

KIC 008682921

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})
008682921-01	OBS	No	375.972220	314.786366	4196.5	3.340	13.7	9.3	3.51	5489	22.80	7.37
008682921-02	OBS	No	0.508538	131.561083	50.7	2.847	10.3	4.6	3.51	5489	3.29	0.00
008682921-03	OBS	No	224.145673	328.125043	4728.5	2.917	10.8	9.3	3.51	5489	29.25	14.69
008682921-04	OBS	No	53.112465	163.980750	494.7	3.563	10.3	2.6	3.51	5489	8.07	100.19

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008682921-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
008682921-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
008682921-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008682921-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

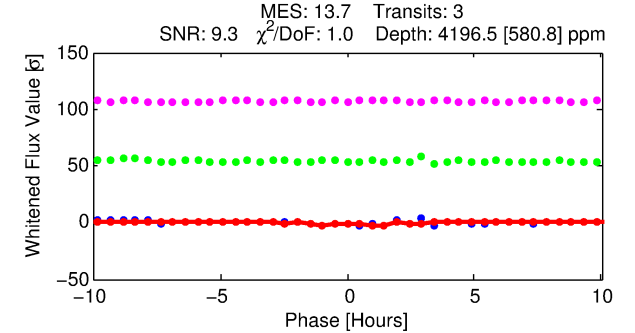
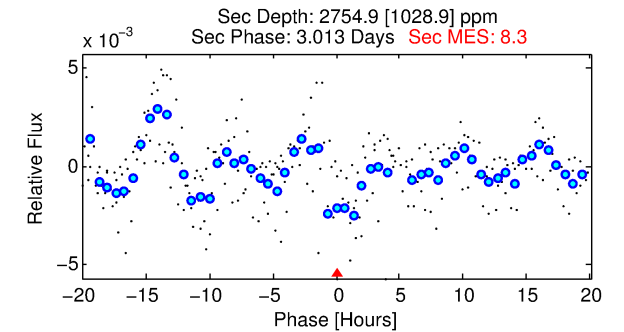
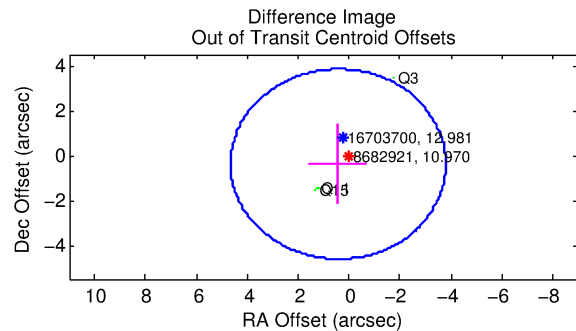
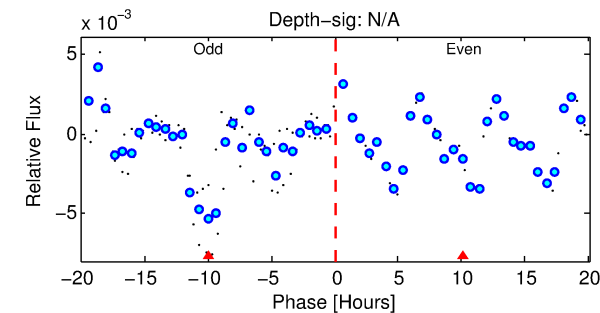
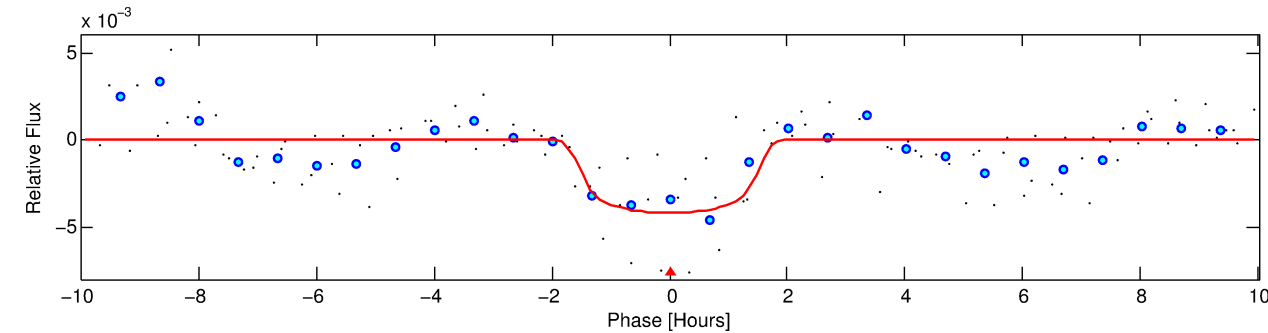
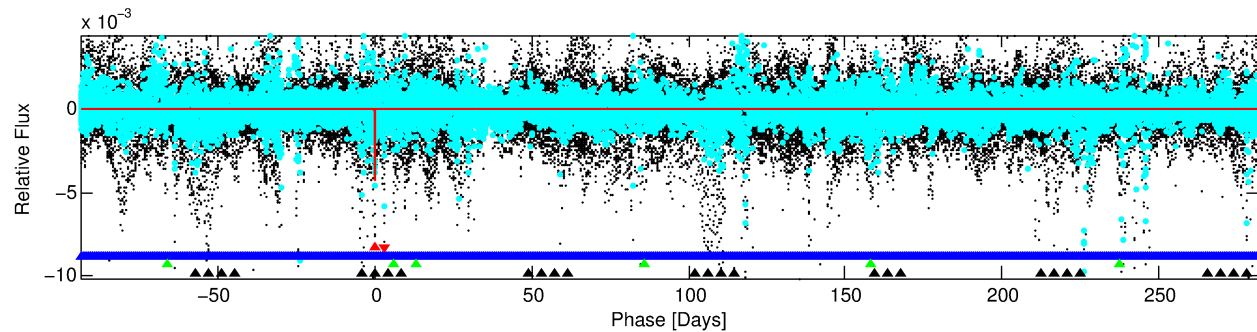
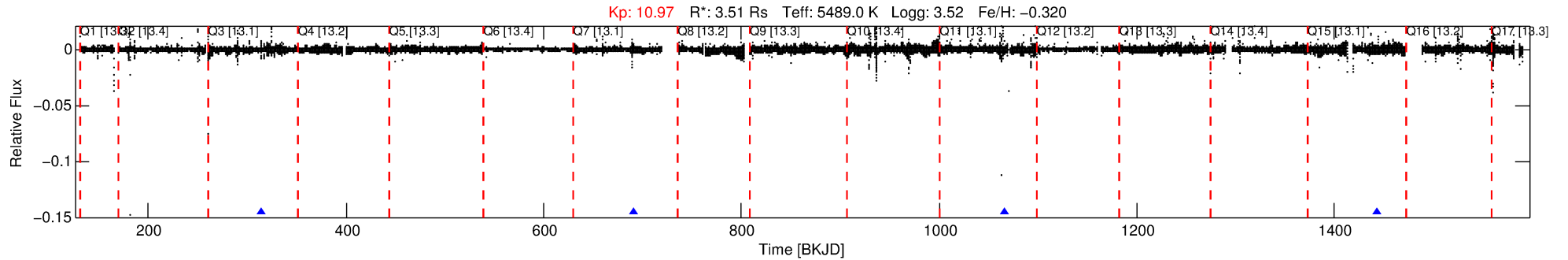
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008682921-01

No Significant Match Found

DV One-Page Summary

KIC: 8682921 Candidate: 1 of 4 Period: 375.972 d



DV Fit Results:

Period = 375.97222 [0.00230] d
Epoch = 314.7864 [0.0033] BKJD
Rp/R* = 0.0595 [0.0180]
a/R* = 860.88 [981.64]
b = 0.35 [2.89]
Seff = 7.37 [10.99]
Teq = 420 [157] K
Rp = 22.80 [17.42] Re
a = 1.1659 [0.9858] AU
Ag = 3961.71 [6522.51] [0.61σ]
Teffp = 5154 [932] K [5.01σ]

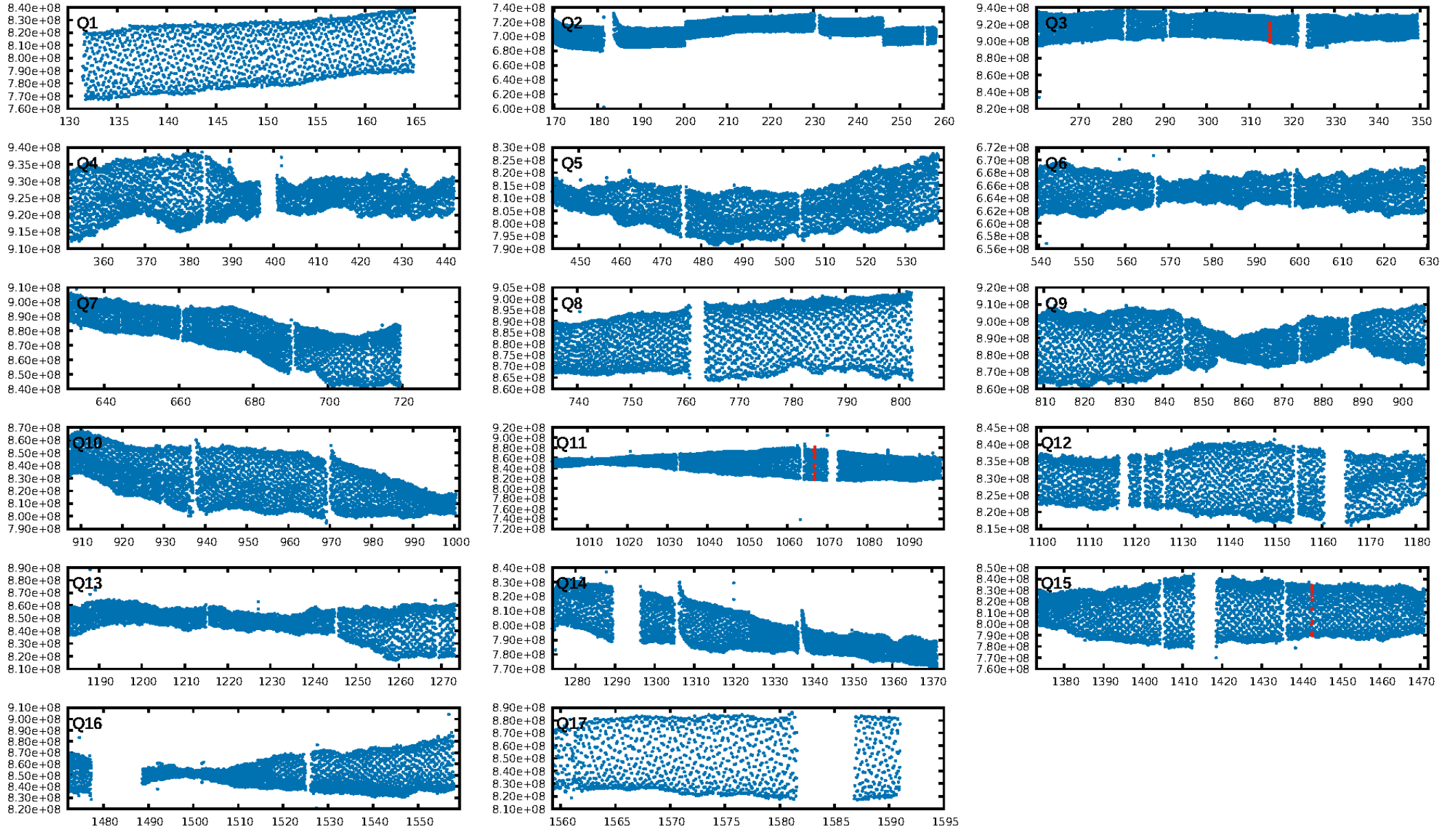
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [821.80σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 65.3%
Bootstrap-pfa: 9.38e-11
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.1734
Centroid-sig: N/A
Centroid-so: 0.950 arcsec [2.26σ]
OotOffset-rm: 0.575 arcsec [0.41σ]
KicOffset-rm: 0.952 arcsec [0.84σ]
OotOffset-st: 0/3/0/0 [3]
KicOffset-st: 0/3/0/0 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 0.00 [0/3]

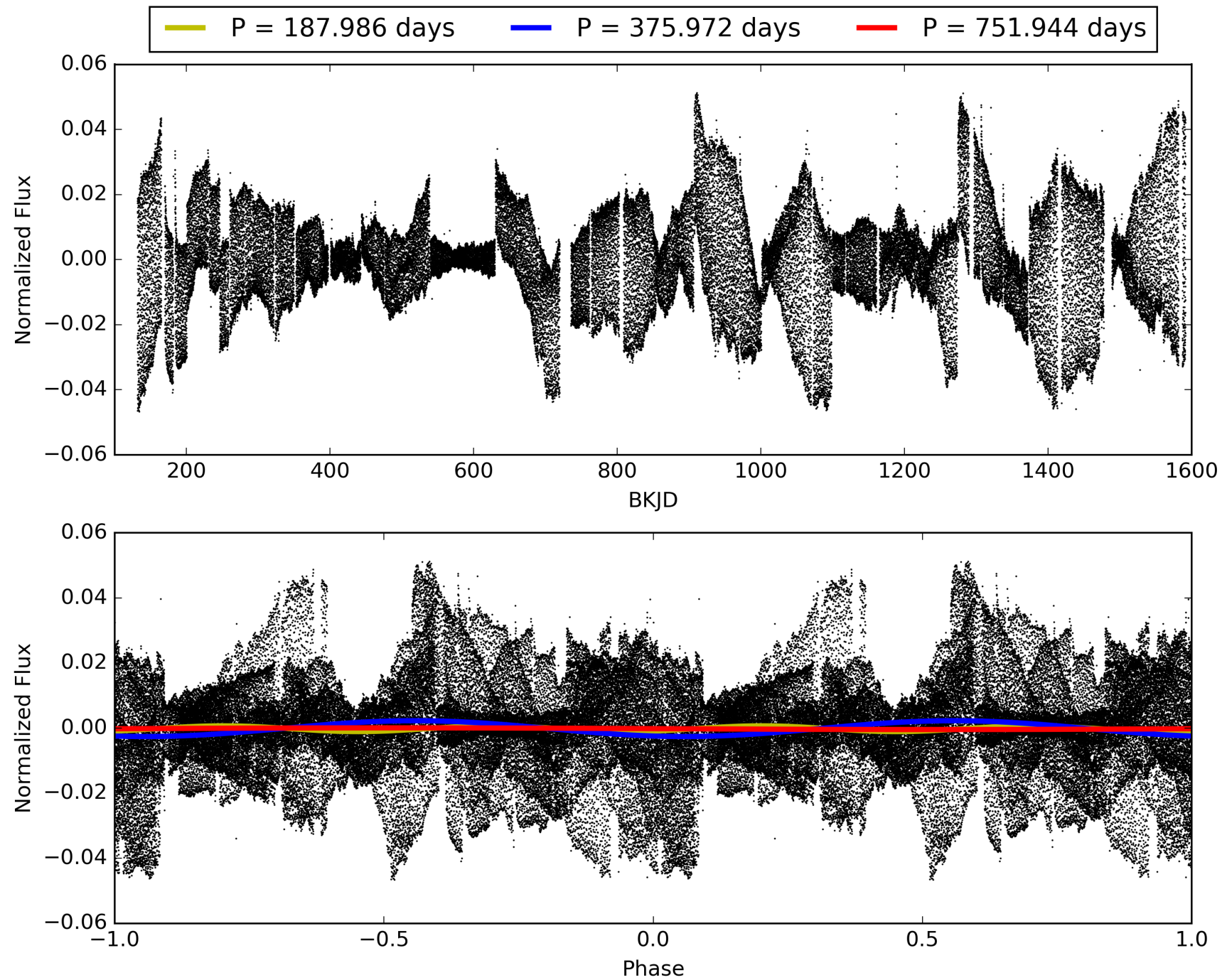
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 00:07:48 Z

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

TCE 008682921-01, PDC Light Curves

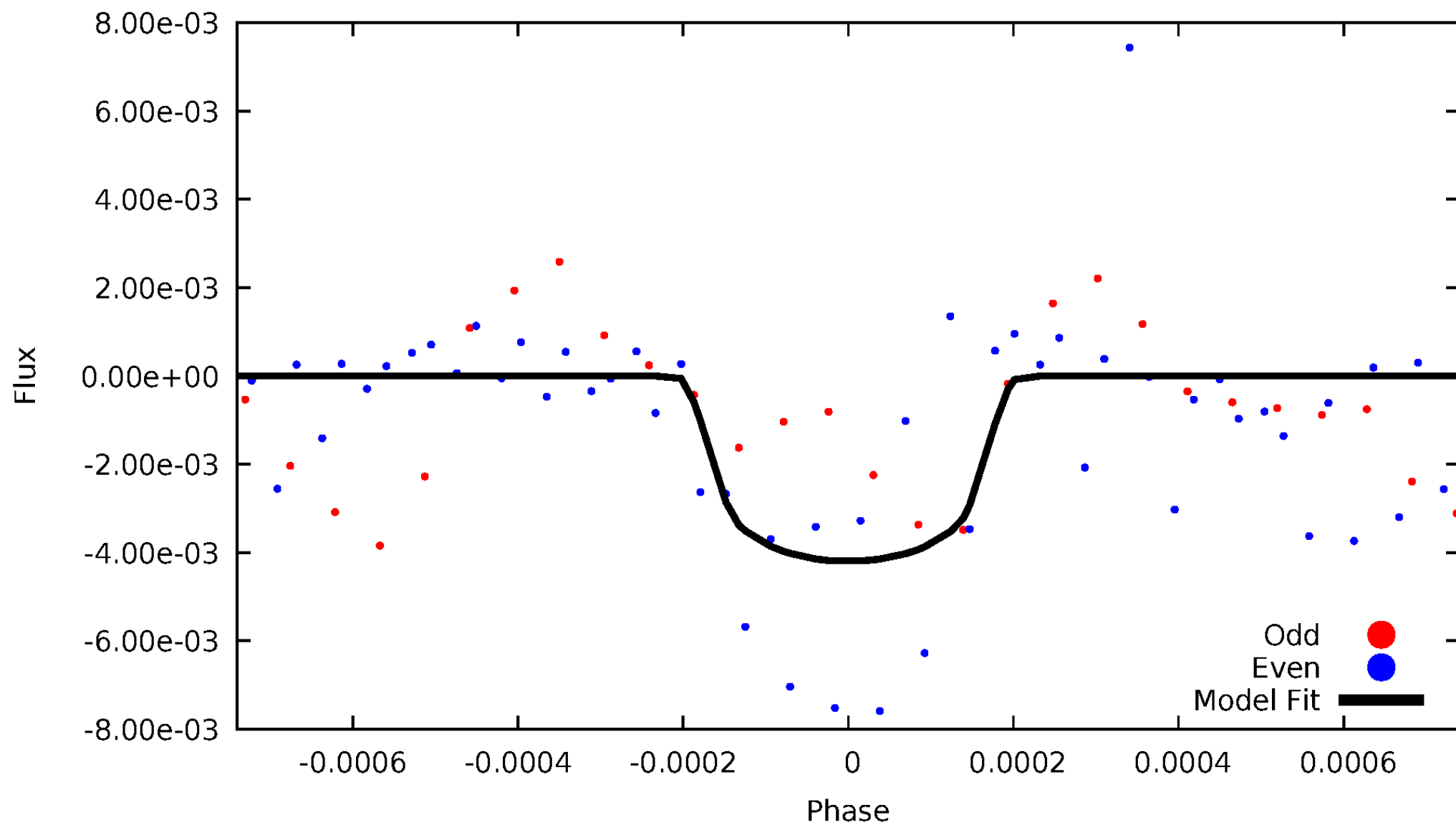


TCE 008682921-01



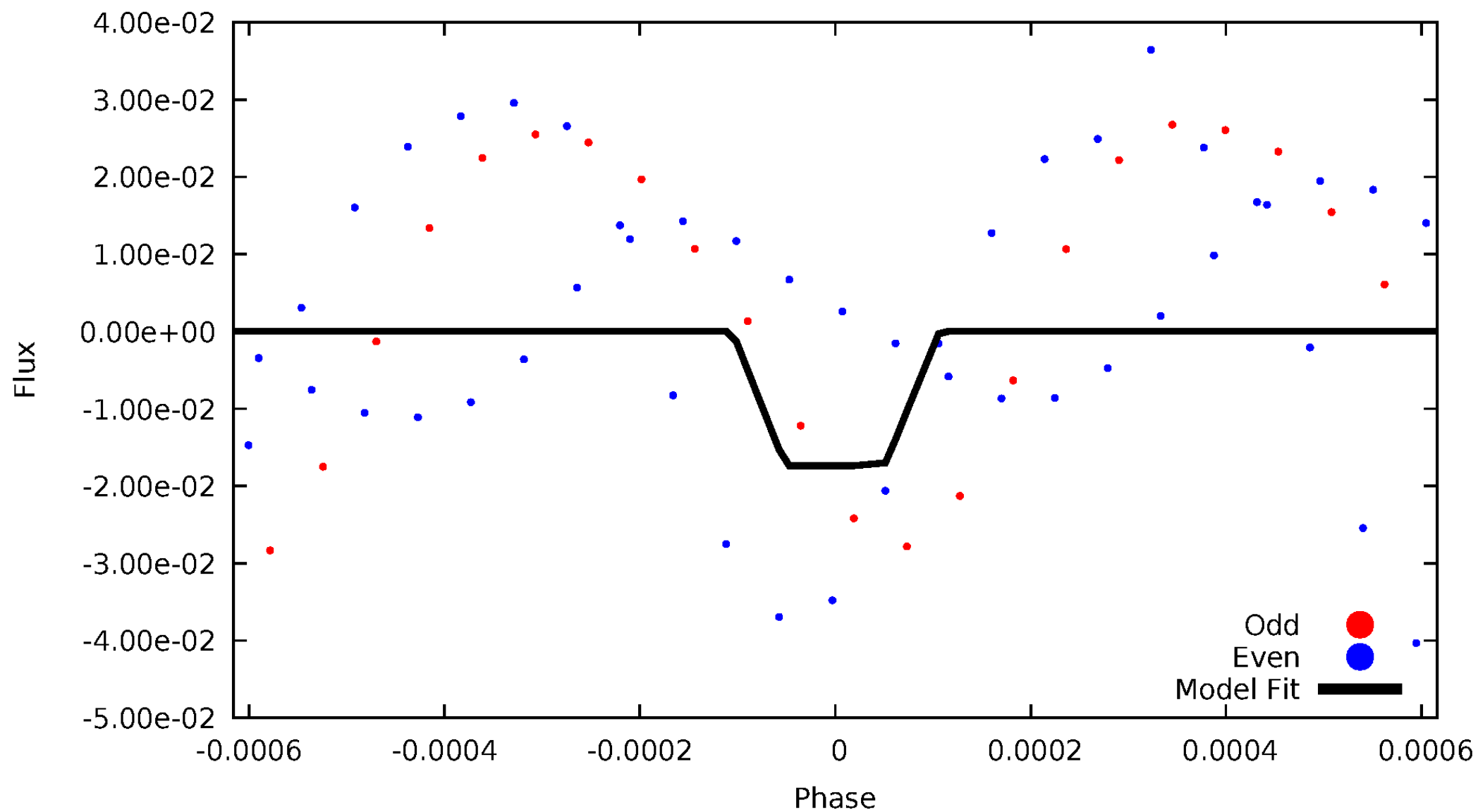
DV Odd/Even

TCE 008682921-01



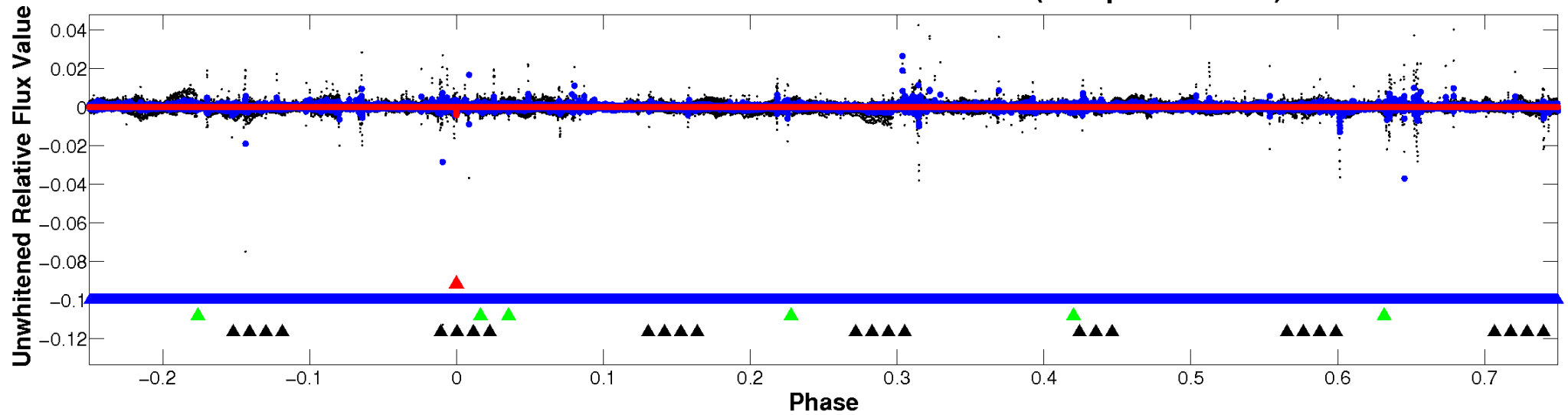
ALT Odd/Even

TCE 008682921-01

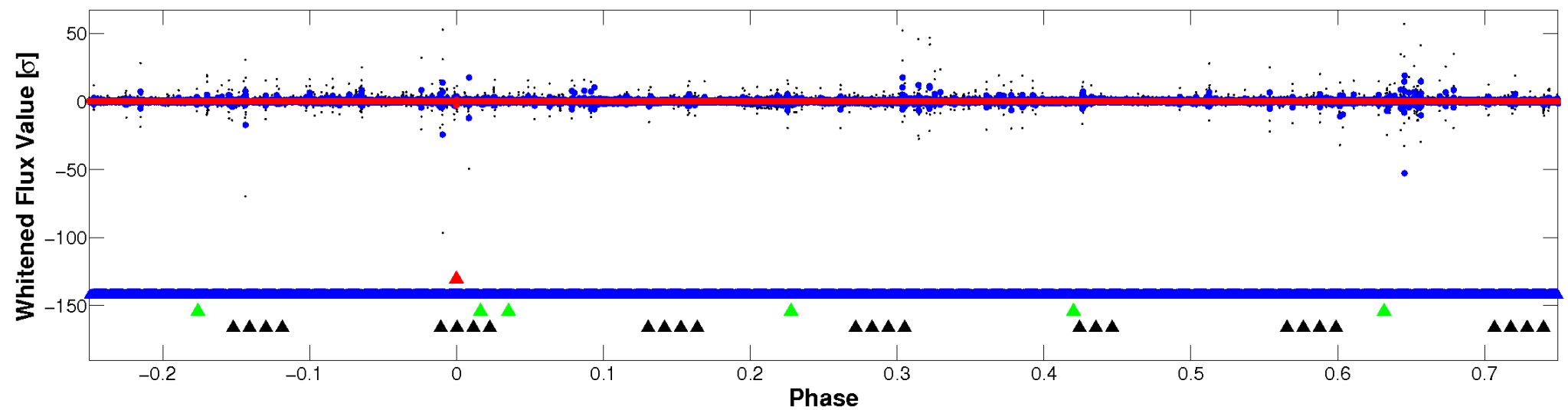


Non-Whitened Vs. Whitened Light Curve

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

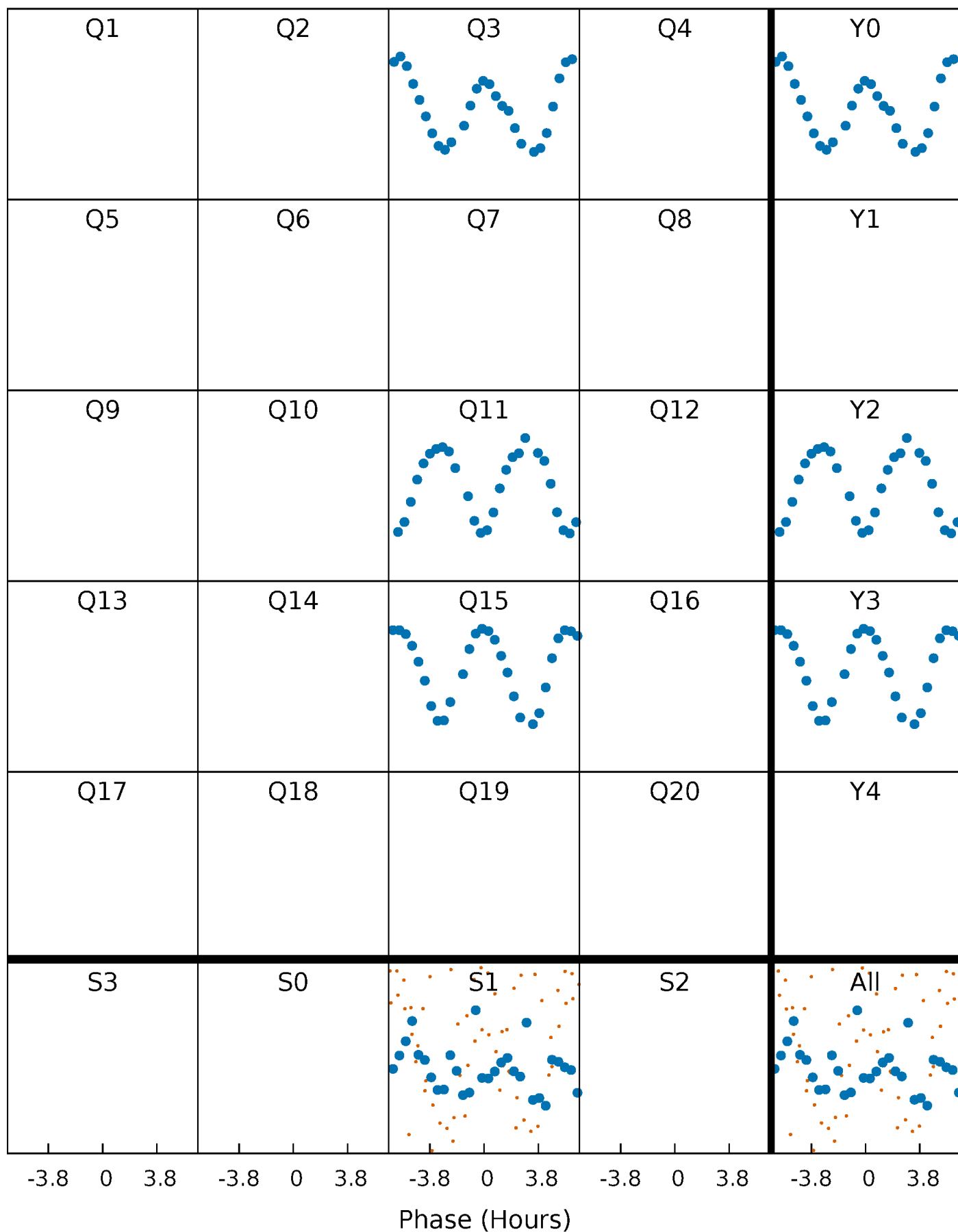


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



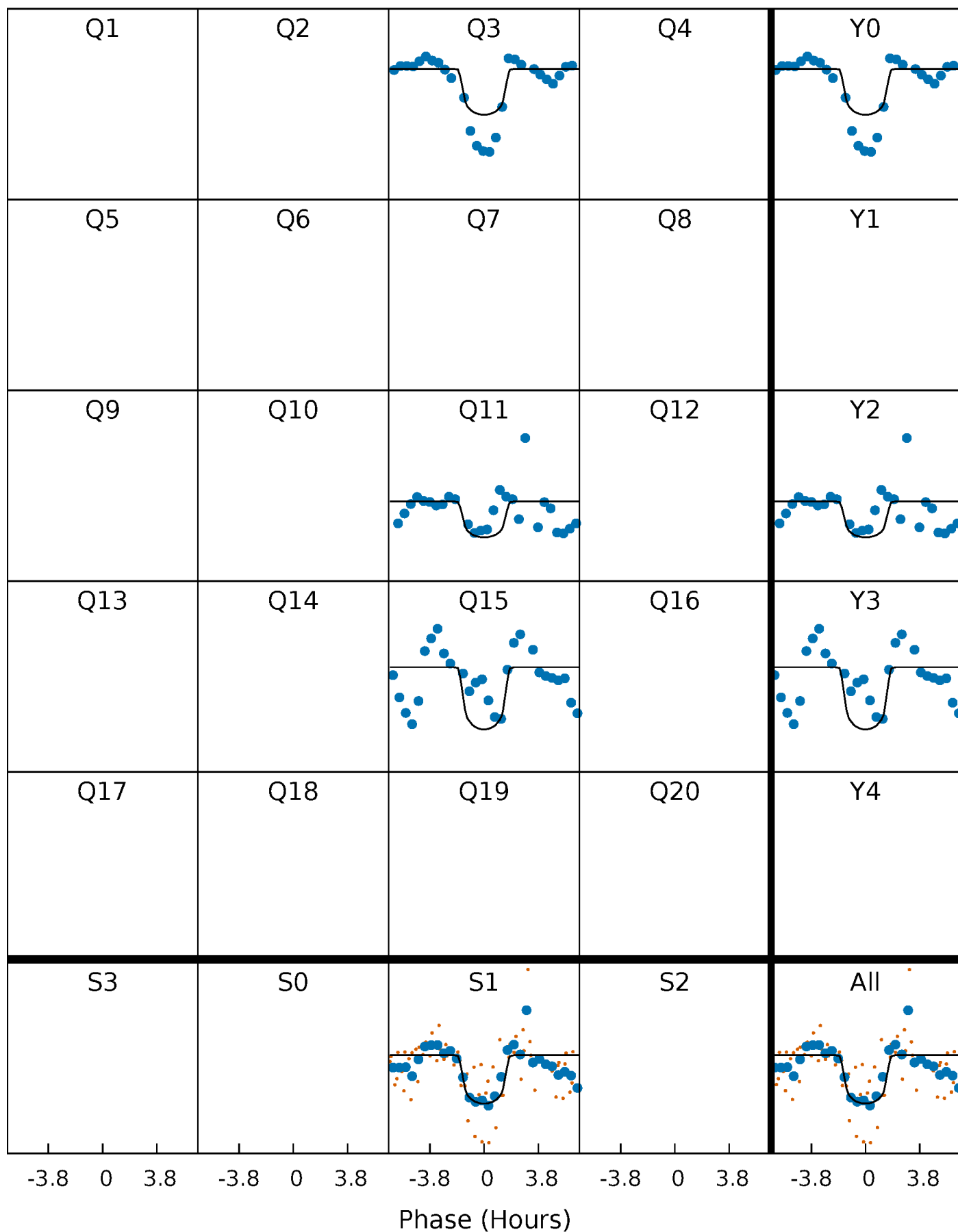
PDC Quarter-Phased Transit Curves

TCE 008682921-01 P=375.972220 Days $T_0=314.786366$ (BKJD)



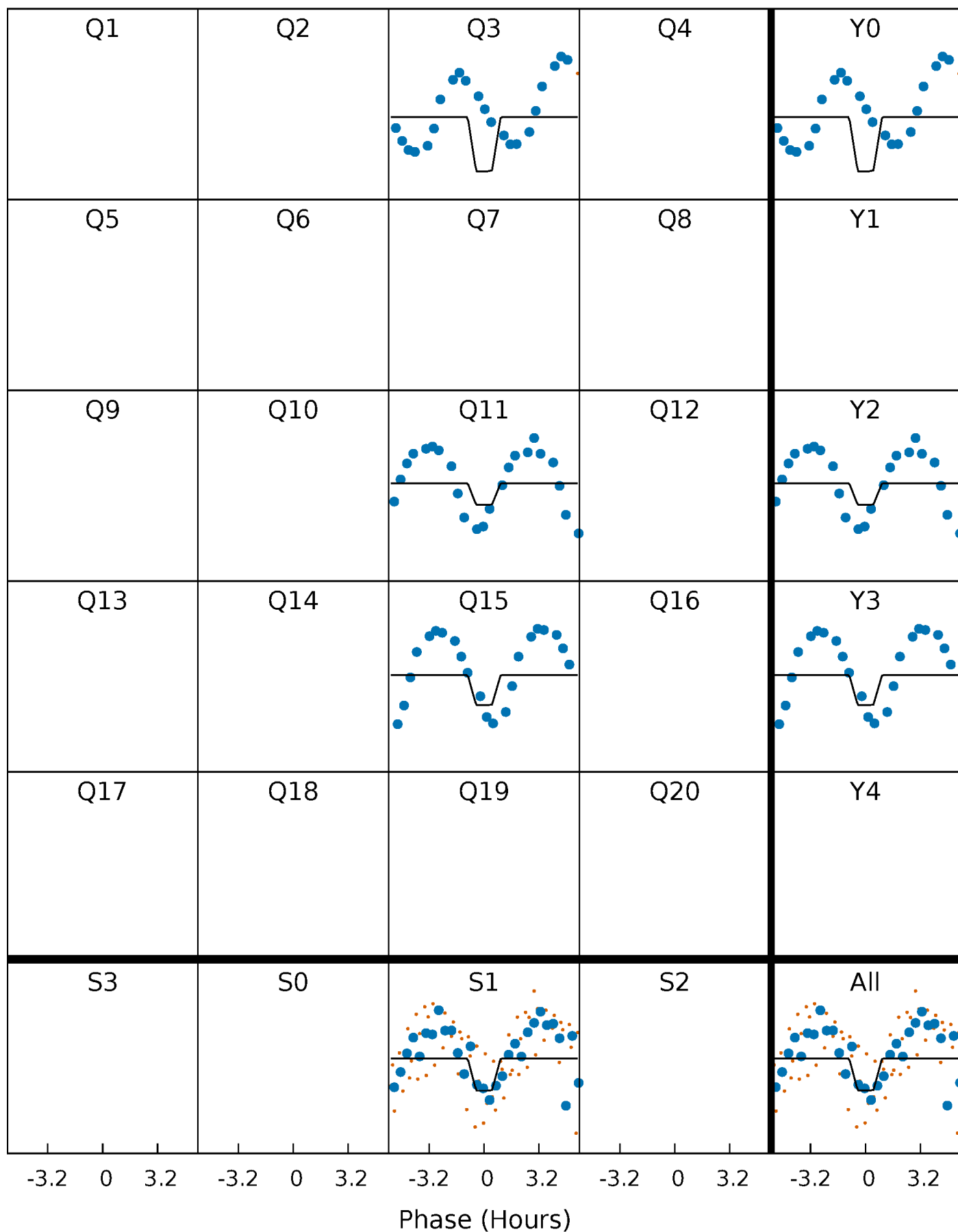
DV Quarter-Phased Transit Curves

TCE 008682921-01 P=375.972220 Days $T_0=314.786366$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

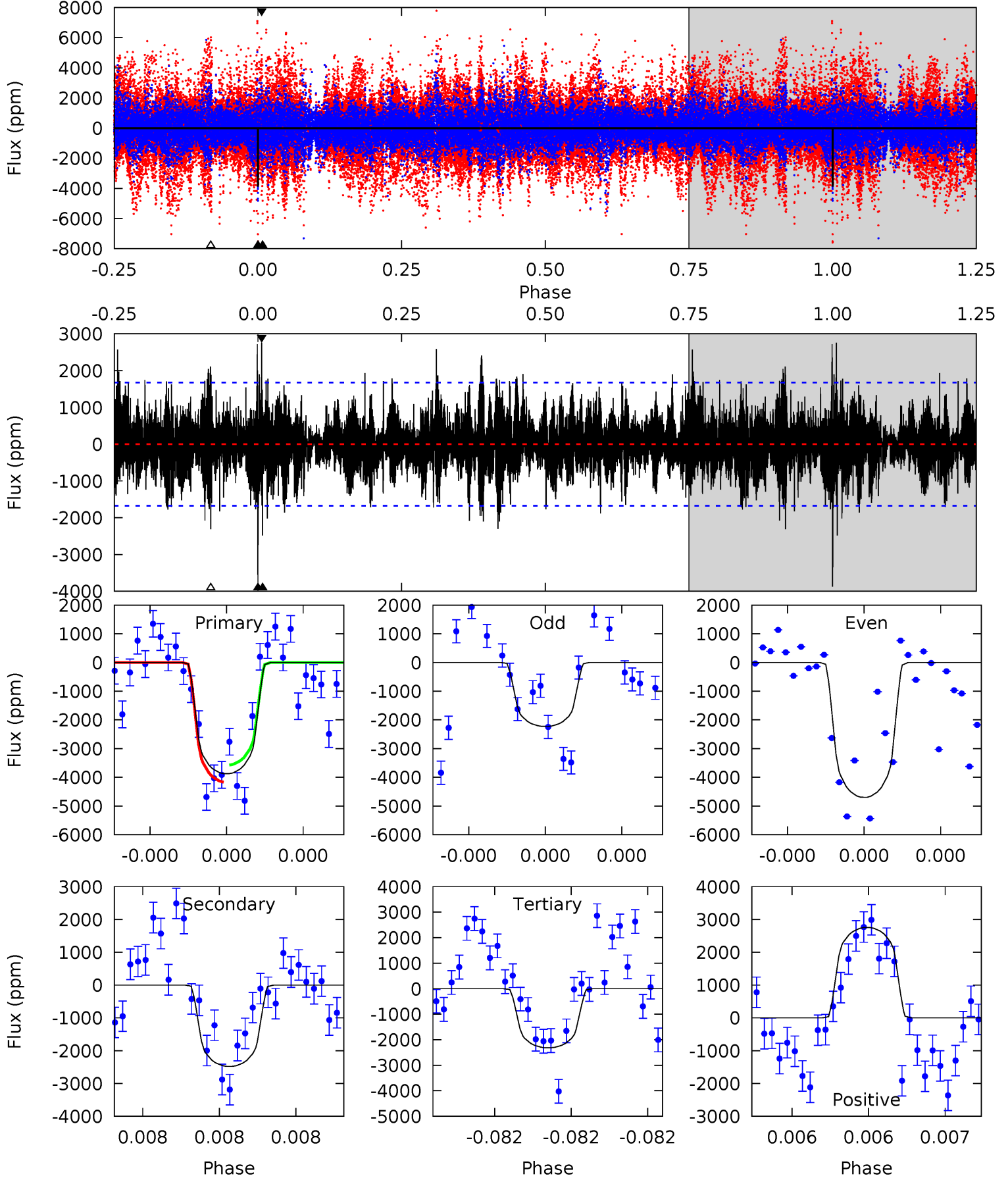
TCE 008682921-01 P=376.071939 Days $T_0=314.593641$ (BKJD)



DV Model-Shift Uniqueness Test

008682921-01, P = 375.972220 Days, E = 314.786366 Days

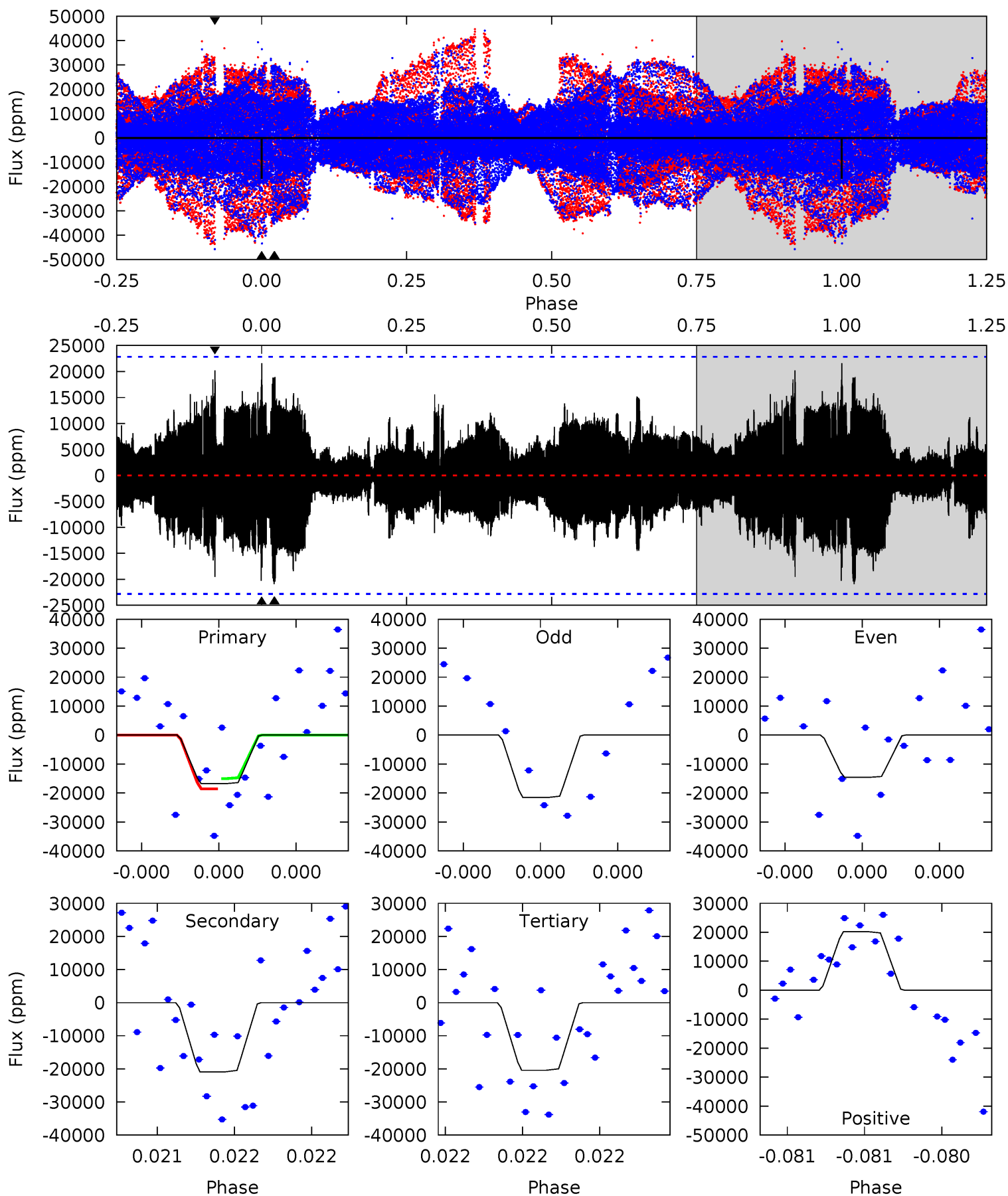
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.0	8.30	7.75	9.22	5.61	3.54	1.92	5.22	3.75	0.55	-0.92	3.61	1.67	0.42	1.00



Alt Model-Shift Uniqueness Test

008682921-01, P = 376.071939 Days, E = 314.593641 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.21	5.25	5.13	5.07	5.73	3.71	1.42	-0.92	-0.86	0.12	0.18	0.78	0.78	0.51	0.42



Stellar Parameters For KIC 008682921

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5489^{+163}_{-180}	$3.522^{+0.918}_{-0.216}$	$-0.320^{+0.350}_{-0.300}$	$3.510^{+0.879}_{-2.461}$	$1.497^{+0.210}_{-0.629}$	$0.049^{+1.378}_{-0.021}$
	+3%/-3%	+26%/-6%	+109%/-94%	+25%/-70%	+14%/-42%	+2826%/-44%
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 008682921-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-2479 ± 299	$19.68^{+10.34}_{-8.95}$	569^{+63}_{-116}	5078^{+947}_{-582}	4634^{+10796}_{-2566}
Alt.	-20926 ± 3984	$46.67^{+14.11}_{-16.13}$	576^{+57}_{-104}	5740^{+504}_{-459}	7155^{+7521}_{-2958}

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 $A_{obs} \gg 1.0$

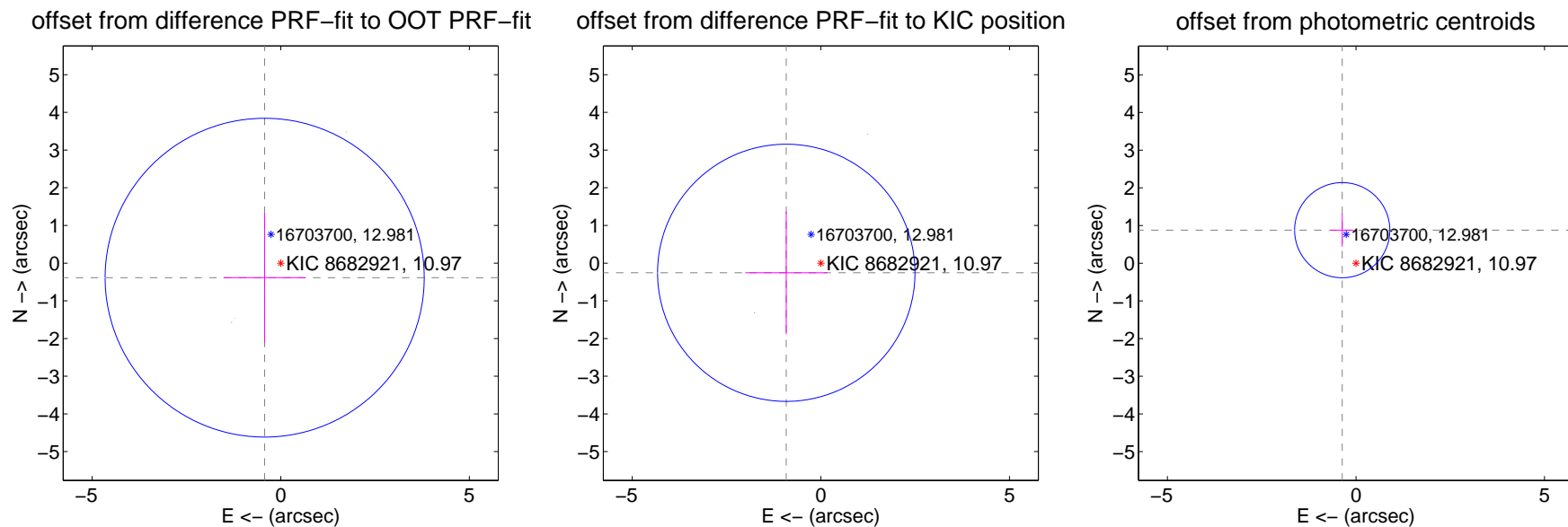
DV Centroid Data

Supplemental centroid analysis for 008682921-01. **Kepler magnitude: 10.97.** Transit SNR 9.29

There are 1 quarters with good PRF difference image offsets

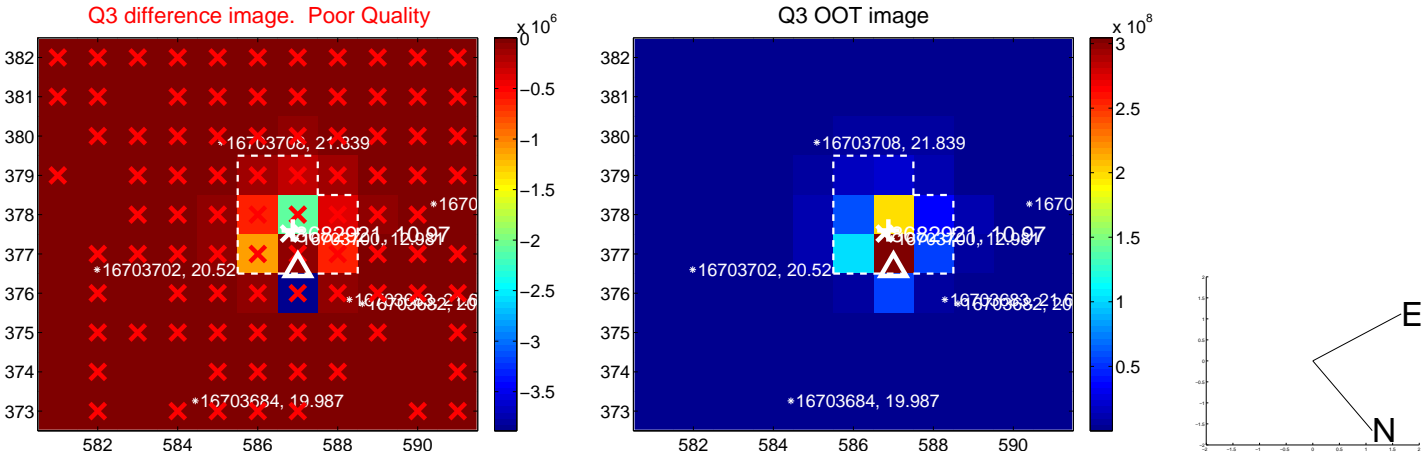
The direct PRF centroid is offset from the target star catalog position by about 0.53 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.575 ± 1.410	0.41	0.426 ± 1.091	-0.386 ± 1.720
PRF-fit source offset from KIC position	0.952 ± 1.137	0.84	0.917 ± 1.090	-0.256 ± 1.628
photometric centroid source offset	0.95 ± 0.42	2.26	0.36 ± 0.30	0.88 ± 0.44



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.



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

Q9 no difference image



Q9 no OOT image



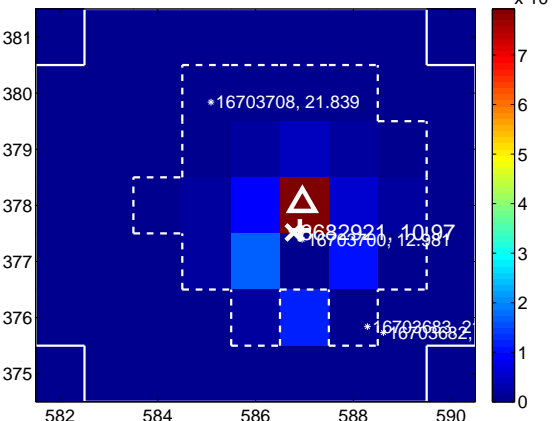
Q10 no difference image



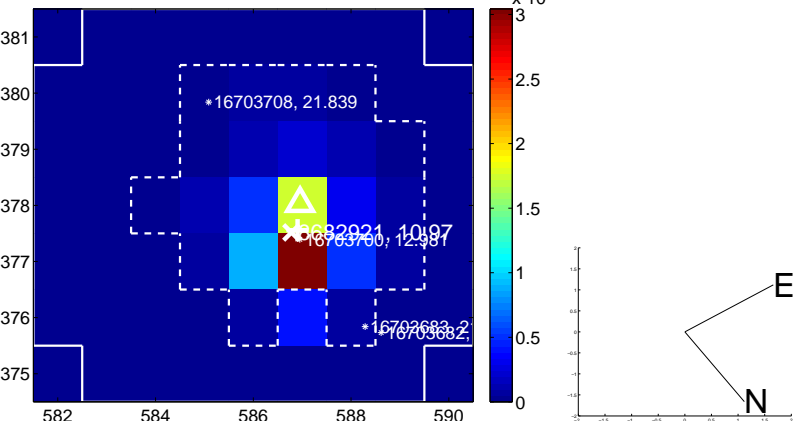
Q10 no OOT image



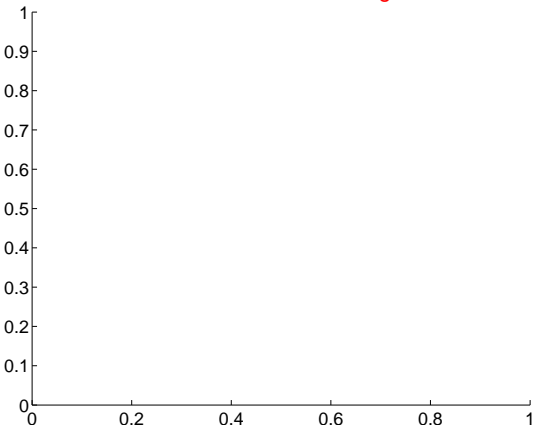
Q11 difference image



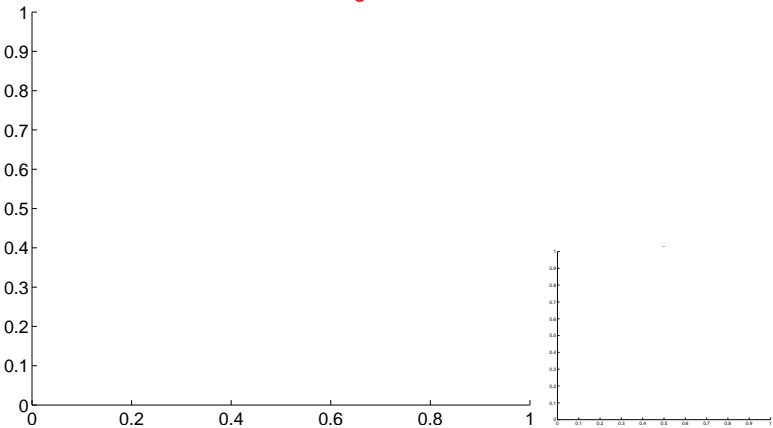
Q11 OOT image



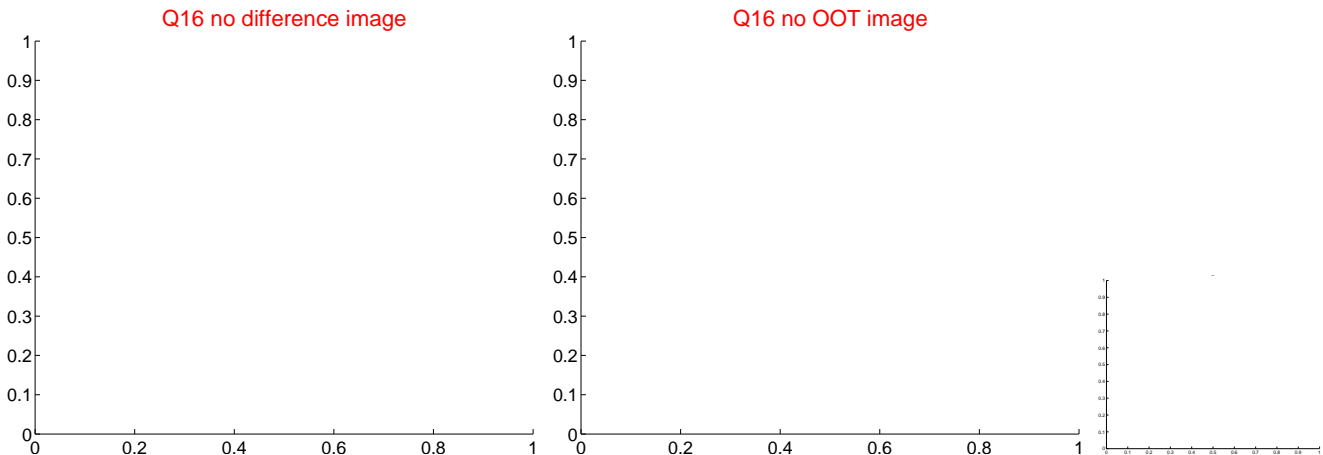
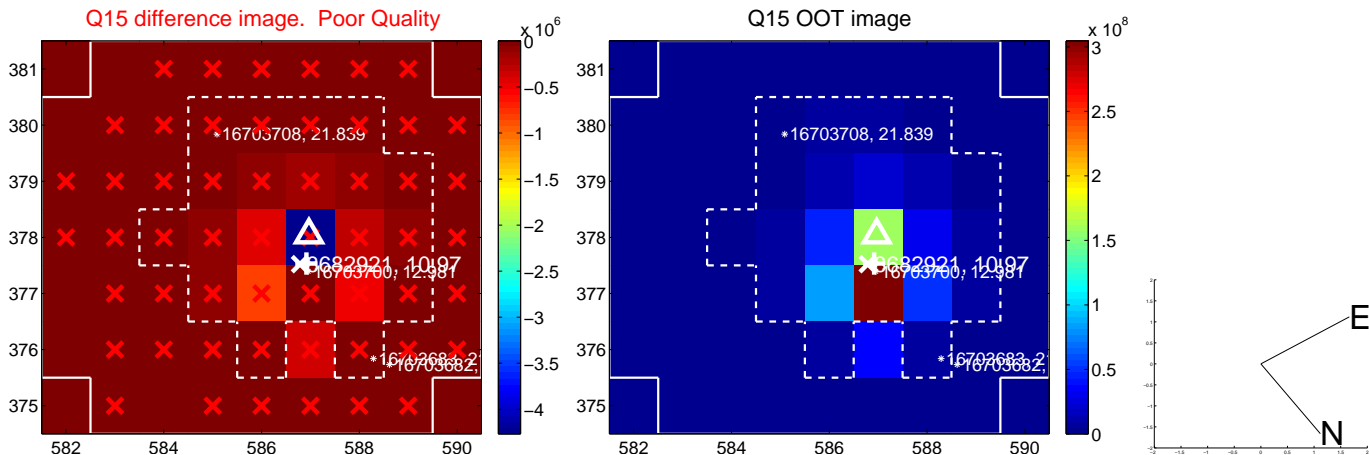
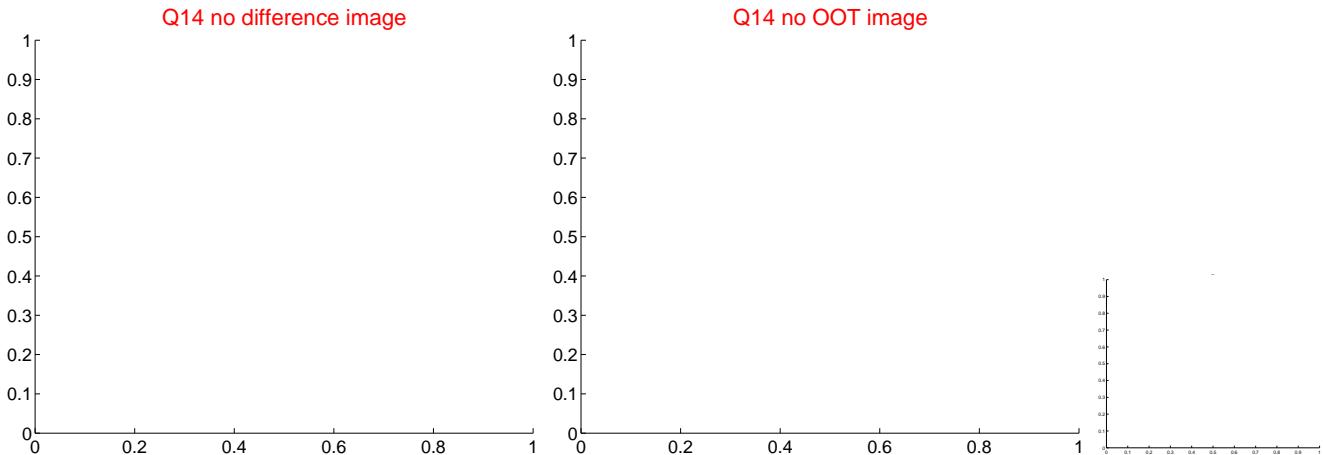
Q12 no difference image



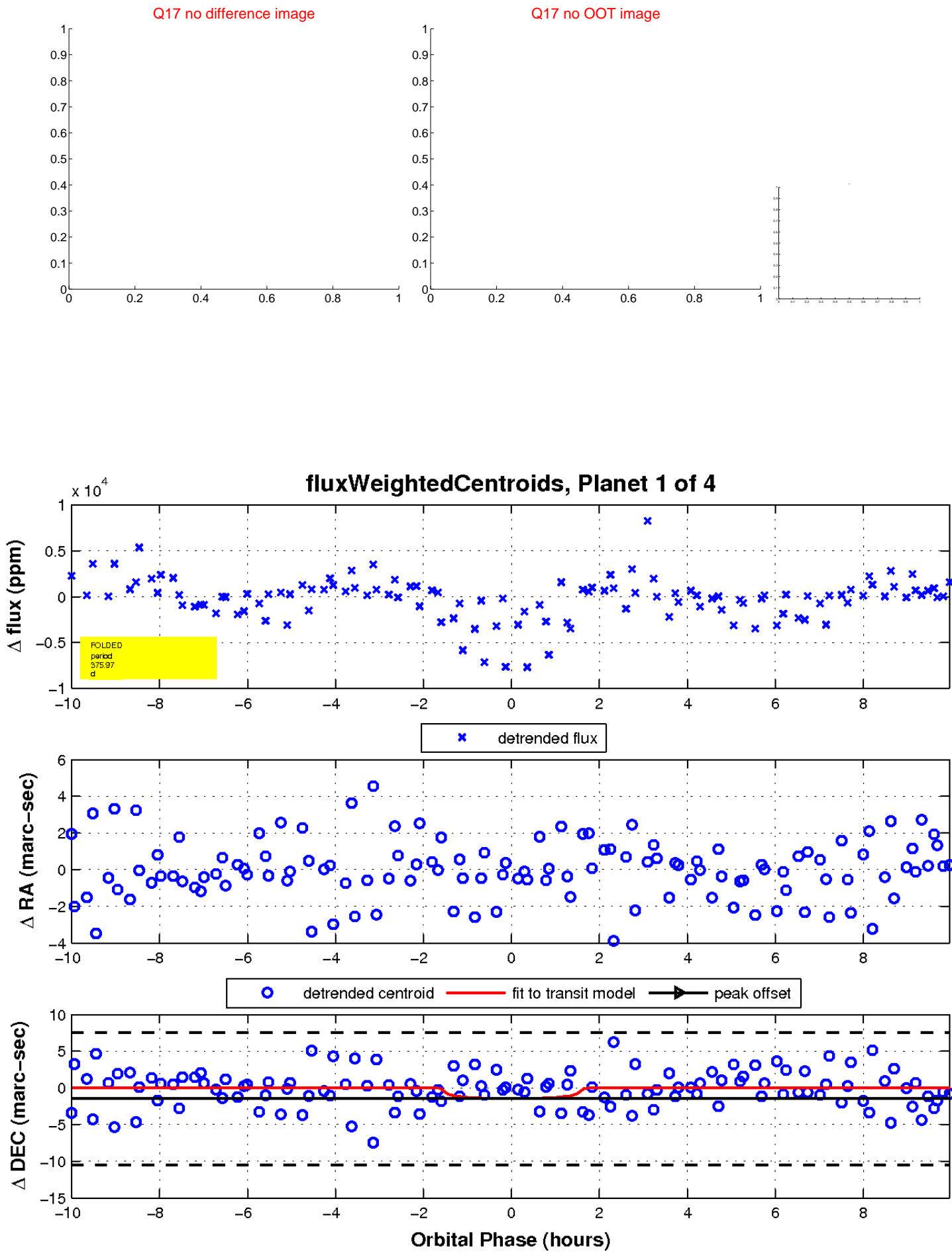
Q12 no OOT image



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

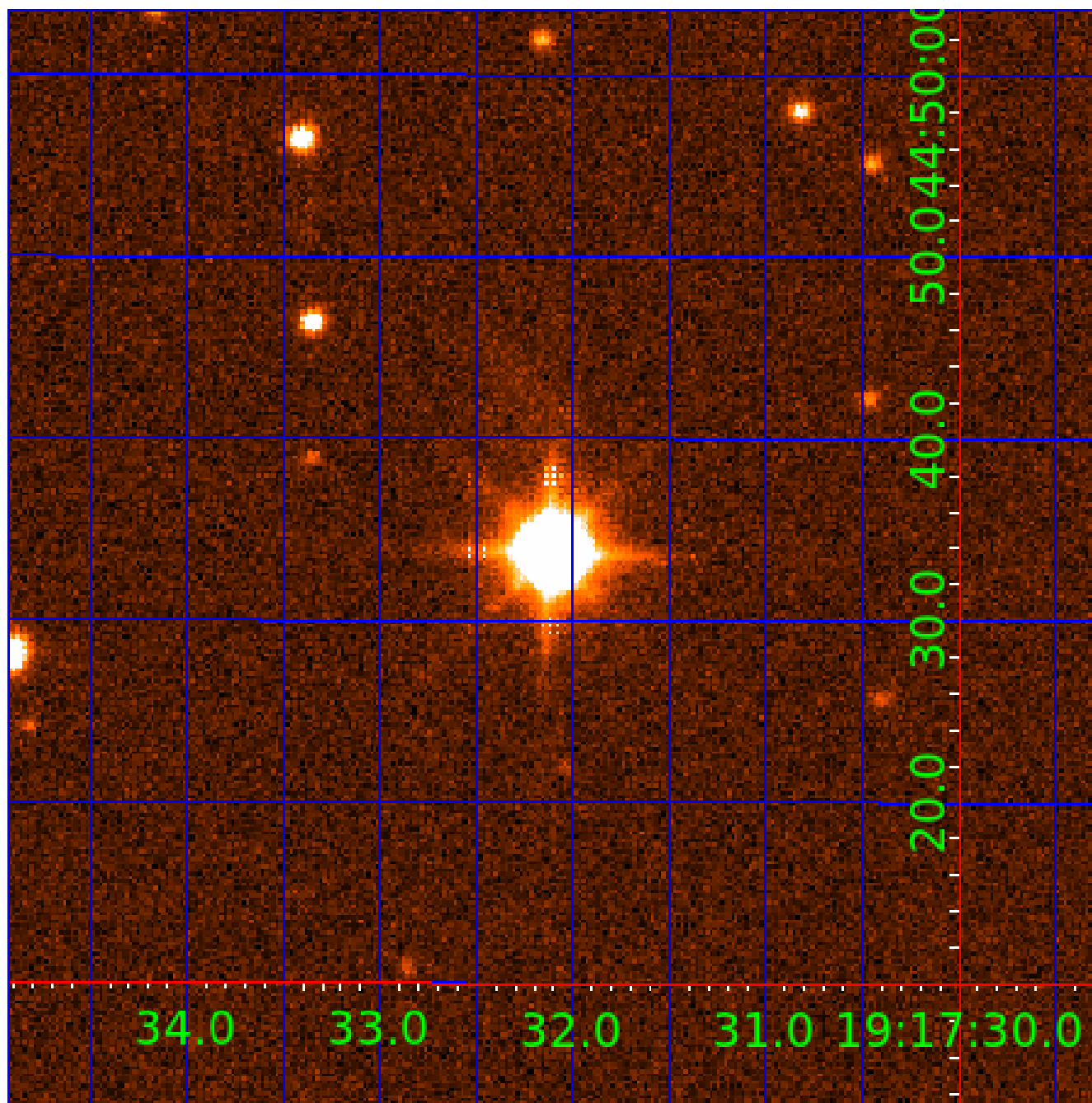


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008682921

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})
008682921-01	OBS	No	375.972220	314.786366	4196.5	3.340	13.7	9.3	3.51	5489	22.80	7.37
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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008682921-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
008682921-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008682921-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

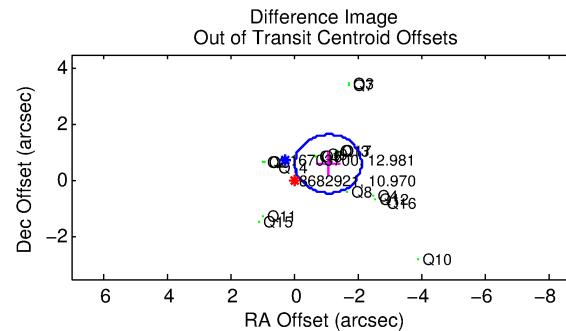
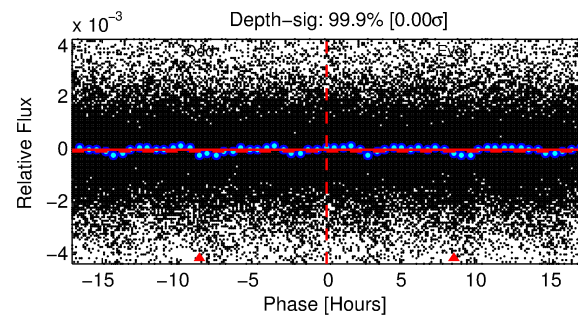
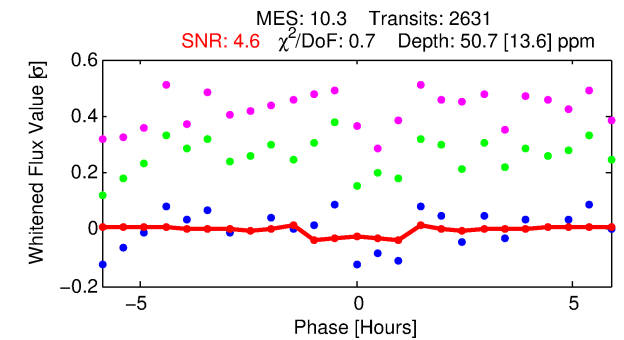
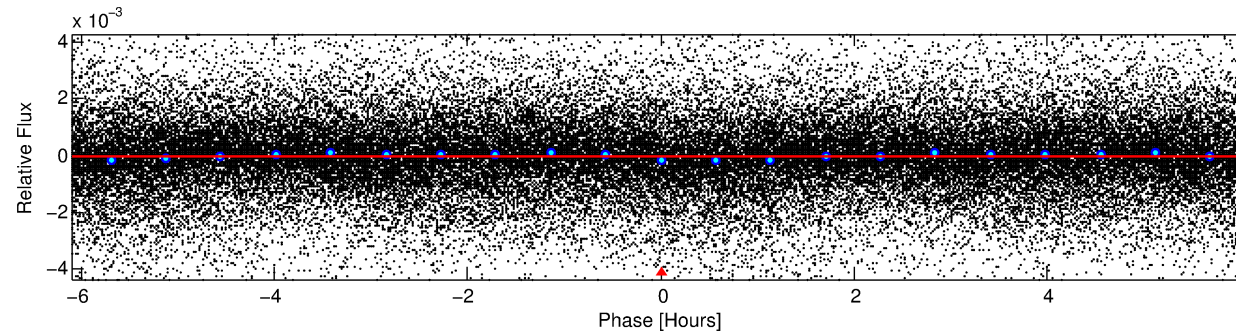
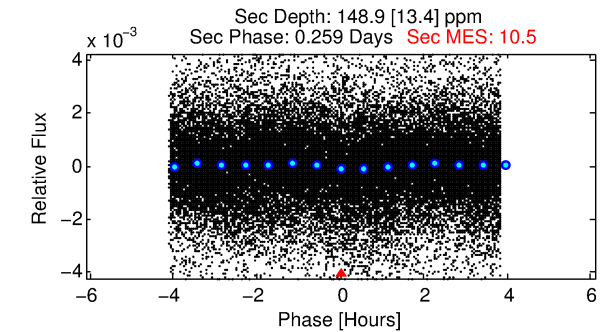
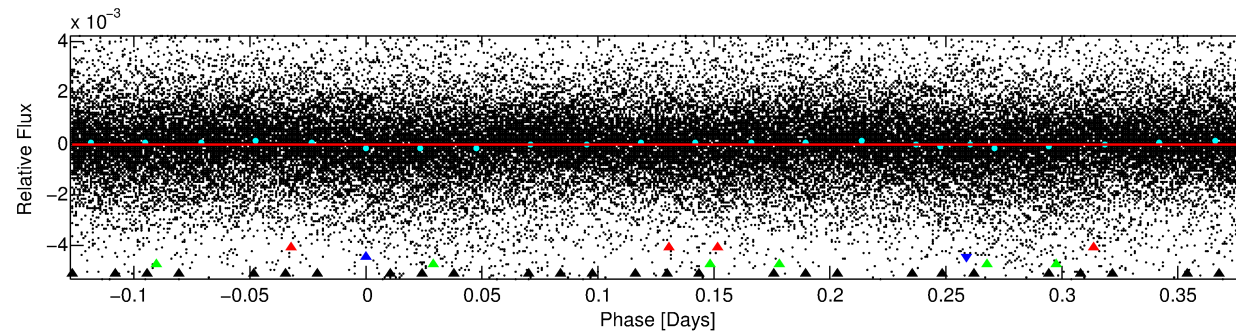
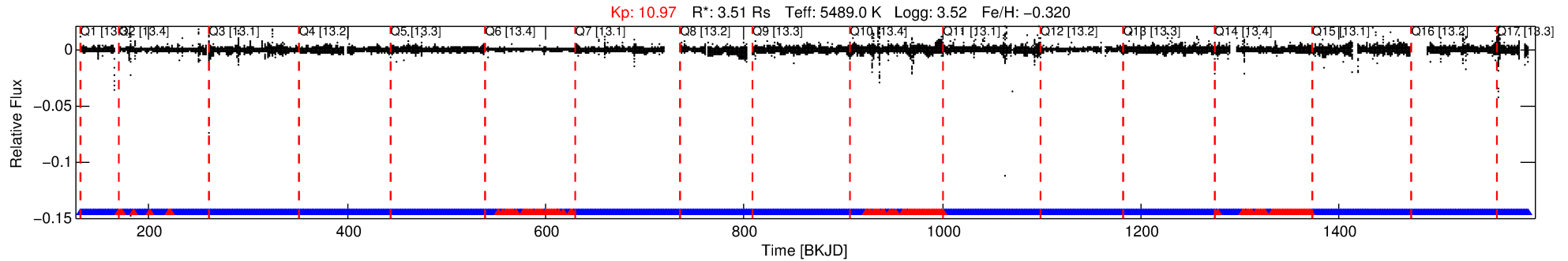
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008682921-02

No Significant Match Found

DV One-Page Summary

KIC: 8682921 Candidate: 2 of 4 Period: 0.509 d



DV Fit Results:

Period = 0.50854 [0.00002] d
Epoch = 131.5611 [0.0031] BKJD
Rp/R* = 0.0086 [0.0020]
a/R* = 1.06 [0.10]
b = 0.96 [0.06]
Seff = N/A
Teq = N/A
Rp = 3.29 [2.42] Re
a = N/A
Ag = N/A
Teffp = N/A

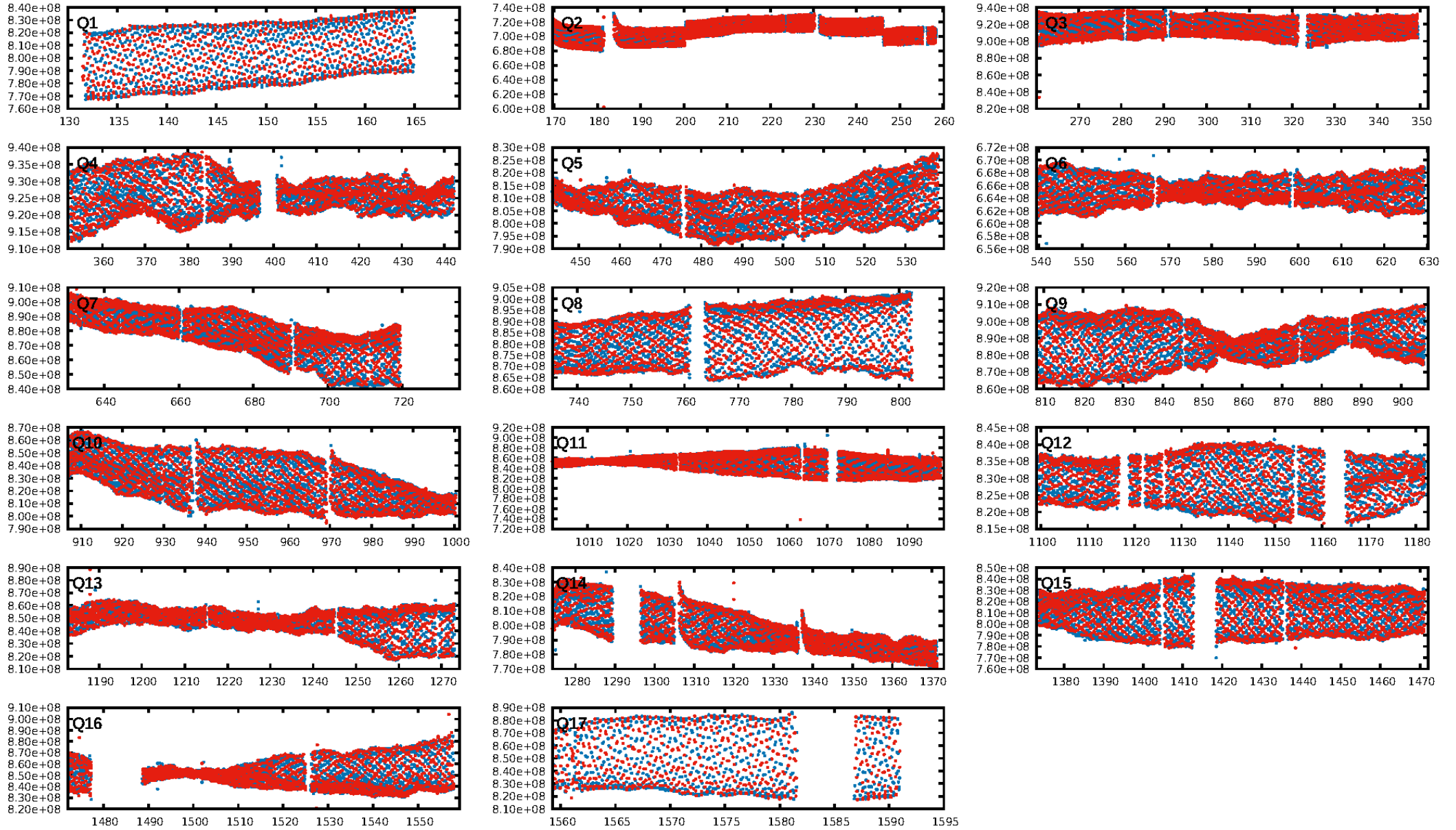
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [276.81 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.20e-18
RollingBand-fgt: 0.90 [2259/2512]
GhostDiagnostic-chr: -1.367
Centroid-sig: N/A
Centroid-so: 0.111 arcsec [0.28 σ]
OotOffset-rm: 1.240 arcsec [3.57 σ]
KicOffset-rm: 2.032 arcsec [5.07 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.47 [8/17]
DiffImageOverlap-fno: 1.00 [17/17]

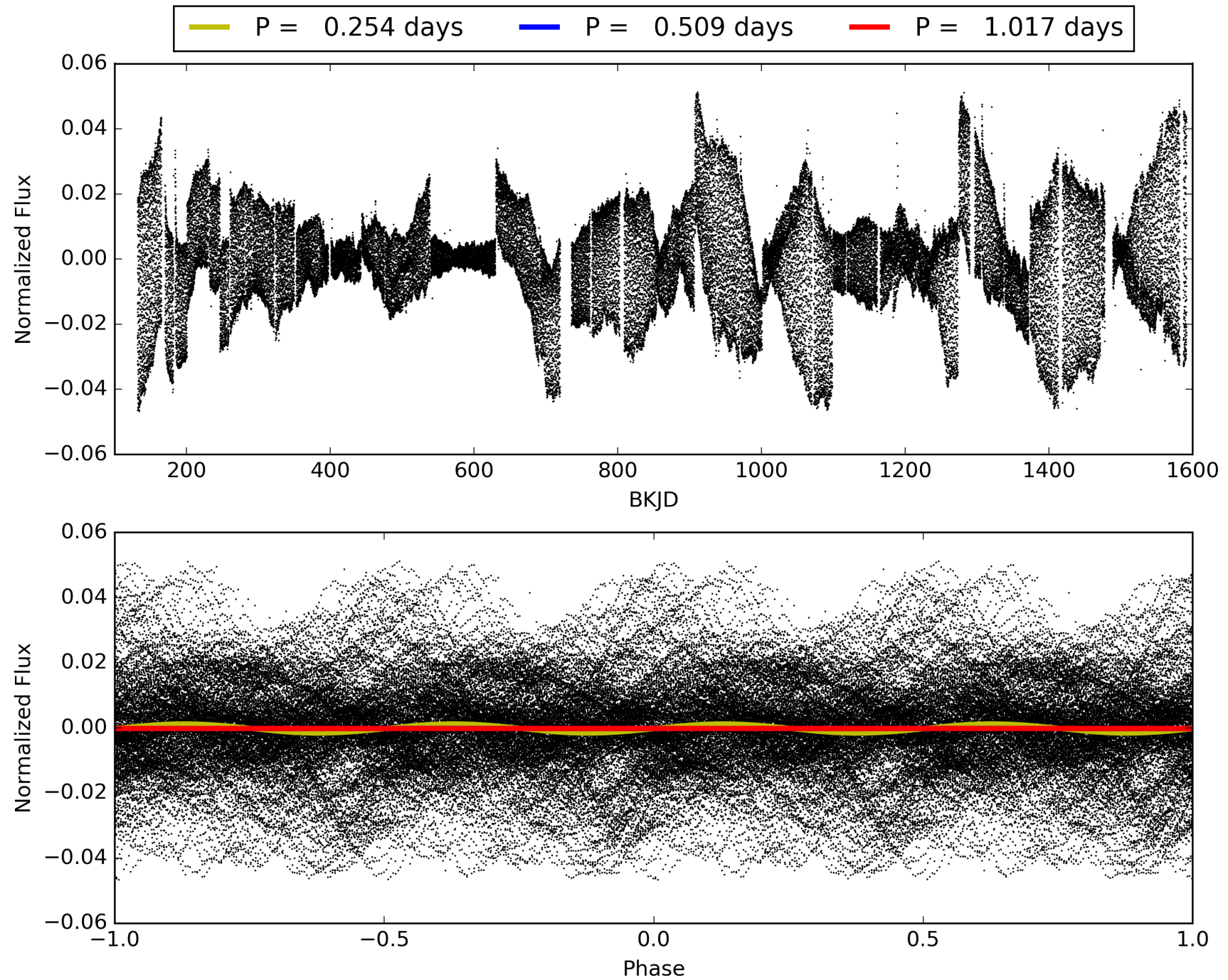
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 00:07:57 Z

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

TCE 008682921-02, PDC Light Curves

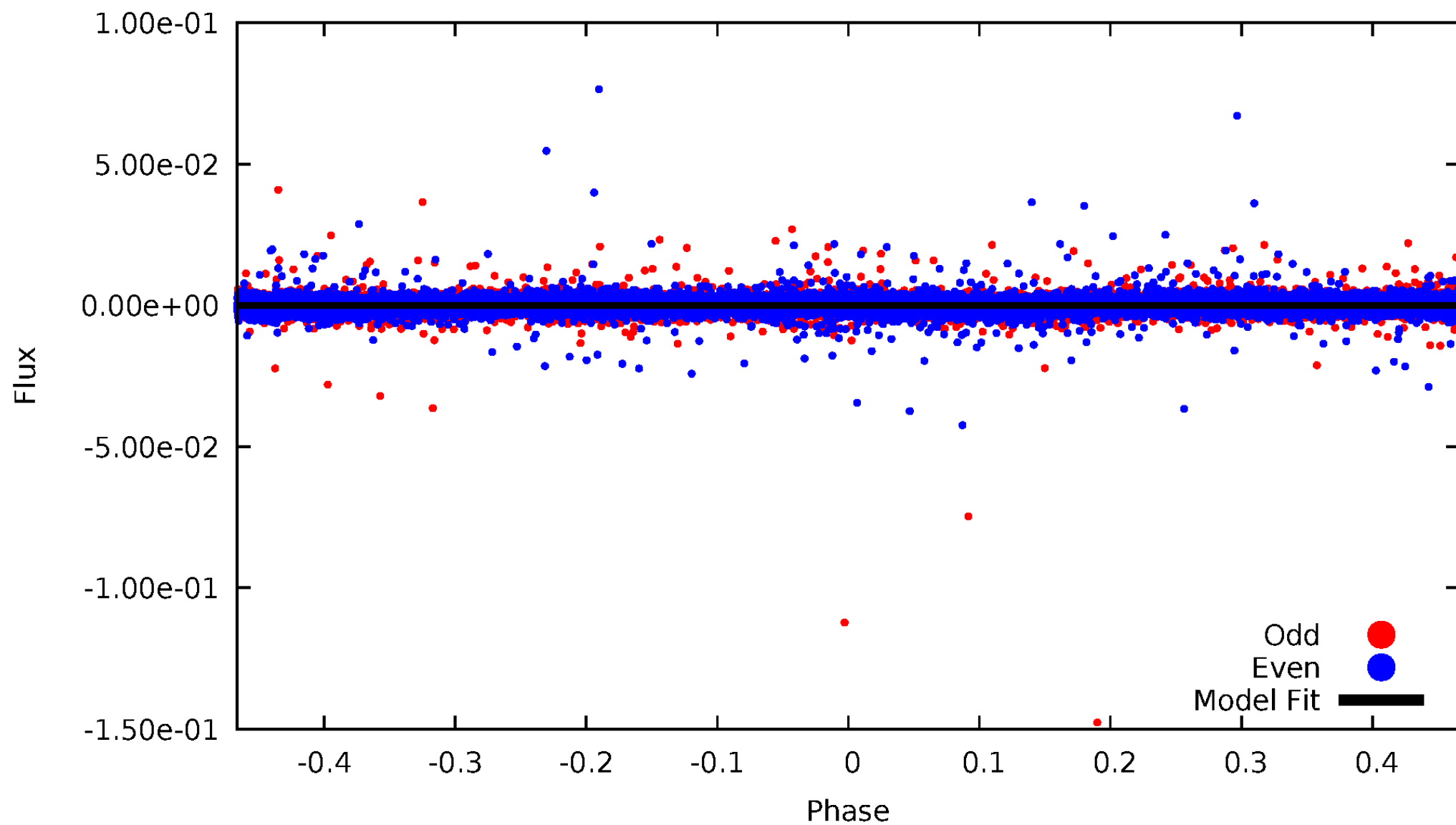


TCE 008682921-02



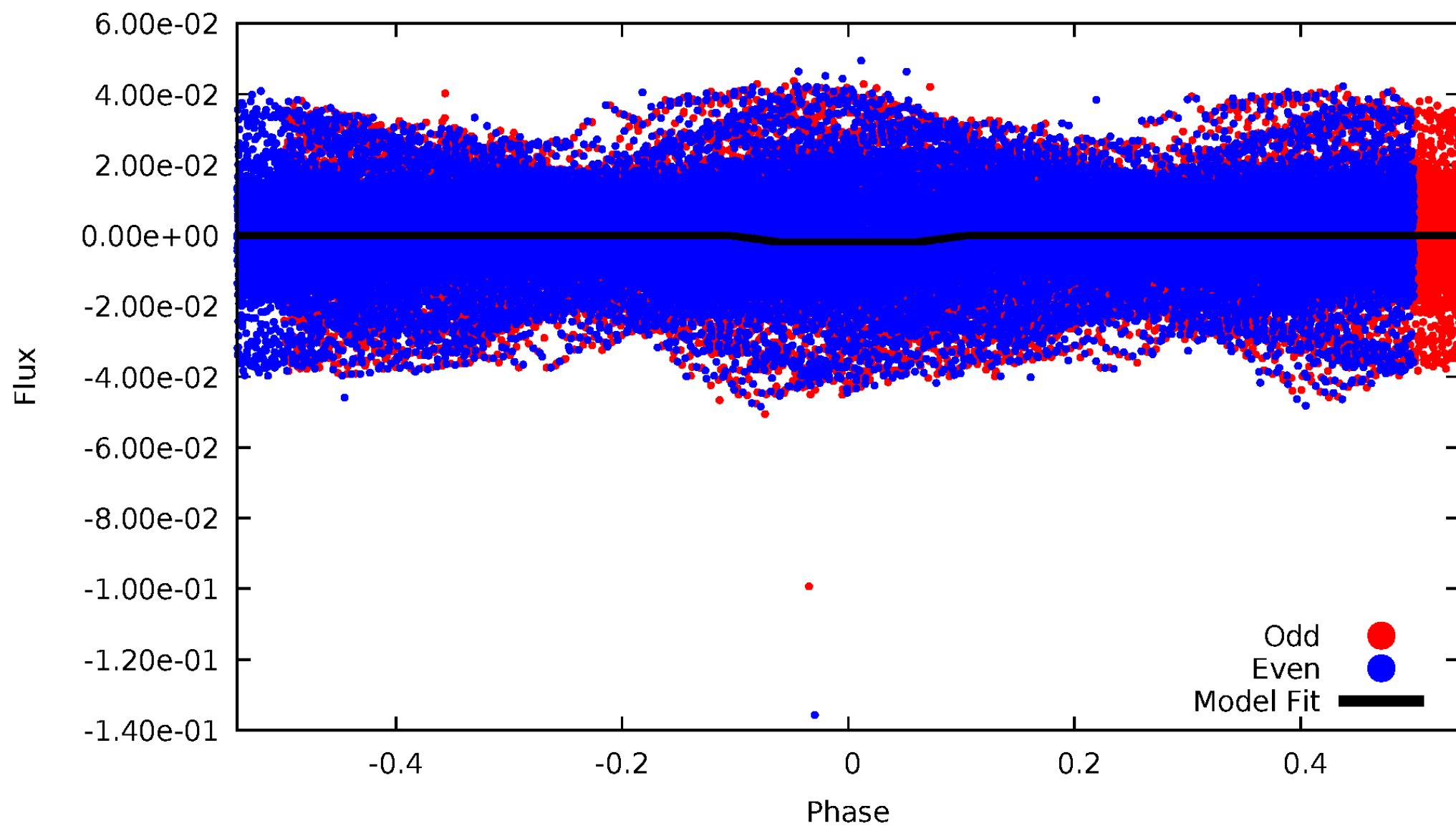
DV Odd/Even

TCE 008682921-02



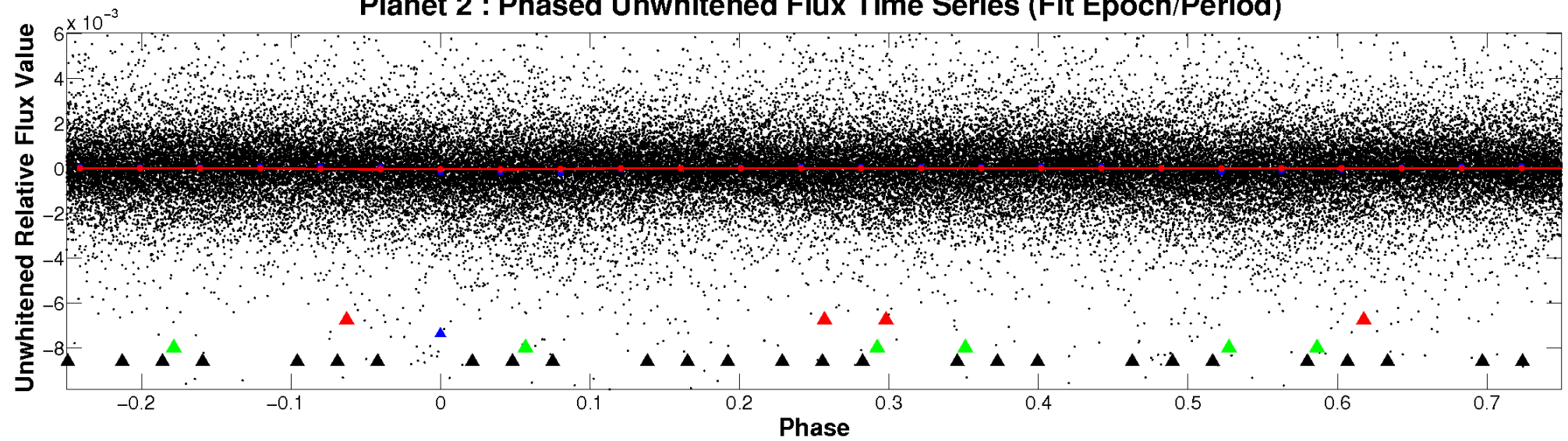
ALT Odd/Even

TCE 008682921-02

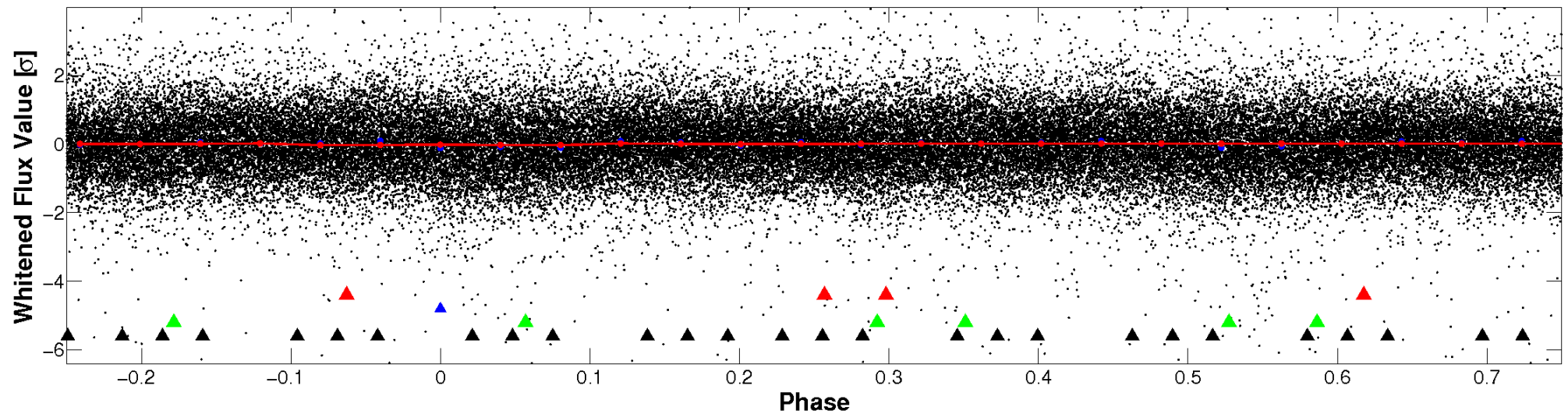


Non-Whitened Vs. Whitened Light Curve

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

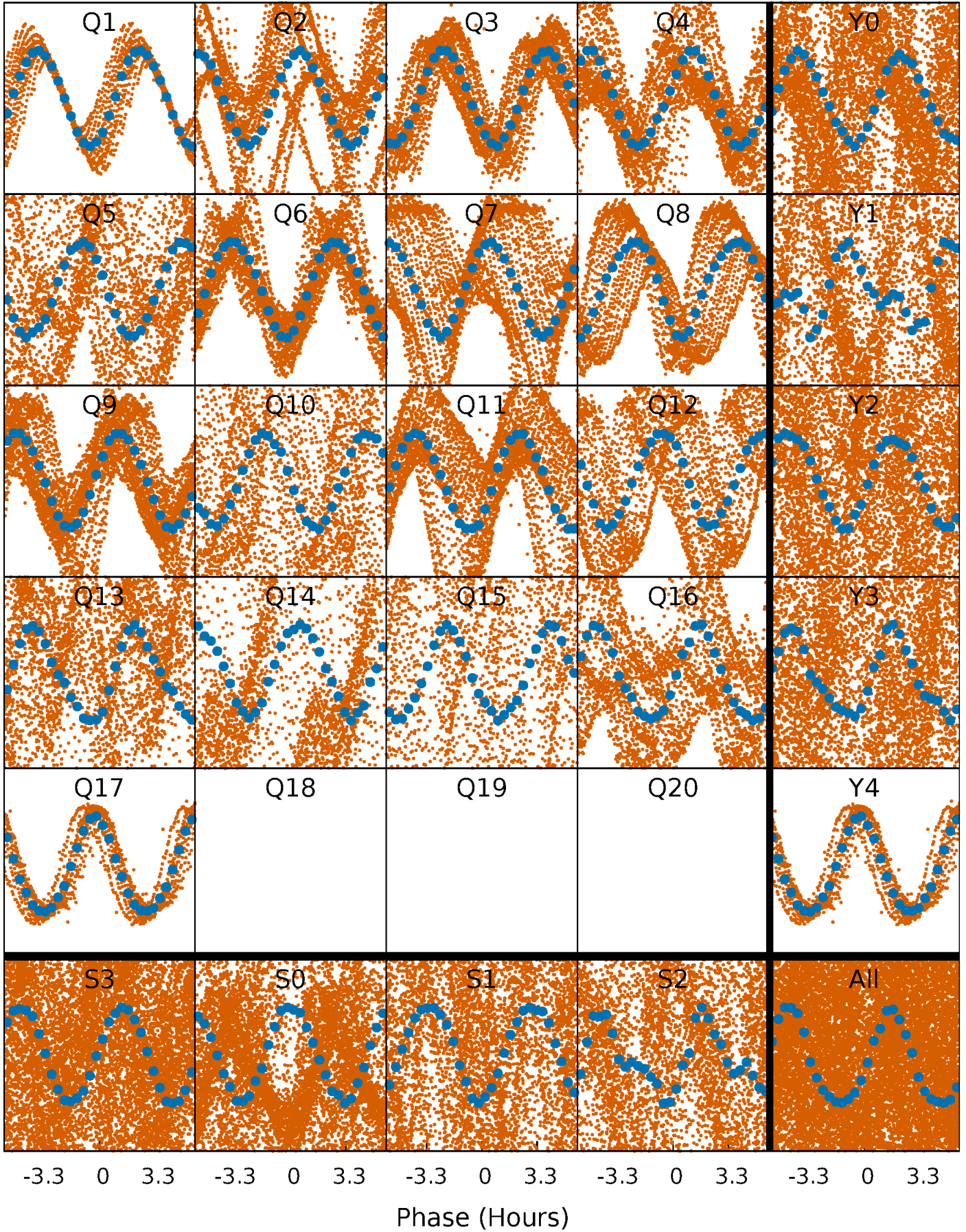


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



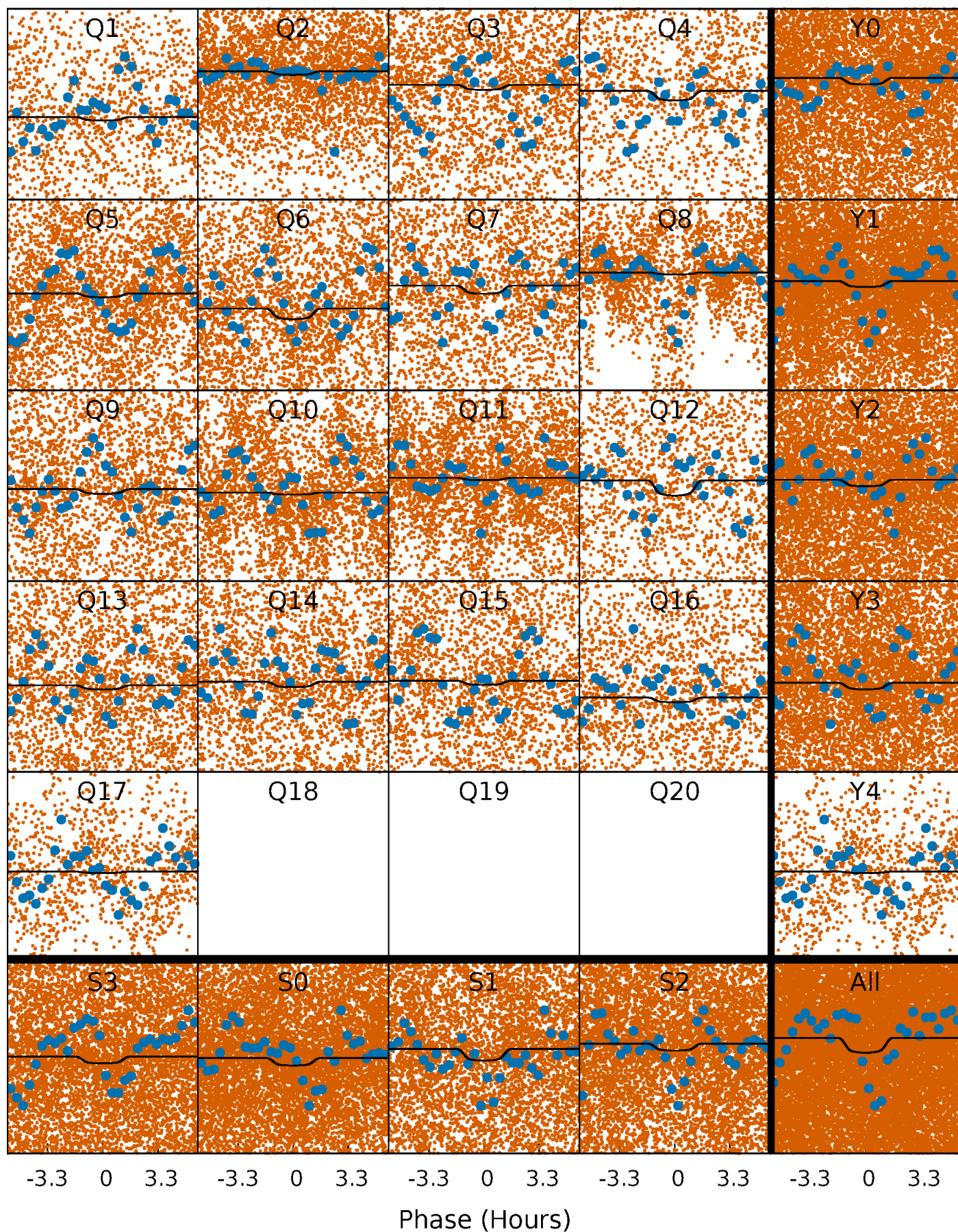
PDC Quarter-Phased Transit Curves

TCE 008682921-02 P= 0.508538 Days $T_0=131.561083$ (BKJD)



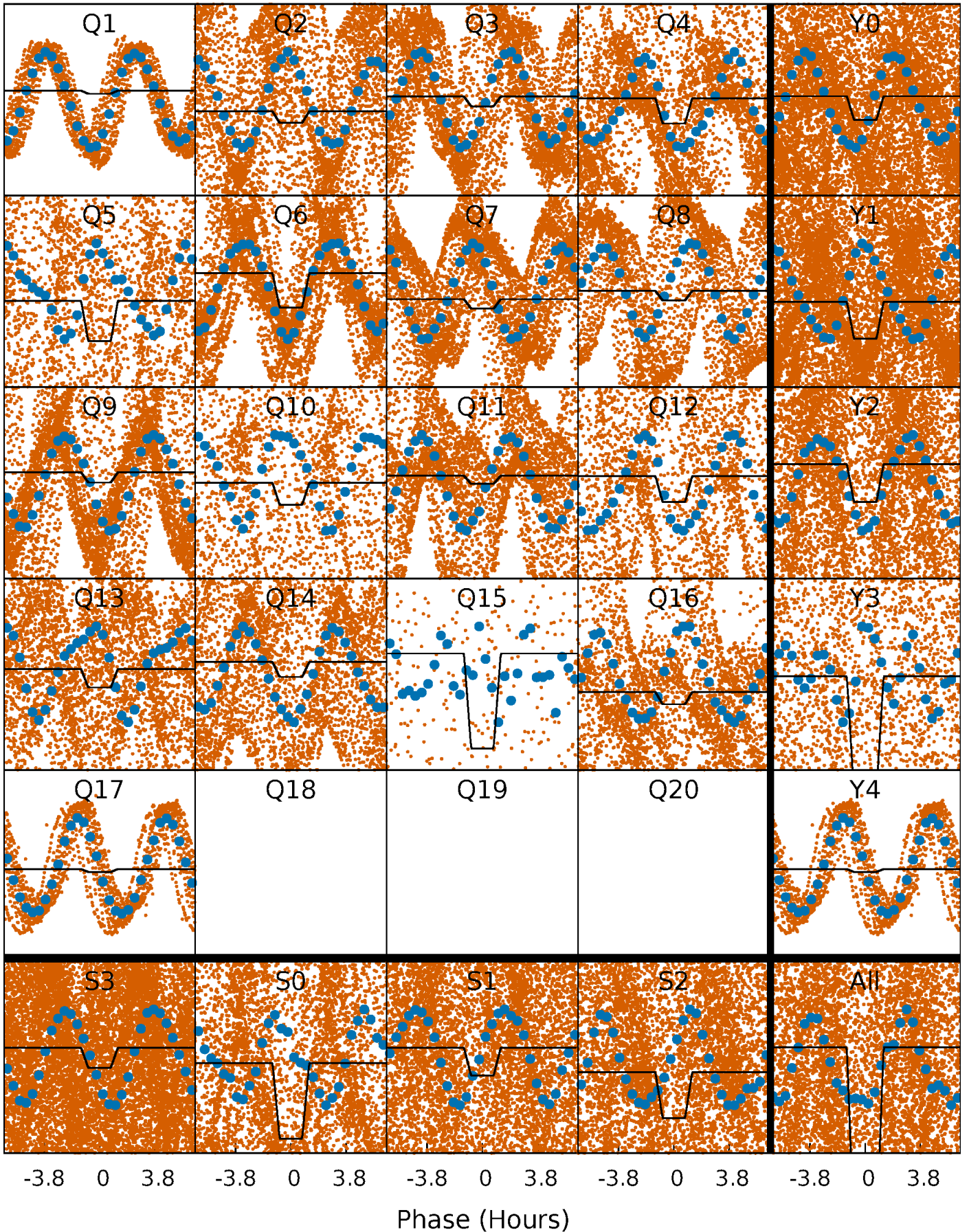
DV Quarter-Phased Transit Curves

TCE 008682921-02 P= 0.508538 Days $T_0=131.561083$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

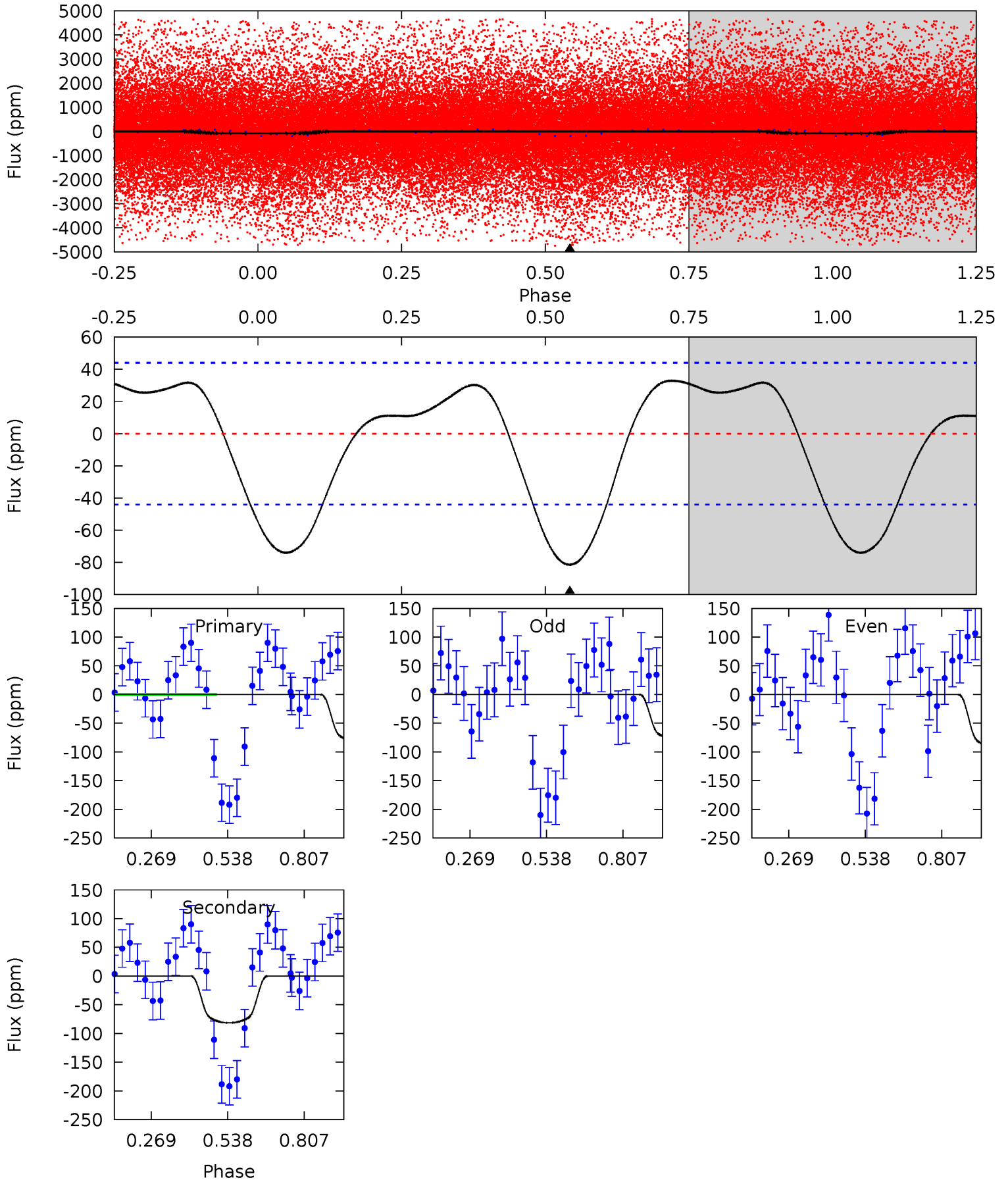
TCE 008682921-02 P= 0.508828 Days $T_0=131.551627$ (BKJD)



DV Model-Shift Uniqueness Test

008682921-02, P = 0.508538 Days, E = 131.052545 Days

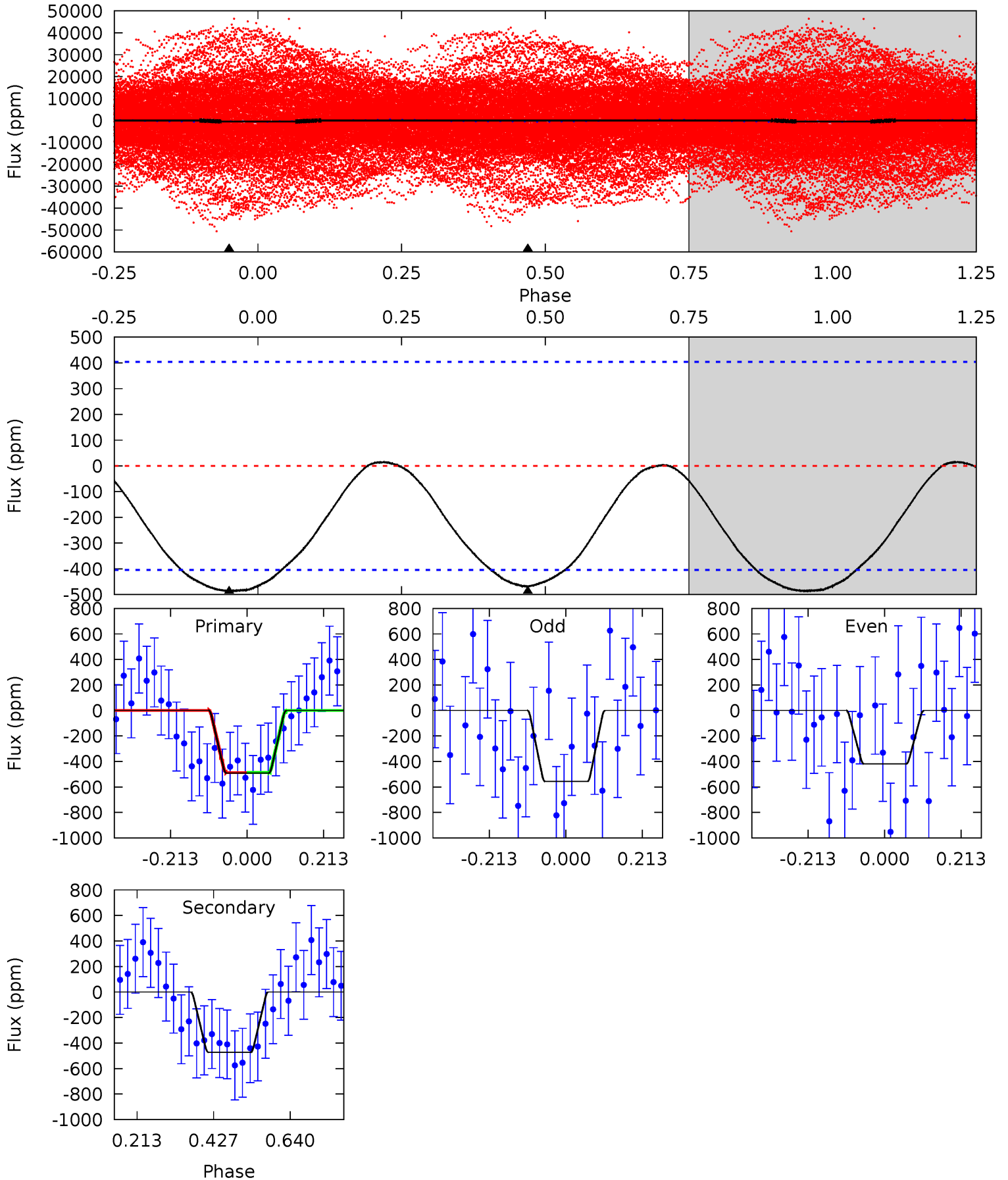
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.05	8.05	0	0	4.35	1.11	3.57	8.05	8.05	8.05	8.05	0.67	0.85	0.29	8.32



Alt Model-Shift Uniqueness Test

008682921-02, P = 0.508828 Days, E = 131.042799 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.35	5.14	0	0	4.40	1.24	0.18	5.35	5.35	5.14	5.14	0.66	0.29	0.03	0.00



Stellar Parameters For KIC 008682921

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5489^{+163}_{-180}	$3.522^{+0.918}_{-0.216}$	$-0.320^{+0.350}_{-0.300}$	$3.510^{+0.879}_{-2.461}$	$1.497^{+0.210}_{-0.629}$	$0.049^{+1.378}_{-0.021}$
	+3%/-3%	+26%/-6%	+109%/-94%	+25%/-70%	+14%/-42%	+2826%/-44%
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 008682921-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-81 ± 10	$2.96^{+1.29}_{-1.18}$	5196^{+523}_{-975}	5148^{+930}_{-869}	$1.021^{+1.588}_{-0.518}$
Alt.	-472 ± 92	$15.92^{+3.07}_{-6.03}$	5200^{+561}_{-977}	-3553^{+7110}_{-694}	$0.215^{+0.285}_{-0.079}$

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 $A_{obs} \gg 1.0$

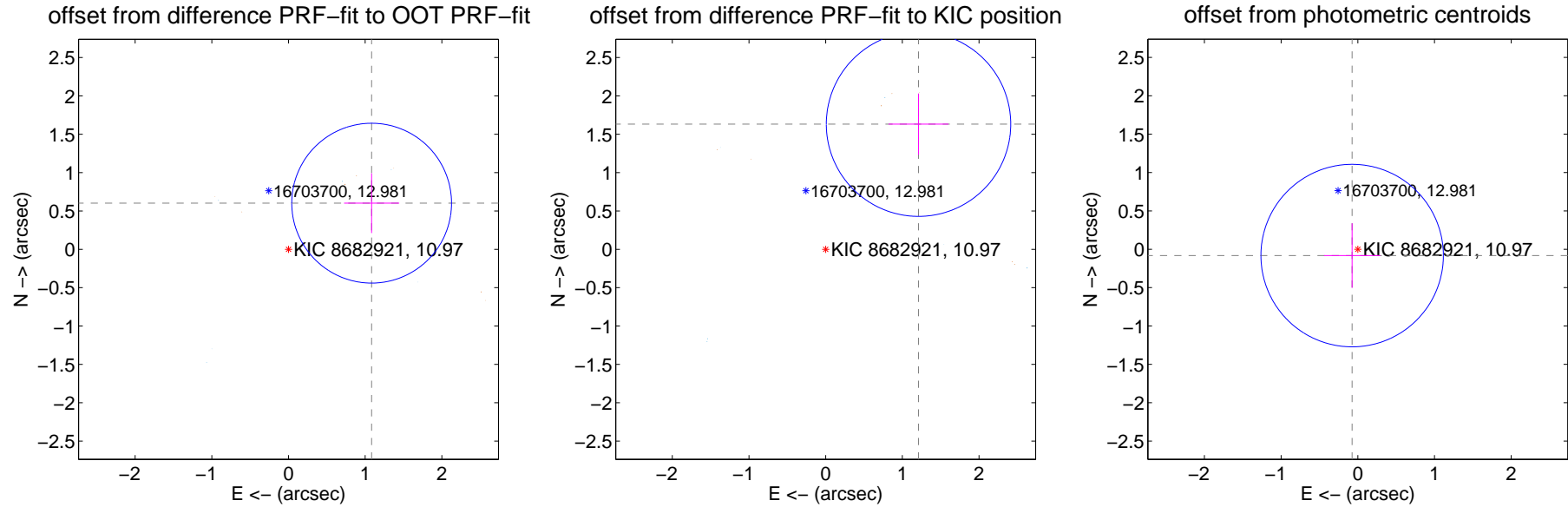
DV Centroid Data

Supplemental centroid analysis for 008682921-02. **Kepler magnitude: 10.97**. Transit SNR 4.62

There are 8 quarters with good PRF difference image offsets

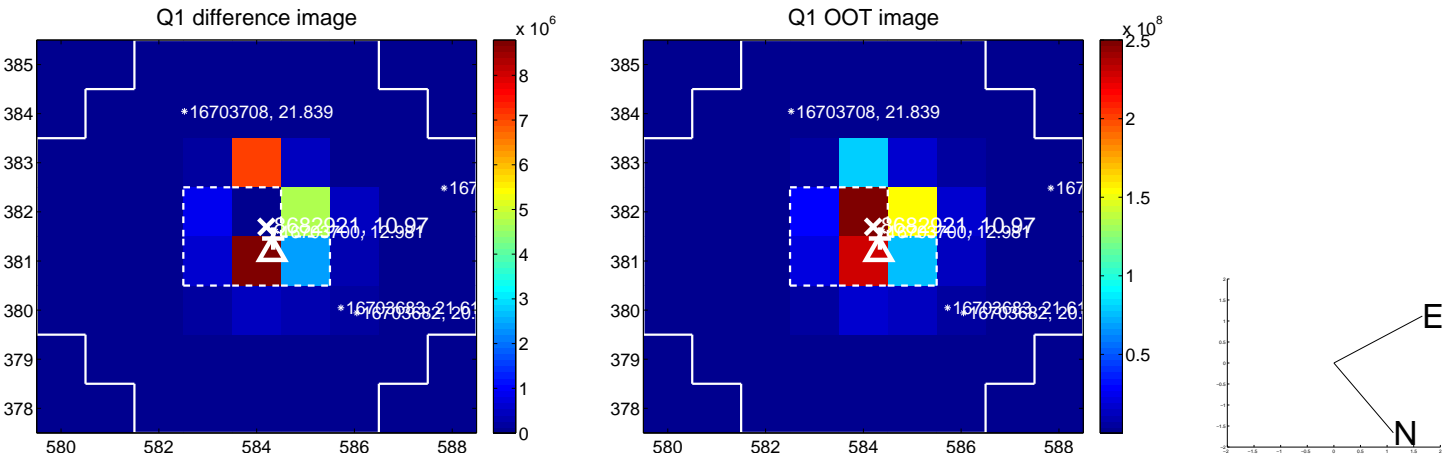
The direct PRF centroid is offset from the target star catalog position by about 1.00 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.240 \pm 0.347	3.57	-1.084 \pm 0.359	0.601 \pm 0.389
PRF-fit source offset from KIC position	2.032 \pm 0.401	5.07	-1.211 \pm 0.390	1.632 \pm 0.399
photometric centroid source offset	0.11 \pm 0.40	0.28	0.07 \pm 0.37	-0.08 \pm 0.42

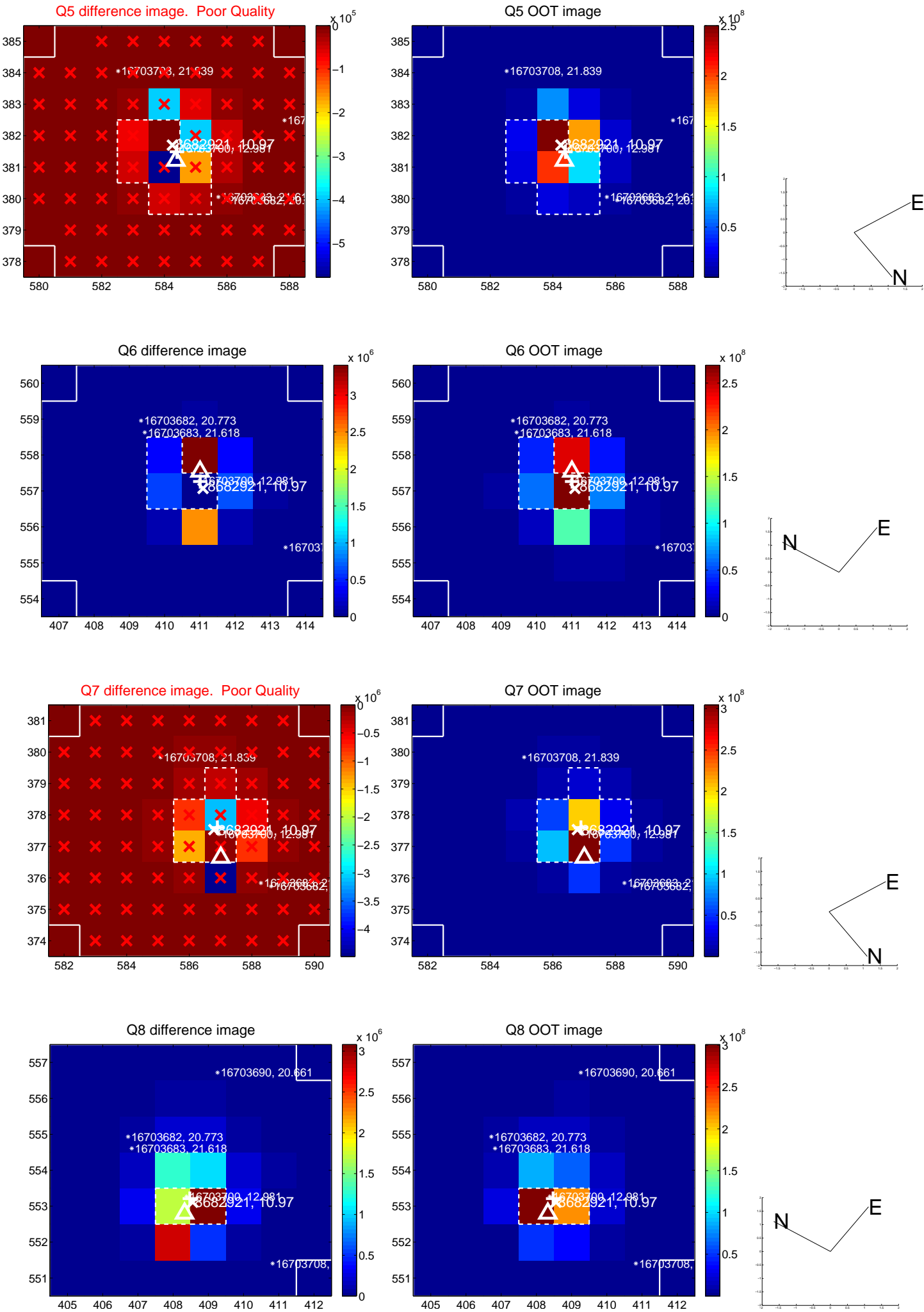


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

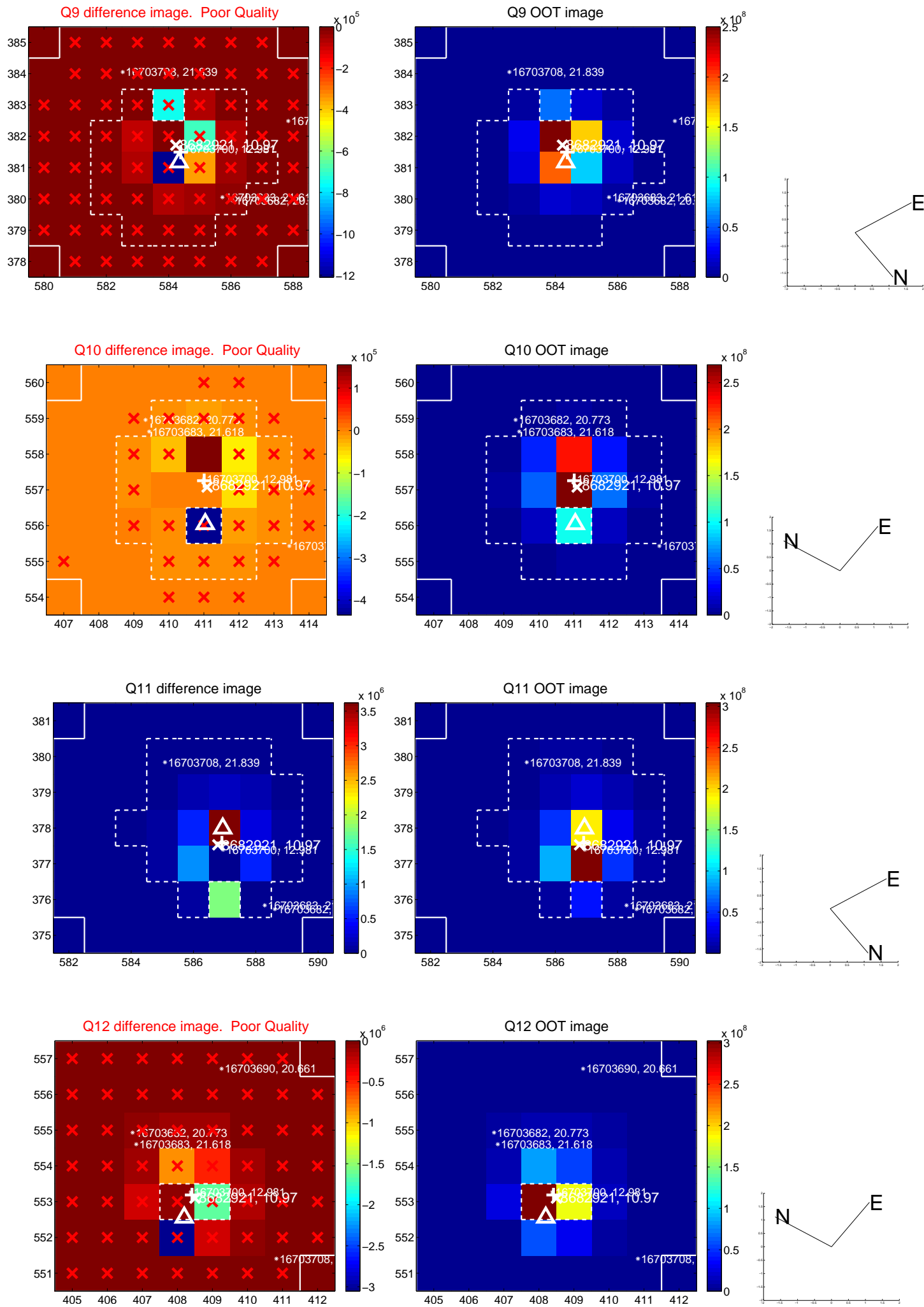
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



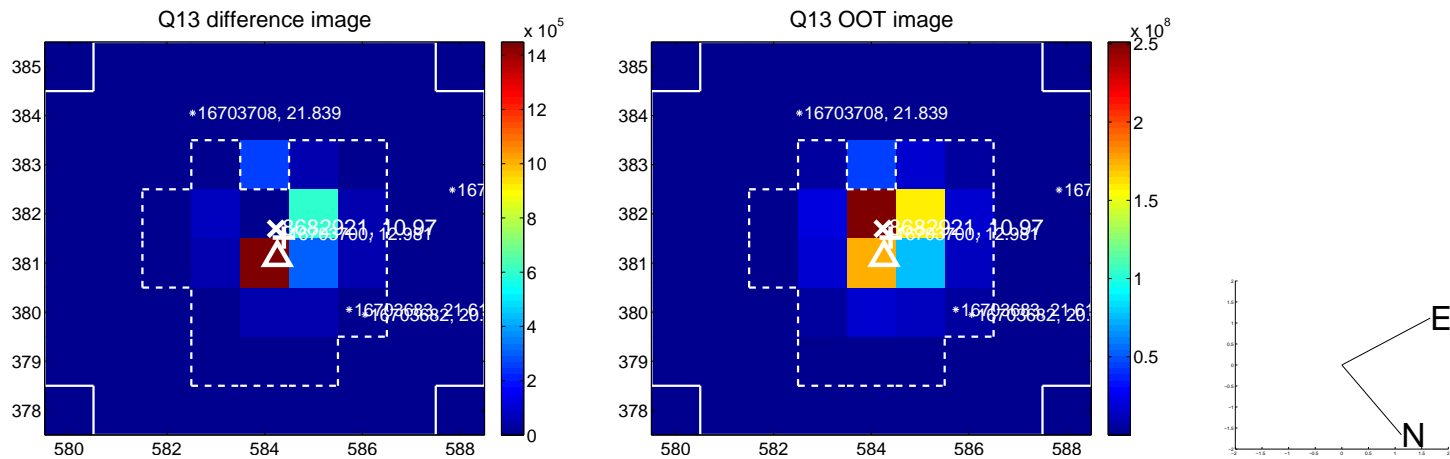
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



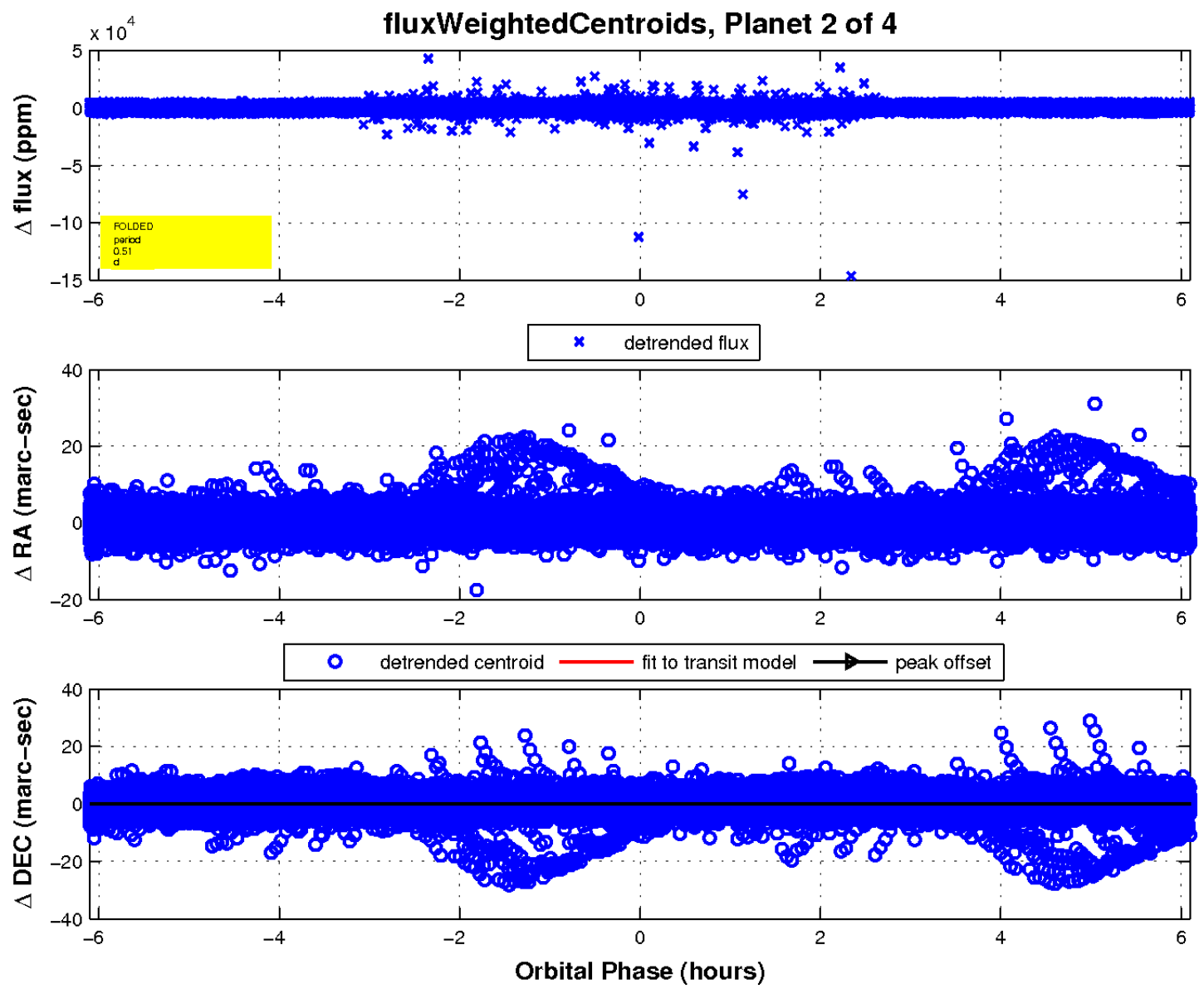
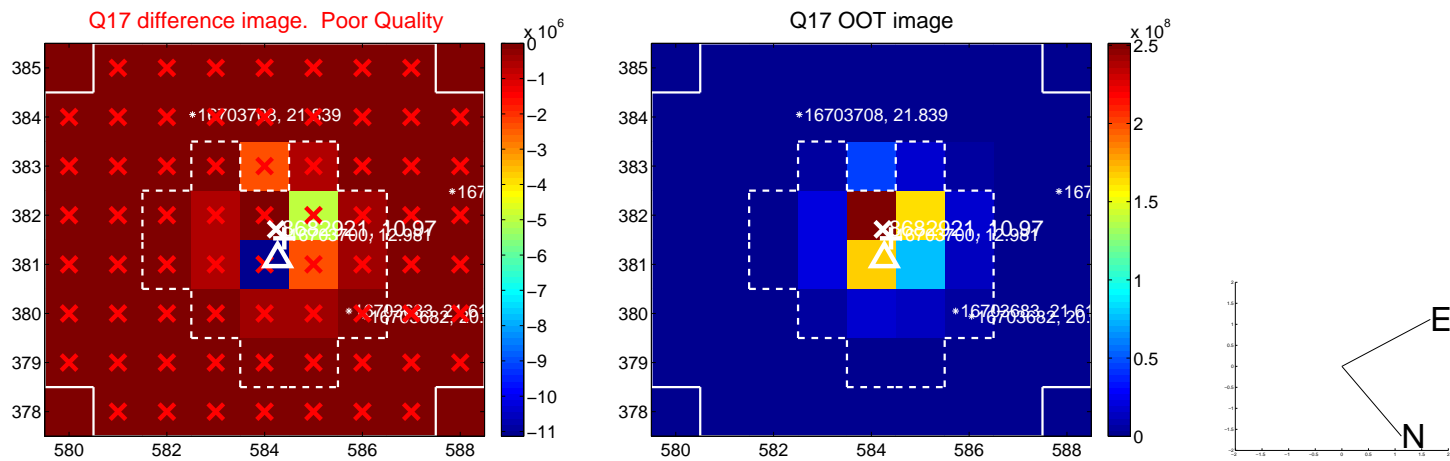
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

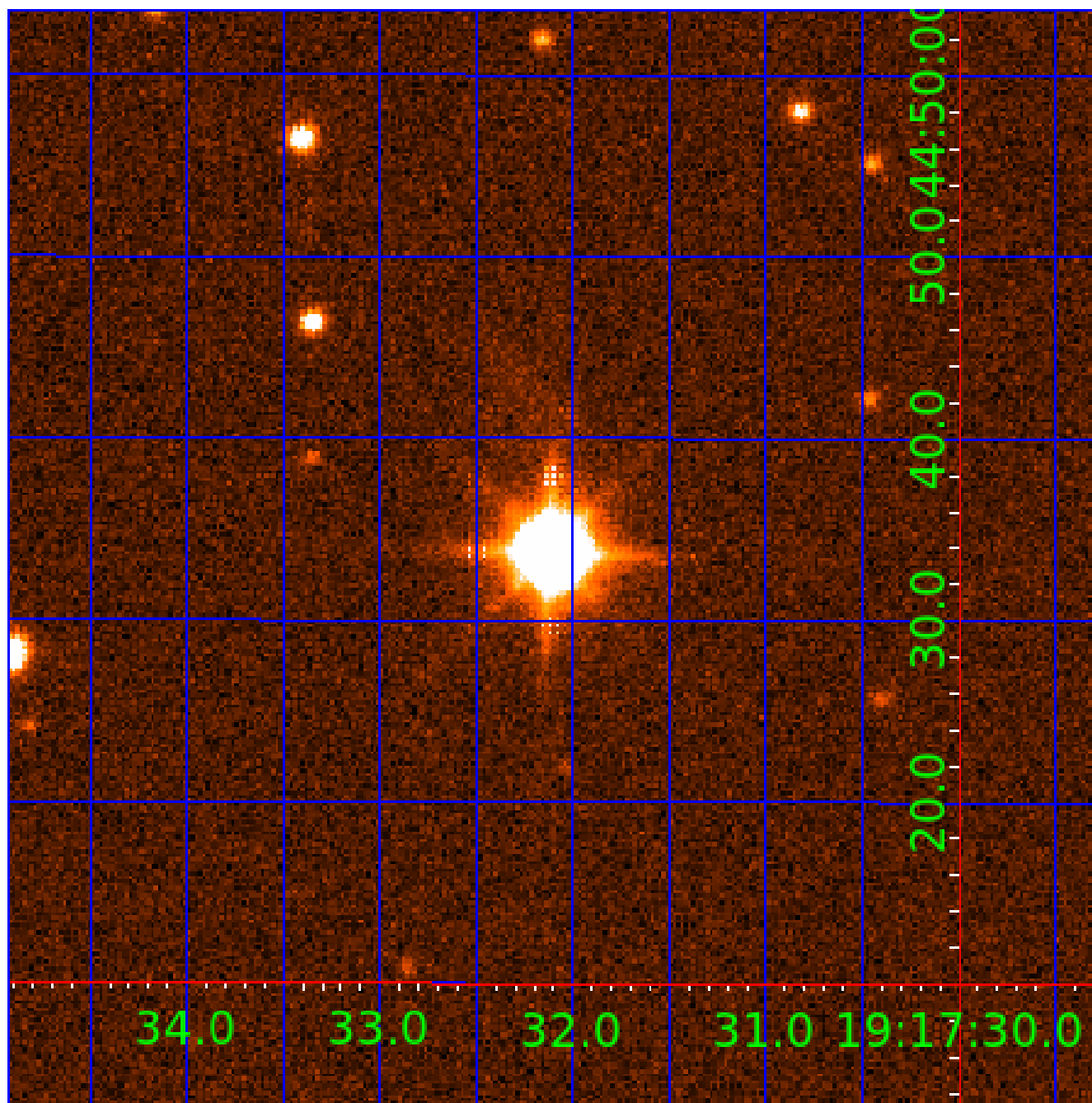


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008682921

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})
008682921-01	OBS	No	375.972220	314.786366	4196.5	3.340	13.7	9.3	3.51	5489	22.80	7.37
008682921-02	OBS	No	0.508538	131.561083	50.7	2.847	10.3	4.6	3.51	5489	3.29	0.00
008682921-03	OBS	No	224.145673	328.125043	4728.5	2.917	10.8	9.3	3.51	5489	29.25	14.69
008682921-04	OBS	No	53.112465	163.980750	494.7	3.563	10.3	2.6	3.51	5489	8.07	100.19

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008682921-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
008682921-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
008682921-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008682921-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

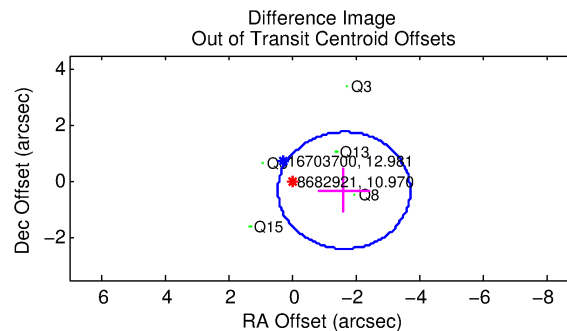
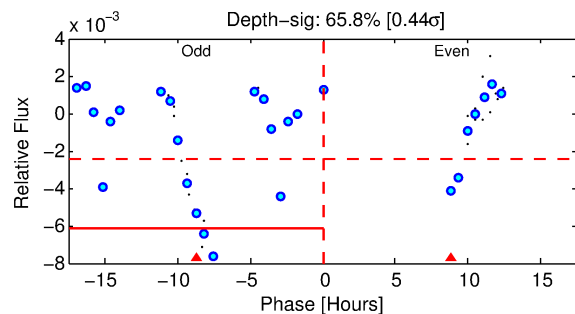
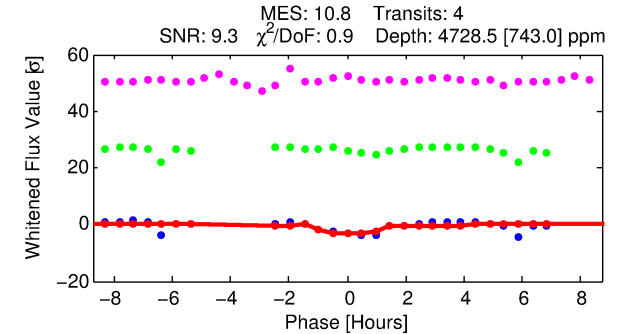
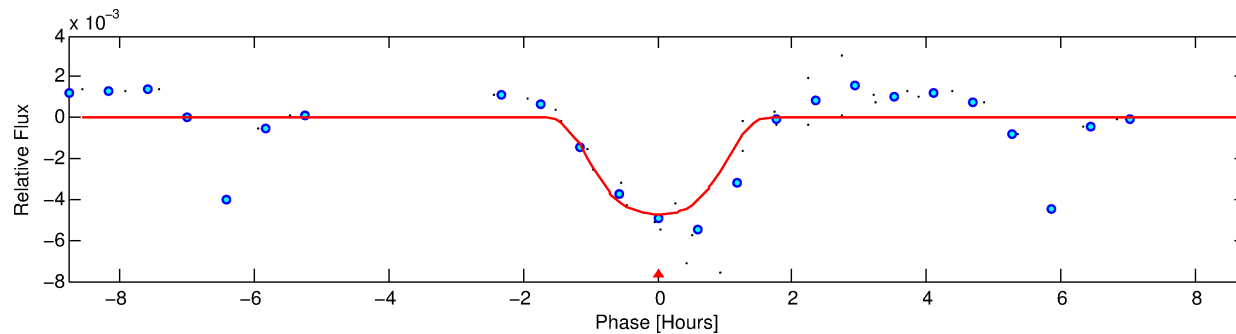
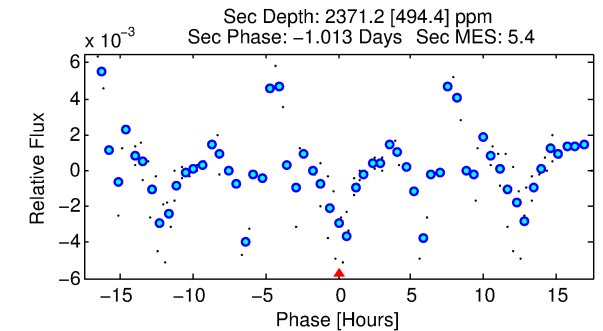
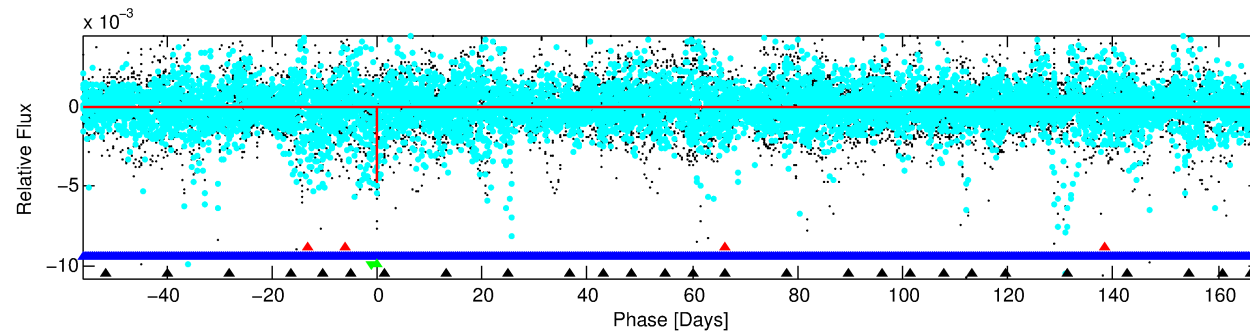
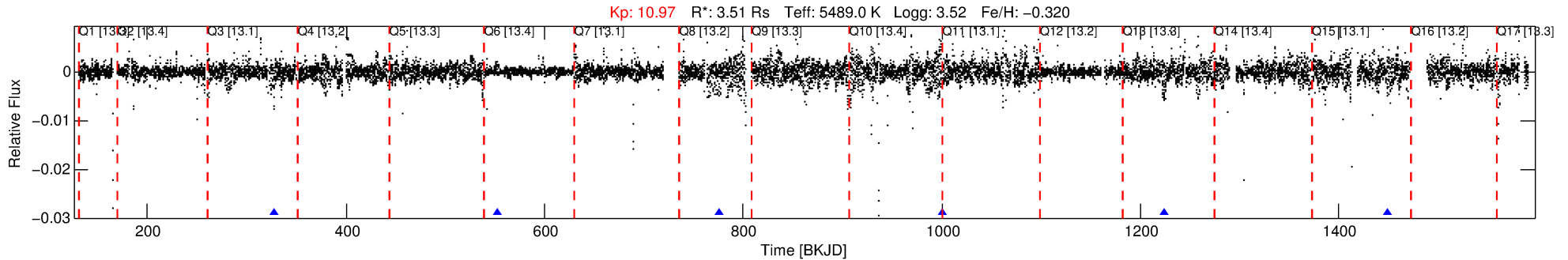
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008682921-03

No Significant Match Found

DV One-Page Summary

KIC: 8682921 Candidate: 3 of 4 Period: 224.146 d



DV Fit Results:

Period = 224.14567 [0.00234] d
Epoch = 328.1250 [0.0065] BKJD
Rp/R* = 0.0764 [0.0091]
a/R* = 339.62 [73.01]
b = 0.91 [0.05]
Seff = 14.69 [21.90]
Teq = 499 [186] K
Rp = 29.25 [20.80] Re
a = 0.8259 [0.6983] AU
Ag = 1039.74 [1578.34] [0.66σ]
Teffp = 4383 [375] K [9.27σ]

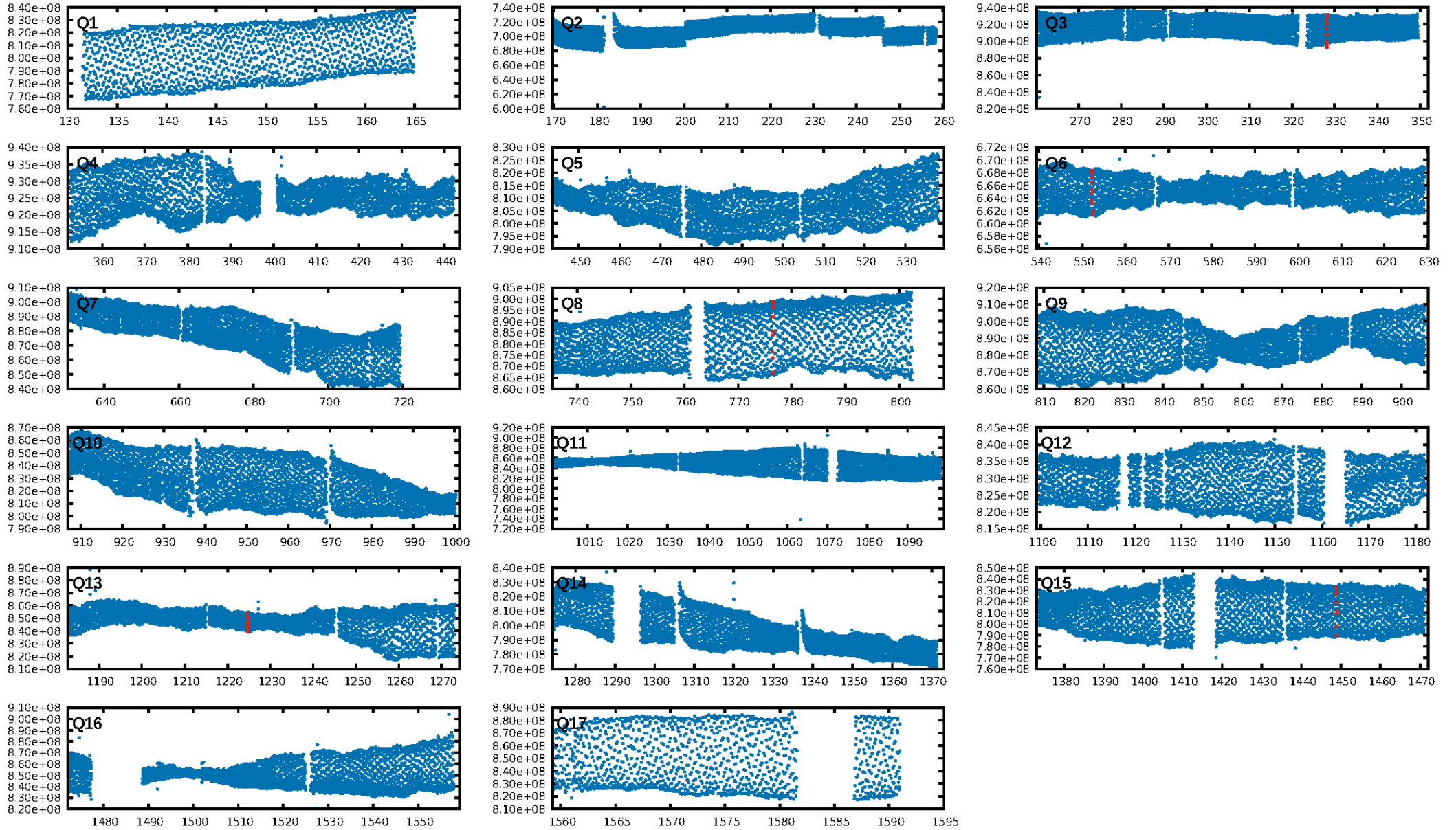
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [891.41σ]
LongPeriod-sig: 100.0% [821.80σ]
ModelChiSquare2-sig: 98.6%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.09e-09
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -21.44
Centroid-sig: N/A
Centroid-so: 0.561 arcsec [4.02σ]
OotOffset-rm: 1.674 arcsec [2.42σ]
KicOffset-rm: 1.403 arcsec [2.28σ]
OotOffset-st: 1/2/1/1 [5]
KicOffset-st: 1/2/1/1 [5]
DiffImageQuality-fgm: 0.60 [3/5]
DiffImageOverlap-fno: 0.00 [0/5]

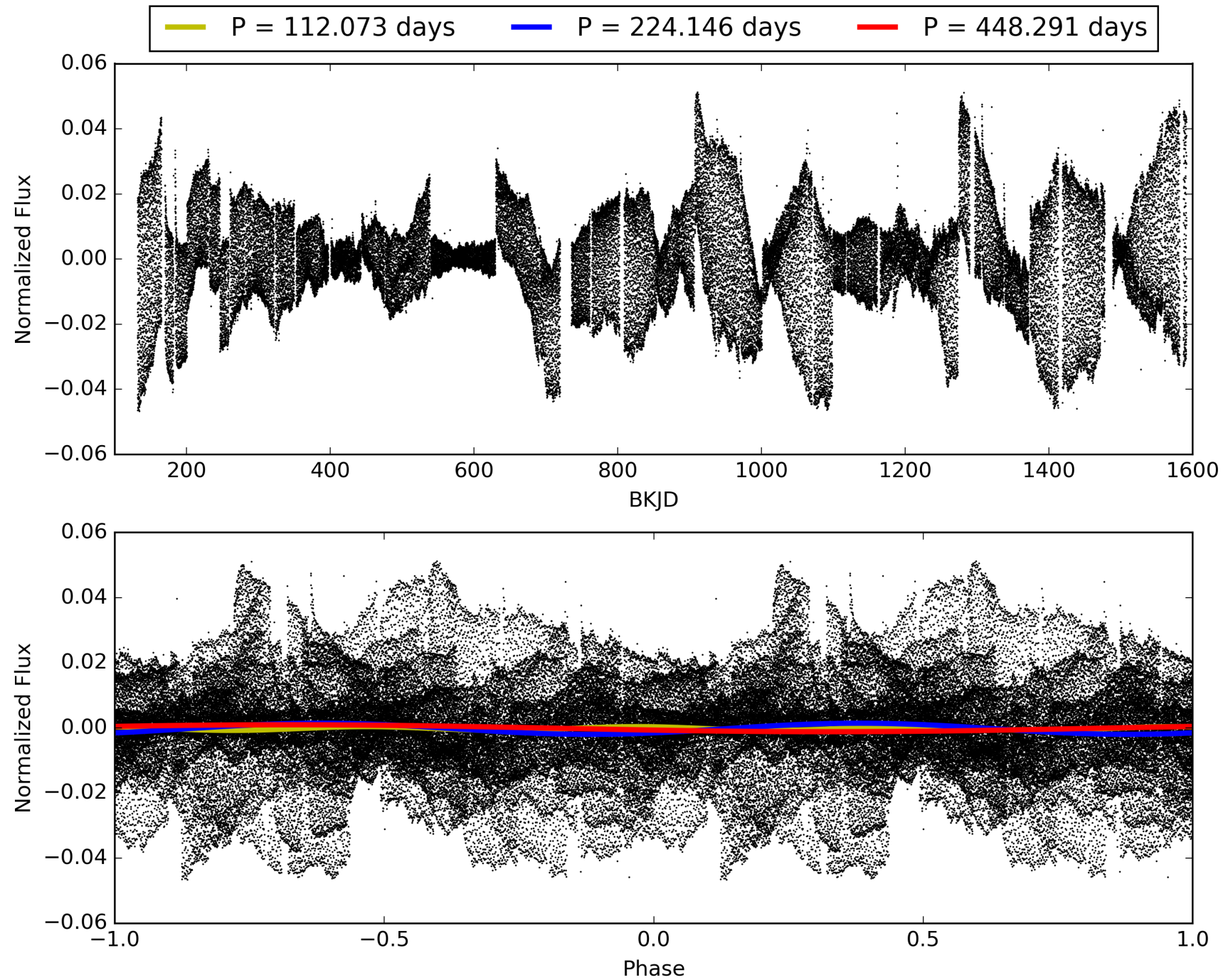
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 00:08:10 Z

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

TCE 008682921-03, PDC Light Curves

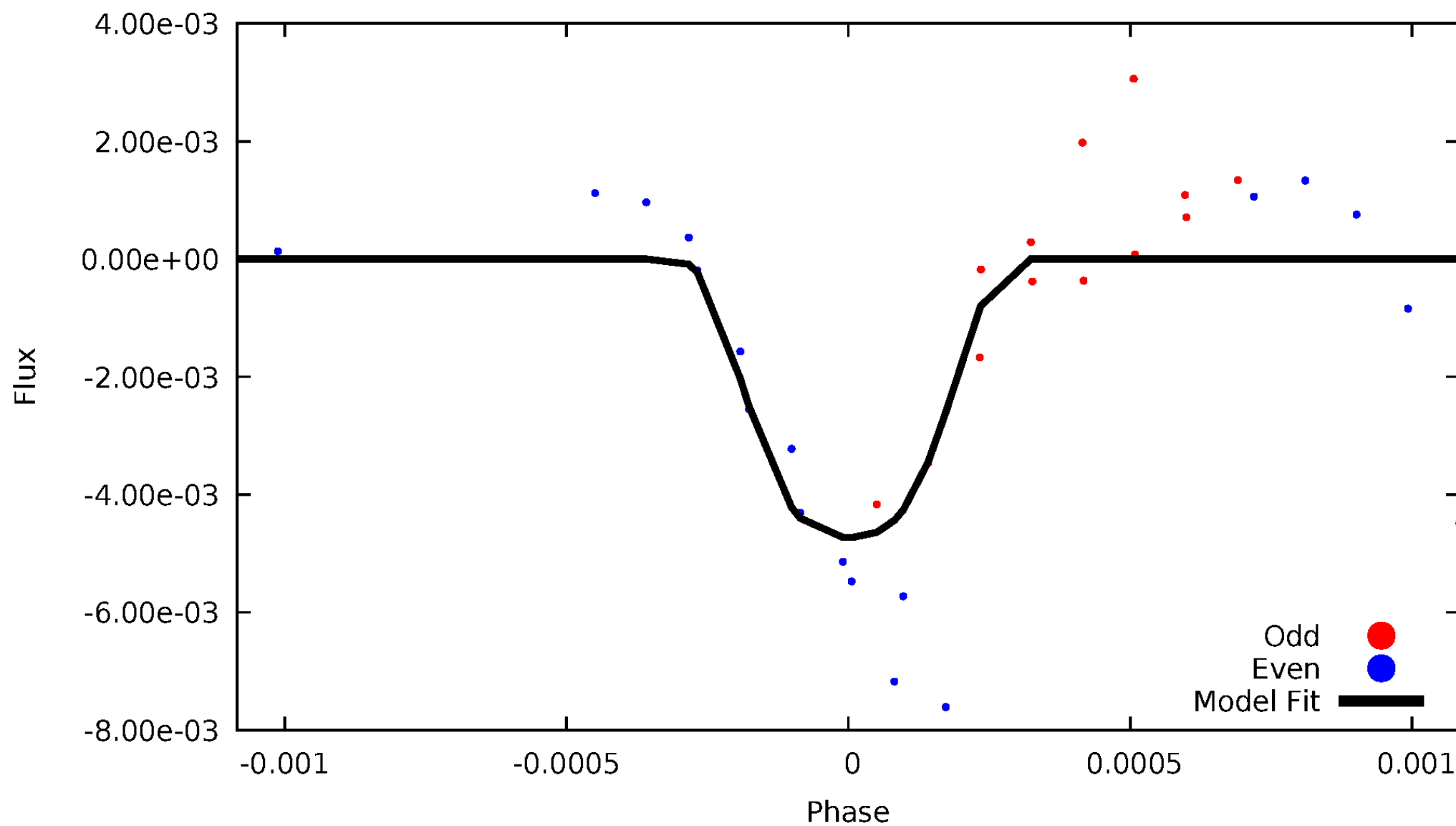


TCE 008682921-03



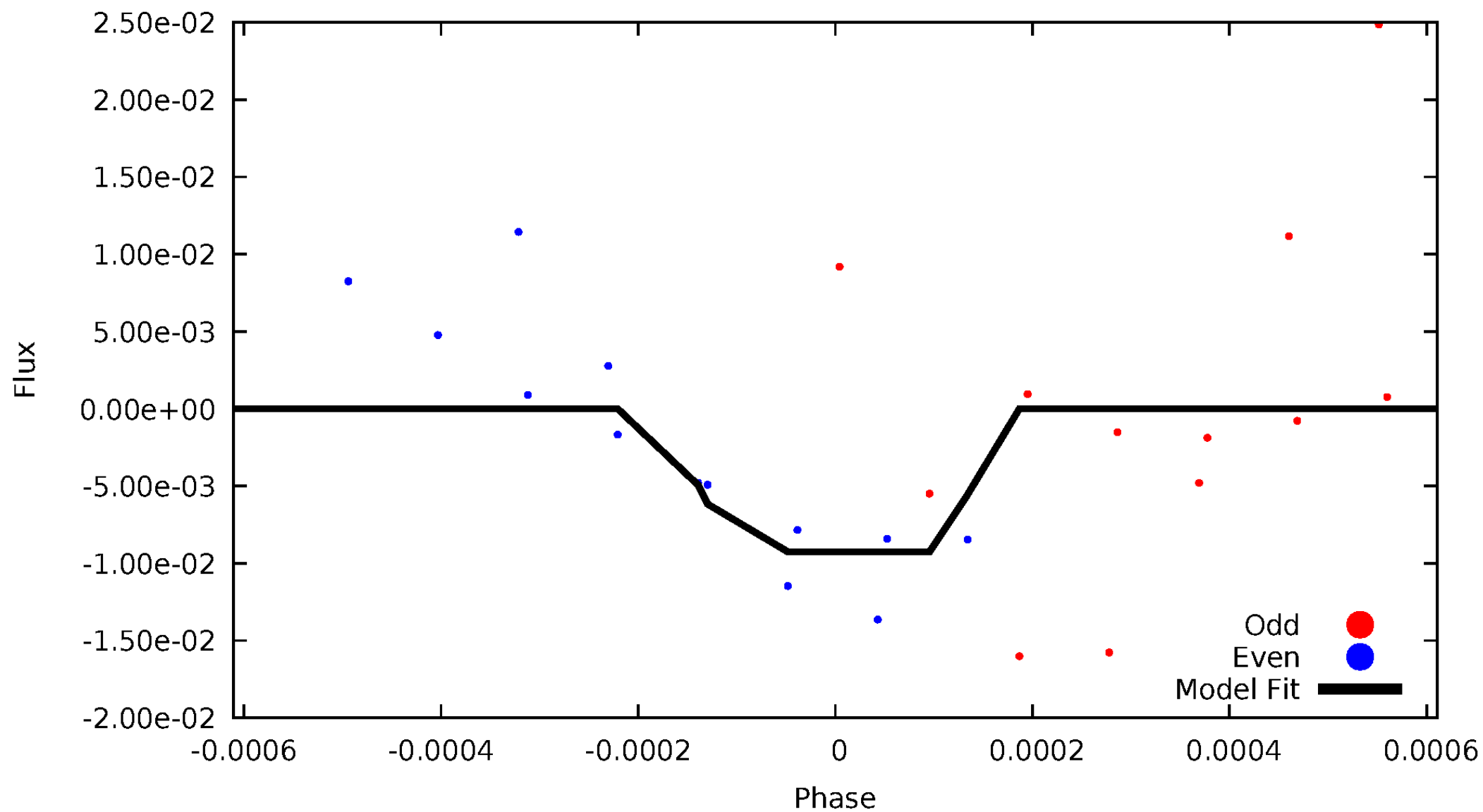
DV Odd/Even

TCE 008682921-03



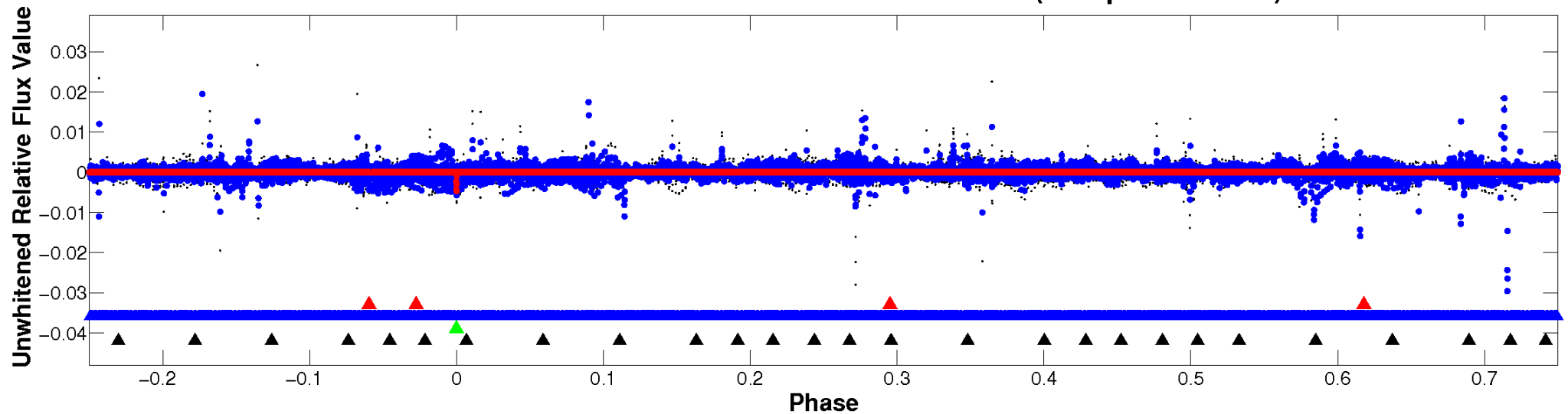
ALT Odd/Even

TCE 008682921-03

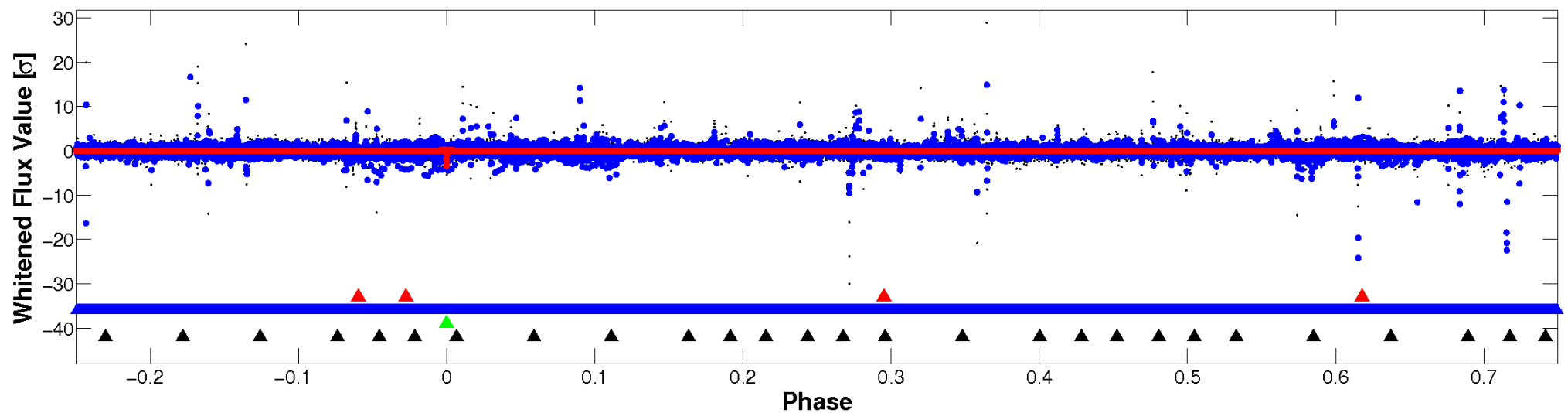


Non-Whitened Vs. Whitened Light Curve

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

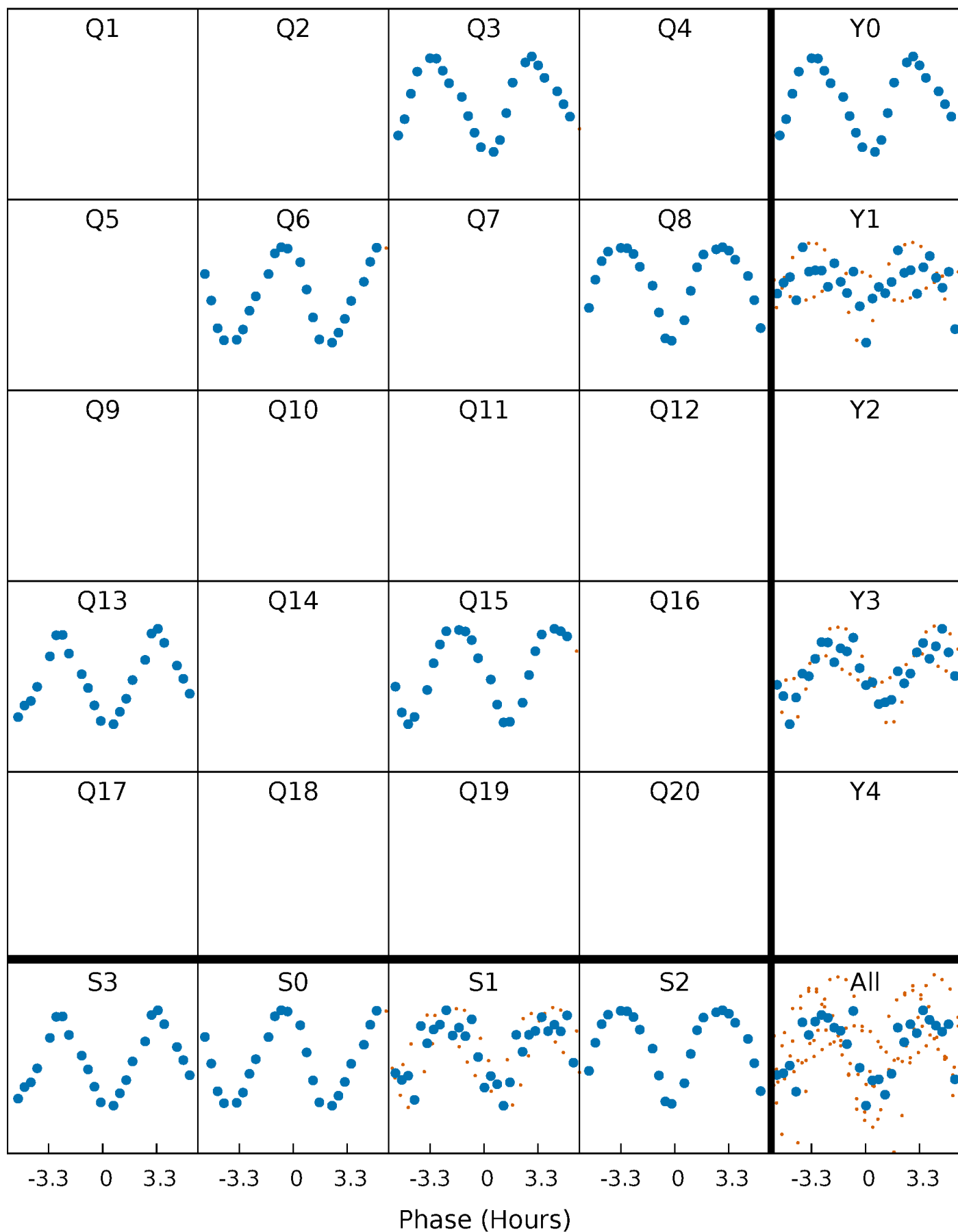


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



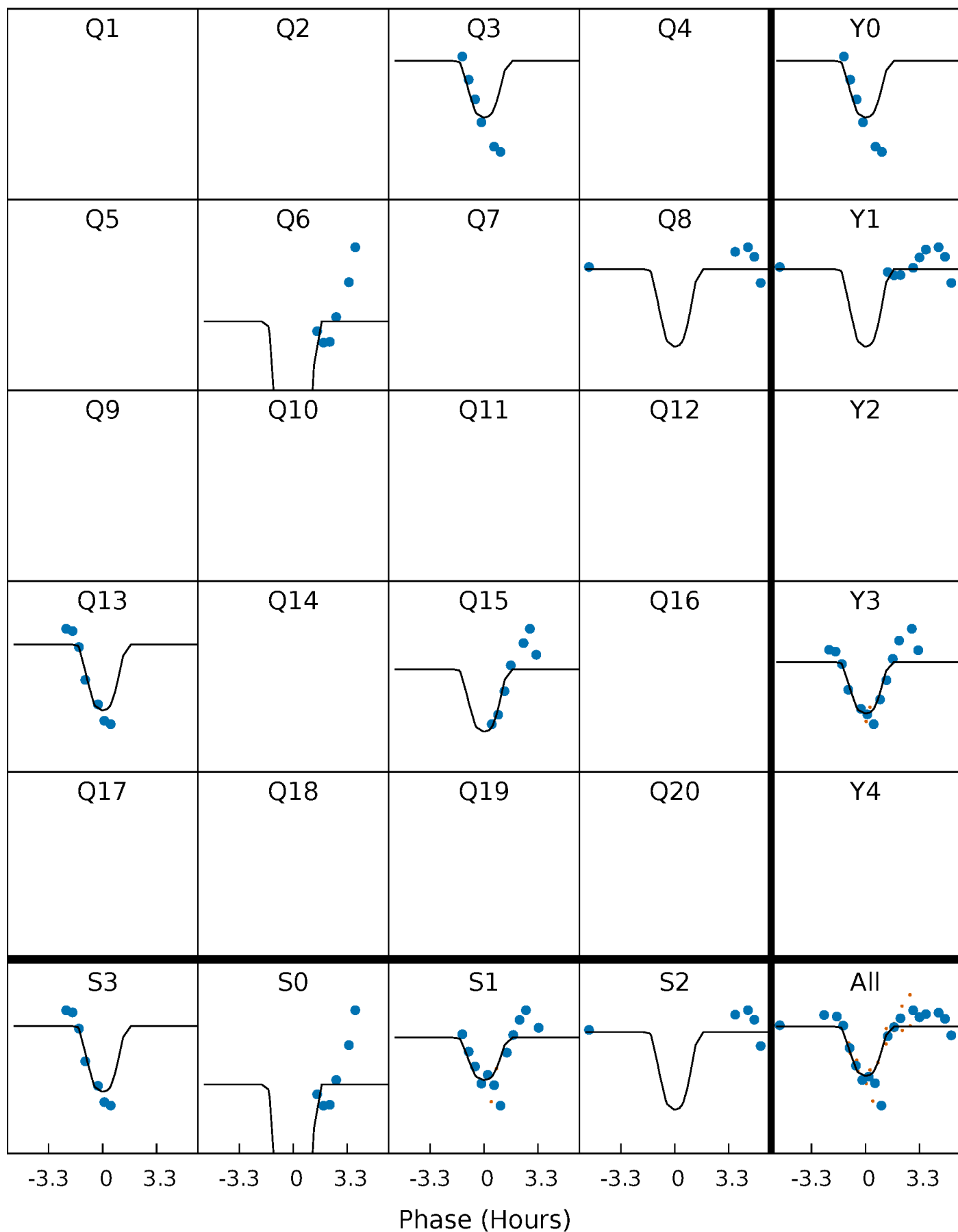
PDC Quarter-Phased Transit Curves

TCE 008682921-03 $P=224.145673$ Days $T_0=328.125043$ (BKJD)



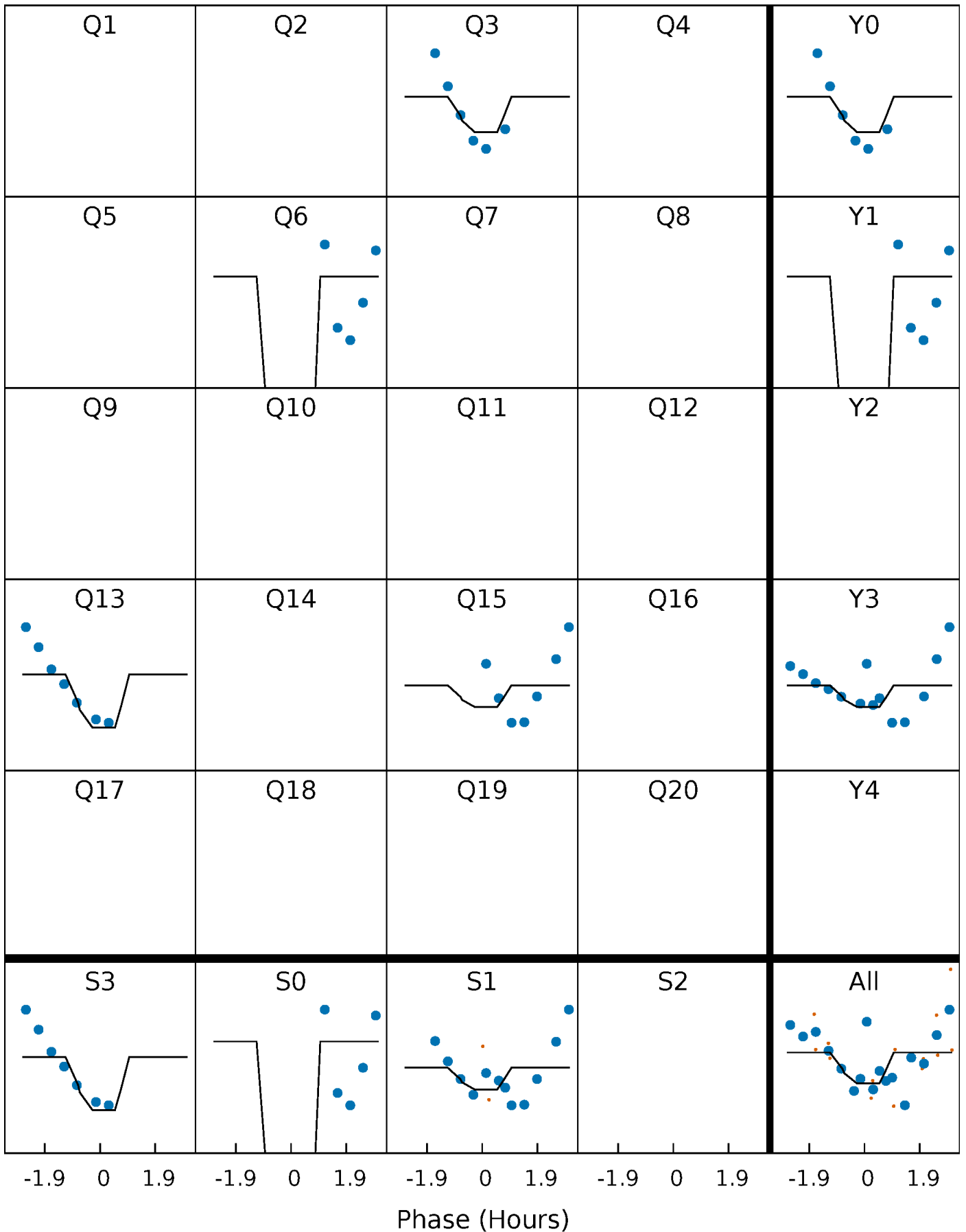
DV Quarter-Phased Transit Curves

TCE 008682921-03 $P=224.145673$ Days $T_0=328.125043$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

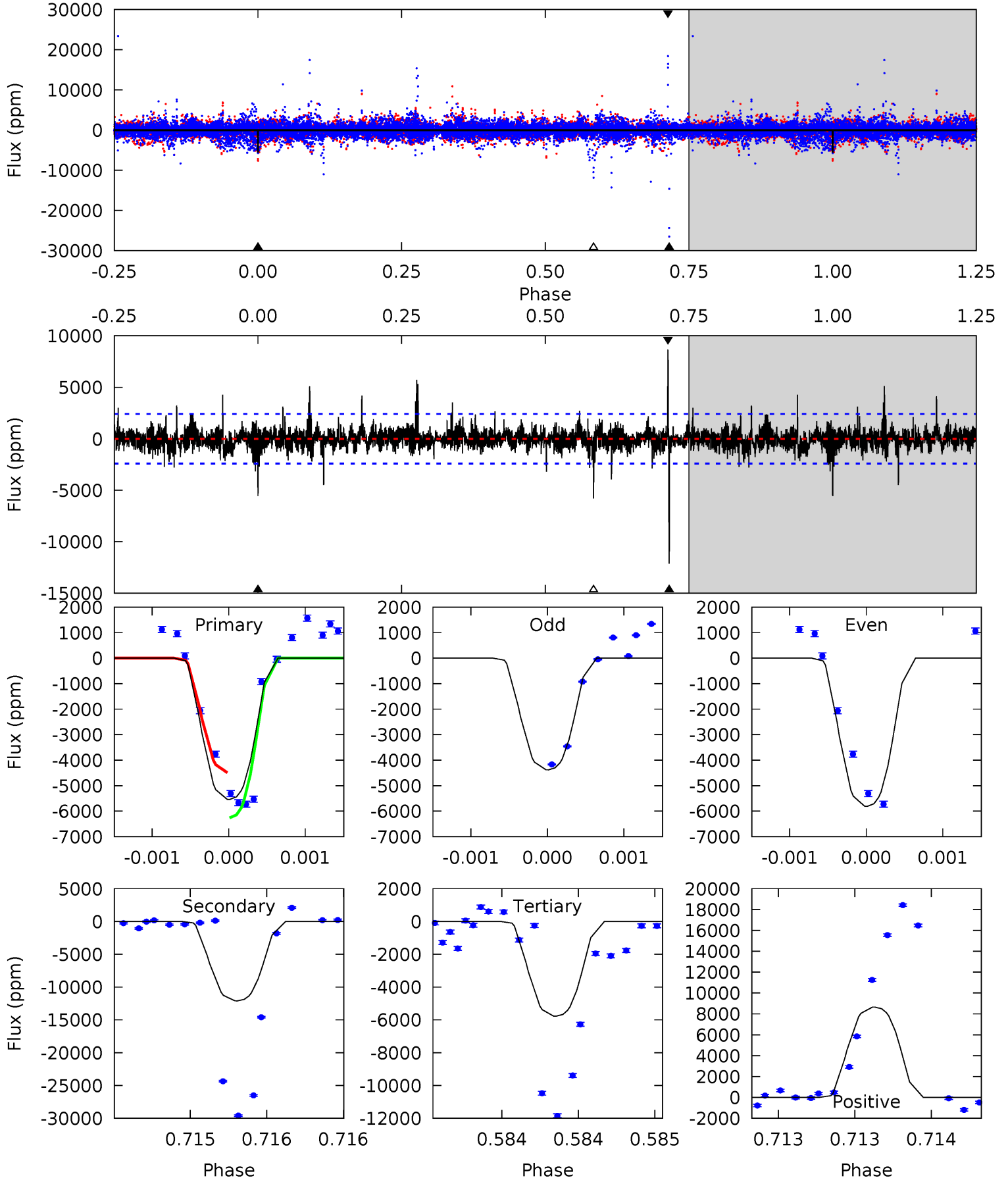
TCE 008682921-03 P=224.146010 Days $T_0=328.133670$ (BKJD)



DV Model-Shift Uniqueness Test

008682921-03, P = 224.145673 Days, E = 103.979370 Days

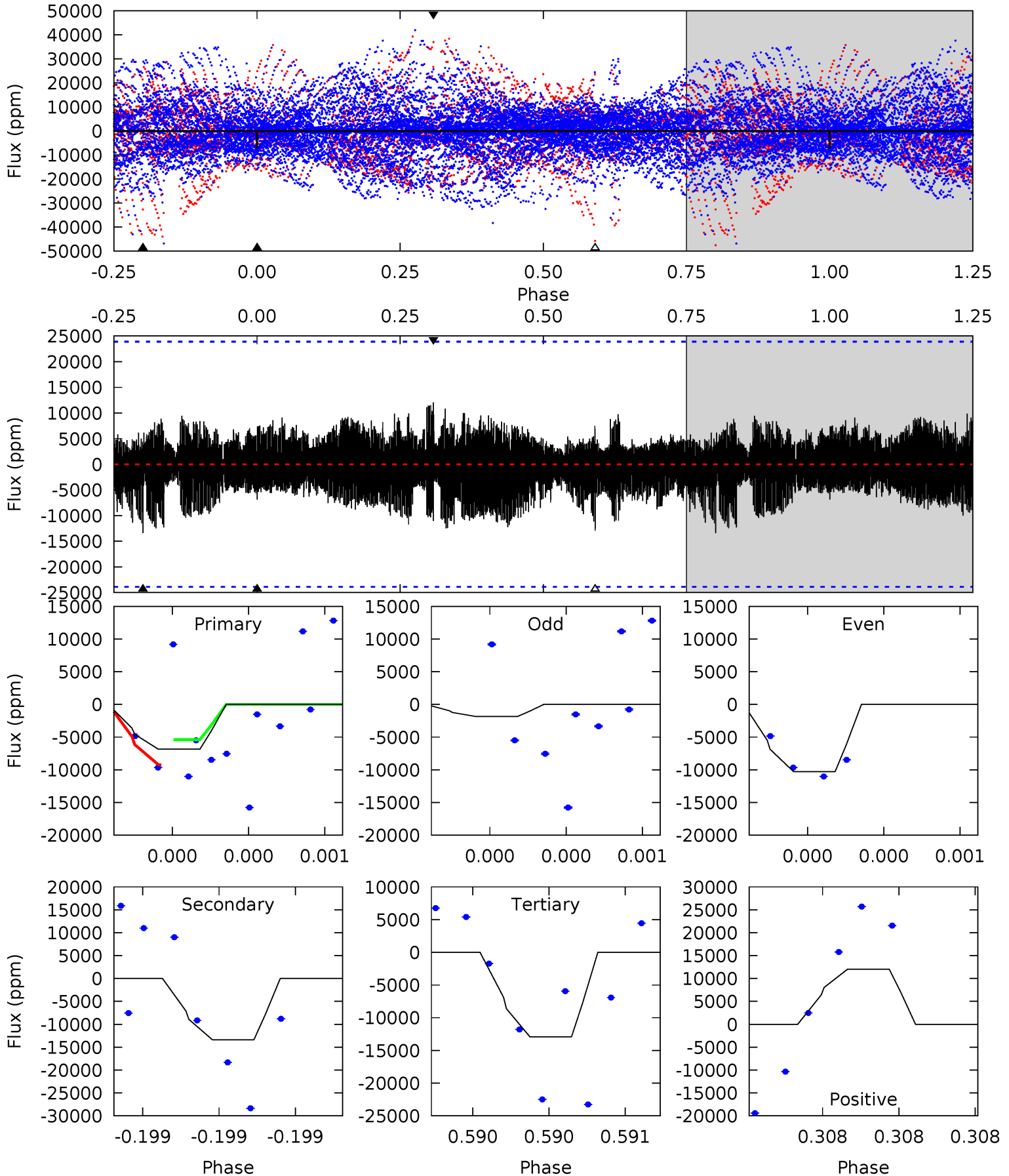
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.9	28.1	13.4	20.1	5.57	3.48	1.77	-0.55	-7.23	14.7	8.01	1.39	1.00	0.42	2.03



Alt Model-Shift Uniqueness Test

008682921-03, P = 224.146010 Days, E = 103.987660 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.63	3.19	3.08	2.87	5.68	3.65	0.89	-1.45	-1.23	0.11	0.32	0.91	0.77	0.47	0.44



Stellar Parameters For KIC 008682921

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5489^{+163}_{-180}	$3.522^{+0.918}_{-0.216}$	$-0.320^{+0.350}_{-0.300}$	$3.510^{+0.879}_{-2.461}$	$1.497^{+0.210}_{-0.629}$	$0.049^{+1.378}_{-0.021}$
	+3%/-3%	+26%/-6%	+109%/-94%	+25%/-70%	+14%/-42%	+2826%/-44%
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 008682921-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-12106 ± 431	$27.55^{+7.45}_{-11.45}$	683^{+73}_{-136}	6578^{+537}_{-433}	6042^{+9022}_{-2270}
Alt.	-13379 ± 4200	$34.92^{+8.52}_{-14.16}$	686^{+73}_{-140}	6019^{+611}_{-602}	4296^{+5767}_{-1948}

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

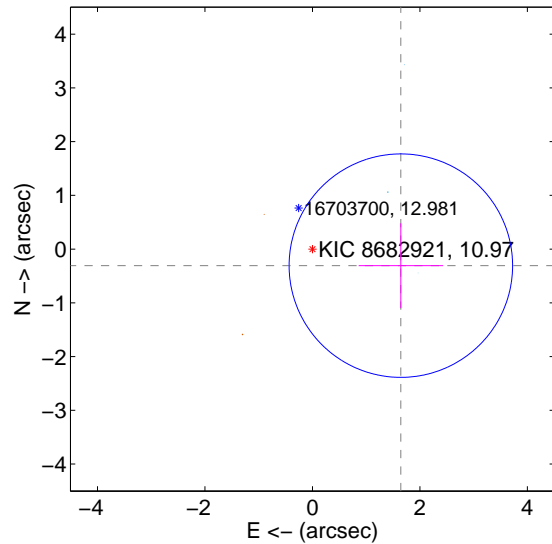
Supplemental centroid analysis for 008682921-03. **Kepler magnitude: 10.97.** Transit SNR 9.25

There are 3 quarters with good PRF difference image offsets

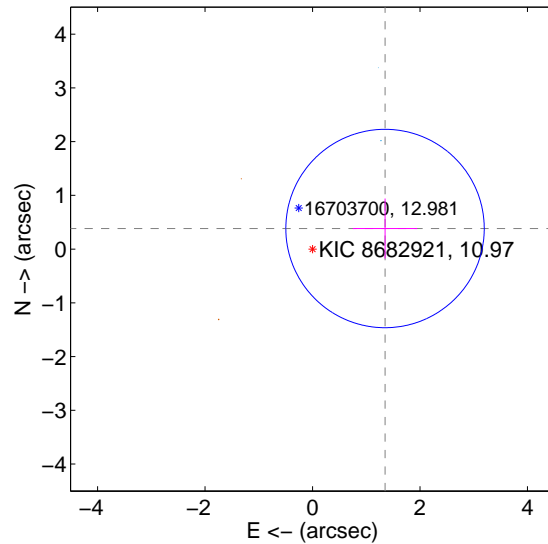
The direct PRF centroid is offset from the target star catalog position by about 0.53 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.674 ± 0.693	2.42	-1.645 ± 0.785	-0.308 ± 0.789
PRF-fit source offset from KIC position	1.403 ± 0.615	2.28	-1.349 ± 0.599	0.383 ± 0.558
photometric centroid source offset	0.56 ± 0.14	4.02	-0.01 ± 0.17	0.56 ± 0.14

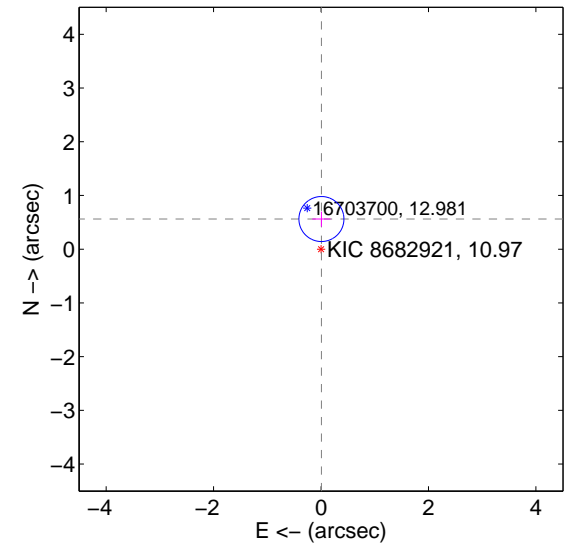
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

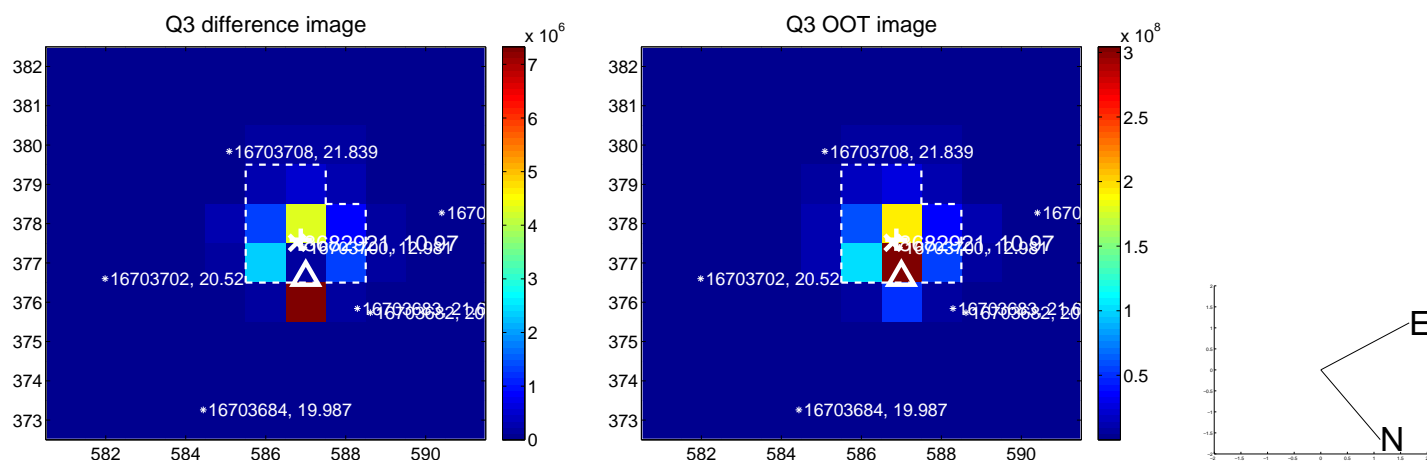


offset from photometric centroids



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

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

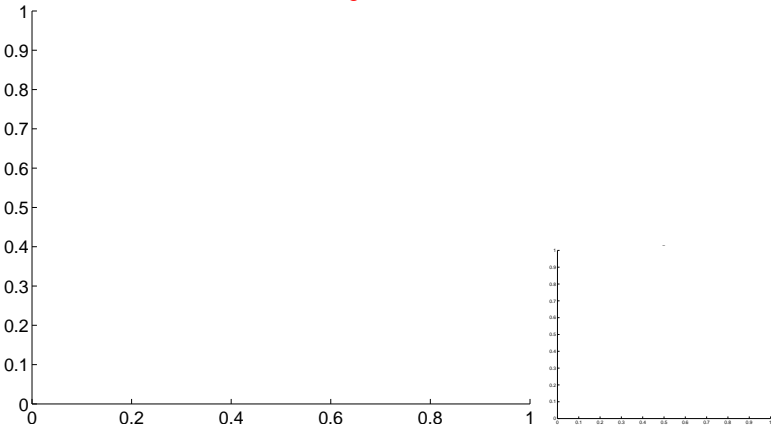


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

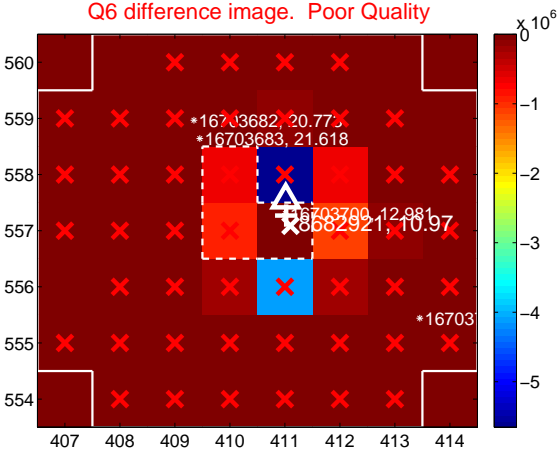
Q5 no difference image



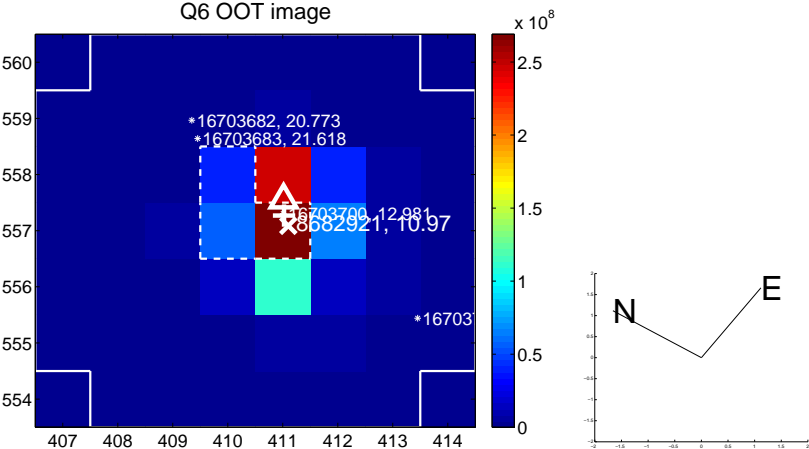
Q5 no OOT image



Q6 difference image. Poor Quality



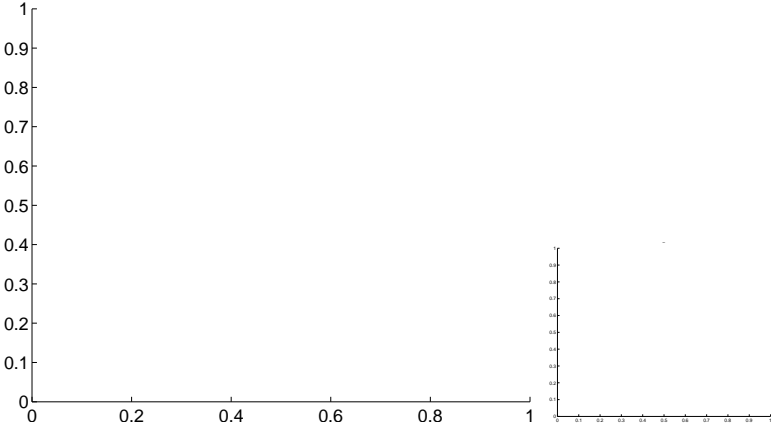
Q6 OOT image



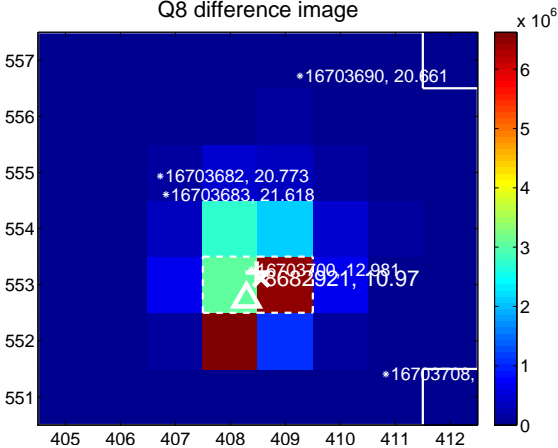
Q7 no difference image



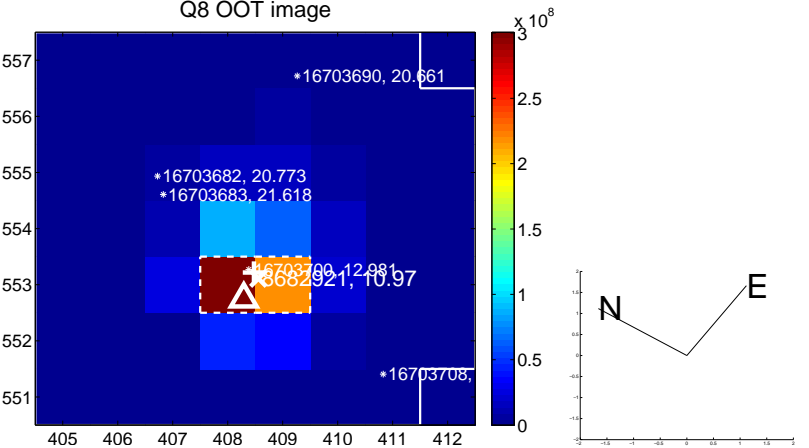
Q7 no OOT image



Q8 difference image



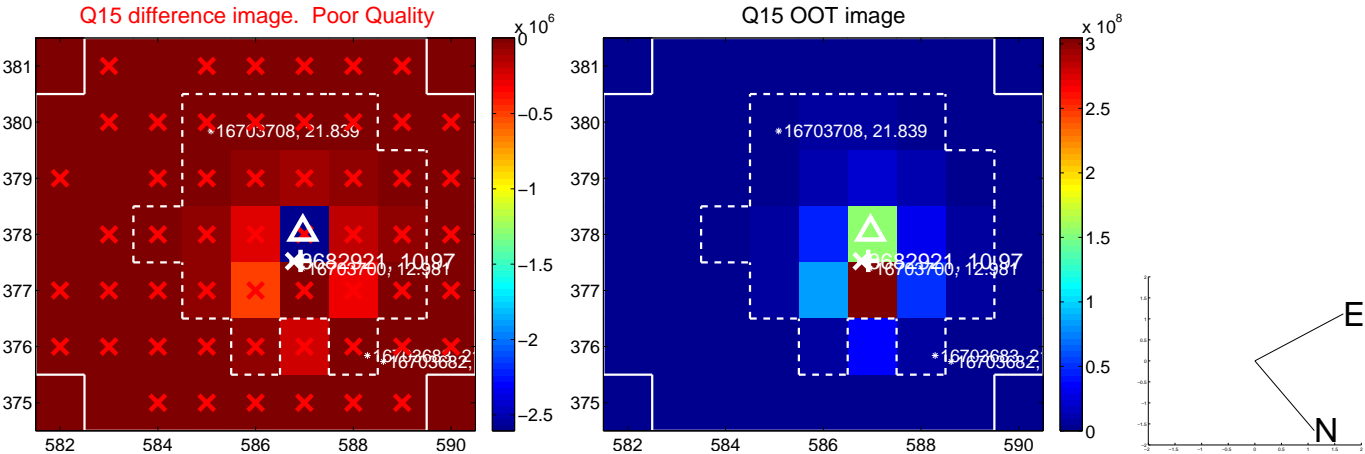
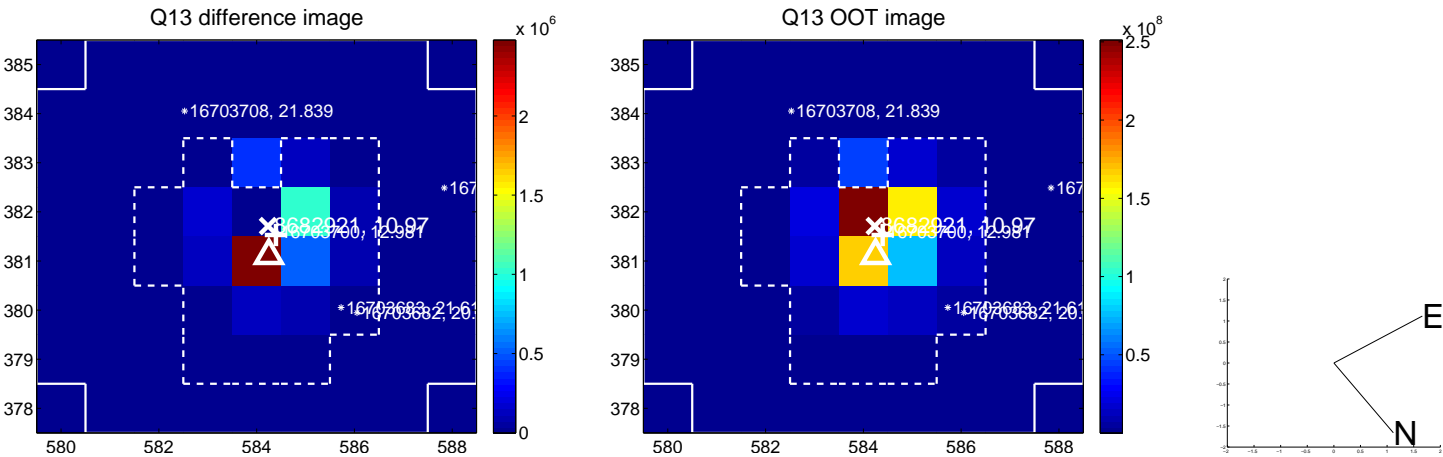
Q8 OOT image



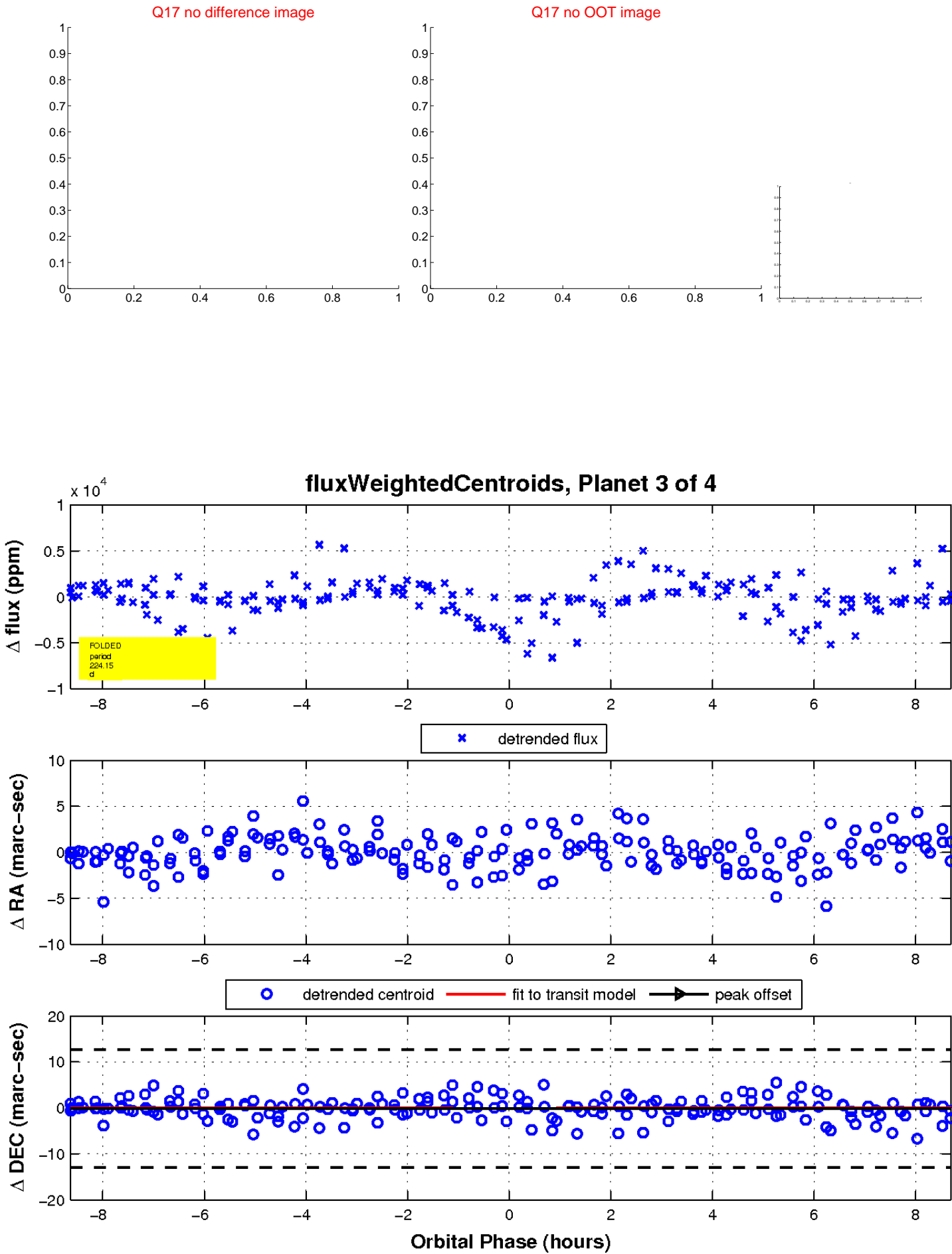
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

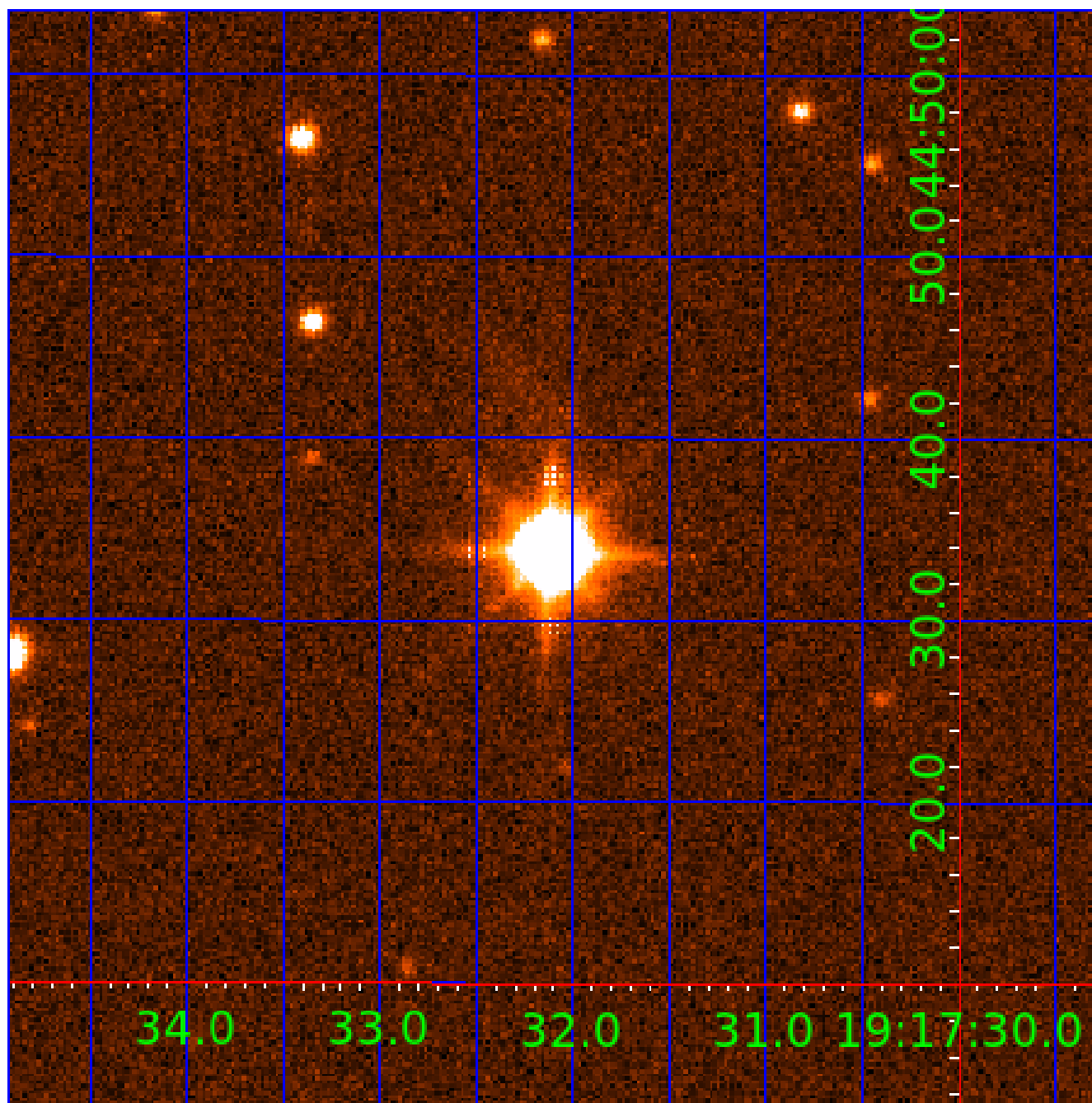


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008682921

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})
008682921-01	OBS	No	375.972220	314.786366	4196.5	3.340	13.7	9.3	3.51	5489	22.80	7.37
008682921-02	OBS	No	0.508538	131.561083	50.7	2.847	10.3	4.6	3.51	5489	3.29	0.00
008682921-03	OBS	No	224.145673	328.125043	4728.5	2.917	10.8	9.3	3.51	5489	29.25	14.69
008682921-04	OBS	No	53.112465	163.980750	494.7	3.563	10.3	2.6	3.51	5489	8.07	100.19

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008682921-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
008682921-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
008682921-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008682921-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

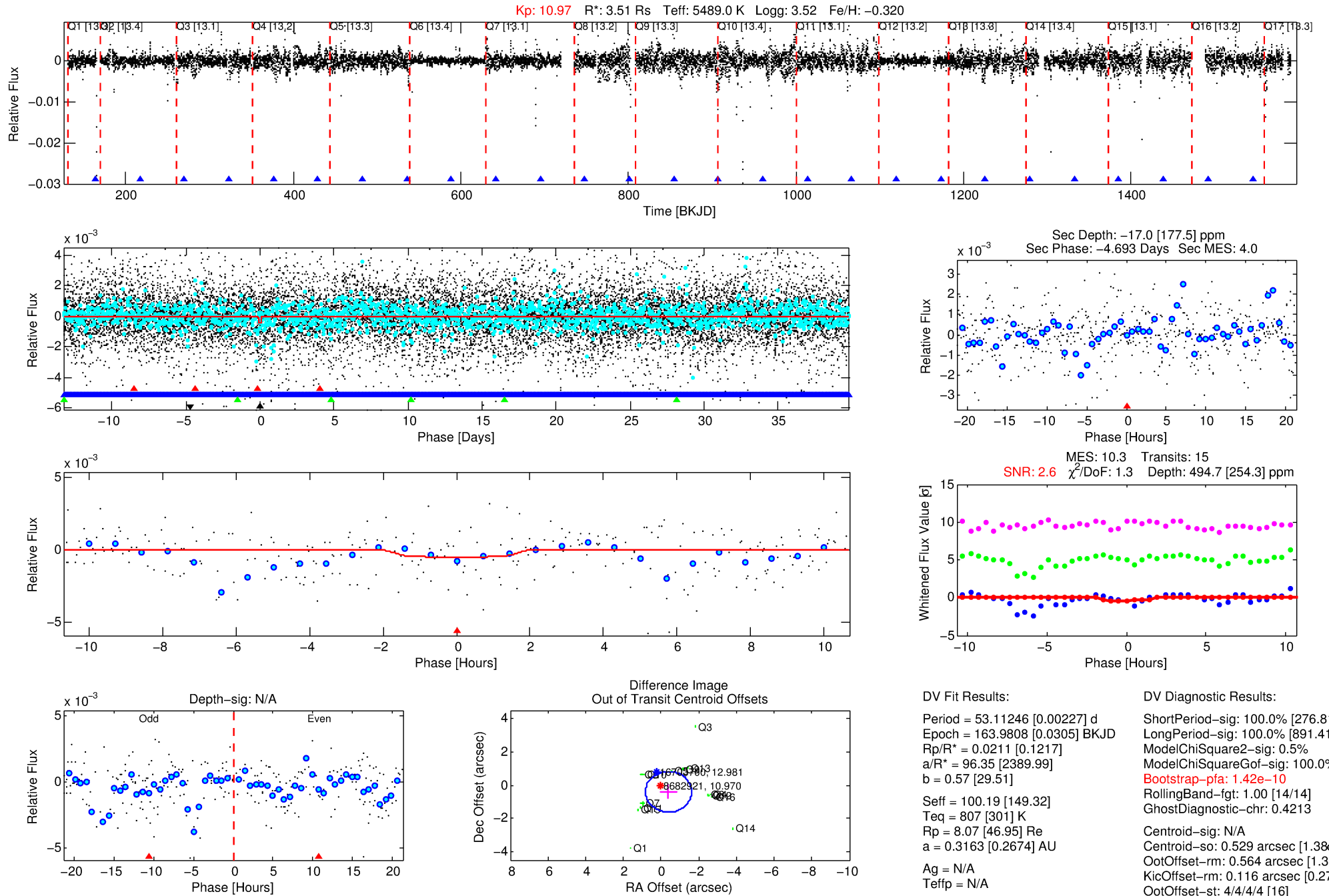
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008682921-04

No Significant Match Found

DV One-Page Summary

KIC: 8682921 Candidate: 4 of 4 Period: 53.112 d



DV Fit Results:

Period = 53.11246 [0.00227] d
Epoch = 163.9808 [0.0305] BKJD
Rp/R* = 0.0211 [0.1217]
a/R* = 96.35 [2389.99]
b = 0.57 [29.51]
Seff = 100.19 [149.32]
Teff = 807 [301] K
Rp = 8.07 [46.95] Re
a = 0.3163 [0.2674] AU
Ag = N/A
Teffp = N/A

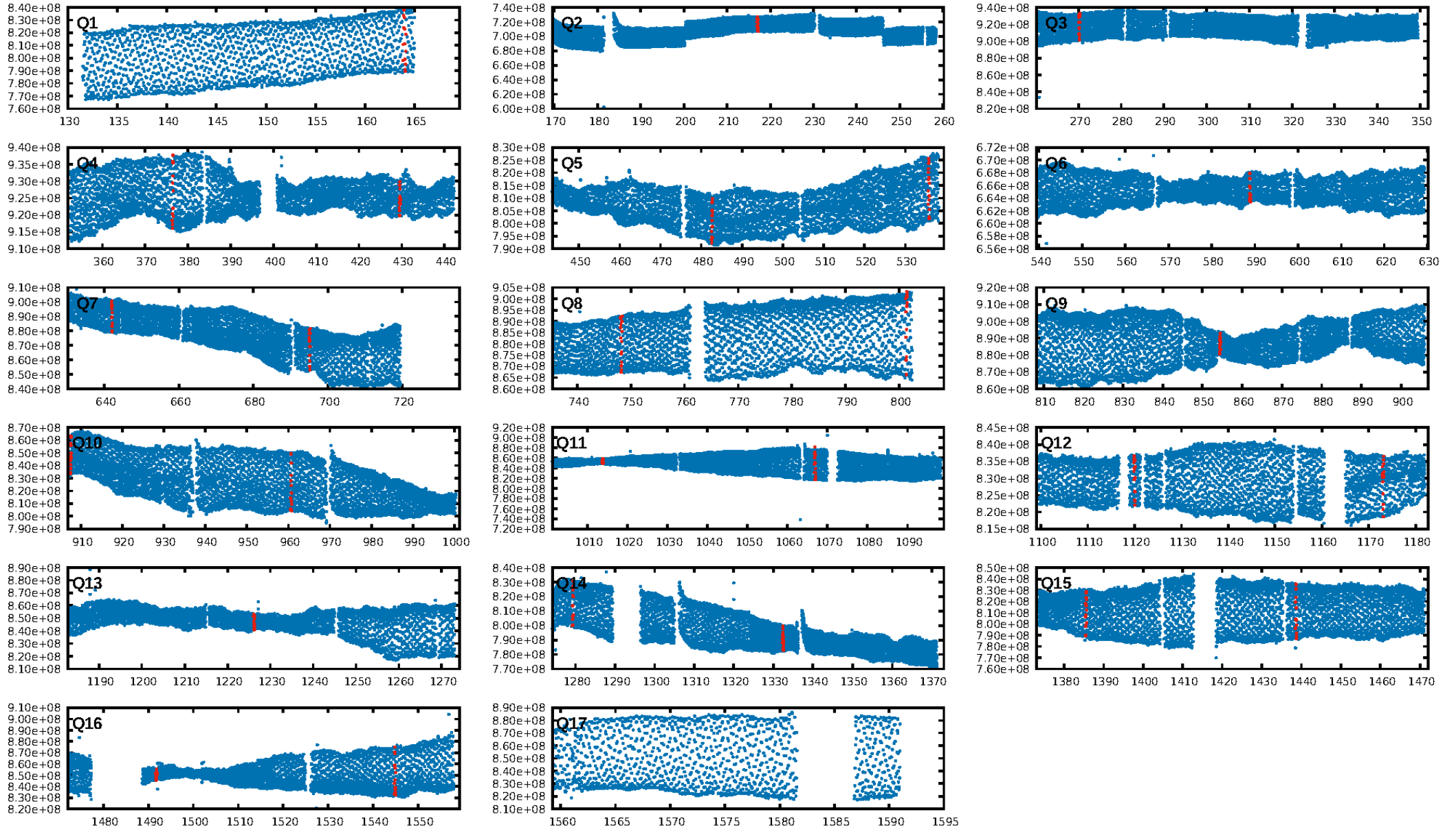
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [276.81σ]
LongPeriod-sig: 100.0% [891.41σ]
ModelChiSquare2-sig: 0.5%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.42e-10
RollingBand-fgt: 1.00 [14/14]
GhostDiagnostic-chr: 0.4213
Centroid-sig: N/A
Centroid-so: 0.529 arcsec [1.38σ]
OotOffset-rm: 0.564 arcsec [1.38σ]
KicOffset-rm: 0.116 arcsec [0.27σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.38 [6/16]
DiffImageOverlap-fno: 0.00 [0/16]

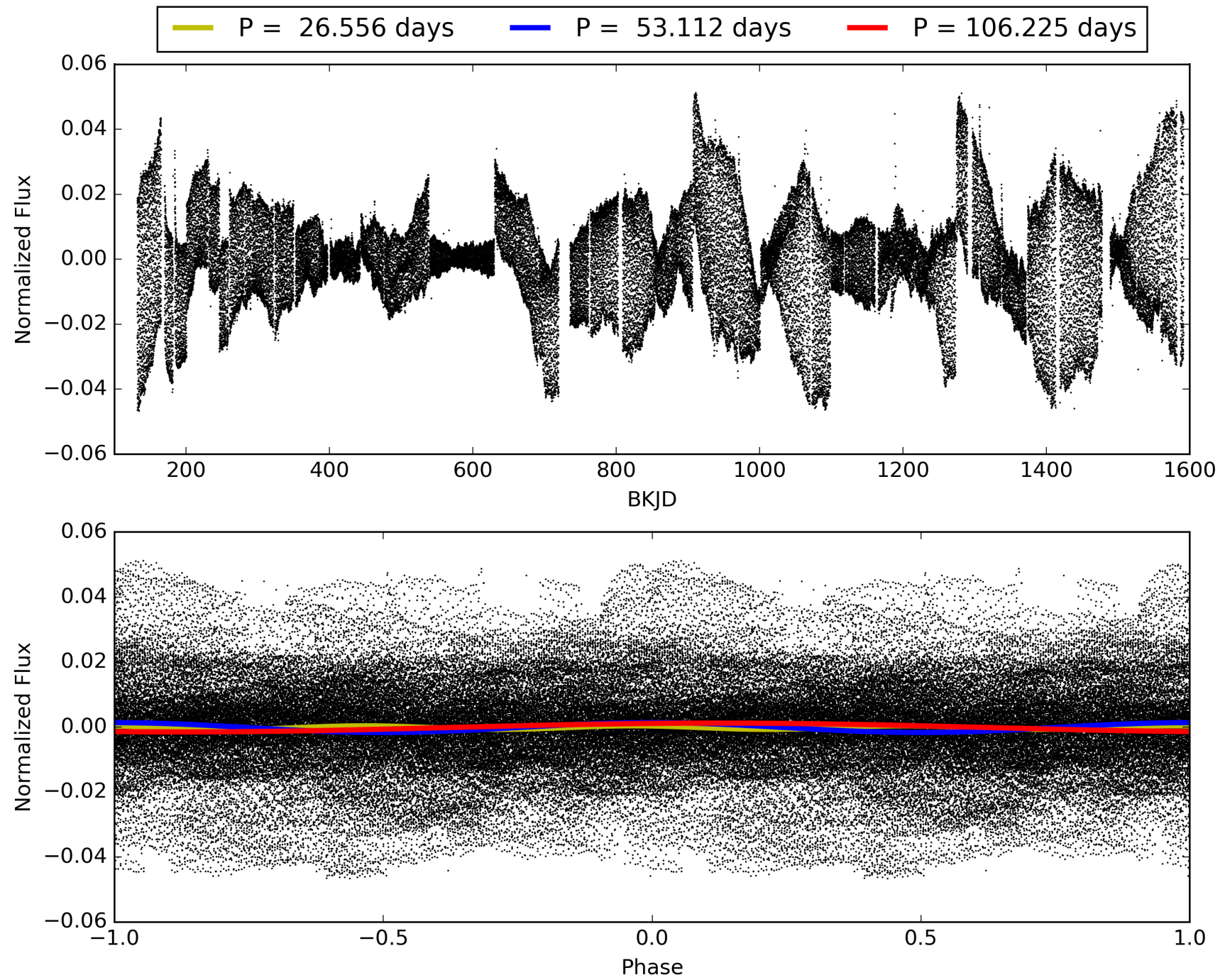
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 00:08:14 Z

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

TCE 008682921-04, PDC Light Curves

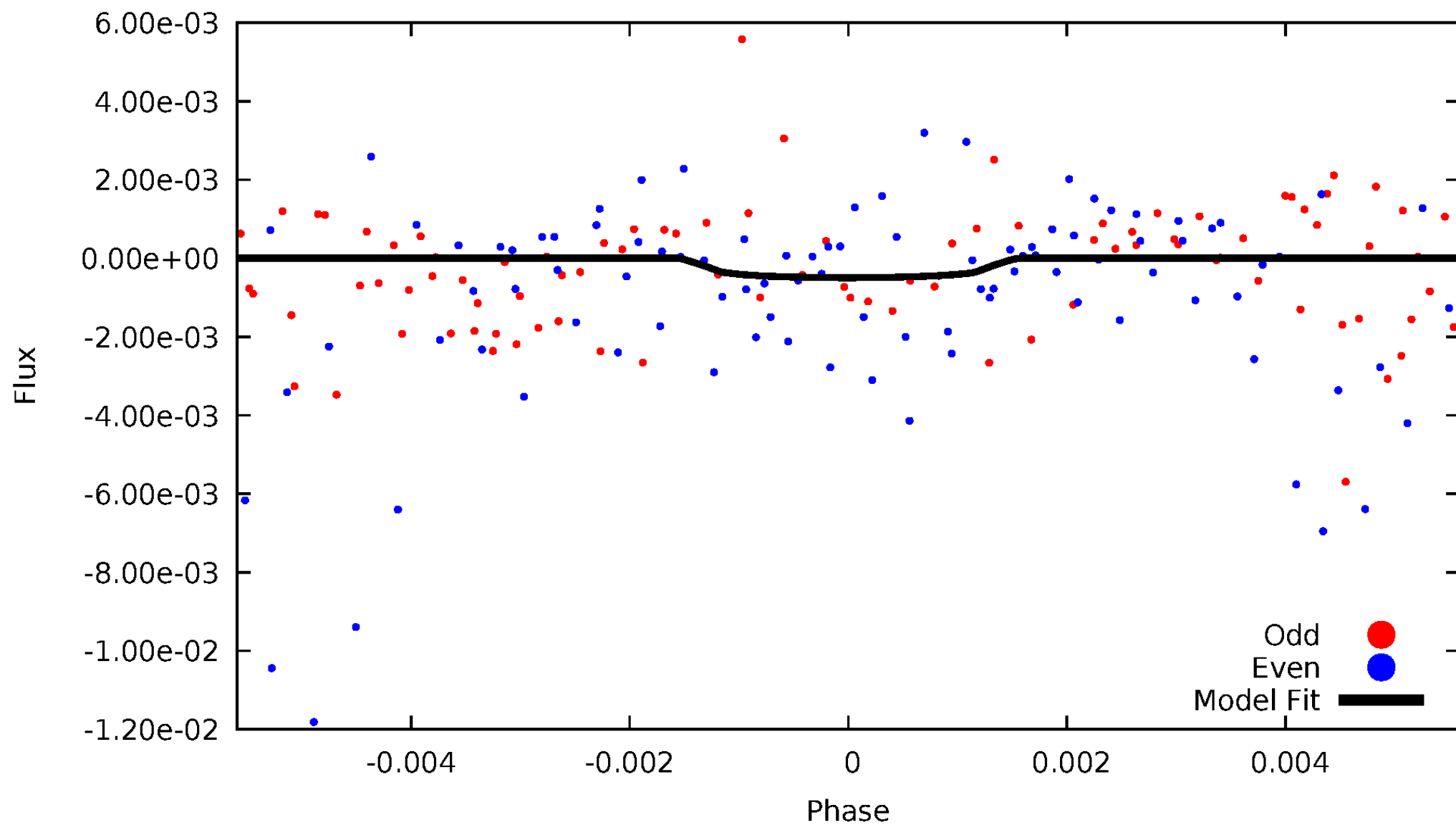


TCE 008682921-04



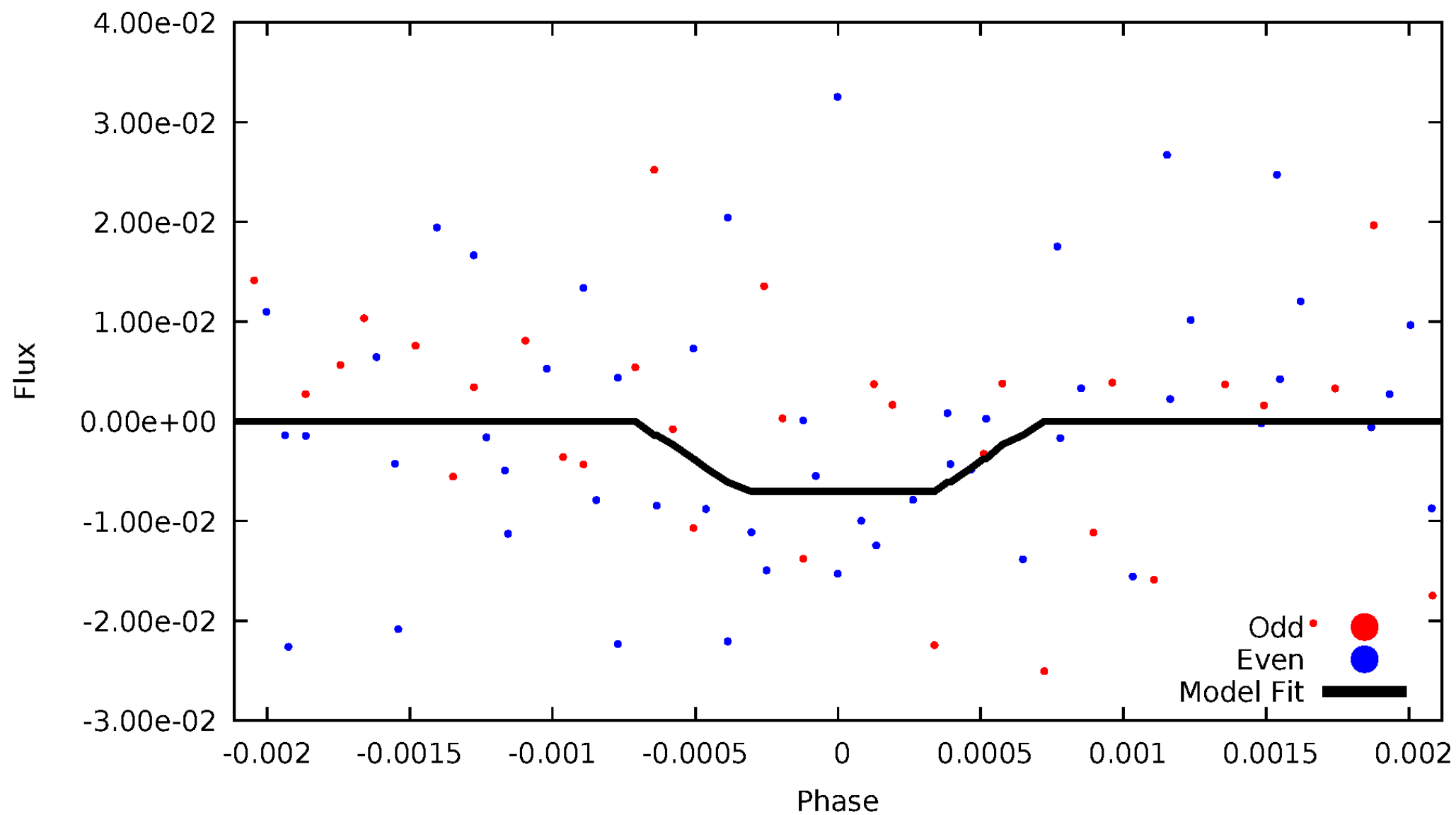
DV Odd/Even

TCE 008682921-04



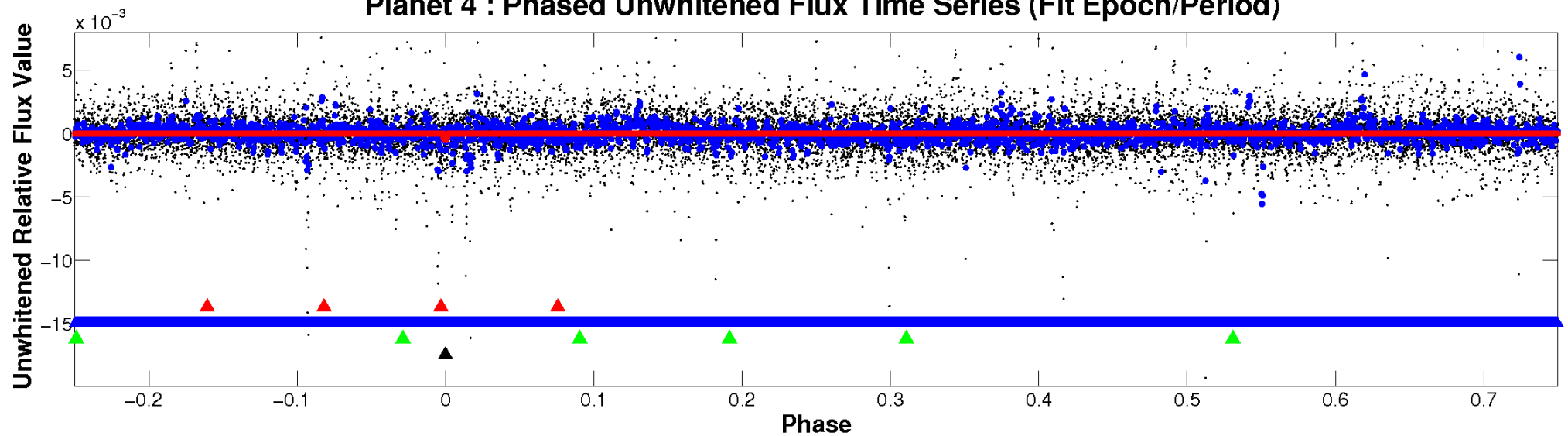
ALT Odd/Even

TCE 008682921-04

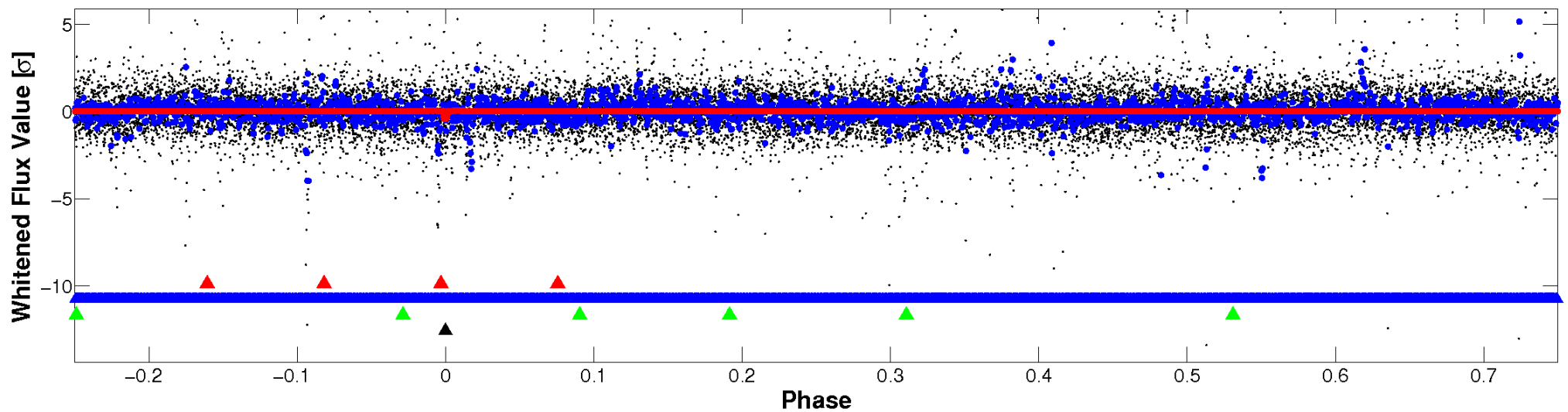


Non-Whitened Vs. Whitened Light Curve

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

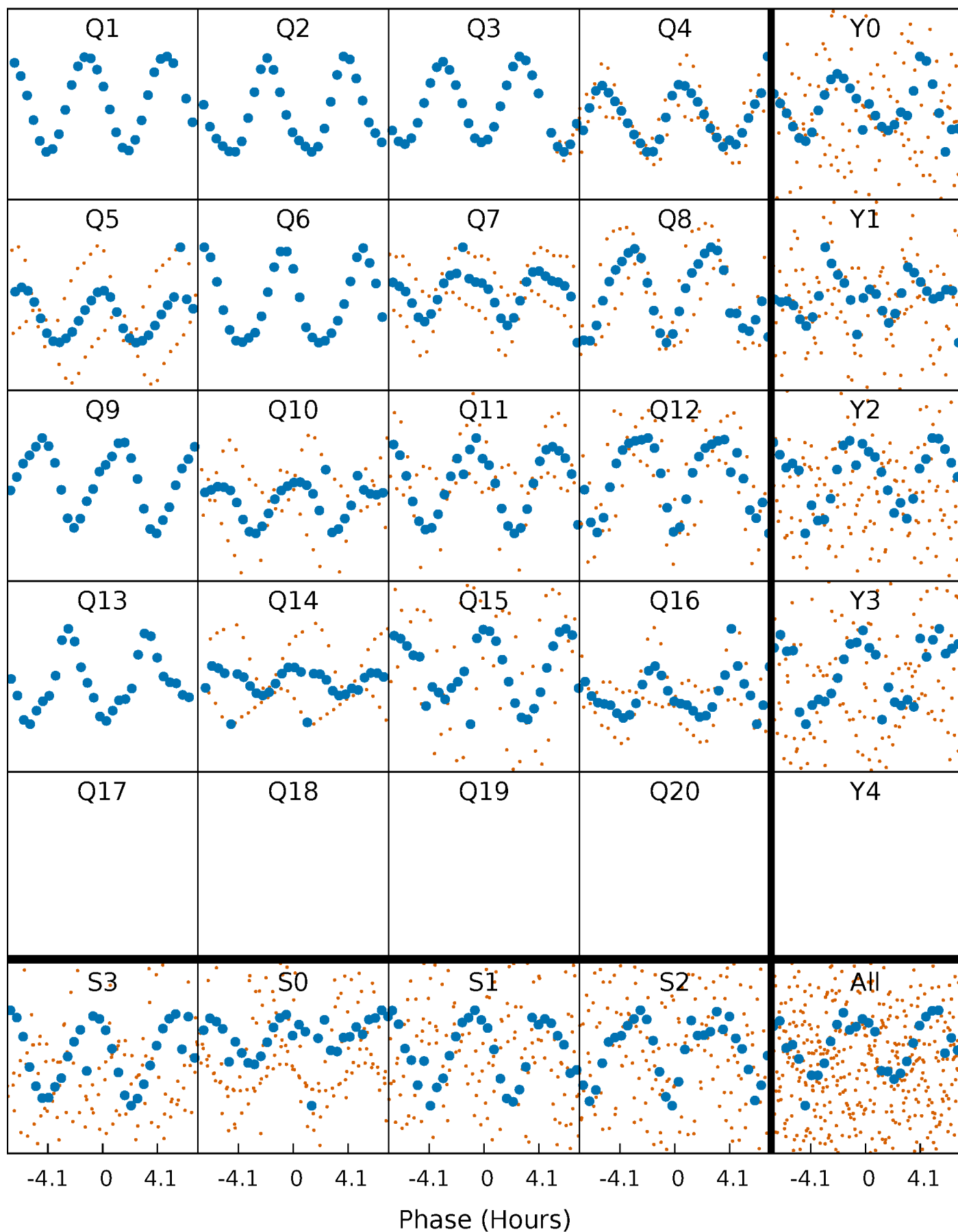


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



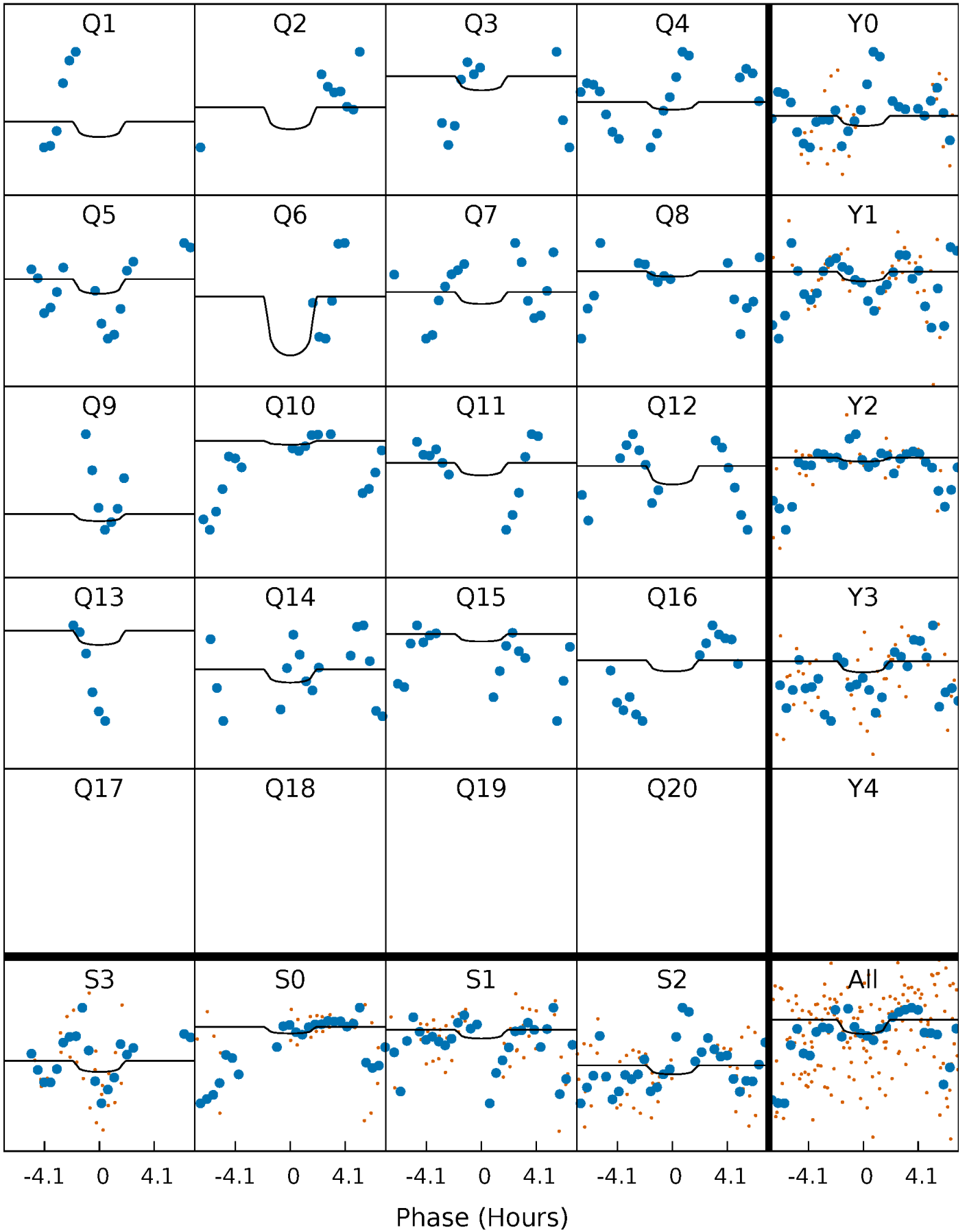
PDC Quarter-Phased Transit Curves

TCE 008682921-04 P= 53.112465 Days $T_0=163.980750$ (BKJD)



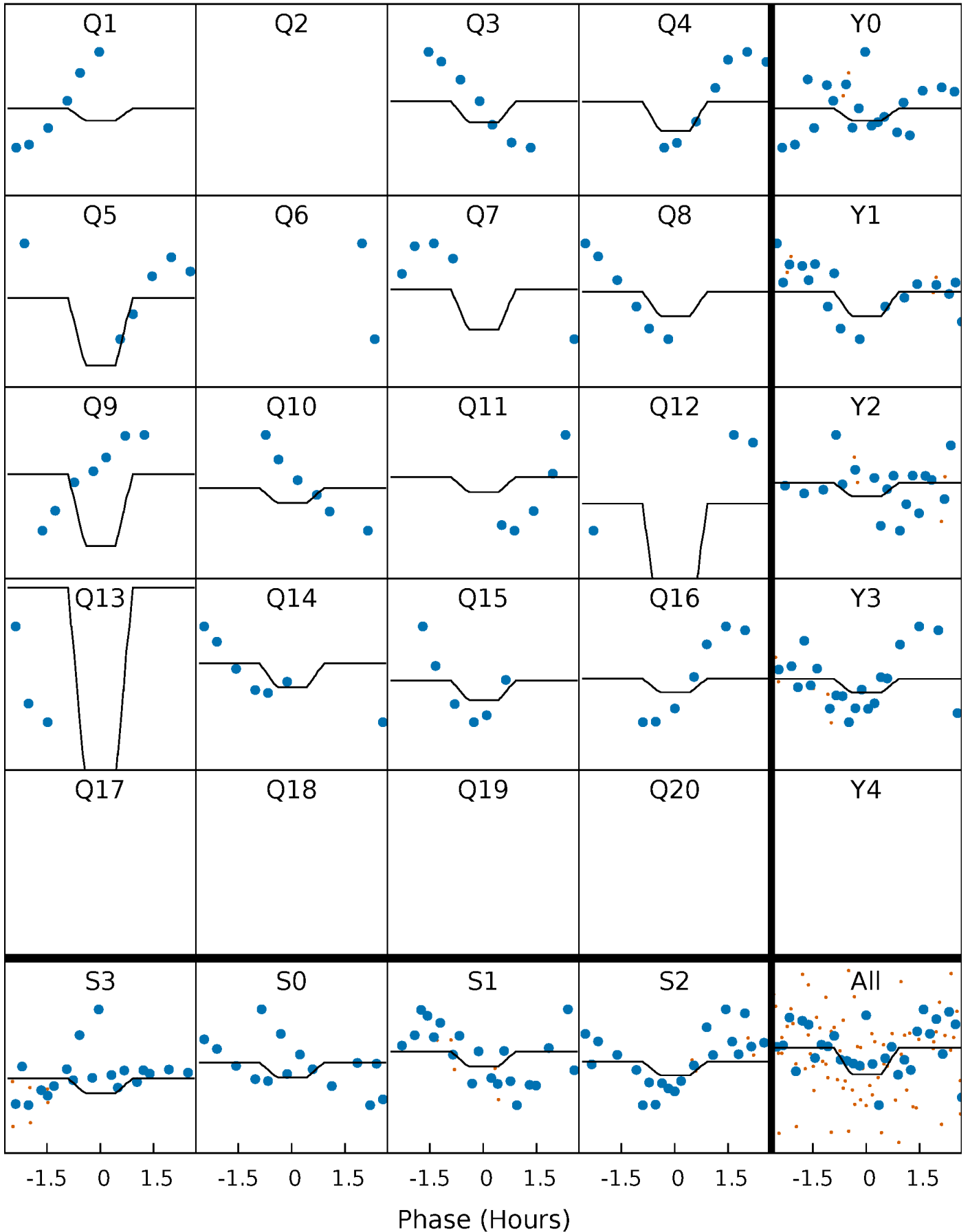
DV Quarter-Phased Transit Curves

TCE 008682921-04 P= 53.112465 Days $T_0=163.980750$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

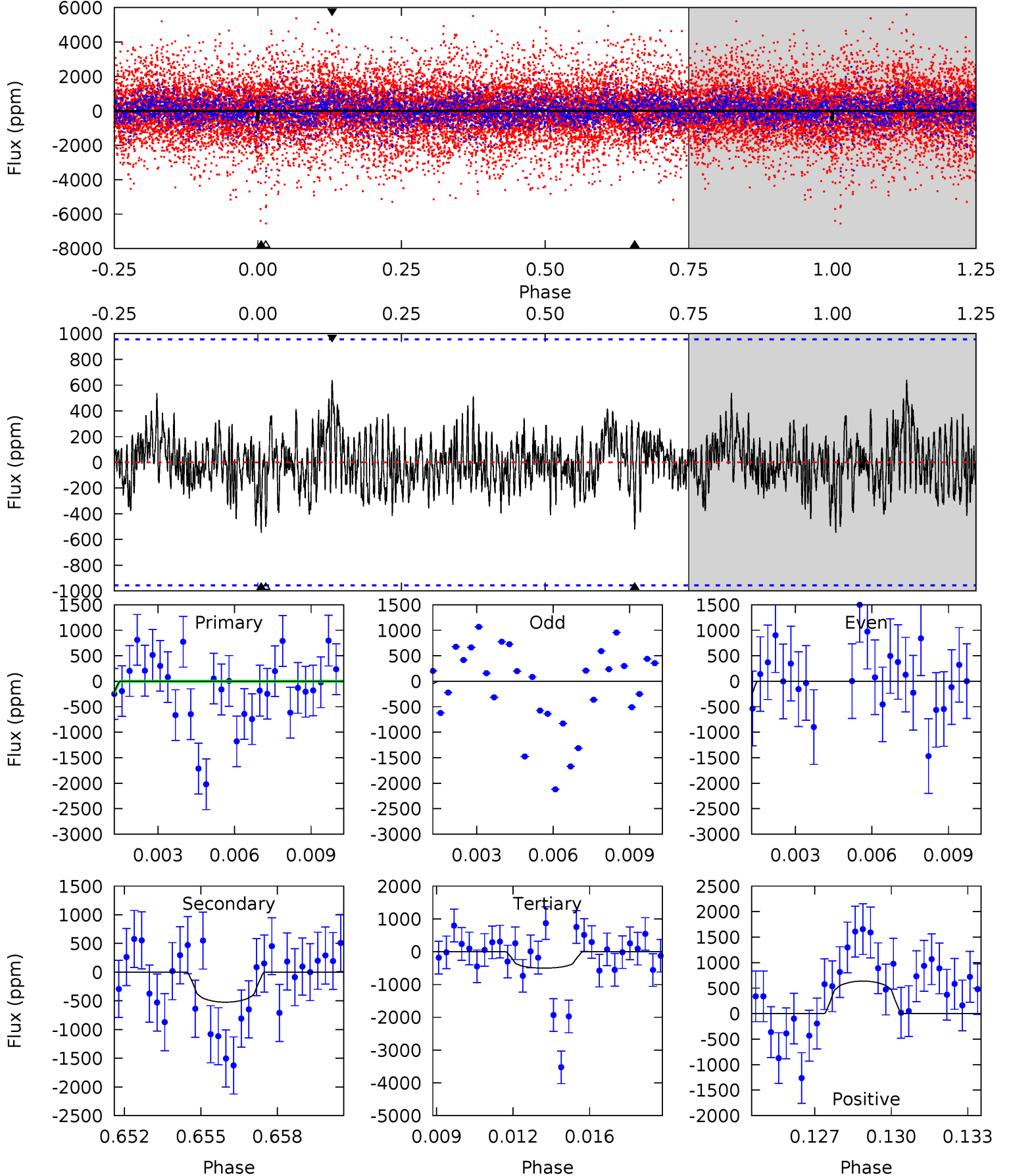
TCE 008682921-04 P= 53.120141 Days $T_0=163.900836$ (BKJD)



DV Model-Shift Uniqueness Test

008682921-04, P = 53.112465 Days, E = 110.868285 Days

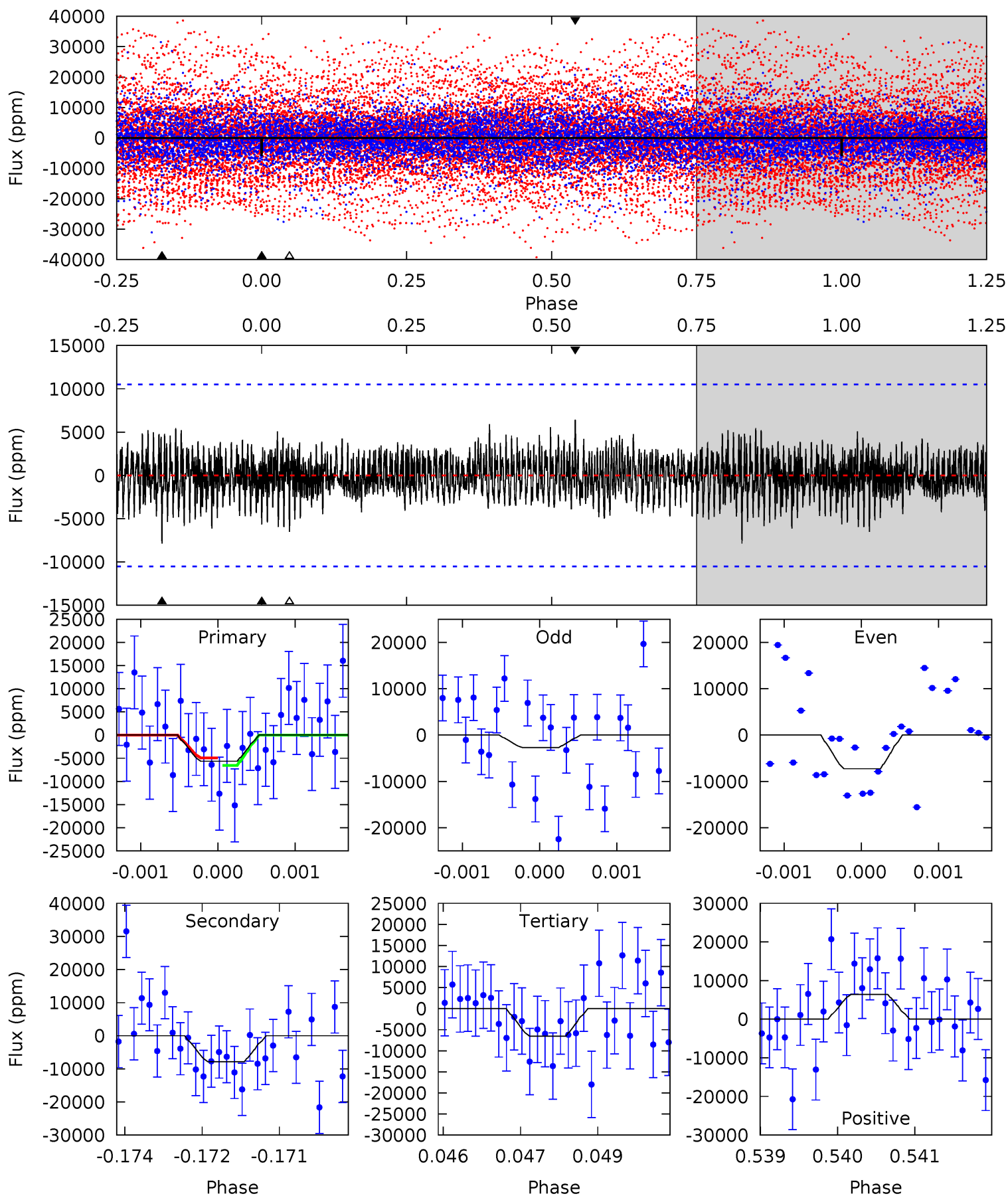
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.01	2.87	2.75	3.50	5.25	2.96	0.93	0.26	-0.49	0.12	-0.63	1.58	1.27	0.54	0.40



Alt Model-Shift Uniqueness Test

008682921-04, P = 53.120141 Days, E = 110.780695 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.90	4.03	3.34	3.31	5.40	3.20	1.03	-0.44	-0.40	0.69	0.72	1.12	0.32	0.45	0.42



Stellar Parameters For KIC 008682921

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5489^{+163}_{-180}	$3.522^{+0.918}_{-0.216}$	$-0.320^{+0.350}_{-0.300}$	$3.510^{+0.879}_{-2.461}$	$1.497^{+0.210}_{-0.629}$	$0.049^{+1.378}_{-0.021}$
	+3%/-3%	+26%/-6%	+109%/-94%	+25%/-70%	+14%/-42%	+2826%/-44%
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 008682921-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-523 ± 182	$28.82^{+36.67}_{-20.67}$	1101^{+114}_{-215}	3261^{+1769}_{-613}	32^{+339}_{-26}
Alt.	-7849 ± 1948	$43.08^{+42.32}_{-29.72}$	1117^{+104}_{-181}	4735^{+3314}_{-1007}	238^{+2069}_{-182}

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

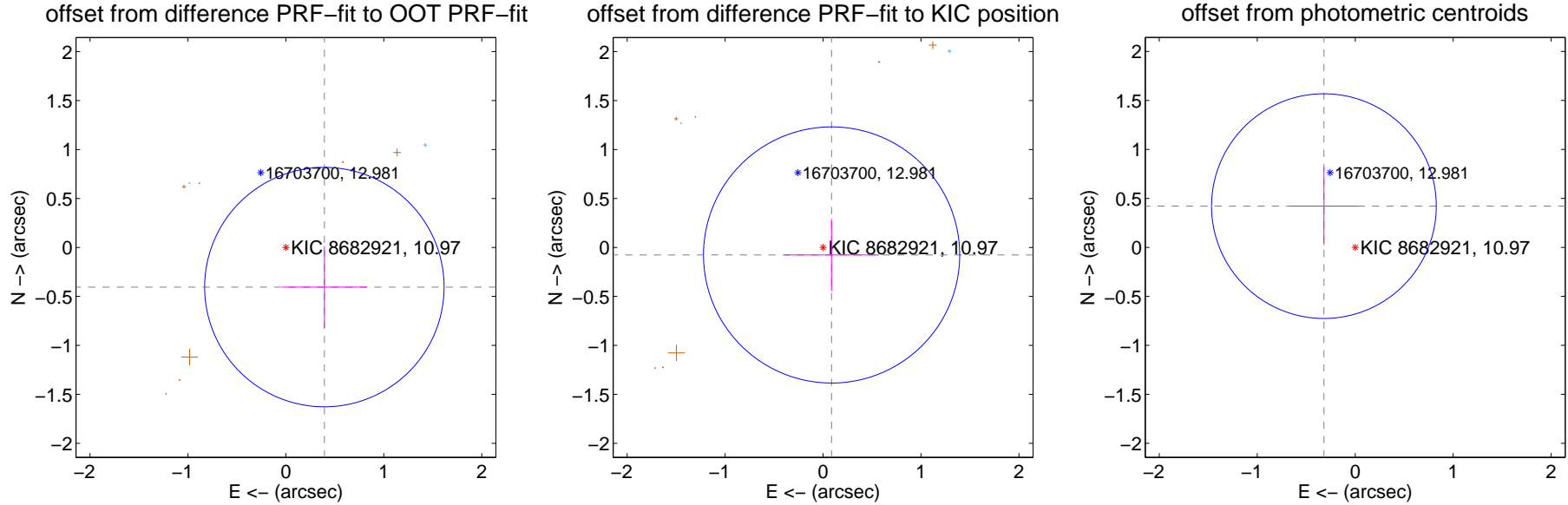
DV Centroid Data

Supplemental centroid analysis for 008682921-04. **Kepler magnitude: 10.97**. Transit SNR 2.63

There are 6 quarters with good PRF difference image offsets

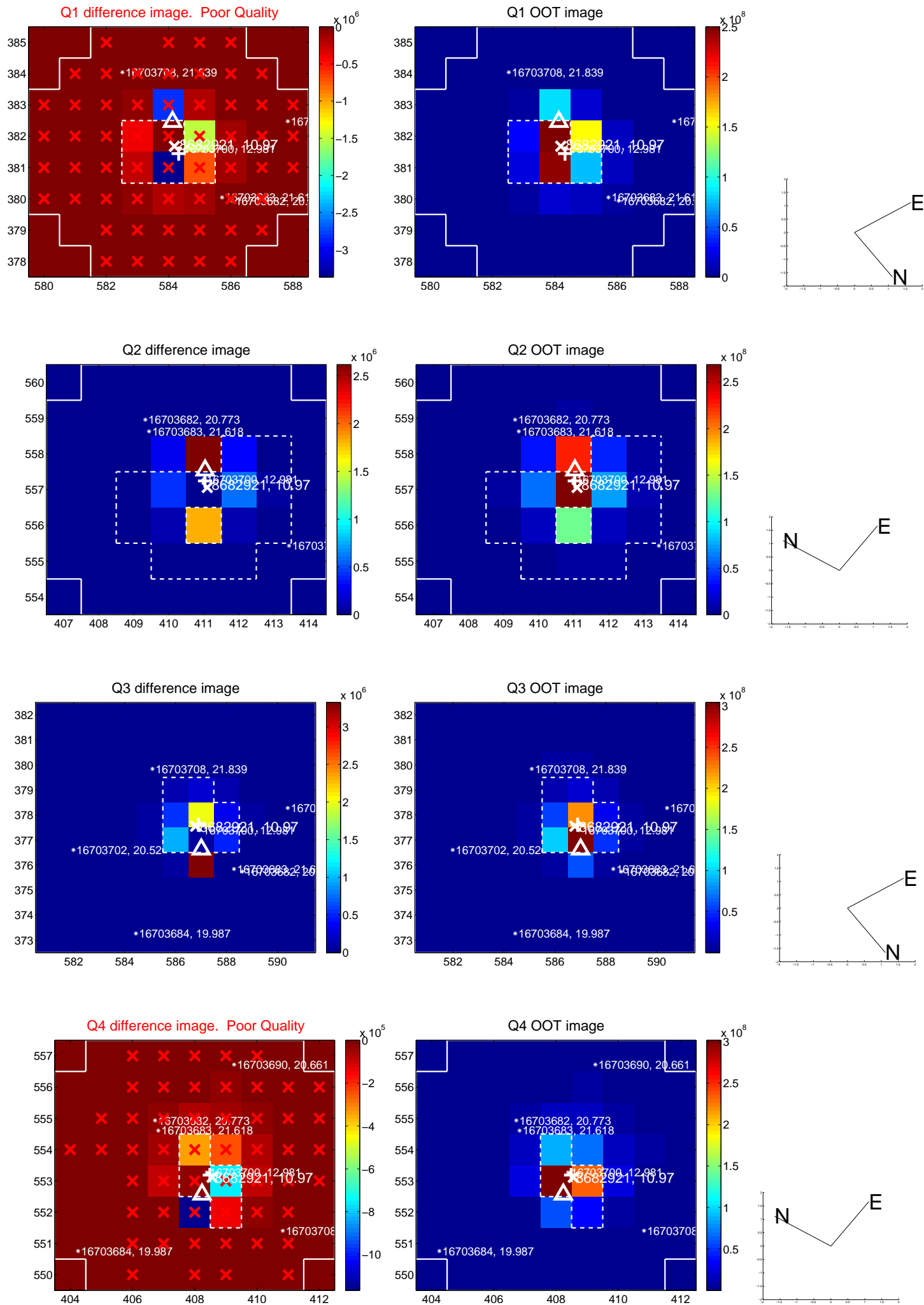
The direct PRF centroid is offset from the target star catalog position by about 0.55 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.564 ± 0.407	1.38	-0.393 ± 0.436	-0.405 ± 0.418
PRF-fit source offset from KIC position	0.116 ± 0.436	0.27	-0.087 ± 0.483	-0.077 ± 0.366
photometric centroid source offset	0.53 ± 0.38	1.38	0.32 ± 0.35	0.42 ± 0.40

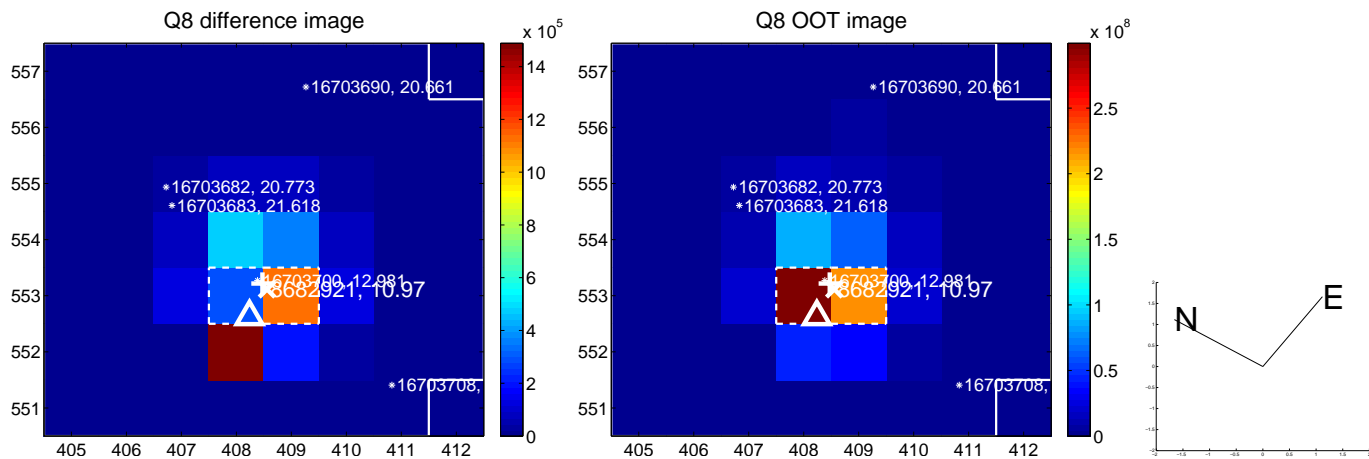
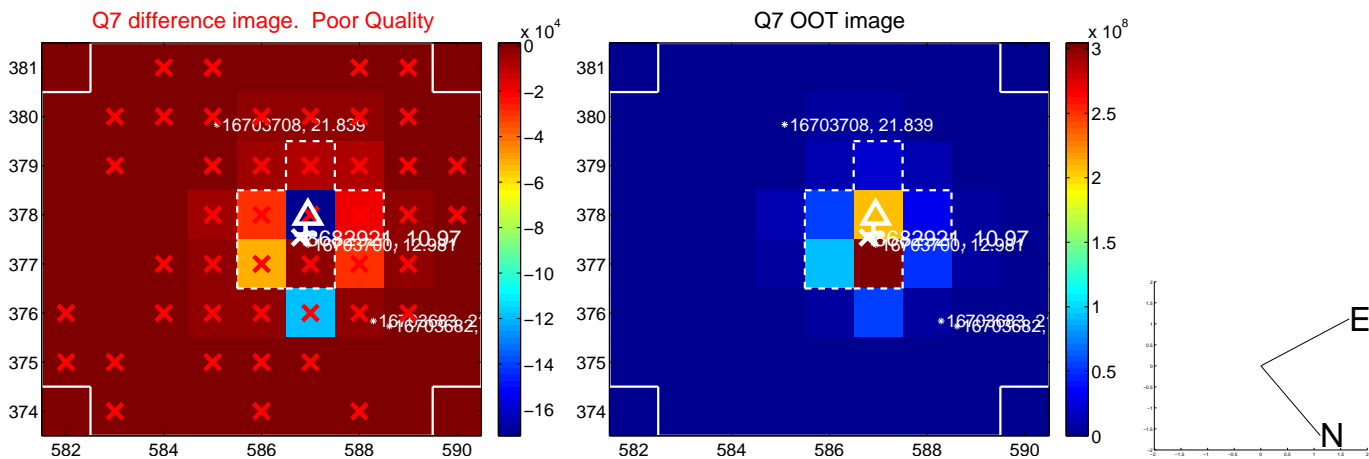
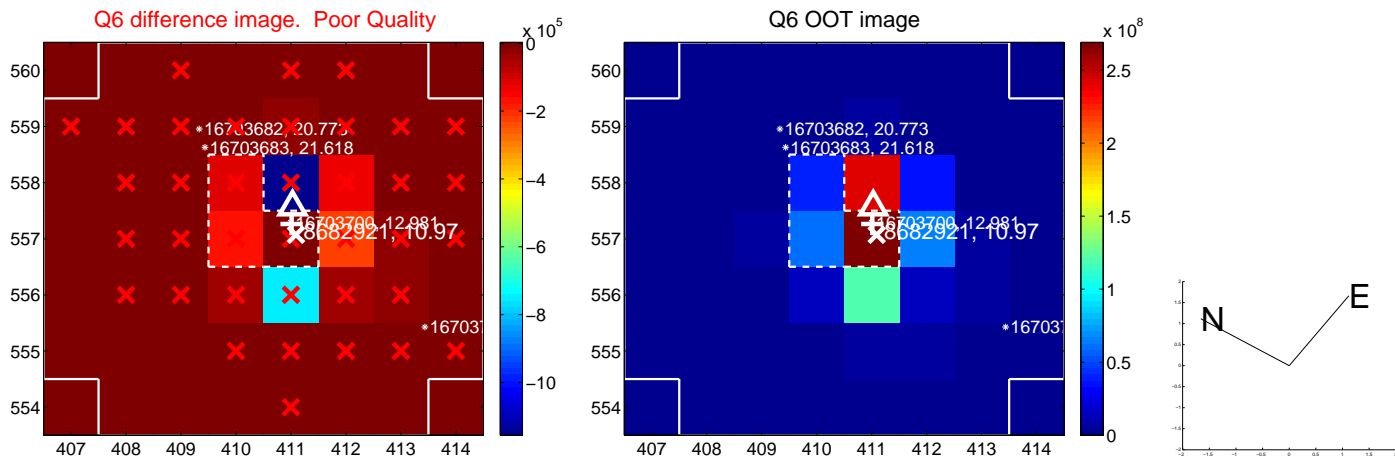
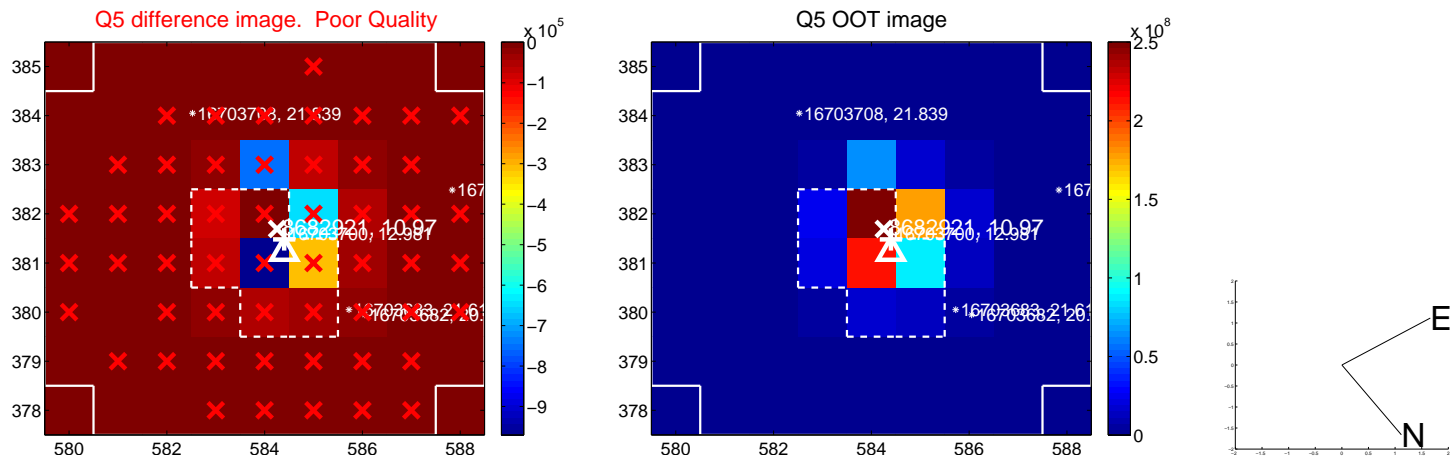


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

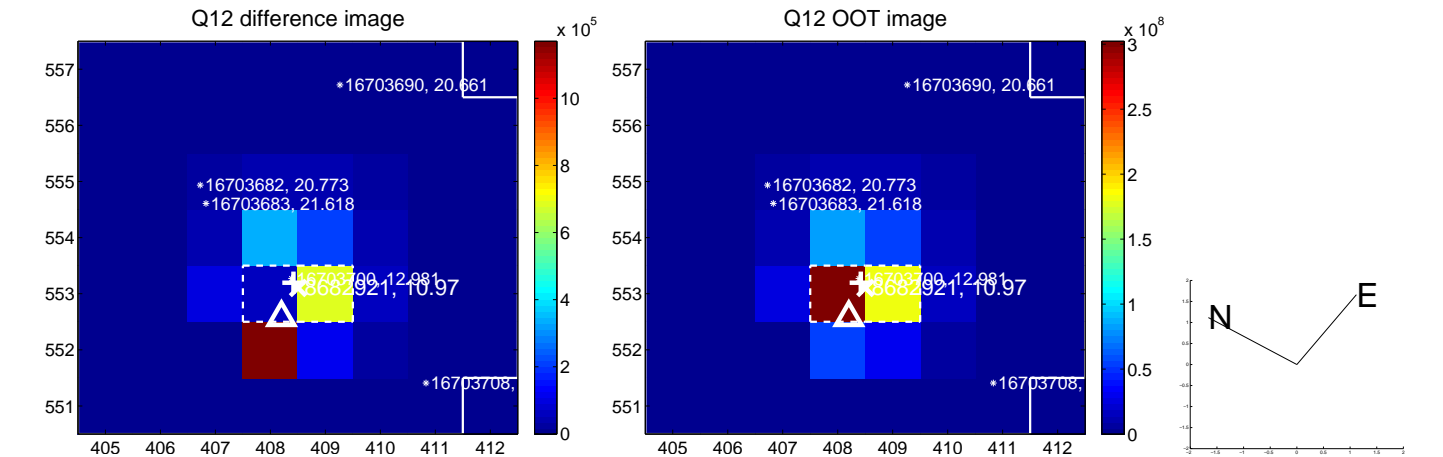
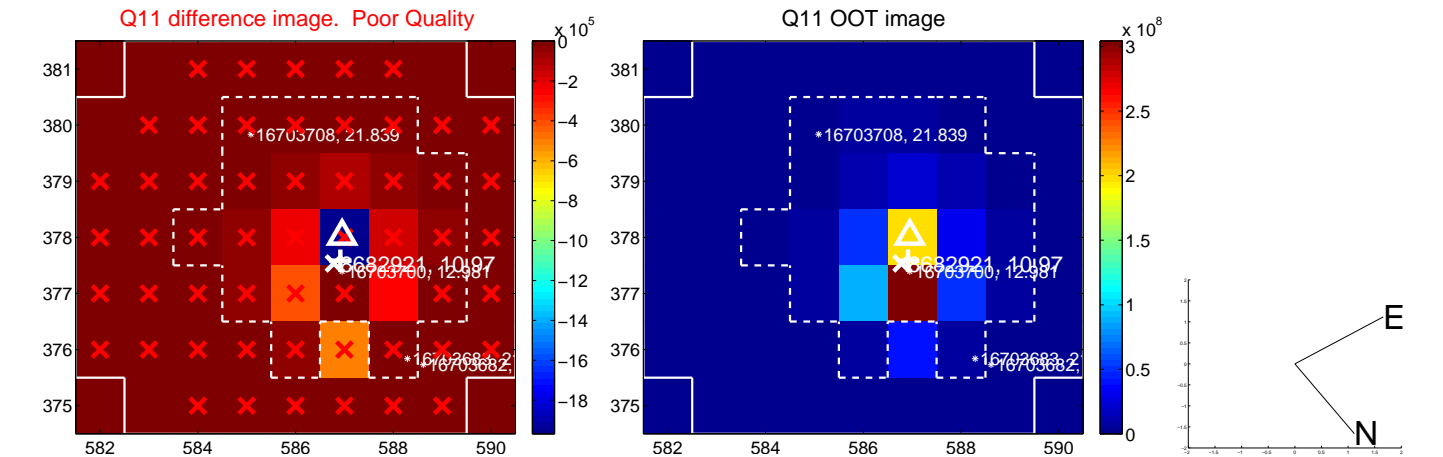
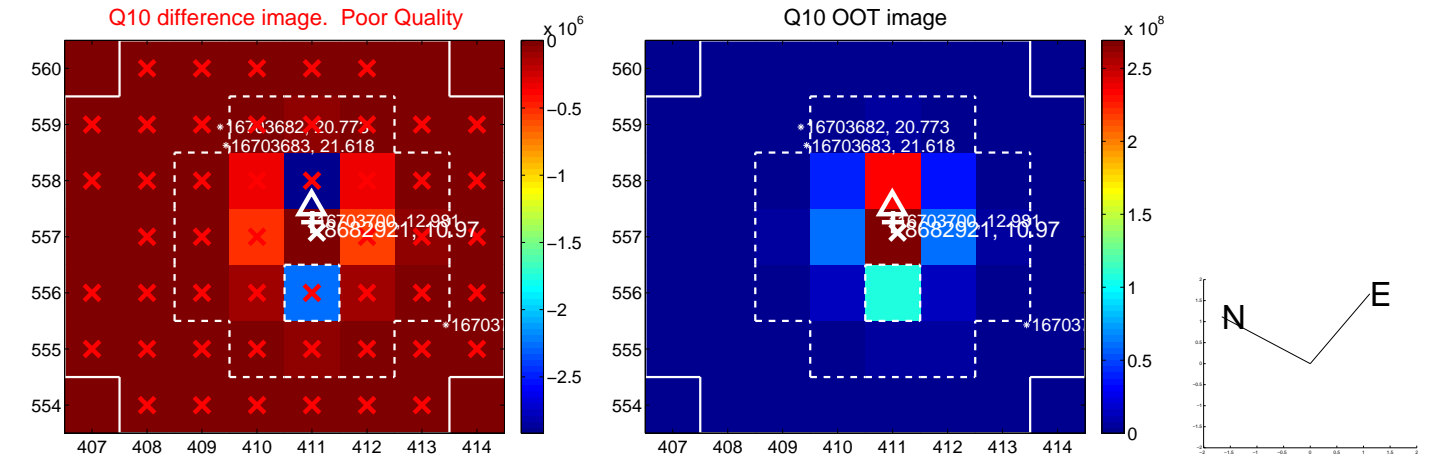
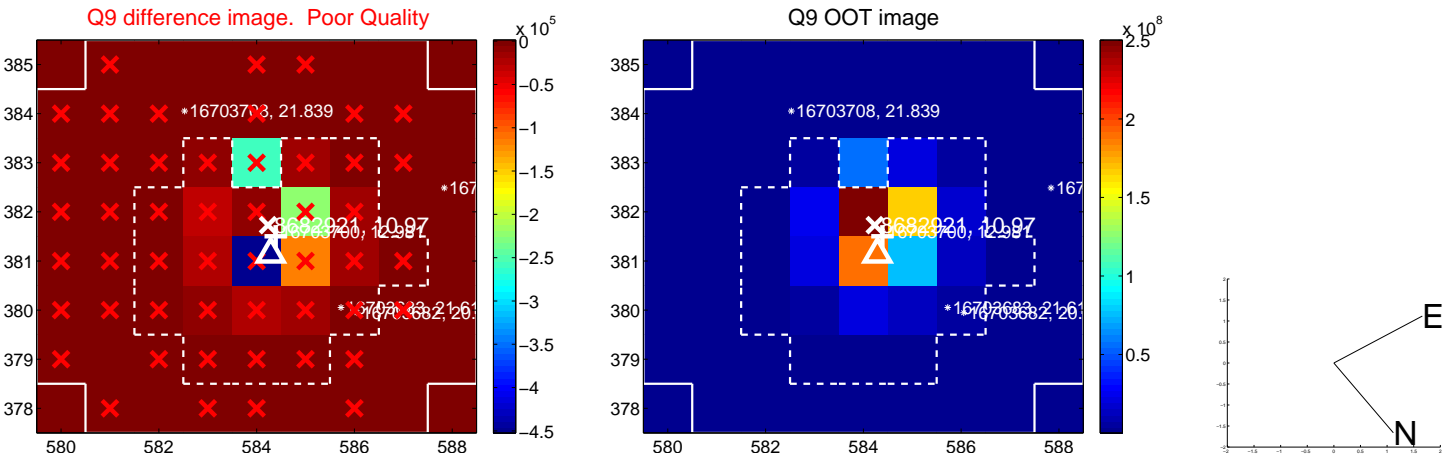
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



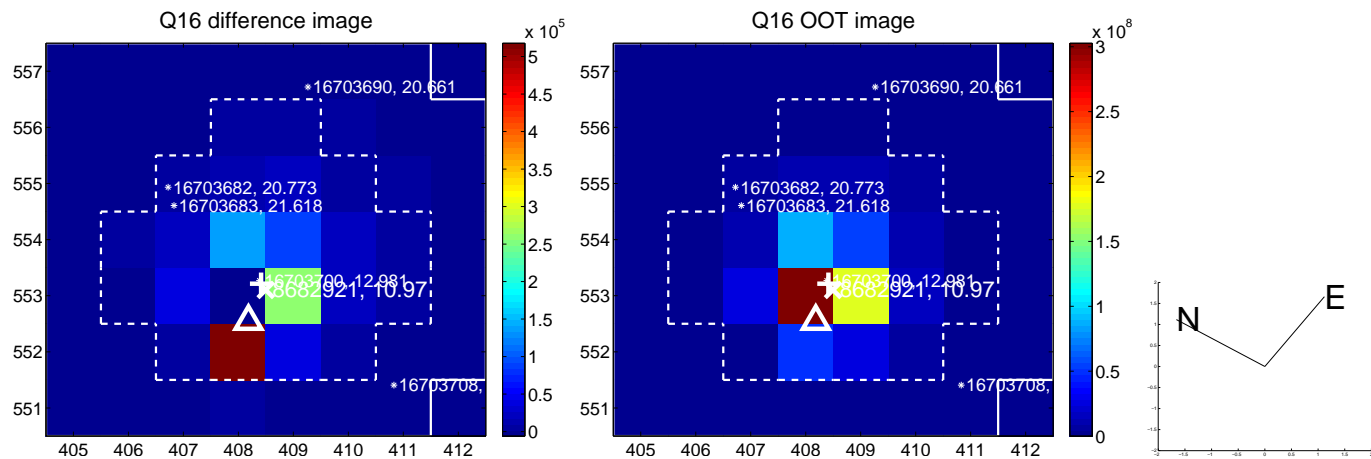
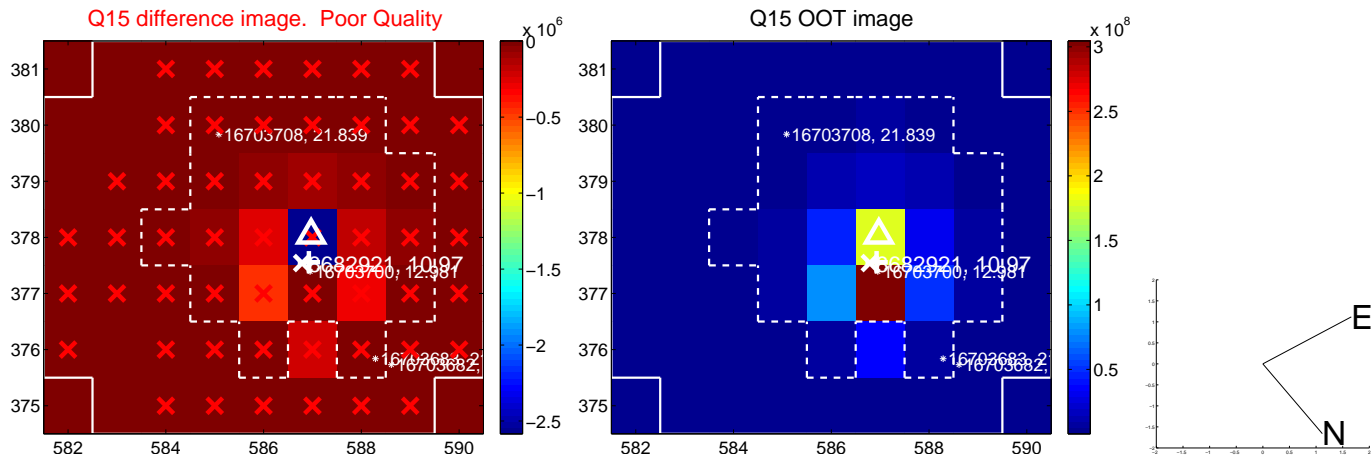
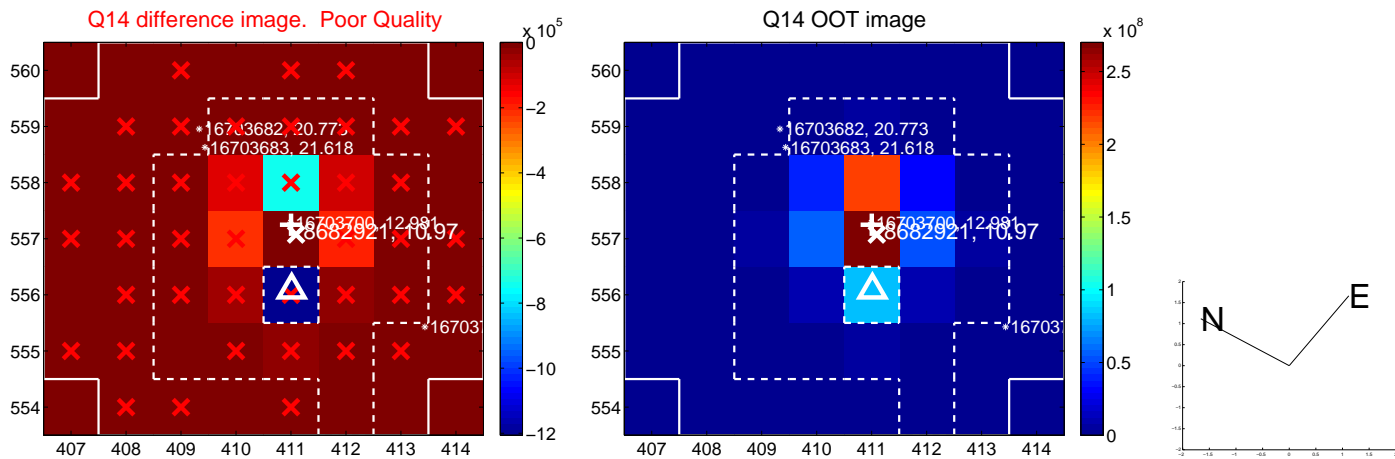
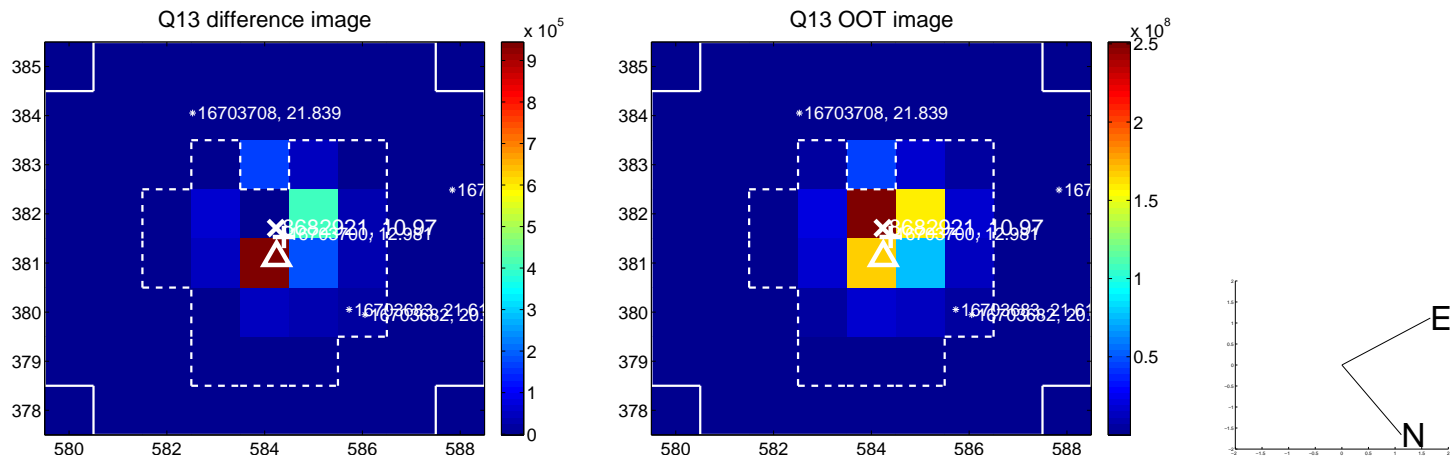
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



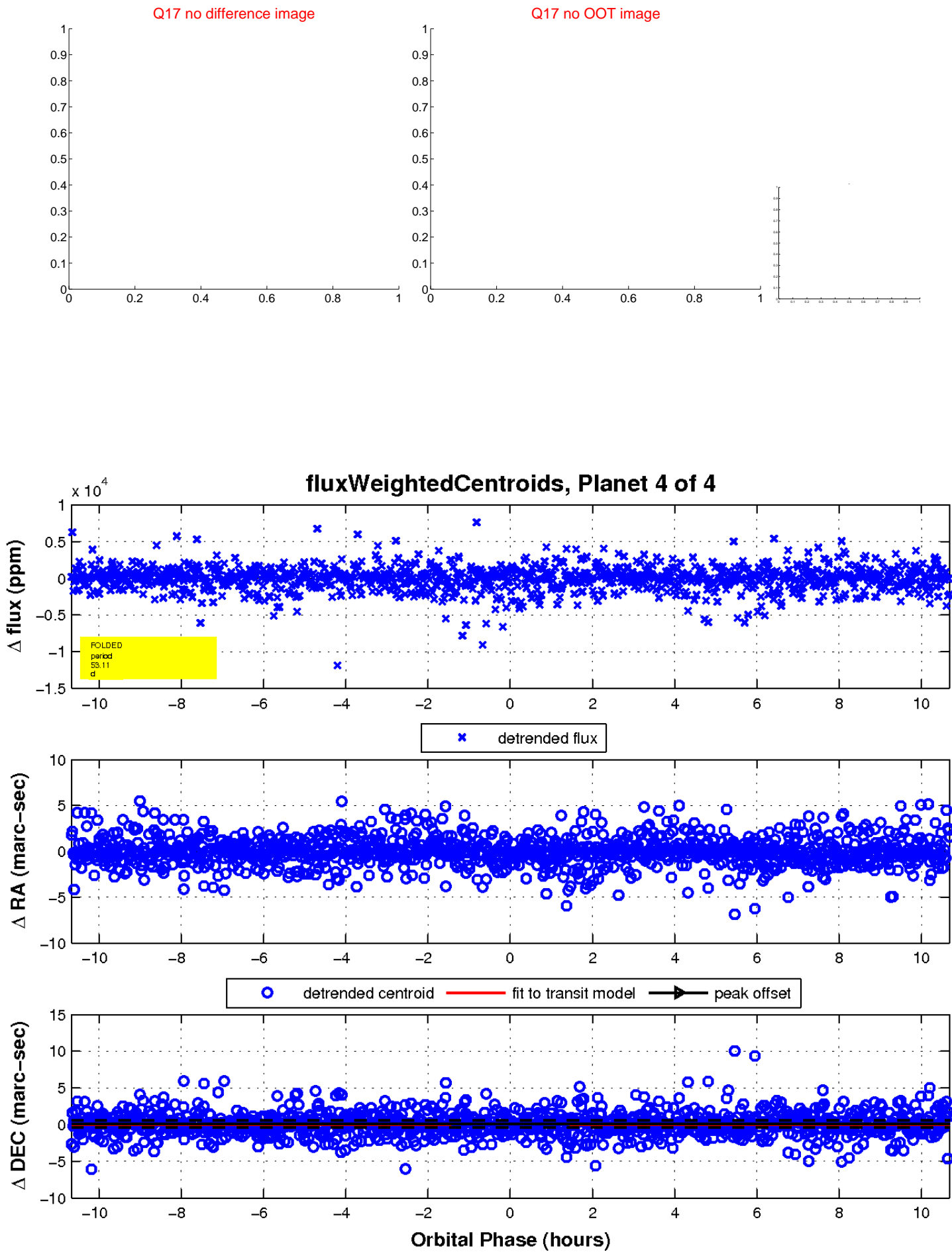
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image

Declination

