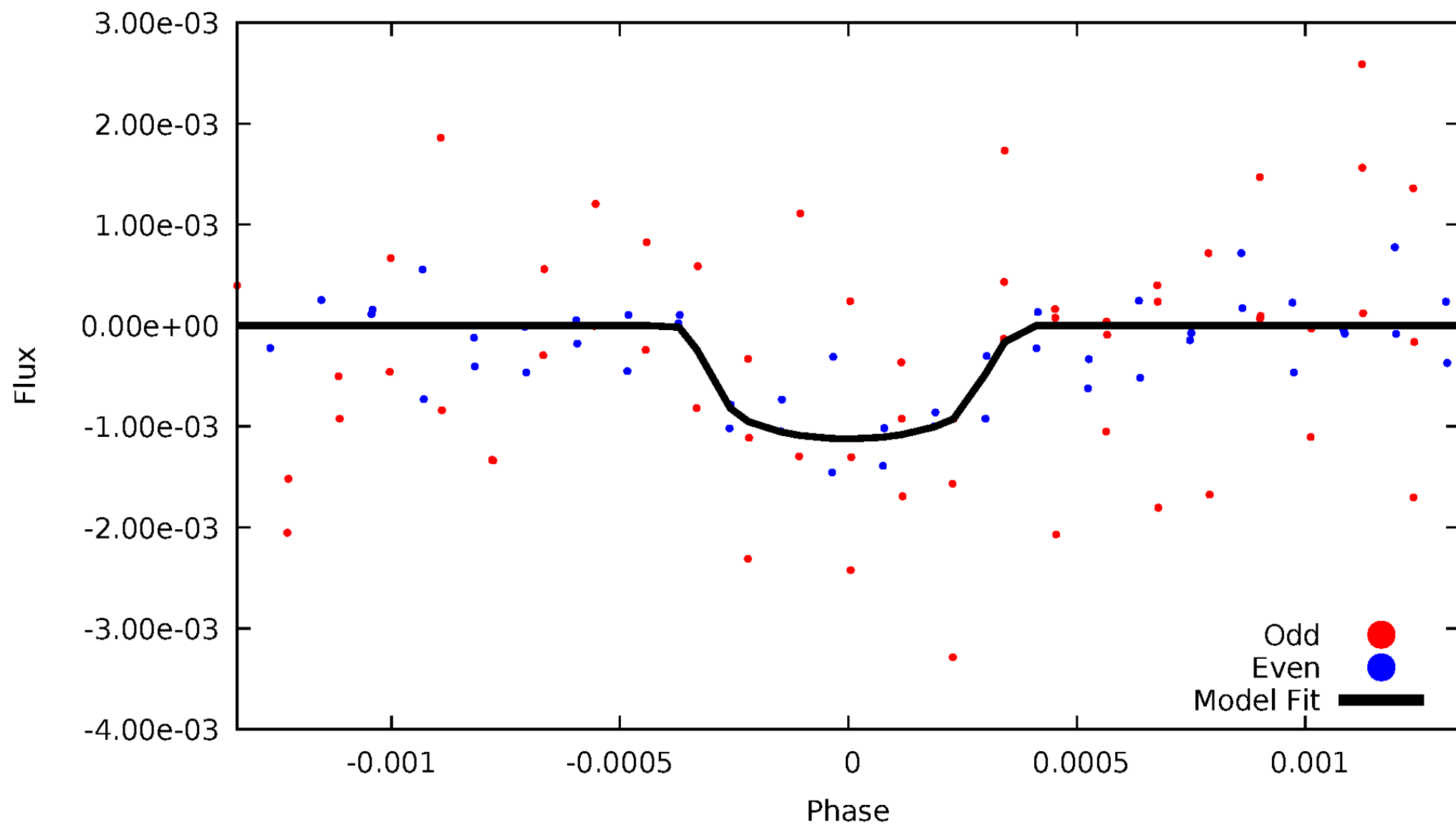


TCE 004476013-04



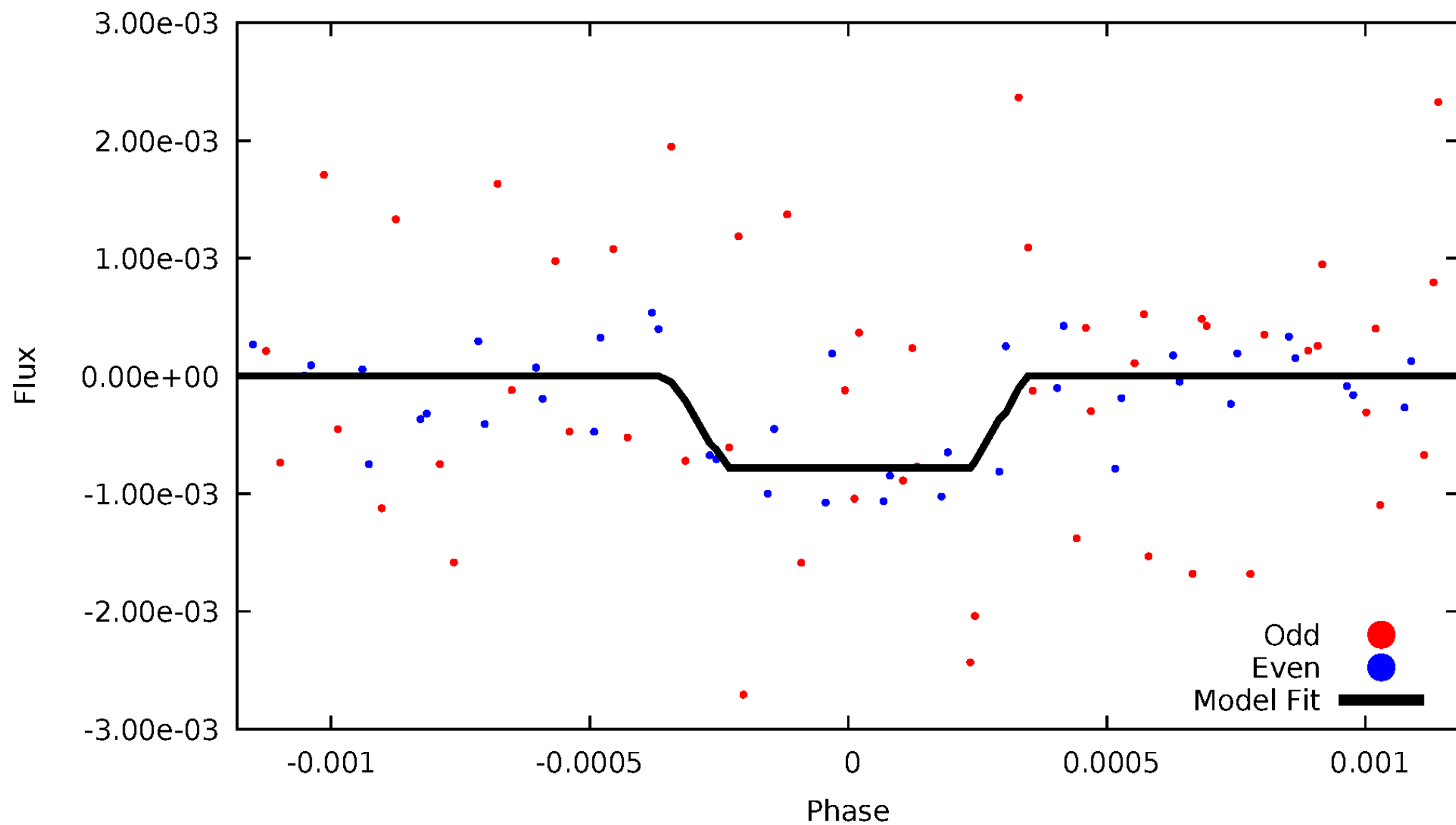
DV Odd/Even

TCE 004476013-04



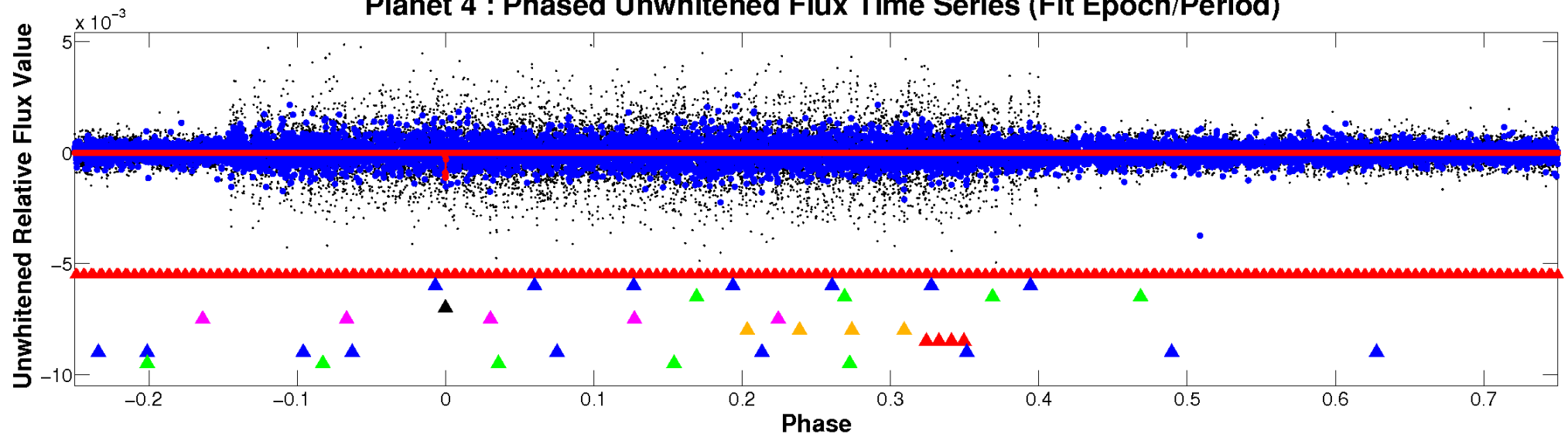
ALT Odd/Even

TCE 004476013-04

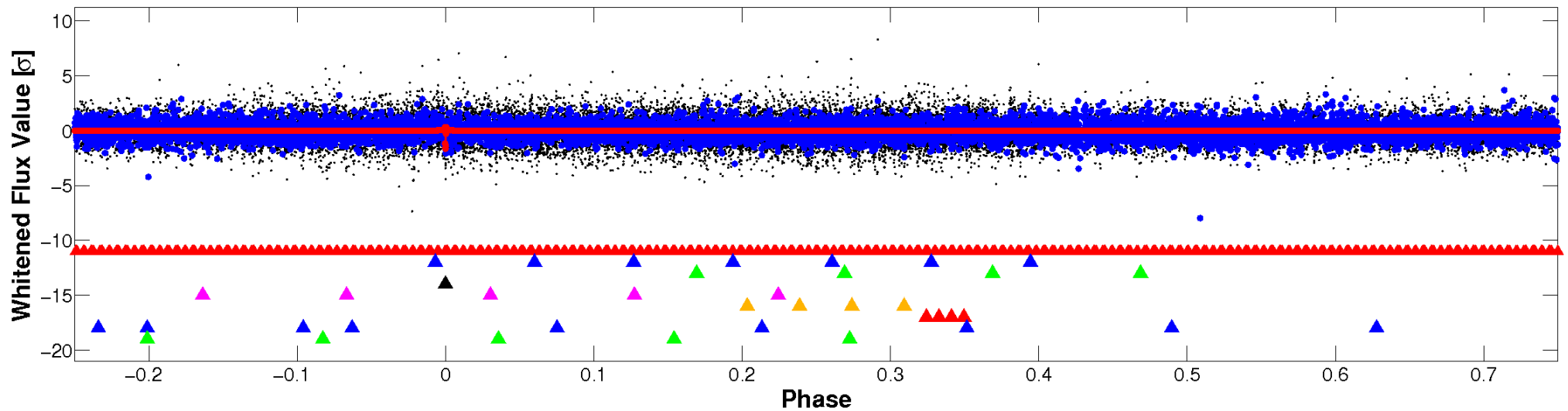


Non-Whitened Vs. Whitened Light Curve

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

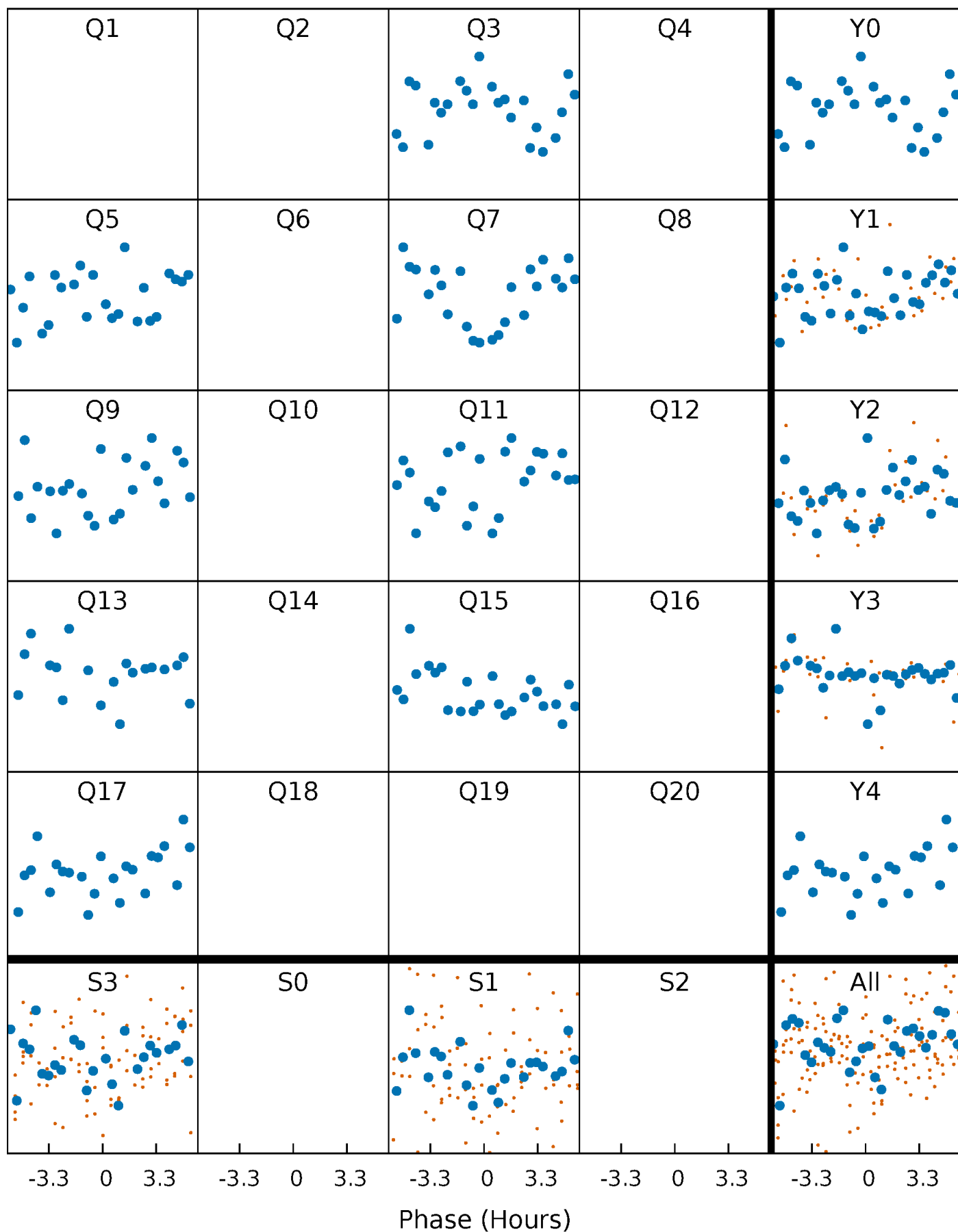


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



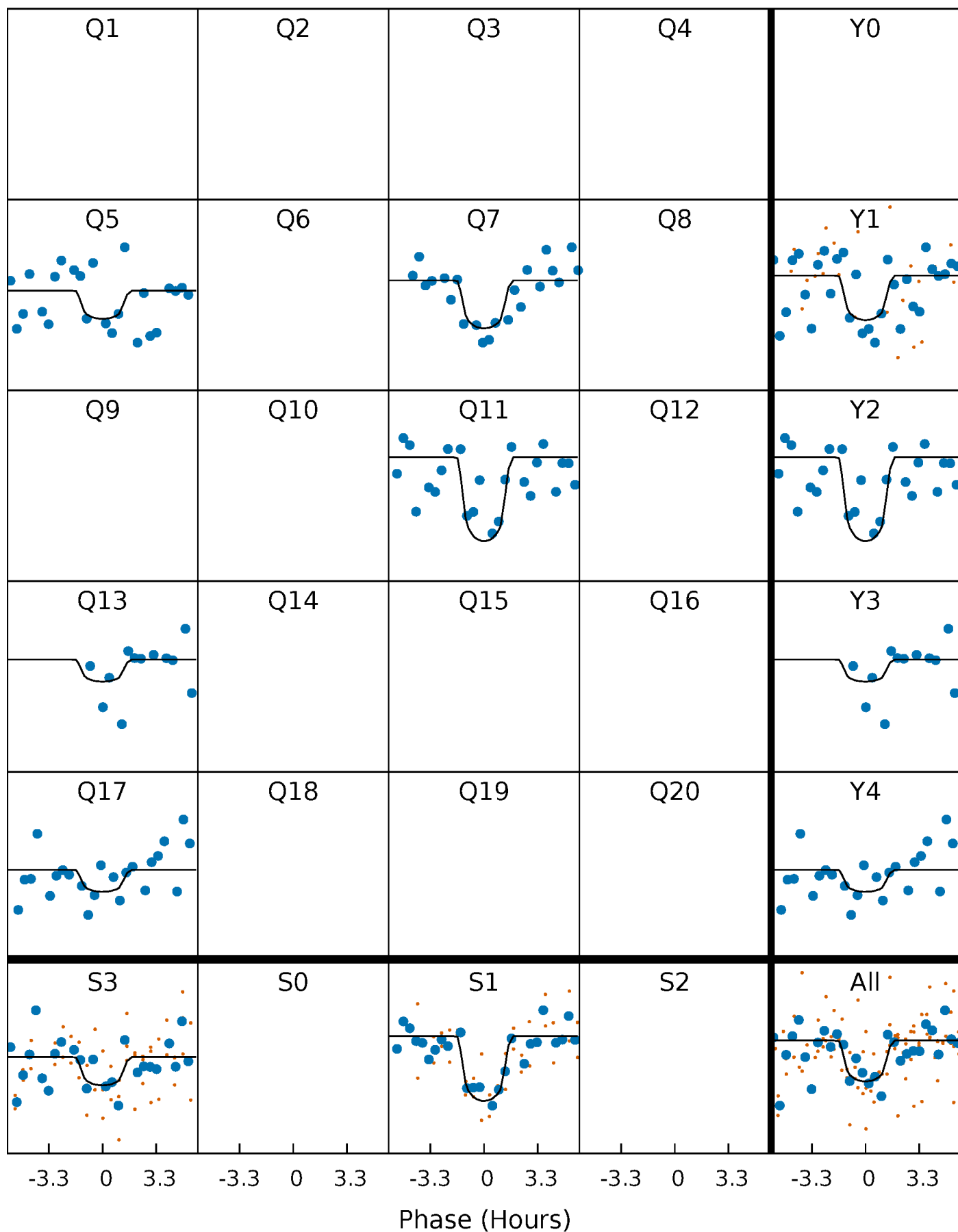
PDC Quarter-Phased Transit Curves

TCE 004476013-04 P=182.482170 Days $T_0=287.571257$ (BKJD)



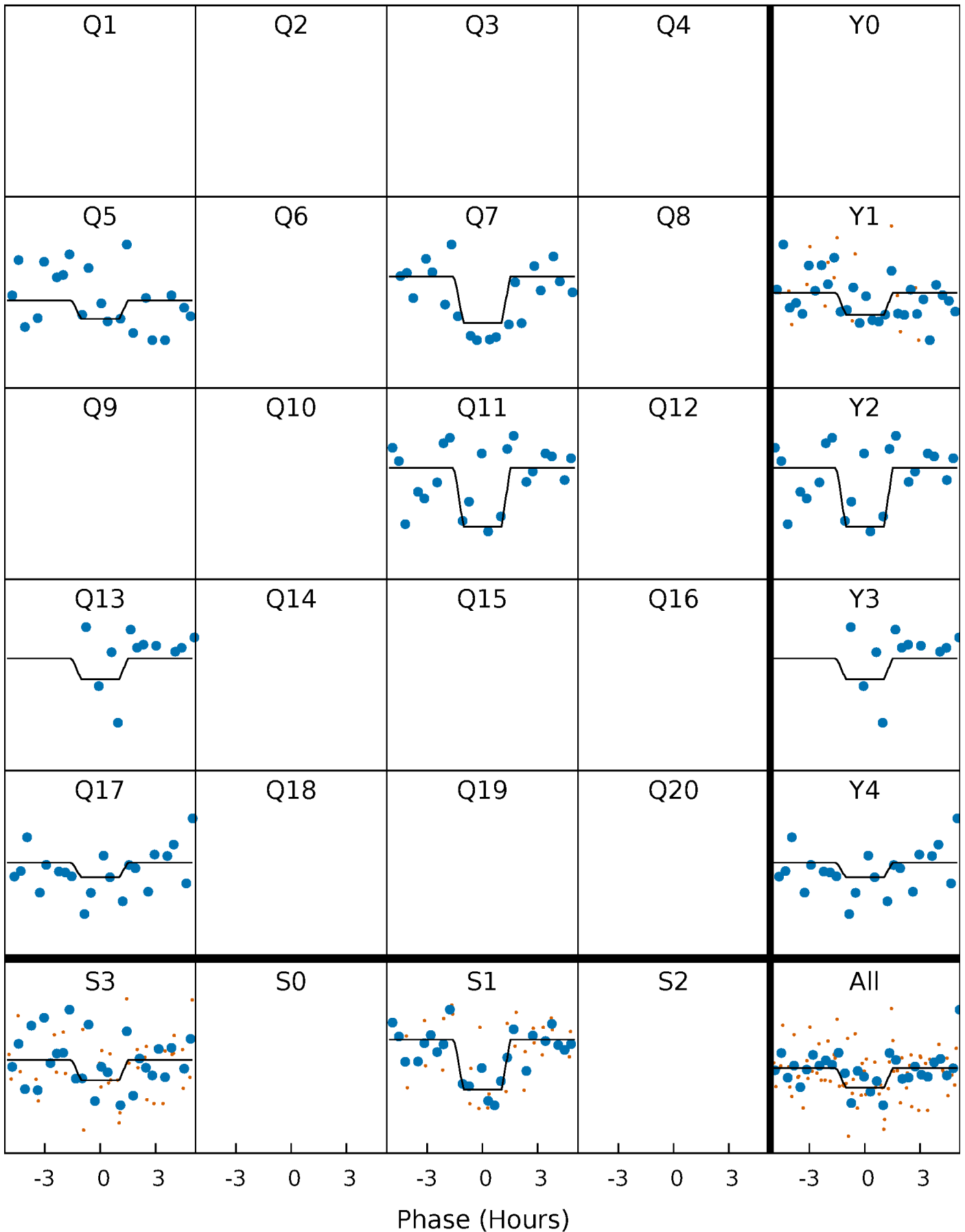
DV Quarter-Phased Transit Curves

TCE 004476013-04 P=182.482170 Days $T_0=287.571257$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

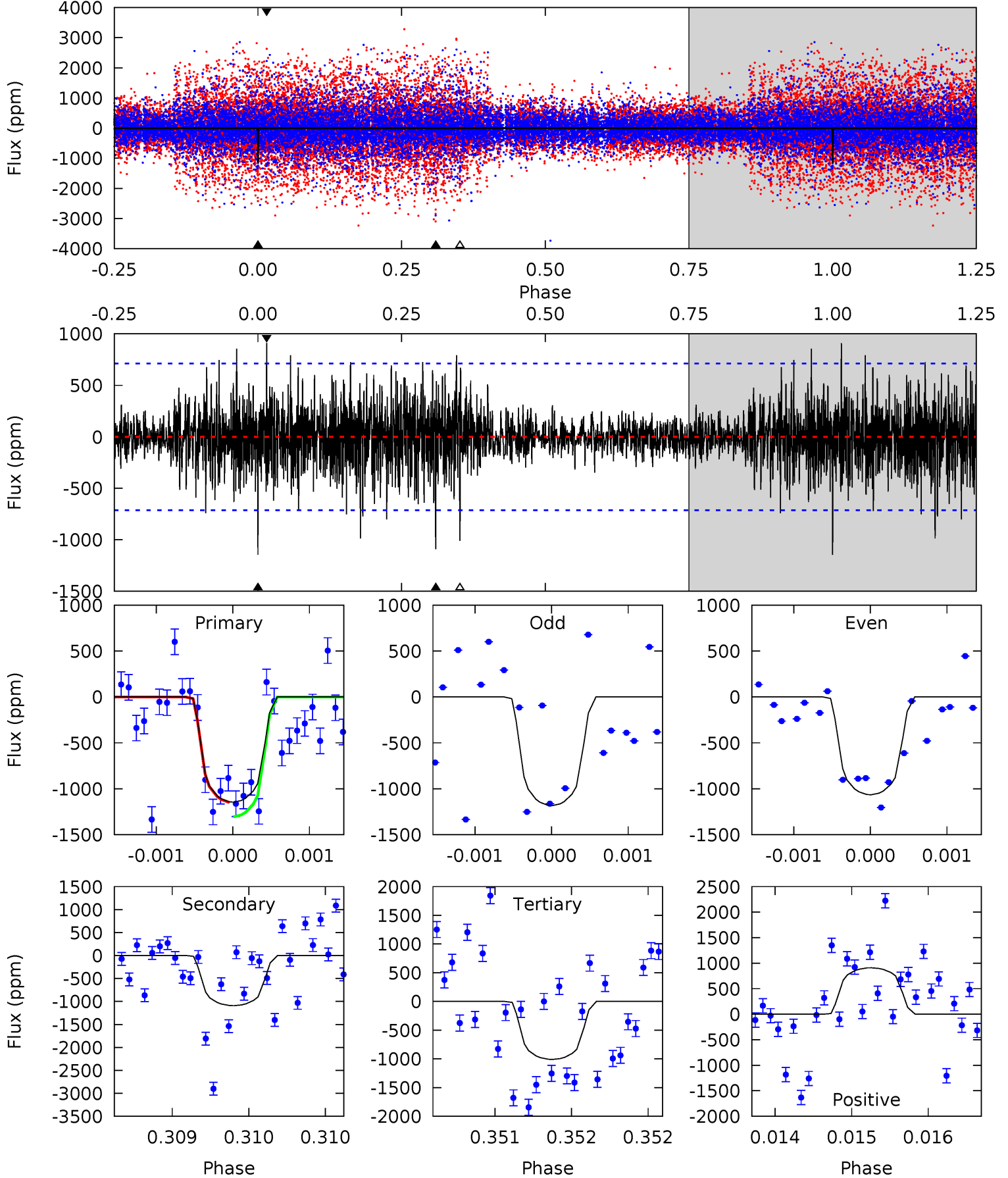
TCE 004476013-04 P=182.481268 Days $T_0=287.574529$ (BKJD)



DV Model-Shift Uniqueness Test

004476013-04, P = 182.482170 Days, E = 105.089087 Days

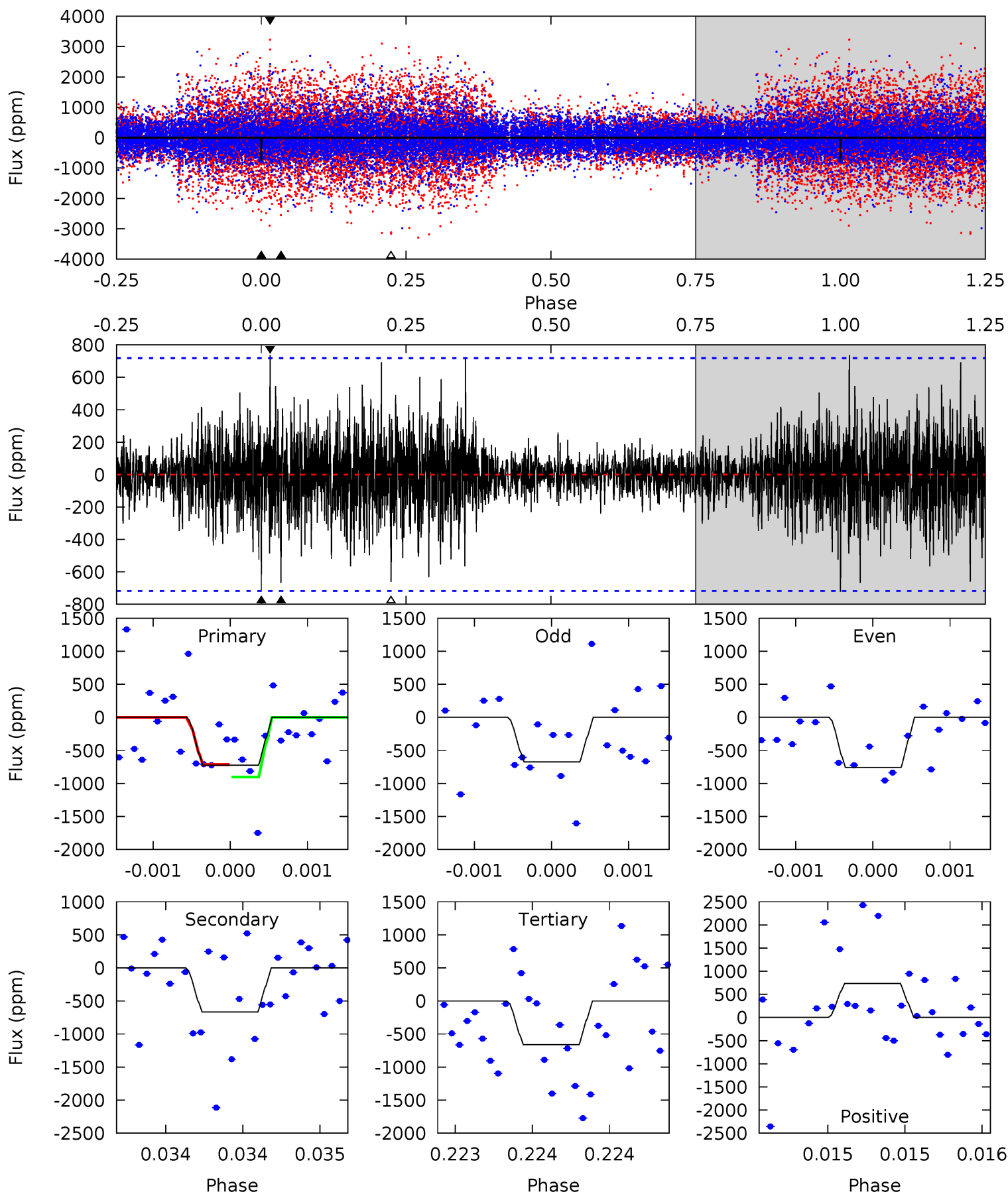
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.86	8.44	7.81	7.04	5.51	3.39	1.61	1.05	1.82	0.63	1.40	0.47	1.05	0.44	0.63



Alt Model-Shift Uniqueness Test

004476013-04, P = 182.481268 Days, E = 105.093261 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.57	5.14	5.10	5.67	5.53	3.41	1.15	0.46	-0.11	0.03	-0.54	0.31	1.37	0.50	0.70



Stellar Parameters For KIC 004476013

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5340^{+160}_{-144}	$4.633^{+0.032}_{-0.097}$	$-0.440^{+0.300}_{-0.300}$	$0.702^{+0.112}_{-0.048}$	$0.783^{+0.076}_{-0.084}$	$3.193^{+0.519}_{-1.000}$
	+3%/-3%	+1%/-2%	+68%/-68%	+16%/-7%	+10%/-11%	+16%/-31%
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 004476013-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1091 ± 129	$3.66^{+3.24}_{-2.52}$	368^{+15}_{-14}	4651^{+3528}_{-973}	$14765^{+131504}_{-10571}$
Alt.	-667 ± 130	$3.45^{+3.17}_{-2.23}$	367^{+16}_{-13}	4282^{+2553}_{-858}	9909^{+72834}_{-7239}

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 $A_{obs} \gg 1.0$

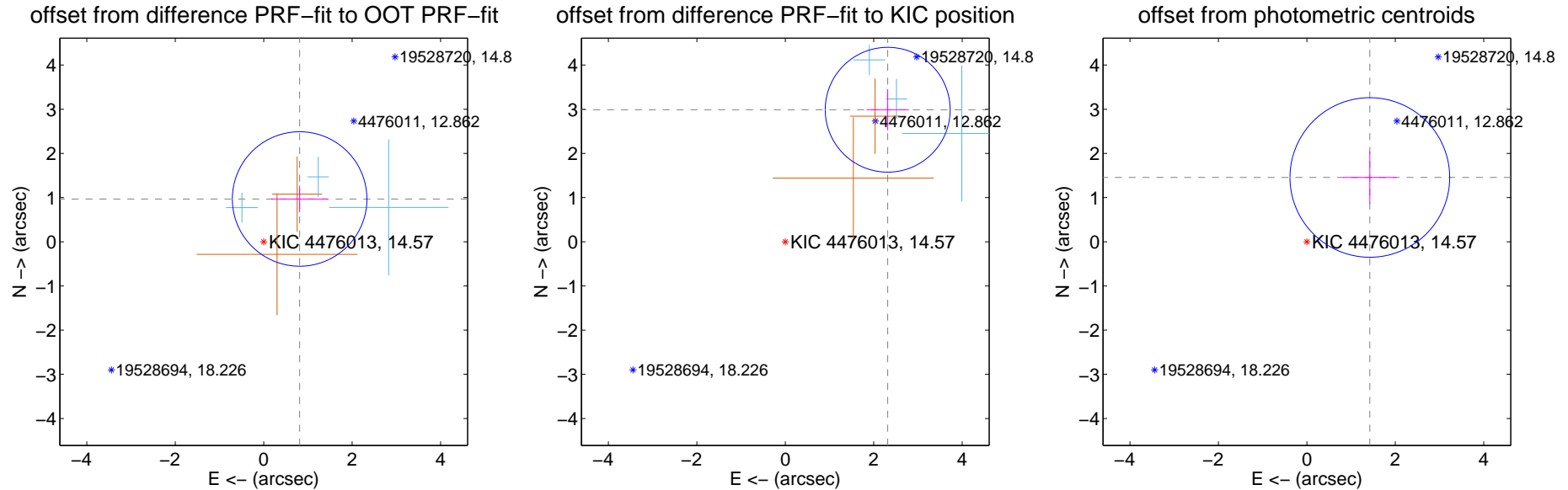
DV Centroid Data

Supplemental centroid analysis for 004476013-04. Kepler magnitude: 14.57. Transit SNR 7.87

There are 3 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 4.11 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.265 ± 0.507	2.49	-0.813 ± 0.641	0.969 ± 0.303
PRF-fit source offset from KIC position	3.781 ± 0.471	8.03	-2.316 ± 0.480	2.989 ± 0.466
photometric centroid source offset	2.04 ± 0.60	3.38	-1.42 ± 0.61	1.46 ± 0.59



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

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

Q1 no difference image



Q1 no OOT image



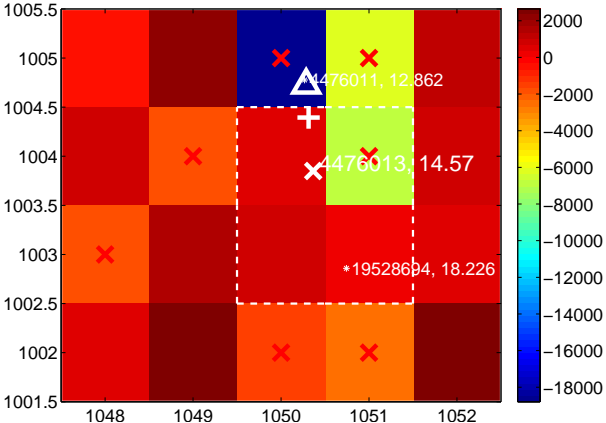
Q2 no difference image



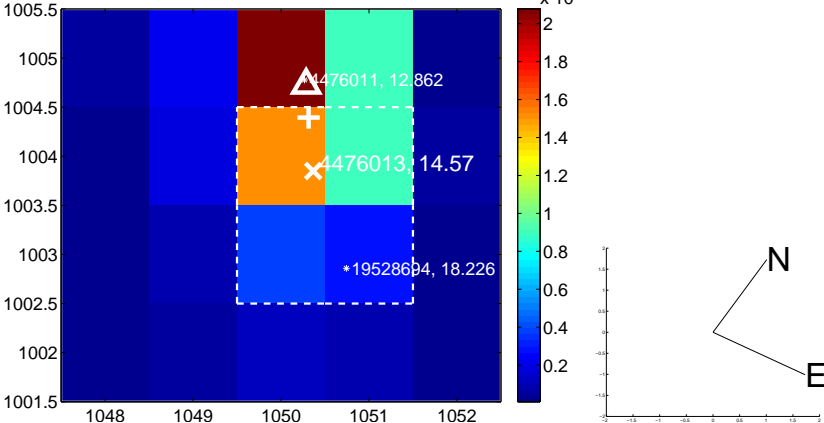
Q2 no OOT image



Q3 difference image. Poor Quality



Q3 OOT image



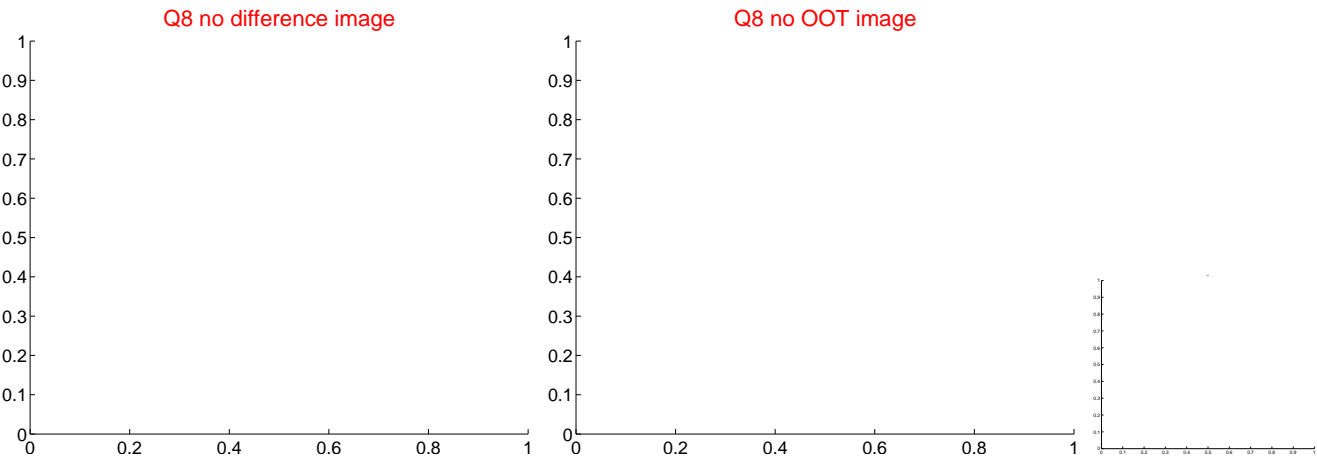
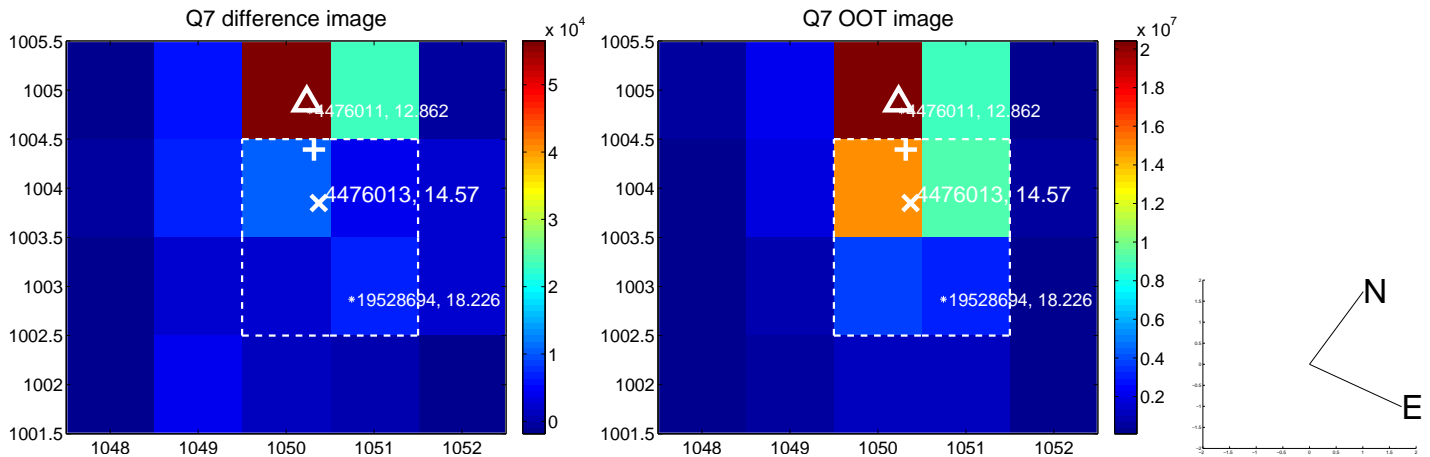
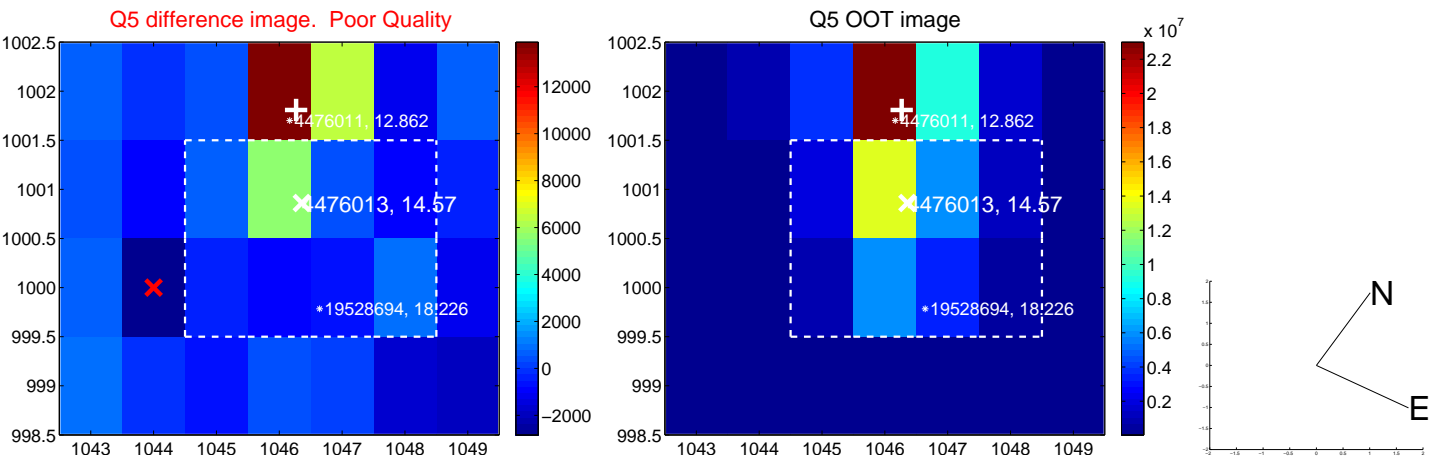
Q4 no difference image



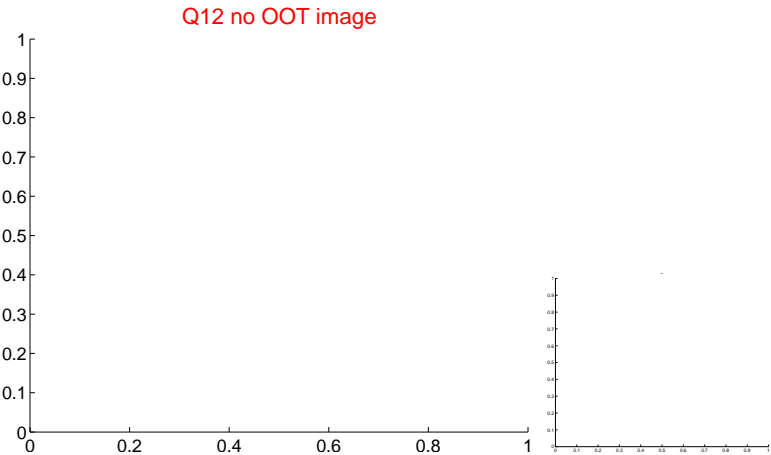
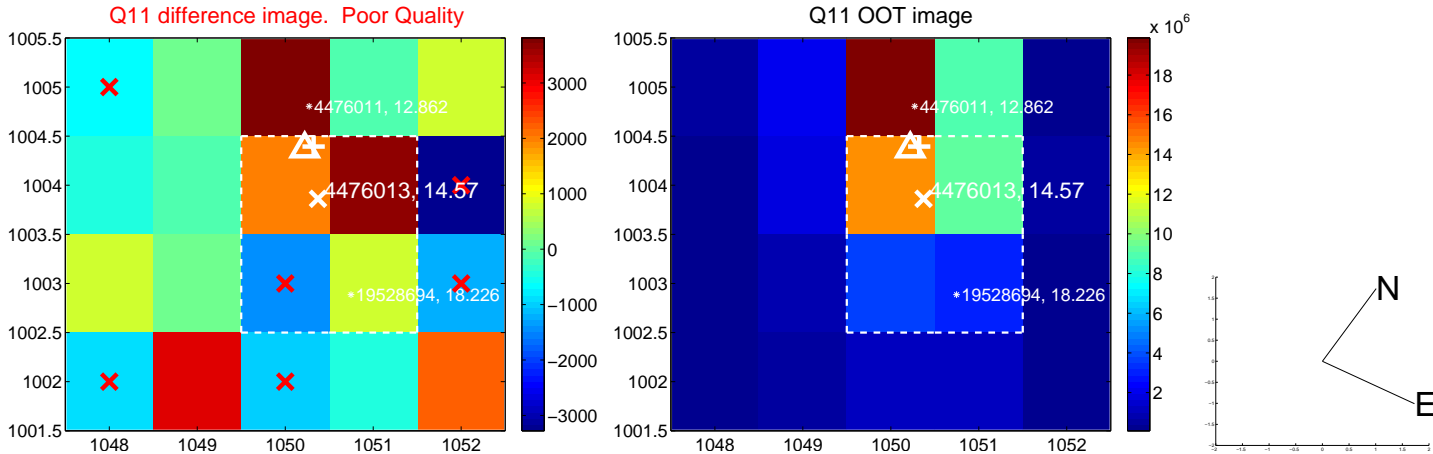
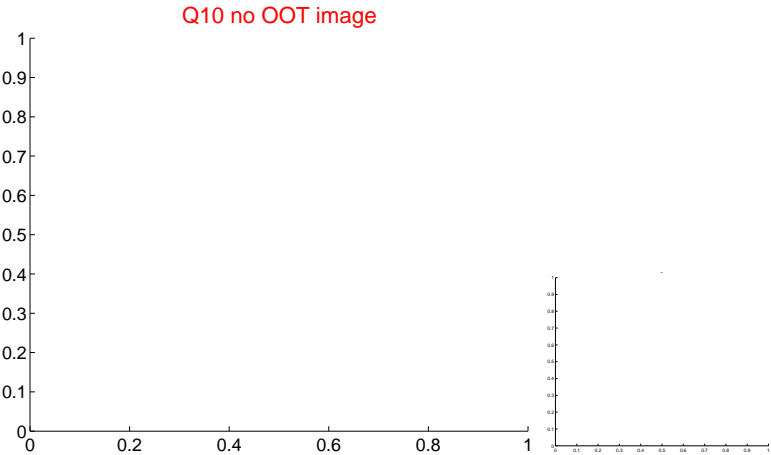
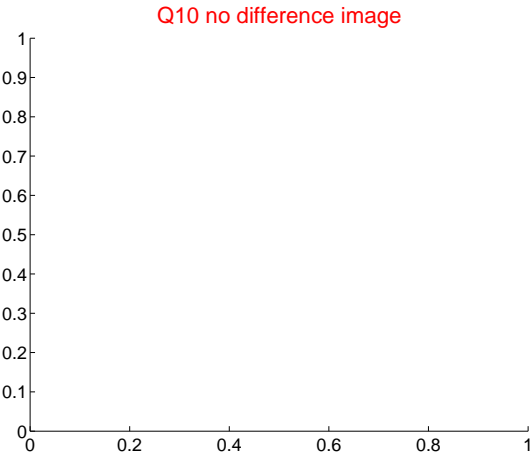
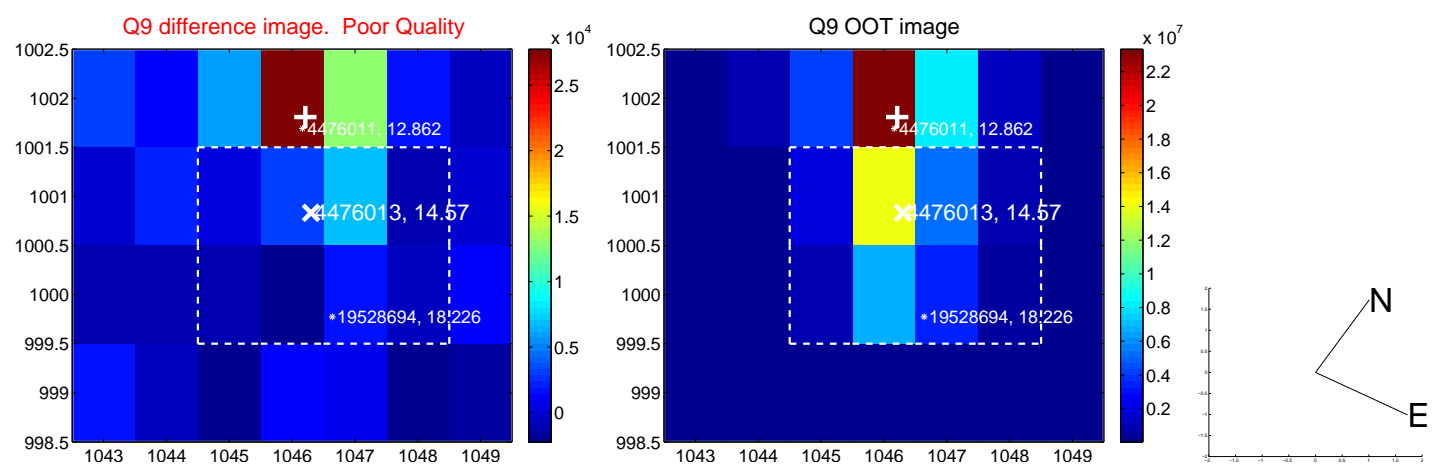
Q4 no OOT image



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

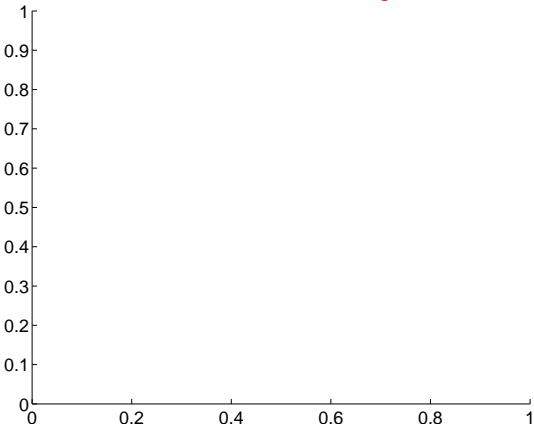


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

Q13 no difference image



Q13 no OOT image



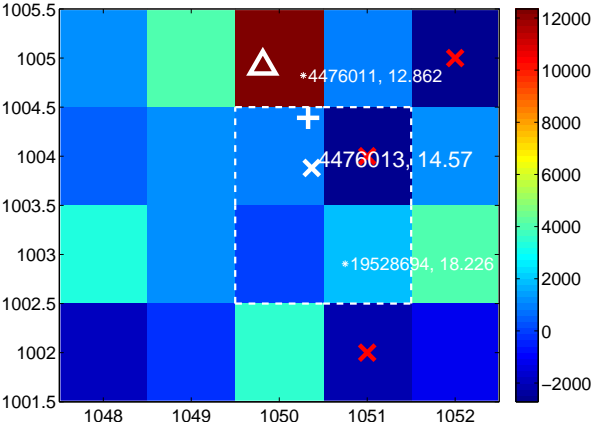
Q14 no difference image



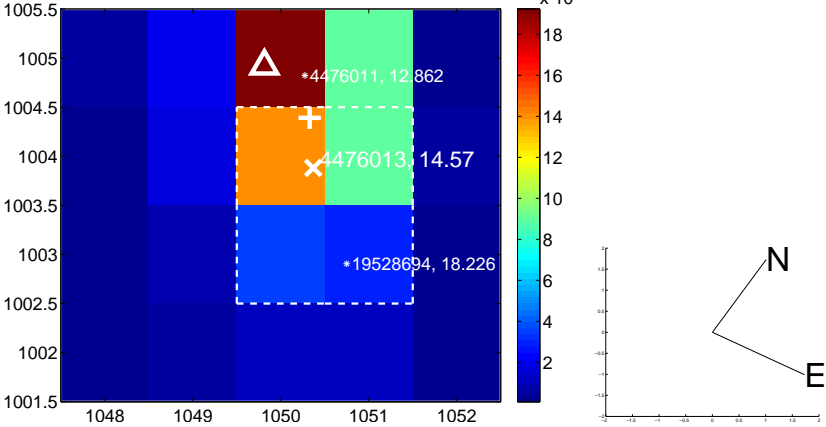
Q14 no OOT image



Q15 difference image



Q15 OOT image



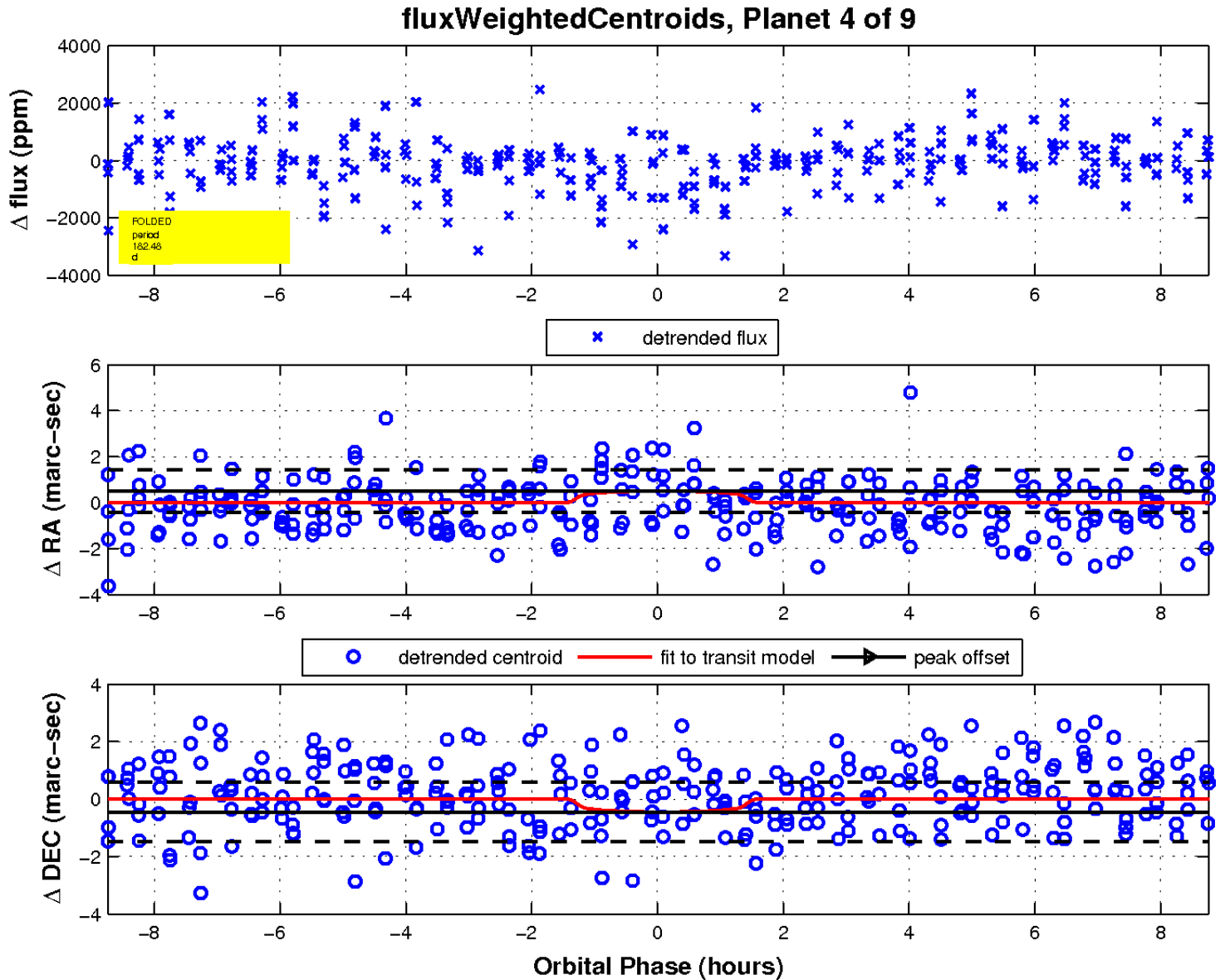
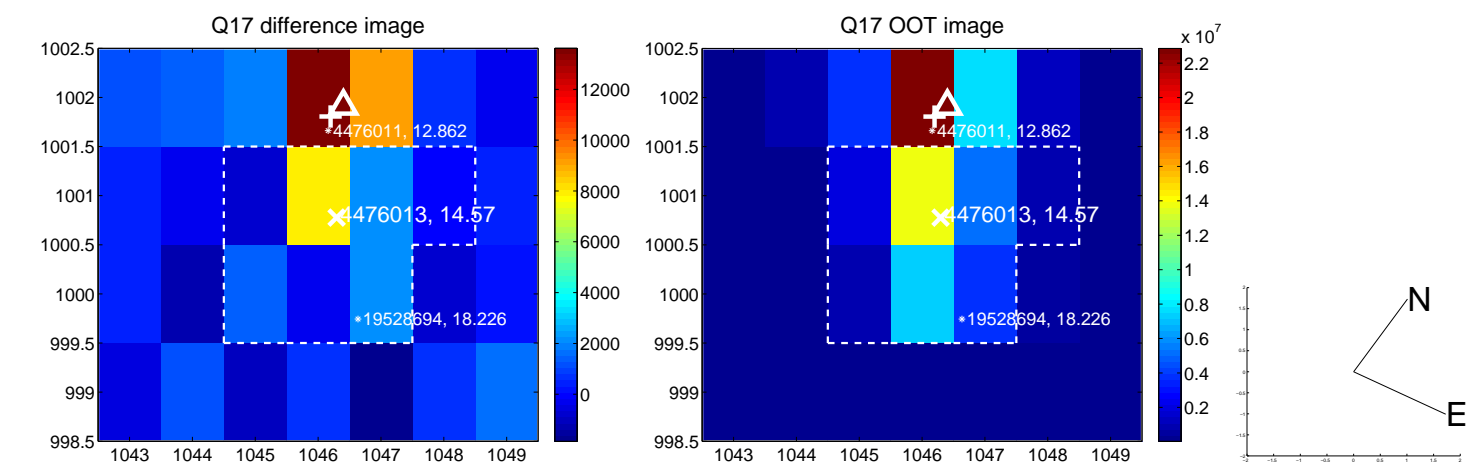
Q16 no difference image



Q16 no OOT image

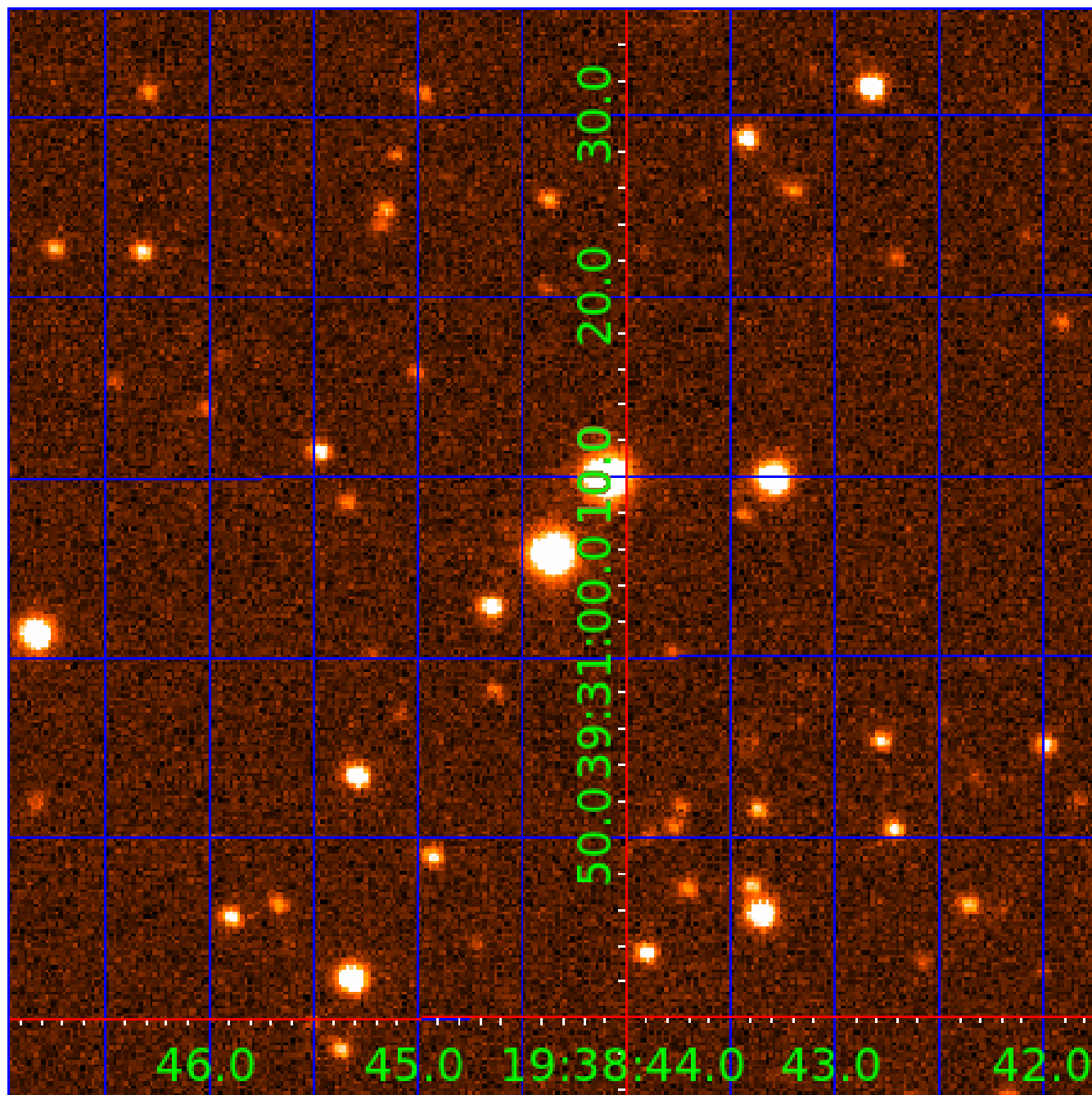


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004476013

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})
004476013-01	OBS	No	3.111300	131.965214	87.6	12.343	7.9	7.2	0.70	5340	0.65	245.11
004476013-02	OBS	No	194.686816	286.324219	1834.8	4.706	9.3	8.5	0.70	5340	5.82	0.99
004476013-03	OBS	No	383.171892	135.986790	2122.1	7.624	8.9	7.9	0.70	5340	3.31	0.40
004476013-04	OBS	No	182.482170	287.571257	1122.5	2.928	8.6	7.9	0.70	5340	2.52	1.08
004476013-05	OBS	No	347.259060	146.038192	2401.0	6.883	8.6	9.7	0.70	5340	4.05	0.46
004476013-06	OBS	No	371.401491	142.216741	1899.3	8.826	7.9	8.1	0.70	5340	3.33	0.42
004476013-07	OBS	No	363.428264	168.875171	2172.9	4.775	8.2	7.4	0.70	5340	5.93	0.43
004476013-09	OBS	No	343.360397	154.816901	2157.6	6.228	8.3	8.2	0.70	5340	6.28	0.46

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004476013-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—CENT_KIC_POS
004476013-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

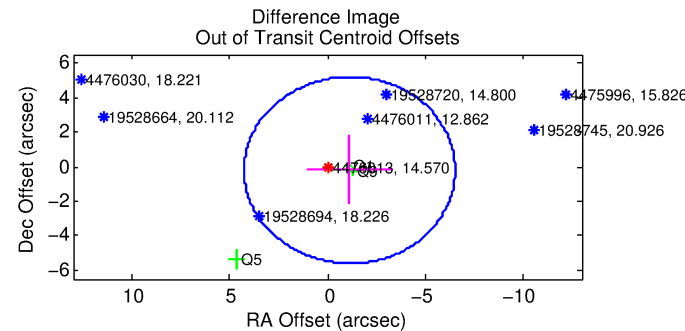
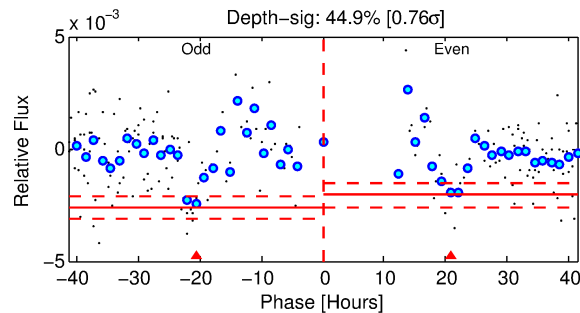
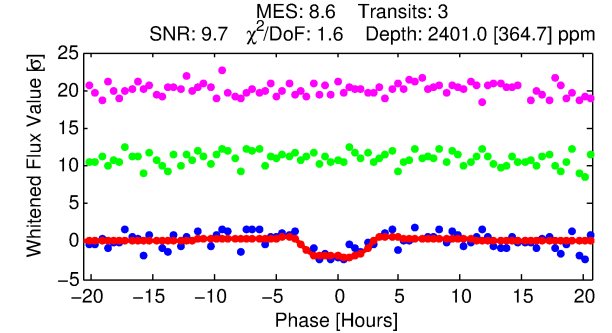
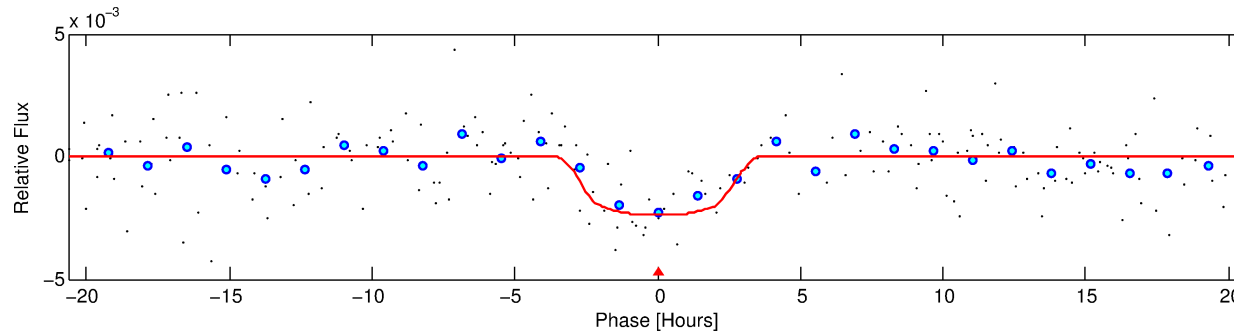
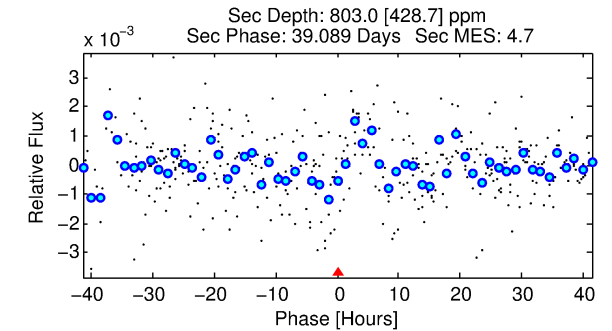
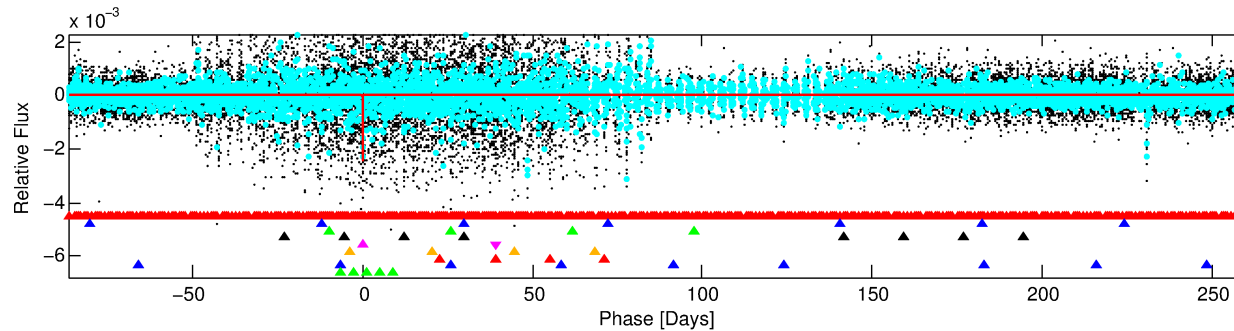
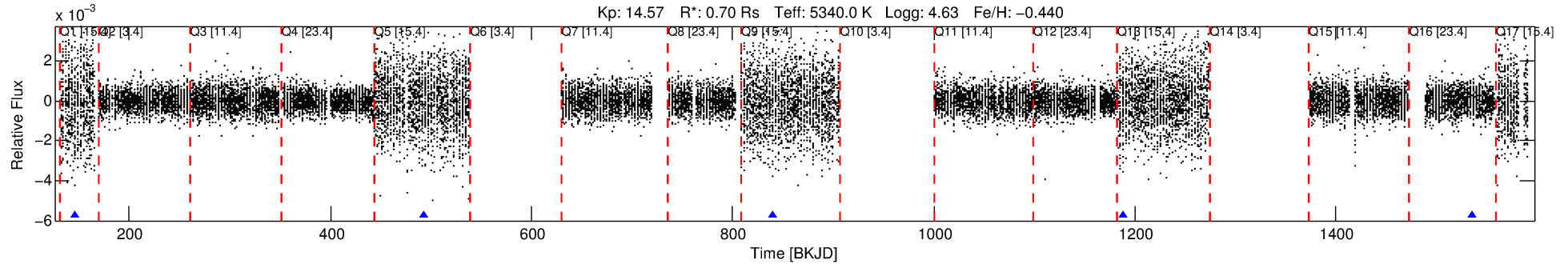
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004476013-05

No Significant Match Found

DV One-Page Summary

KIC: 4476013 Candidate: 5 of 9 Period: 347.259 d



DV Fit Results:

Period = 347.25906 [0.00771] d
Epoch = 146.0382 [0.0159] BKJD
Rp/R* = 0.0529 [0.0084]
a/R* = 221.63 [111.91]
b = 0.88 [0.13]
Seff = 0.46 [0.10]
Teq = 210 [11] K
Rp = 4.05 [0.91] Re
a = 0.8872 [0.1152] AU
Ag = 21163.21 [13712.90] [1.54σ]
Teffp = 3908 [618] K [5.98σ]

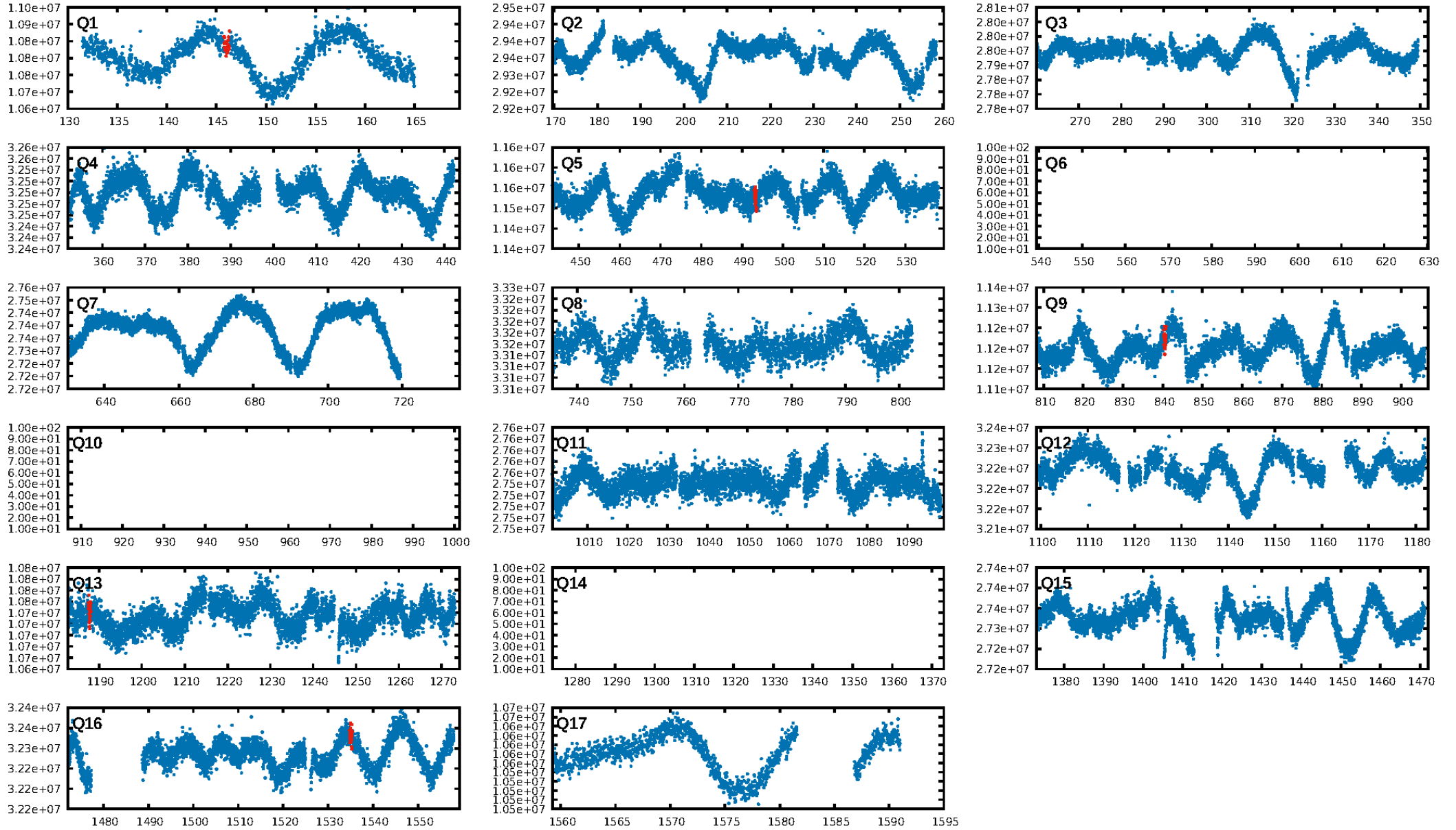
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [10.08σ]
LongPeriod-sig: 100.0% [46.32σ]
ModelChiSquare2-sig: 64.8%
ModelChiSquareGof-sig: 91.3%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 0.3959
Centroid-sig: 46.8%
Centroid-so: 1.616 arcsec [5.90σ]
OotOffset-rm: 1.150 arcsec [0.64σ]
KicOffset-rm: 4.596 arcsec [2.47σ]
OotOffset-st: 0/0/0/3 [3]
KicOffset-st: 0/0/0/3 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 0.25 [1/4]

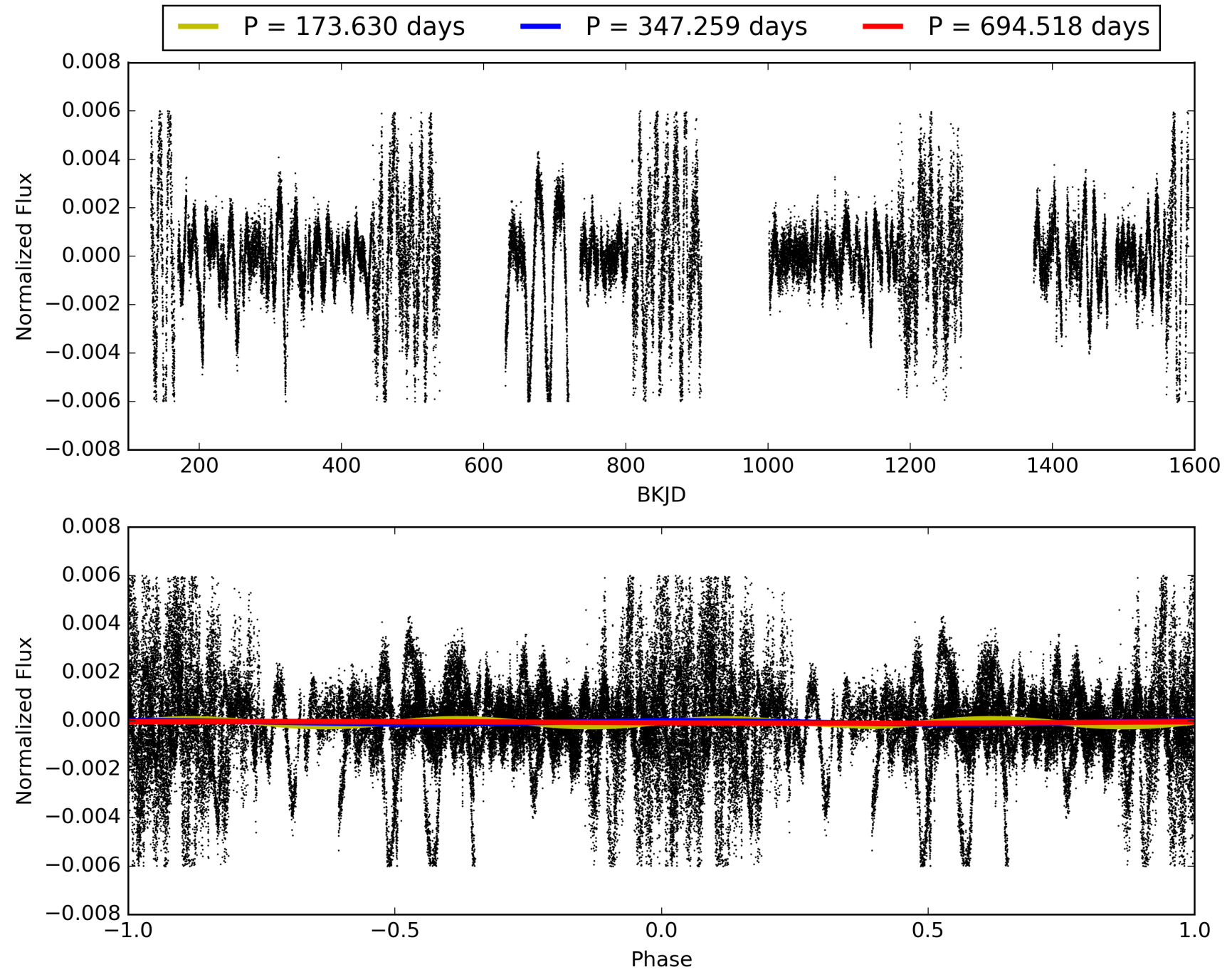
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:37:26 Z

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

TCE 004476013-05, PDC Light Curves

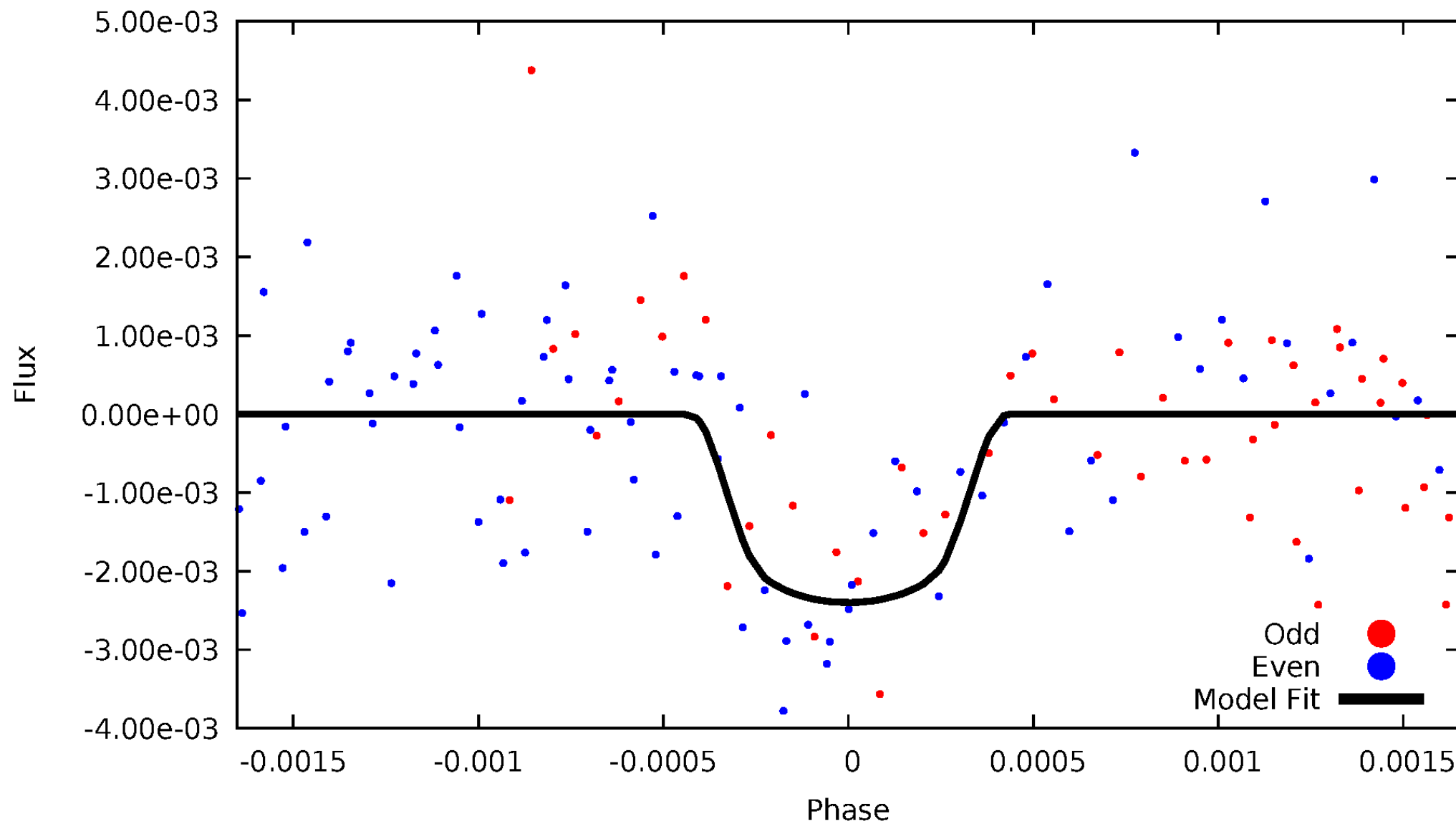


TCE 004476013-05



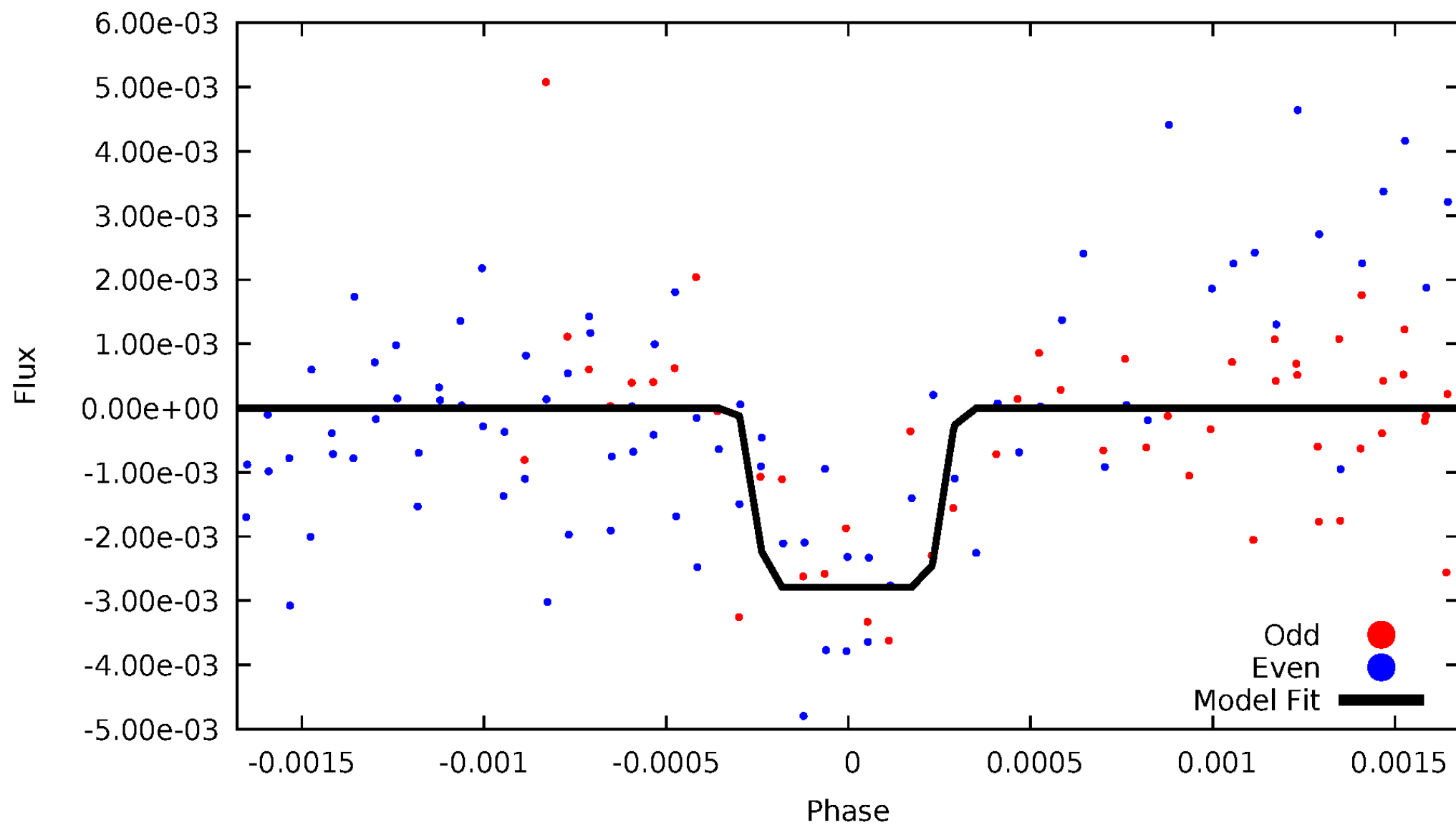
DV Odd/Even

TCE 004476013-05



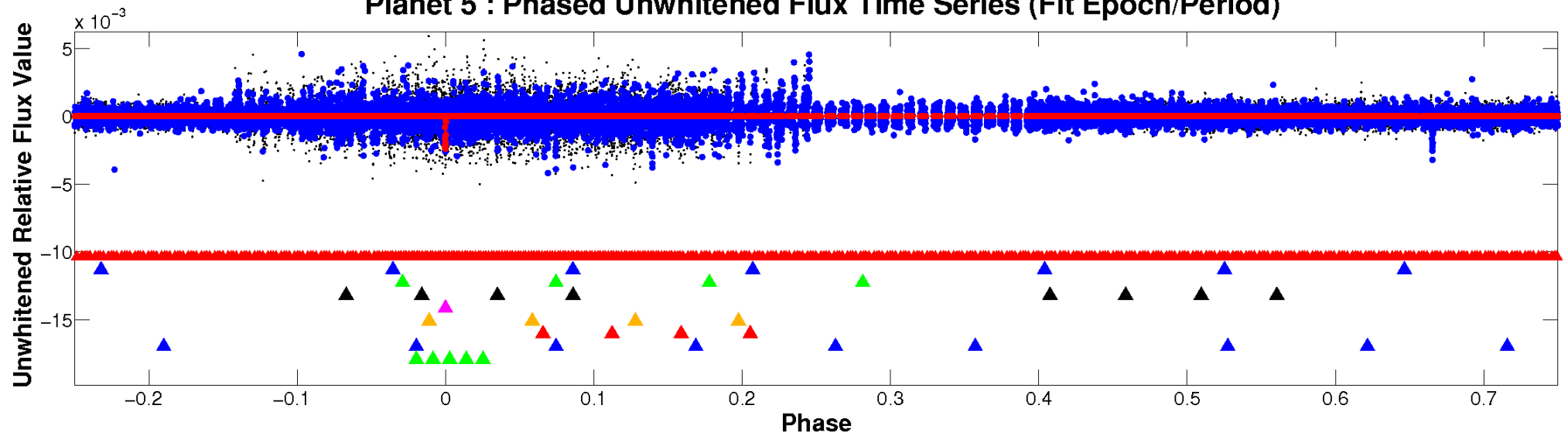
ALT Odd/Even

TCE 004476013-05

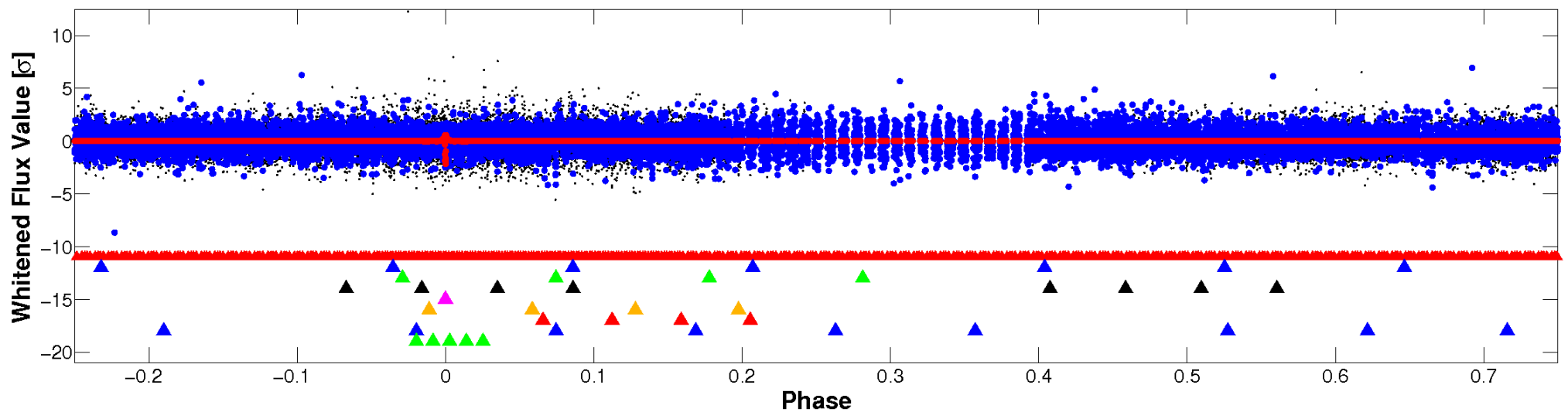


Non-Whitened Vs. Whitened Light Curve

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

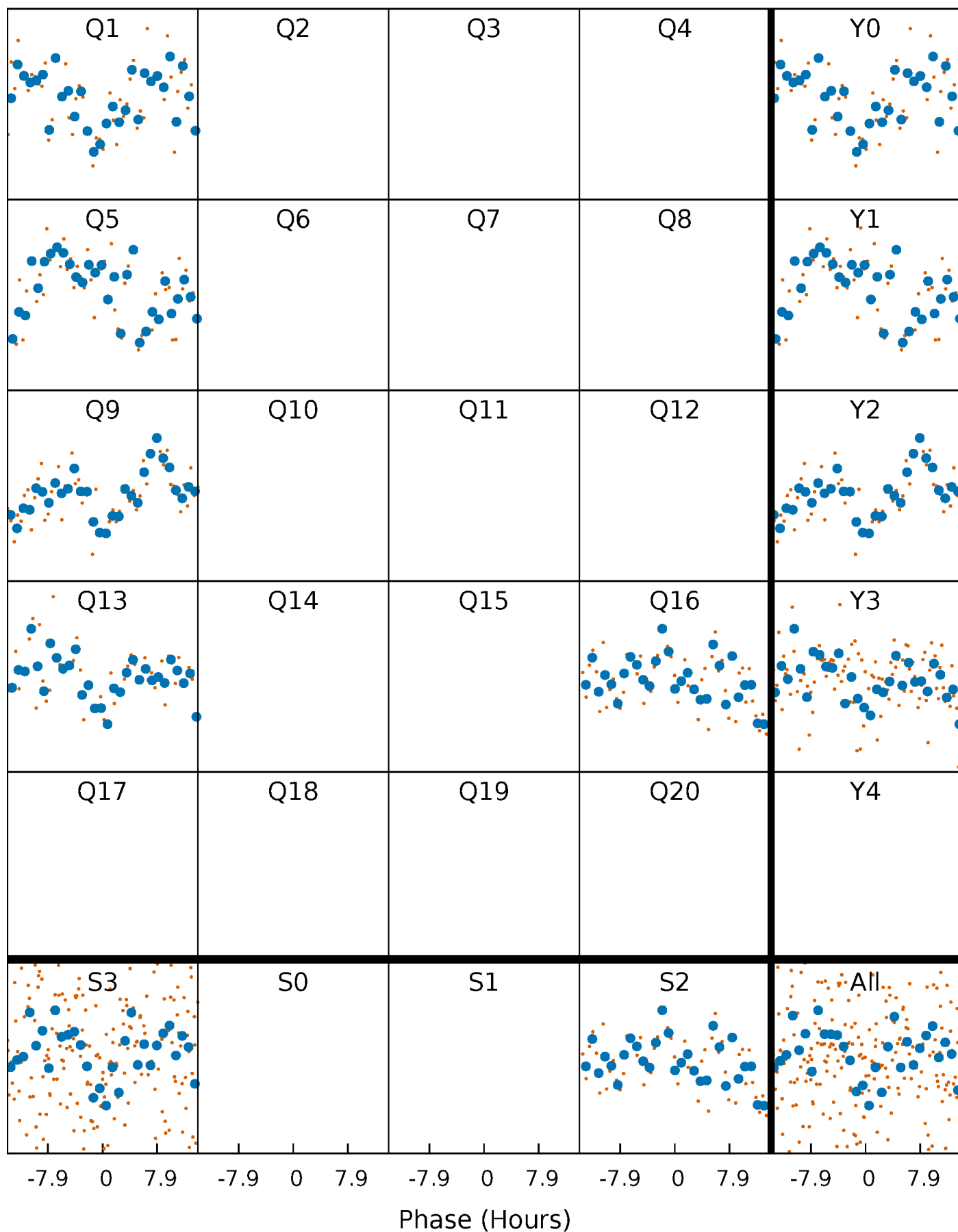


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



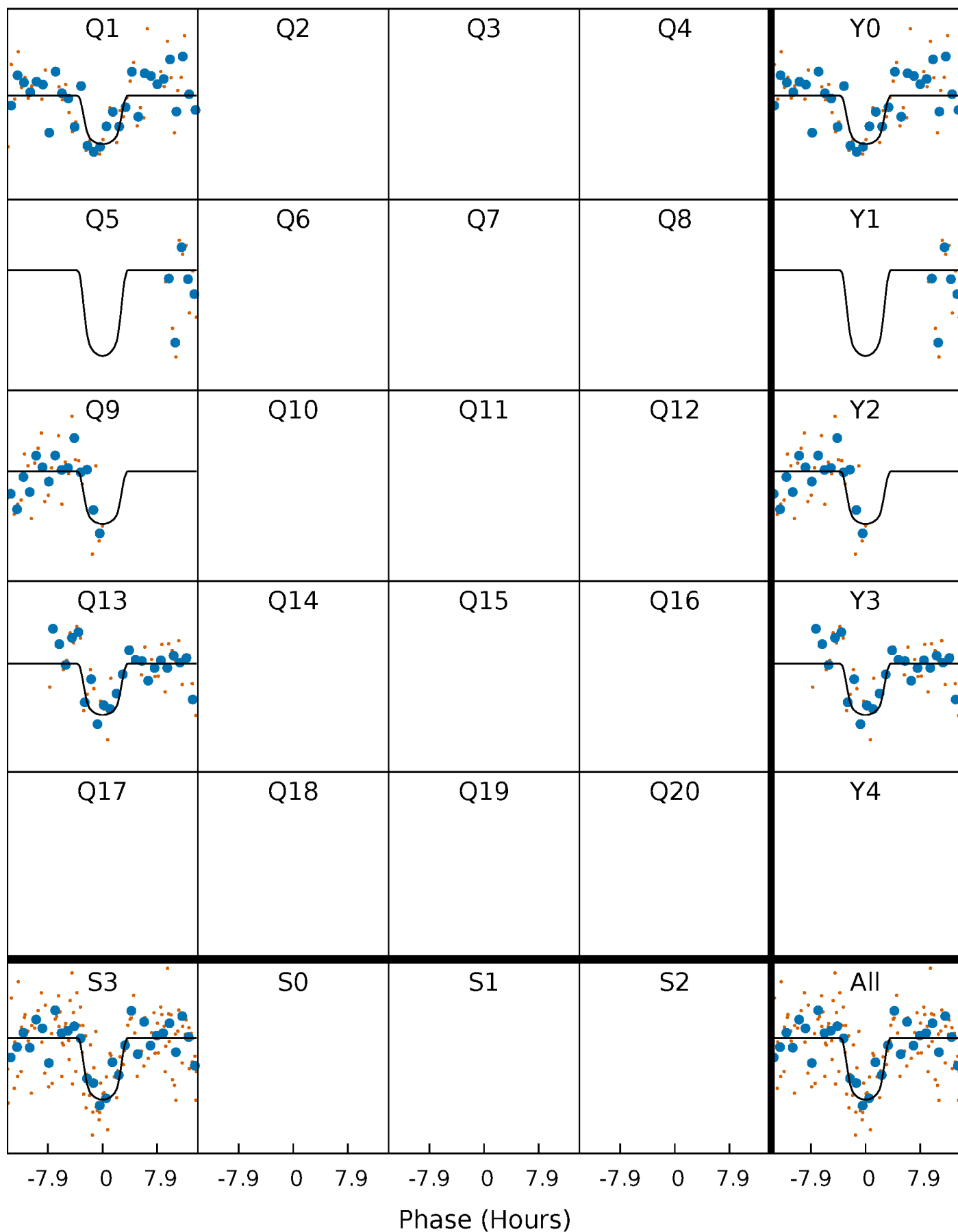
PDC Quarter-Phased Transit Curves

TCE 004476013-05 $P=347.259060$ Days $T_0=146.038192$ (BKJD)



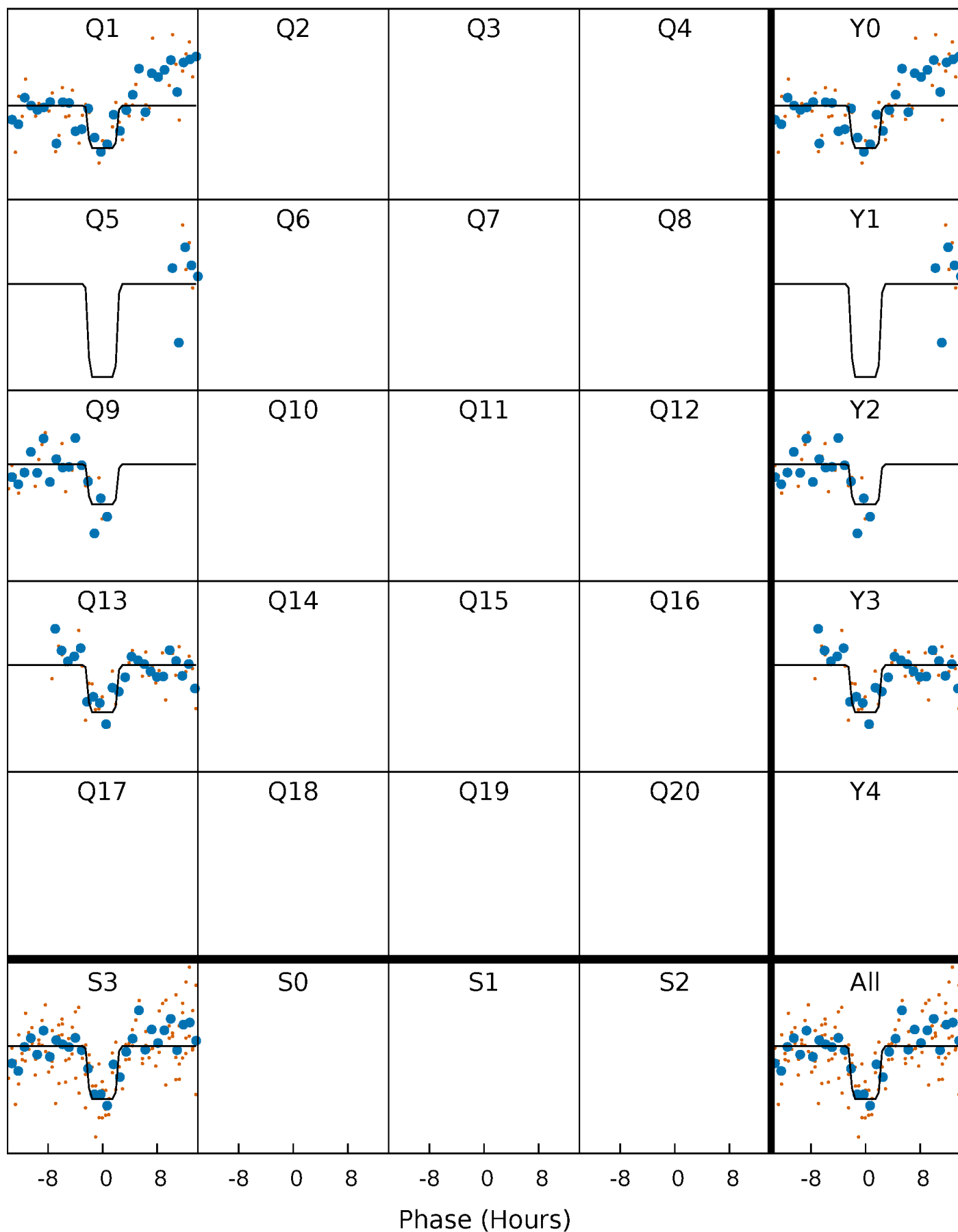
DV Quarter-Phased Transit Curves

TCE 004476013-05 $P=347.259060$ Days $T_0=146.038192$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

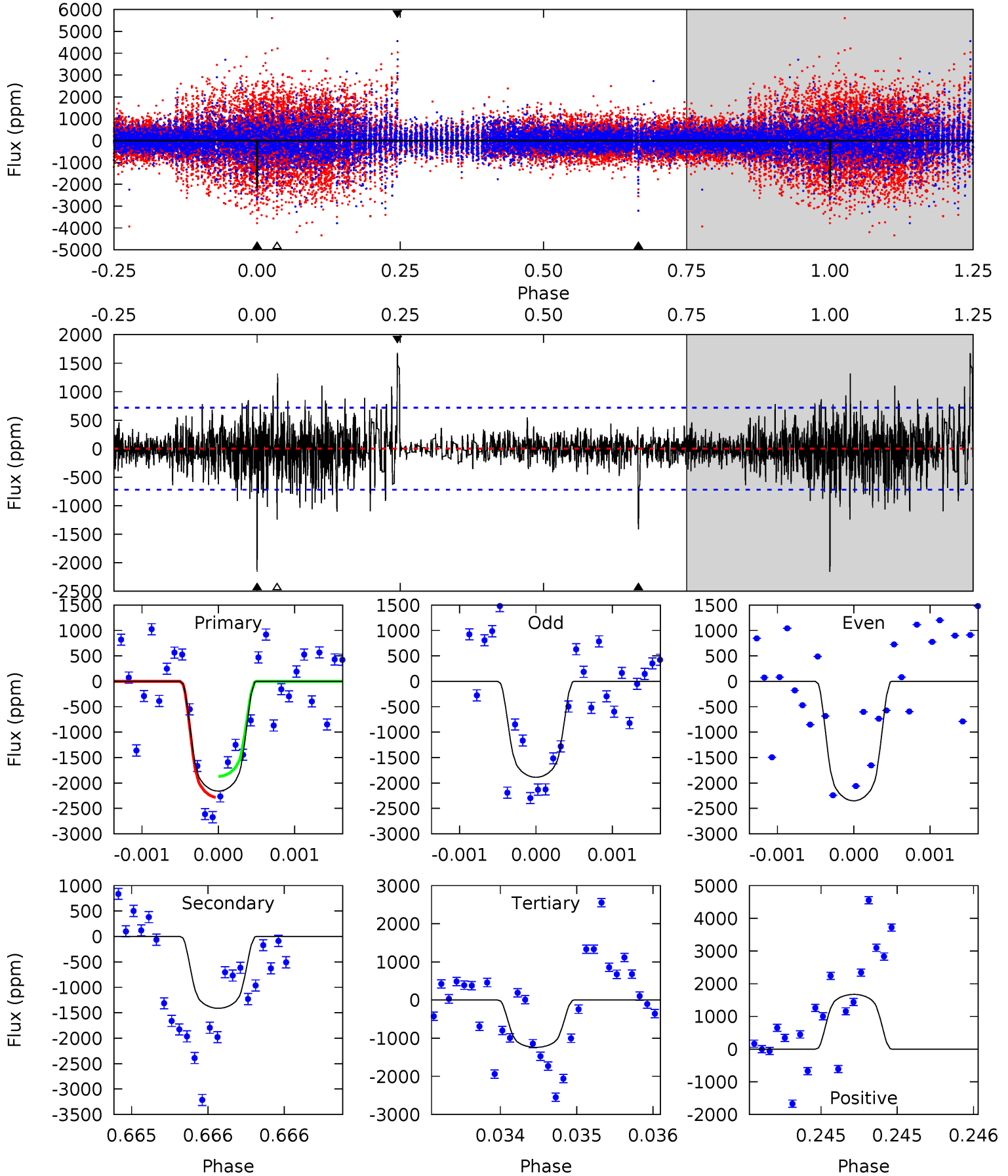
TCE 004476013-05 $P=347.268352$ Days $T_0=146.001187$ (BKJD)



DV Model-Shift Uniqueness Test

004476013-05, P = 347.259060 Days, E = 146.038192 Days

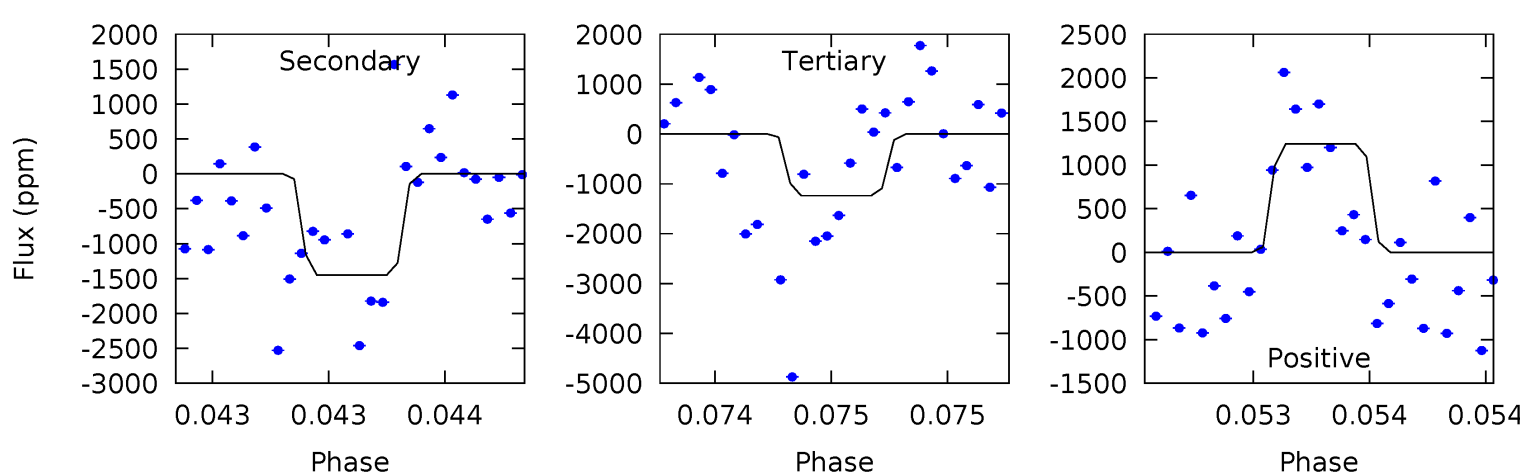
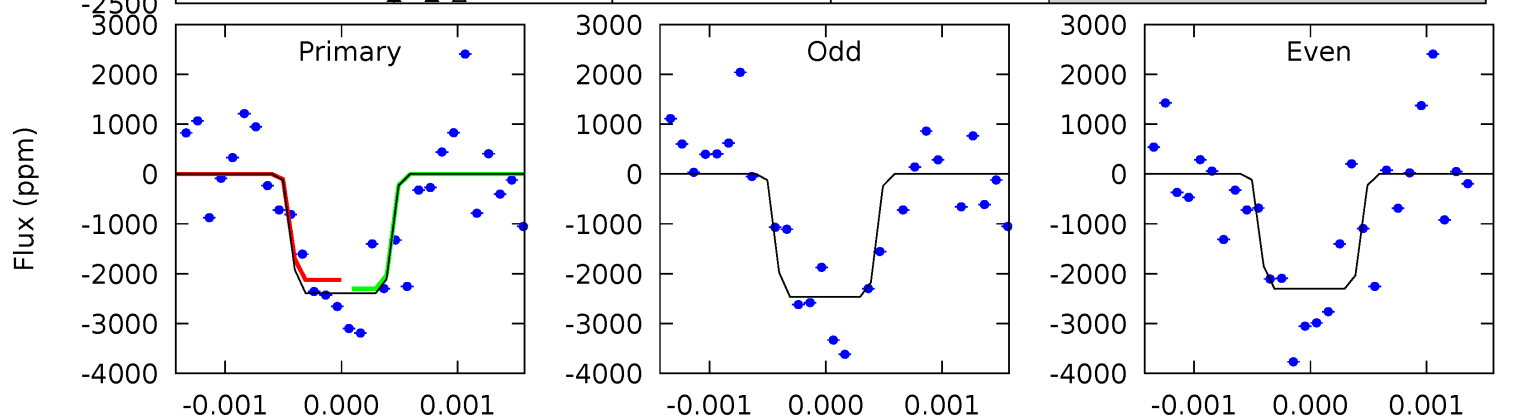
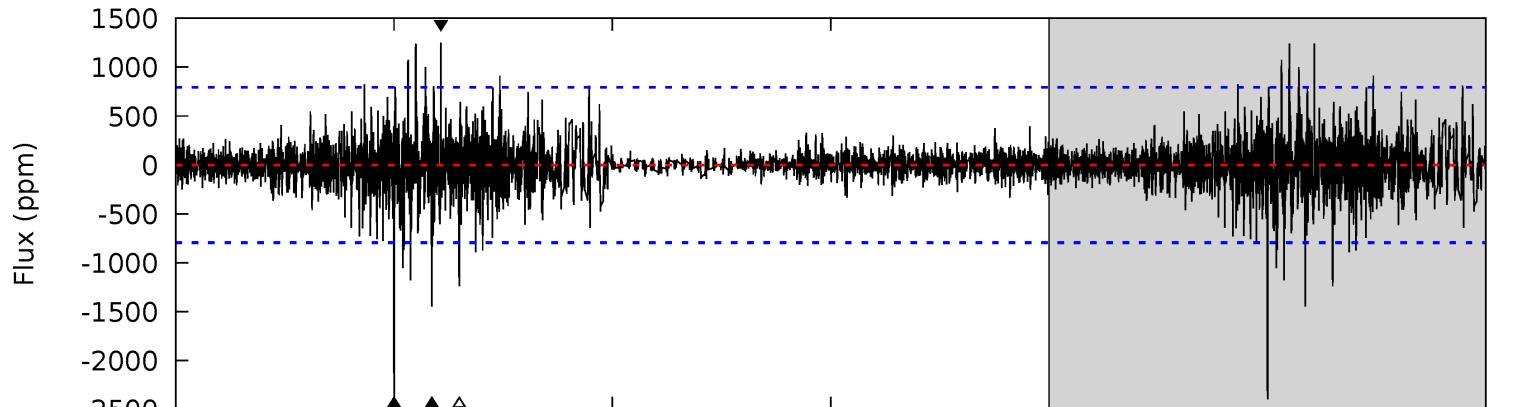
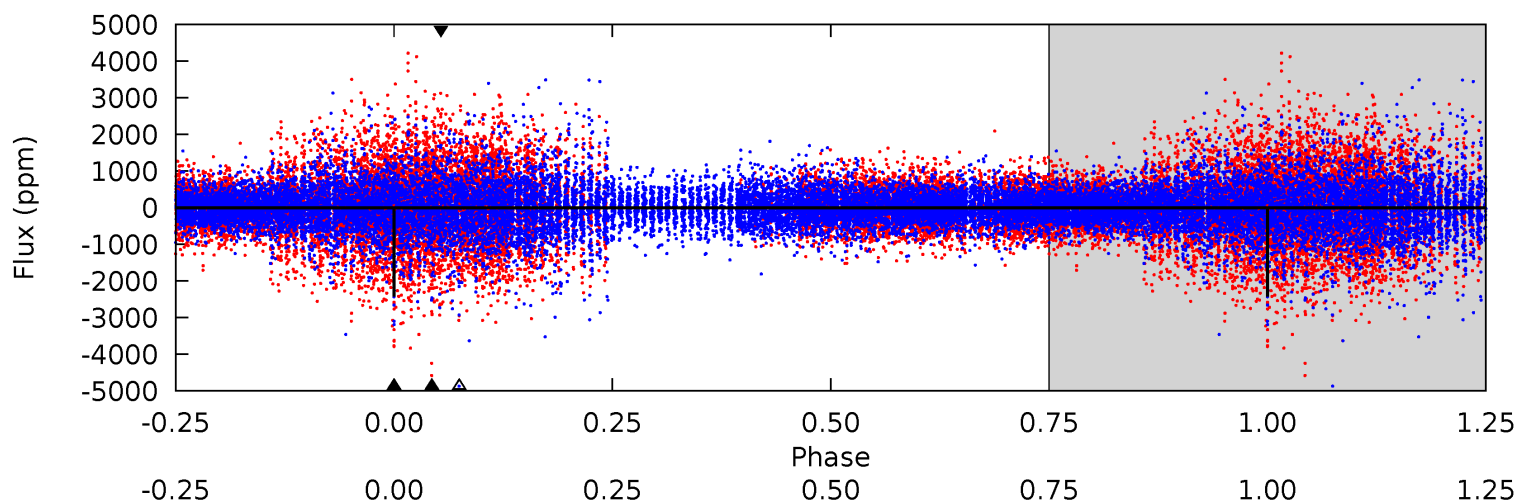
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.4	10.8	9.45	12.7	5.47	3.33	1.93	7.00	3.70	1.31	-1.99	1.71	0.98	0.44	1.49



Alt Model-Shift Uniqueness Test

004476013-05, P = 347.268352 Days, E = 146.001187 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.7	10.1	8.65	8.67	5.54	3.44	1.25	8.07	8.04	1.47	1.44	0.53	1.09	0.34	0.56



Stellar Parameters For KIC 004476013

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5340^{+160}_{-144}	$4.633^{+0.032}_{-0.097}$	$-0.440^{+0.300}_{-0.300}$	$0.702^{+0.112}_{-0.048}$	$0.783^{+0.076}_{-0.084}$	$3.193^{+0.519}_{-1.000}$
	+3%/-3%	+1%/-2%	+68%/-68%	+16%/-7%	+10%/-11%	+16%/-31%
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 004476013-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-1413 ± 131	$4.14^{+0.72}_{-0.66}$	297^{+13}_{-11}	4636^{+388}_{-312}	35223^{+15746}_{-9970}
Alt.	-1448 ± 143	$4.12^{+0.76}_{-0.71}$	297^{+13}_{-11}	4659^{+409}_{-289}	36336^{+16990}_{-10216}

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

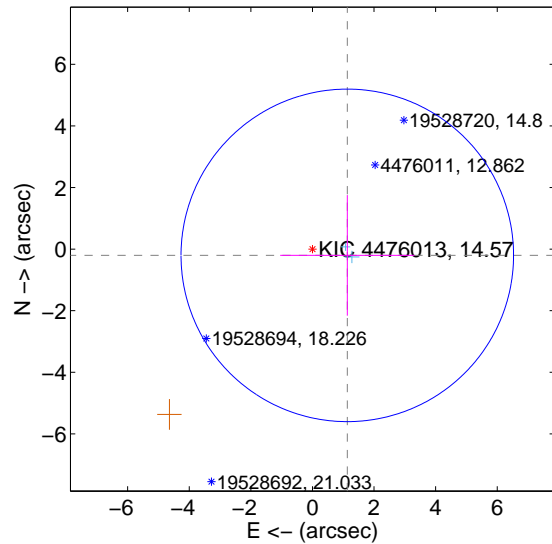
Supplemental centroid analysis for 004476013-05. Kepler magnitude: 14.57. Transit SNR 9.73

There are 2 quarters with good PRF difference image offsets

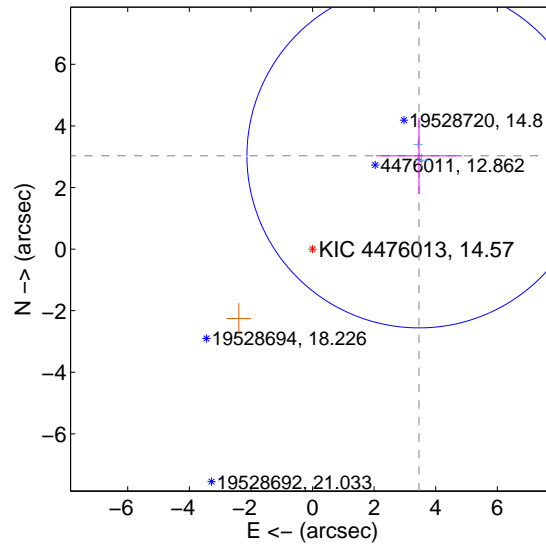
The OOT PRF centroid is offset from the target star catalog position by about 3.87 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.150 ± 1.799	0.64	-1.131 ± 2.179	-0.204 ± 1.956
PRF-fit source offset from KIC position	4.596 ± 1.862	2.47	-3.457 ± 1.395	3.028 ± 1.238
photometric centroid source offset	1.62 ± 0.27	5.90	-1.16 ± 0.27	1.12 ± 0.28

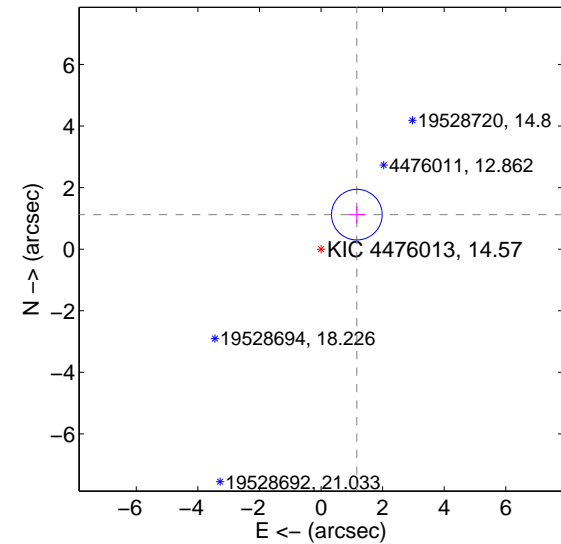
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

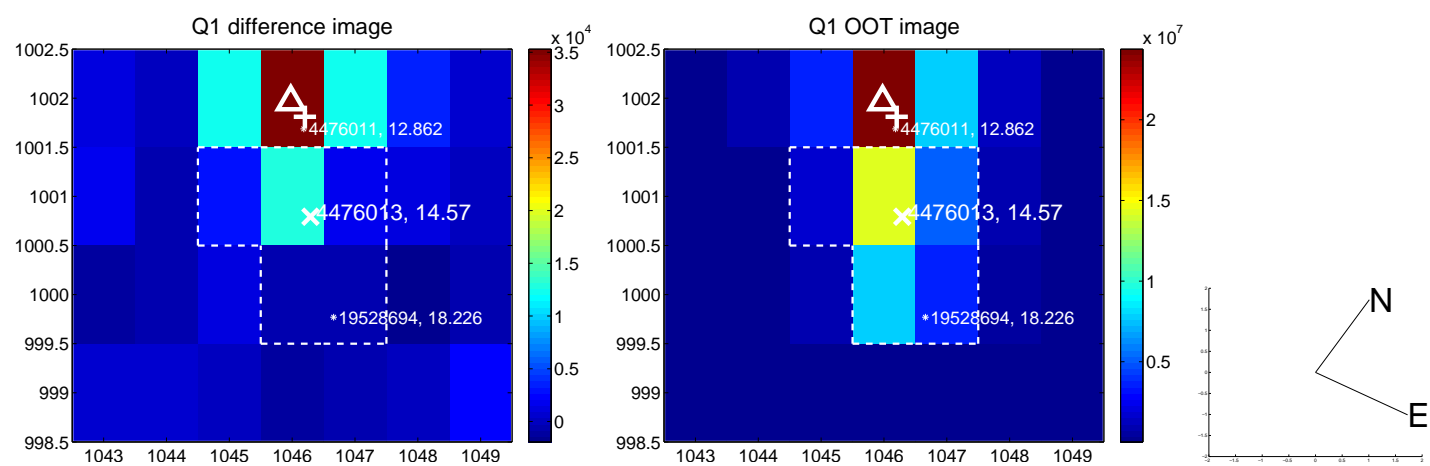


offset from photometric centroids

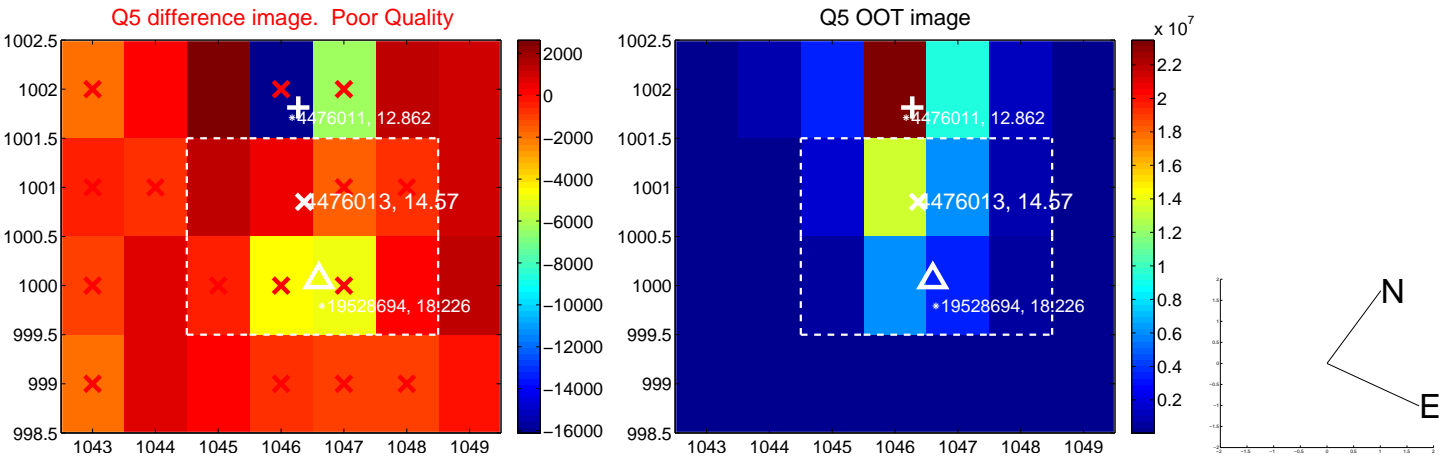


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

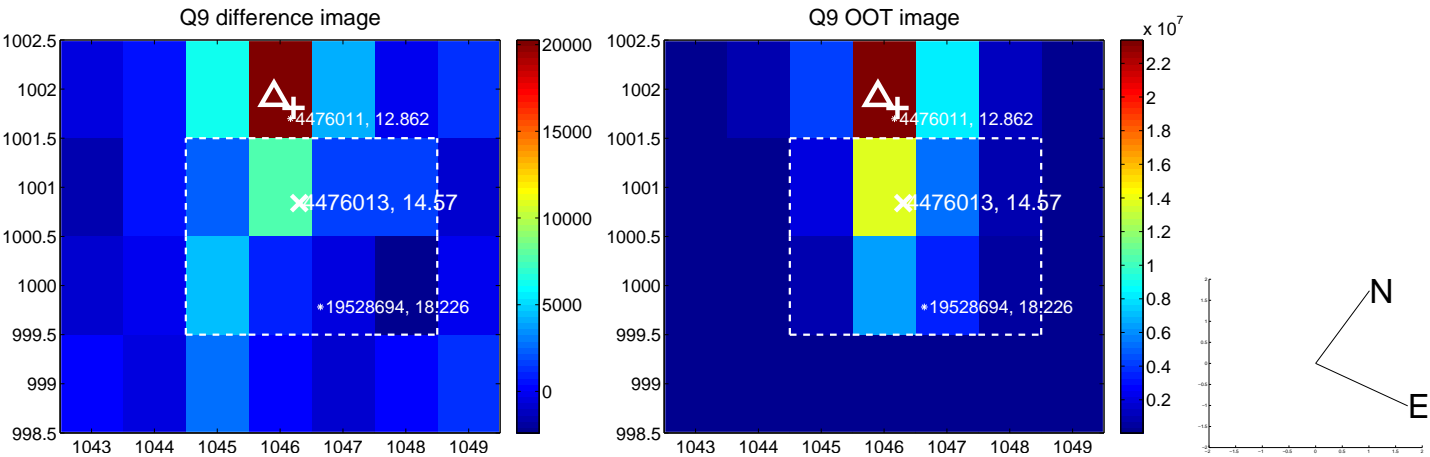
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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

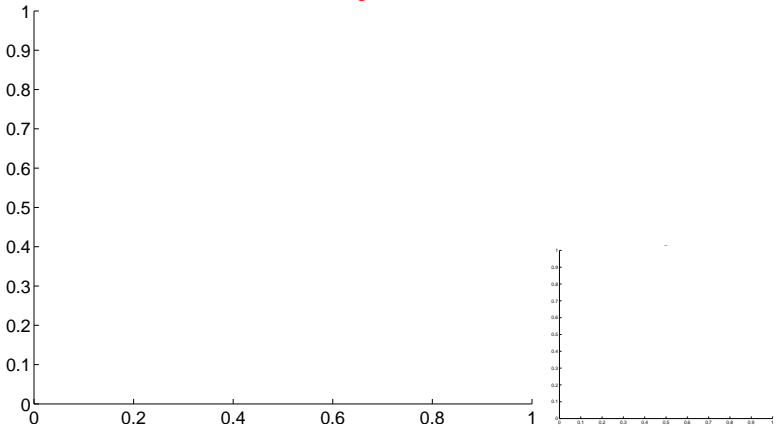


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

Q13 no difference image



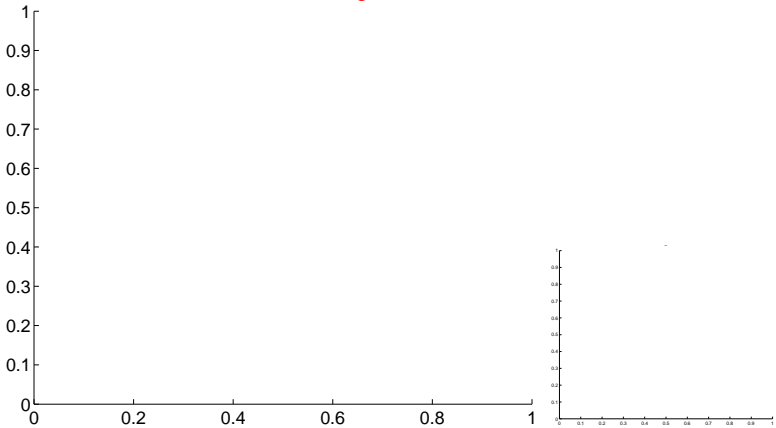
Q13 no OOT image



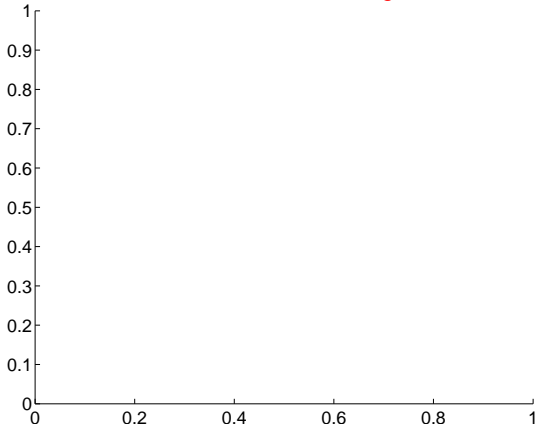
Q14 no difference image



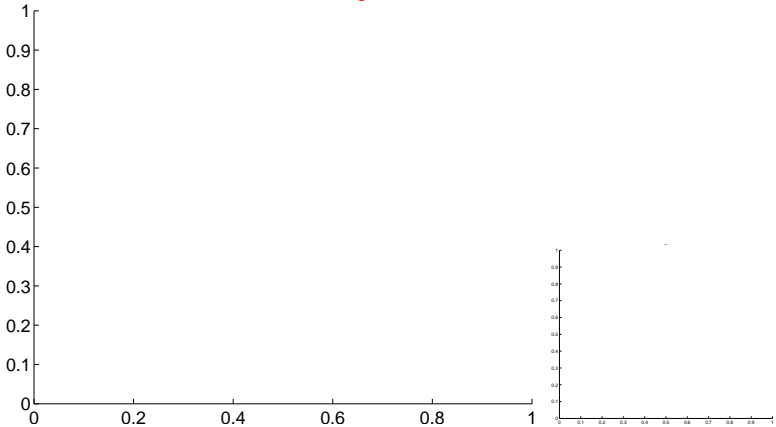
Q14 no OOT image



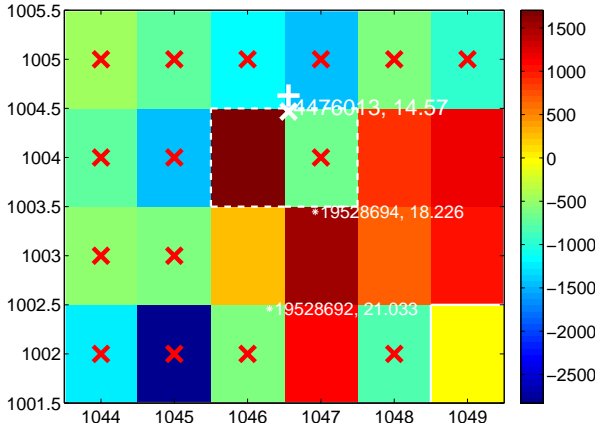
Q15 no difference image



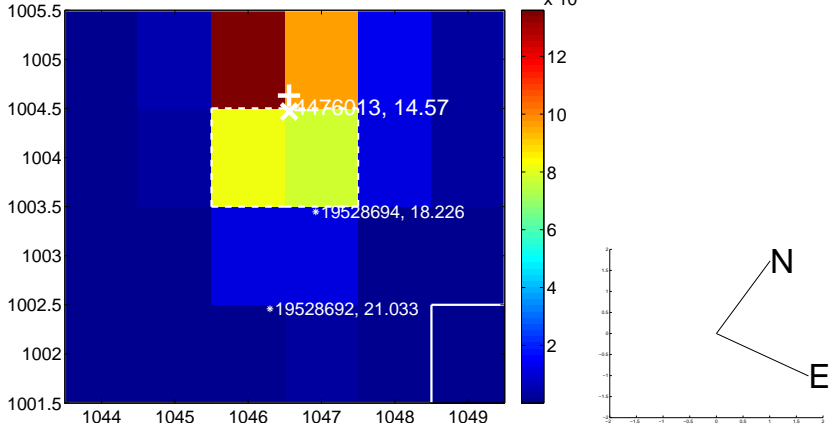
Q15 no OOT image



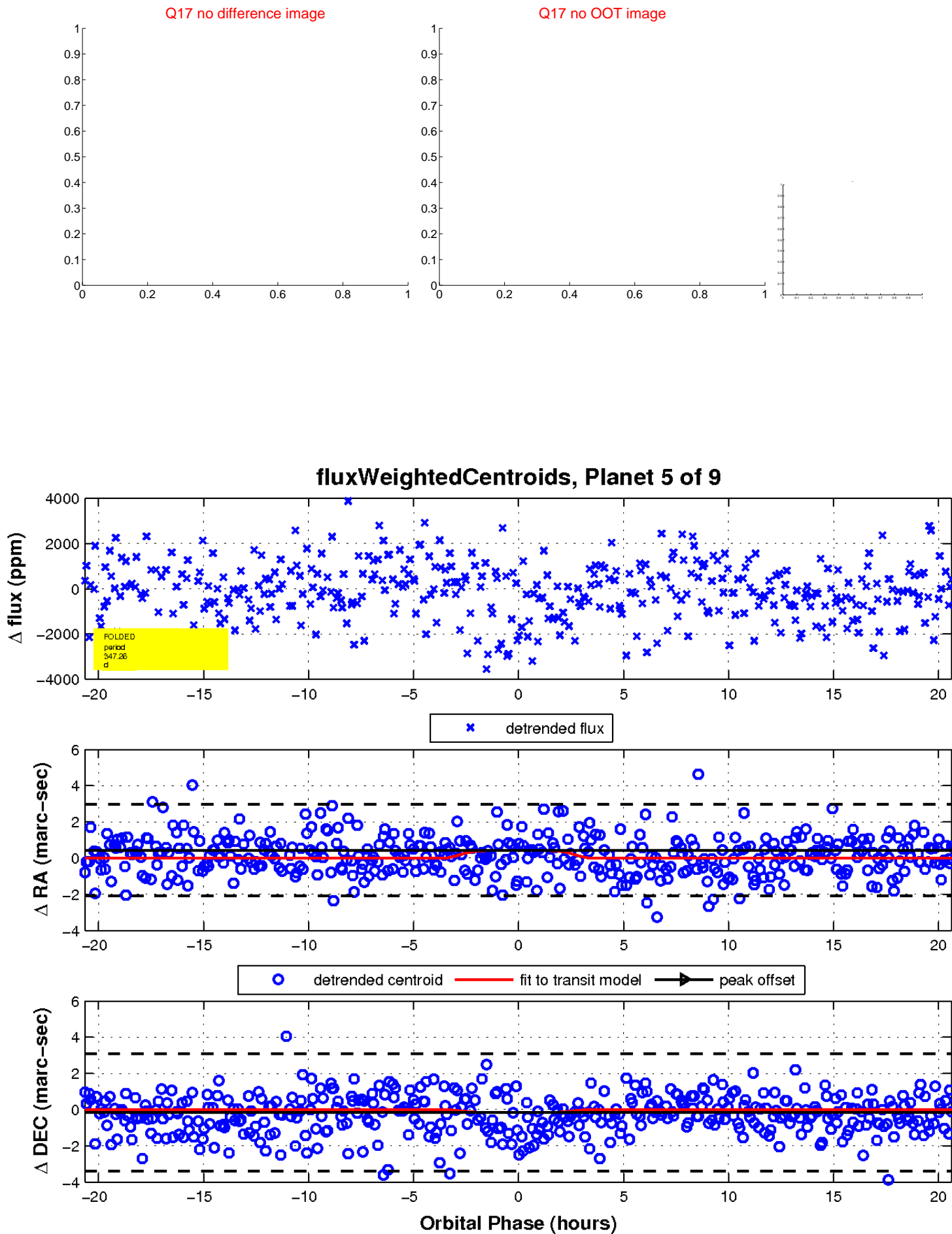
Q16 difference image. Poor Quality



Q16 OOT image

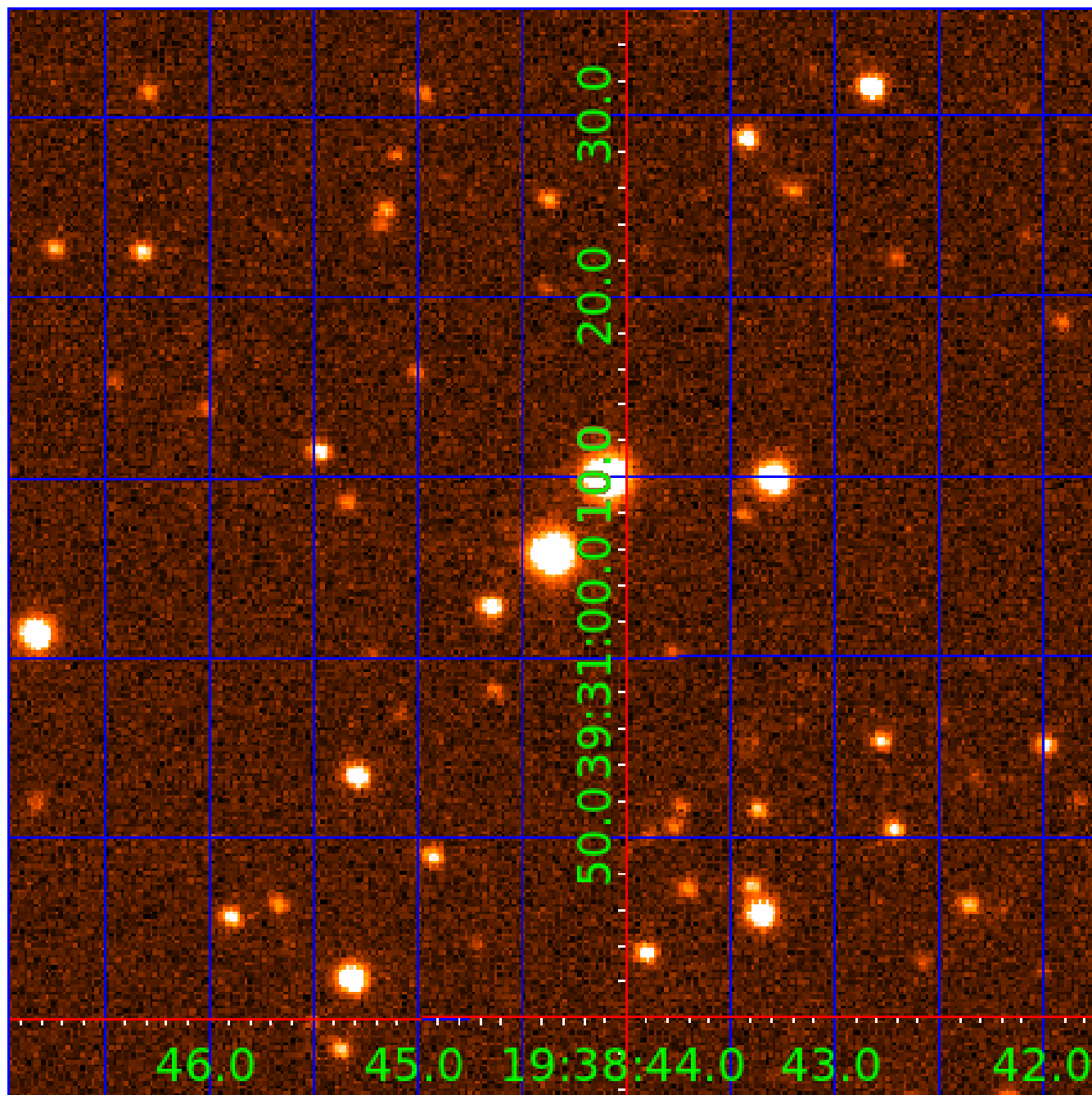


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004476013

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})
004476013-01	OBS	No	3.111300	131.965214	87.6	12.343	7.9	7.2	0.70	5340	0.65	245.11
004476013-02	OBS	No	194.686816	286.324219	1834.8	4.706	9.3	8.5	0.70	5340	5.82	0.99
004476013-03	OBS	No	383.171892	135.986790	2122.1	7.624	8.9	7.9	0.70	5340	3.31	0.40
004476013-04	OBS	No	182.482170	287.571257	1122.5	2.928	8.6	7.9	0.70	5340	2.52	1.08
004476013-05	OBS	No	347.259060	146.038192	2401.0	6.883	8.6	9.7	0.70	5340	4.05	0.46
004476013-06	OBS	No	371.401491	142.216741	1899.3	8.826	7.9	8.1	0.70	5340	3.33	0.42
004476013-07	OBS	No	363.428264	168.875171	2172.9	4.775	8.2	7.4	0.70	5340	5.93	0.43
004476013-09	OBS	No	343.360397	154.816901	2157.6	6.228	8.3	8.2	0.70	5340	6.28	0.46

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004476013-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—CENT_KIC_POS
004476013-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

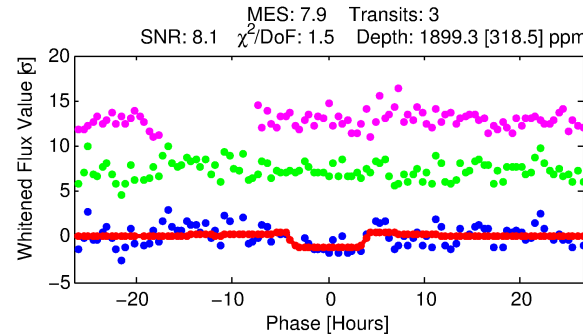
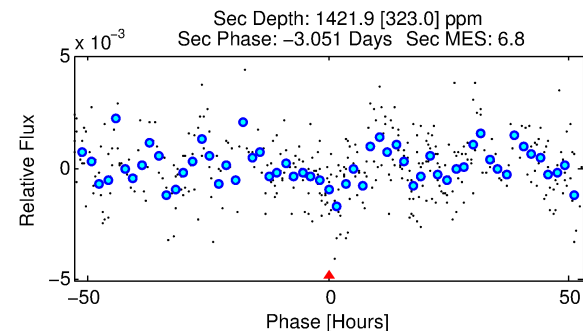
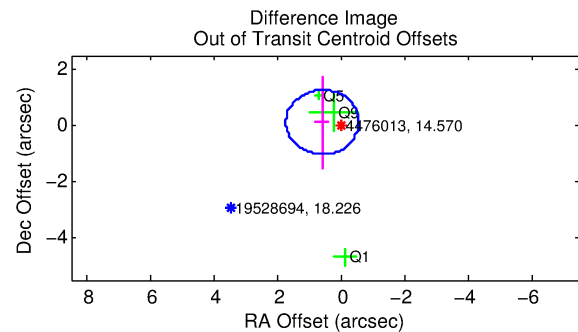
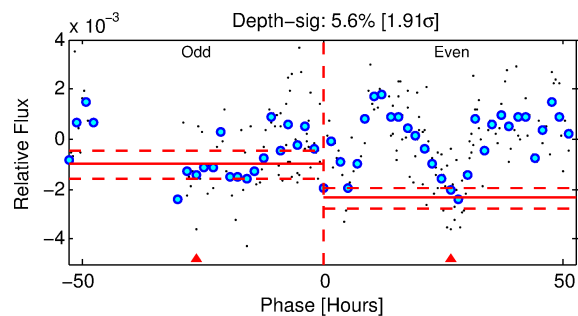
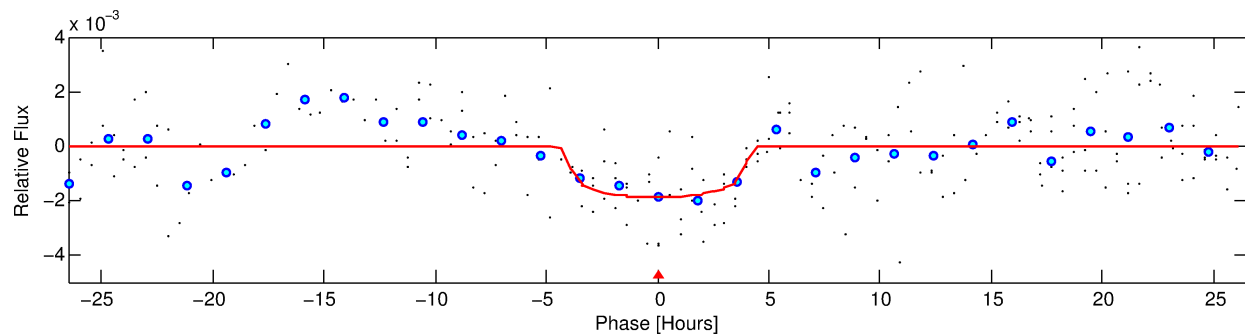
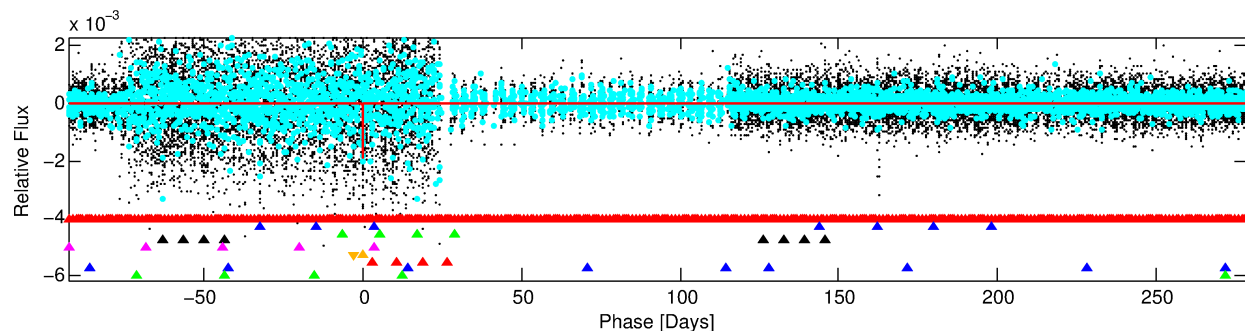
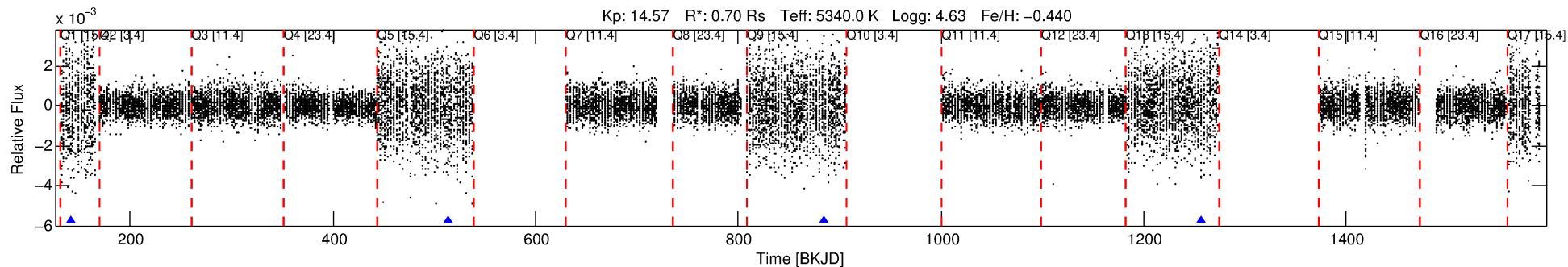
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004476013-06

No Significant Match Found

DV One-Page Summary

KIC: 4476013 Candidate: 6 of 9 Period: 371.401 d



DV Fit Results:

Period = 371.40149 [0.01008] d
Epoch = 142.2167 [0.0211] BKJD
Rp/R* = 0.0435 [0.0161]
a/R* = 231.78 [334.87]
b = 0.75 [0.83]
Seff = 0.42 [0.09]
Teq = 205 [11] K
Rp = 3.33 [1.34] Re
a = 0.9279 [0.1205] AU
Ag = 60699.89 [48195.26] [1.26 σ]
Teffp = 4973 [972] K [4.90 σ]

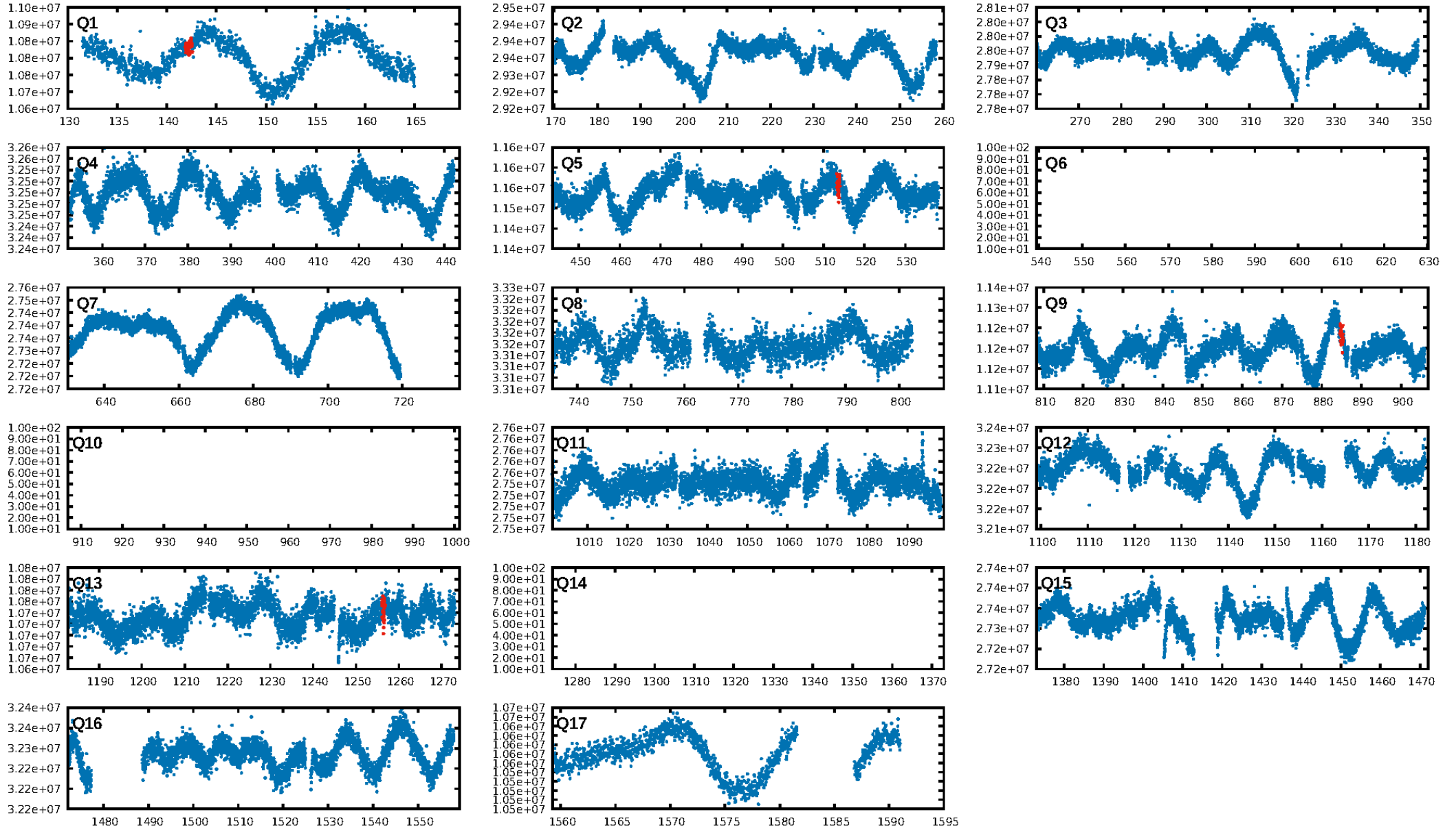
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [19.07 σ]
LongPeriod-sig: 100.0% [24.22 σ]
ModelChiSquare2-sig: 46.1%
ModelChiSquareGof-sig: 98.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: -5.206
Centroid-sig: 69.8%
Centroid-so: 1.600 arcsec [4.89 σ]
OotOffset-rm: 0.613 arcsec [1.61 σ]
KicOffset-rm: 3.805 arcsec [2.64 σ]
OotOffset-st: 0/0/0/3 [3]
KicOffset-st: 0/0/0/3 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 0.50 [2/4]

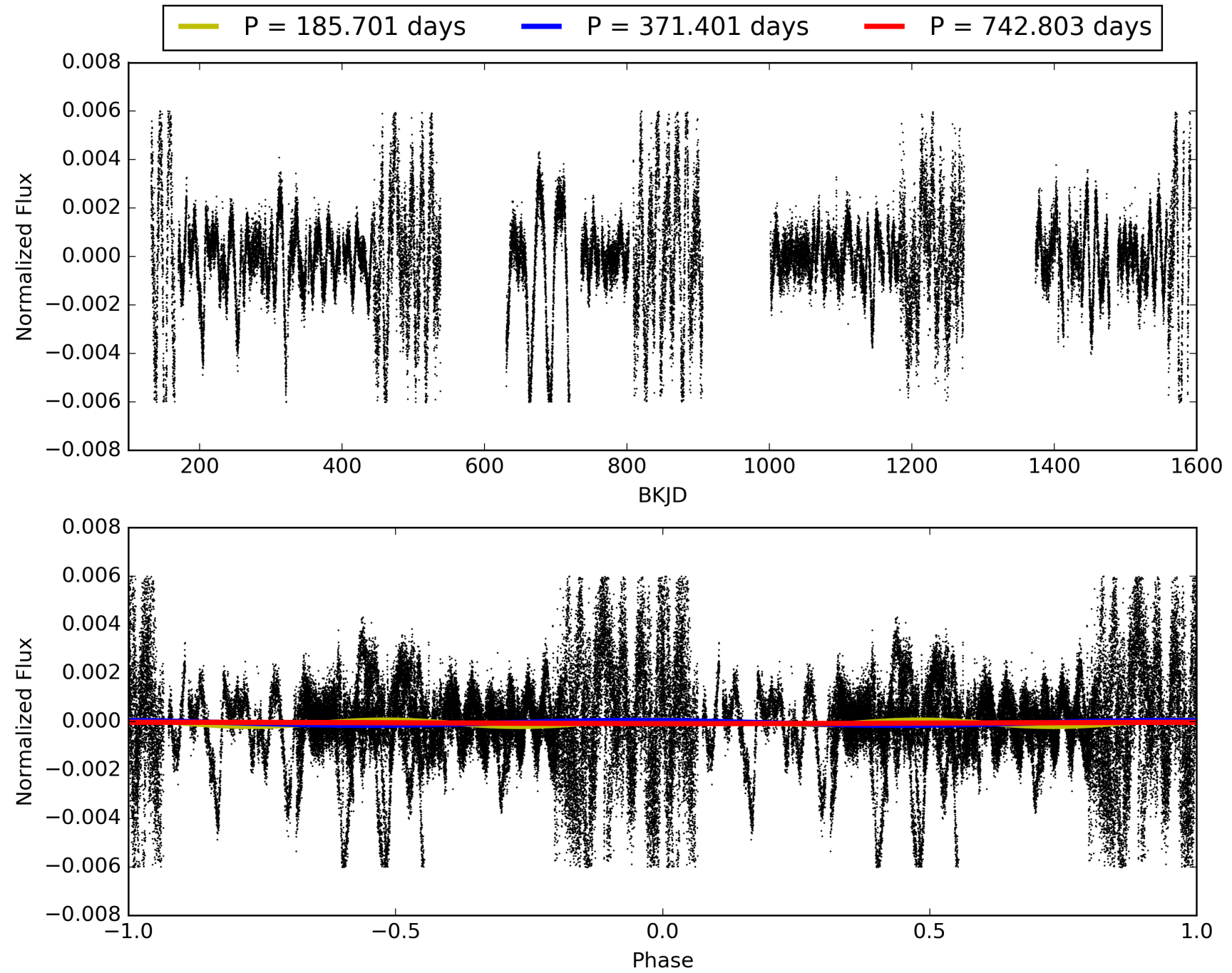
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:37:32 Z

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

TCE 004476013-06, PDC Light Curves

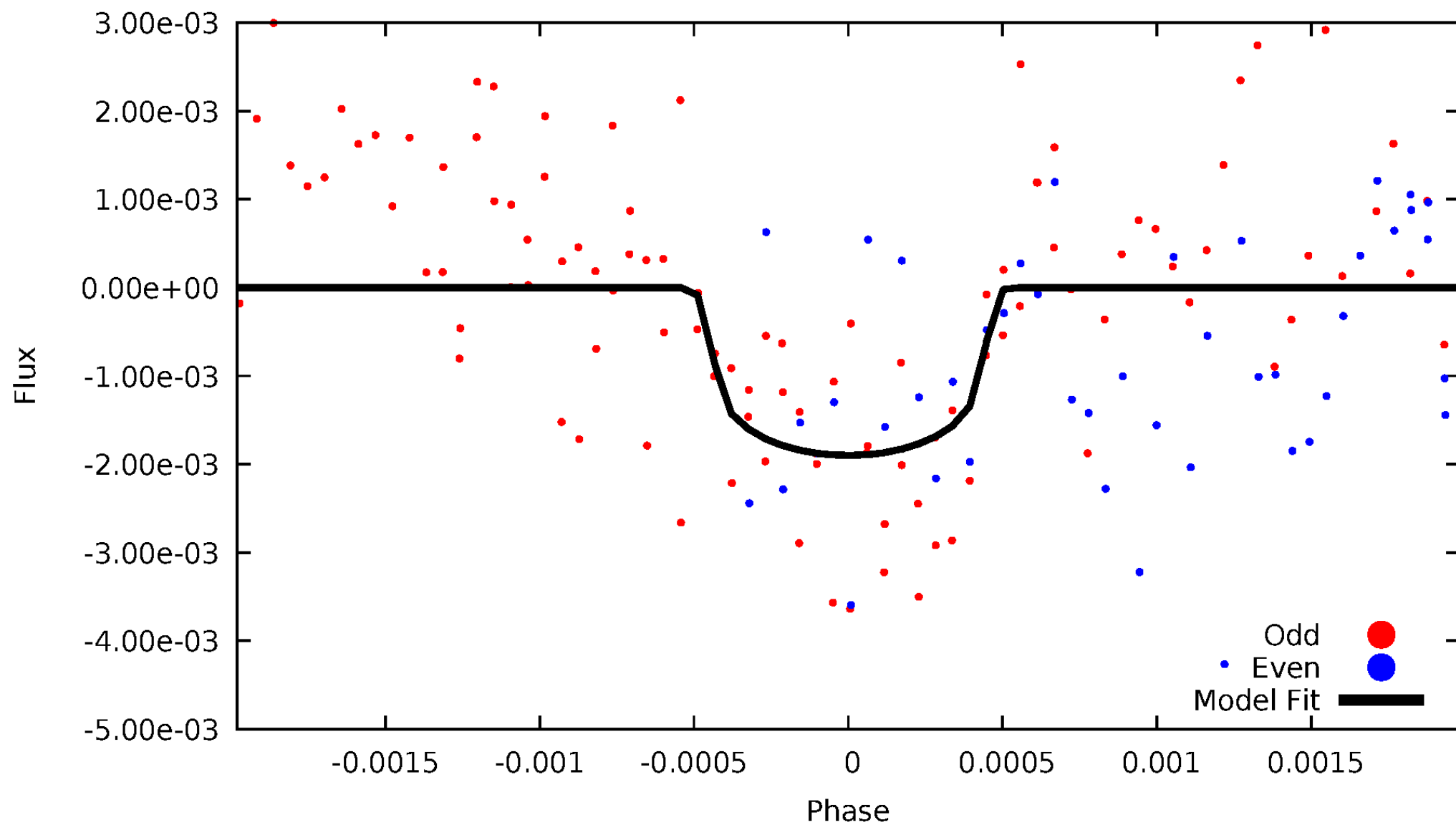


TCE 004476013-06



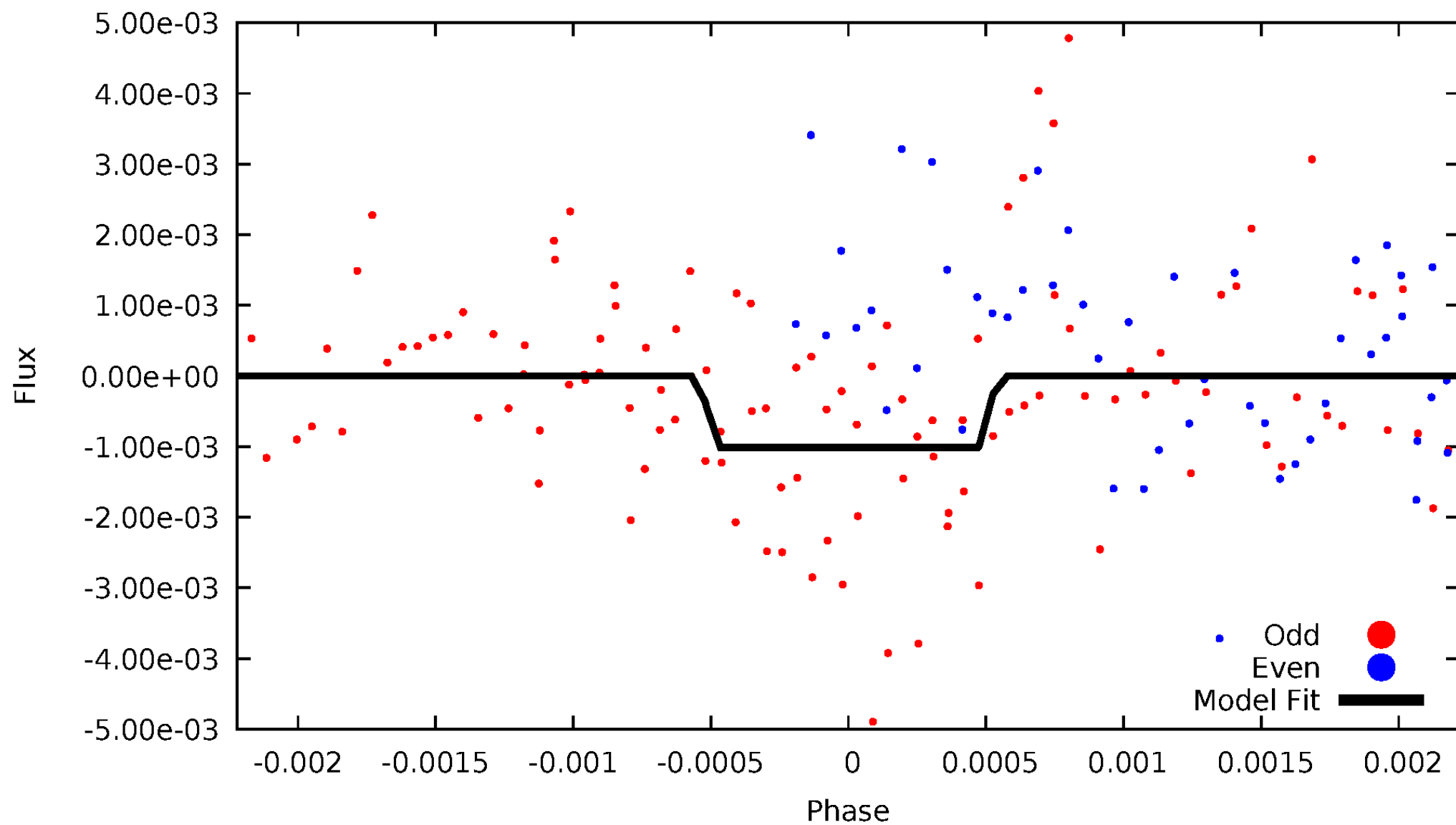
DV Odd/Even

TCE 004476013-06



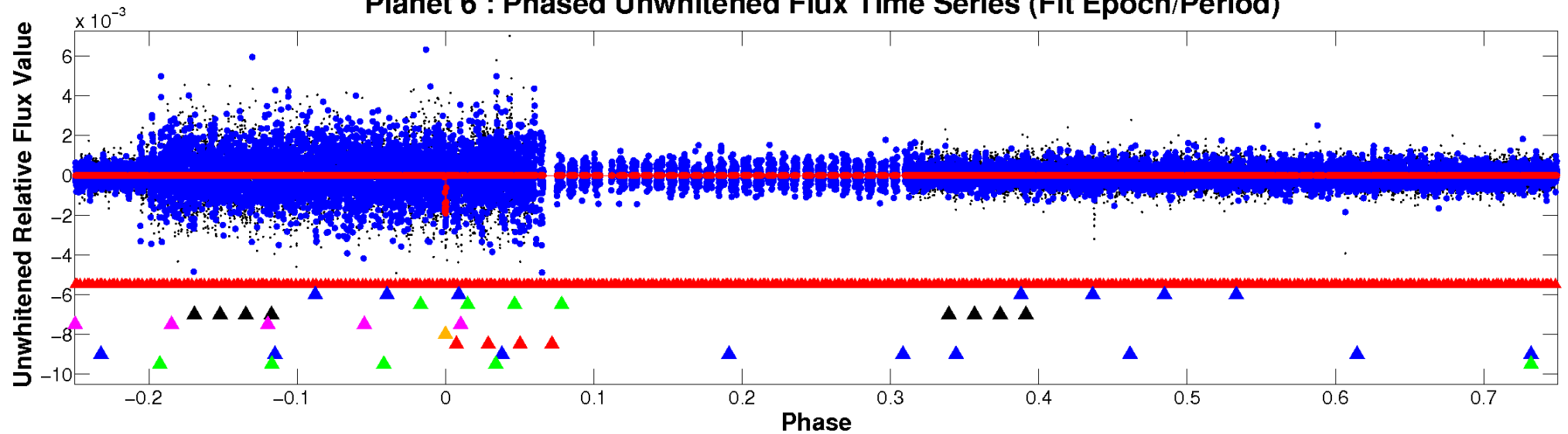
ALT Odd/Even

TCE 004476013-06

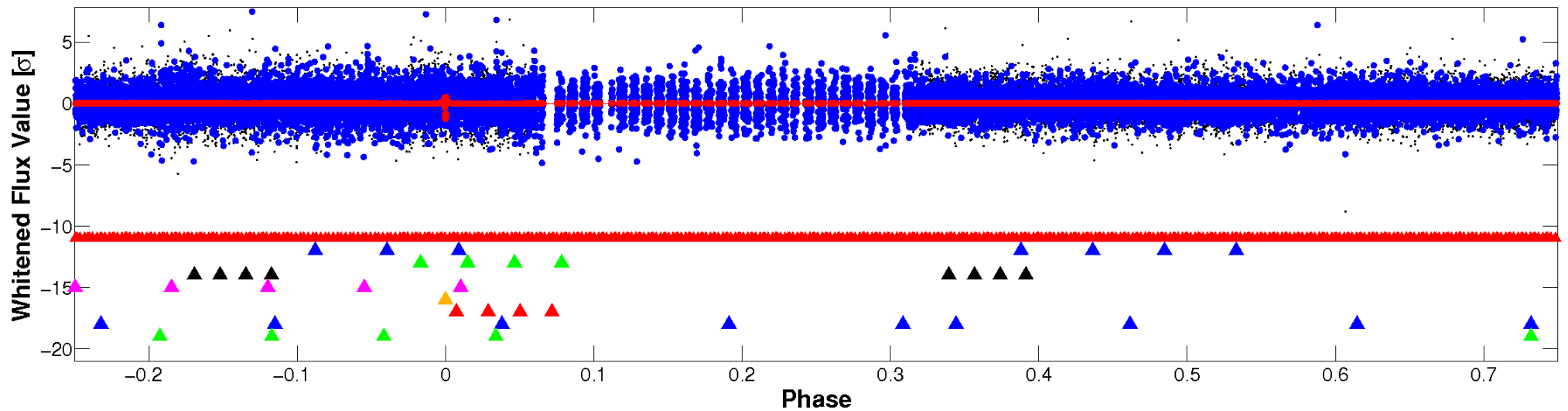


Non-Whitened Vs. Whitened Light Curve

Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

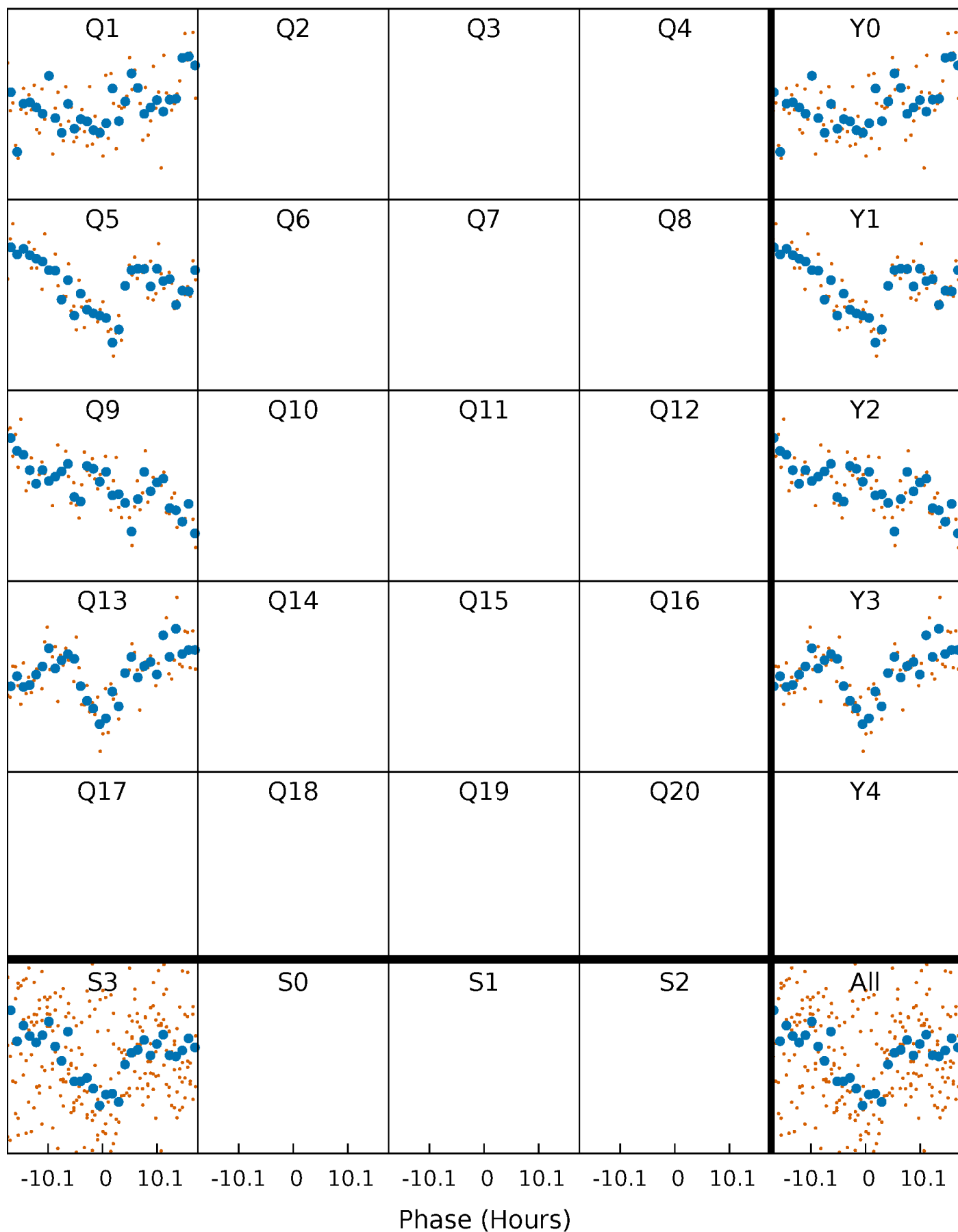


Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



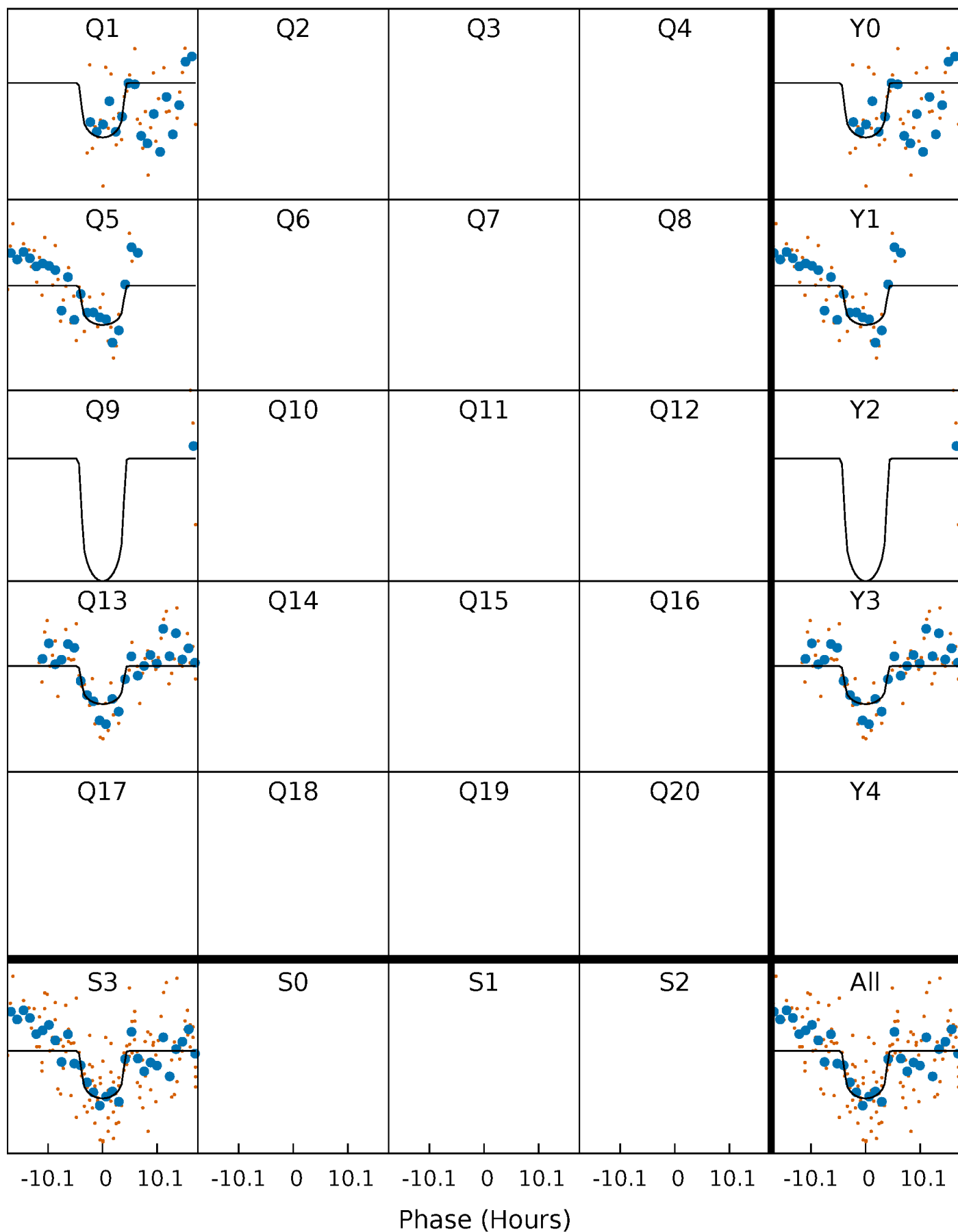
PDC Quarter-Phased Transit Curves

TCE 004476013-06 P=371.401491 Days $T_0=142.216741$ (BKJD)



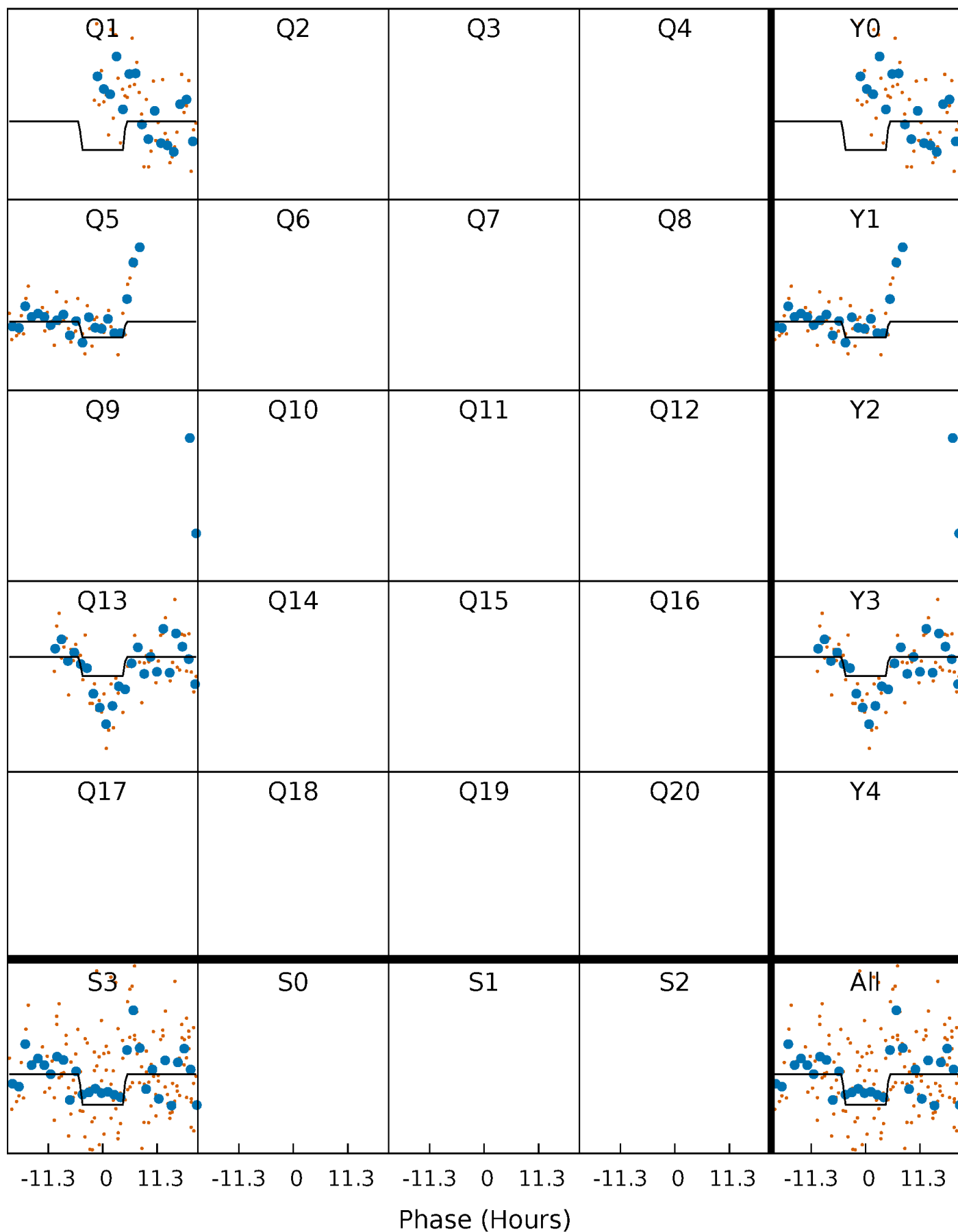
DV Quarter-Phased Transit Curves

TCE 004476013-06 P=371.401491 Days $T_0=142.216741$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

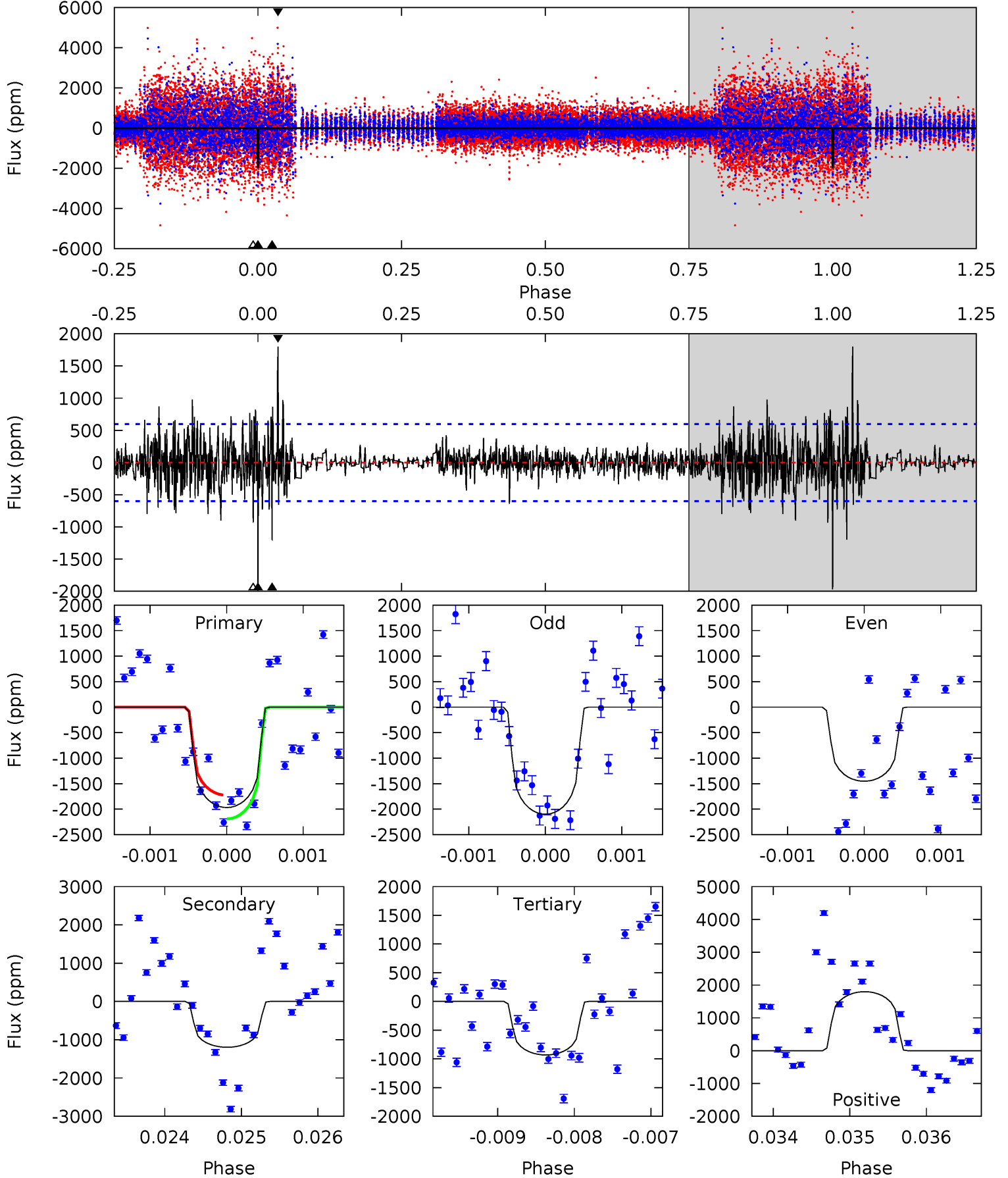
TCE 004476013-06 P=371.400387 Days $T_0=142.168497$ (BKJD)



DV Model-Shift Uniqueness Test

004476013-06, P = 371.401491 Days, E = 142.216741 Days

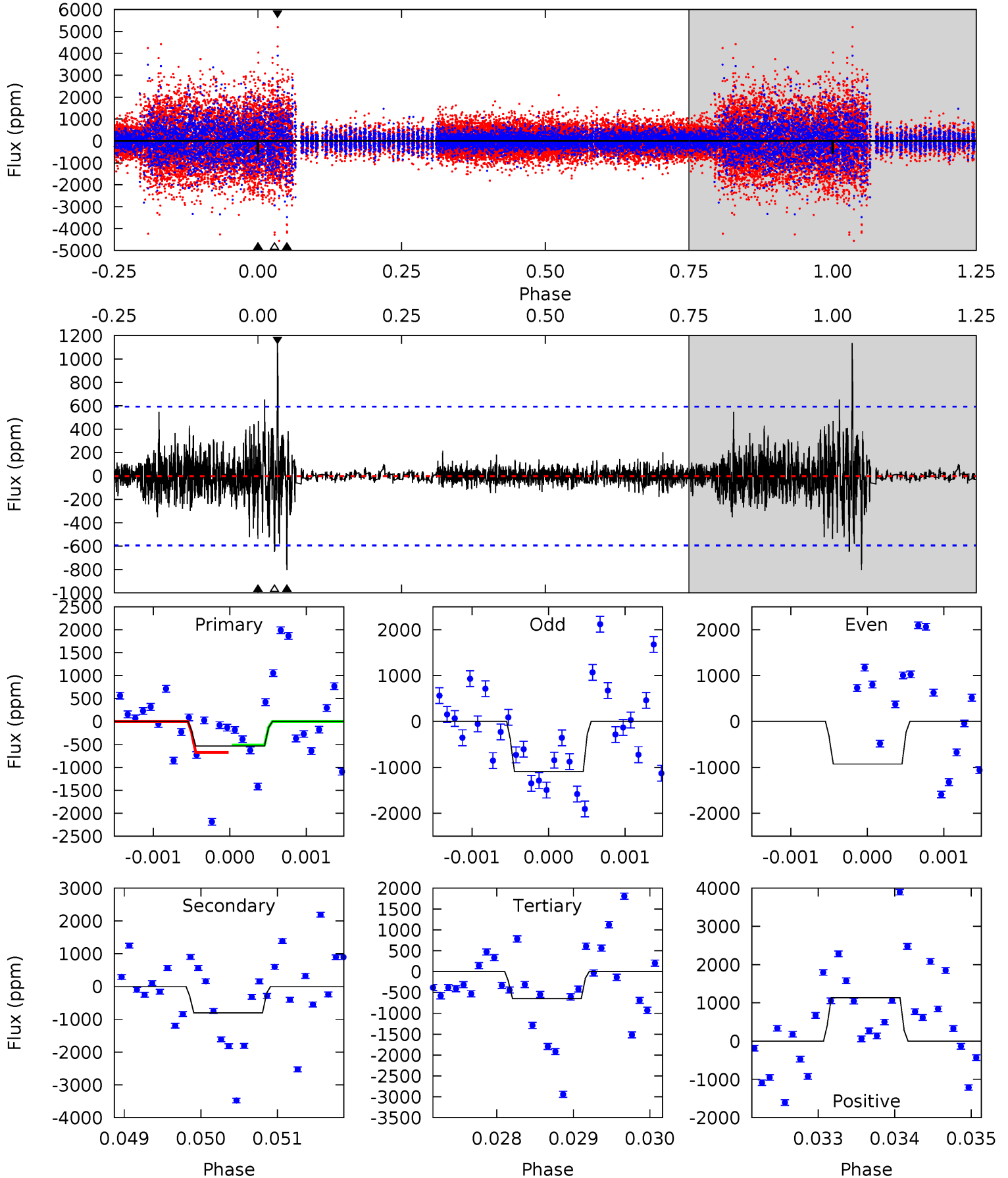
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.9	10.9	8.49	16.4	5.45	3.29	1.88	9.44	1.55	2.41	-5.48	2.65	1.01	0.48	2.14



Alt Model-Shift Uniqueness Test

004476013-06, P = 371.400387 Days, E = 142.168497 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.93	7.37	5.94	10.4	5.44	3.28	0.92	-1.02	-5.49	1.43	-3.04	0.68	0.96	0.59	0.76



Stellar Parameters For KIC 004476013

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5340^{+160}_{-144}	$4.633^{+0.032}_{-0.097}$	$-0.440^{+0.300}_{-0.300}$	$0.702^{+0.112}_{-0.048}$	$0.783^{+0.076}_{-0.084}$	$3.193^{+0.519}_{-1.000}$
	+3%/-3%	+1%/-2%	+68%/-68%	+16%/-7%	+10%/-11%	+16%/-31%
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 004476013-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1197 ± 110	$3.30^{+1.36}_{-1.18}$	290^{+12}_{-10}	4893^{+1078}_{-609}	51604^{+68717}_{-25467}
Alt.	-803 ± 109	$2.54^{+1.21}_{-1.16}$	290^{+12}_{-11}	5042^{+1716}_{-749}	$57397^{+153047}_{-31428}$

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 $A_{obs} \gg 1.0$

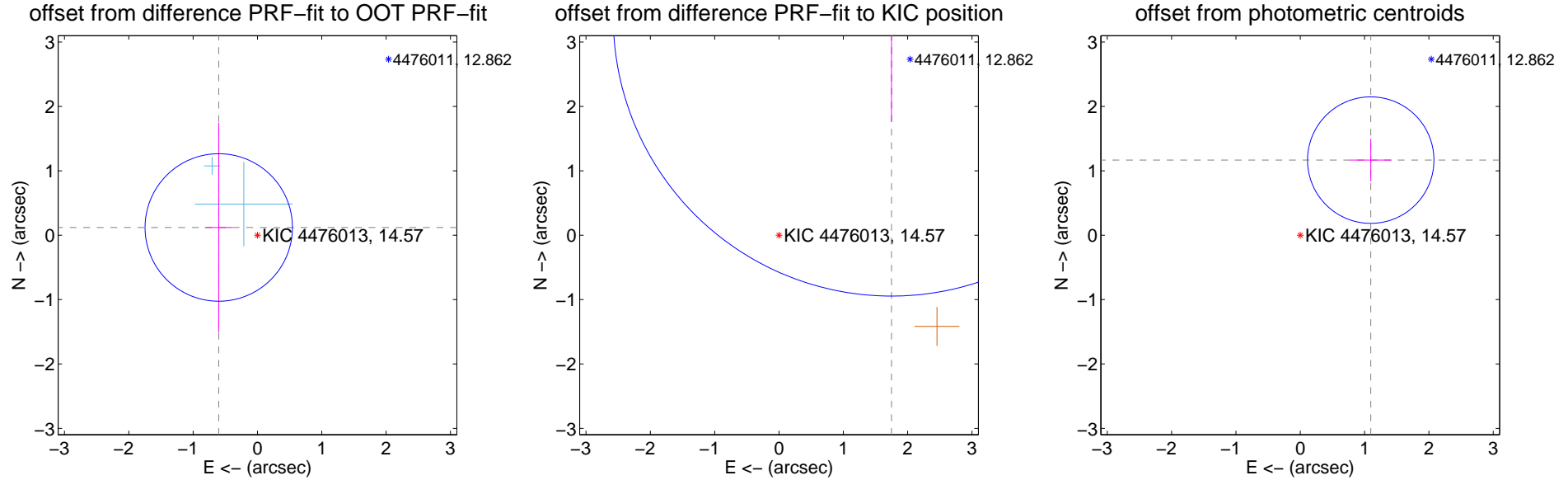
DV Centroid Data

Supplemental centroid analysis for 004476013-06. Kepler magnitude: 14.57. Transit SNR 8.11

There are 2 quarters with good PRF difference image offsets

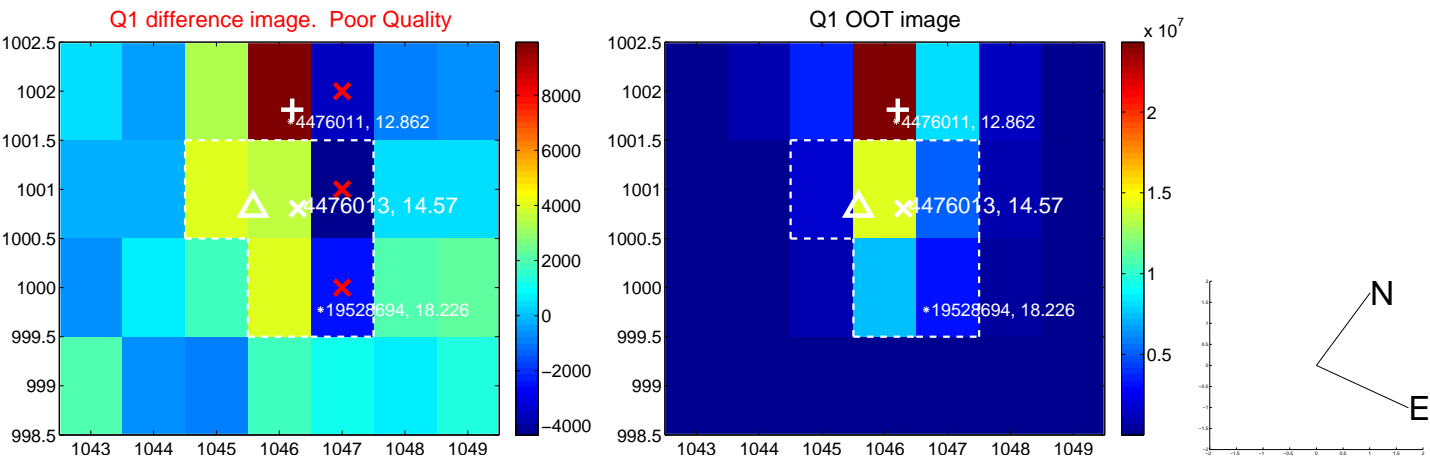
The OOT PRF centroid is offset from the target star catalog position by about 4.09 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.613 ± 0.382	1.61	0.601 ± 0.215	0.120 ± 1.627
PRF-fit source offset from KIC position	3.805 ± 1.442	2.64	-1.749 ± 0.211	3.379 ± 1.620
photometric centroid source offset	1.60 ± 0.33	4.89	-1.10 ± 0.32	1.17 ± 0.33

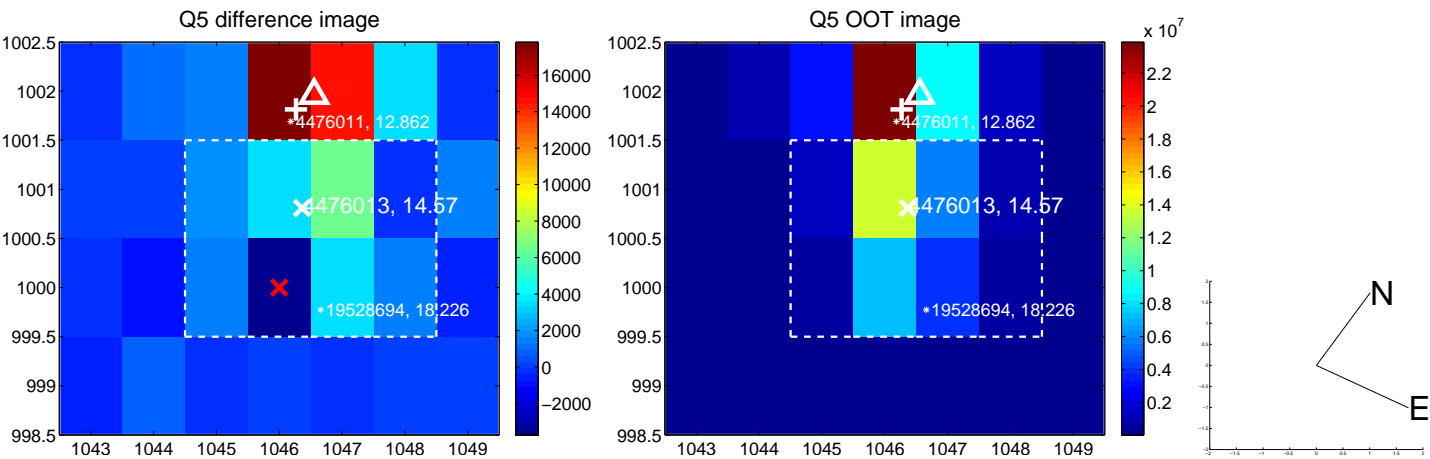


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

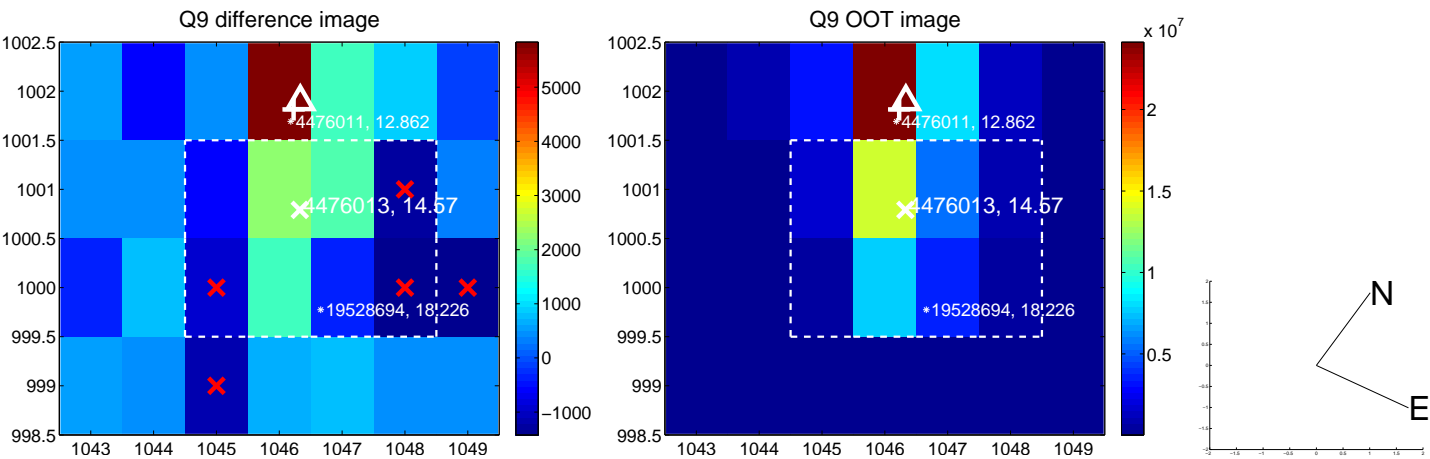
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



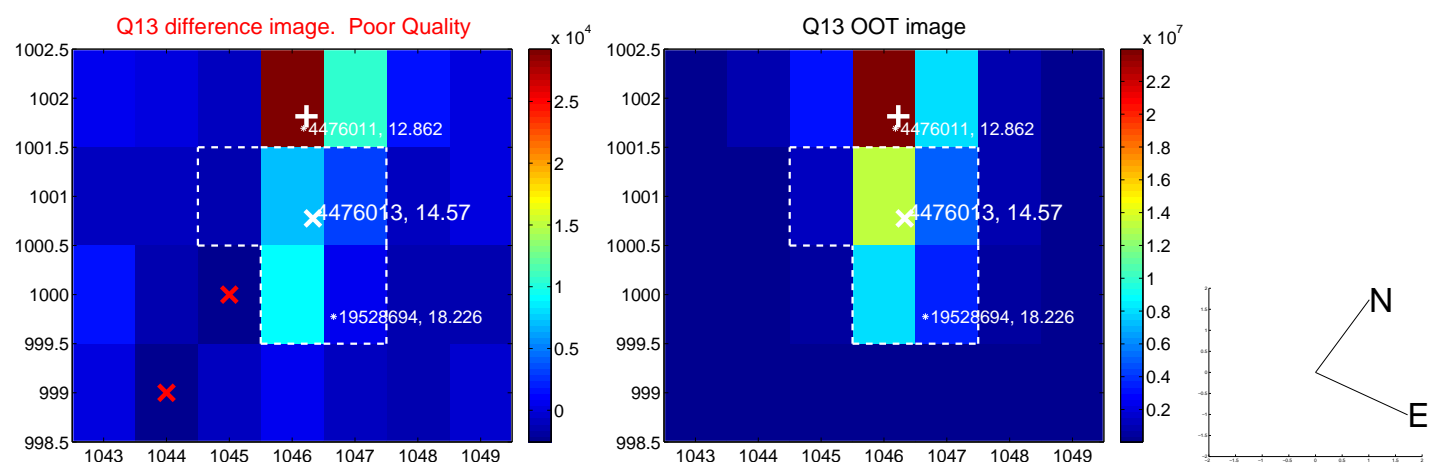
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



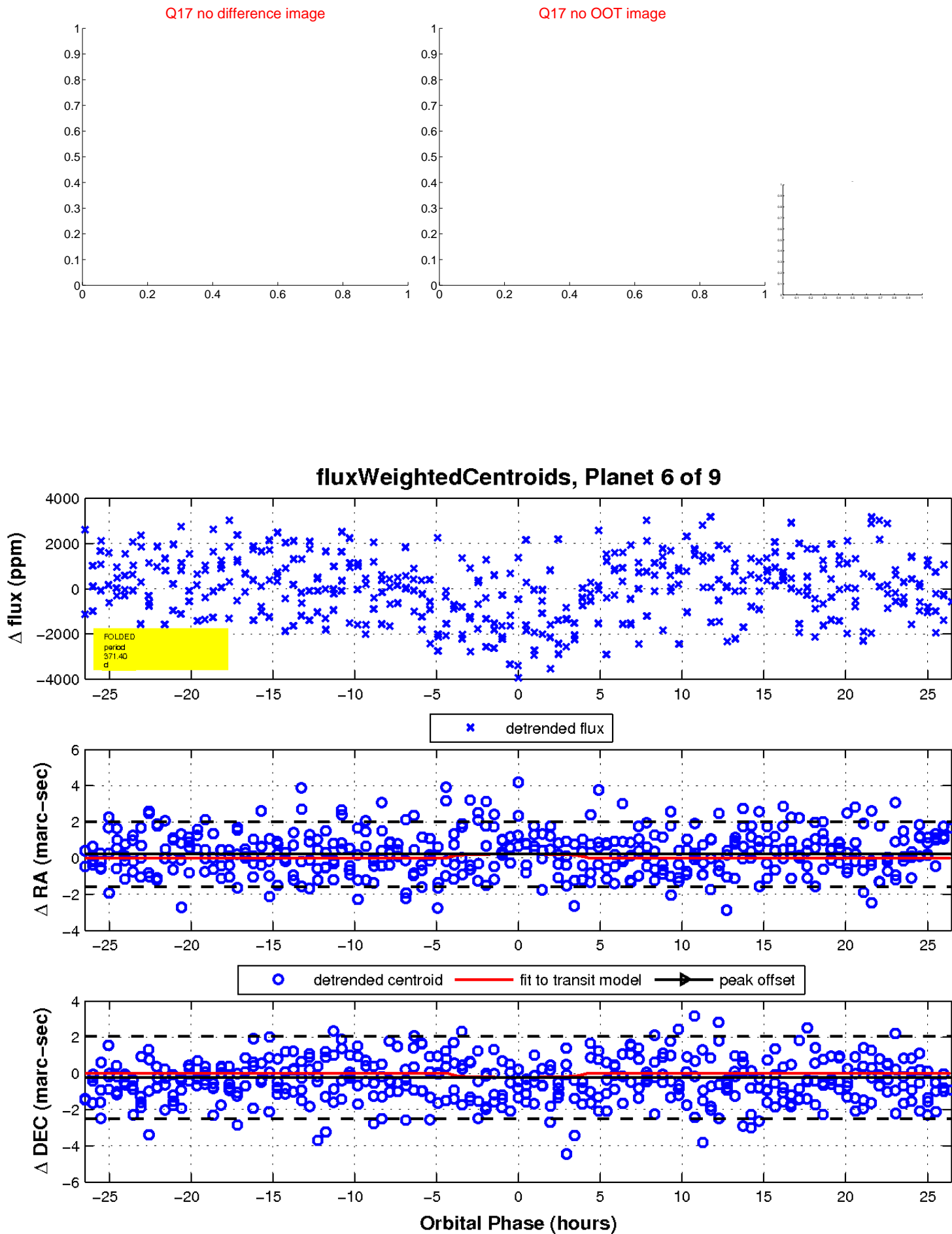
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

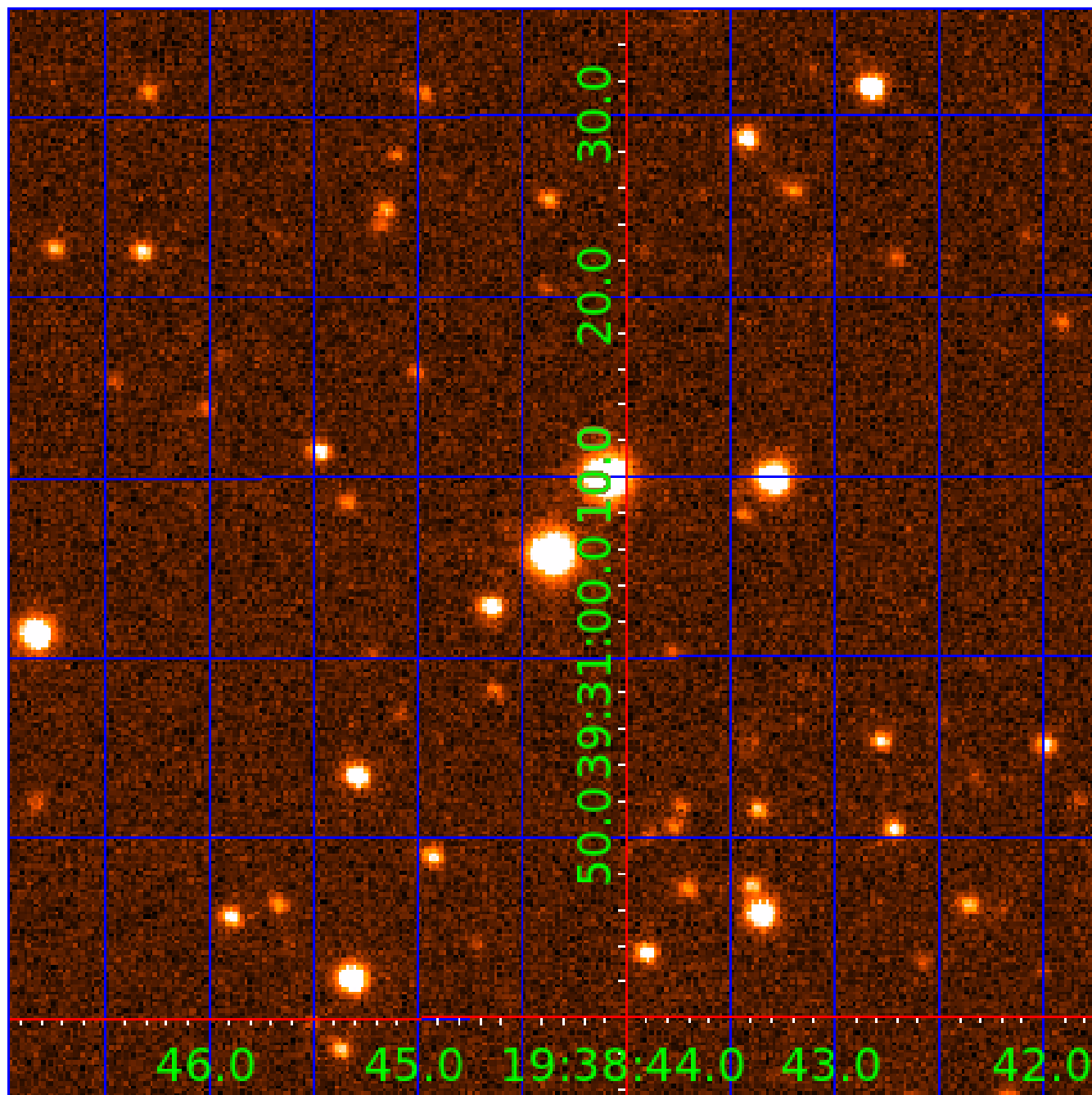


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004476013

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})
004476013-01	OBS	No	3.111300	131.965214	87.6	12.343	7.9	7.2	0.70	5340	0.65	245.11
004476013-02	OBS	No	194.686816	286.324219	1834.8	4.706	9.3	8.5	0.70	5340	5.82	0.99
004476013-03	OBS	No	383.171892	135.986790	2122.1	7.624	8.9	7.9	0.70	5340	3.31	0.40
004476013-04	OBS	No	182.482170	287.571257	1122.5	2.928	8.6	7.9	0.70	5340	2.52	1.08
004476013-05	OBS	No	347.259060	146.038192	2401.0	6.883	8.6	9.7	0.70	5340	4.05	0.46
004476013-06	OBS	No	371.401491	142.216741	1899.3	8.826	7.9	8.1	0.70	5340	3.33	0.42
004476013-07	OBS	No	363.428264	168.875171	2172.9	4.775	8.2	7.4	0.70	5340	5.93	0.43
004476013-09	OBS	No	343.360397	154.816901	2157.6	6.228	8.3	8.2	0.70	5340	6.28	0.46

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004476013-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—CENT_KIC_POS
004476013-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

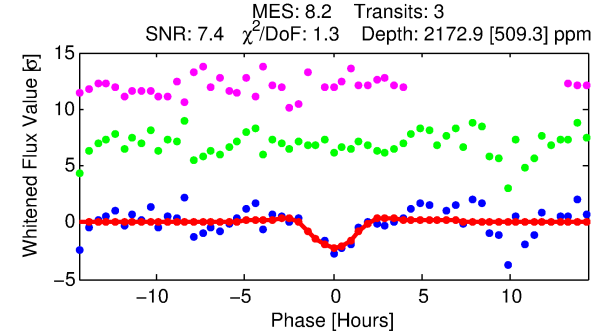
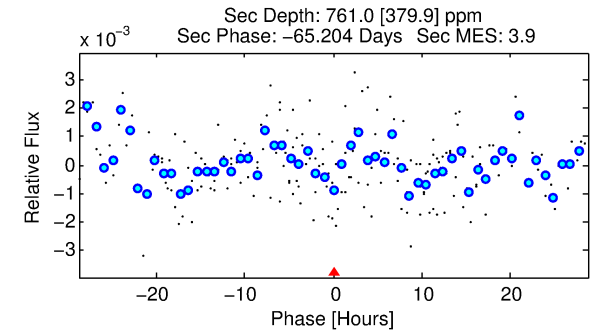
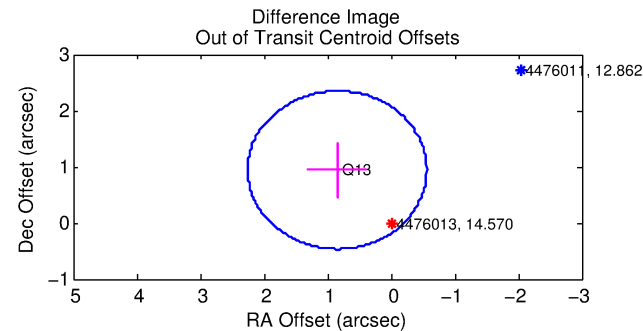
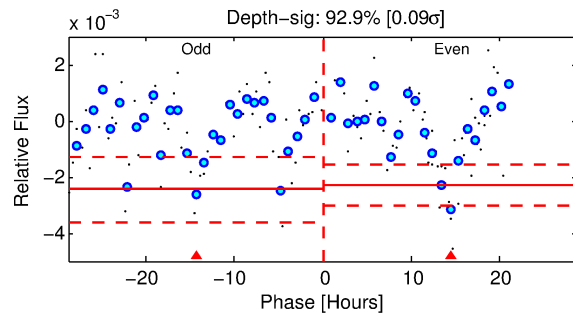
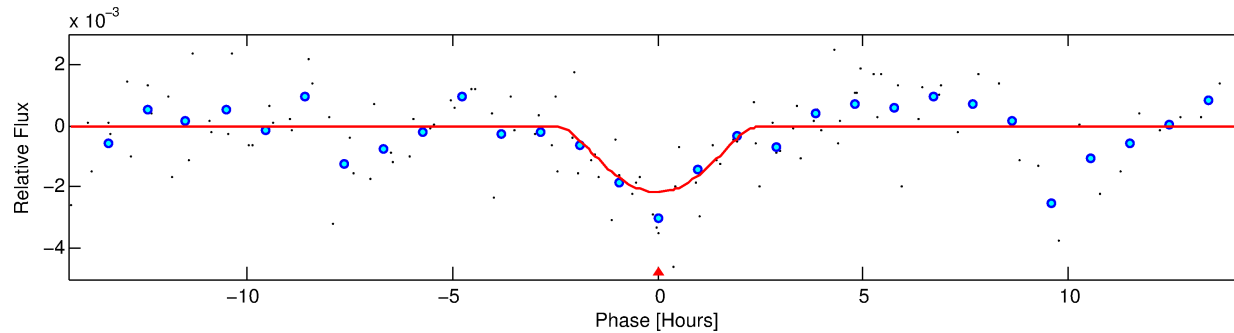
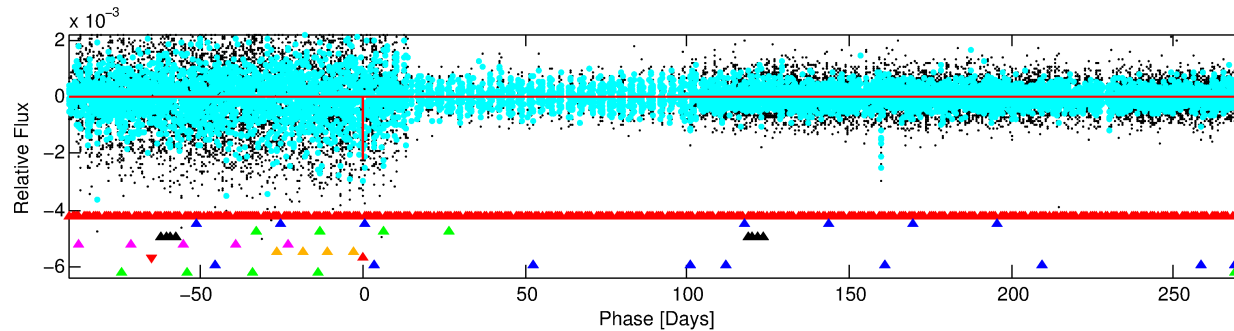
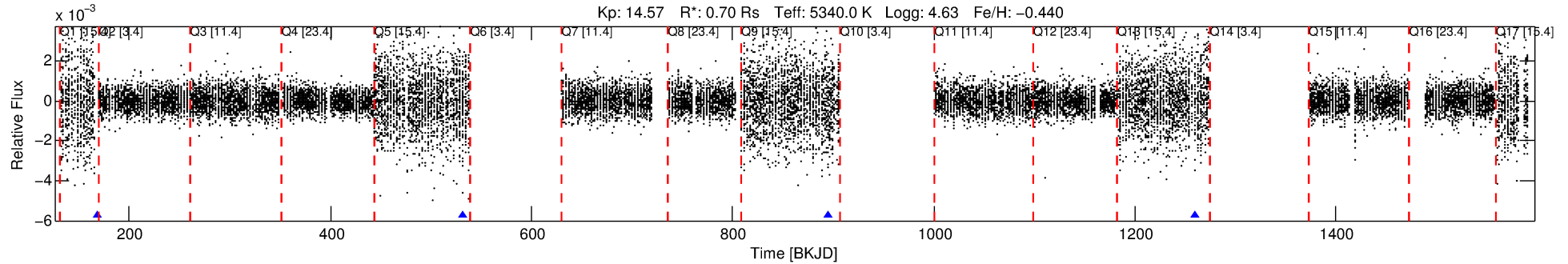
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004476013-07

No Significant Match Found

DV One-Page Summary

KIC: 4476013 Candidate: 7 of 9 Period: 363.428 d



DV Fit Results:

Period = 363.42826 [0.01059] d
Epoch = 168.8752 [0.0261] BKJD
Rp/R* = 0.0774 [0.4759]
a/R* = 243.55 [351.85]
b = 0.99 [0.72]
Seff = 0.43 [0.09]
Teq = 206 [11] K
Rp = 5.93 [36.47] Re
a = 0.9145 [0.1187] AU
Ag = 9956.87 [122537.74] [0.08 σ]
Teffp = 3188 [9807] K [0.30 σ]

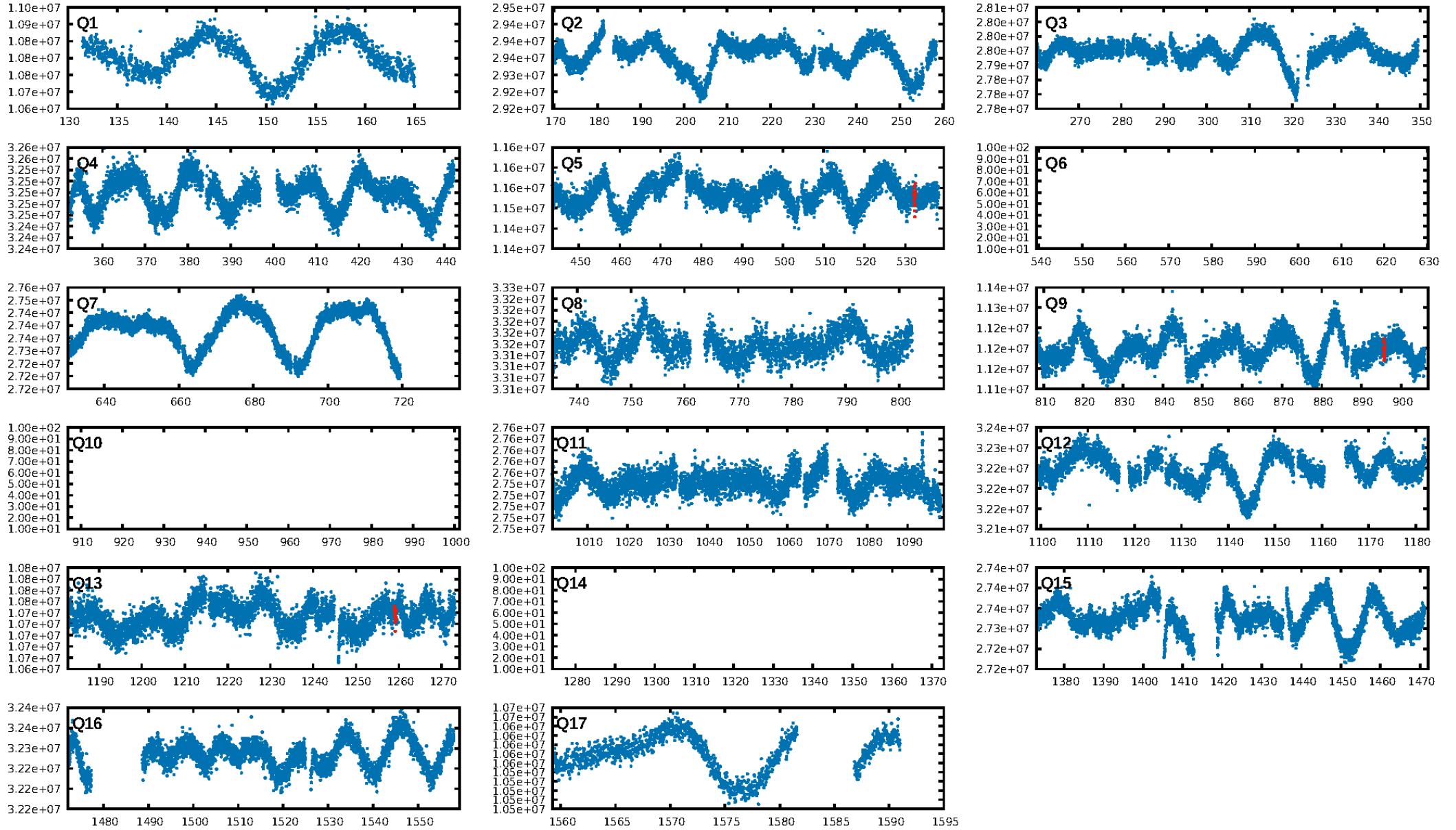
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [46.32 σ]
LongPeriod-sig: 100.0% [19.07 σ]
ModelChiSquare2-sig: 45.5%
ModelChiSquareGof-sig: 93.9%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -1.373
Centroid-sig: 22.2%
Centroid-so: 2.032 arcsec [3.41 σ]
OotOffset-rm: 1.266 arcsec [2.70 σ]
KicOffset-rm: 4.611 arcsec [9.62 σ]
OotOffset-st: 0/0/0/1 [1]
KicOffset-st: 0/0/0/1 [1]
DiffImageQuality-fgm: 1.00 [1/1]
DiffImageOverlap-fno: 1.00 [3/3]

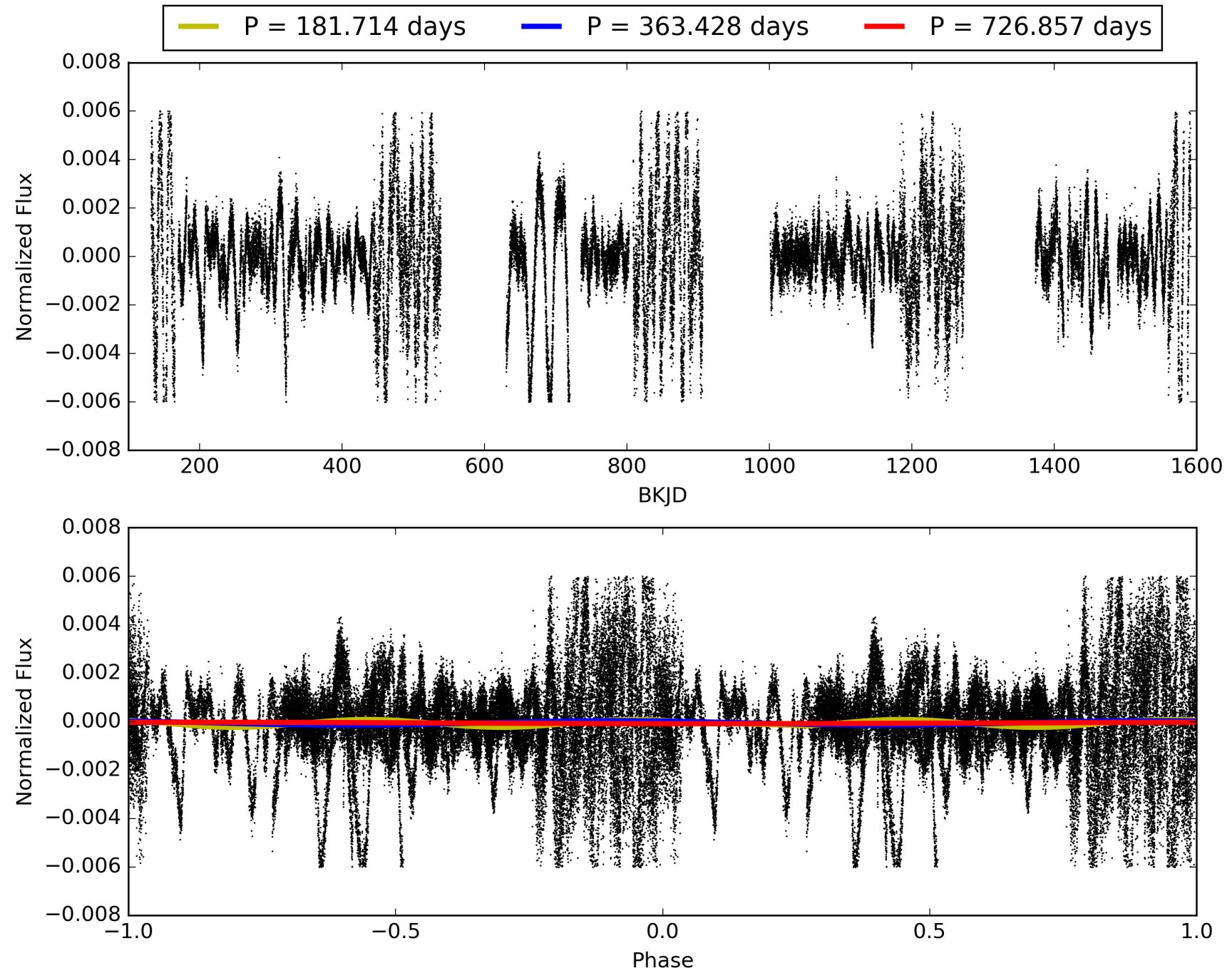
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:37:39 Z

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

TCE 004476013-07, PDC Light Curves

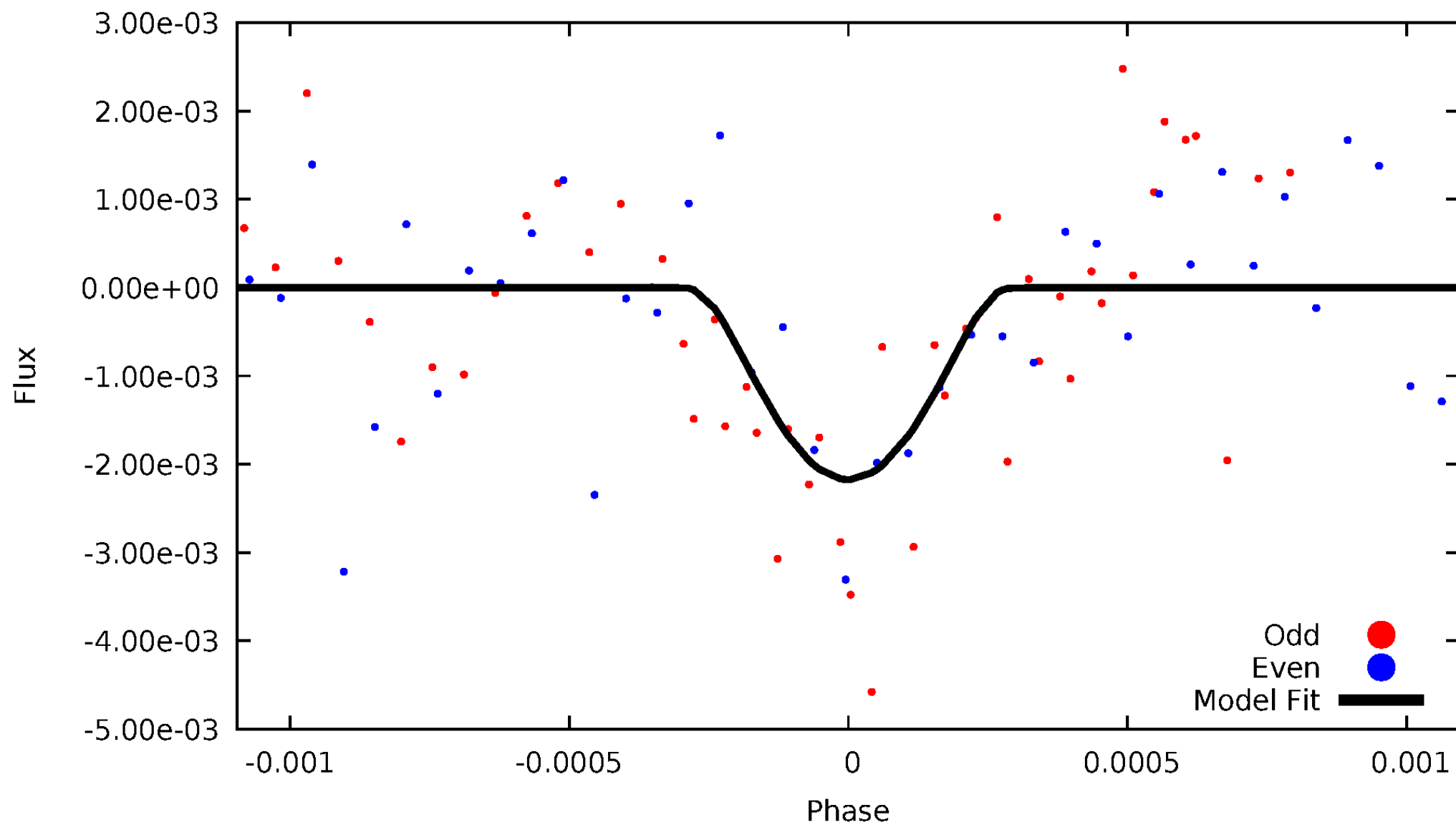


TCE 004476013-07



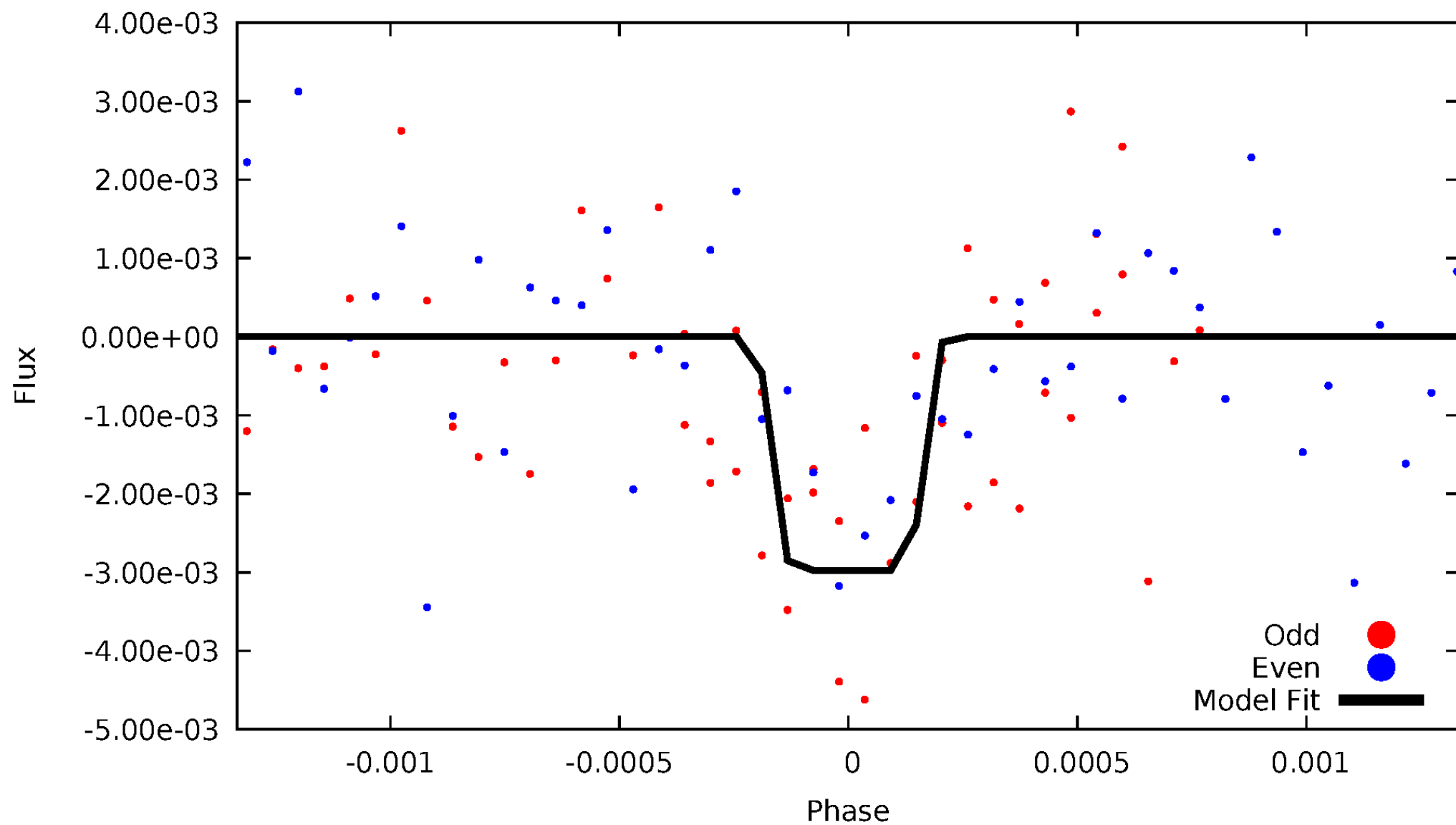
DV Odd/Even

TCE 004476013-07

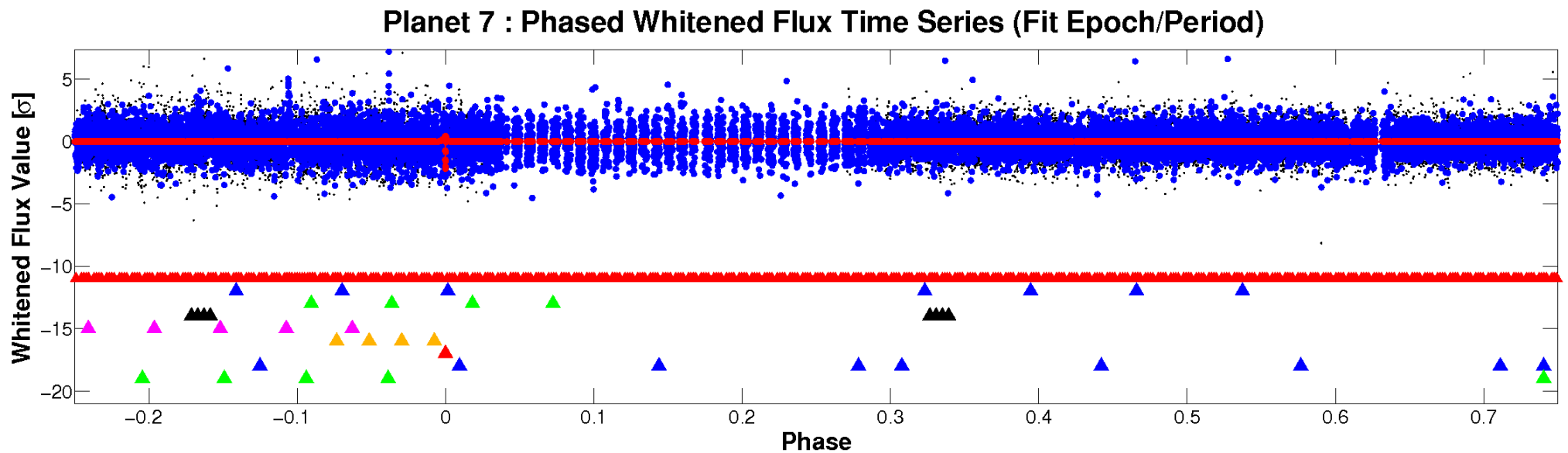
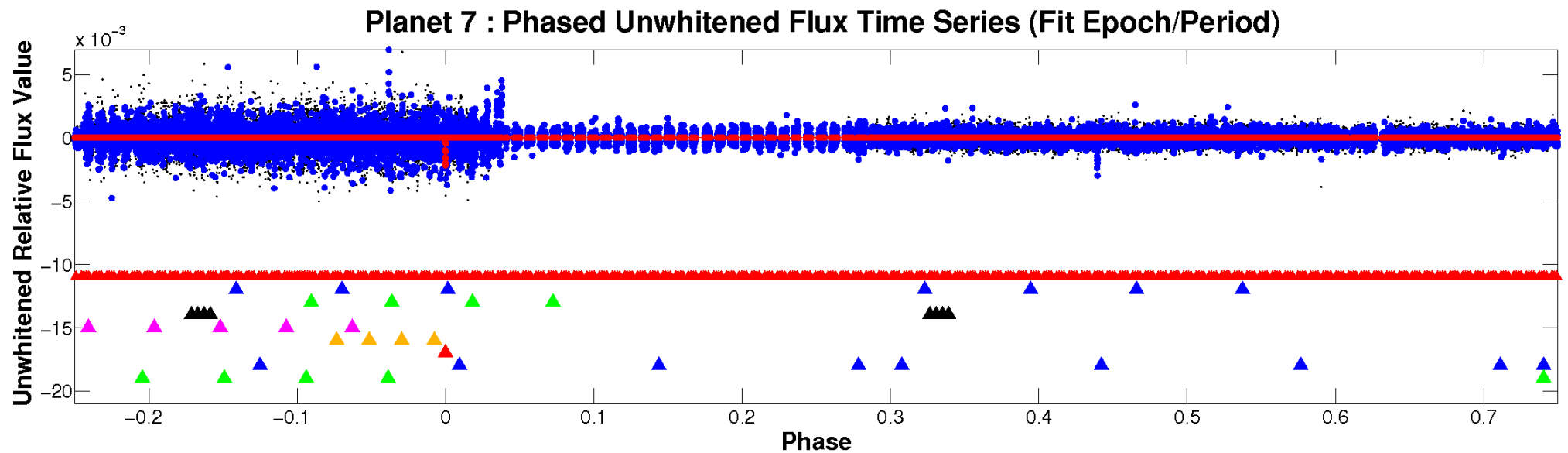


ALT Odd/Even

TCE 004476013-07

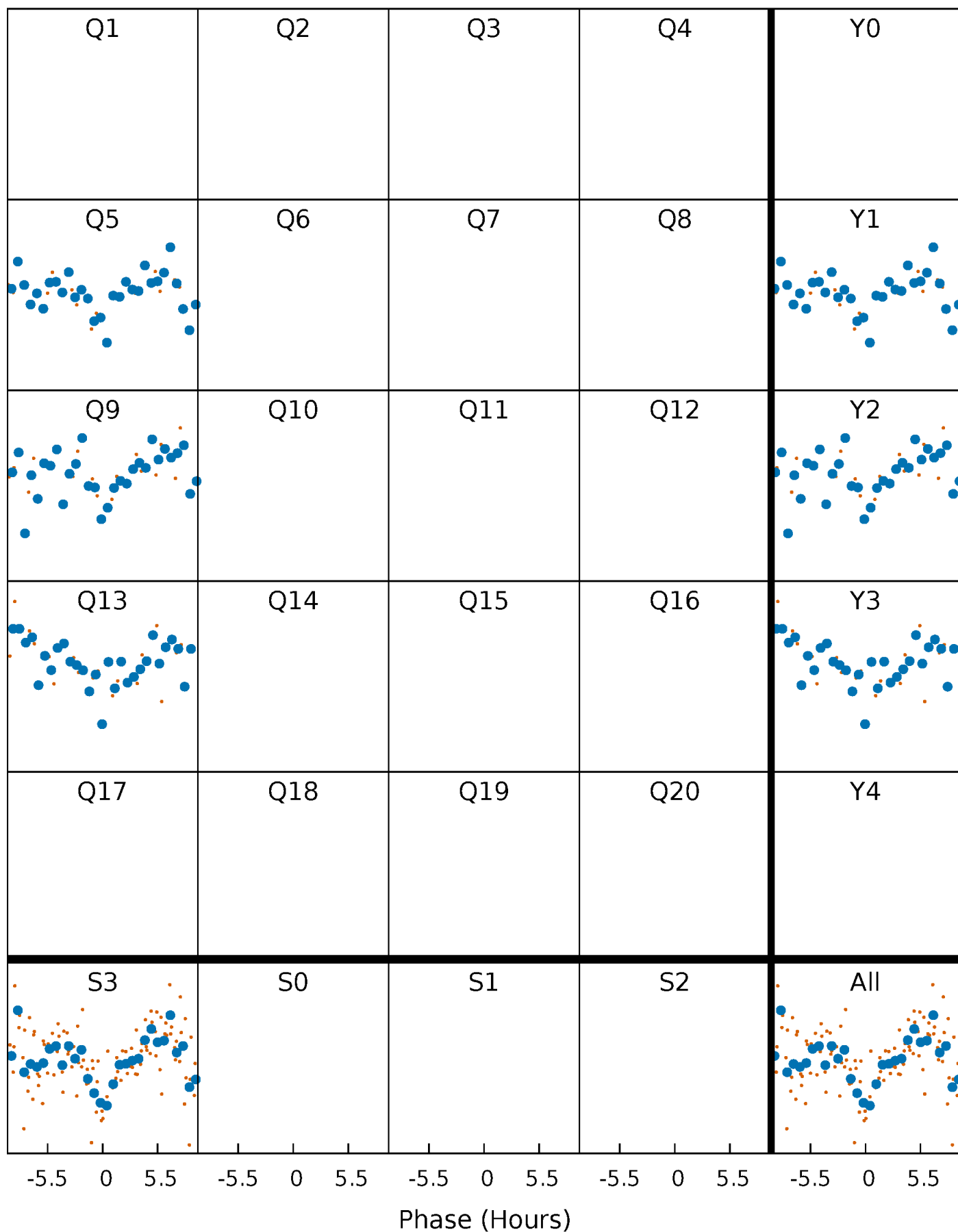


Non-Whitened Vs. Whitened Light Curve



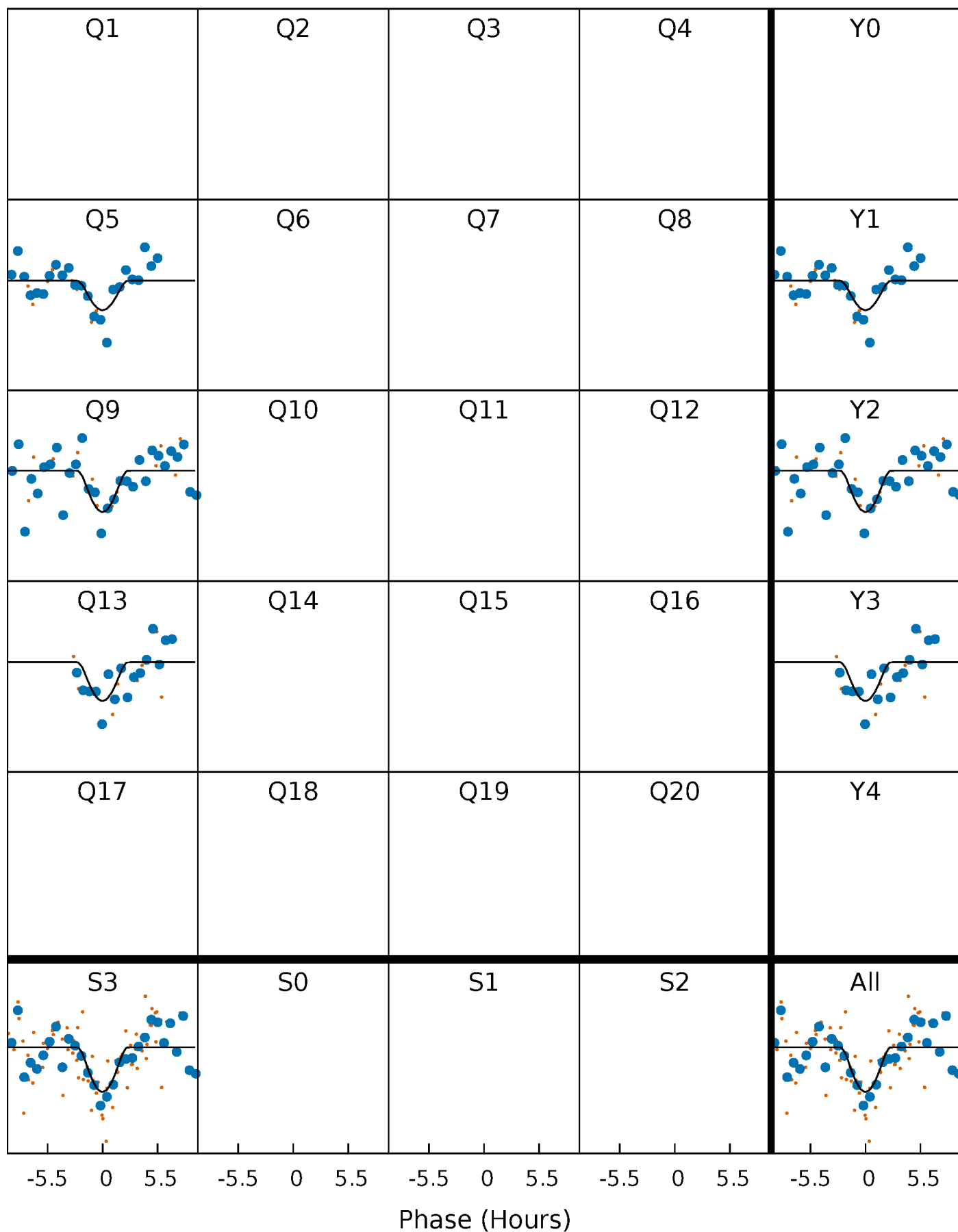
PDC Quarter-Phased Transit Curves

TCE 004476013-07 $P=363.428264$ Days $T_0=168.875171$ (BKJD)



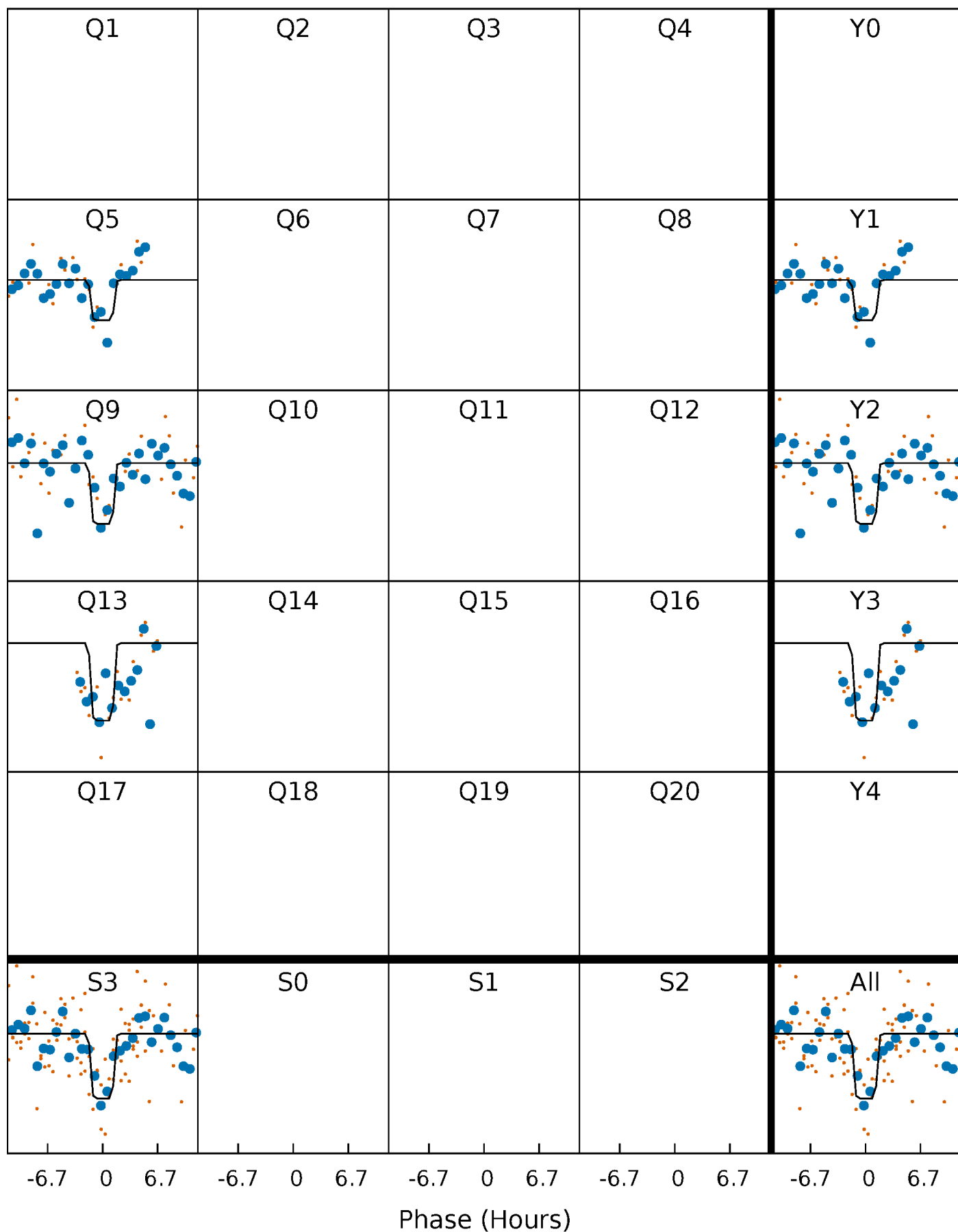
DV Quarter-Phased Transit Curves

TCE 004476013-07 $P=363.428264$ Days $T_0=168.875171$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

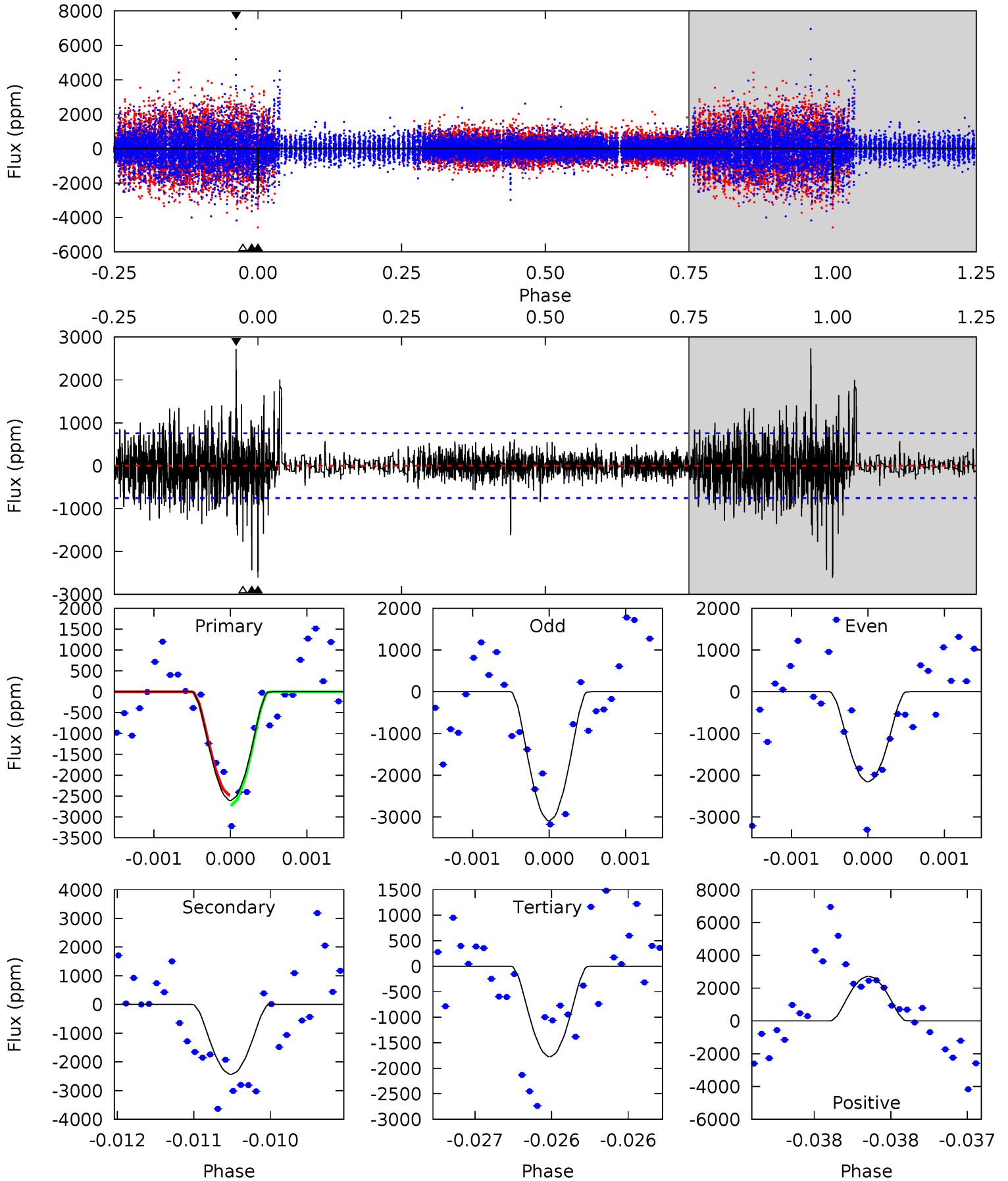
TCE 004476013-07 $P=363.431580$ Days $T_0=168.874044$ (BKJD)



DV Model-Shift Uniqueness Test

004476013-07, P = 363.428264 Days, E = 168.875171 Days

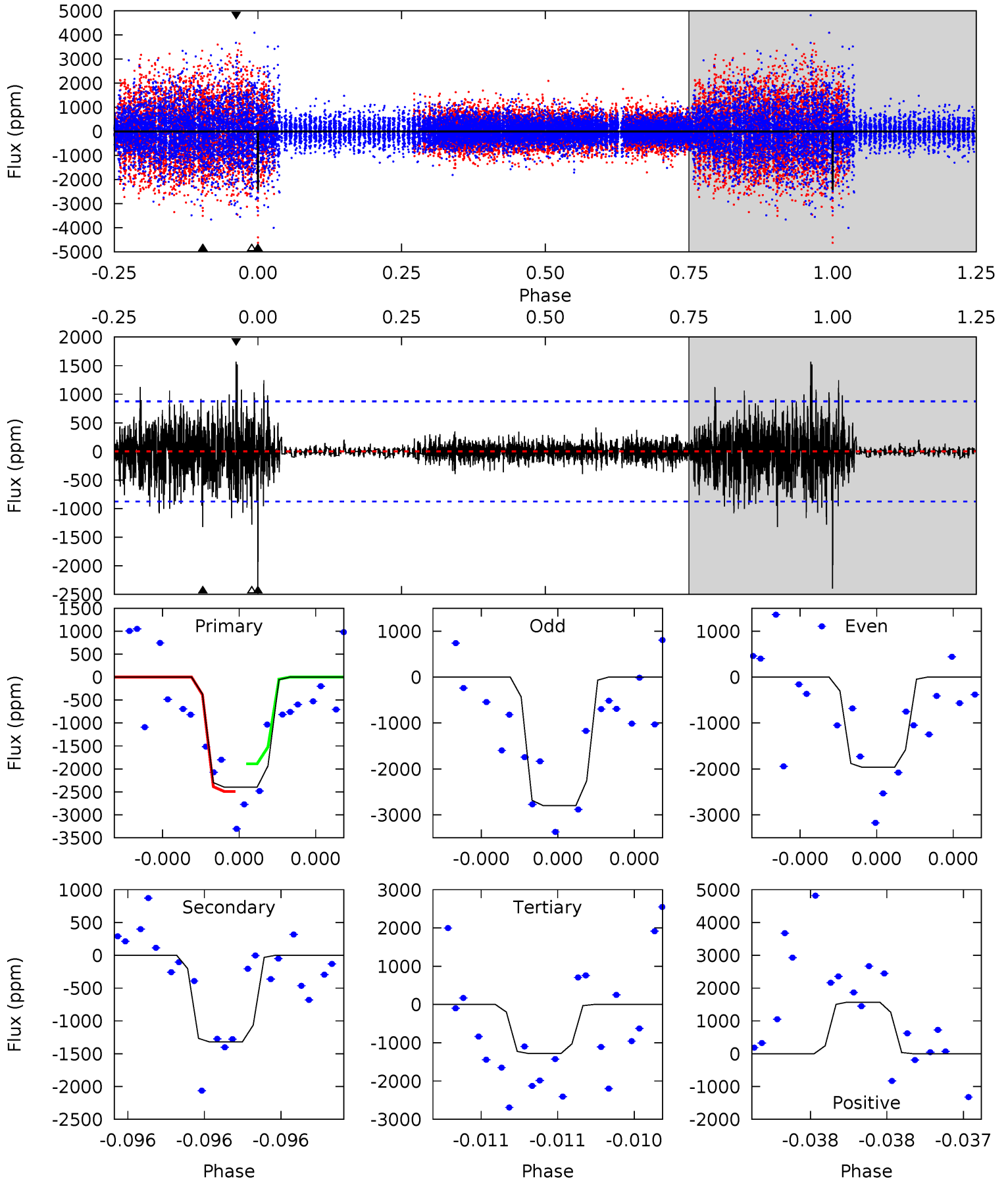
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.2	17.9	13.1	20.1	5.55	3.44	2.41	6.11	-0.85	4.85	-2.12	3.23	1.07	0.51	0.94



Alt Model-Shift Uniqueness Test

004476013-07, P = 363.431580 Days, E = 168.874044 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.4	8.47	8.20	10.1	5.61	3.54	1.36	7.17	5.31	0.27	-1.59	2.56	0.95	0.40	1.94



Stellar Parameters For KIC 004476013

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5340^{+160}_{-144}	$4.633^{+0.032}_{-0.097}$	$-0.440^{+0.300}_{-0.300}$	$0.702^{+0.112}_{-0.048}$	$0.783^{+0.076}_{-0.084}$	$3.193^{+0.519}_{-1.000}$
	+3%/-3%	+1%/-2%	+68%/-68%	+16%/-7%	+10%/-11%	+16%/-31%
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 004476013-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-2435 ± 136	$26.77^{+28.24}_{-18.67}$	292^{+12}_{-11}	2786^{+1218}_{-463}	1517^{+15205}_{-1140}
Alt.	-1321 ± 156	$27.03^{+27.77}_{-18.97}$	293^{+12}_{-11}	2557^{+1028}_{-391}	807^{+8383}_{-613}

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 $A_{obs} \gg 1.0$

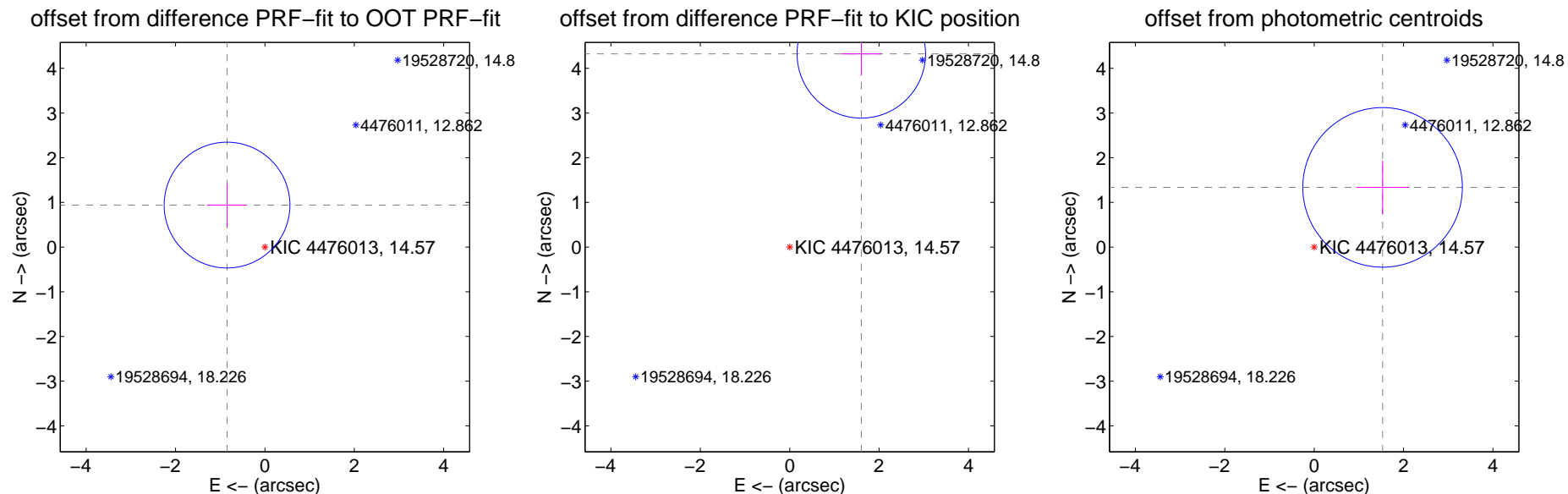
DV Centroid Data

Supplemental centroid analysis for 004476013-07. Kepler magnitude: 14.57. Transit SNR 7.41

There are 1 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 4.18 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.266 ± 0.469	2.70	0.848 ± 0.452	0.940 ± 0.483
PRF-fit source offset from KIC position	4.611 ± 0.479	9.62	-1.602 ± 0.452	4.324 ± 0.483
photometric centroid source offset	2.03 ± 0.60	3.41	-1.53 ± 0.59	1.34 ± 0.60

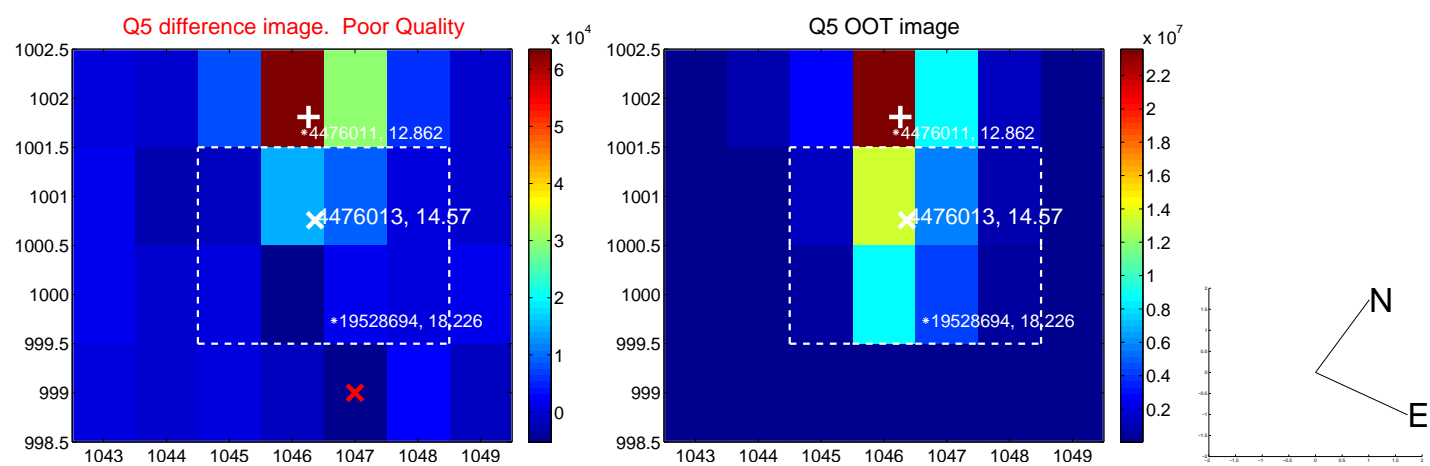


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

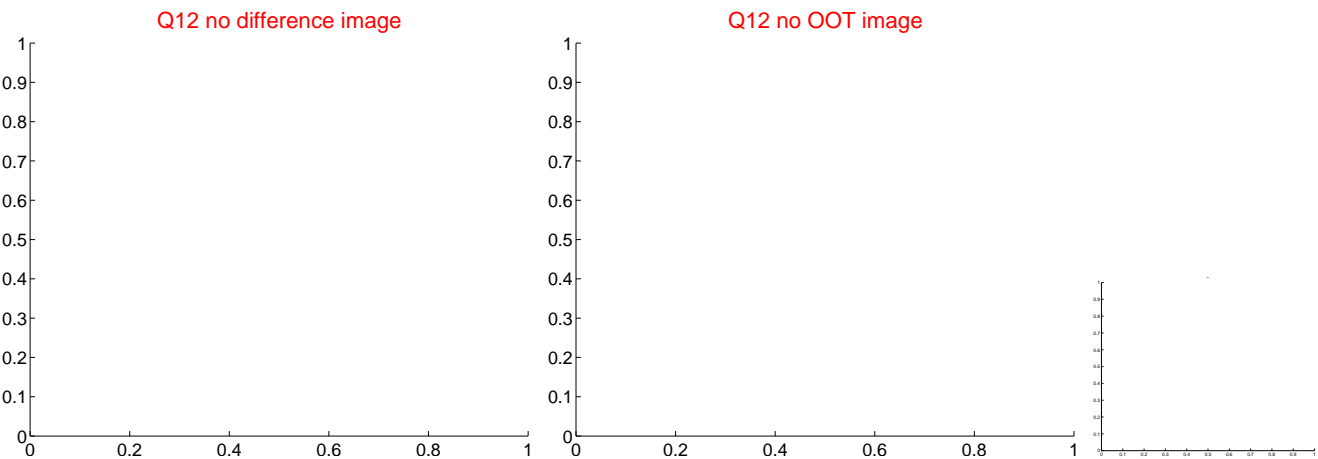
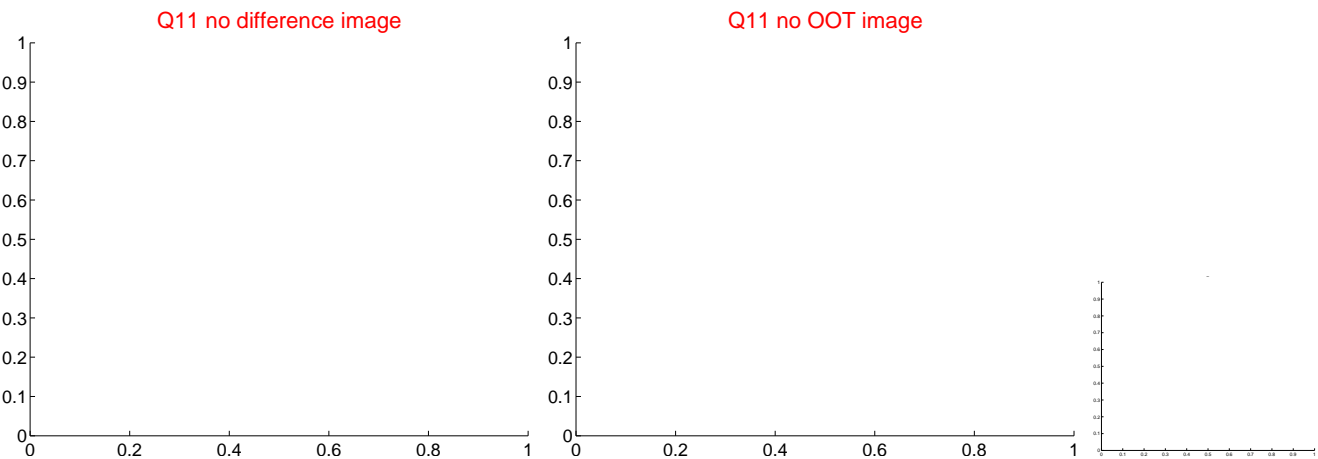
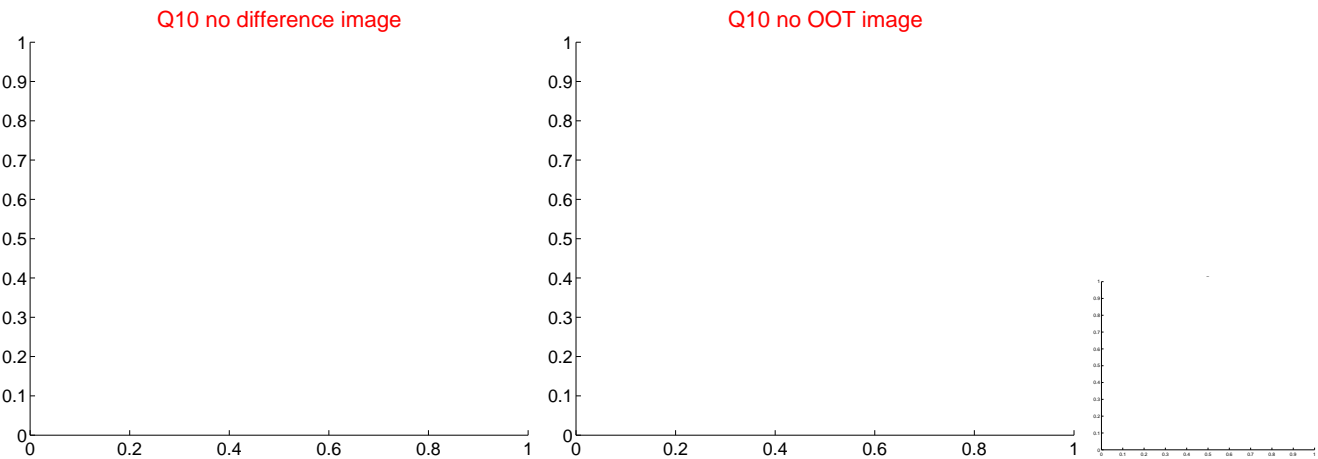
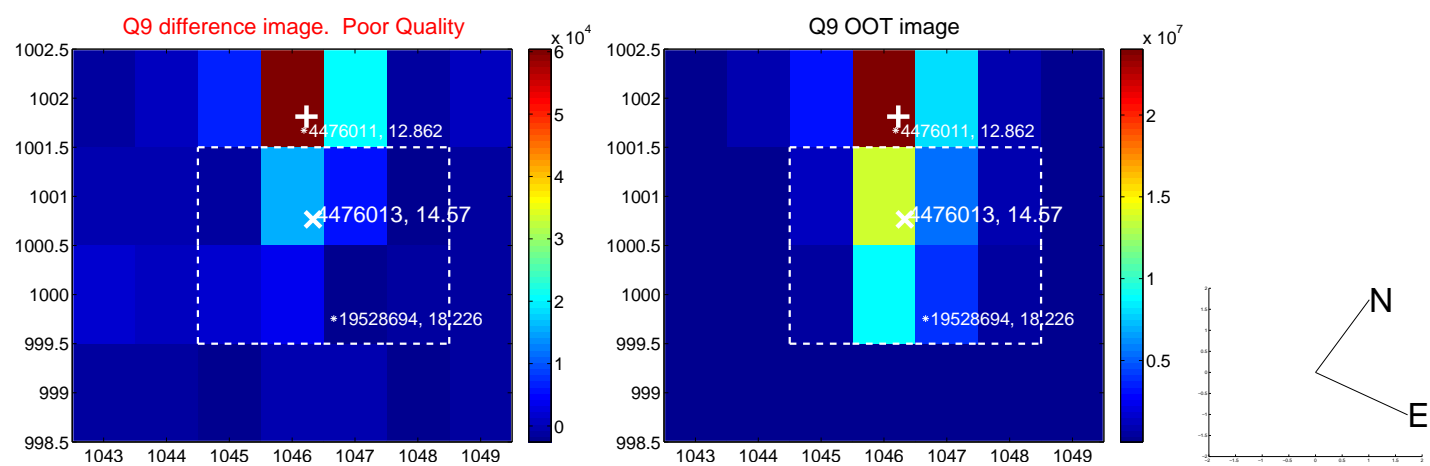
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



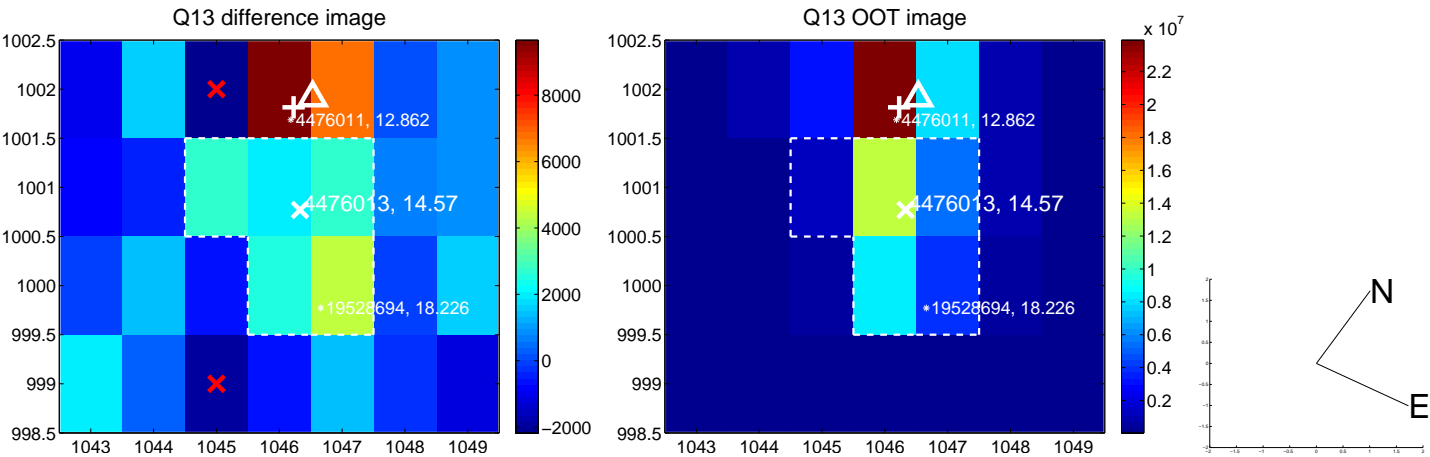
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



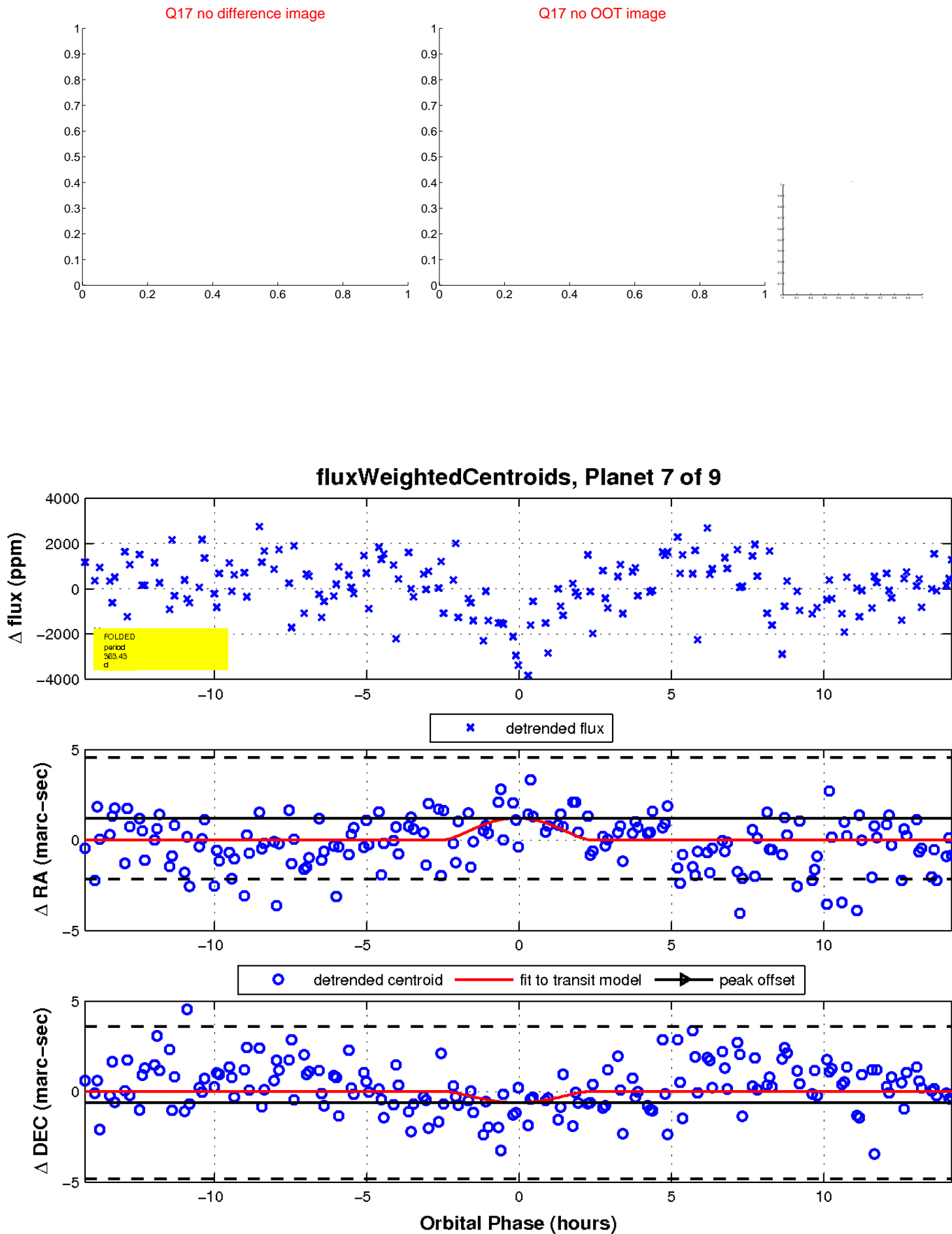
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

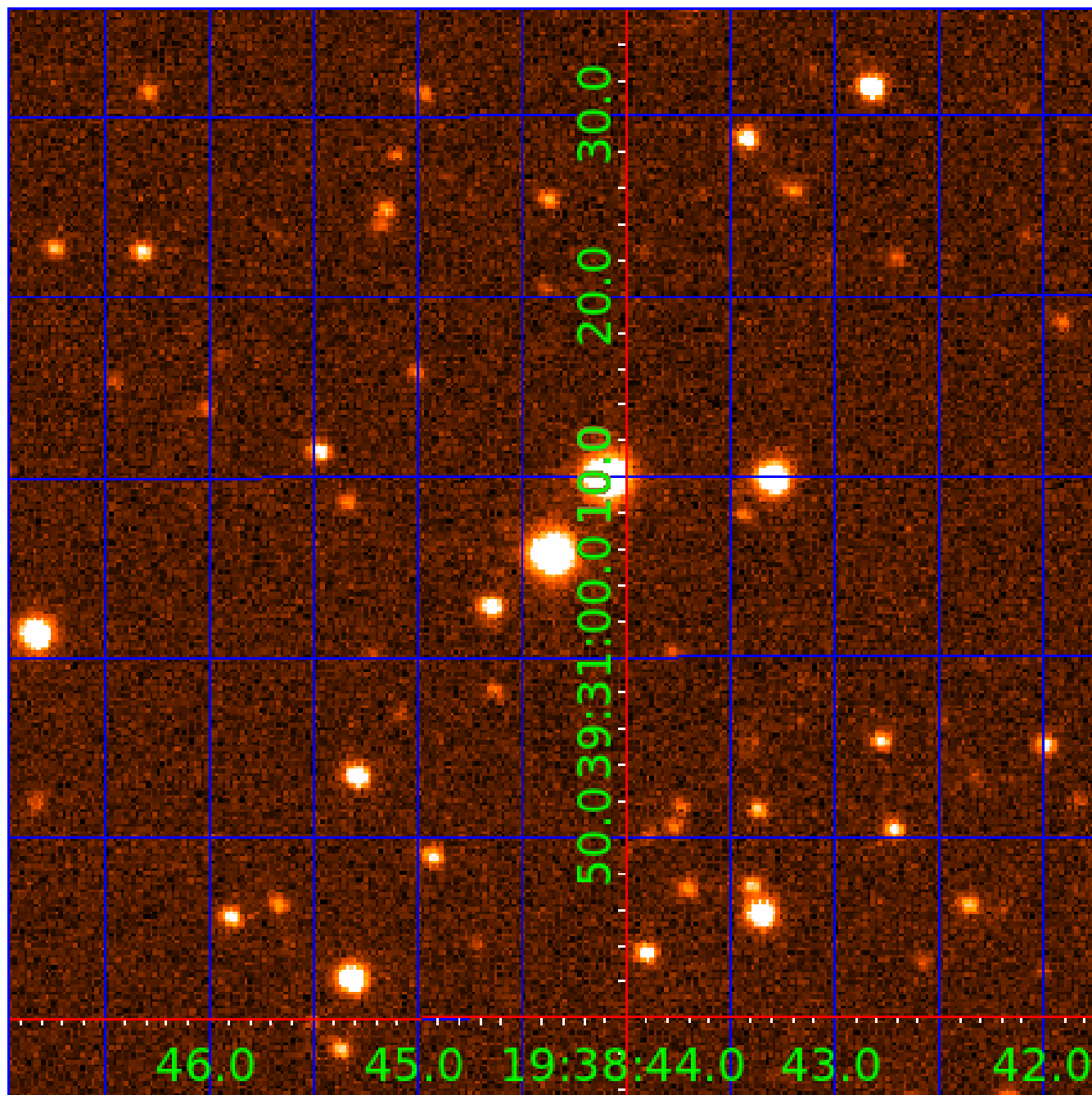


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004476013

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})
004476013-01	OBS	No	3.111300	131.965214	87.6	12.343	7.9	7.2	0.70	5340	0.65	245.11
004476013-02	OBS	No	194.686816	286.324219	1834.8	4.706	9.3	8.5	0.70	5340	5.82	0.99
004476013-03	OBS	No	383.171892	135.986790	2122.1	7.624	8.9	7.9	0.70	5340	3.31	0.40
004476013-04	OBS	No	182.482170	287.571257	1122.5	2.928	8.6	7.9	0.70	5340	2.52	1.08
004476013-05	OBS	No	347.259060	146.038192	2401.0	6.883	8.6	9.7	0.70	5340	4.05	0.46
004476013-06	OBS	No	371.401491	142.216741	1899.3	8.826	7.9	8.1	0.70	5340	3.33	0.42
004476013-07	OBS	No	363.428264	168.875171	2172.9	4.775	8.2	7.4	0.70	5340	5.93	0.43
004476013-09	OBS	No	343.360397	154.816901	2157.6	6.228	8.3	8.2	0.70	5340	6.28	0.46

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004476013-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—CENT_KIC_POS
004476013-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
004476013-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
004476013-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

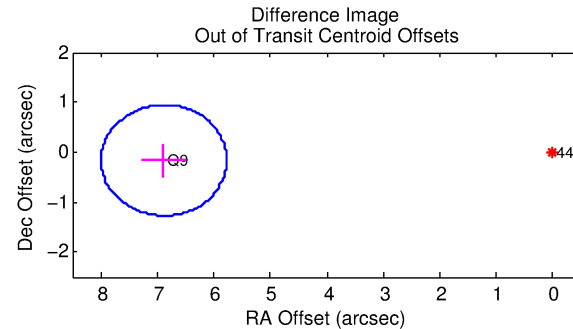
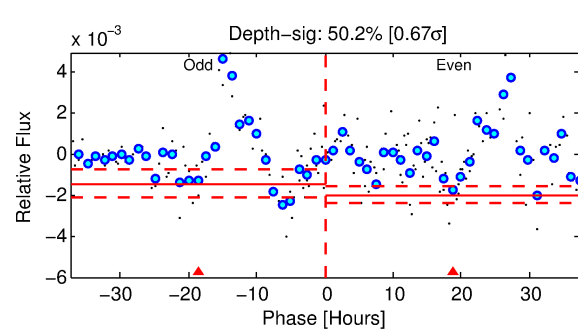
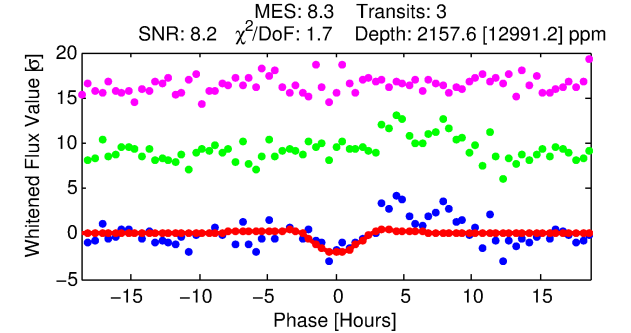
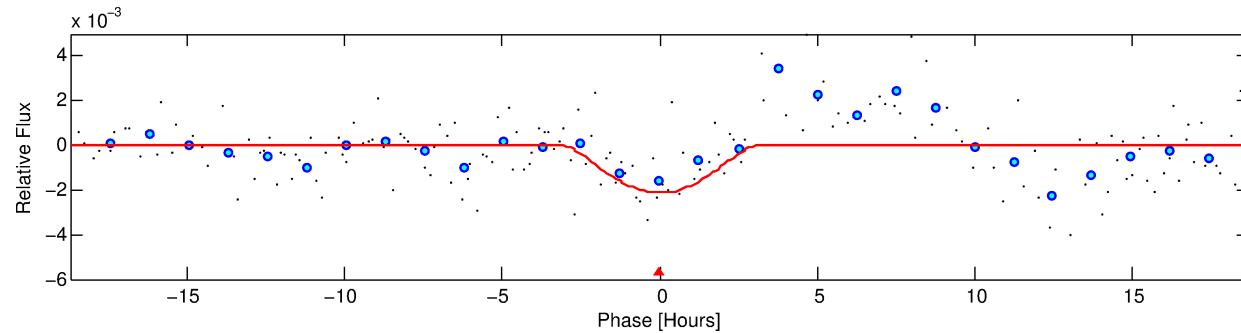
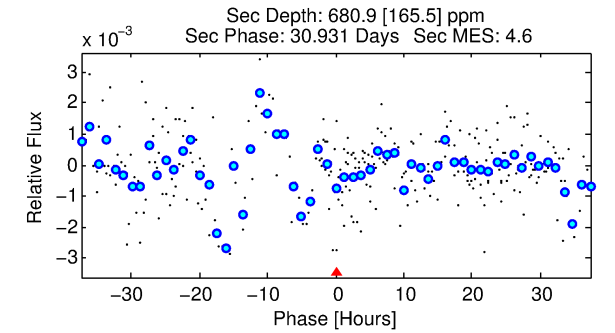
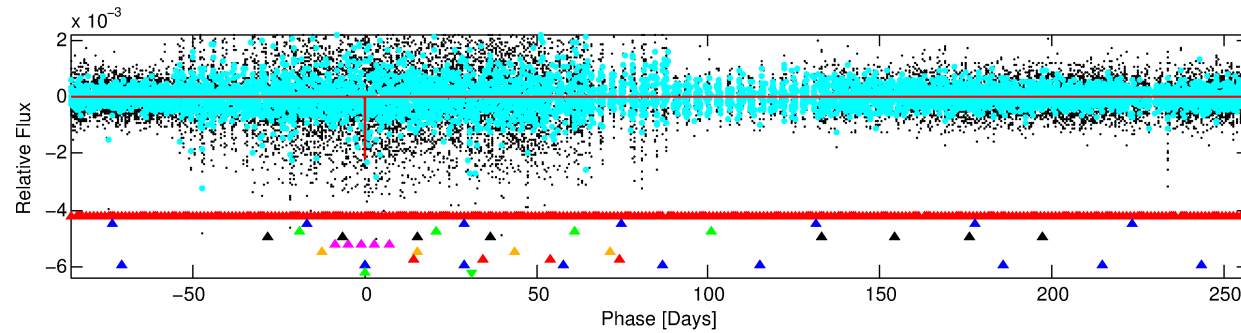
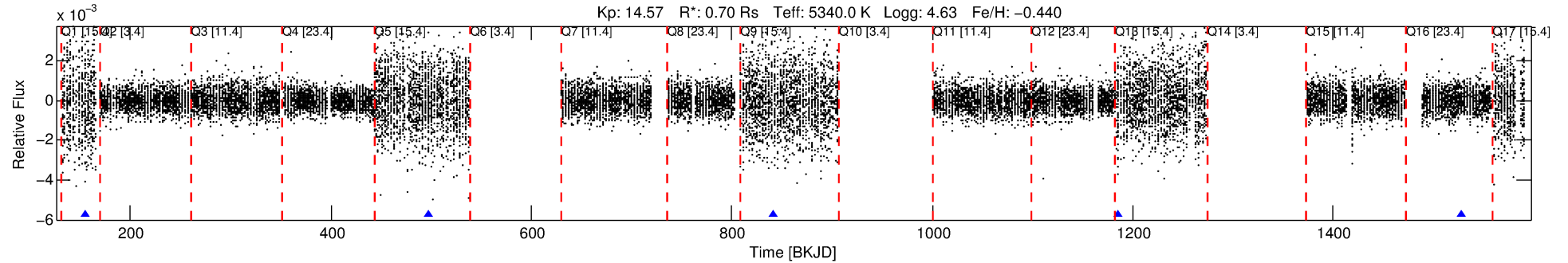
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004476013-09

No Significant Match Found

DV One-Page Summary

KIC: 4476013 Candidate: 9 of 9 Period: 343.360 d



DV Fit Results:

Period = 343.36040 [0.00877] d
Epoch = 154.8169 [0.0178] BKJD
Rp/R* = 0.0820 [0.6264]
a/R* = 174.02 [280.61]
b = 1.00 [1.21]
Seff = 0.46 [0.10]
Teq = 210 [12] K
Rp = 6.28 [47.99] Re
a = 0.8806 [0.1143] AU
Ag = 7361.60 [112490.74] [0.07σ]
Teff = 3012 [11507] K [0.24σ]

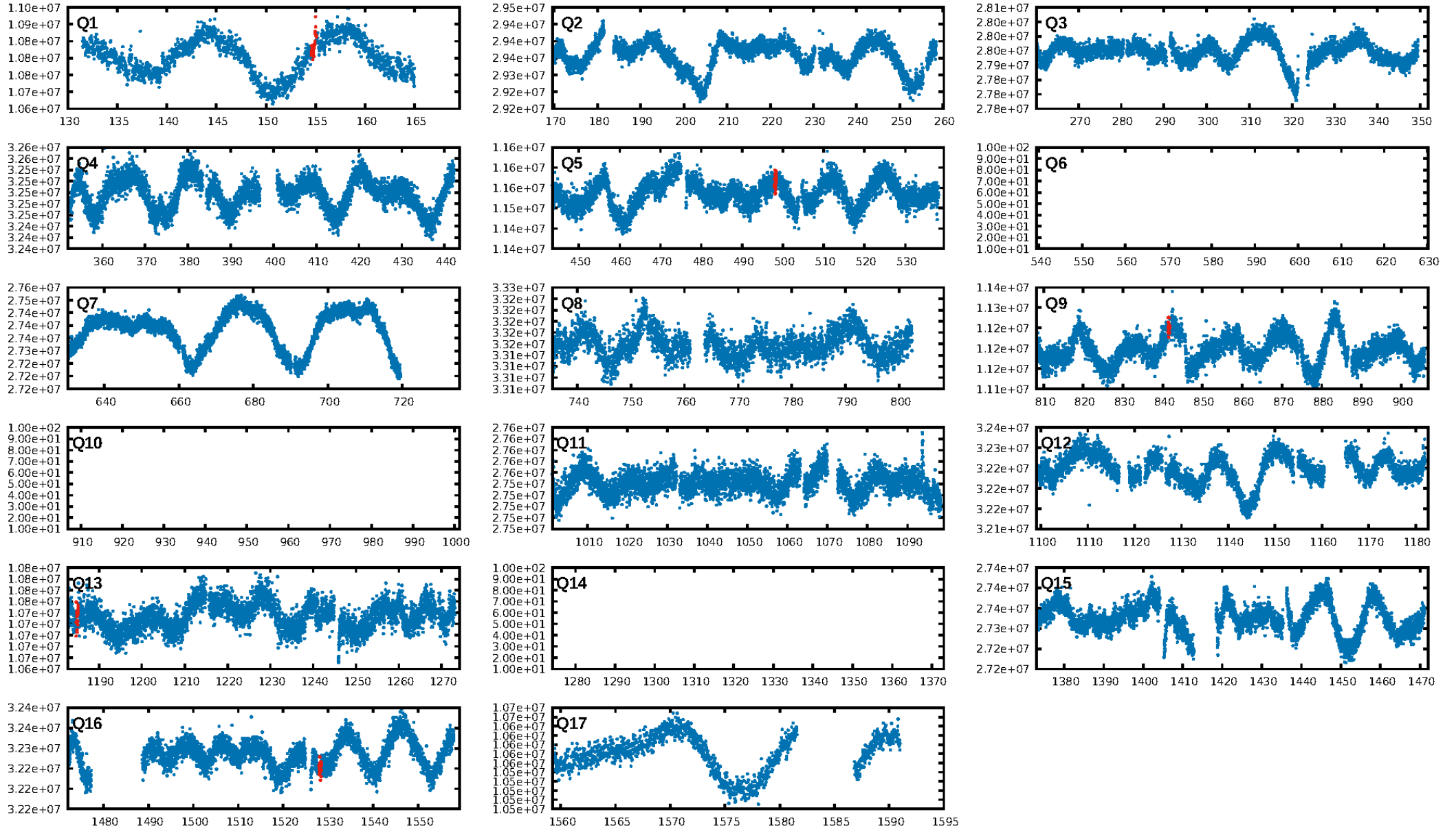
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [457.08σ]
LongPeriod-sig: 100.0% [10.08σ]
ModelChiSquare2-sig: 46.9%
ModelChiSquareGoF-sig: 86.1%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: -0.5121
Centroid-sig: 27.8%
Centroid-so: 1.283 arcsec [3.43σ]
OotOffset-rm: 6.882 arcsec [18.58σ]
KicOffset-rm: 5.503 arcsec [15.41σ]
OotOffset-st: 0/0/0/1 [1]
KicOffset-st: 0/0/0/1 [1]
DiffImageQuality-fgm: 1.00 [1/1]
DiffImageOverlap-fno: 0.50 [2/4]

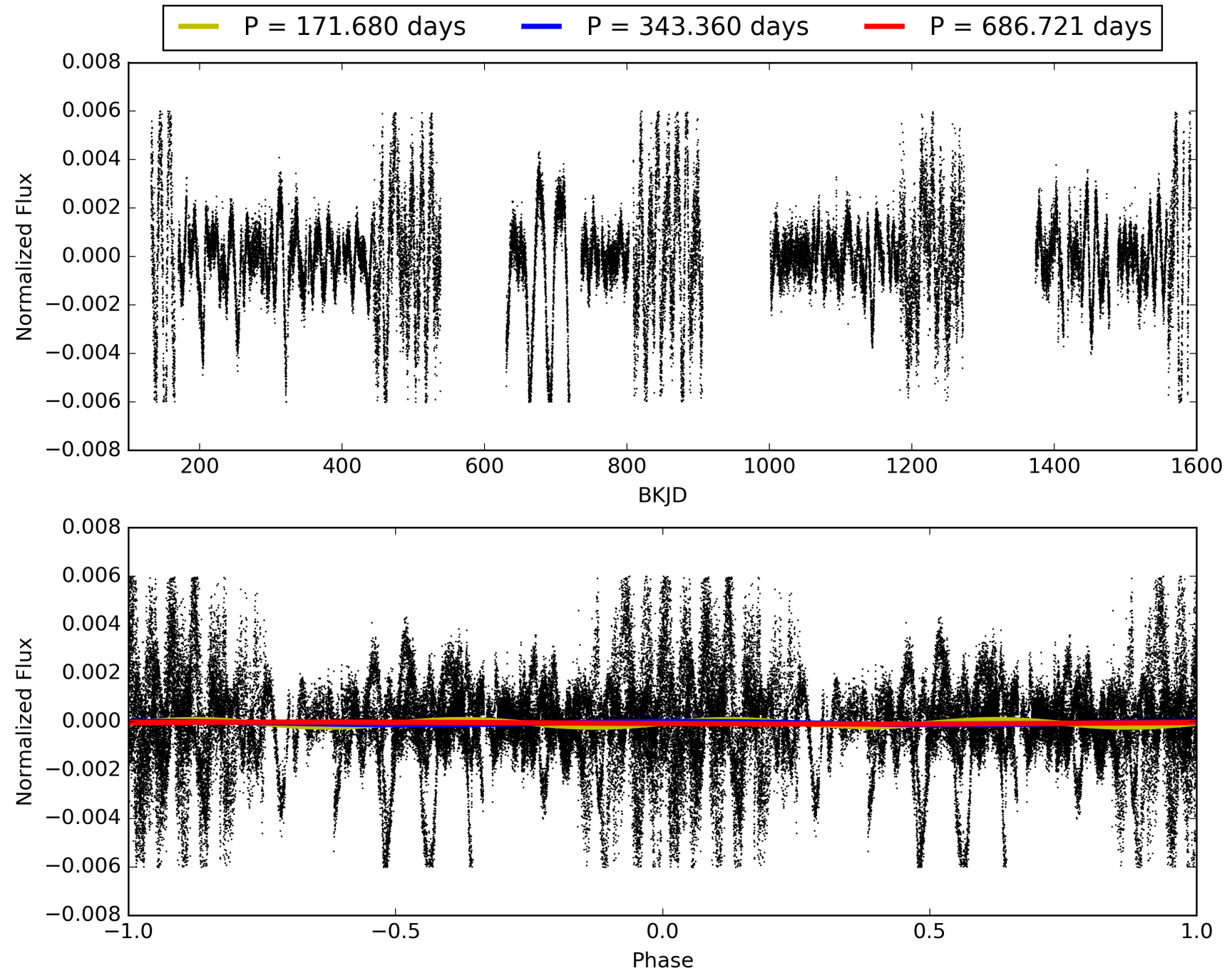
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:37:52 Z

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

TCE 004476013-09, PDC Light Curves

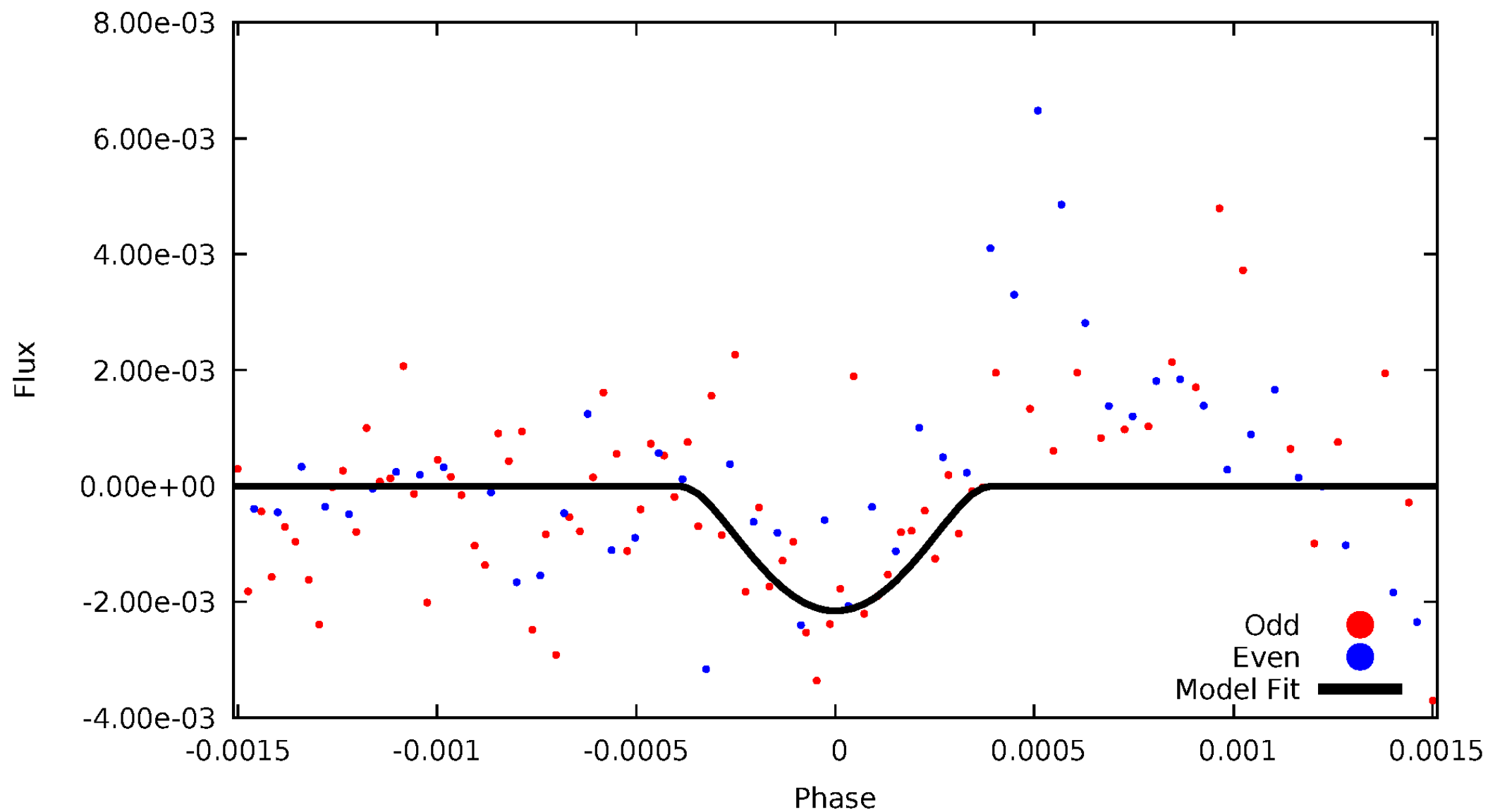


TCE 004476013-09



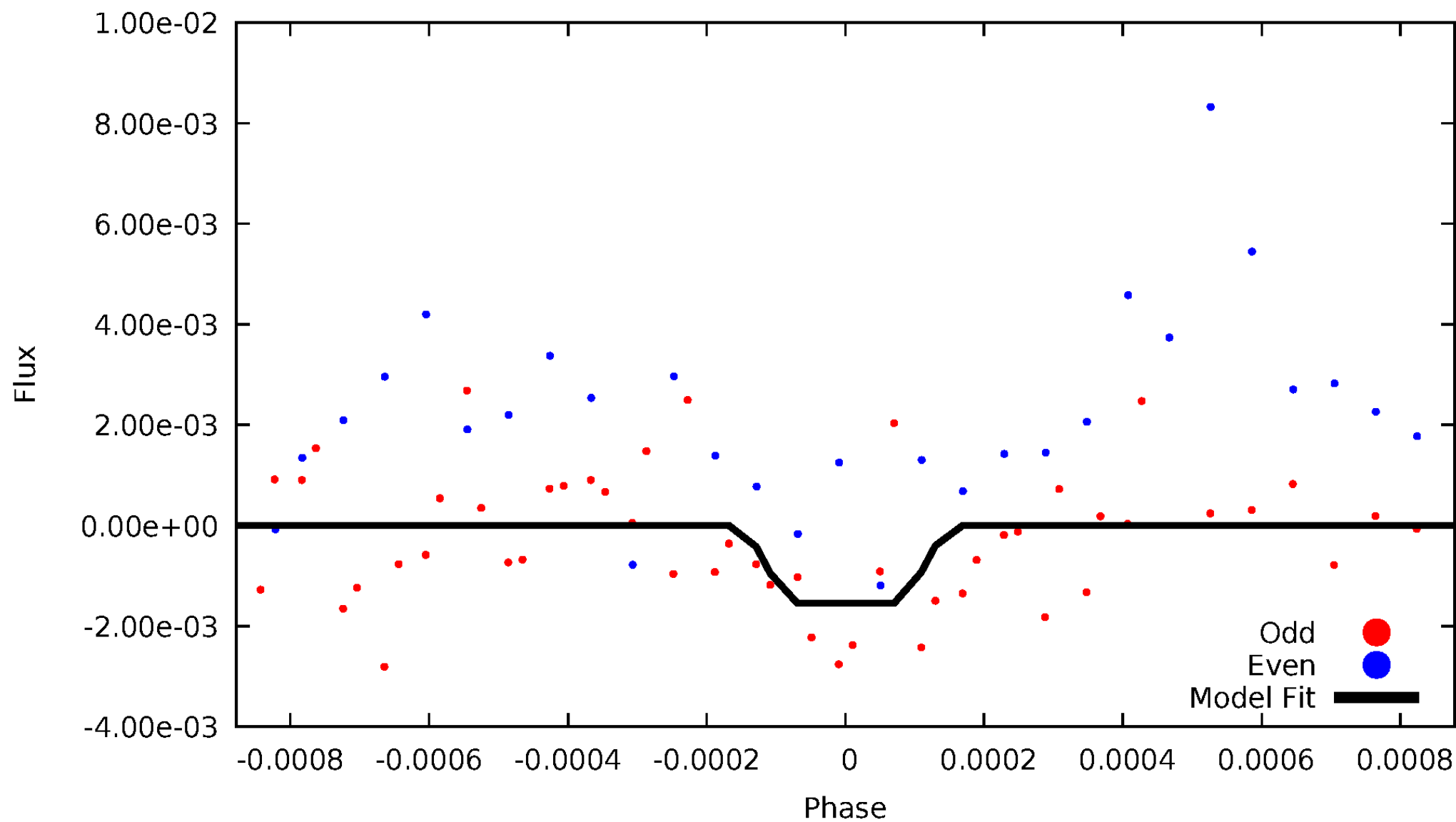
DV Odd/Even

TCE 004476013-09



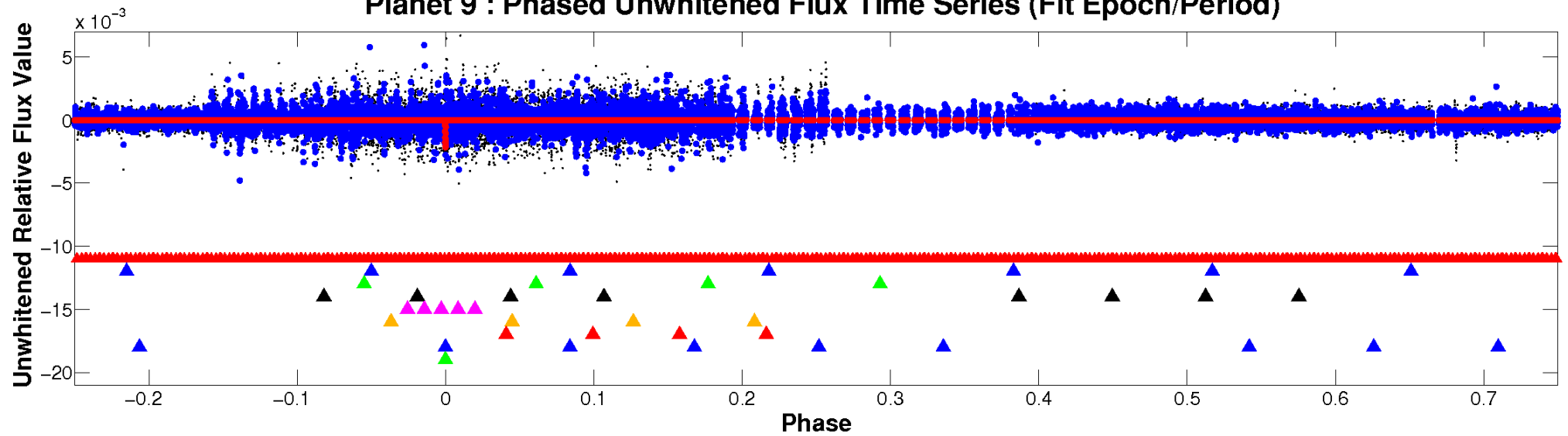
ALT Odd/Even

TCE 004476013-09

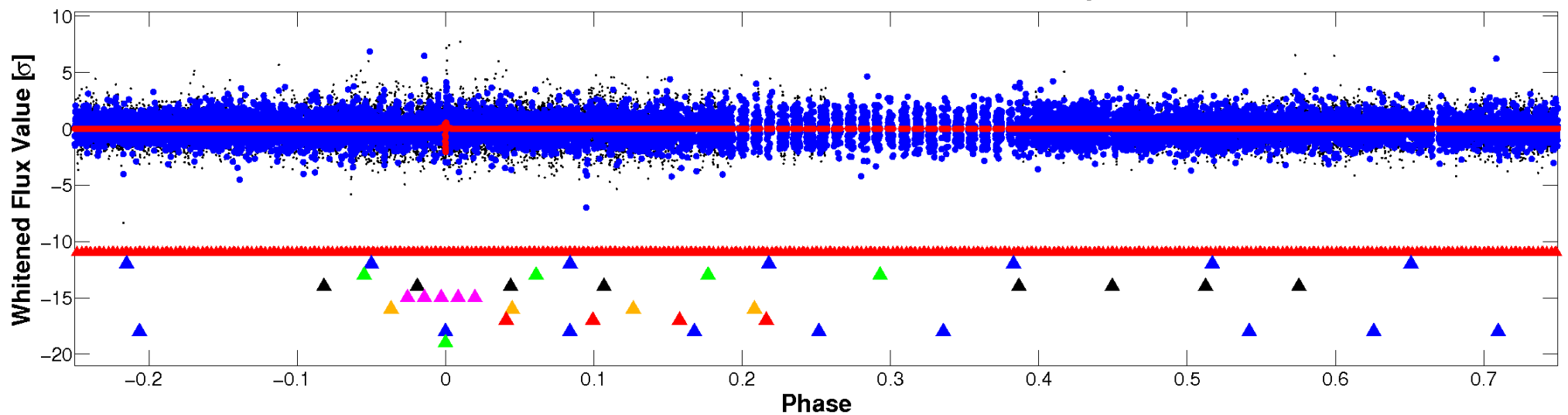


Non-Whitened Vs. Whitened Light Curve

Planet 9 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

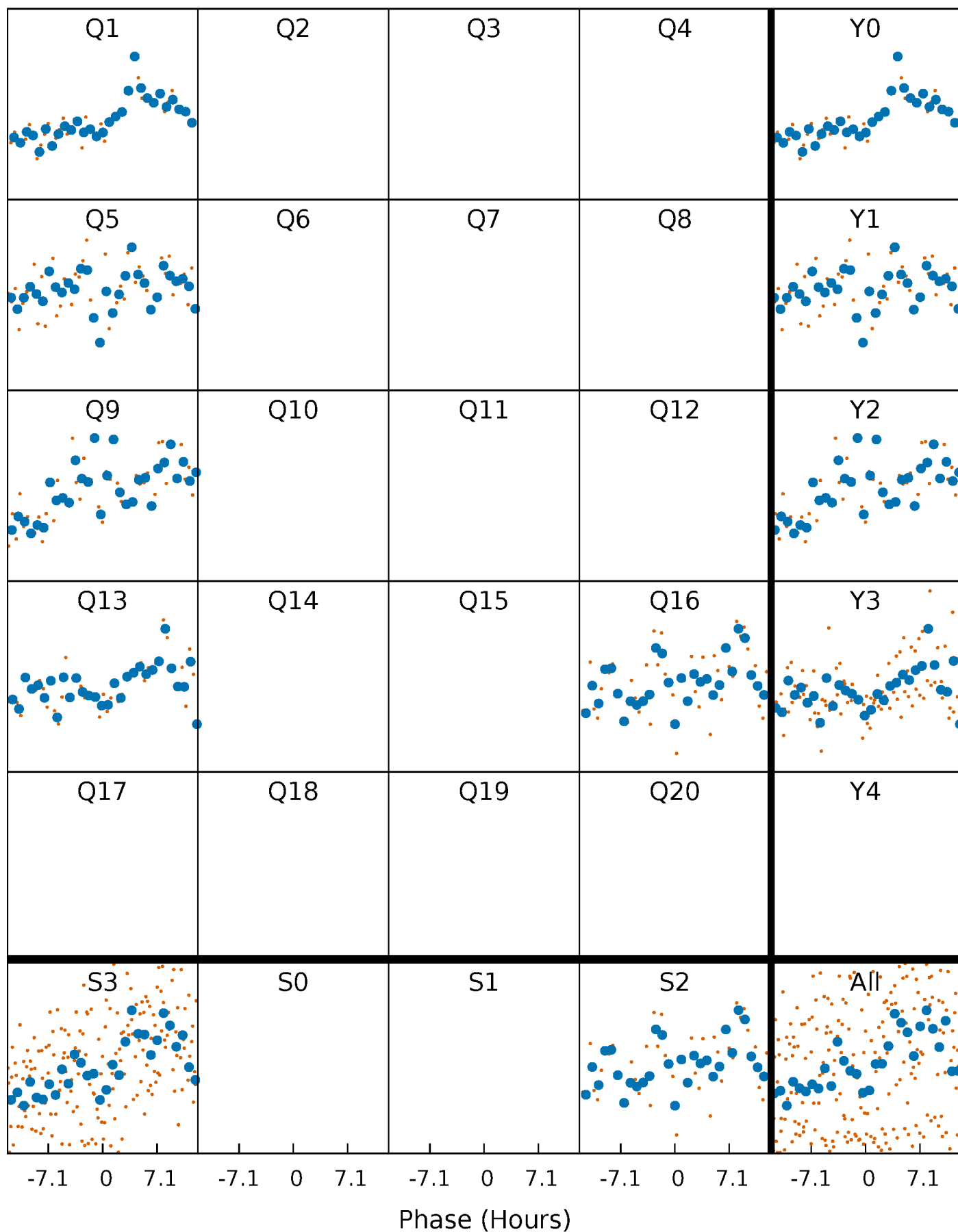


Planet 9 : Phased Whitened Flux Time Series (Fit Epoch/Period)



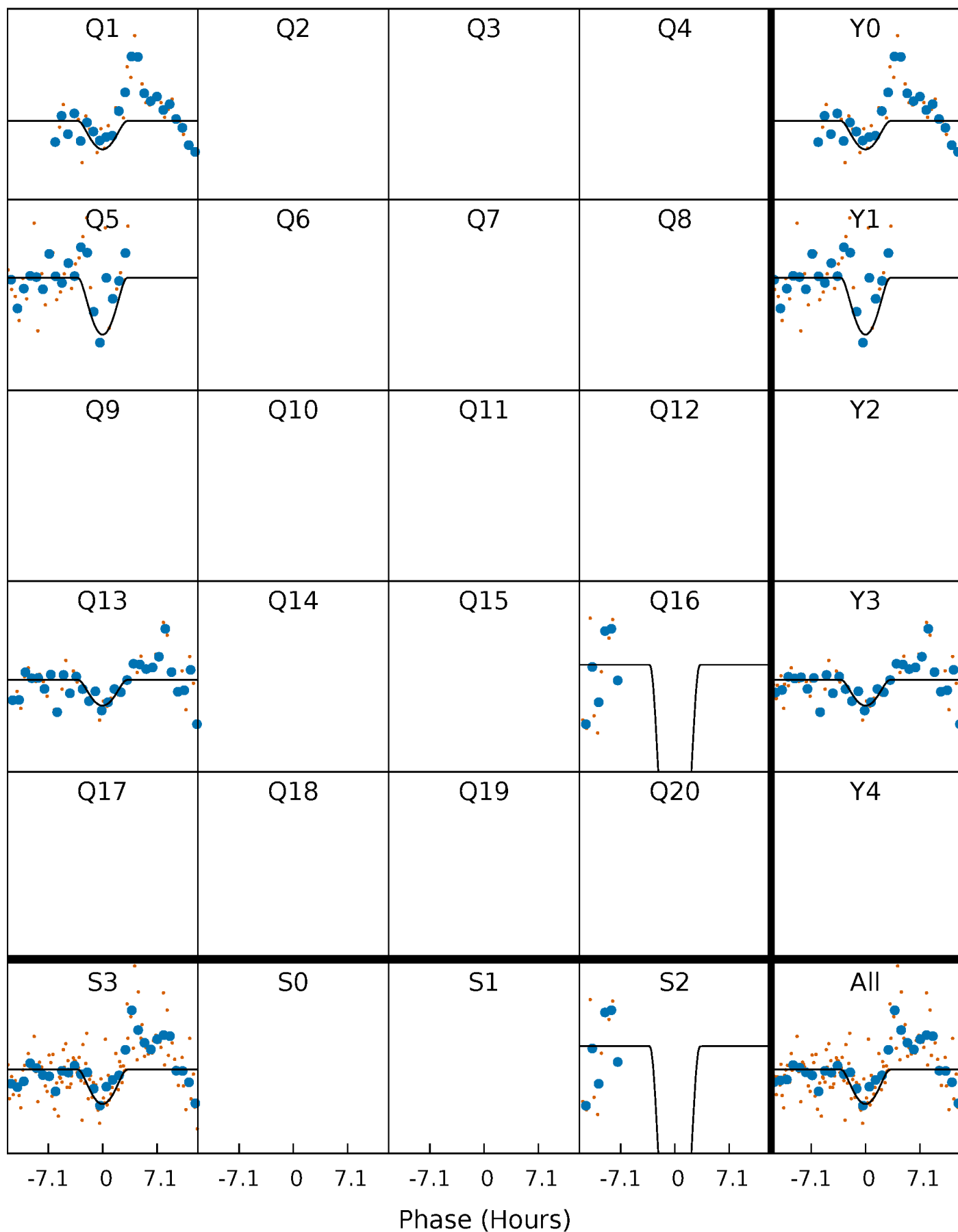
PDC Quarter-Phased Transit Curves

TCE 004476013-09 $P=343.360397$ Days $T_0=154.816901$ (BKJD)



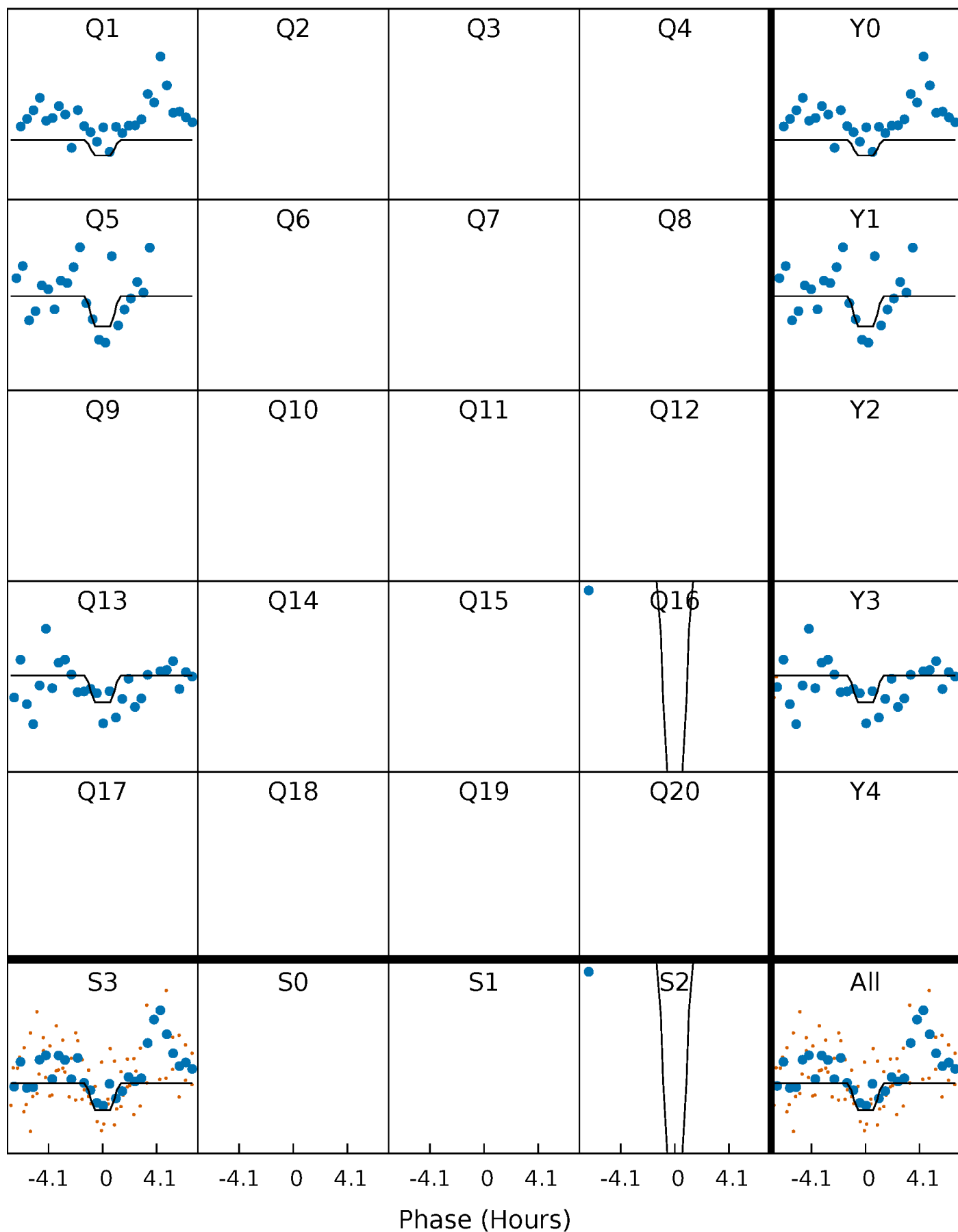
DV Quarter-Phased Transit Curves

TCE 004476013-09 $P=343.360397$ Days $T_0=154.816901$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

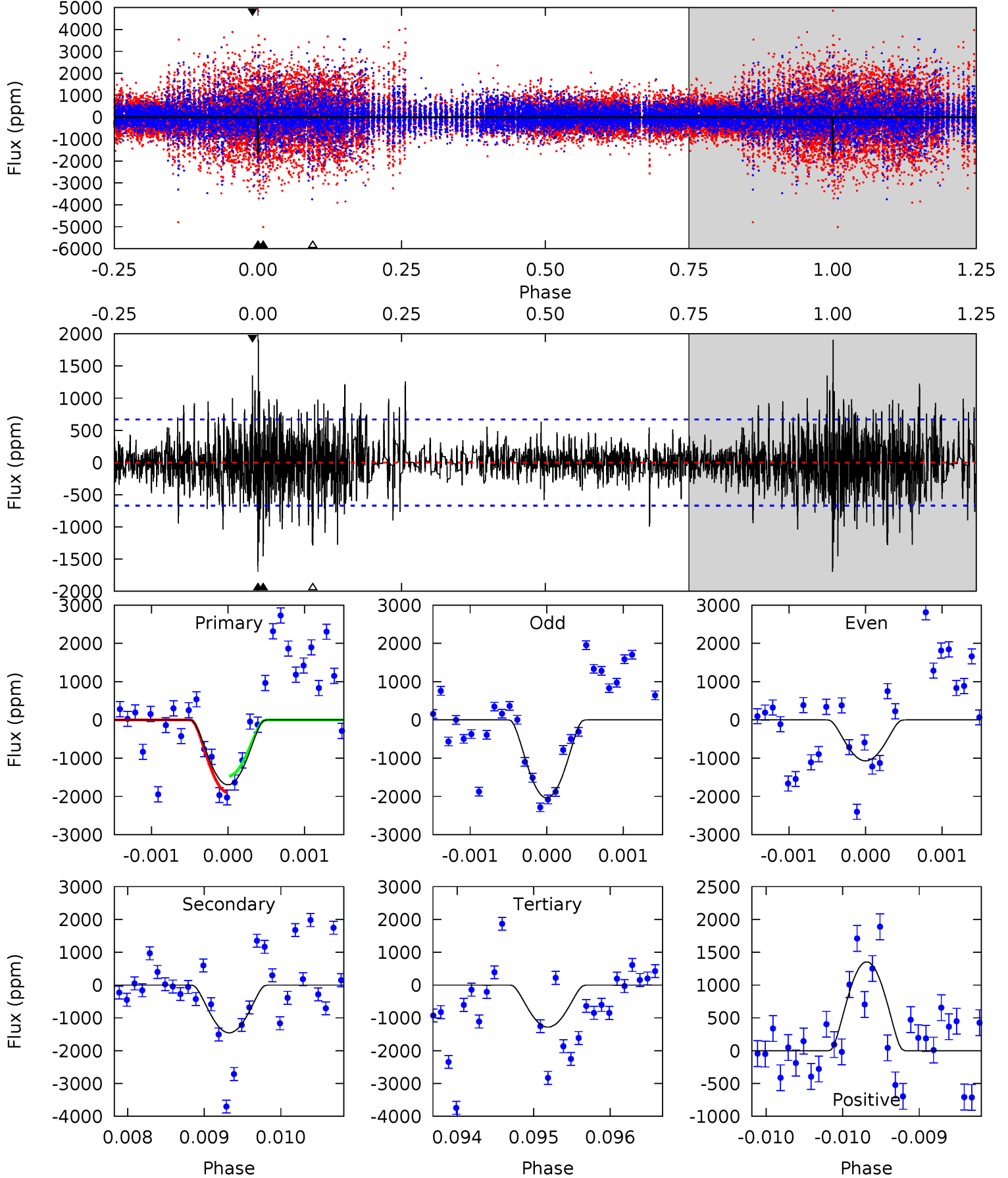
TCE 004476013-09 P=343.358182 Days $T_0=154.810817$ (BKJD)



DV Model-Shift Uniqueness Test

004476013-09, P = 343.360397 Days, E = 154.816901 Days

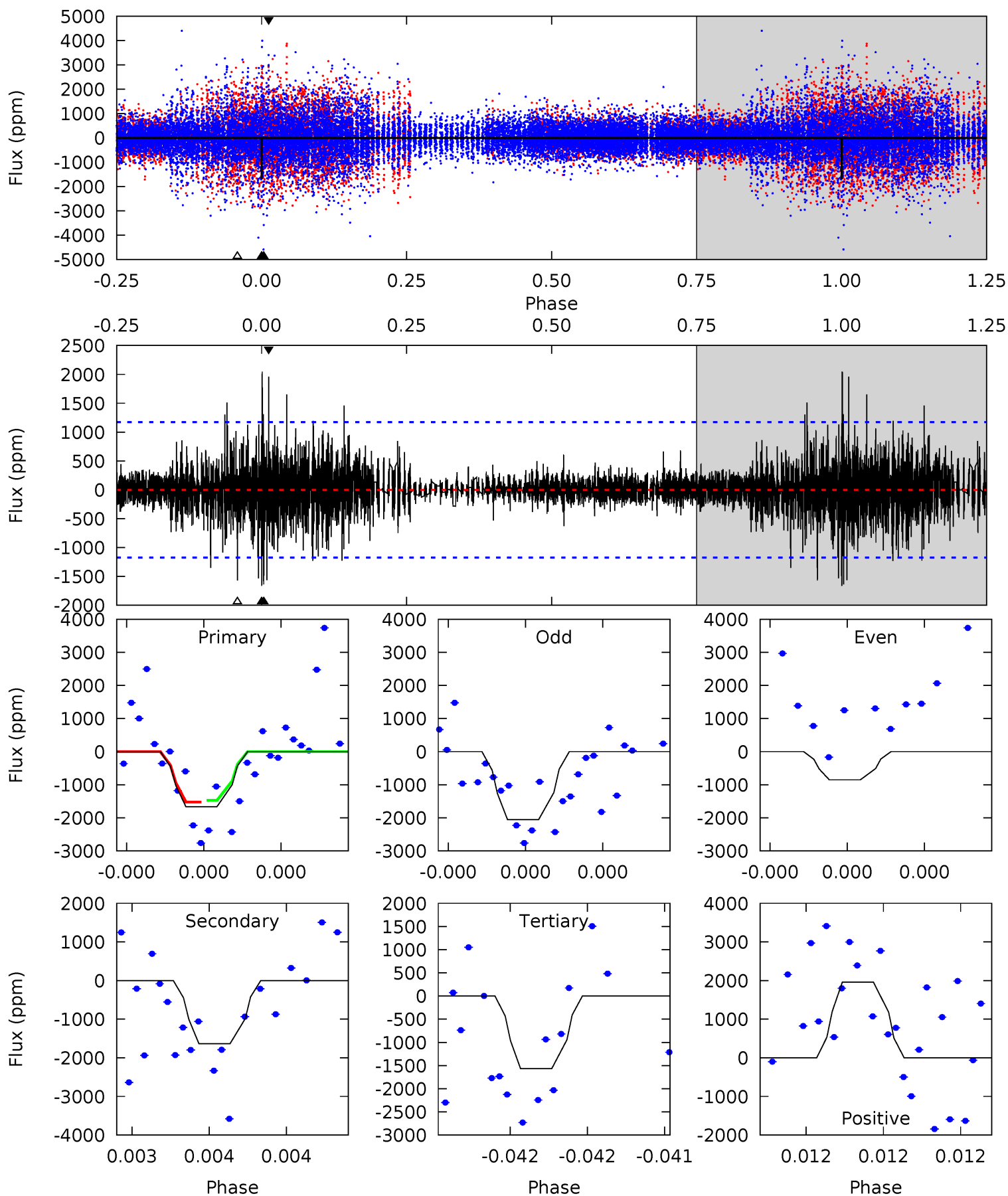
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.9	11.9	10.5	11.1	5.49	3.35	2.32	3.39	2.81	1.42	0.84	3.77	1.27	0.53	1.68



Alt Model-Shift Uniqueness Test

004476013-09, P = 343.358182 Days, E = 154.810817 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.02	7.88	7.57	9.45	5.66	3.62	1.29	0.45	-1.42	0.32	-1.56	2.81	0.83	0.55	0



Stellar Parameters For KIC 004476013

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5340^{+160}_{-144}	$4.633^{+0.032}_{-0.097}$	$-0.440^{+0.300}_{-0.300}$	$0.702^{+0.112}_{-0.048}$	$0.783^{+0.076}_{-0.084}$	$3.193^{+0.519}_{-1.000}$
	+3%/-3%	+1%/-2%	+68%/-68%	+16%/-7%	+10%/-11%	+16%/-31%
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 004476013-09 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1454 ± 122	$35.63^{+36.16}_{-22.65}$	298^{+12}_{-11}	2425^{+741}_{-363}	490^{+3289}_{-371}
Alt.	-1634 ± 207	$35.18^{+37.48}_{-24.90}$	298^{+13}_{-10}	2482^{+929}_{-387}	591^{+5690}_{-458}

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

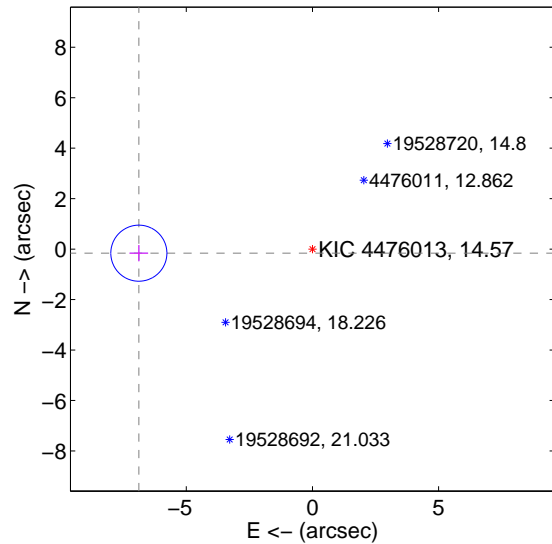
Supplemental centroid analysis for 004476013-09. Kepler magnitude: 14.57. Transit SNR 8.20

There are 1 quarters with good PRF difference image offsets

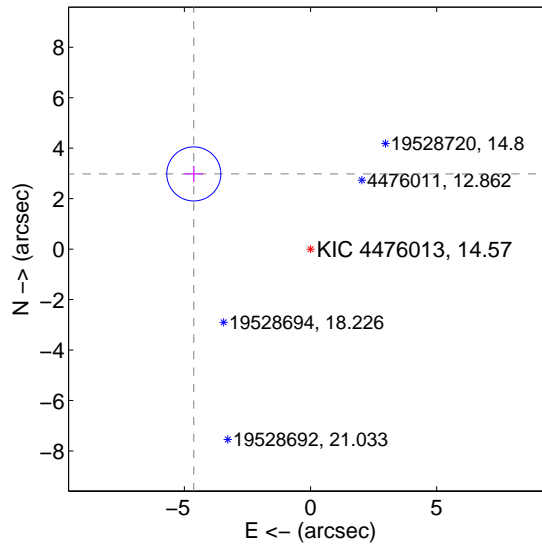
The OOT PRF centroid is offset from the target star catalog position by about 3.87 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	6.882 ± 0.370	18.58	6.880 ± 0.370	-0.162 ± 0.323
PRF-fit source offset from KIC position	5.503 ± 0.357	15.41	4.626 ± 0.370	2.980 ± 0.323
photometric centroid source offset	1.28 ± 0.37	3.43	-1.04 ± 0.37	0.75 ± 0.38

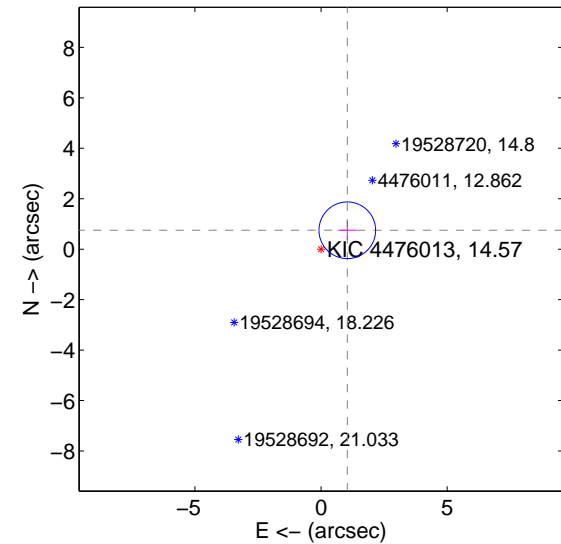
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

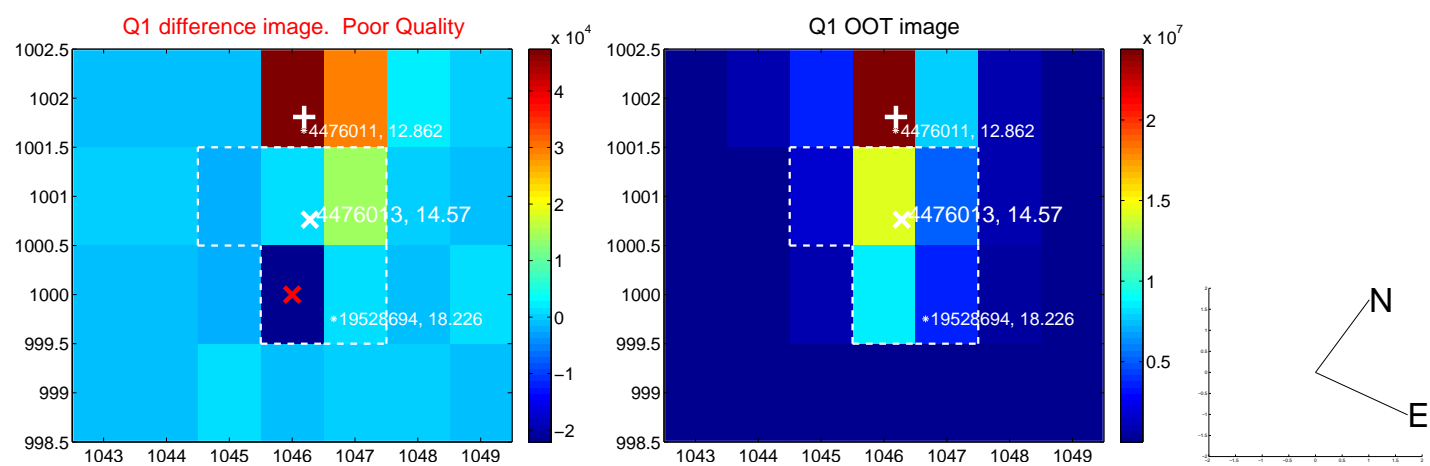


offset from photometric centroids

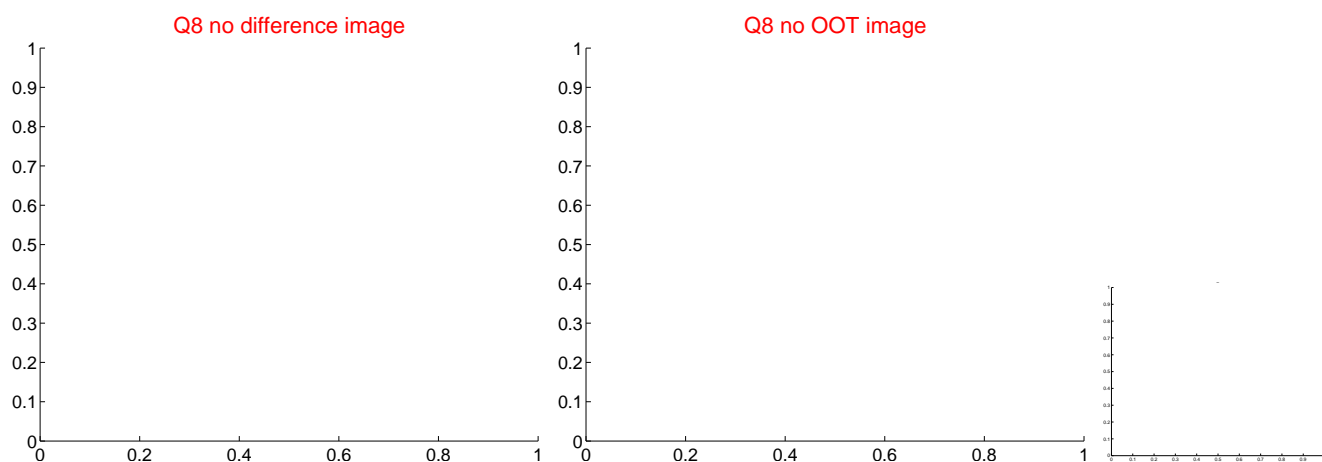
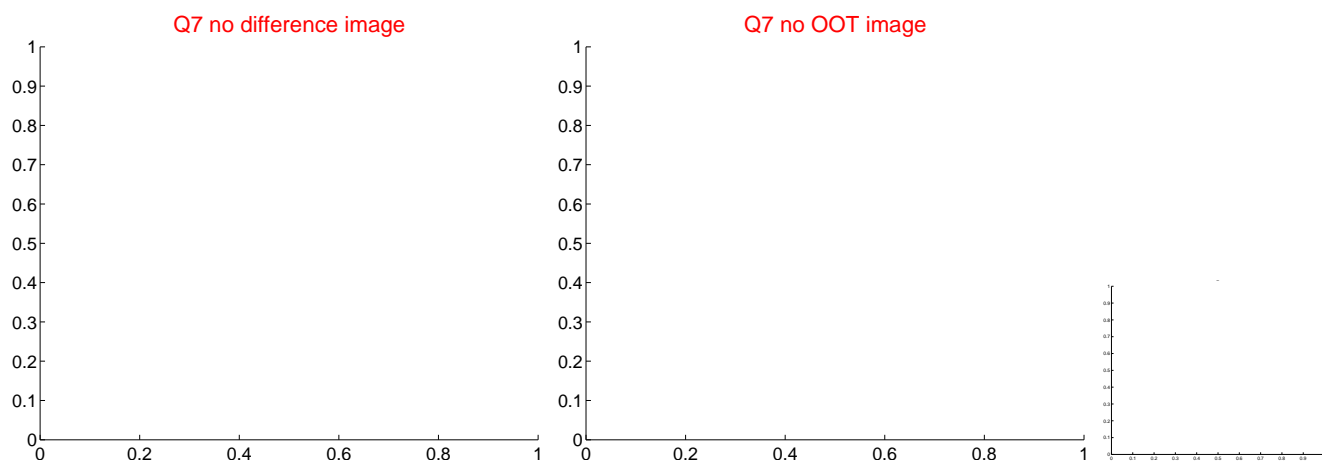
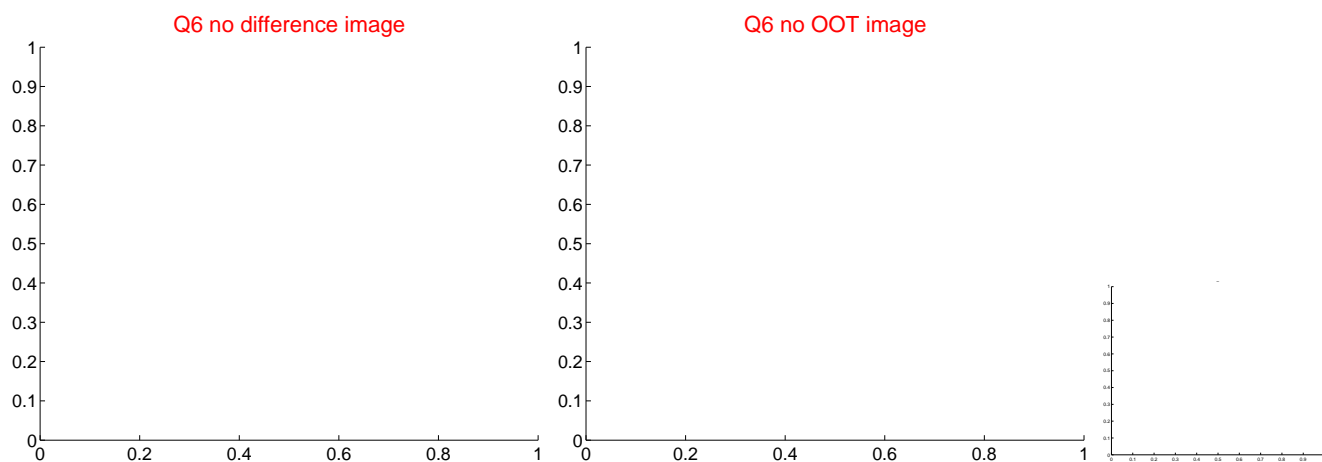
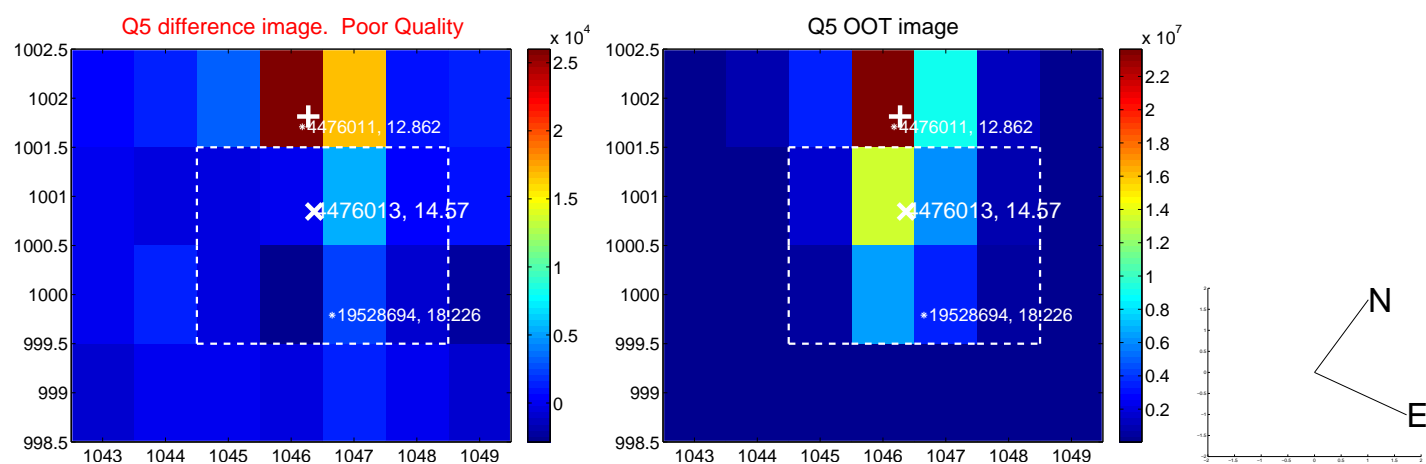


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

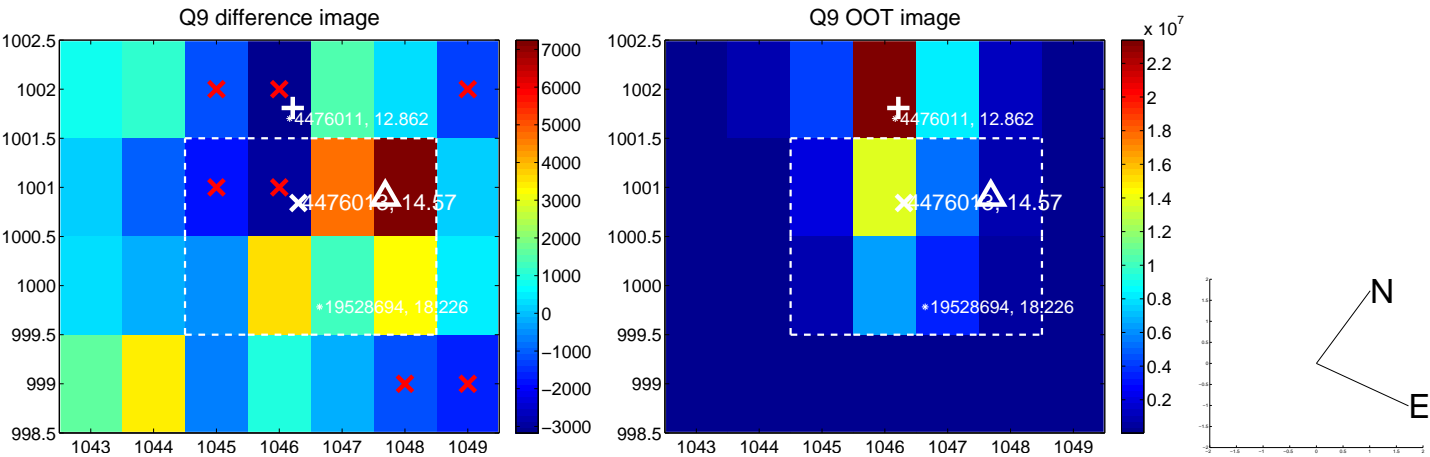
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



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

Q13 no difference image



Q13 no OOT image



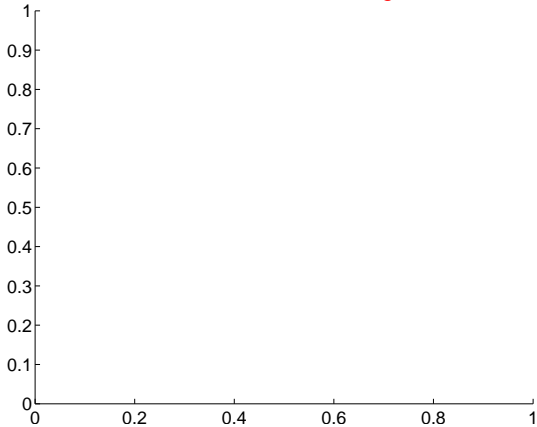
Q14 no difference image



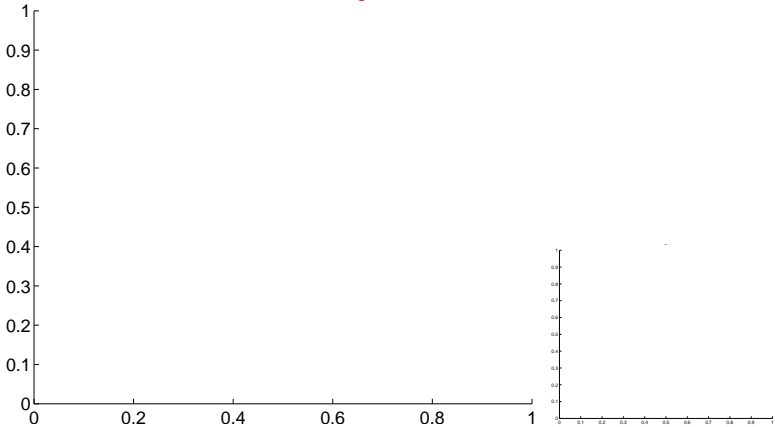
Q14 no OOT image



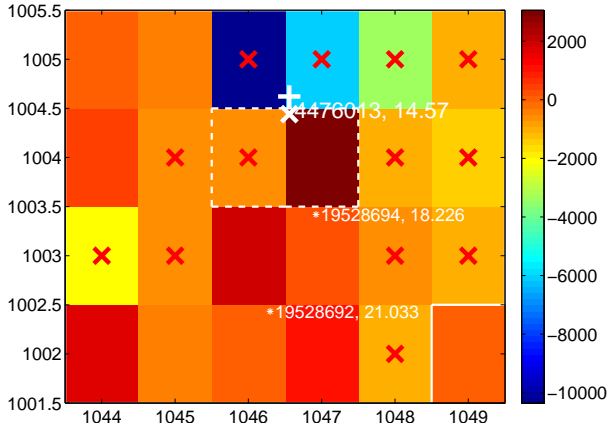
Q15 no difference image



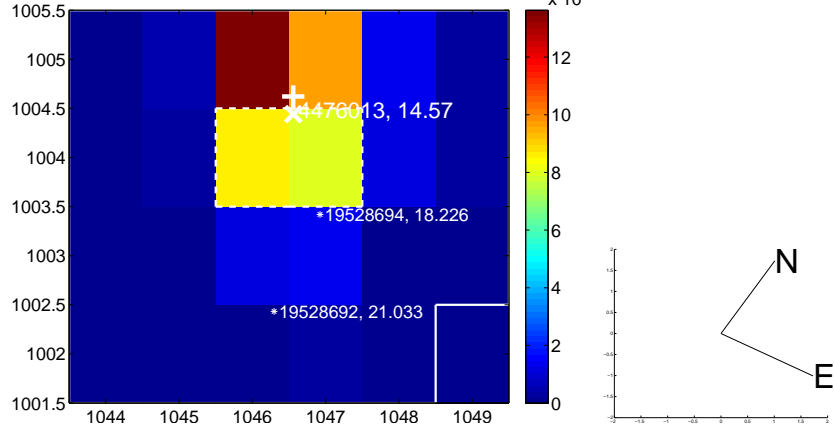
Q15 no OOT image



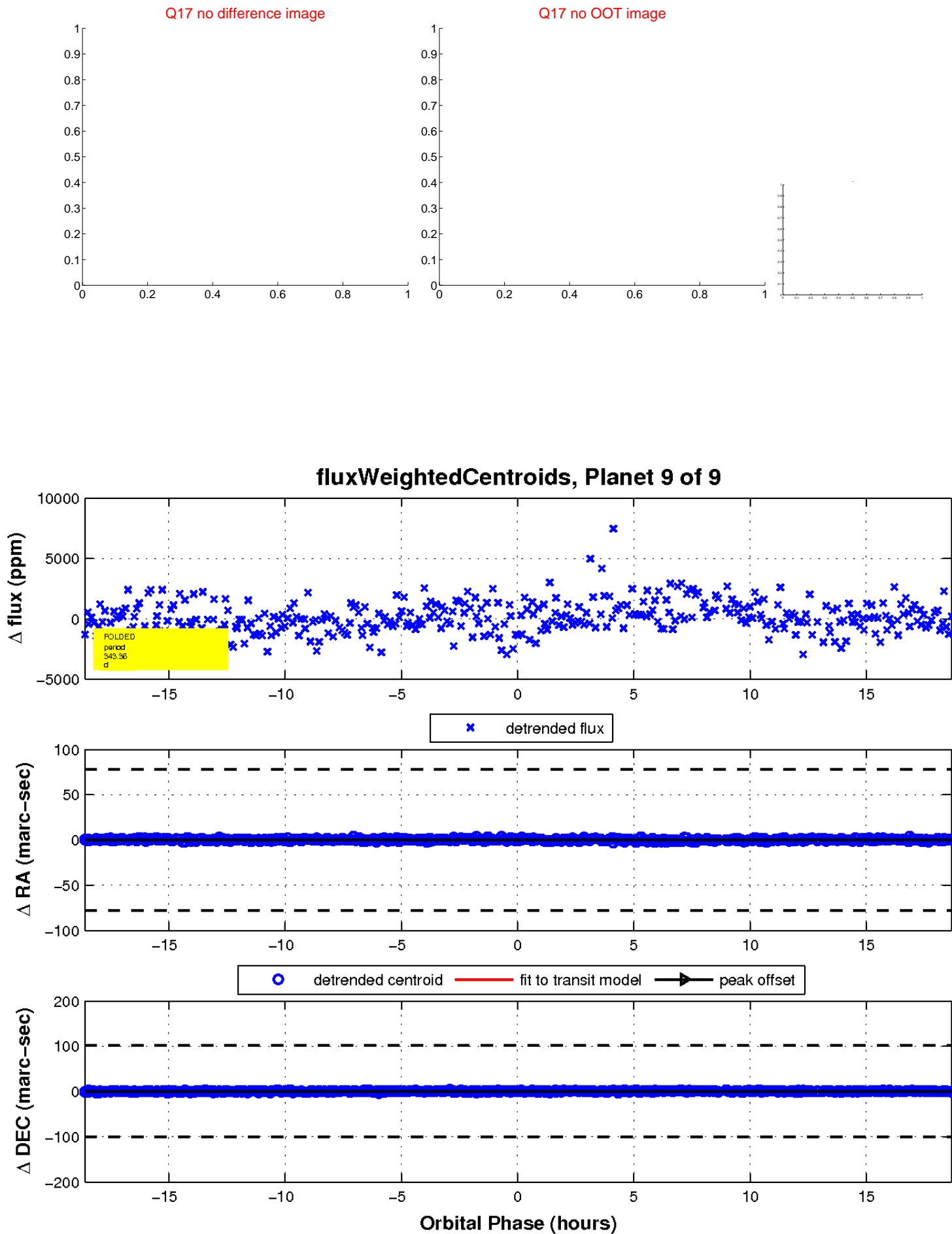
Q16 difference image. Poor Quality



Q16 OOT image



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



UKIRT Image

Declination

