

KIC 009216810

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})
009216810-01	OBS	No	1.460203	131.749013	10.5	4.078	9.2	6.5	1.93	6995	0.72	11220.59
009216810-02	OBS	8179.01	138.629025	235.373033	142.5	4.934	7.6	8.2	1.93	6995	2.73	25.91

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009216810-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL —LPP_DV —CENT_SATURATED
009216810-02	OBS	FP	0.21	1	0	0	0	INCONSISTENT_TRANS —CENT_SATURATED

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

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

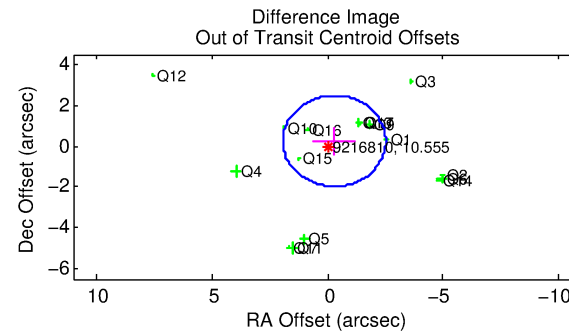
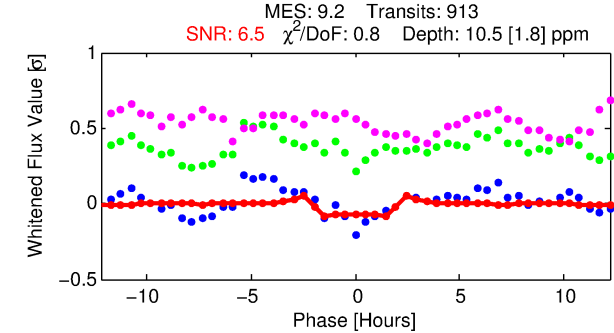
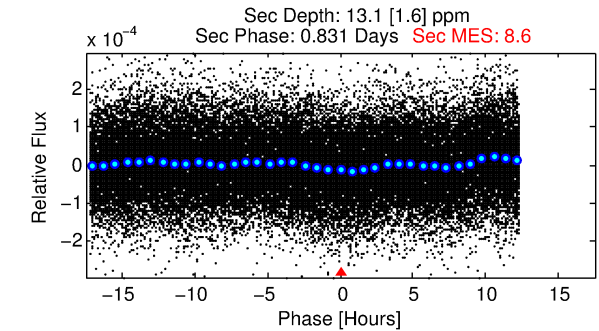
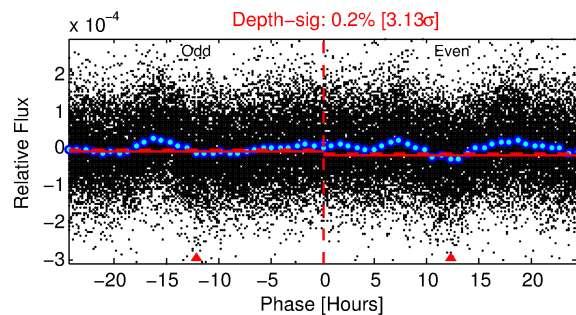
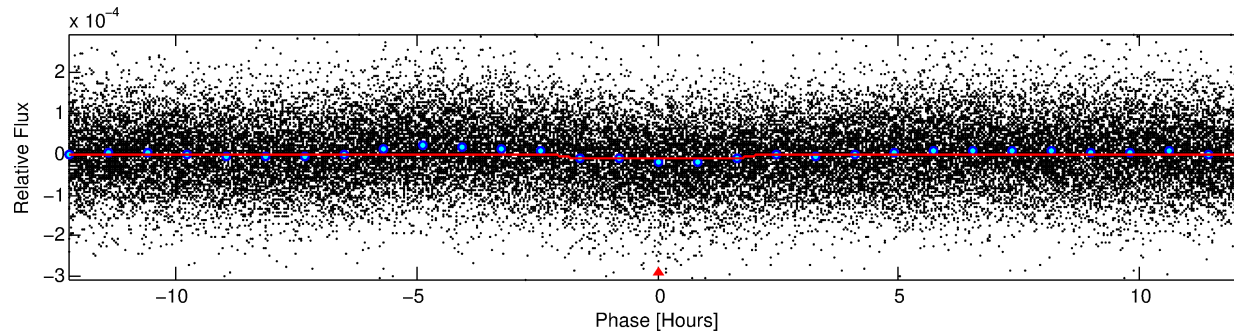
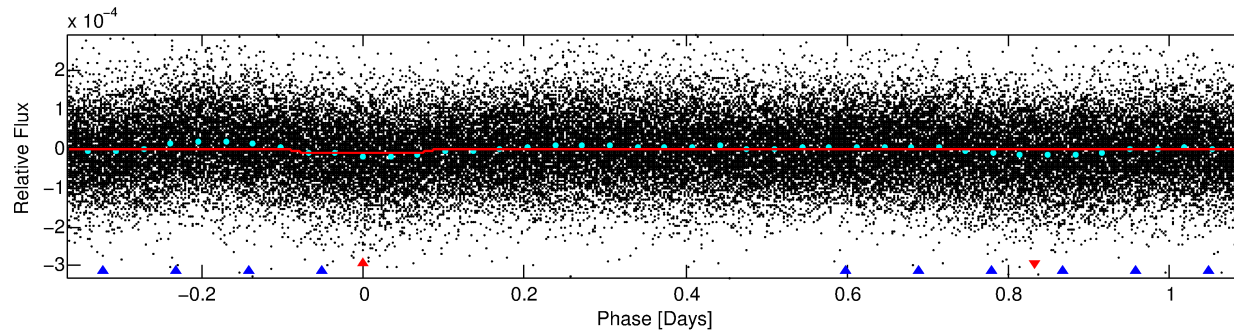
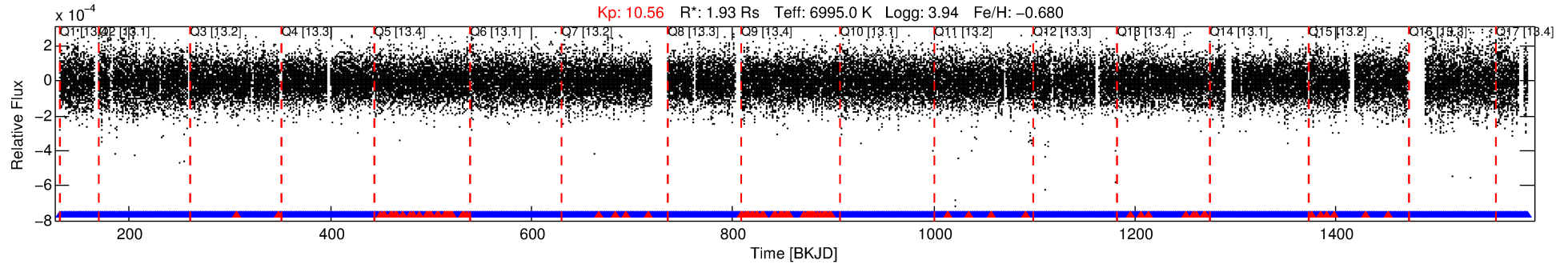
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009216810-01

No Significant Match Found

DV One-Page Summary

KIC: 9216810 Candidate: 1 of 2 Period: 1.460 d



DV Fit Results:

Period = 1.46020 [0.00002] d
Epoch = 131.7490 [0.0035] BKJD
Rp/R* = 0.0034 [0.0006]
a/R* = 1.59 [0.85]
b = 0.89 [0.22]
Seff = 11220.59 [5406.00]
Teq = 2624 [316] K
Rp = 0.72 [0.25] Re
a = 0.0267 [0.0077] AU
Ag = 9.88 [5.79] [1.53 σ]
Teffp = 7194 [682] K [6.08 σ]

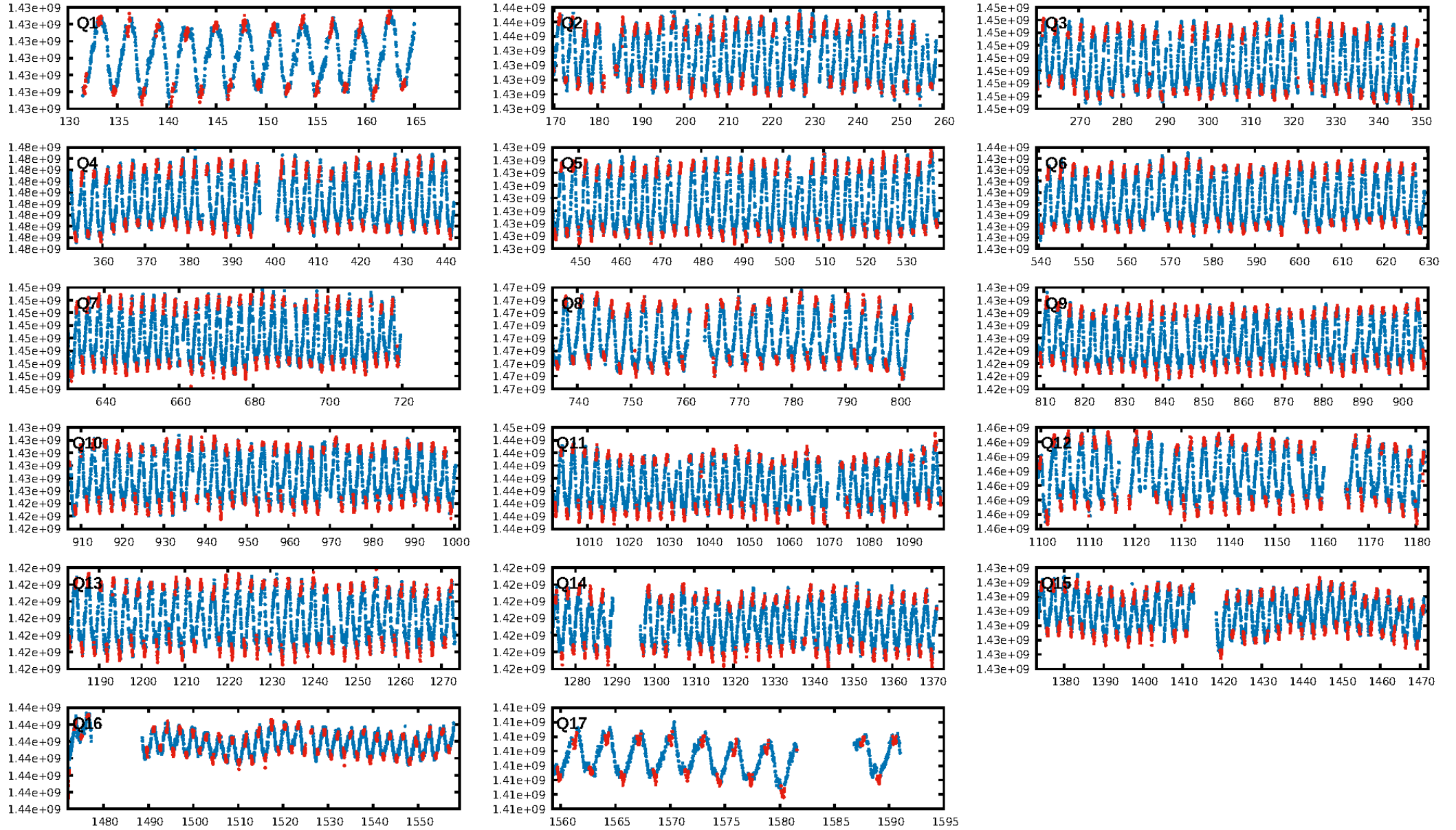
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [514.27 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 3.68e-15
RollingBand-fgt: 0.90 [788/872]
GhostDiagnostic-chr: -3.853
Centroid-sig: 3.7%
Centroid-so: 1.804 arcsec [1.70 σ]
OotOffset-rm: 0.386 arcsec [0.52 σ]
KicOffset-rm: 1.321 arcsec [1.83 σ]
OotOffset-st: 4/4/3/5 [16]
KicOffset-st: 4/4/3/5 [16]
DiffImageQuality-fgm: 0.25 [4/16]
DiffImageOverlap-fno: 1.00 [17/17]

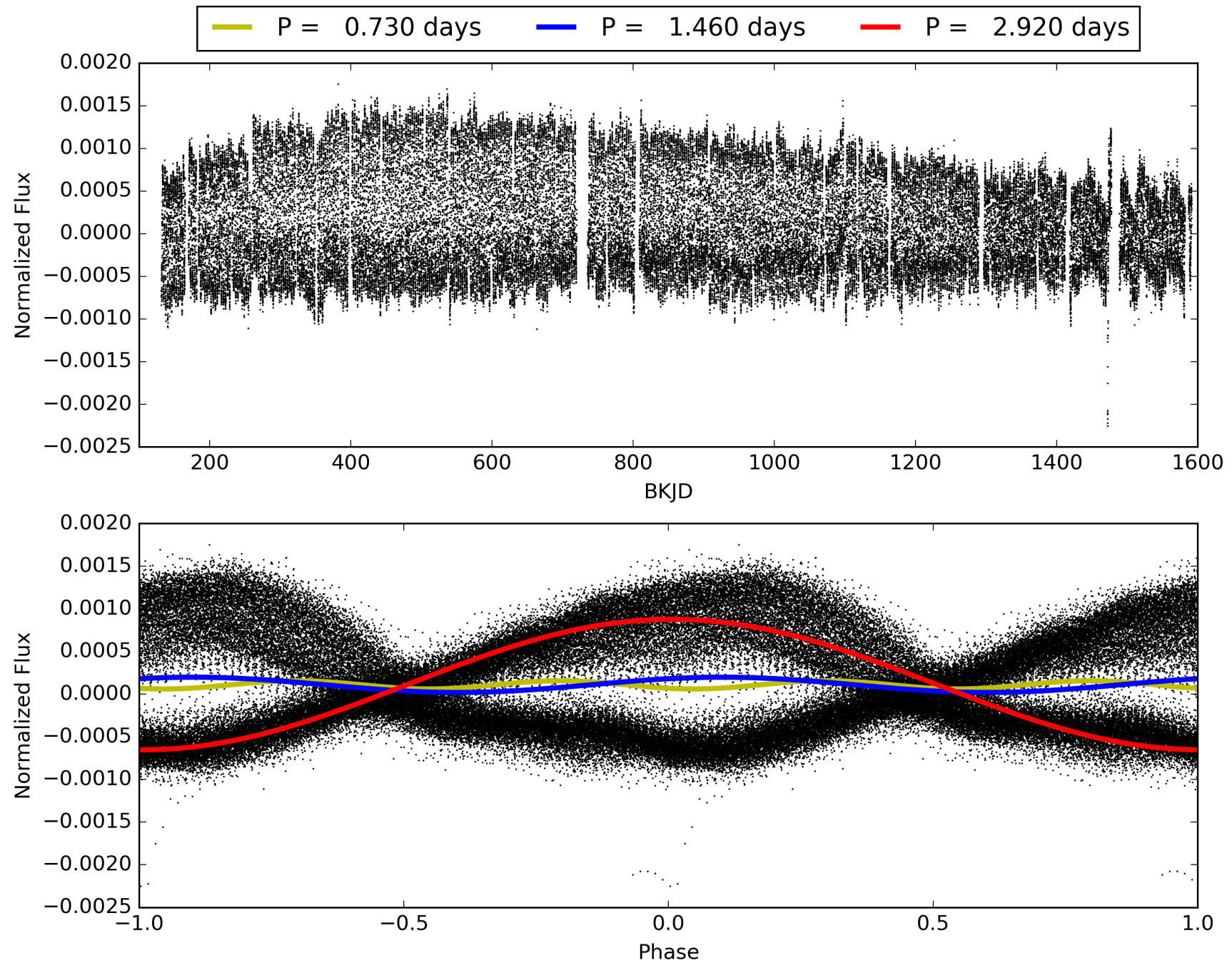
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 23:44:21 Z

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

TCE 009216810-01, PDC Light Curves

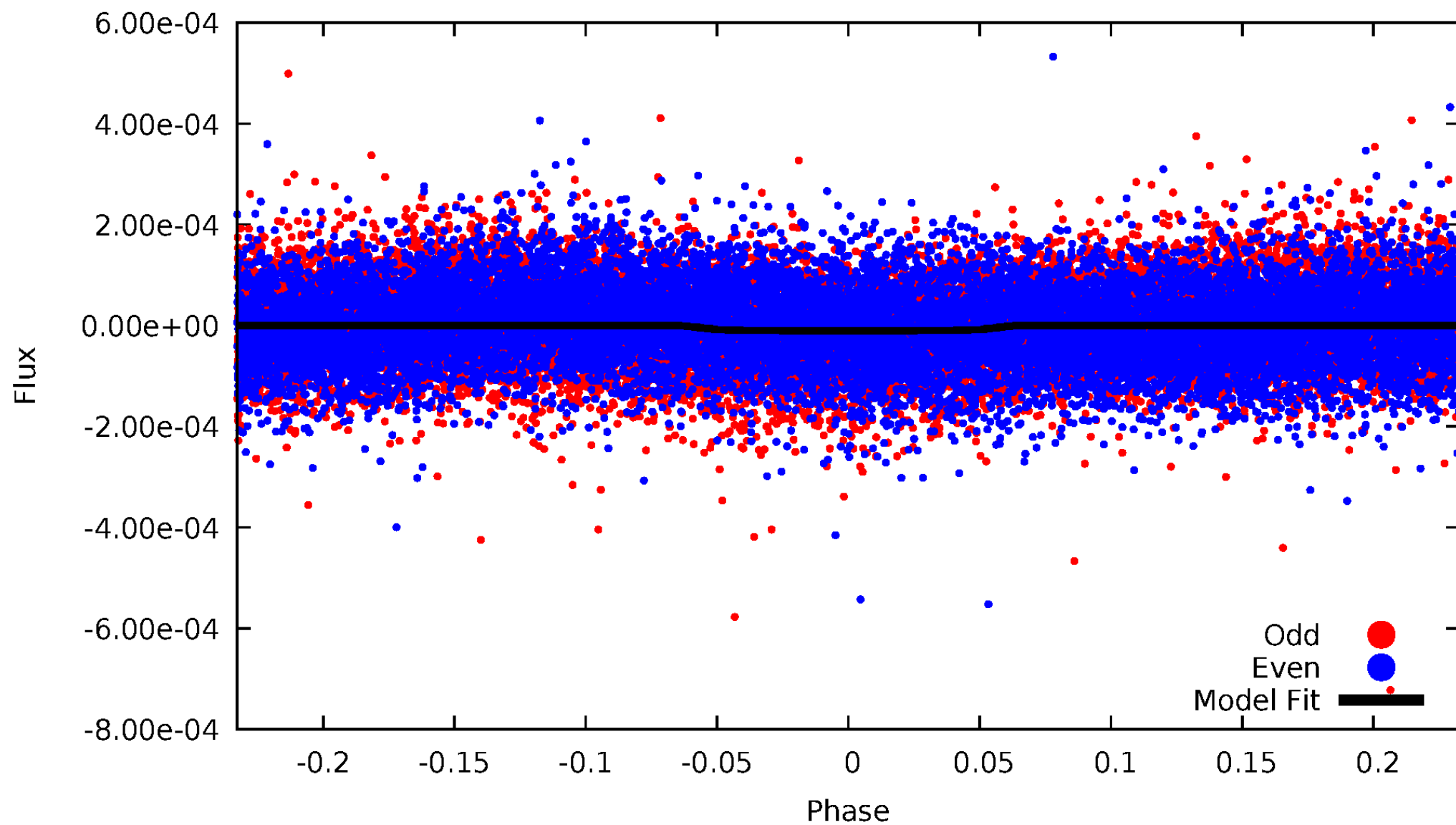


TCE 009216810-01



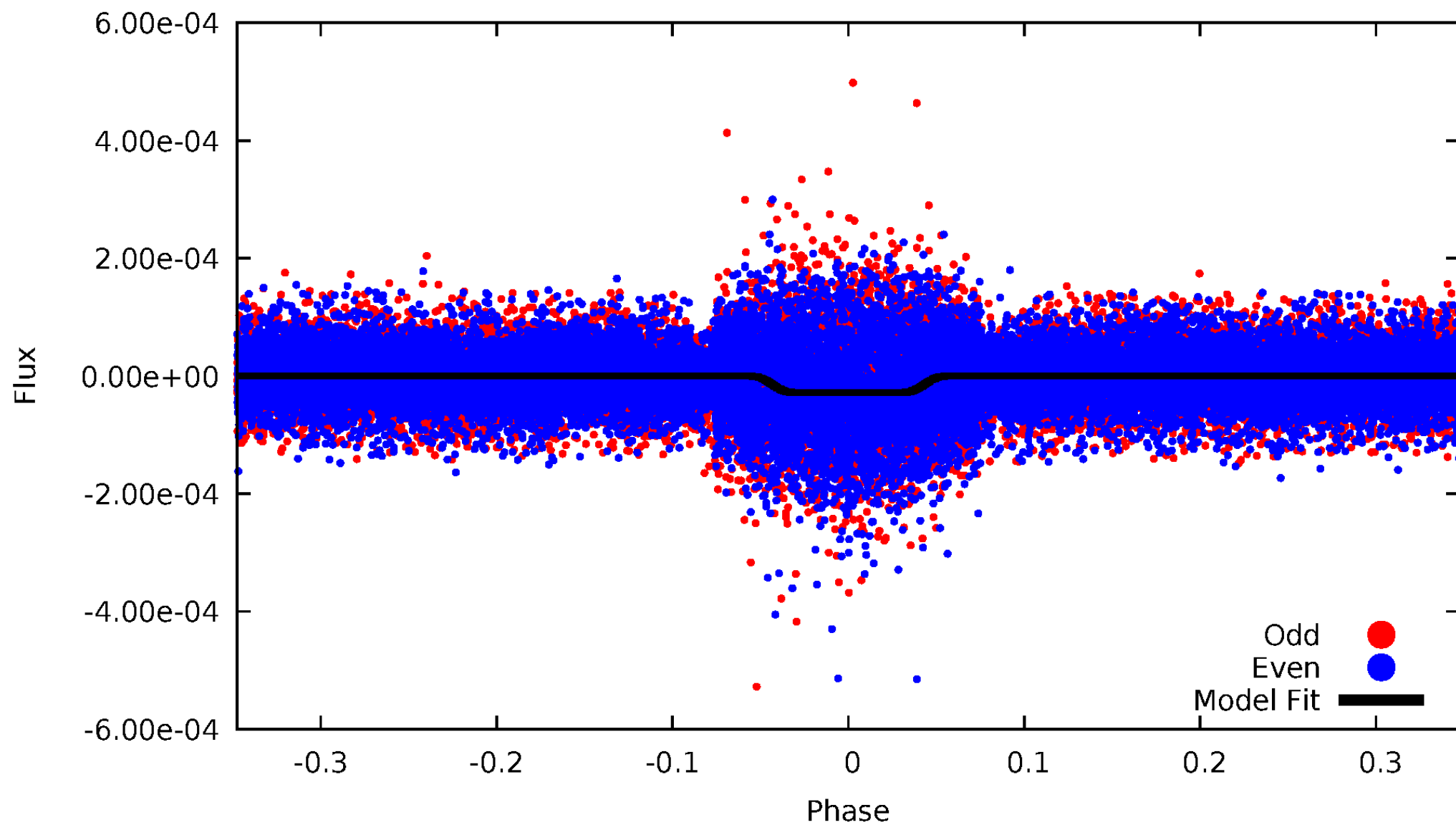
DV Odd/Even

TCE 009216810-01



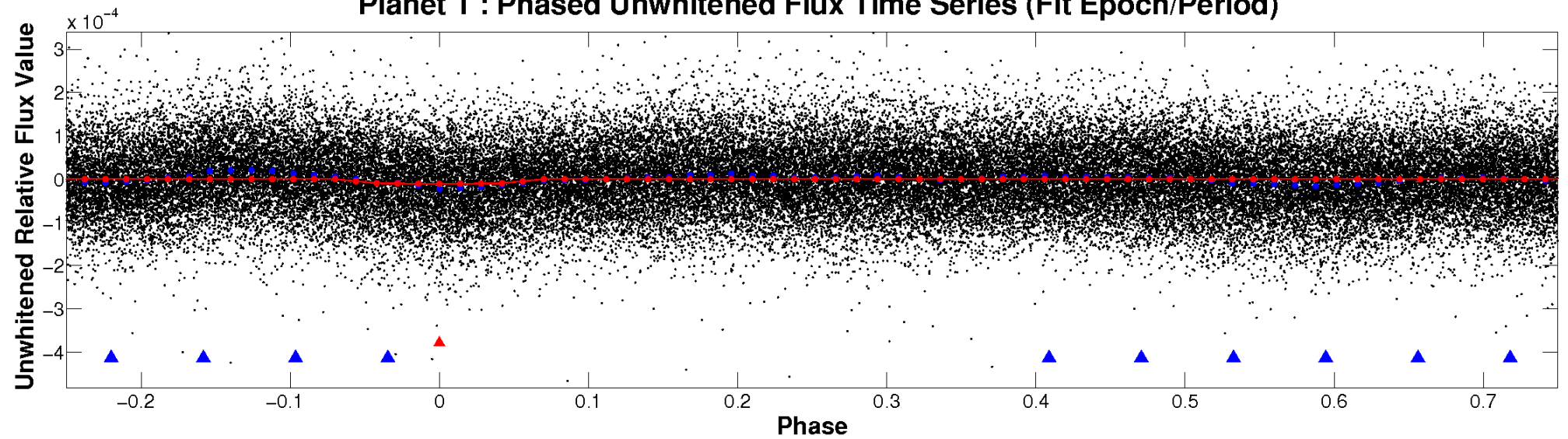
ALT Odd/Even

TCE 009216810-01

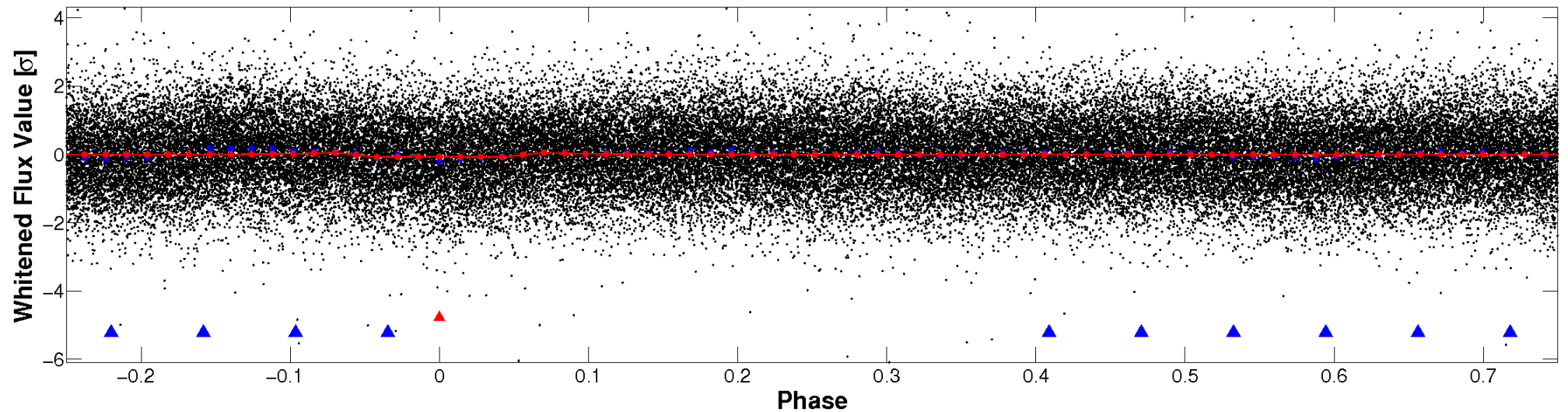


Non-Whitened Vs. Whitened Light Curve

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

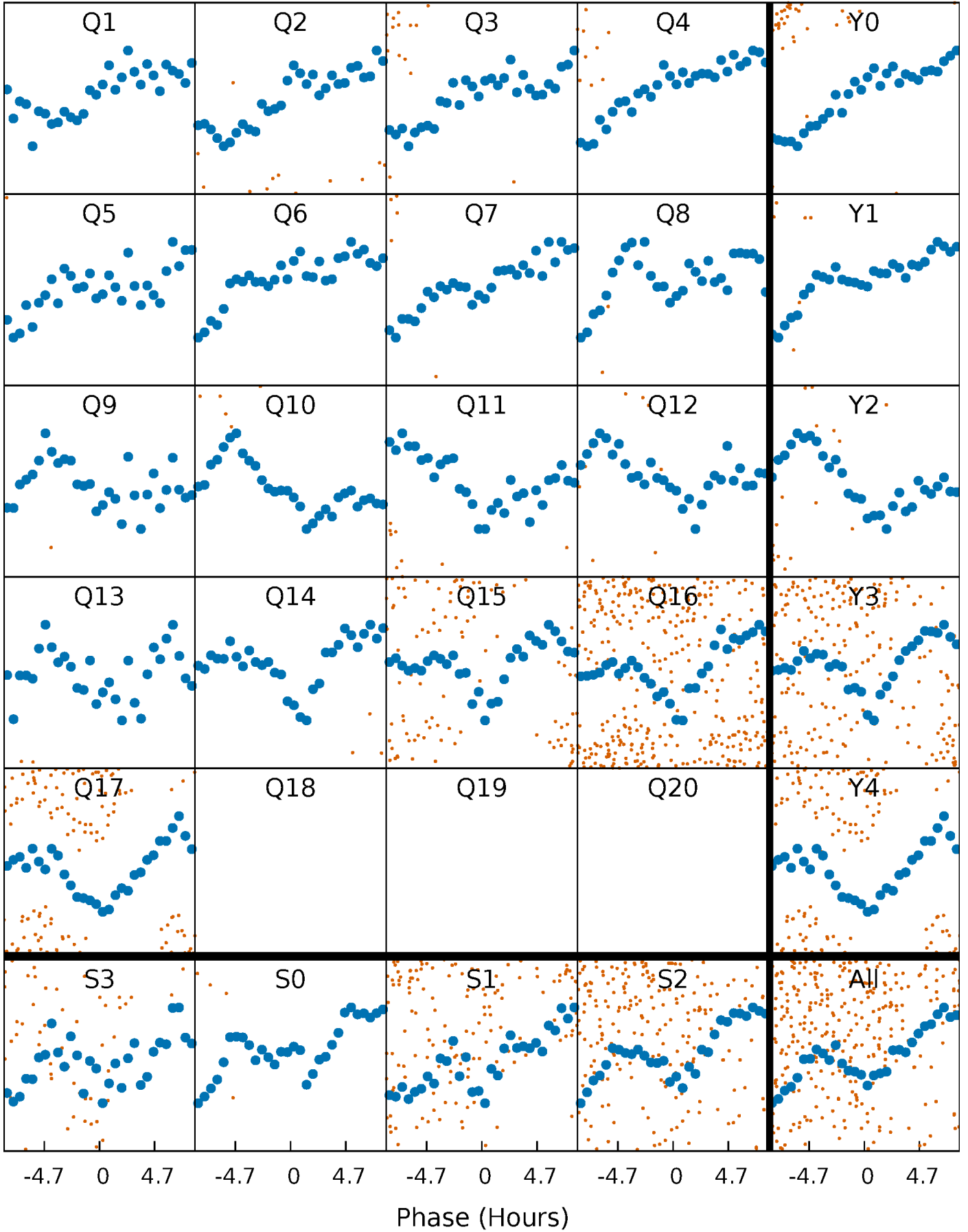


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



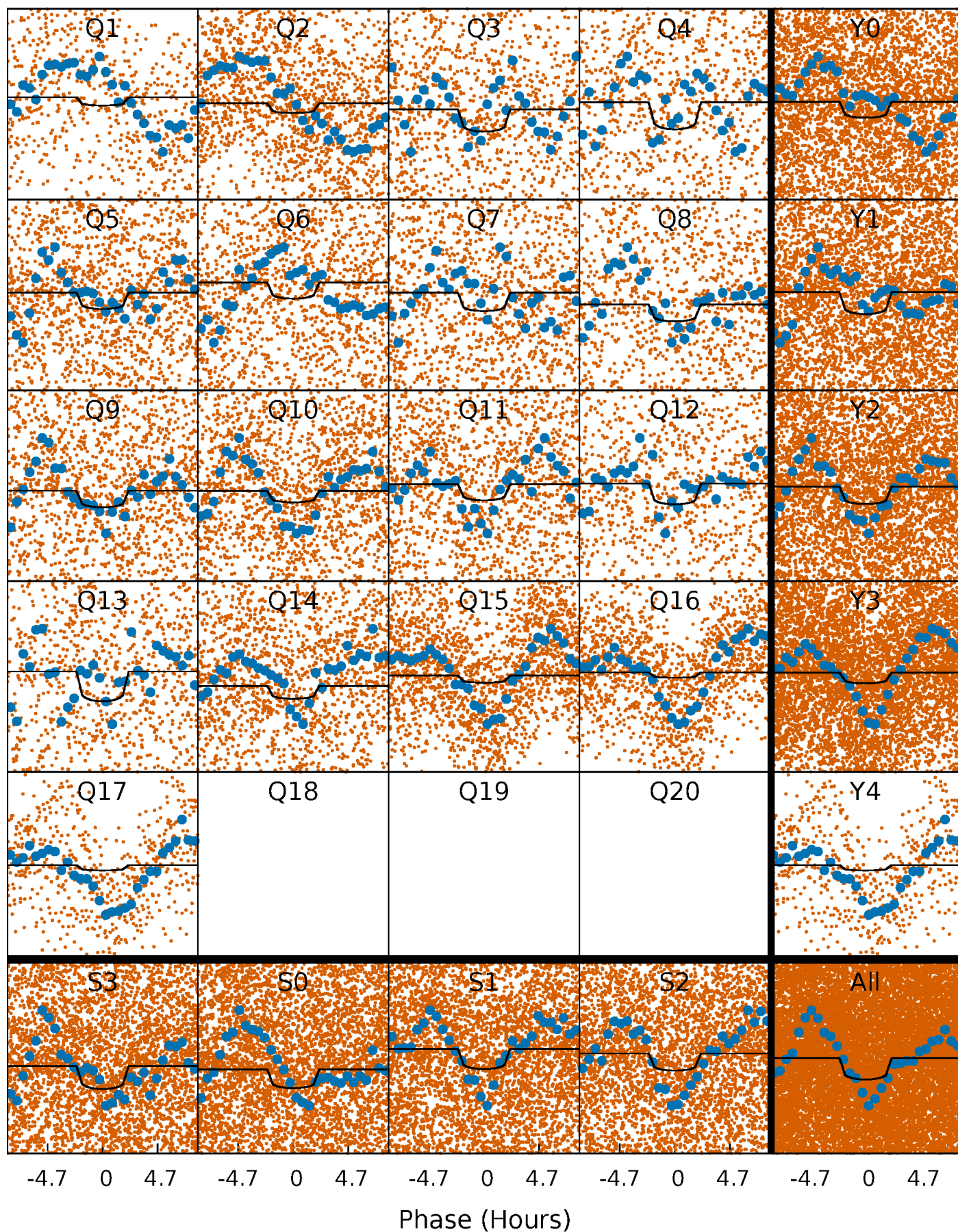
PDC Quarter-Phased Transit Curves

TCE 009216810-01 P= 1.460203 Days $T_0=131.749013$ (BKJD)



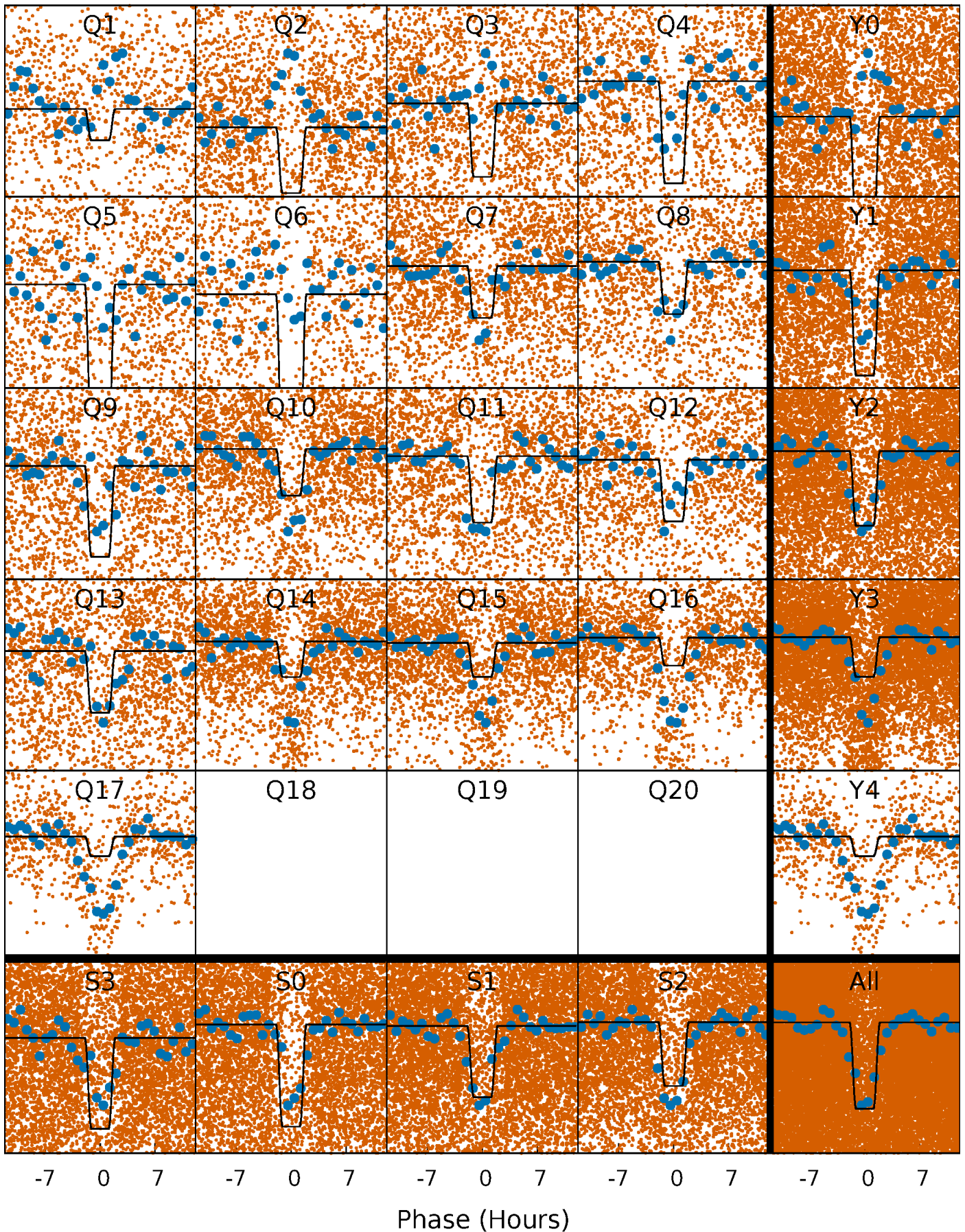
DV Quarter-Phased Transit Curves

TCE 009216810-01 P= 1.460203 Days $T_0=131.749013$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

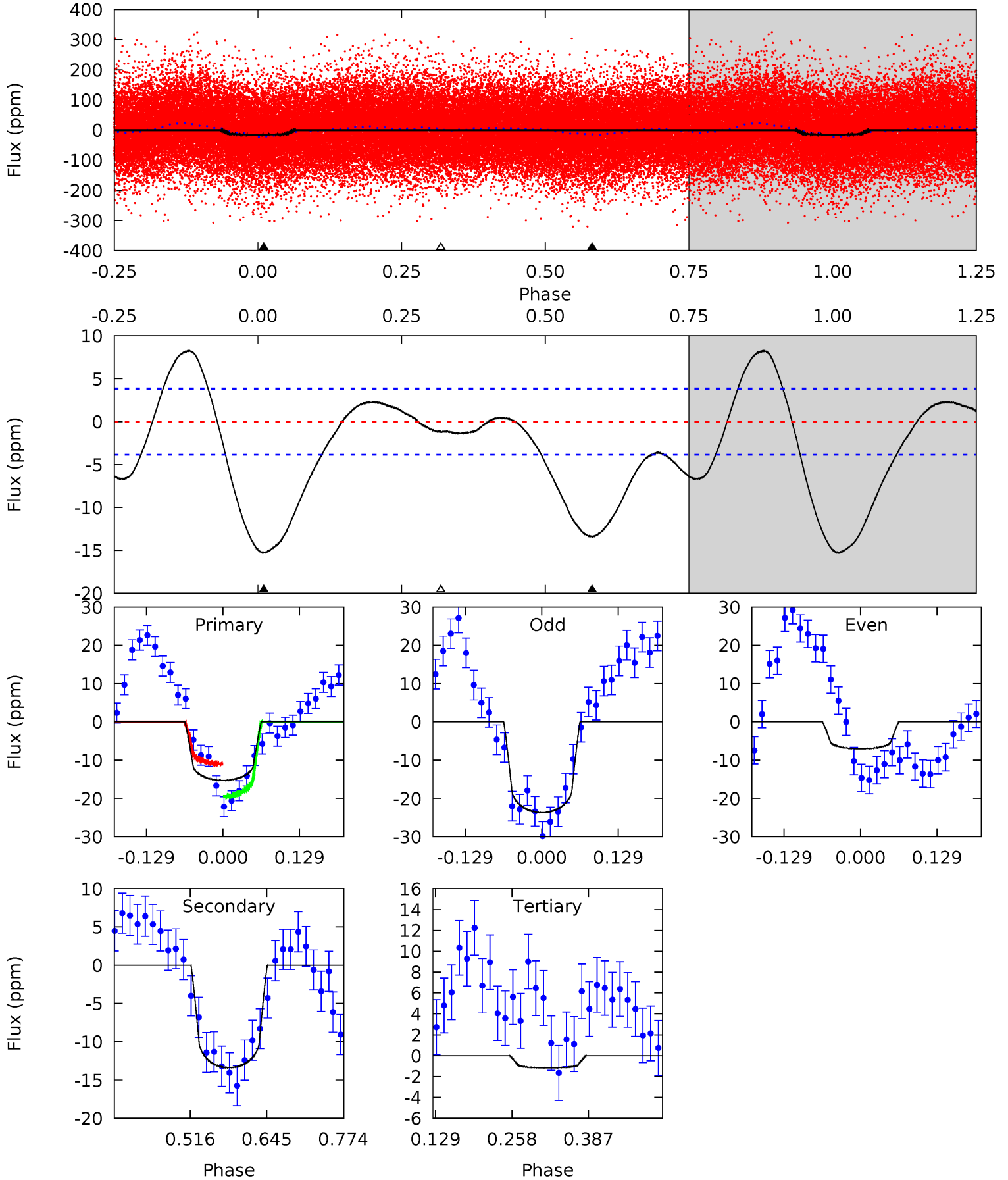
TCE 009216810-01 P= 1.460236 Days $T_0=131.738492$ (BKJD)



DV Model-Shift Uniqueness Test

009216810-01, P = 1.460203 Days, E = 130.288810 Days

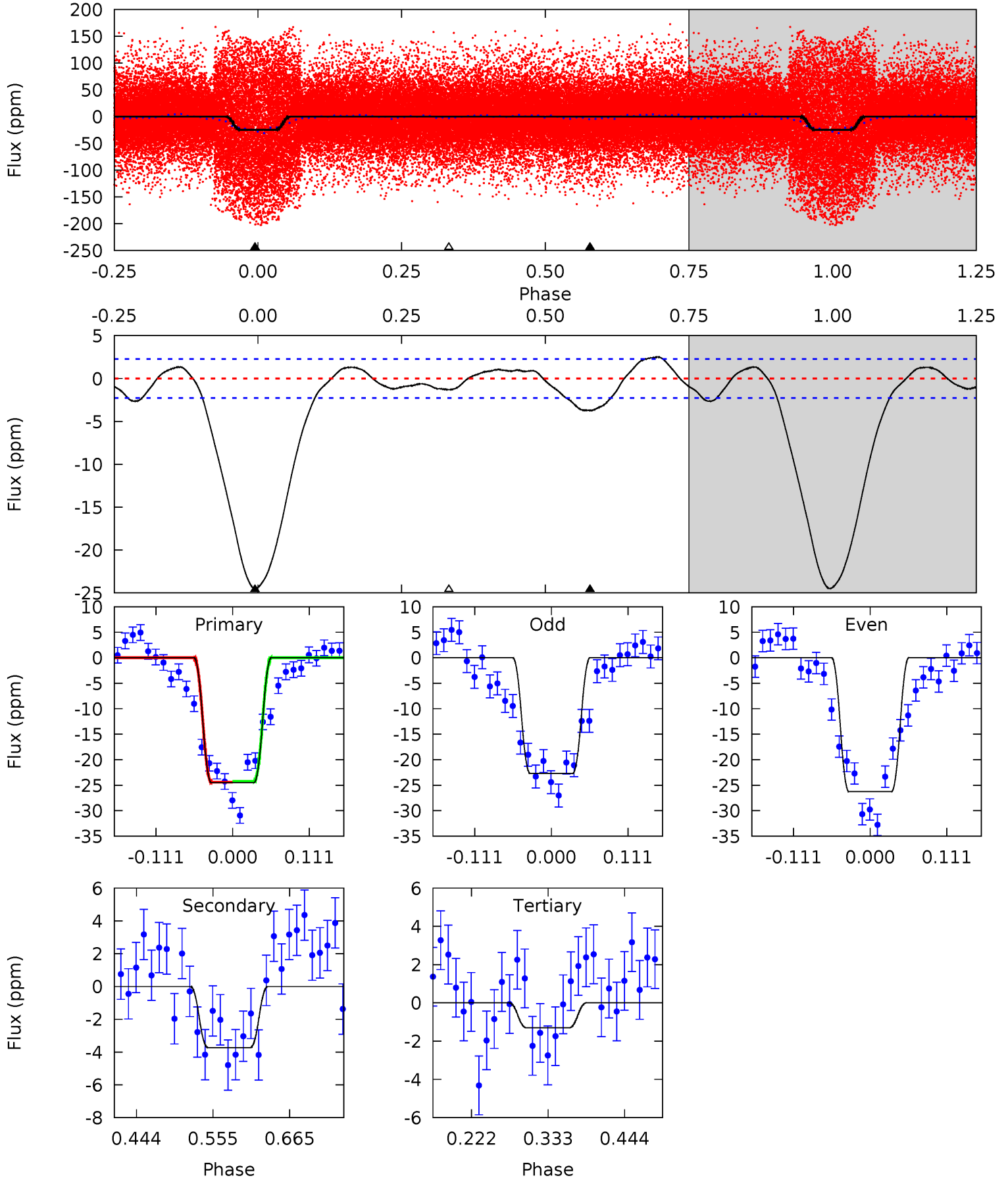
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.9	15.7	1.39	0	4.51	1.52	4.01	16.5	17.9	14.3	15.7	9.75	1.09	0.35	4.94



Alt Model-Shift Uniqueness Test

009216810-01, P = 1.460236 Days, E = 130.278256 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
48.9	7.44	2.61	0	4.54	1.59	2.35	46.3	48.9	4.84	7.44	3.57	0.90	0.09	0.18



Stellar Parameters For KIC 009216810

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6995^{+183}_{-224}	$3.942^{+0.273}_{-0.117}$	$-0.680^{+0.300}_{-0.300}$	$1.931^{+0.386}_{-0.580}$	$1.192^{+0.193}_{-0.158}$	$0.233^{+0.391}_{-0.080}$
	+3%/-3%	+7%/-3%	+44%/-44%	+20%/-30%	+16%/-13%	+168%/-35%
Source	PHO1	FLK73	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 009216810-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-13 ± 1	$0.70^{+0.15}_{-0.15}$	3606^{+241}_{-295}	7184^{+863}_{-656}	11^{+7}_{-3}
Alt.	-4 ± 1	$1.09^{+0.19}_{-0.20}$	3605^{+246}_{-308}	4178^{+292}_{-263}	$1.262^{+0.664}_{-0.366}$

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

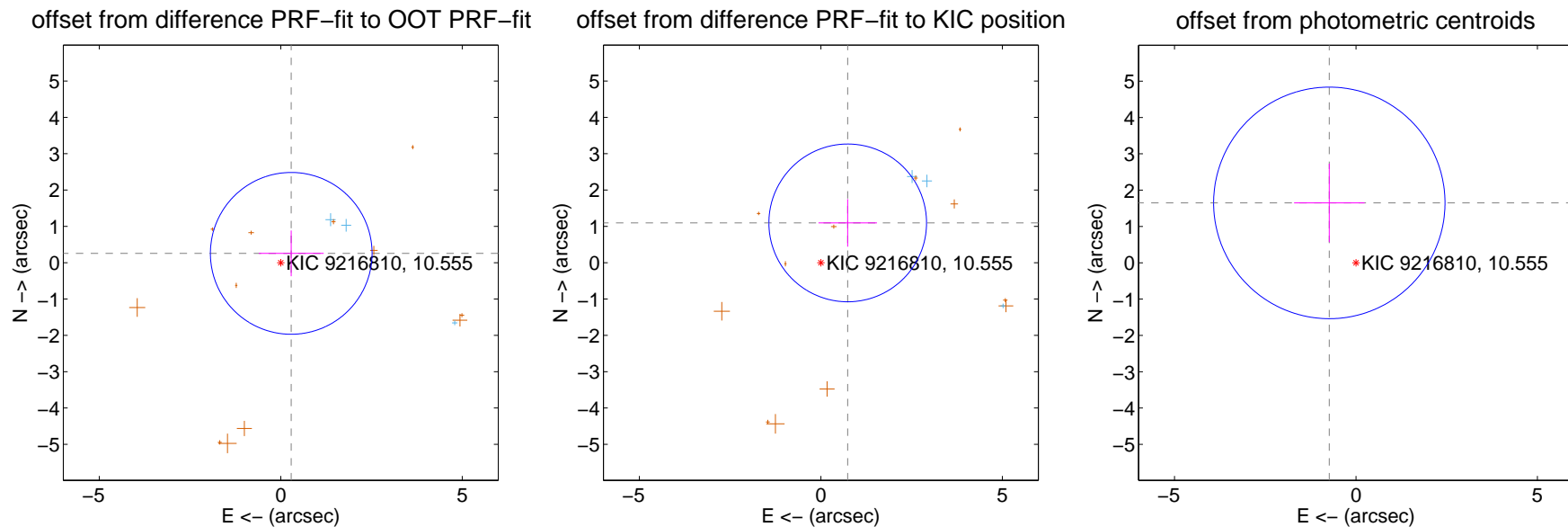
DV Centroid Data

Supplemental centroid analysis for 009216810-01. **Kepler magnitude: 10.55.** Transit SNR 6.48

There are 4 quarters with good PRF difference image offsets

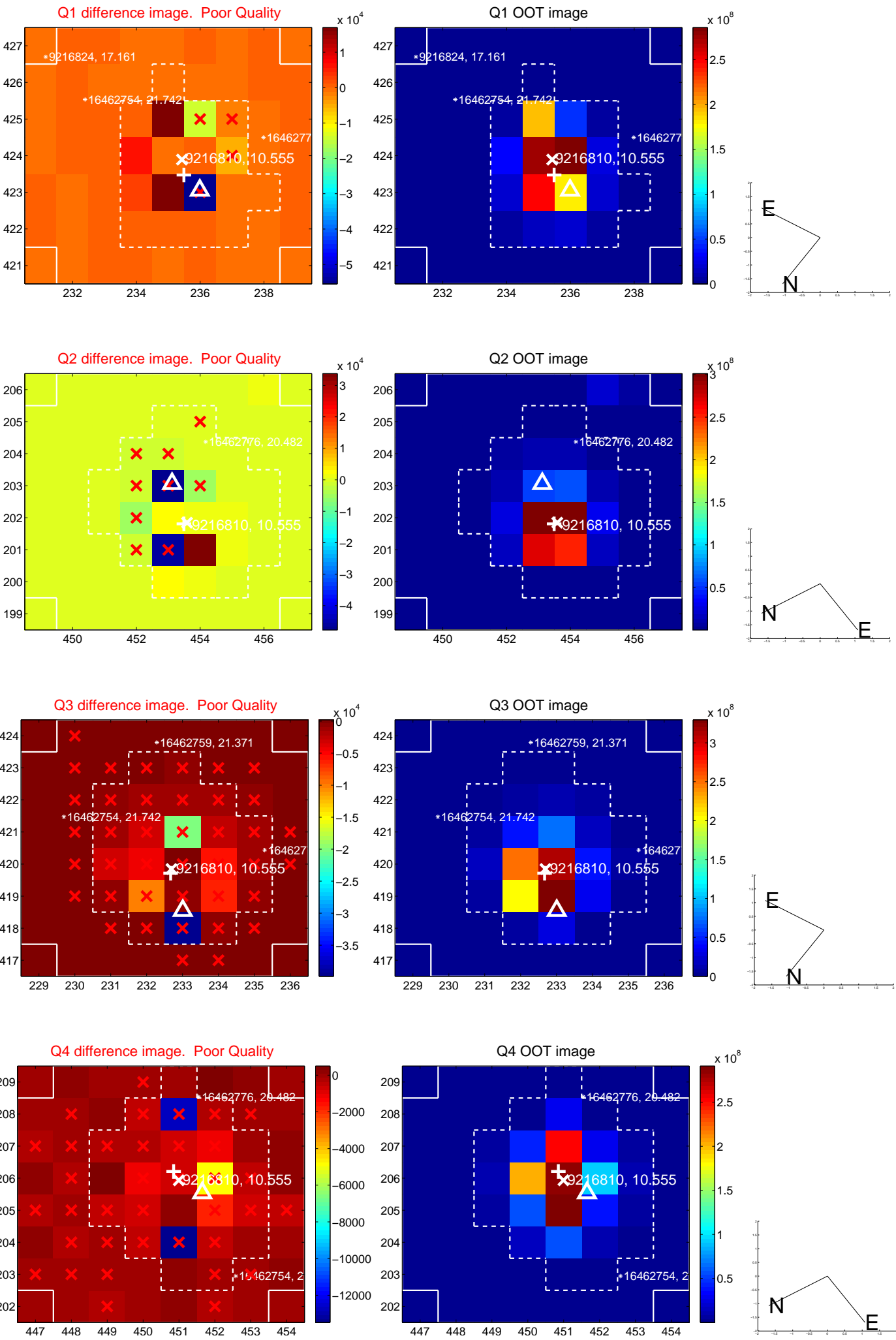
The direct PRF centroid is offset from the target star catalog position by about 1.67 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.386 ± 0.742	0.52	-0.289 ± 0.894	0.257 ± 0.630
PRF-fit source offset from KIC position	1.321 ± 0.724	1.83	-0.740 ± 0.805	1.095 ± 0.655
photometric centroid source offset	1.80 ± 1.06	1.70	0.73 ± 0.97	1.65 ± 1.08

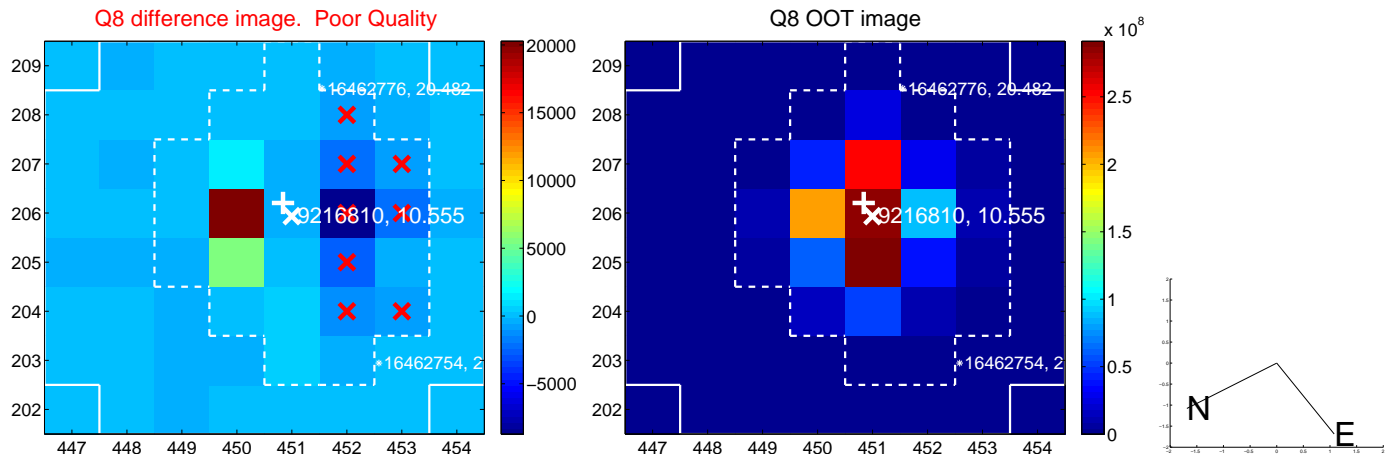
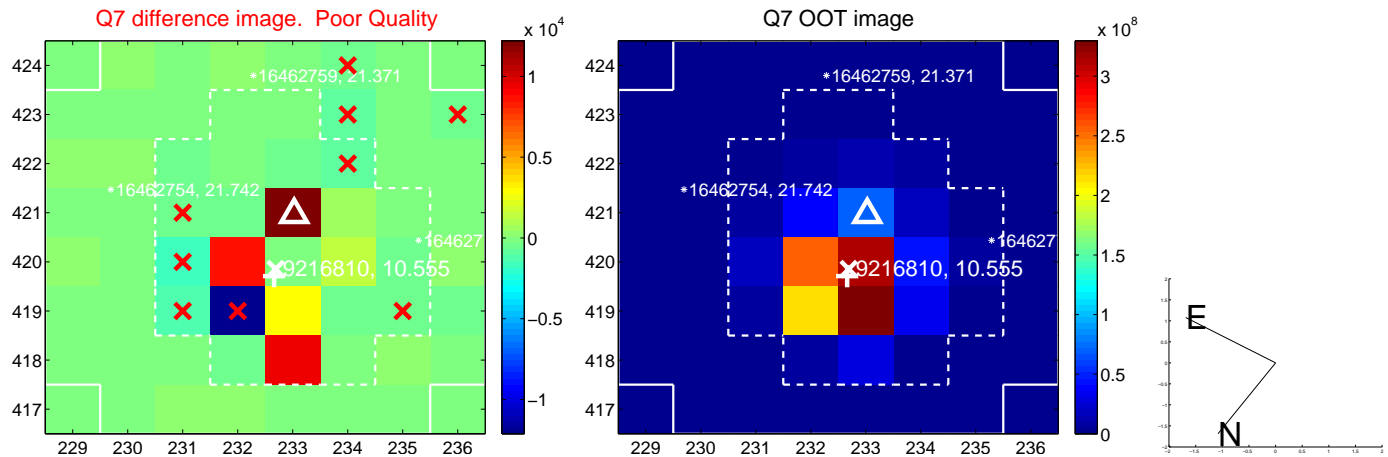
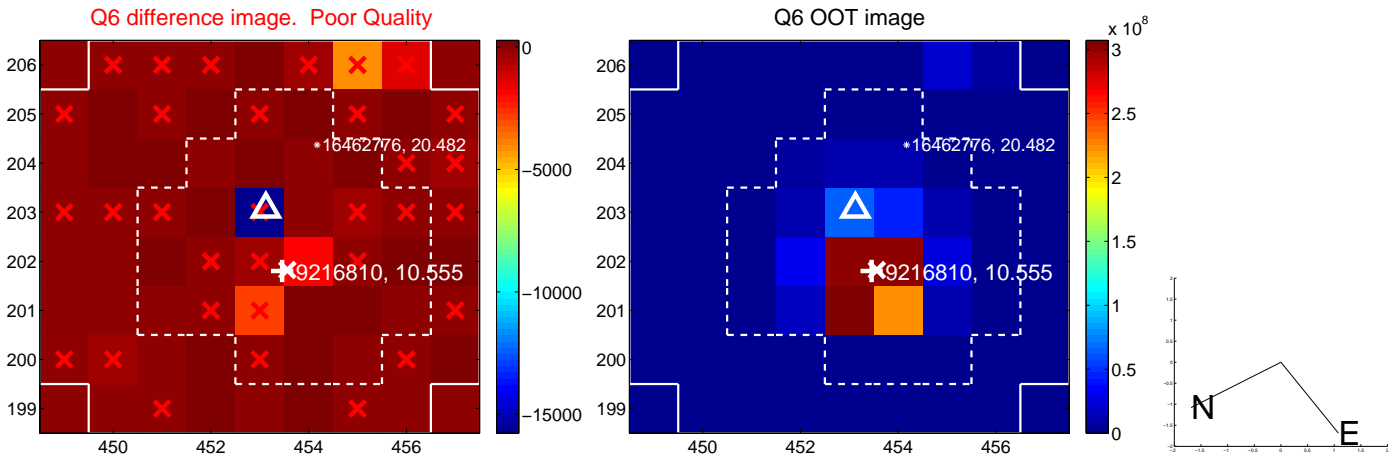
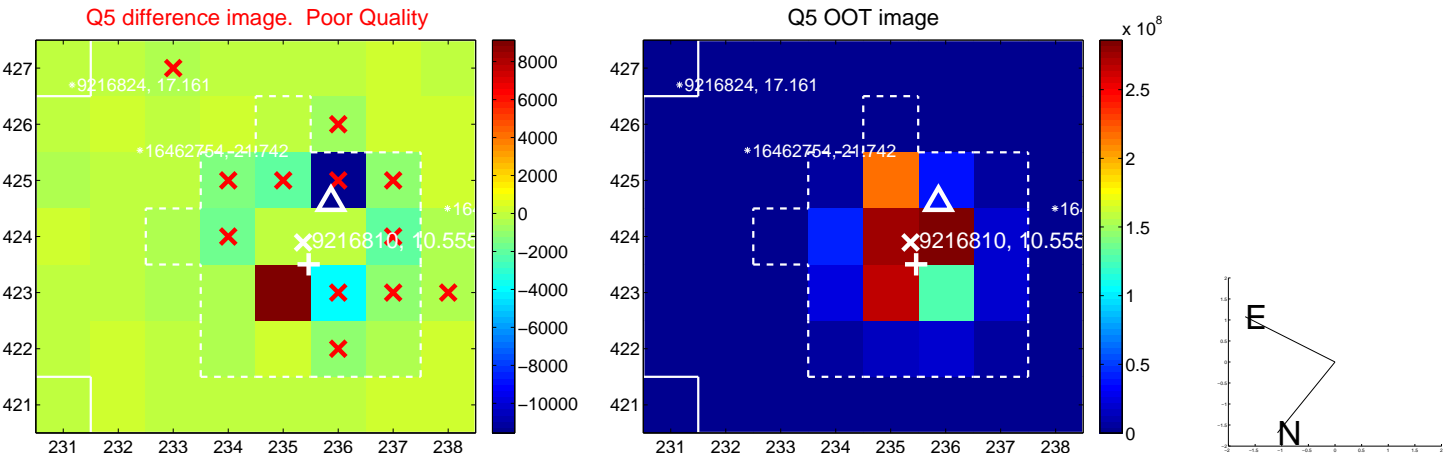


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

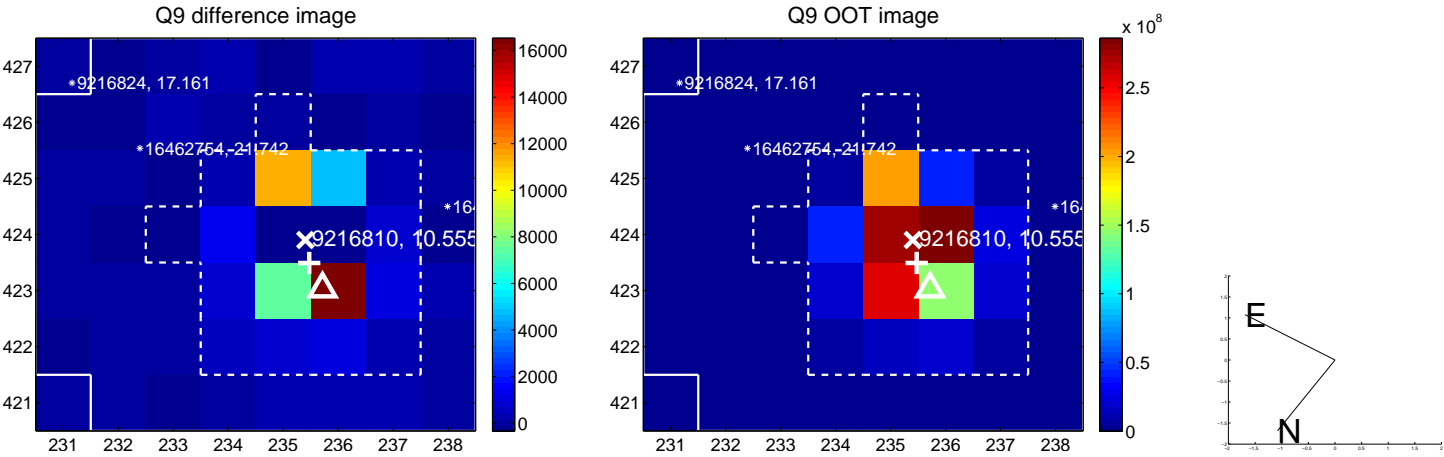
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



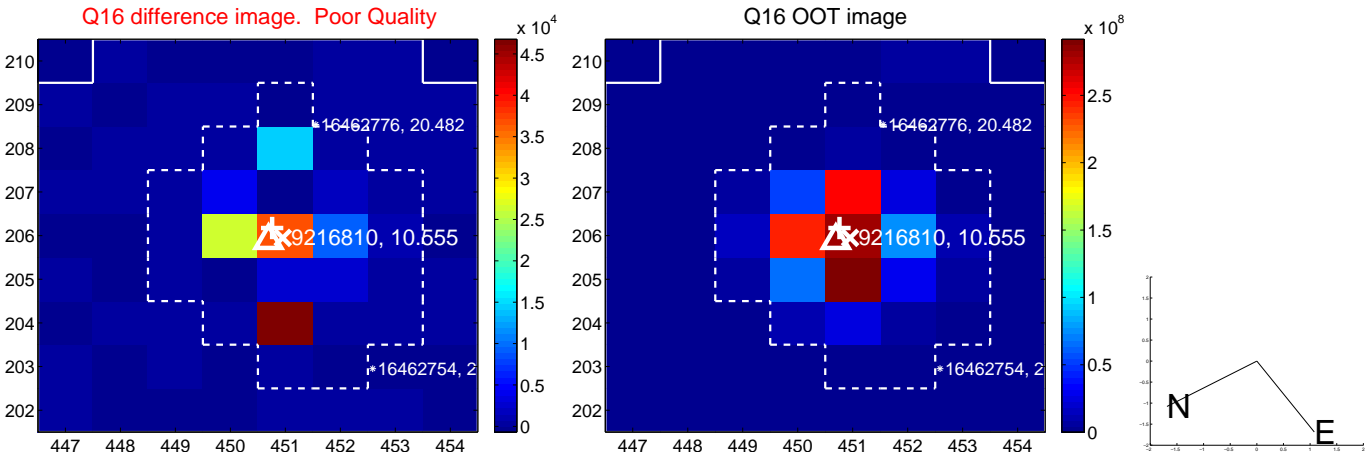
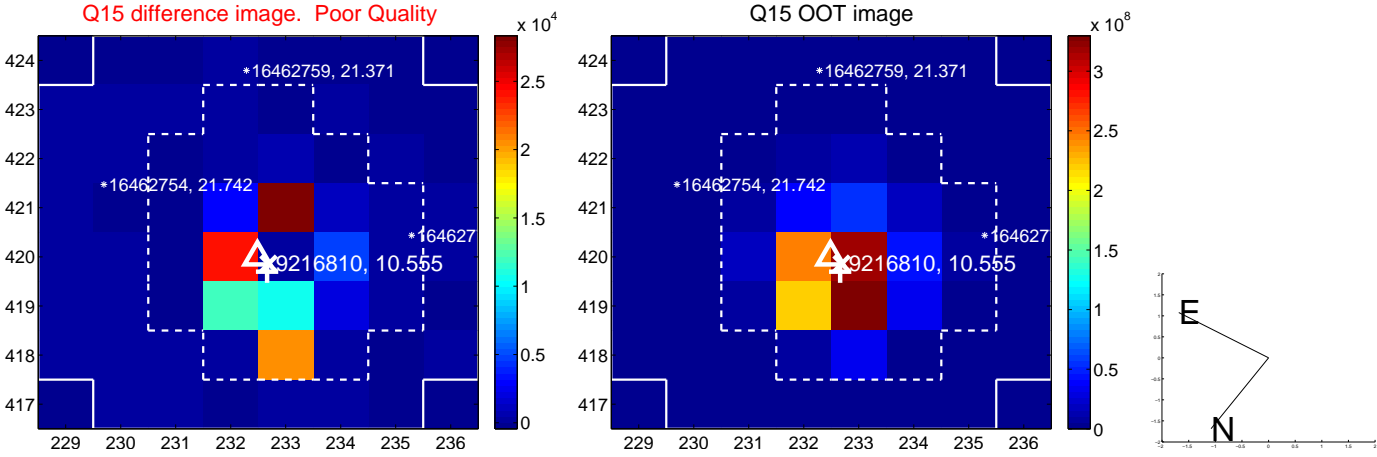
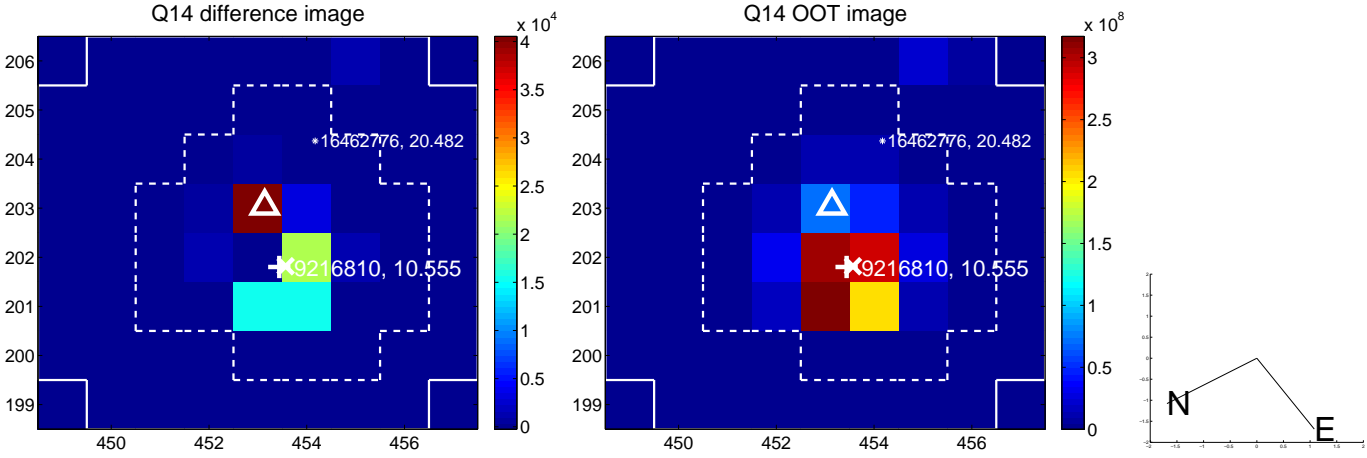
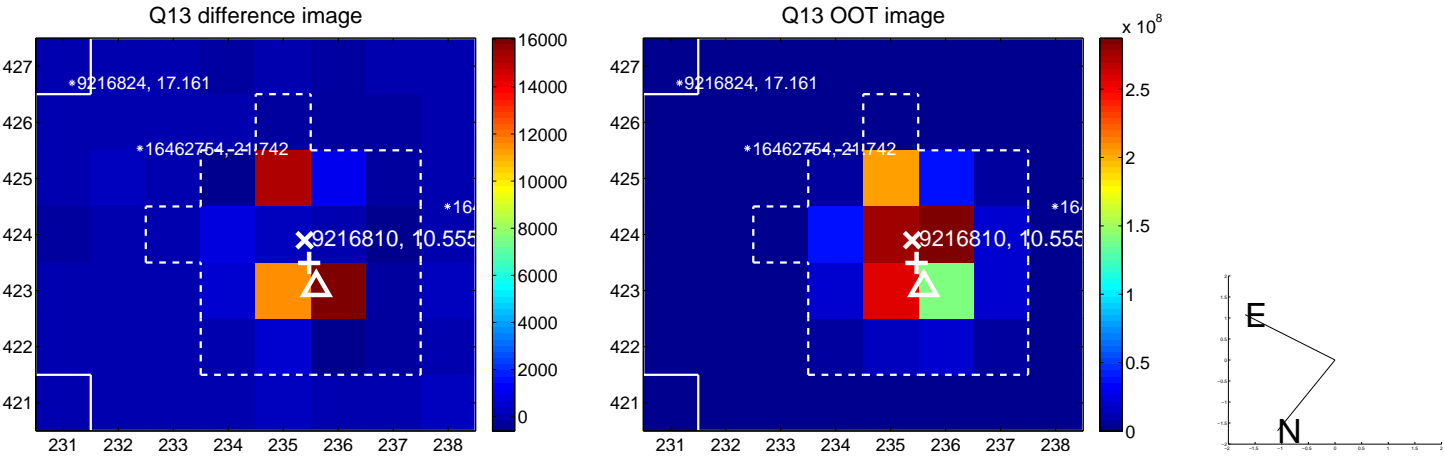
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



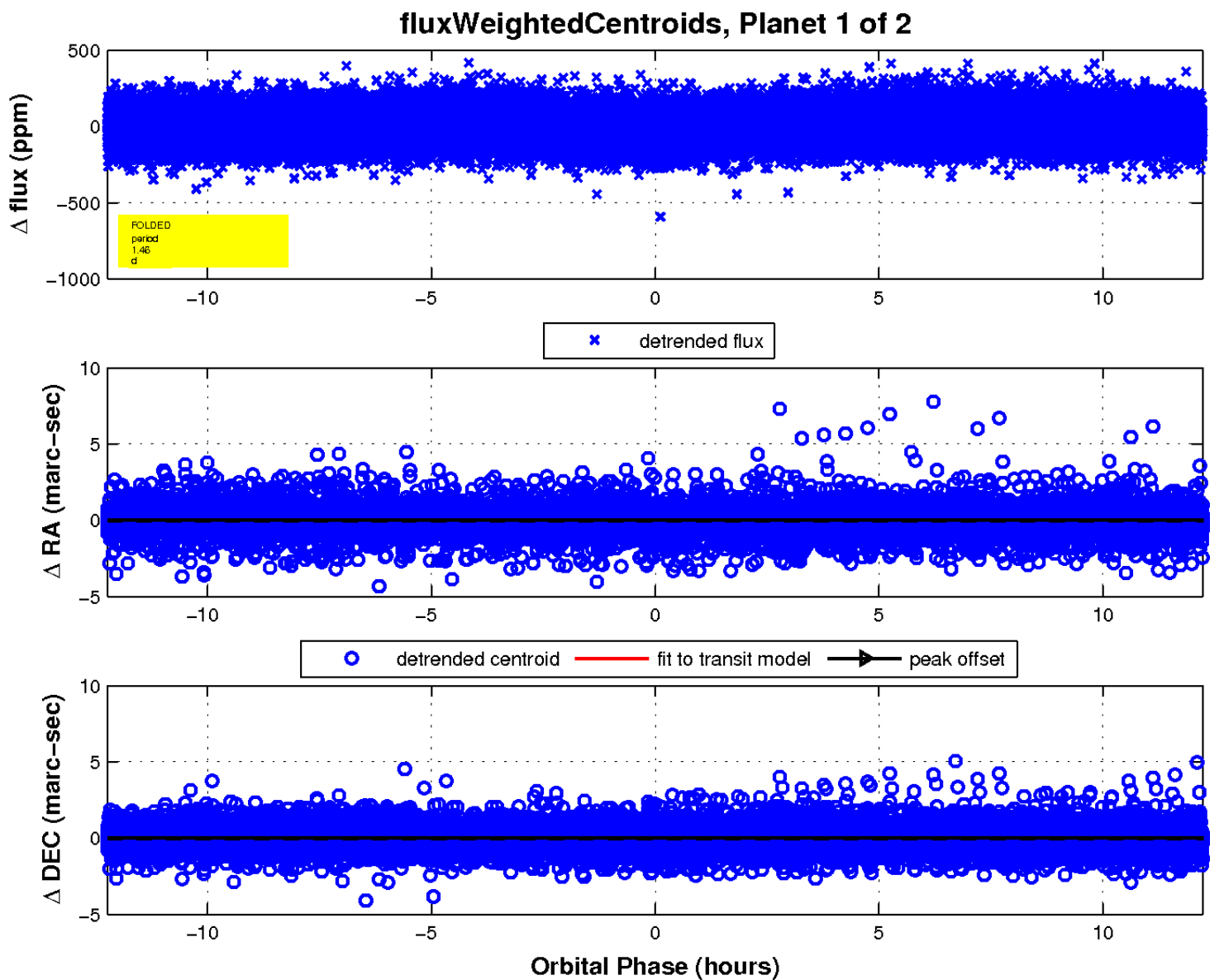
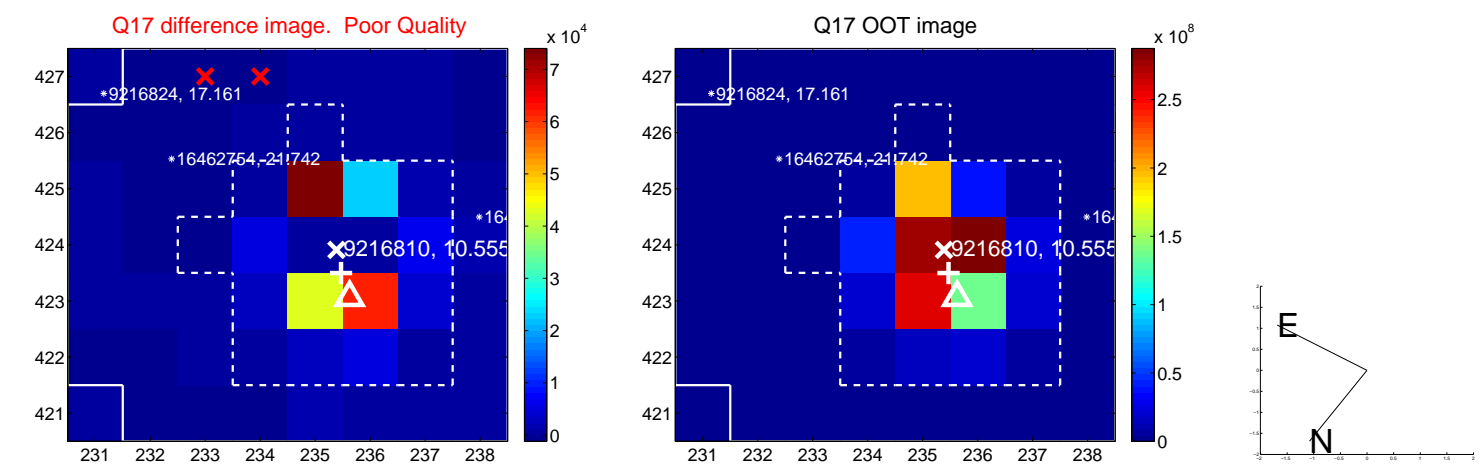
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

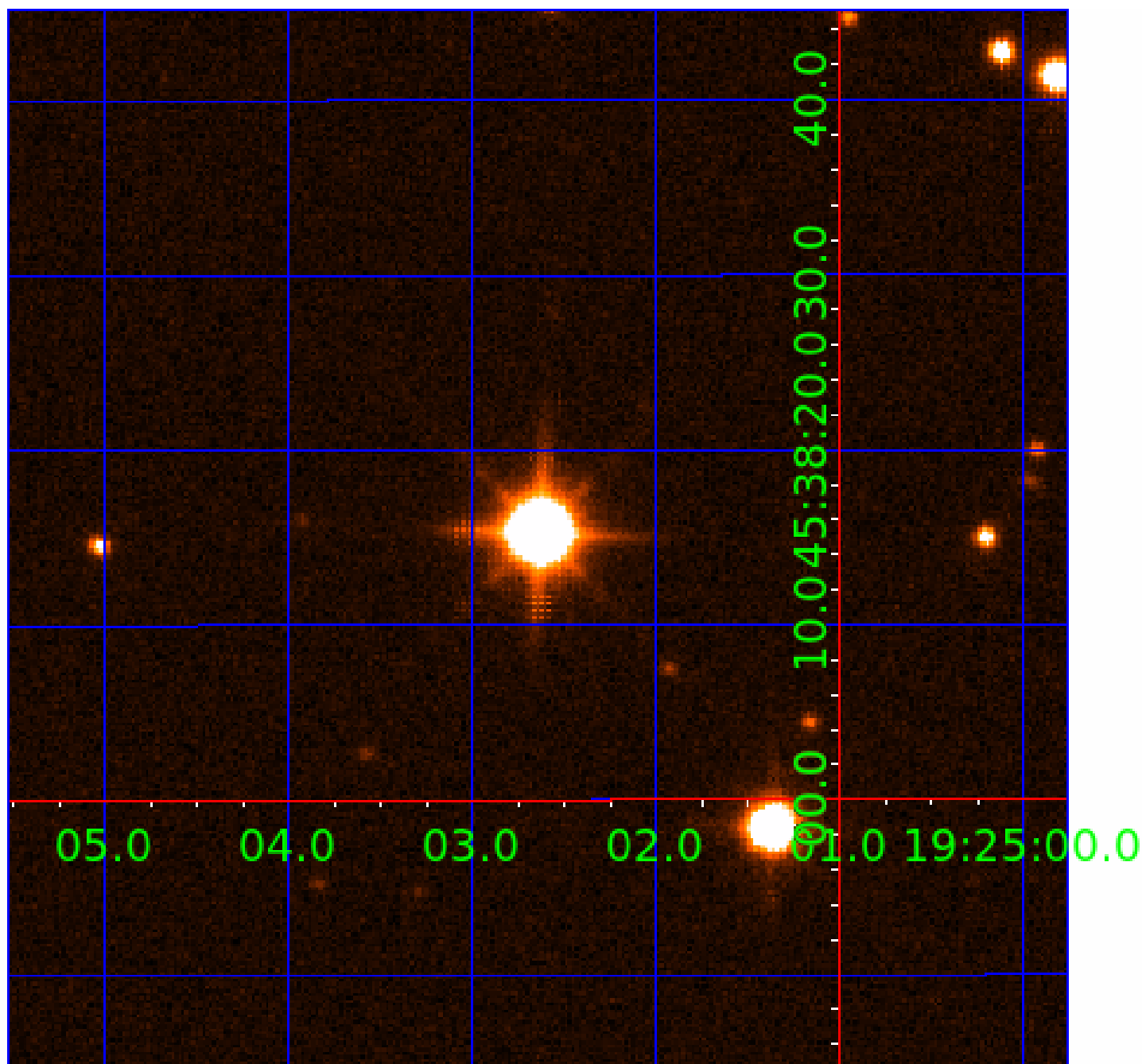


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009216810

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})
009216810-01	OBS	No	1.460203	131.749013	10.5	4.078	9.2	6.5	1.93	6995	0.72	11220.59
009216810-02	OBS	8179.01	138.629025	235.373033	142.5	4.934	7.6	8.2	1.93	6995	2.73	25.91

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009216810-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
009216810-02	OBS	FP	0.21	1	0	0	0	INCONSISTENT_TRANS—CENT_SATURATED

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

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

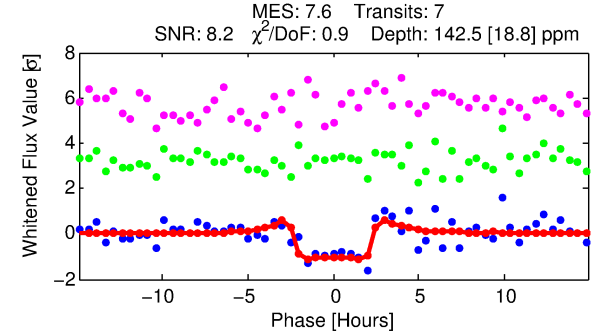
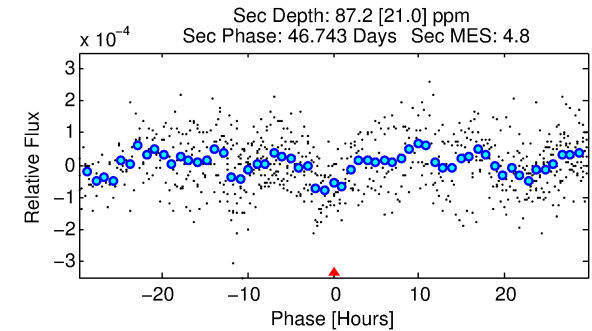
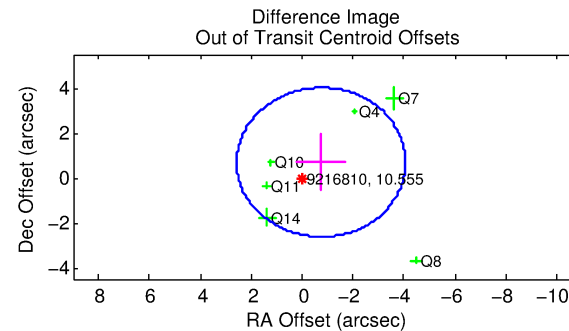
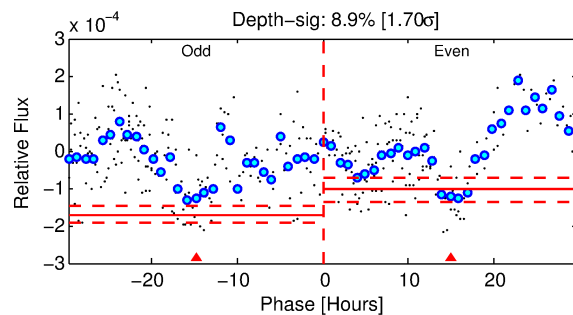
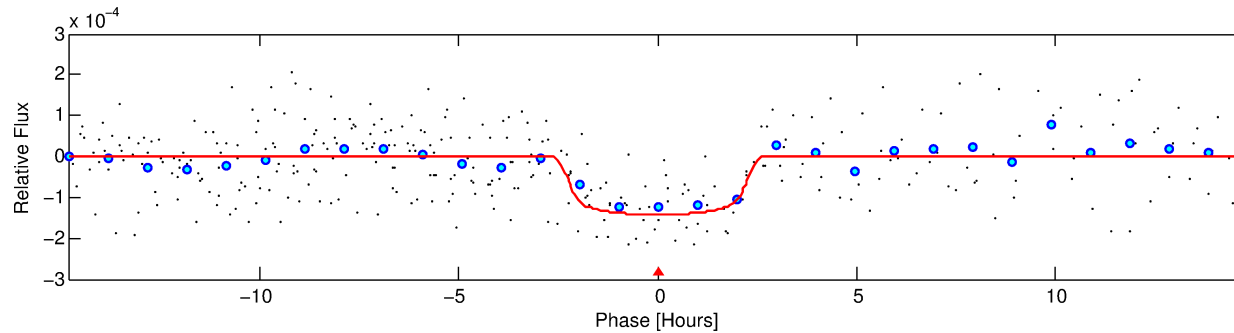
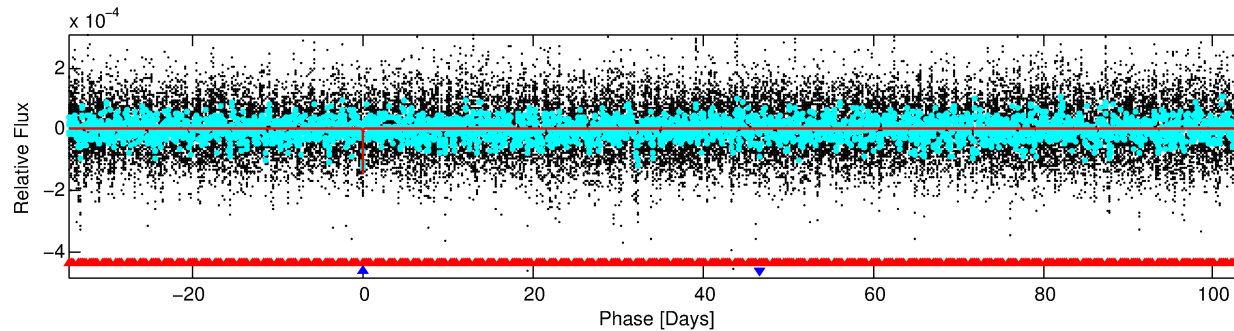
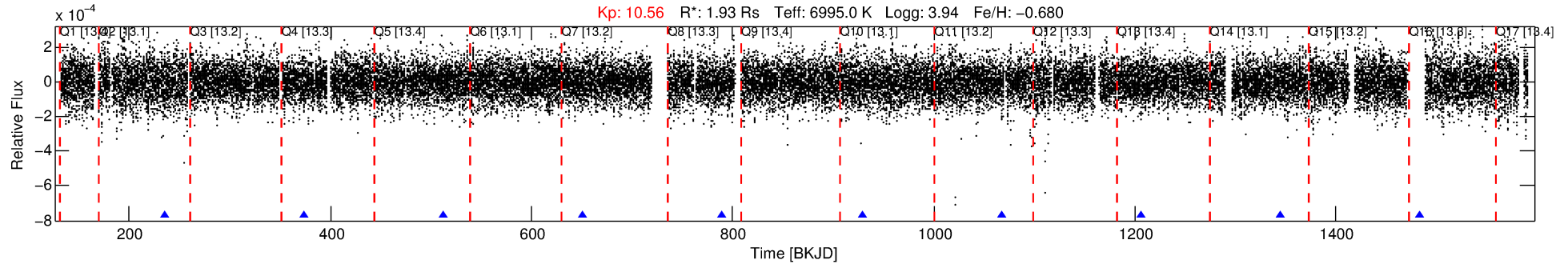
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009216810-02

No Significant Match Found

DV One-Page Summary

KIC: 9216810 Candidate: 2 of 2 Period: 138.629 d



DV Fit Results:

Period = 138.62902 [0.00184] d
Epoch = 235.3730 [0.0108] BKJD
Rp/R* = 0.0129 [0.0026]
a/R* = 90.24 [104.59]
b = 0.92 [0.19]
Seff = 25.91 [12.48]
Teq = 575 [69] K
Rp = 2.73 [0.99] Re
a = 0.5556 [0.1610] AU
Ag = 1993.49 [1318.86] [1.51σ]
Teffp = 5943 [725] K [7.37σ]

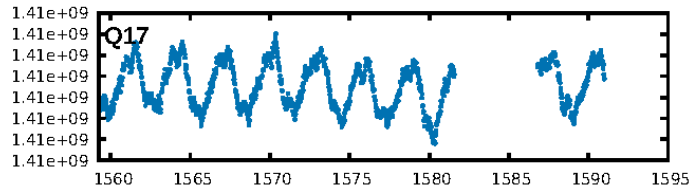
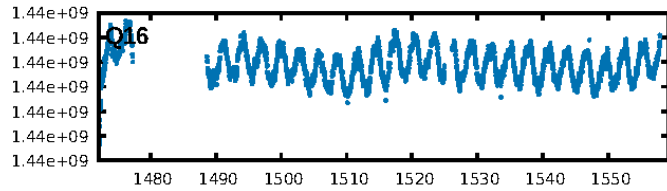
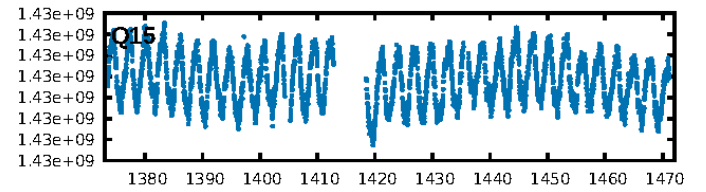
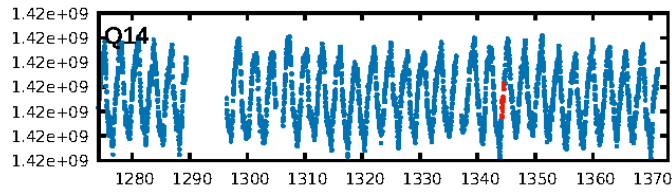
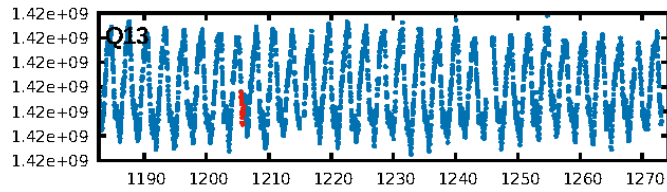
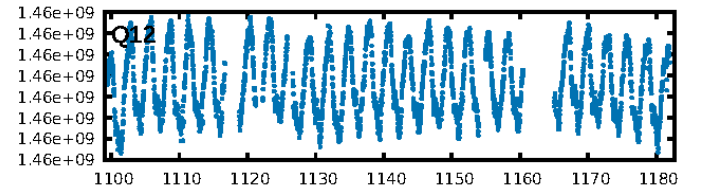
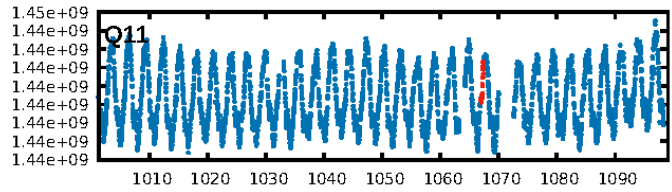
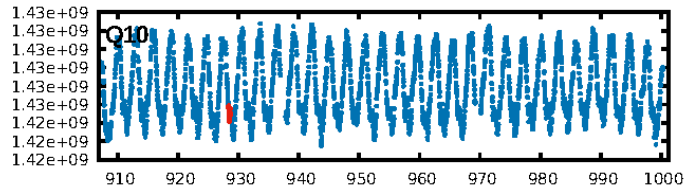
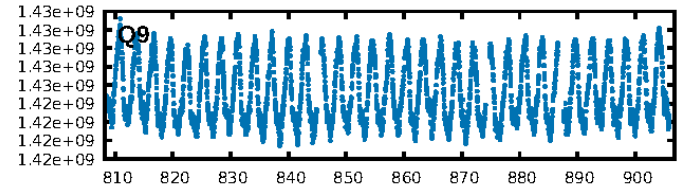
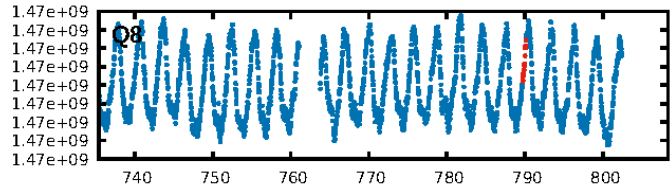
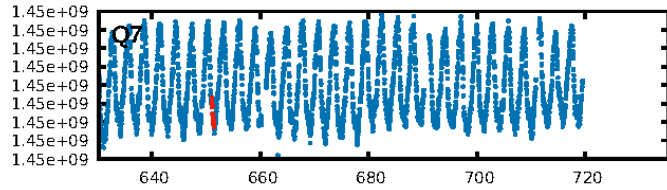
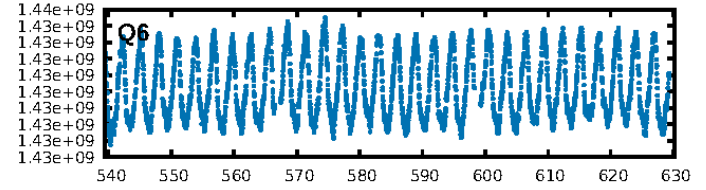
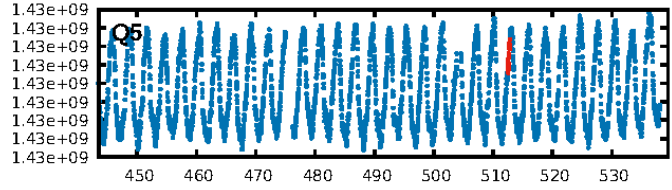
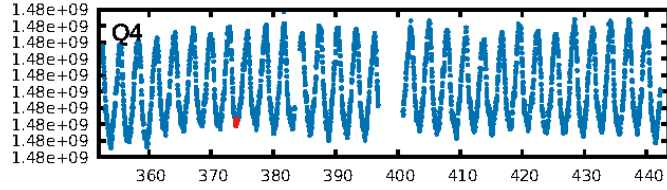
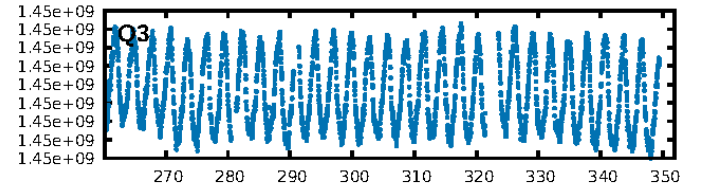
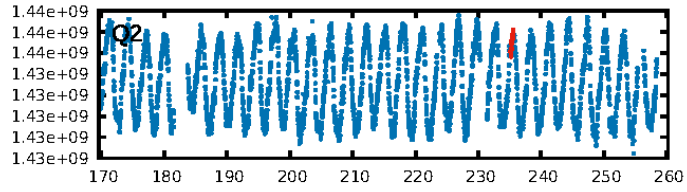
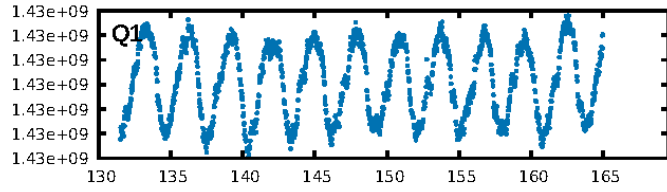
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [514.27σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 70.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 5.29e-10
RollingBand-fgt: 1.00 [7/7]
GhostDiagnostic-chr: -1.253
Centroid-sig: 38.7%
Centroid-so: 0.625 arcsec [0.89σ]
OotOffset-rm: 1.019 arcsec [0.92σ]
KicOffset-rm: 1.959 arcsec [1.67σ]
OotOffset-st: 2/2/2/0 [6]
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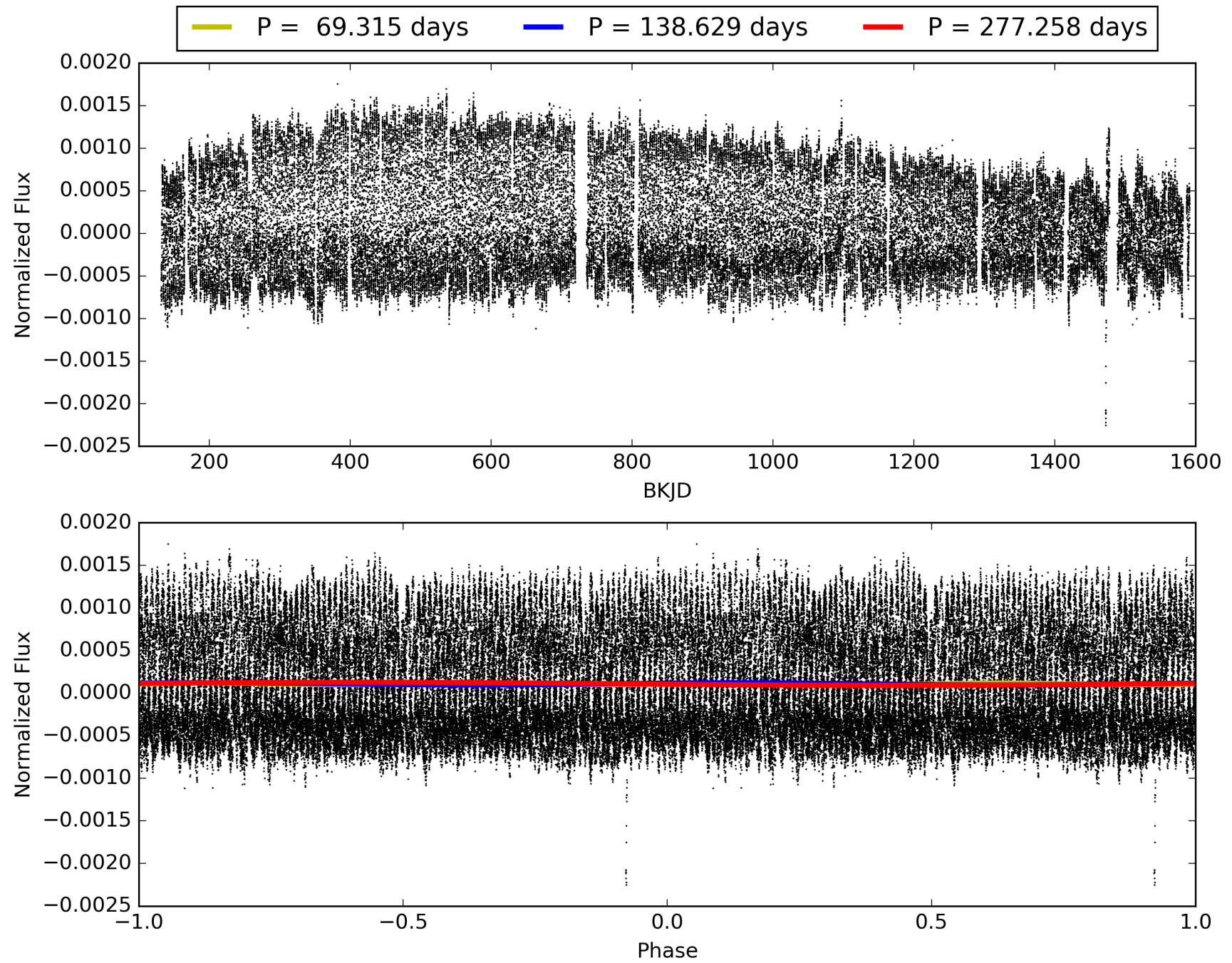
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 23:44:32 Z

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

TCE 009216810-02, PDC Light Curves

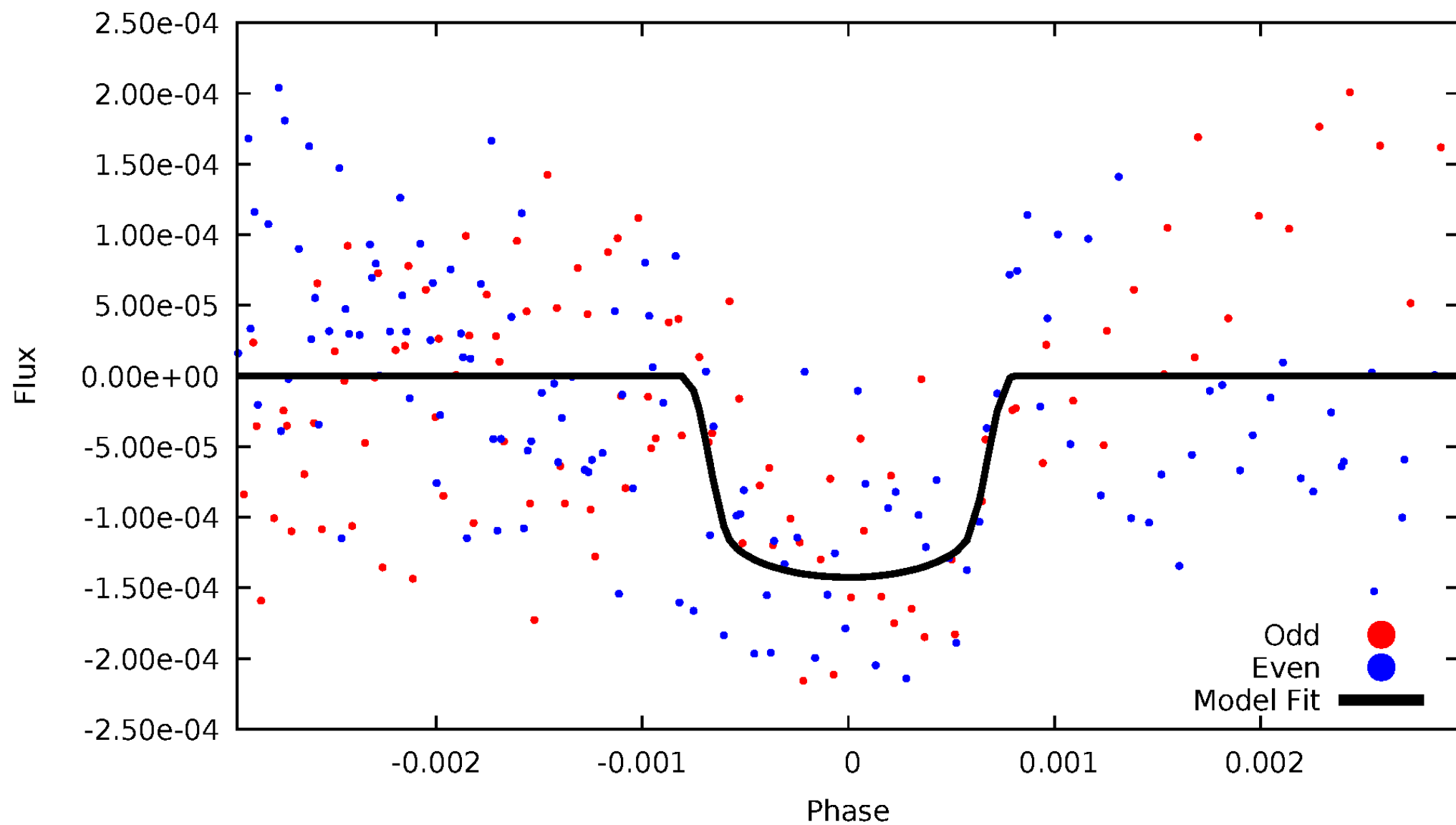


TCE 009216810-02



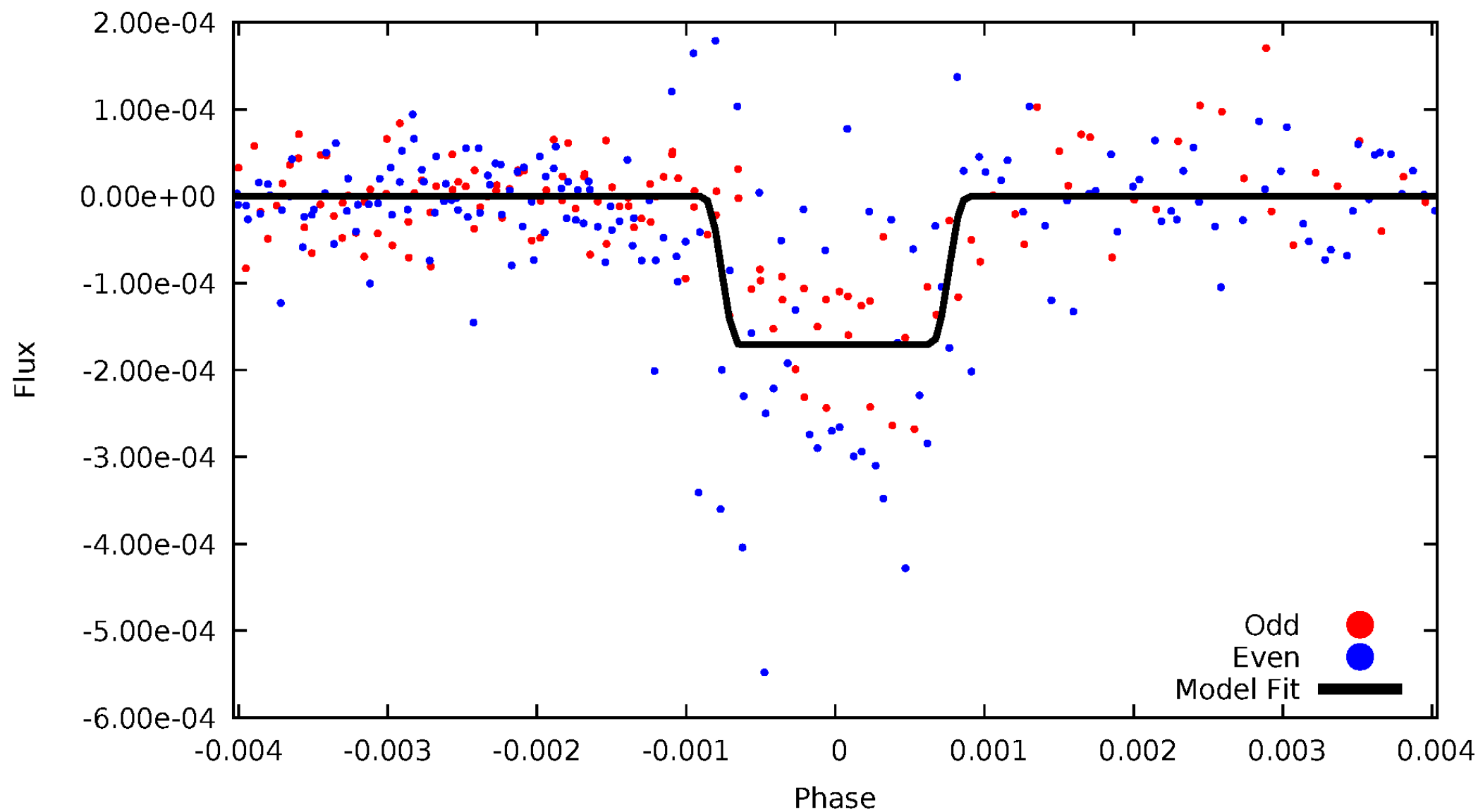
DV Odd/Even

TCE 009216810-02



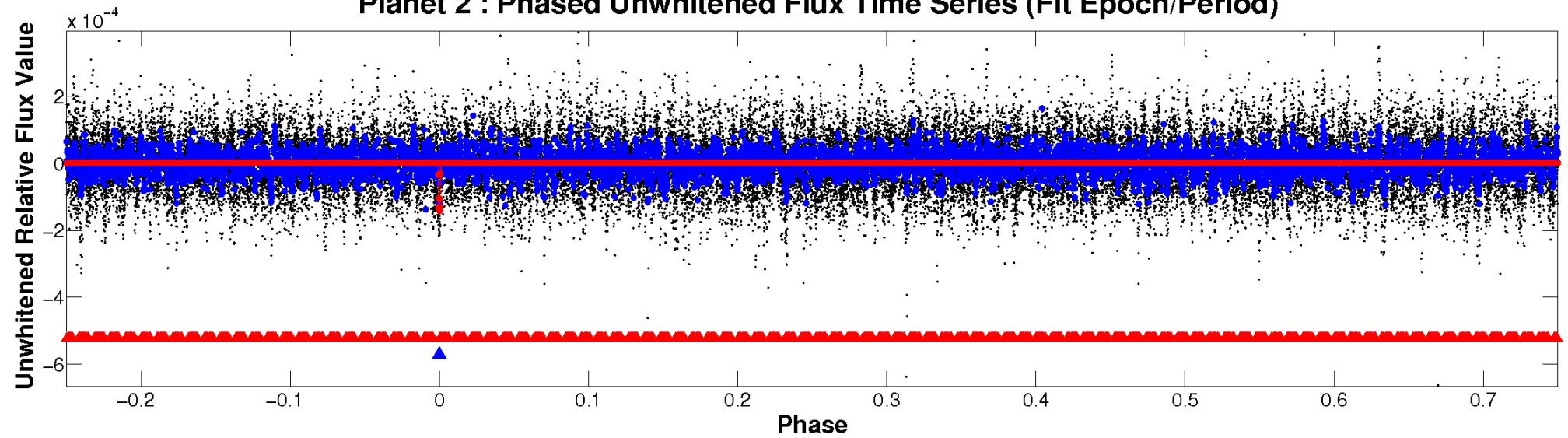
ALT Odd/Even

TCE 009216810-02

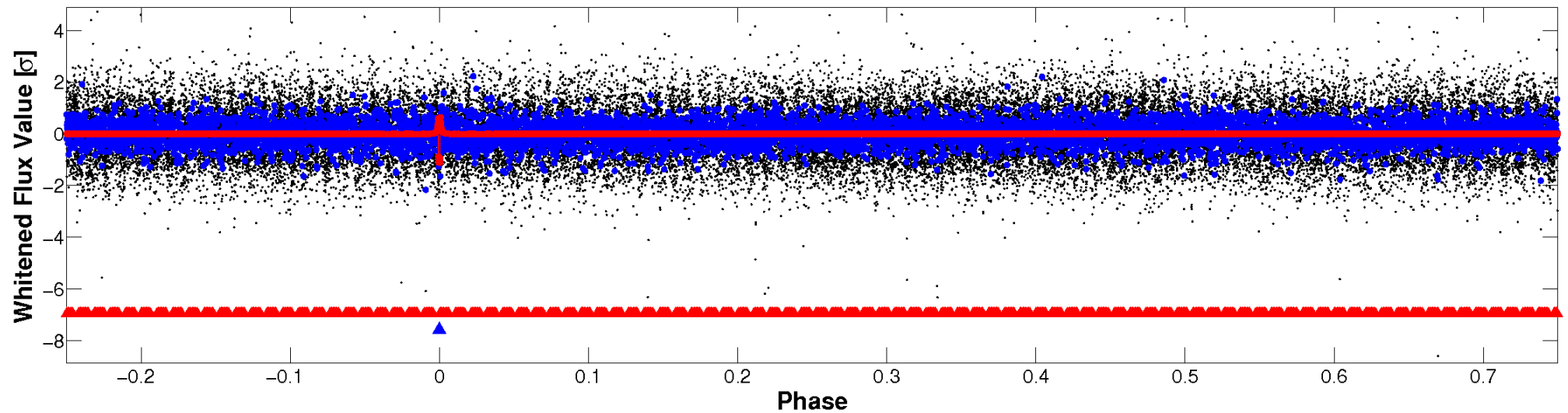


Non-Whitened Vs. Whitened Light Curve

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

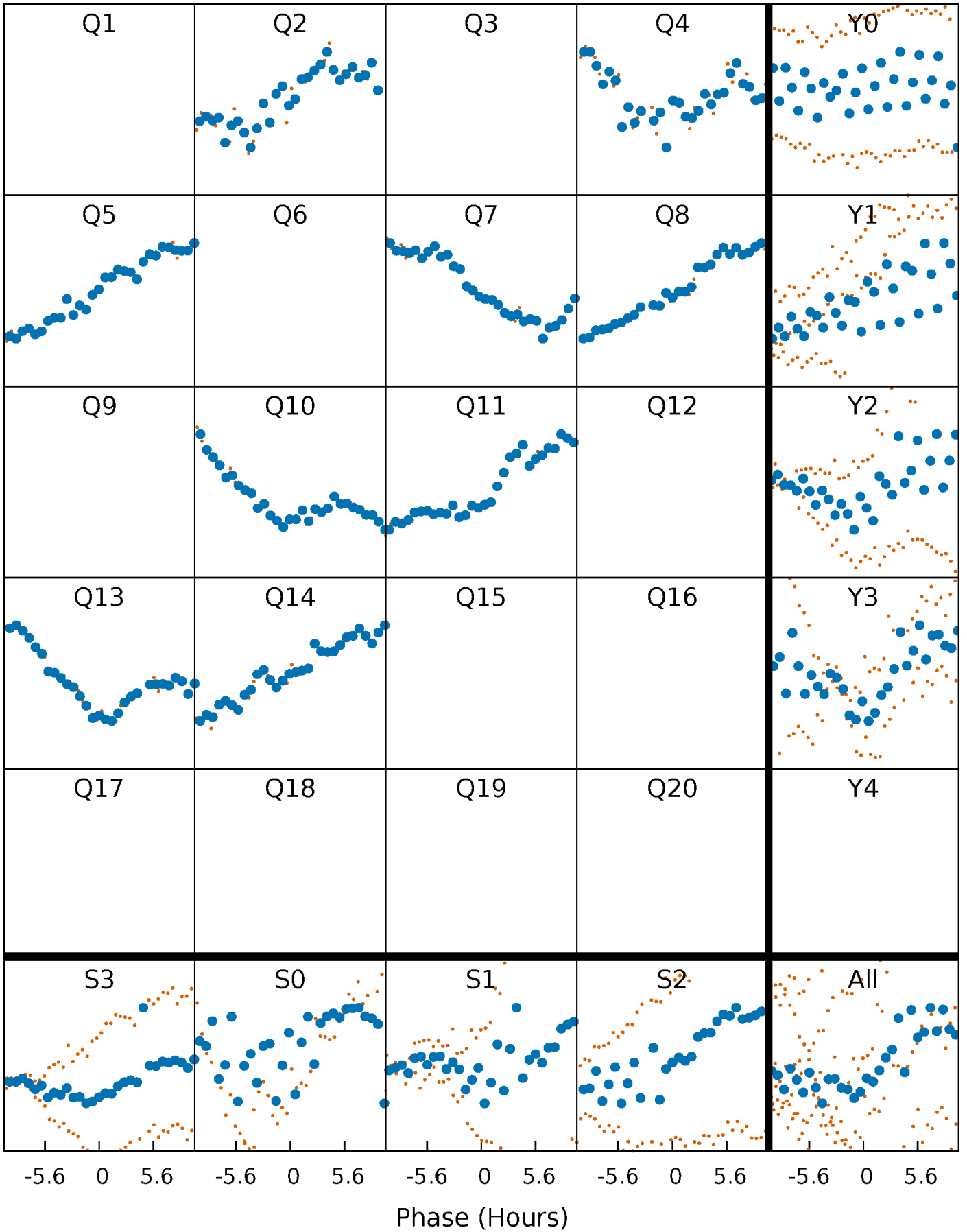


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



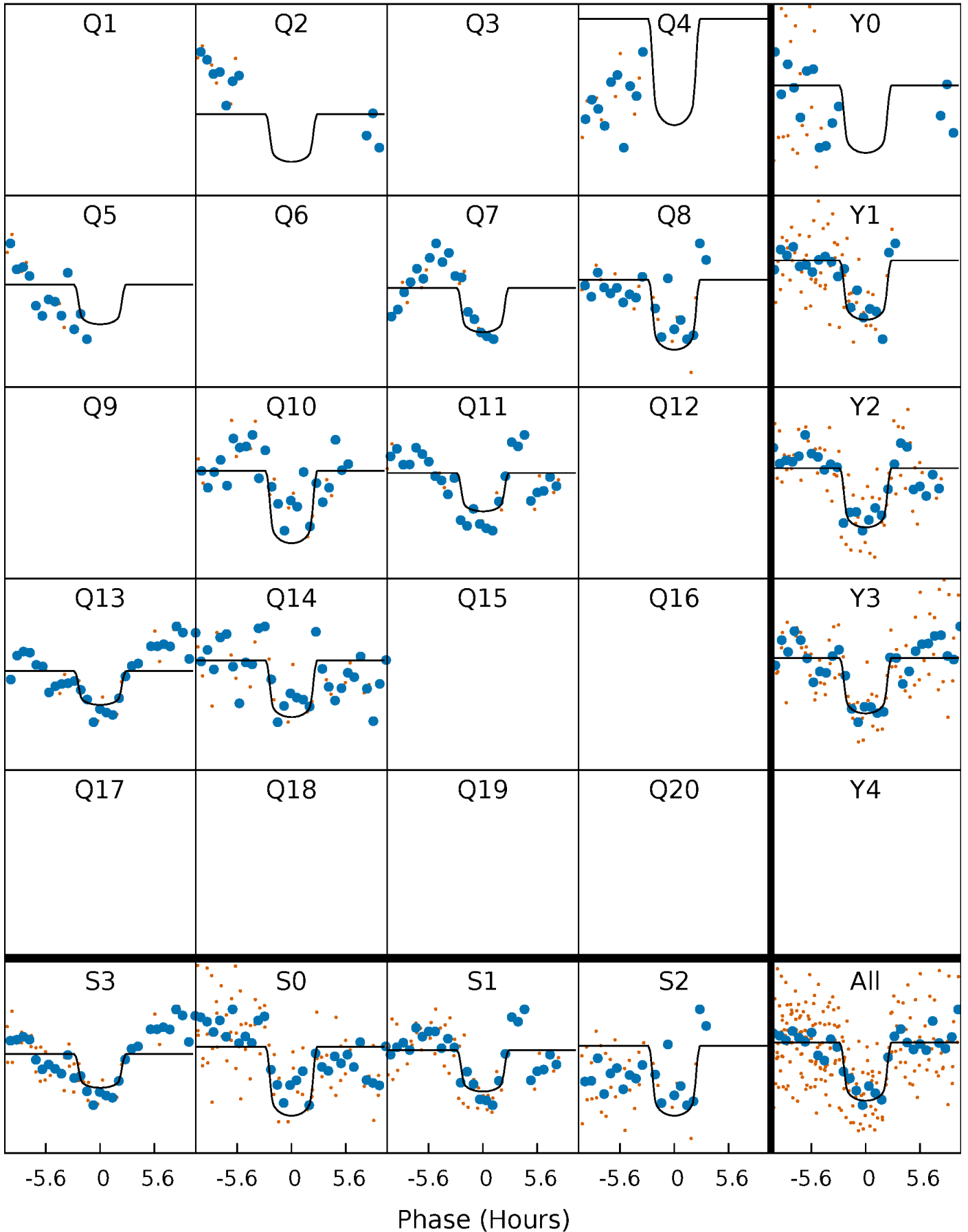
PDC Quarter-Phased Transit Curves

TCE 009216810-02 P=138.629025 Days $T_0=235.373033$ (BKJD)



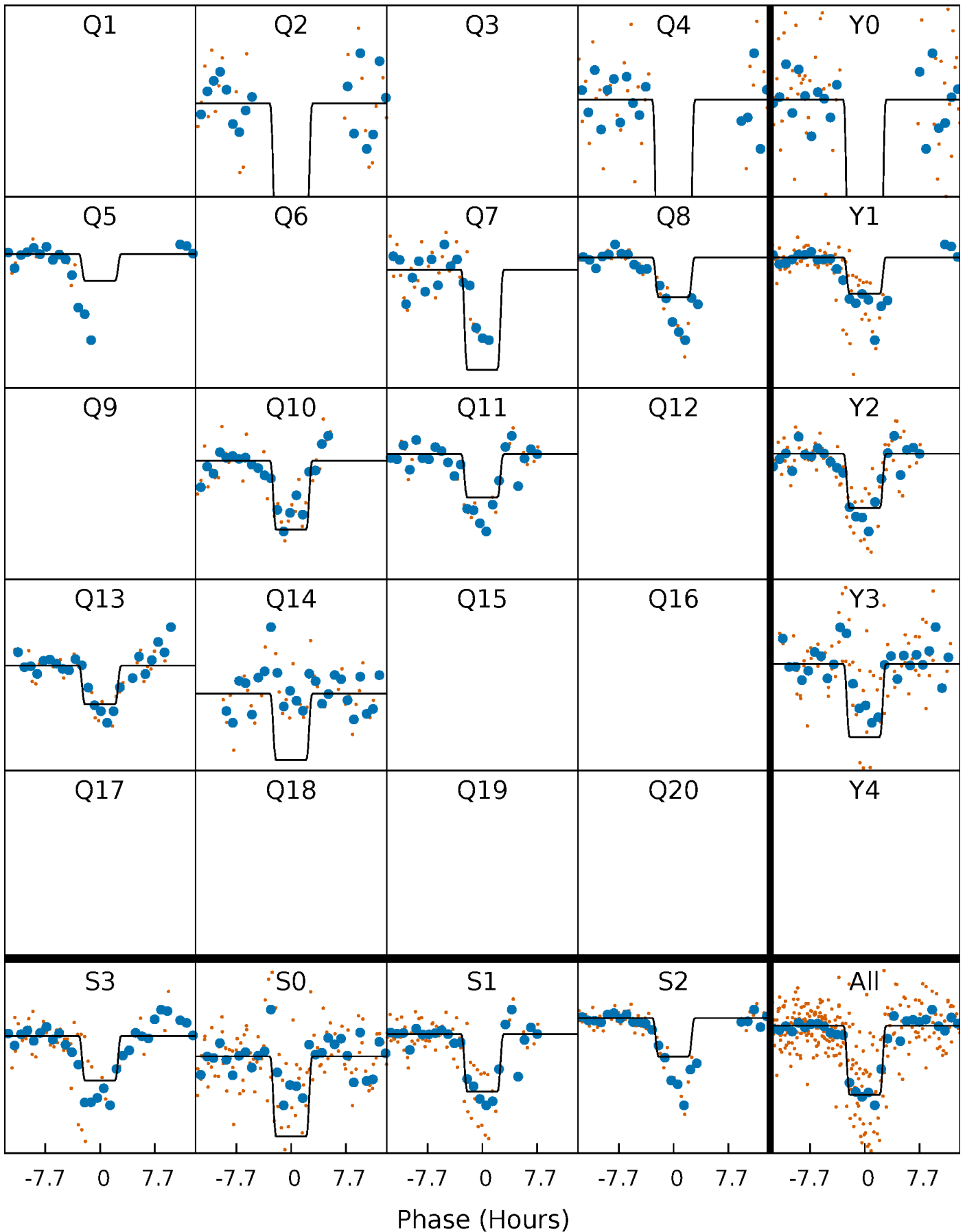
DV Quarter-Phased Transit Curves

TCE 009216810-02 P=138.629025 Days $T_0=235.373033$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

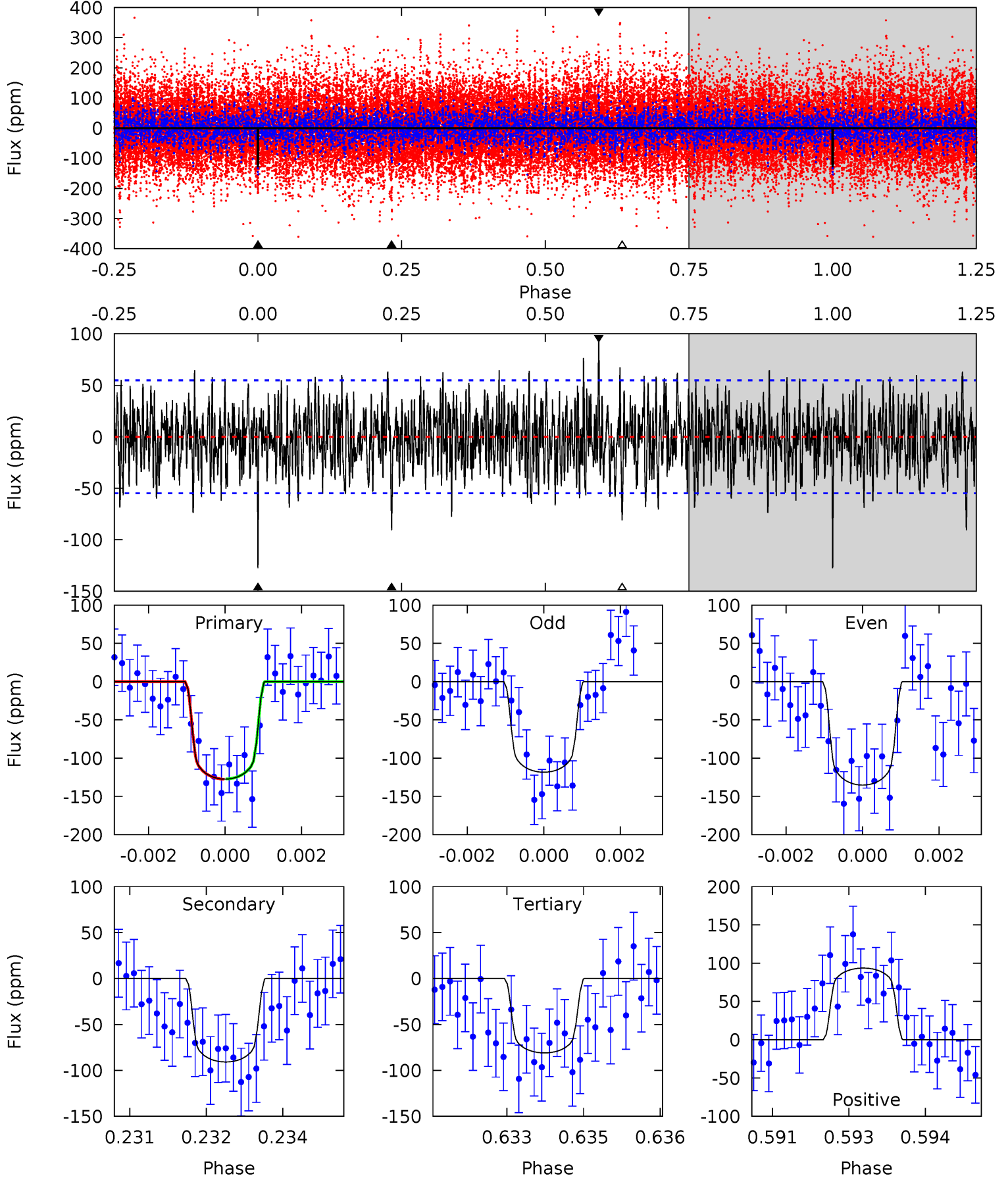
TCE 009216810-02 P=138.625982 Days $T_0=235.392651$ (BKJD)



DV Model-Shift Uniqueness Test

009216810-02, P = 138.629025 Days, E = 96.744008 Days

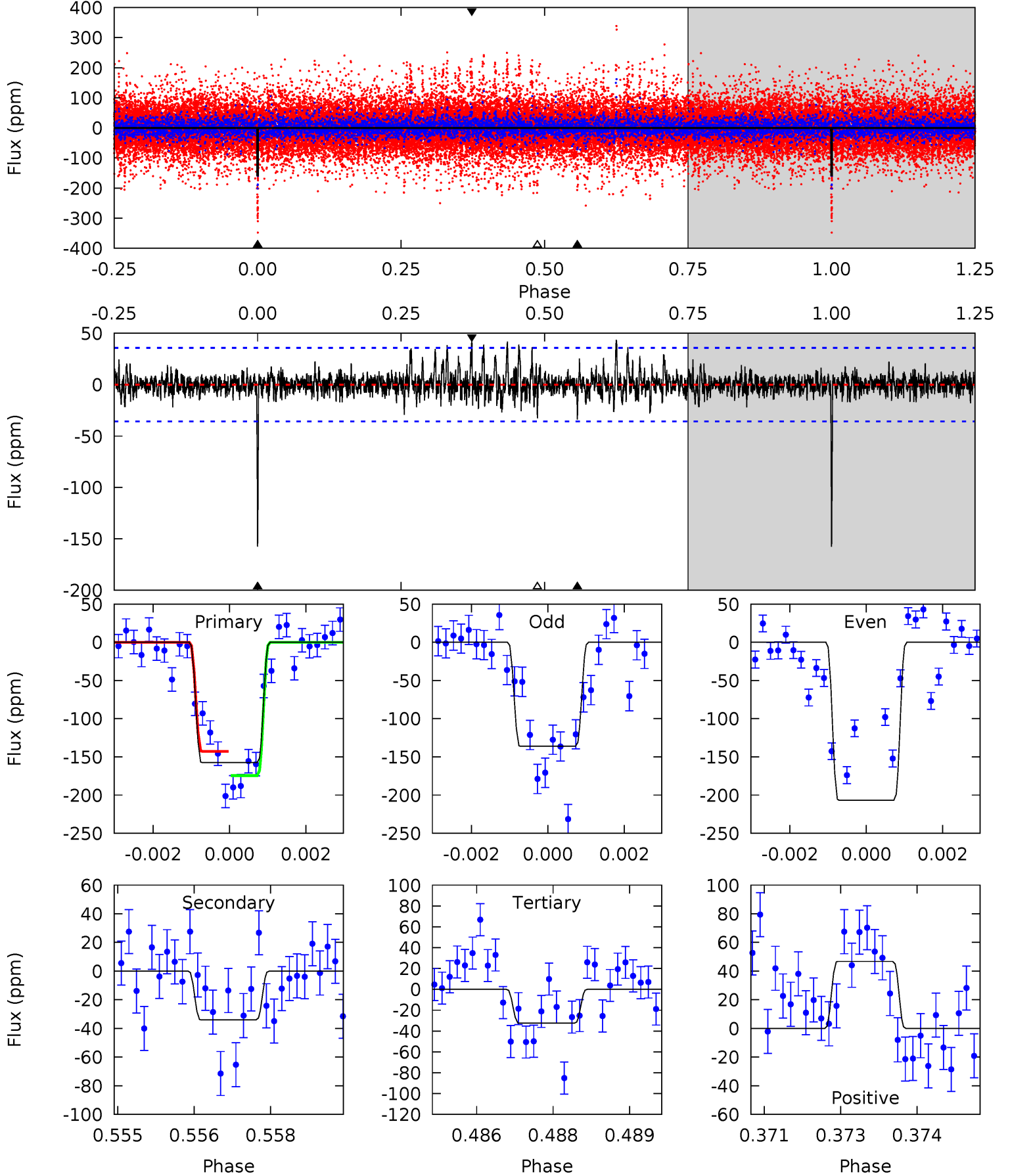
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.5	8.90	7.93	9.17	5.37	3.17	2.48	4.54	3.31	0.97	-0.27	0.82	1.17	0.42	0.01



Alt Model-Shift Uniqueness Test

009216810-02, $P = 138.625982$ Days, $E = 96.766669$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.6	5.09	4.87	7.00	5.35	3.14	1.28	18.7	16.6	0.22	-1.91	5.04	1.13	0.23	2.39



Stellar Parameters For KIC 009216810

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6995^{+183}_{-224}	$3.942^{+0.273}_{-0.117}$	$-0.680^{+0.300}_{-0.300}$	$1.931^{+0.386}_{-0.580}$	$1.192^{+0.193}_{-0.158}$	$0.233^{+0.391}_{-0.080}$
	+3%/-3%	+7%/-3%	+44%/-44%	+20%/-30%	+16%/-13%	+168%/-35%
Source	PHO1	FLK73	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 009216810-02 / KOI 8179.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-91 ± 10	$2.63^{+0.75}_{-0.67}$	794^{+48}_{-68}	5921^{+888}_{-494}	2251^{+1719}_{-891}
Alt.	-34 ± 7	$2.64^{+0.69}_{-0.68}$	791^{+49}_{-66}	4751^{+532}_{-365}	837^{+638}_{-332}

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 $A_{obs} \gg 1.0$

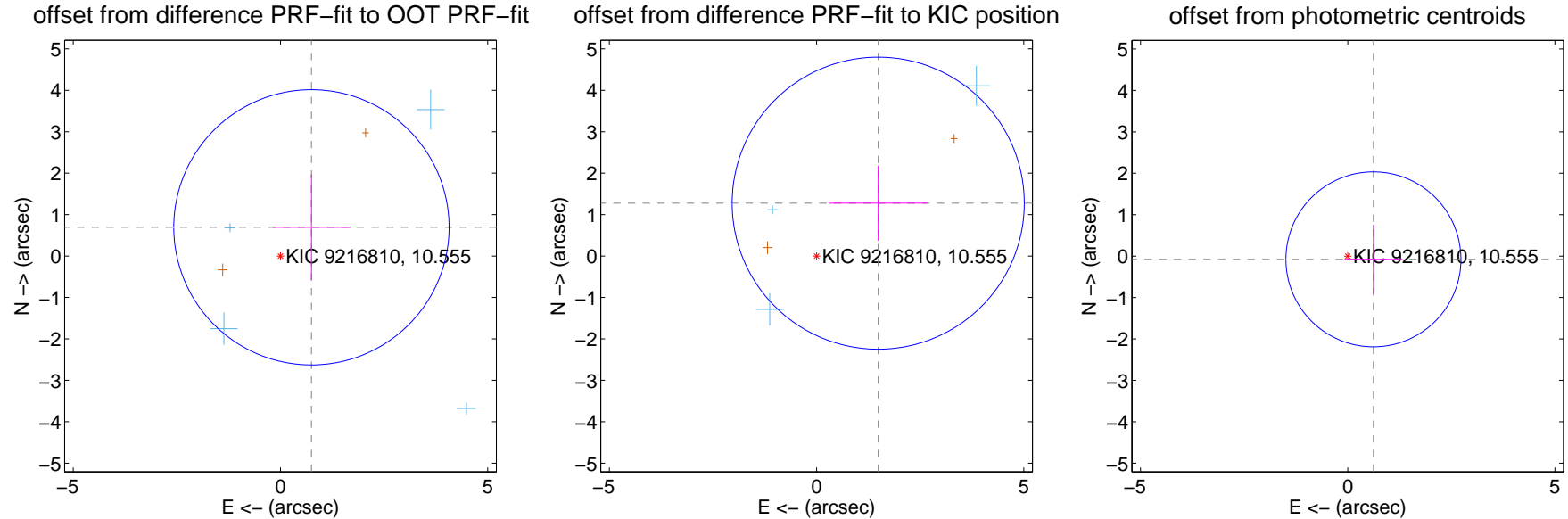
DV Centroid Data

Supplemental centroid analysis for 009216810-02. **Kepler magnitude: 10.55**. Transit SNR 8.17

There are 4 quarters with good PRF difference image offsets

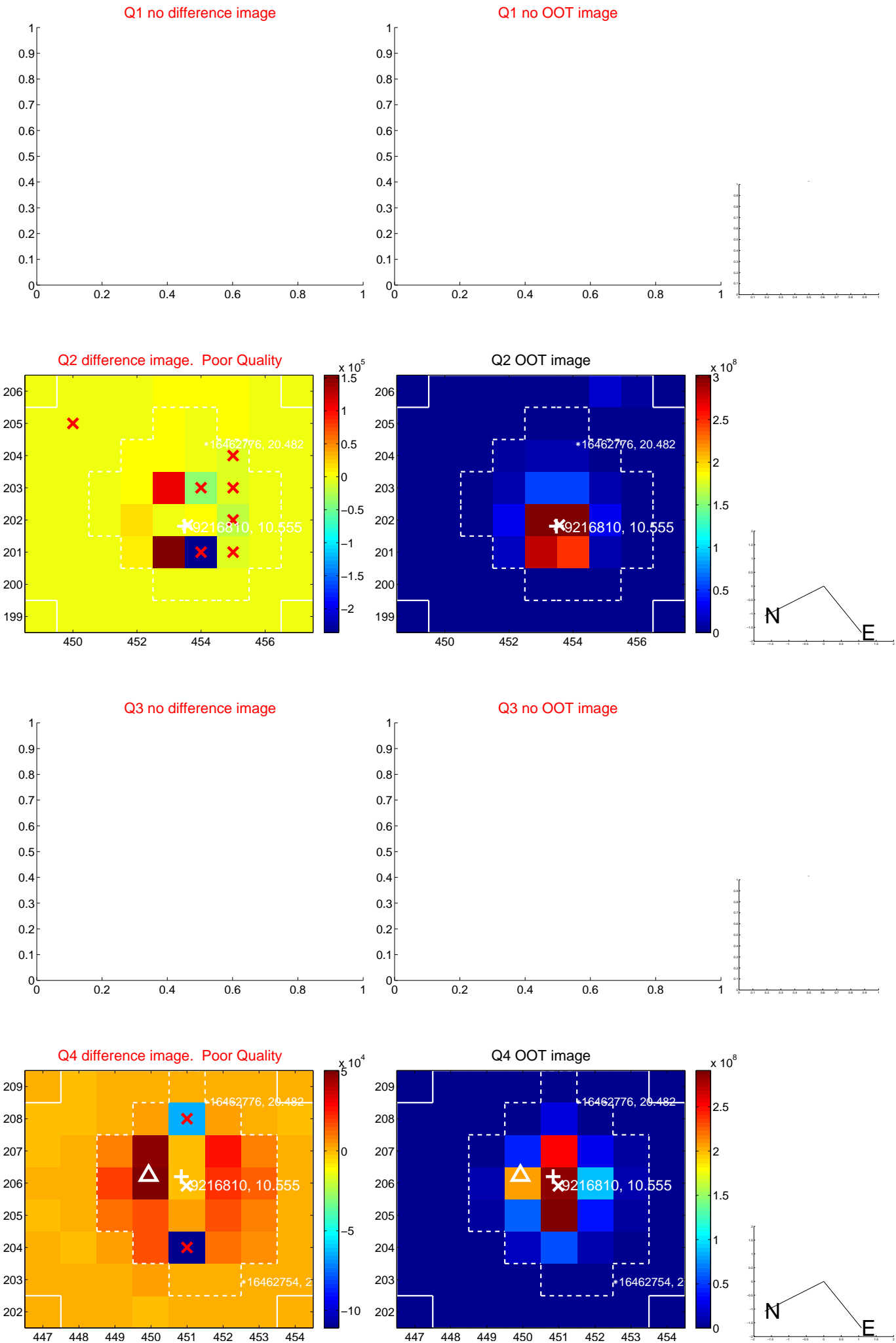
The direct PRF centroid is offset from the target star catalog position by about 0.52 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.019 ± 1.107	0.92	-0.747 ± 0.943	0.693 ± 1.272
PRF-fit source offset from KIC position	1.959 ± 1.175	1.67	-1.488 ± 1.185	1.275 ± 0.909
photometric centroid source offset	0.62 ± 0.70	0.89	-0.62 ± 0.70	-0.08 ± 0.83

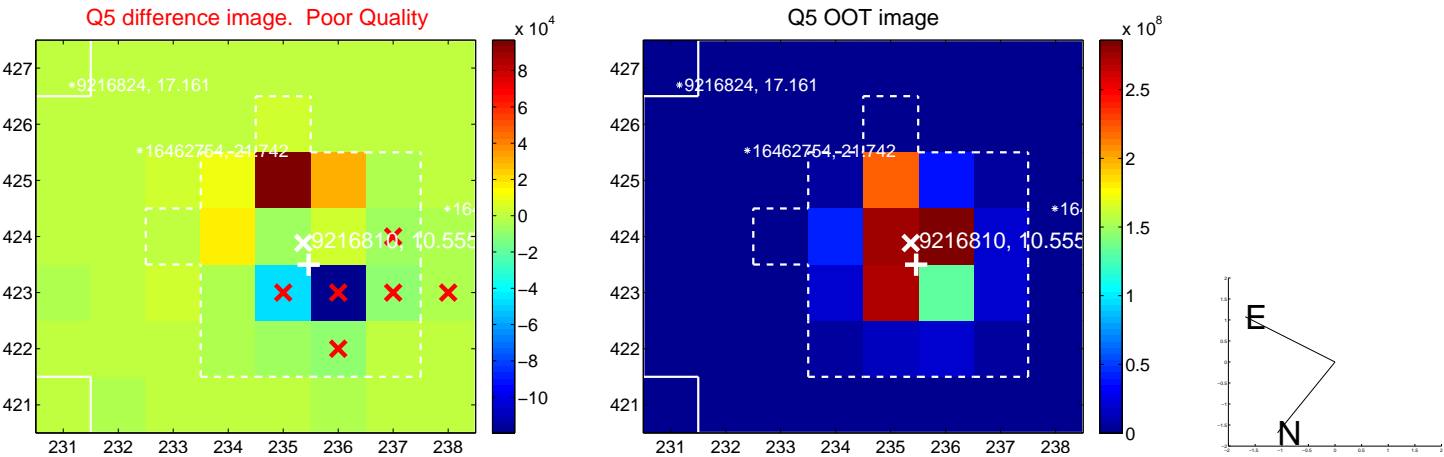


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

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



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



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

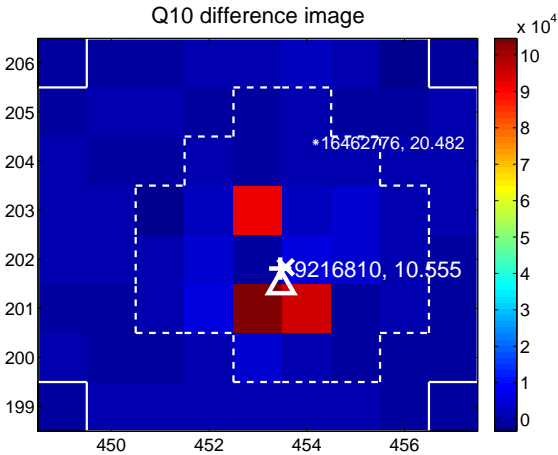
Q9 no difference image



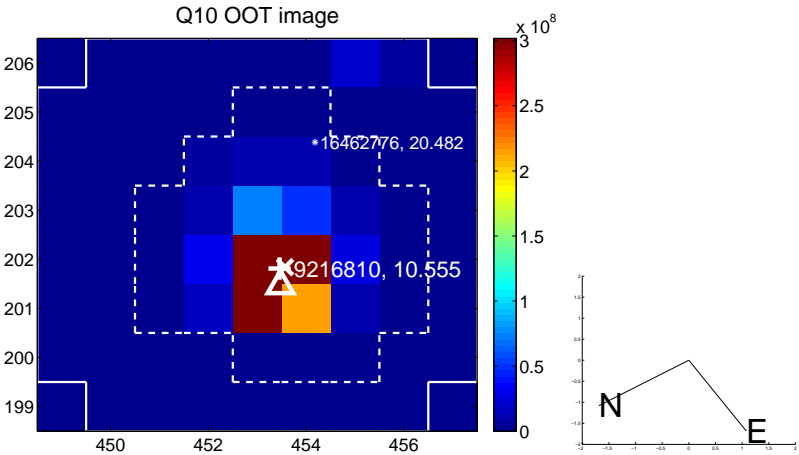
Q9 no OOT image



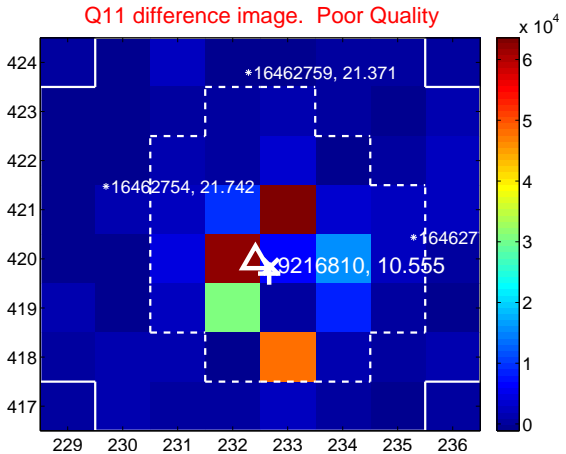
Q10 difference image



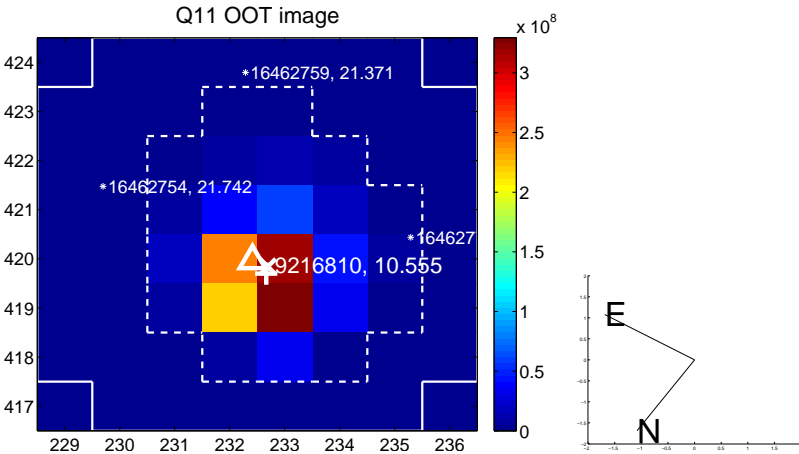
Q10 OOT image



Q11 difference image. Poor Quality



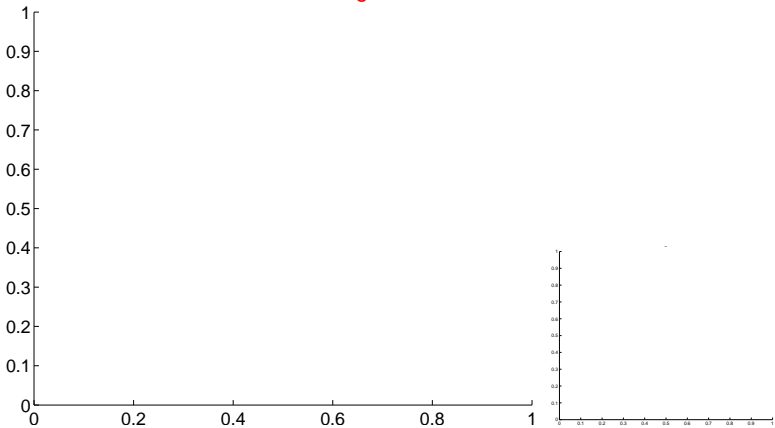
Q11 OOT image



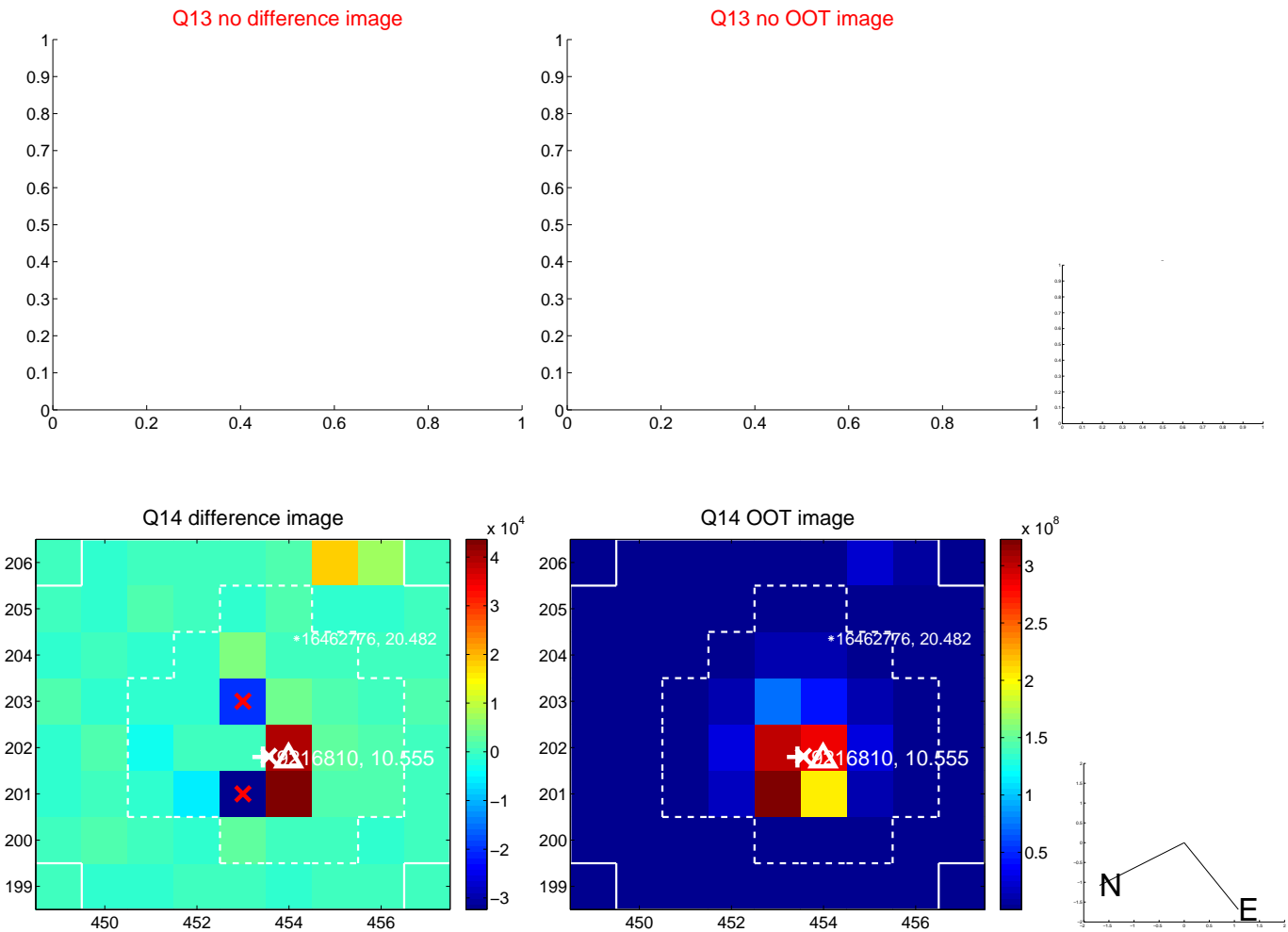
Q12 no difference image



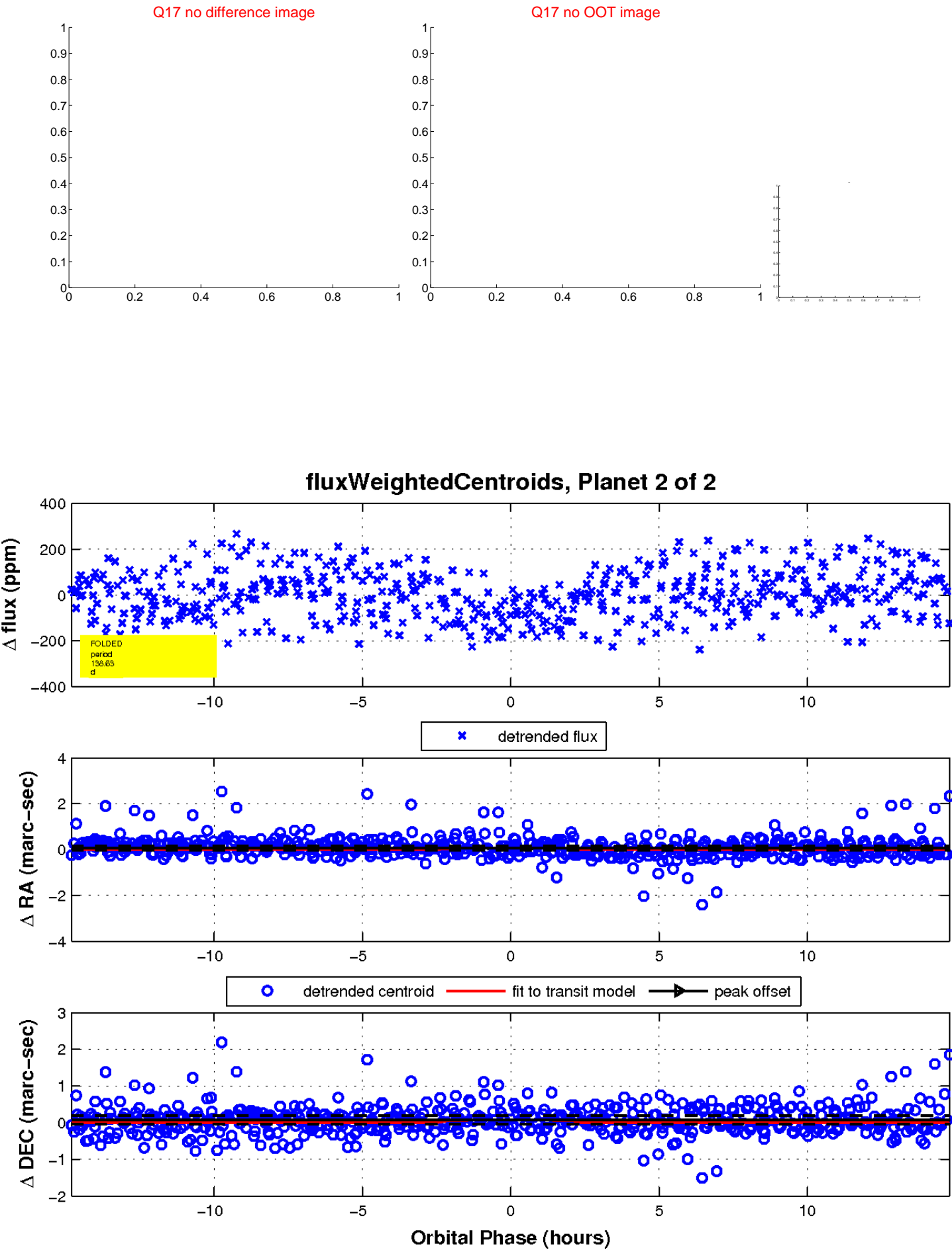
Q12 no OOT image



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

