

KIC 012203082

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})
012203082-01	OBS	No	32.960807	158.580960	336.3	2.006	7.6	4.6	0.51	3805	0.94	1.89
012203082-02	OBS	No	487.763311	379.613347	1478.3	6.654	8.9	6.5	0.51	3805	2.06	0.05

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012203082-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
012203082-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_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.

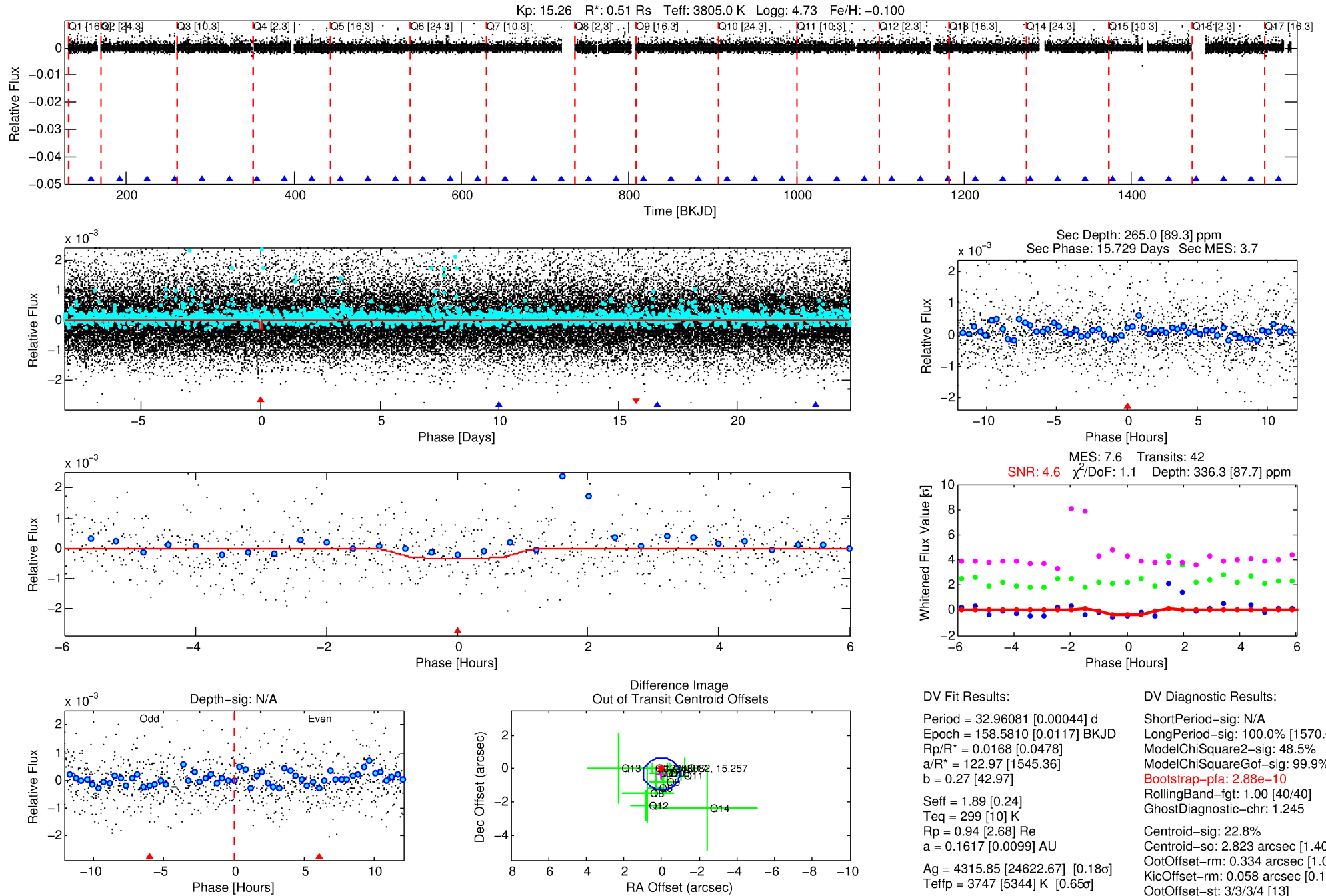
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012203082-01

No Significant Match Found

DV One-Page Summary

KIC: 12203082 Candidate: 1 of 2 Period: 32.961 d



DV Fit Results:

Period = 32.96081 [0.00044] d
Epoch = 158.5810 [0.0117] BKJD
Rp/R* = 0.0168 [0.0478]
a/R* = 122.97 [1545.36]
b = 0.27 [42.97]
Seff = 1.89 [0.24]
Teq = 299 [10] K
Rp = 0.94 [2.68] Re
a = 0.1617 [0.0099] AU
Ag = 4315.85 [24622.67] [0.18σ]
Teffp = 3747 [5344] K [0.65σ]

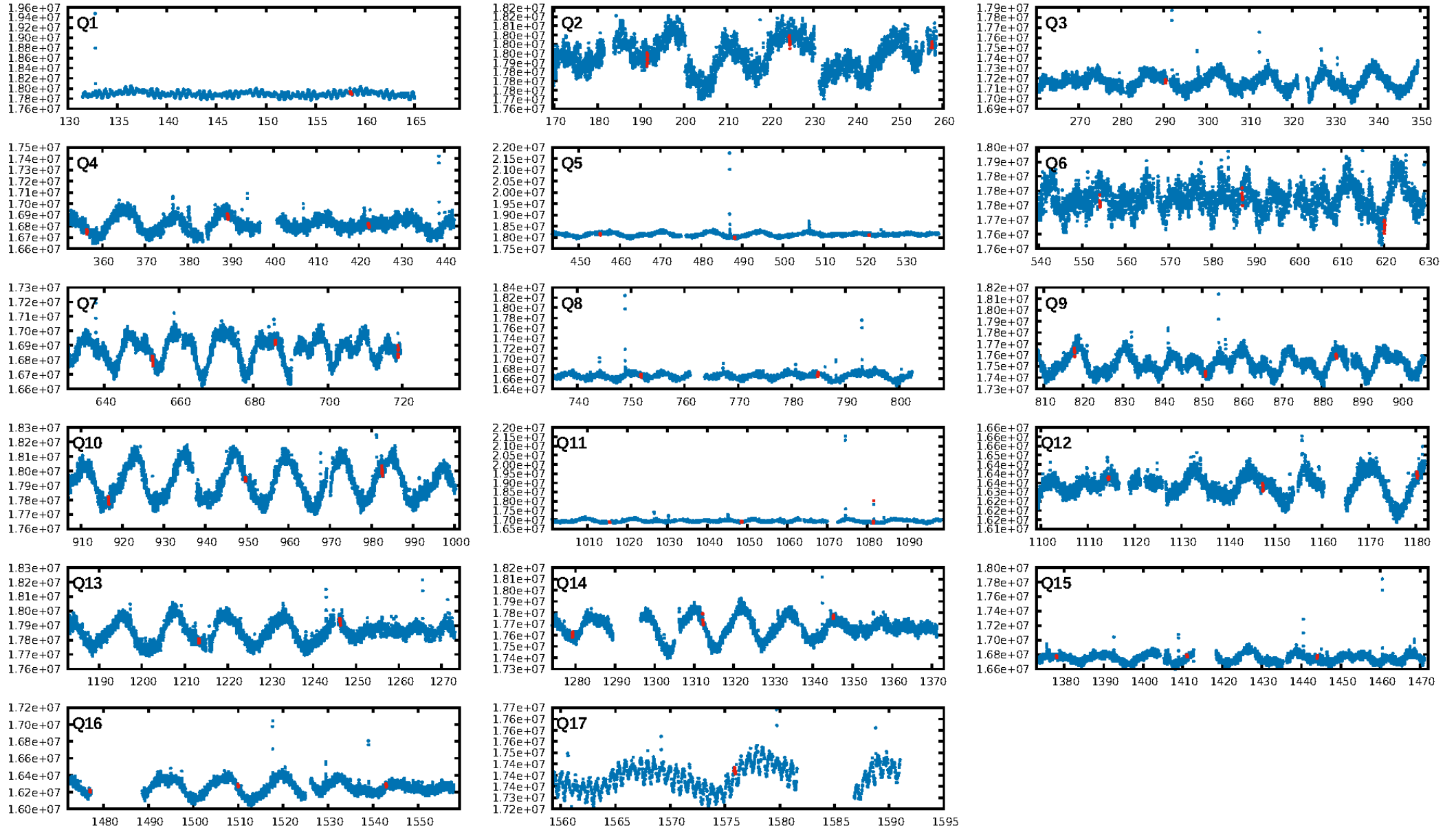
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [1570.66σ]
ModelChiSquare2-sig: 48.5%
ModelChiSquareGof-sig: 99.9%
Bootstrap-pfa: 2.88e-10
RollingBand-fgt: 1.00 [40/40]
GhostDiagnostic-chr: 1.245
Centroid-sig: 22.8%
Centroid-so: 2.823 arcsec [1.40σ]
OotOffset-rm: 0.334 arcsec [1.04σ]
KicOffset-rm: 0.058 arcsec [0.19σ]
OotOffset-st: 3/3/3/4 [13]
KicOffset-st: 3/3/3/4 [13]
DiffImageQuality-fgm: 0.54 [7/13]
DiffImageOverlap-fno: 1.00 [16/16]

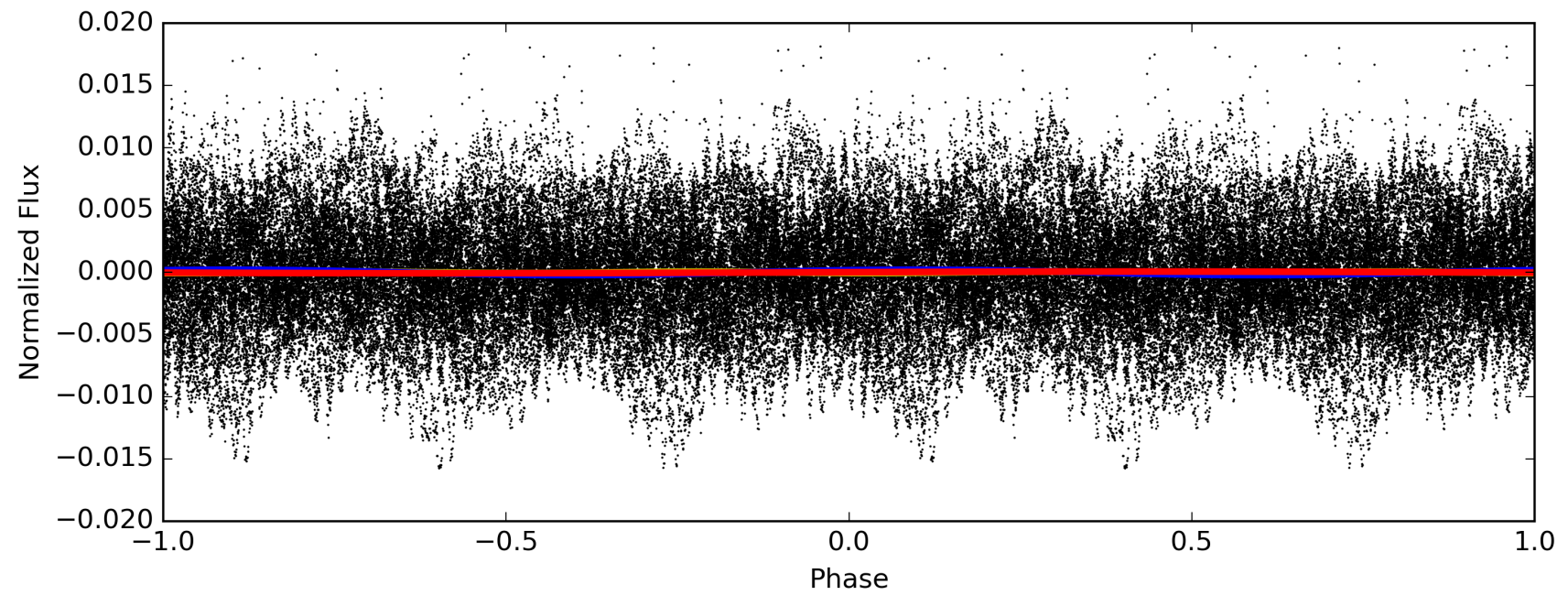
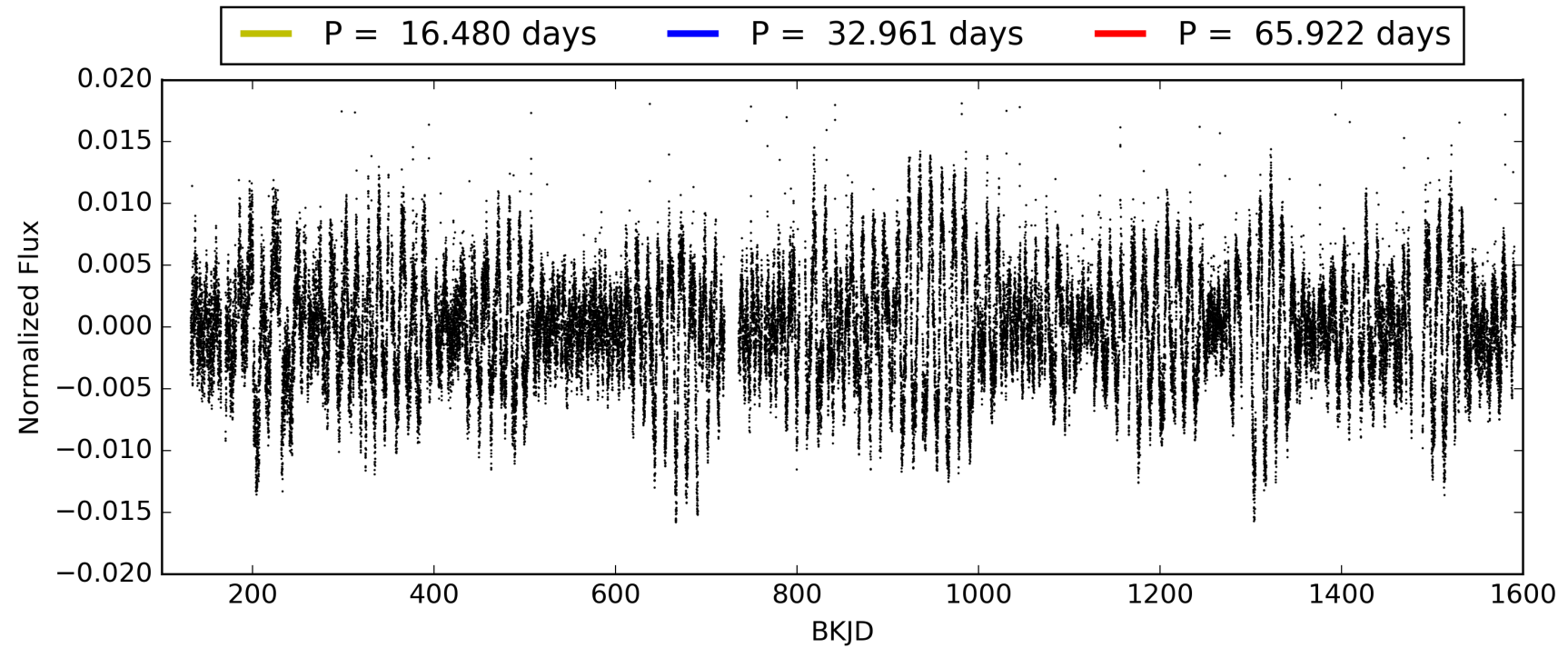
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 03:46:36 Z

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

TCE 012203082-01, PDC Light Curves

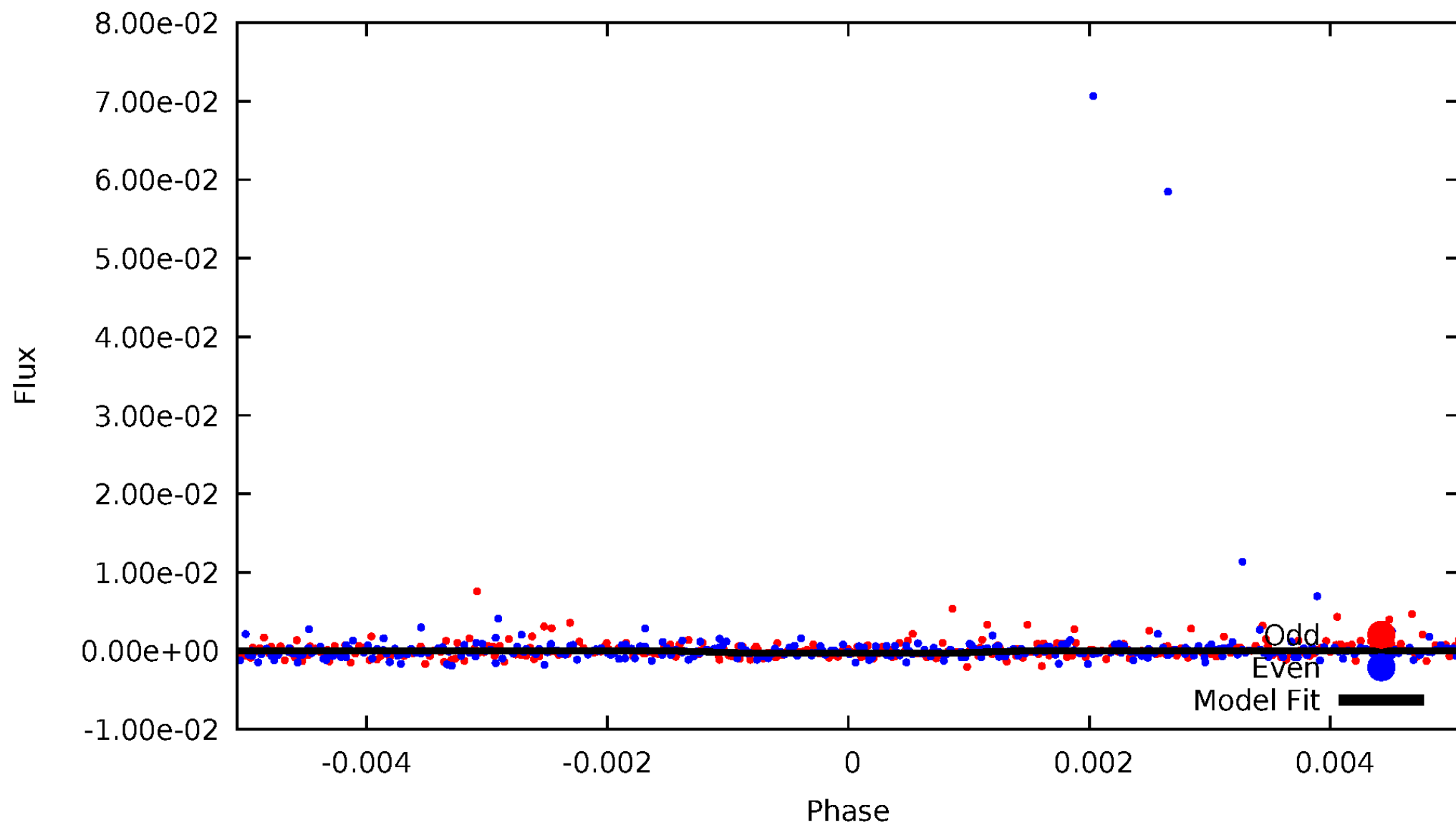


TCE 012203082-01



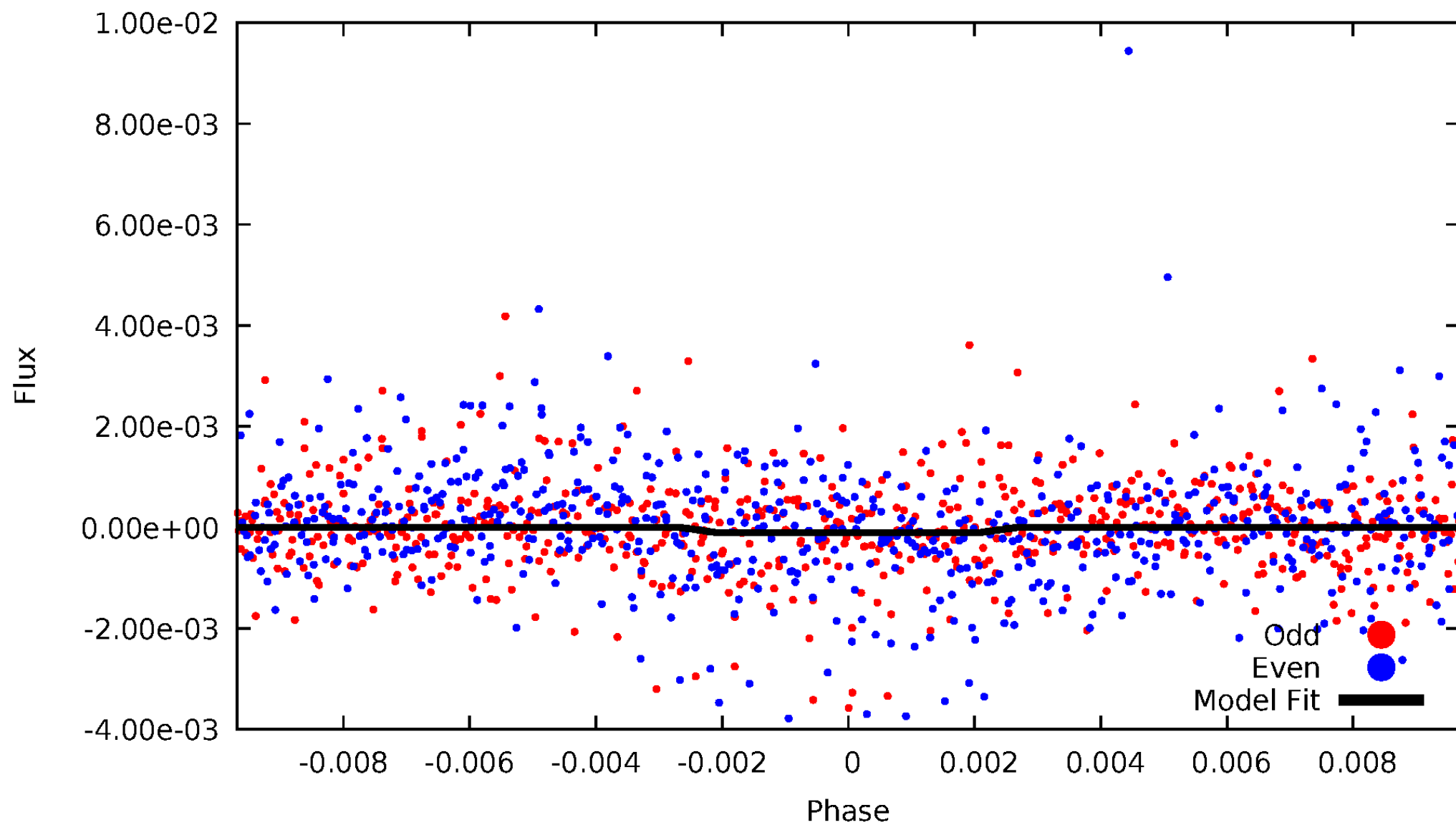
DV Odd/Even

TCE 012203082-01

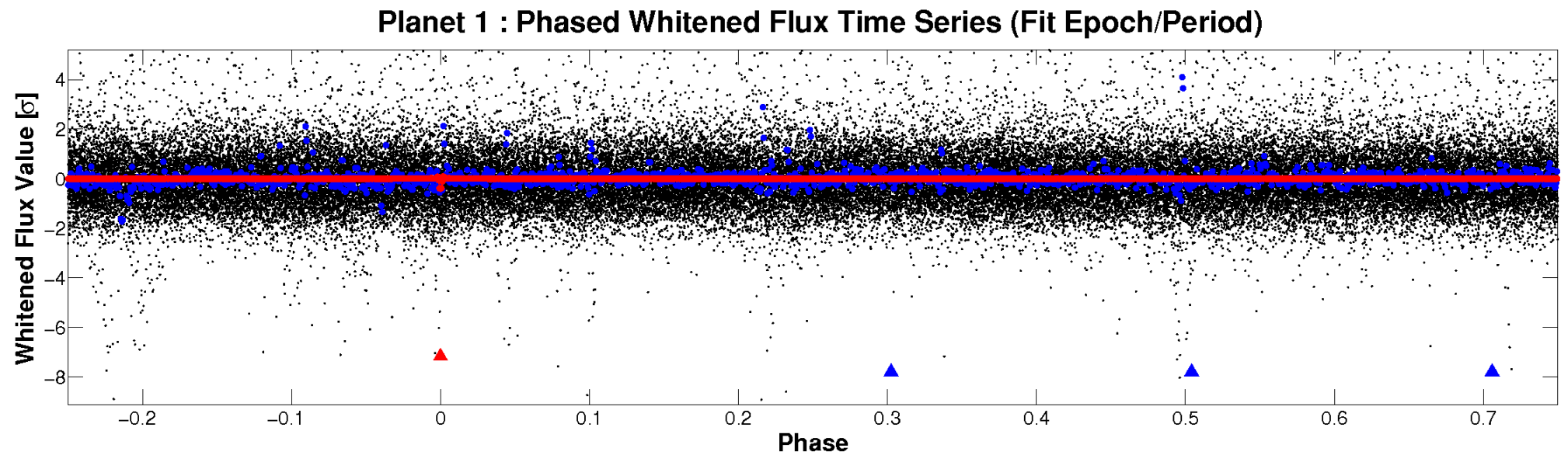
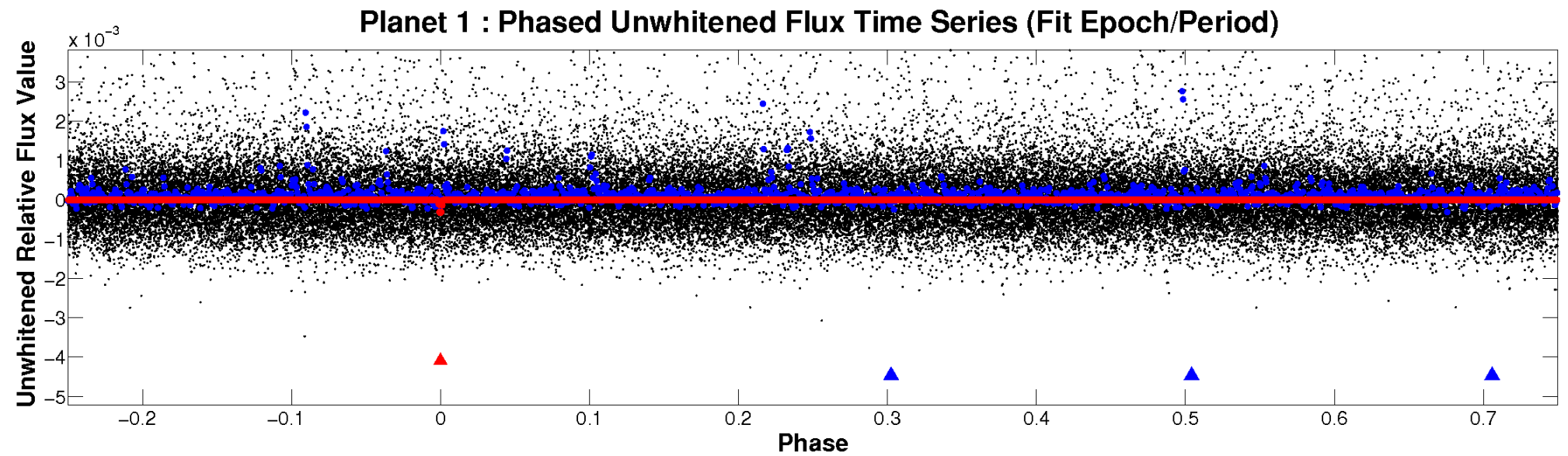


ALT Odd/Even

TCE 012203082-01

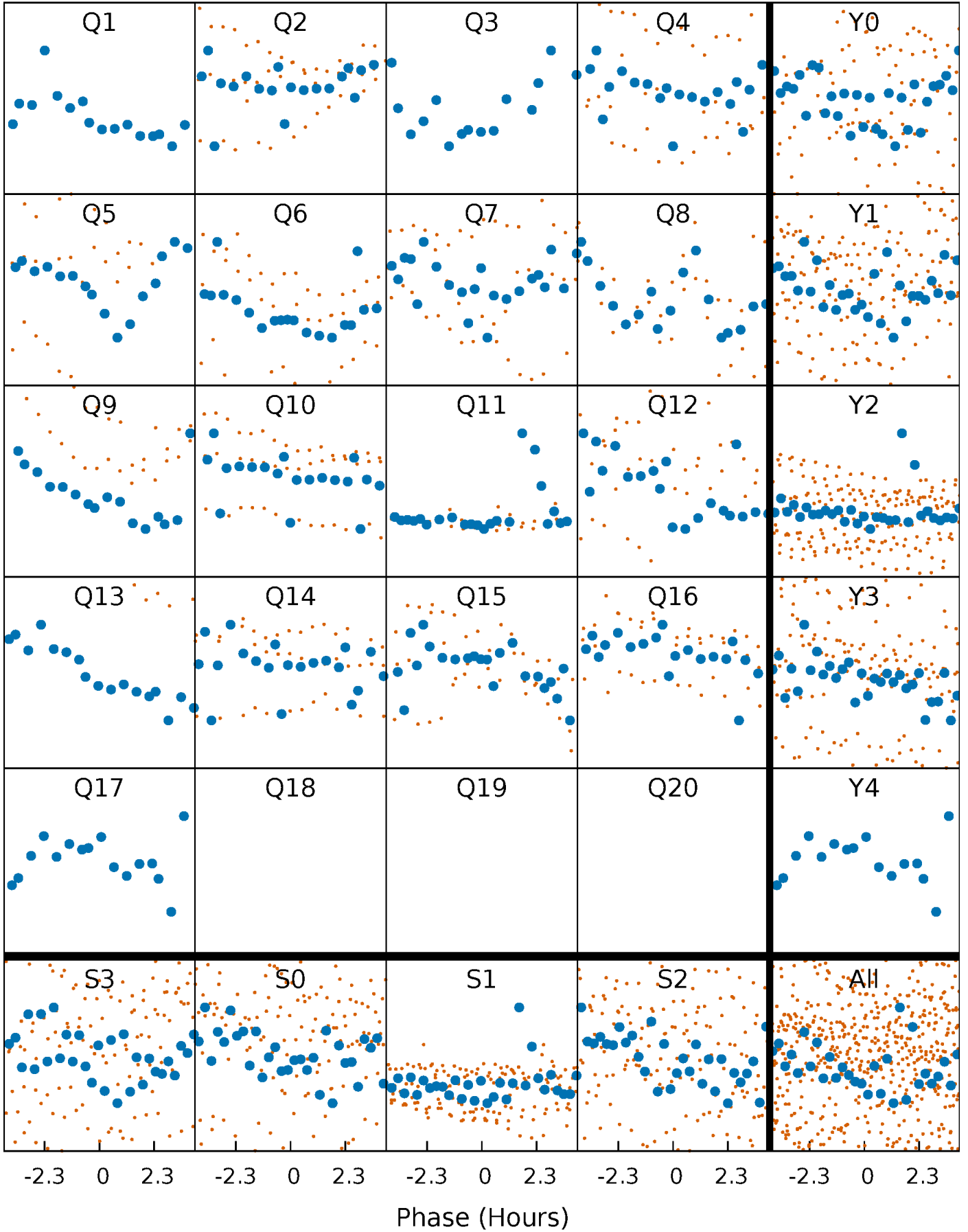


Non-Whitened Vs. Whitened Light Curve



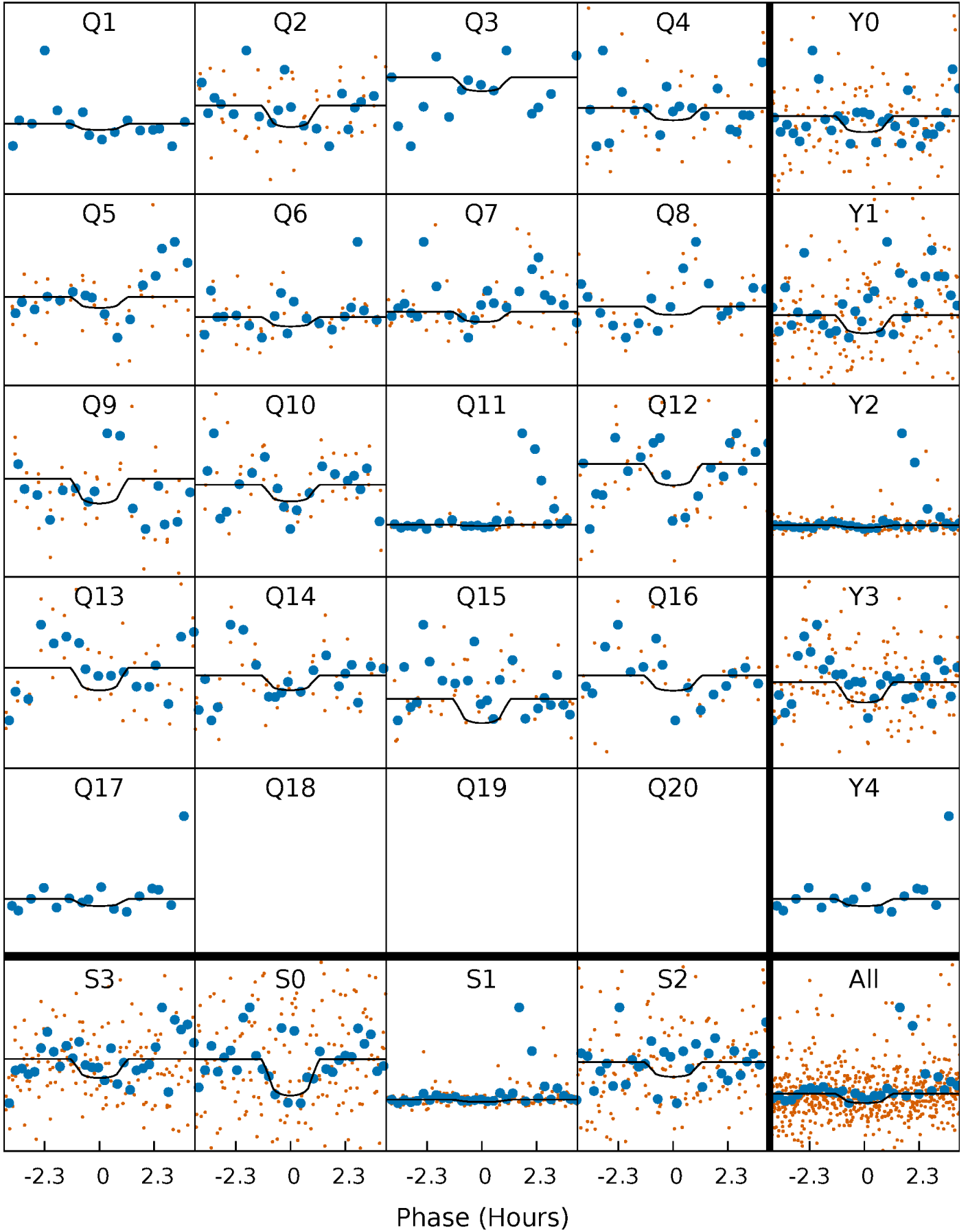
PDC Quarter-Phased Transit Curves

TCE 012203082-01 P= 32.960807 Days $T_0=158.580960$ (BKJD)



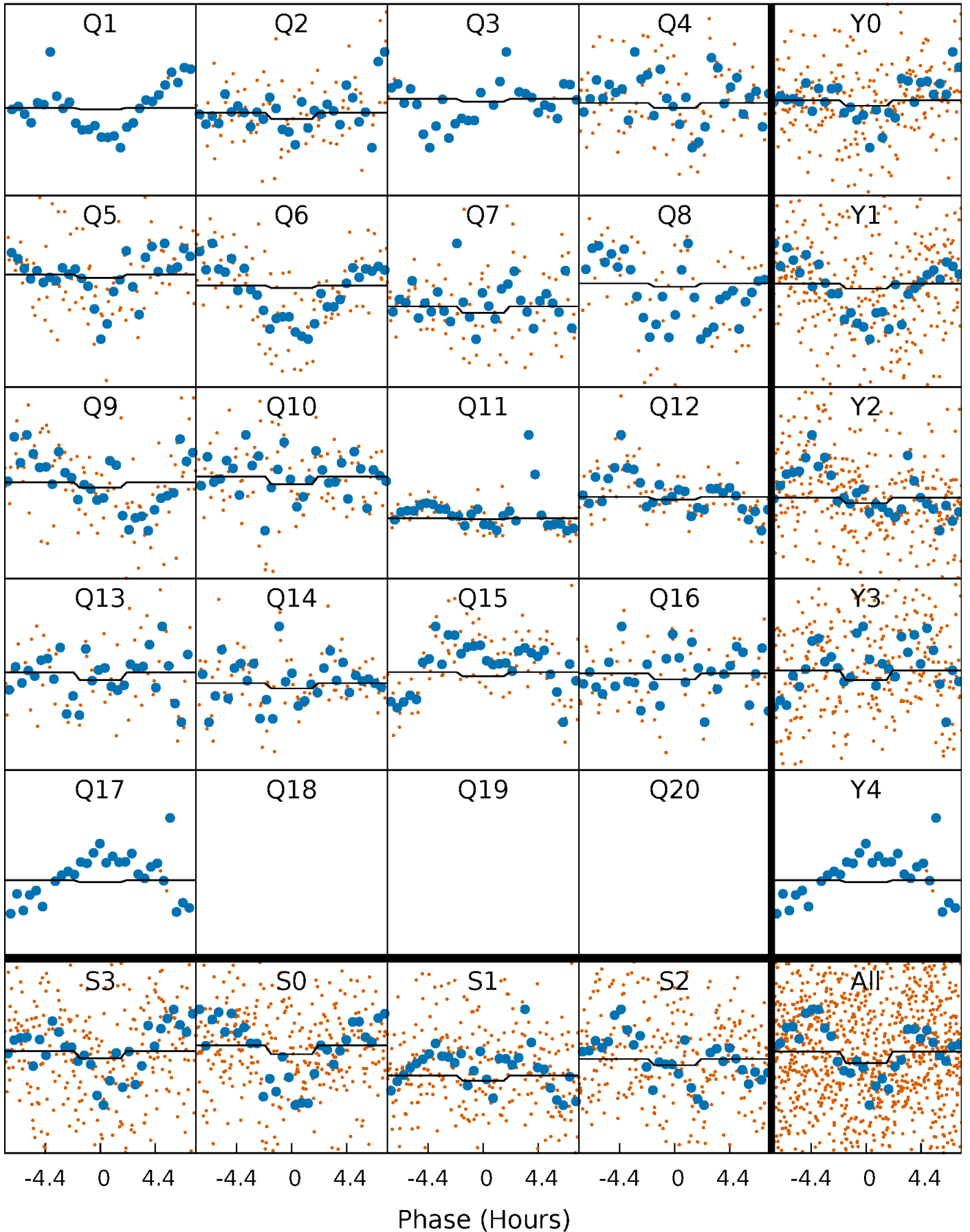
DV Quarter-Phased Transit Curves

TCE 012203082-01 P= 32.960807 Days $T_0=158.580960$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

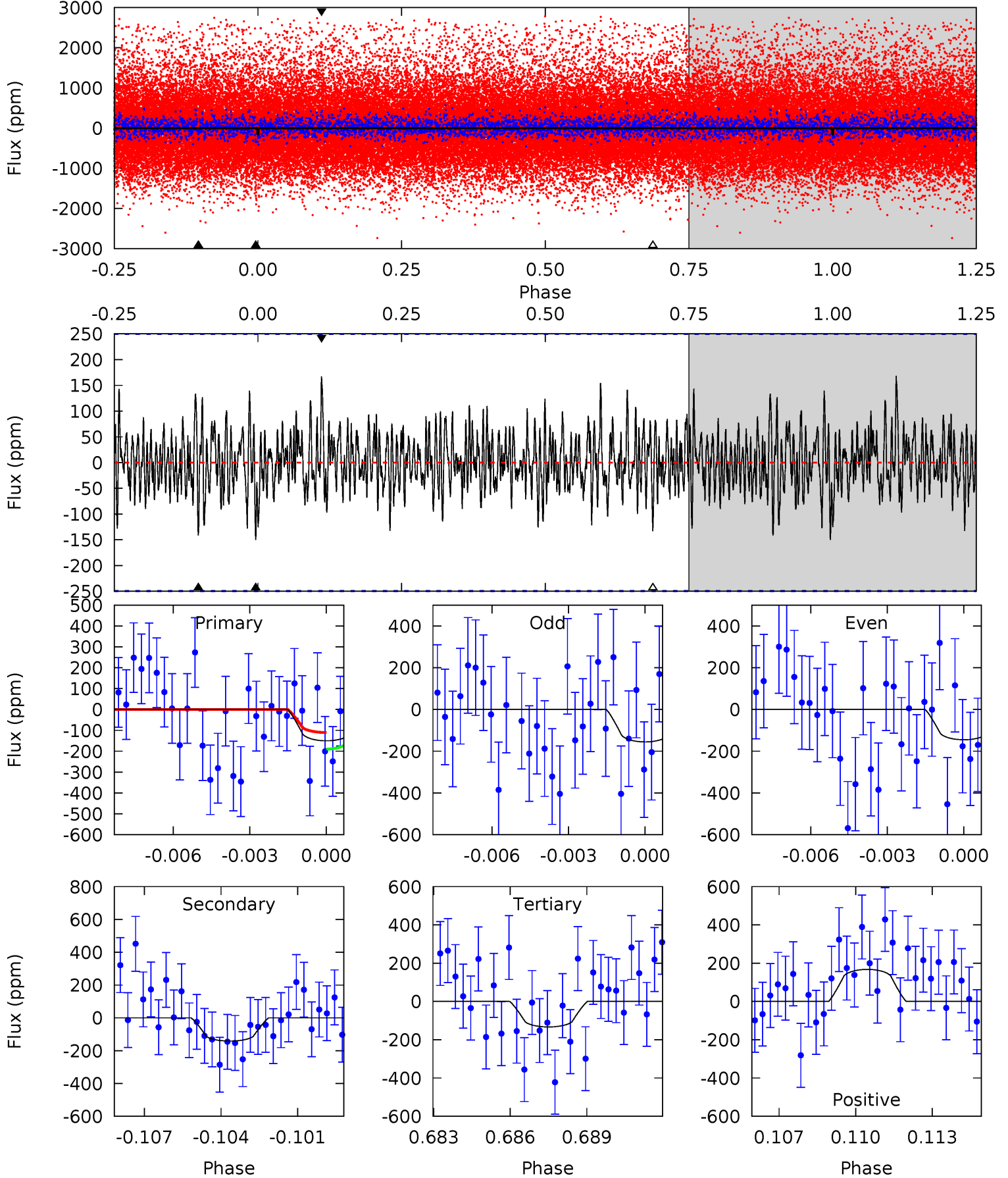
TCE 012203082-01 P= 32.957082 Days $T_0=158.646831$ (BKJD)



DV Model-Shift Uniqueness Test

012203082-01, P = 32.960807 Days, E = 125.620153 Days

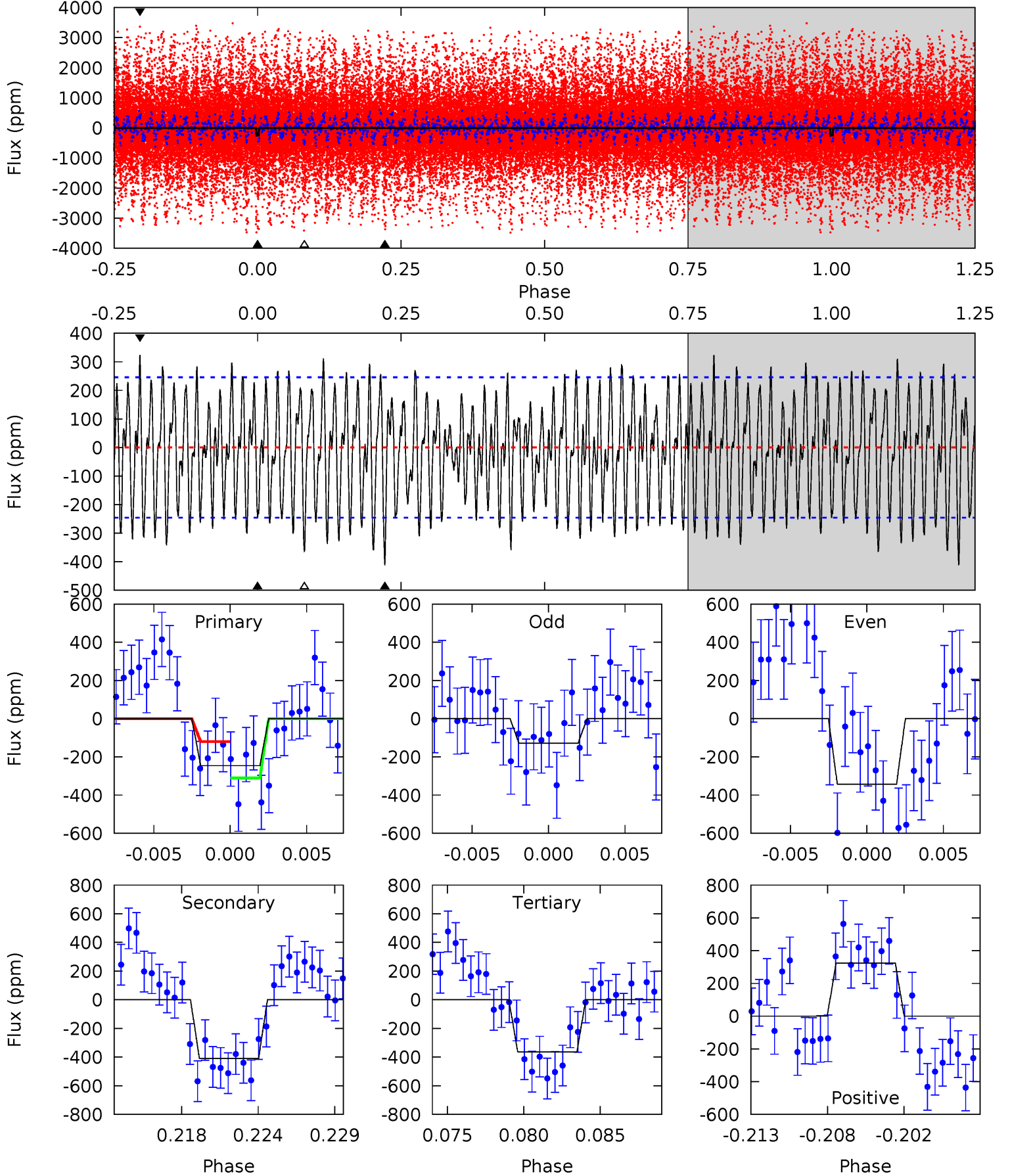
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.16	2.98	2.80	3.52	5.25	2.96	1.02	0.36	-0.36	0.17	-0.55	0.11	0.77	0.53	0.84



Alt Model-Shift Uniqueness Test

012203082-01, P = 32.957082 Days, E = 125.689749 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.15	8.57	7.60	6.77	5.15	2.79	3.15	-2.46	-1.62	0.97	1.81	2.25	1.96	0.44	2.00



Stellar Parameters For KIC 012203082

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	3805^{+76}_{-92}	$4.733^{+0.042}_{-0.024}$	$-0.100^{+0.100}_{-0.100}$	$0.513^{+0.029}_{-0.040}$	$0.519^{+0.033}_{-0.033}$	$5.426^{+1.065}_{-0.567}$
	+2%/-2%	+1%/-1%	+100%/-100%	+6%/-8%	+6%/-6%	+20%/-10%
Source	PHO2	PHO2	PHO2	DSEP		

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

Secondary Eclipse Parameters for KIC 012203082-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-141 ± 48	$2.17^{+2.21}_{-1.40}$	415^{+11}_{-12}	2645^{+964}_{-412}	394^{+3185}_{-301}
Alt.	-410 ± 48	$1.98^{+1.94}_{-1.33}$	416^{+10}_{-11}	3169^{+1482}_{-558}	1463^{+11690}_{-1098}

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

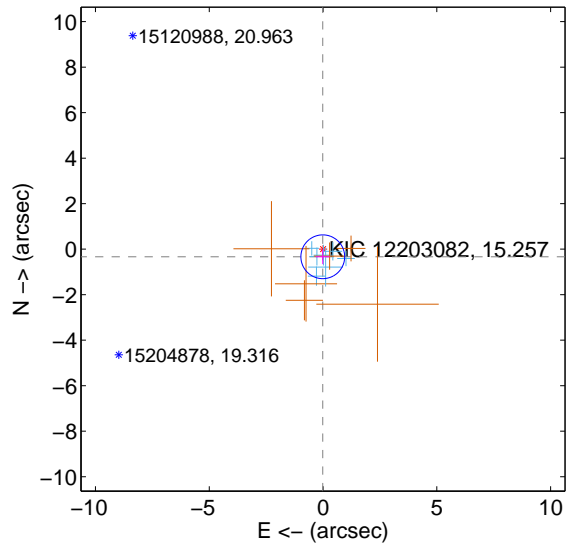
Supplemental centroid analysis for 012203082-01. Kepler magnitude: 15.26. Transit SNR 4.60

There are 7 quarters with good PRF difference image offsets

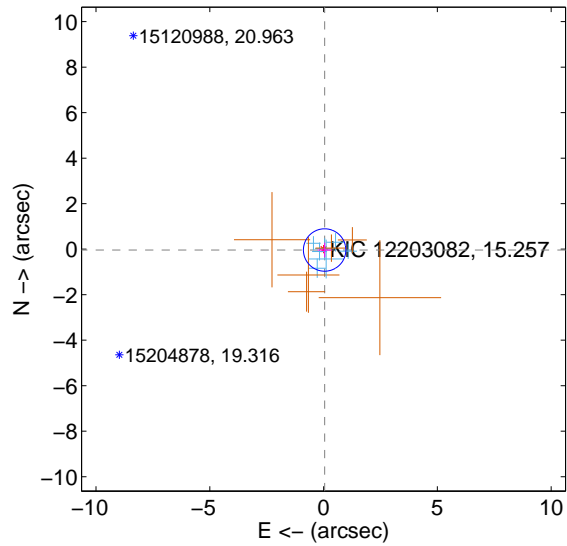
The direct PRF centroid is offset from the target star catalog position by about 0.38 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.334 ± 0.321	1.04	0.011 ± 0.304	-0.334 ± 0.321
PRF-fit source offset from KIC position	0.058 ± 0.311	0.19	-0.046 ± 0.304	-0.036 ± 0.321
photometric centroid source offset	2.82 ± 2.01	1.40	2.79 ± 2.01	0.44 ± 2.25

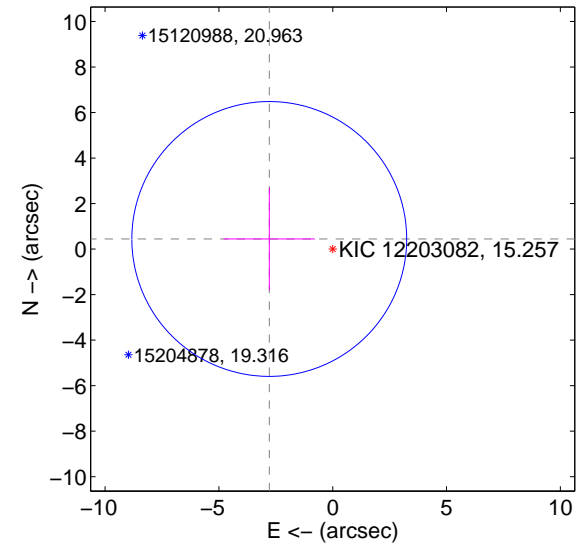
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

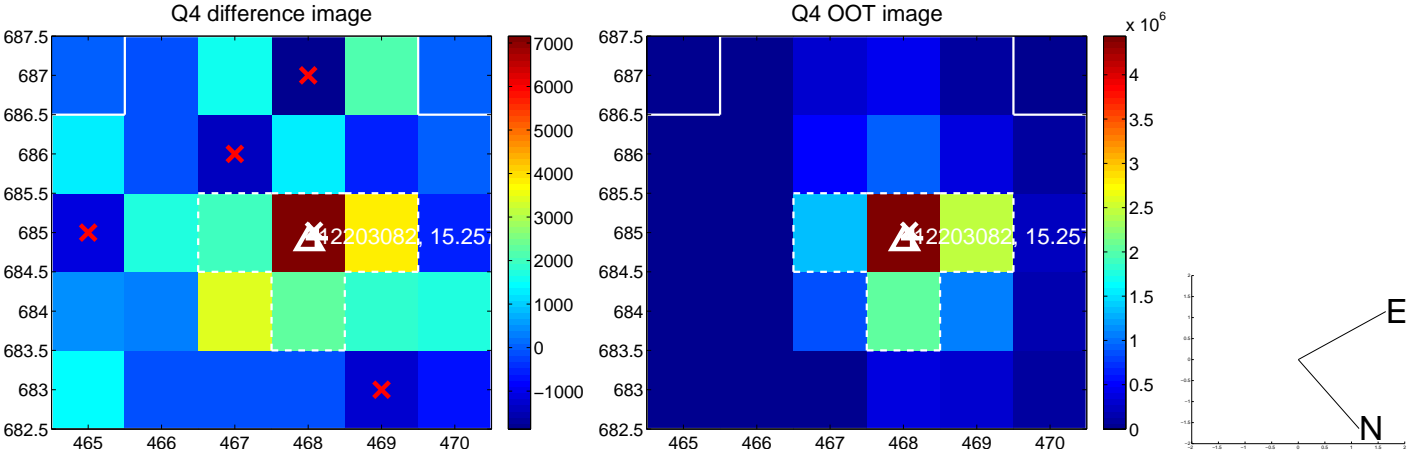
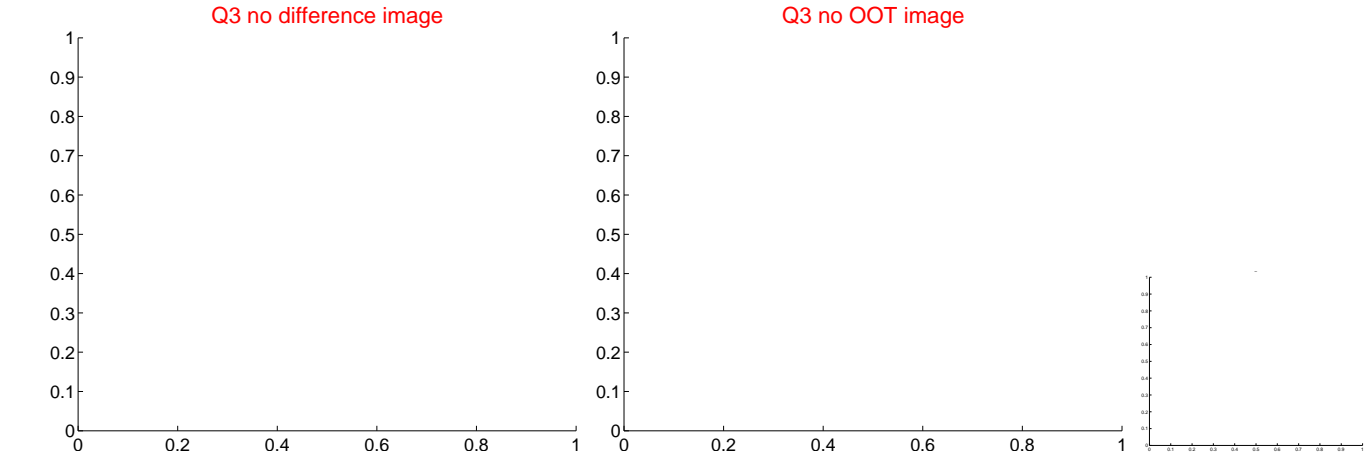
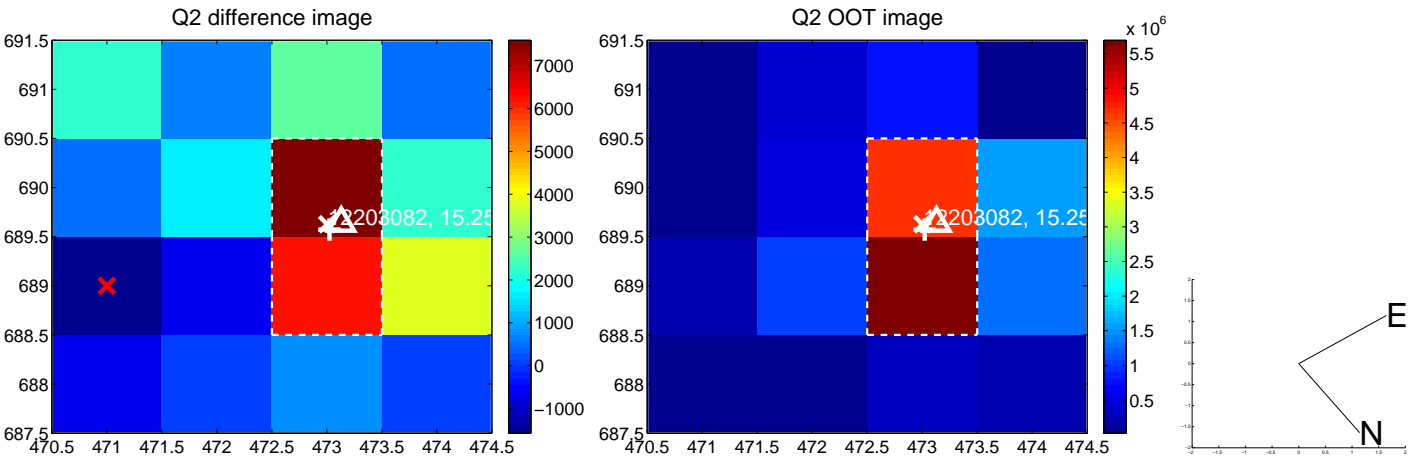
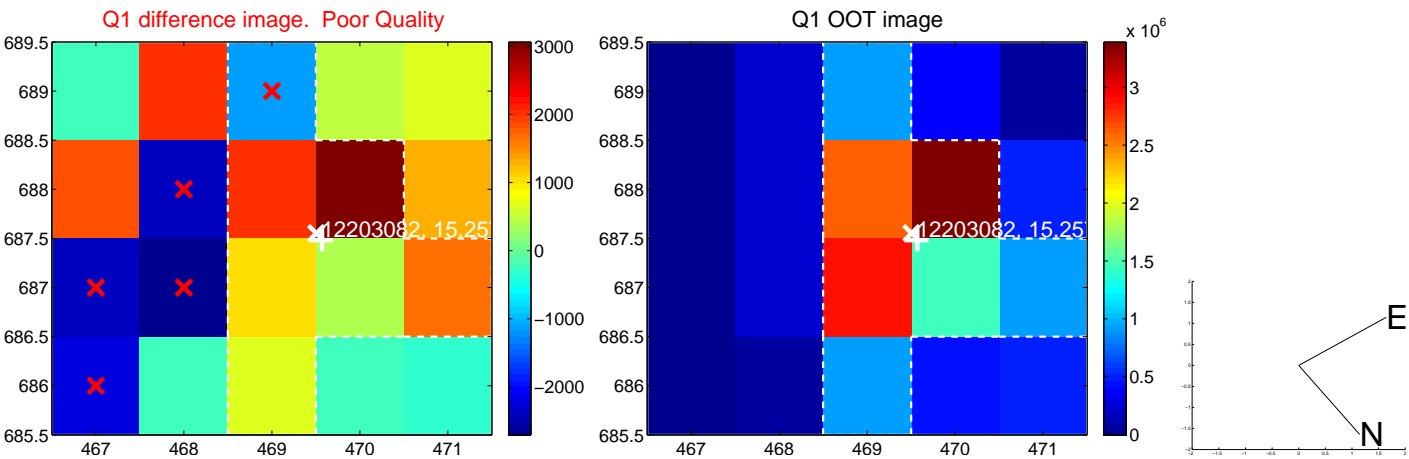


offset from photometric centroids

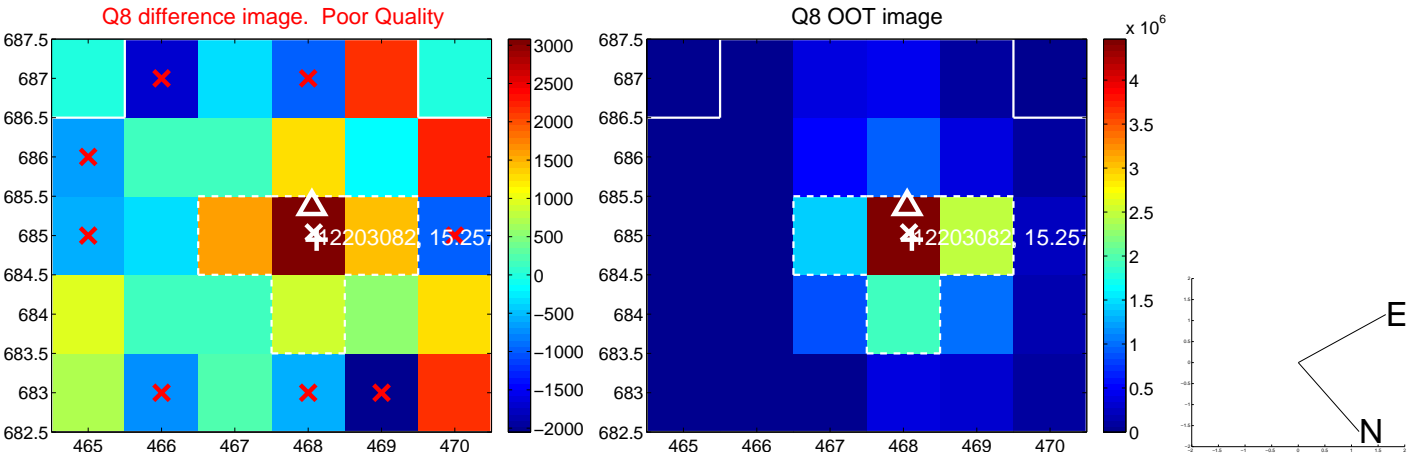
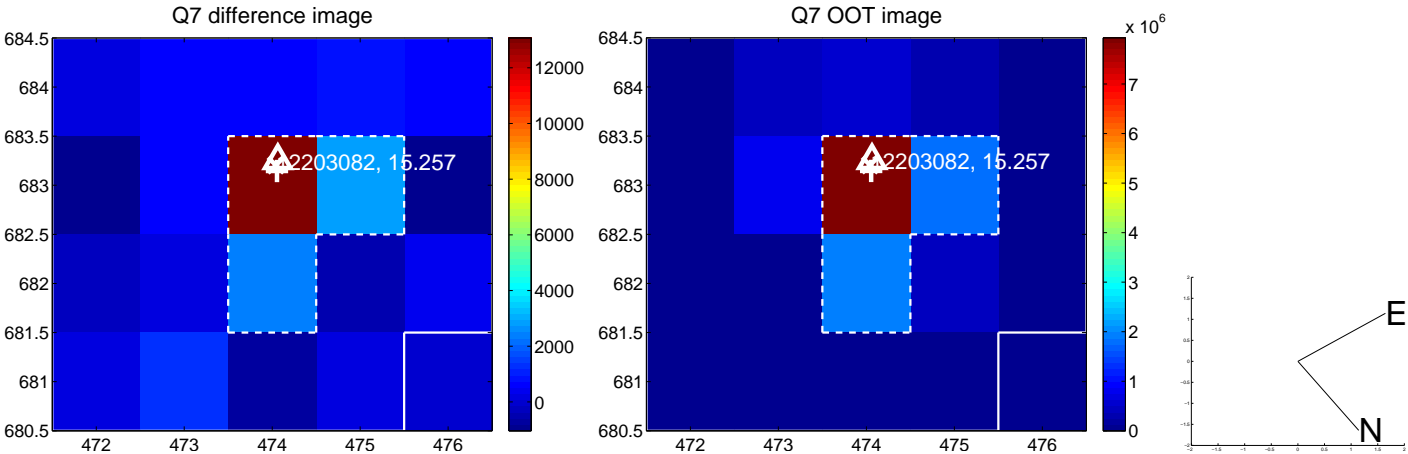
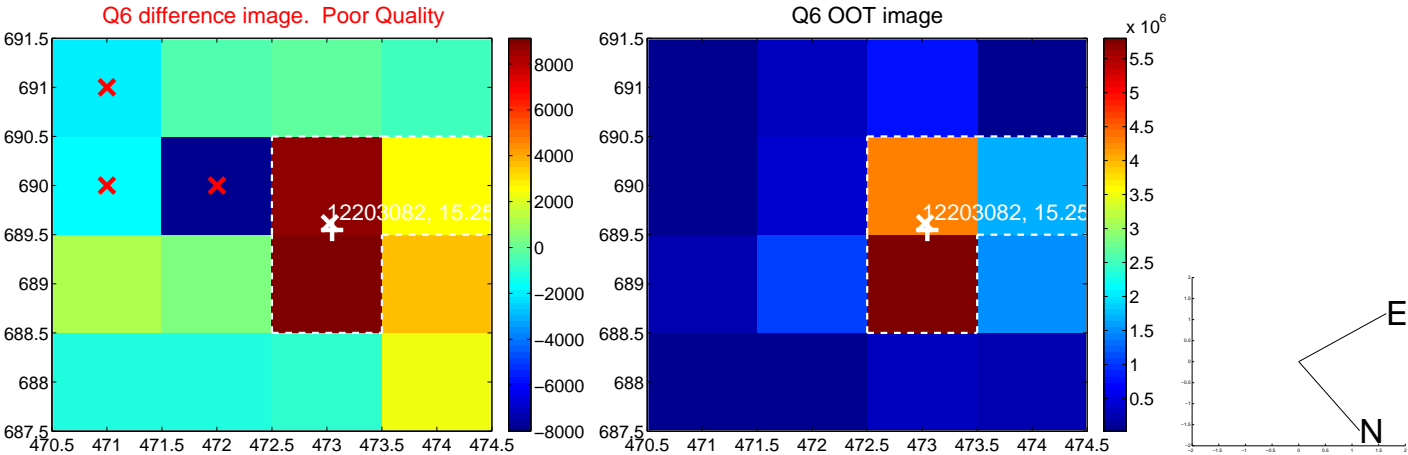
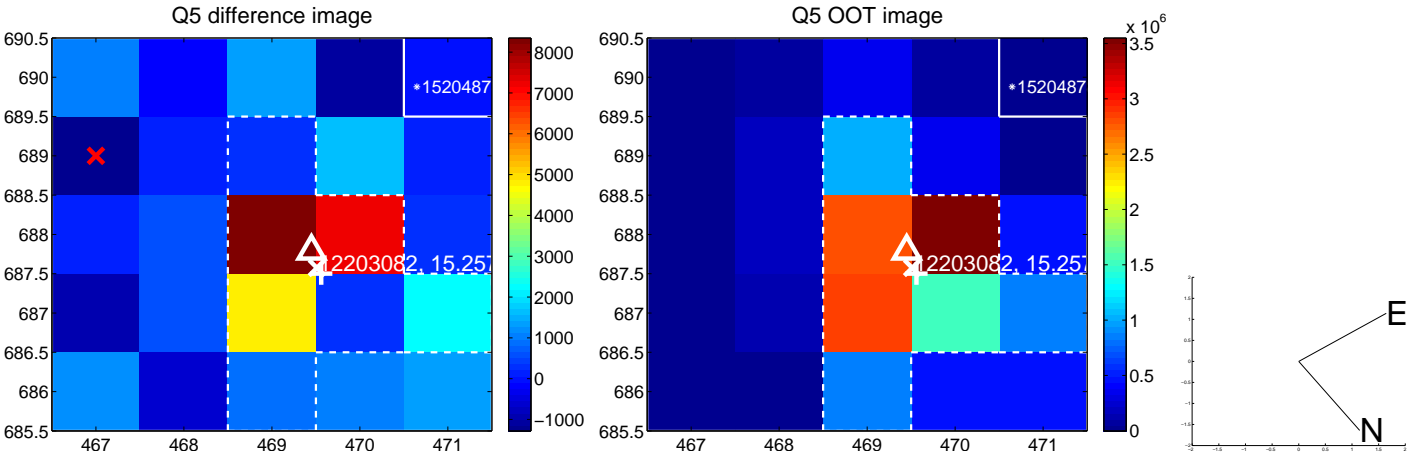


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

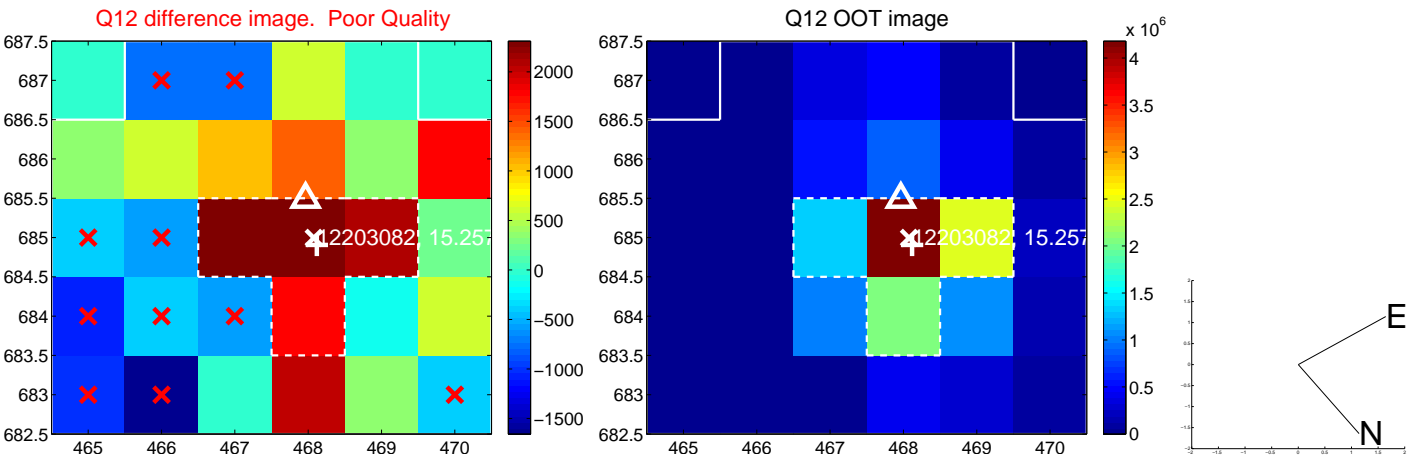
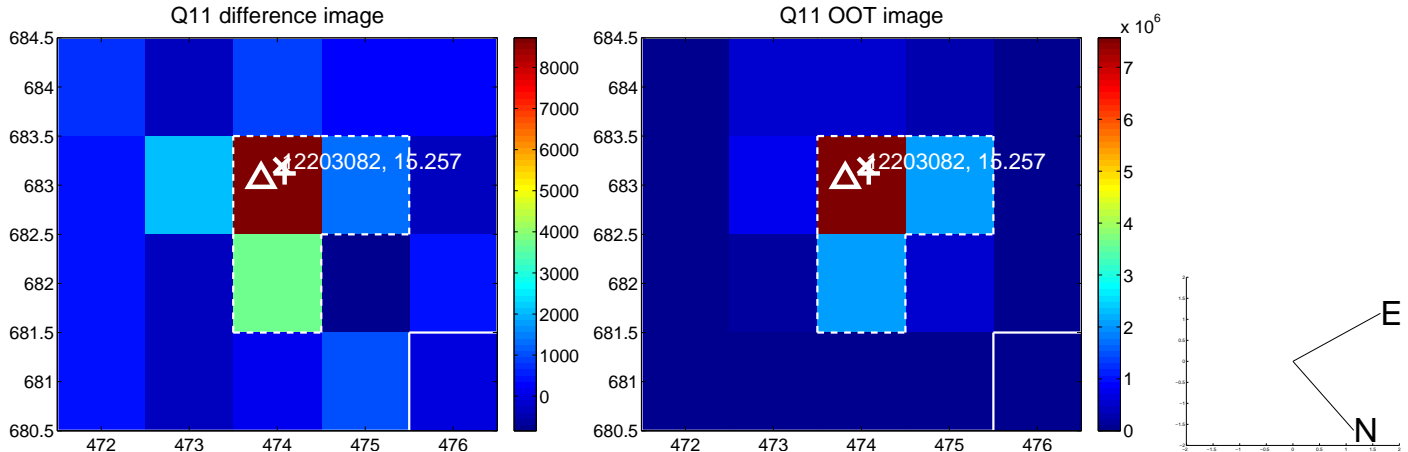
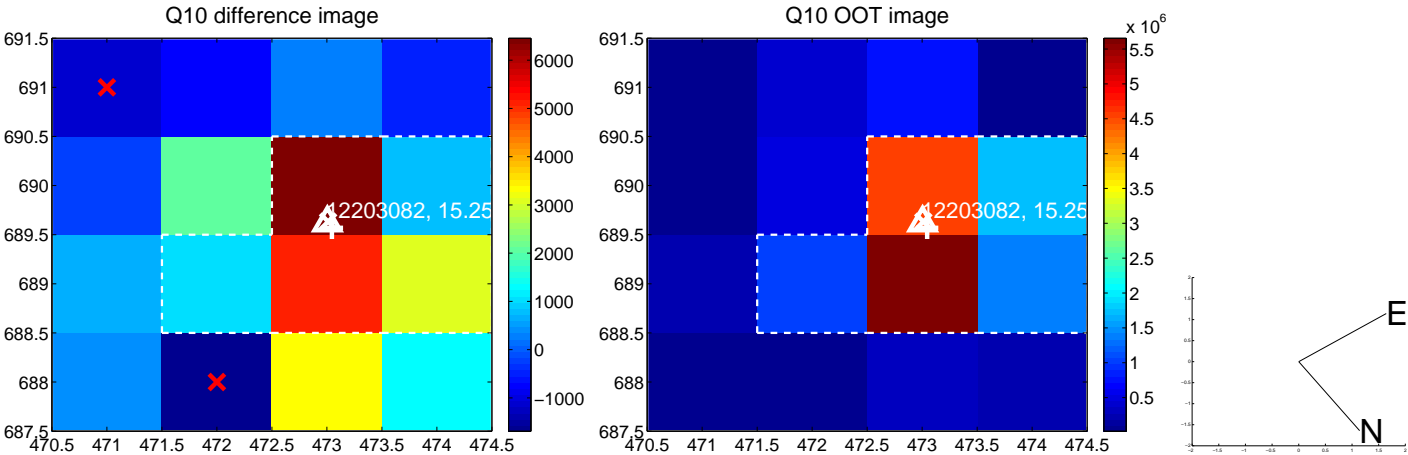
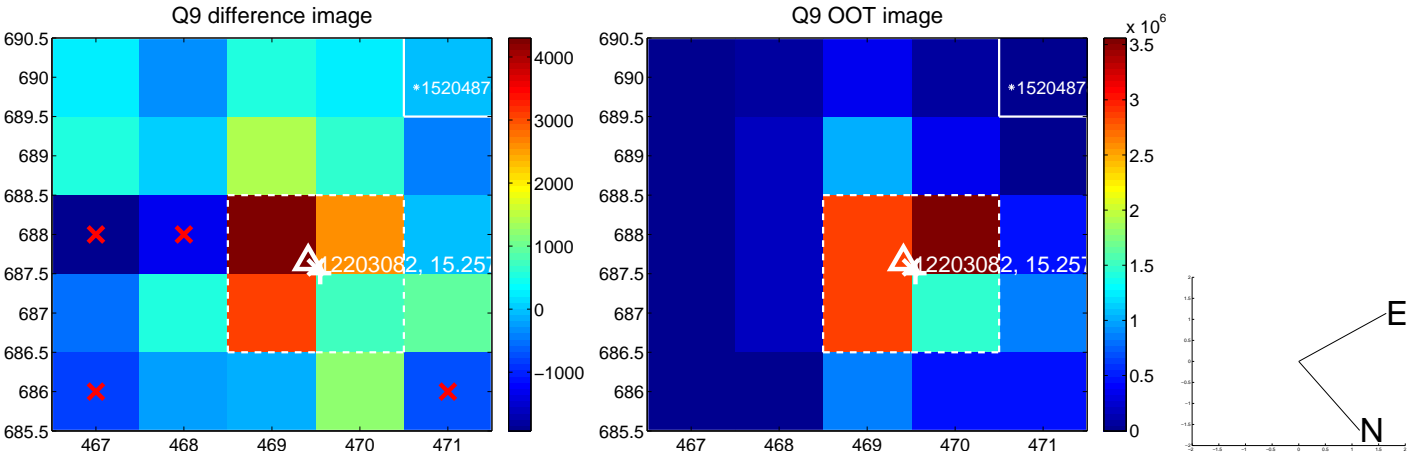
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



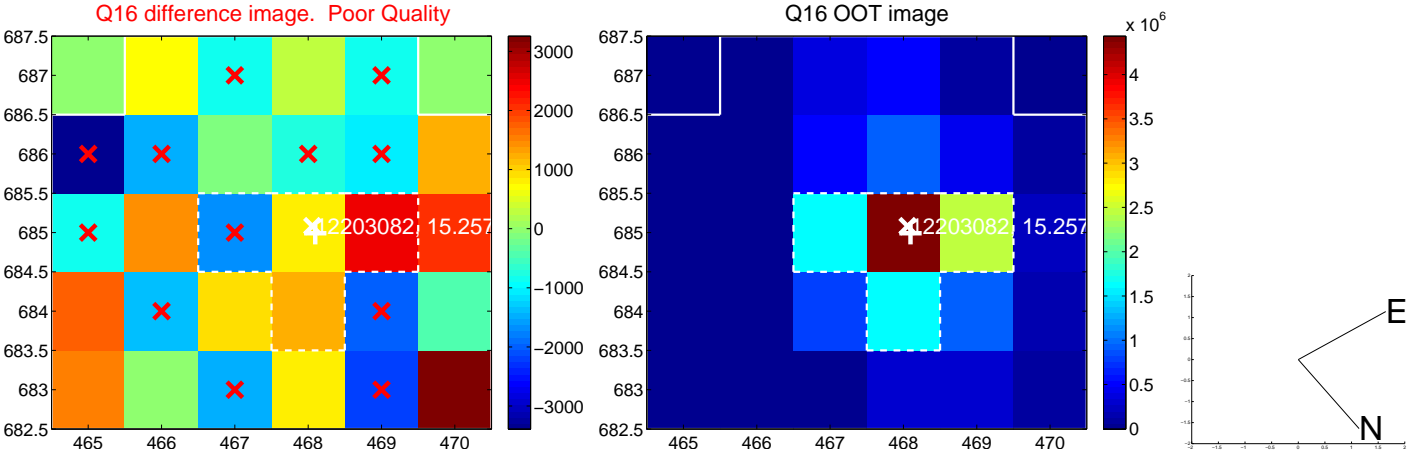
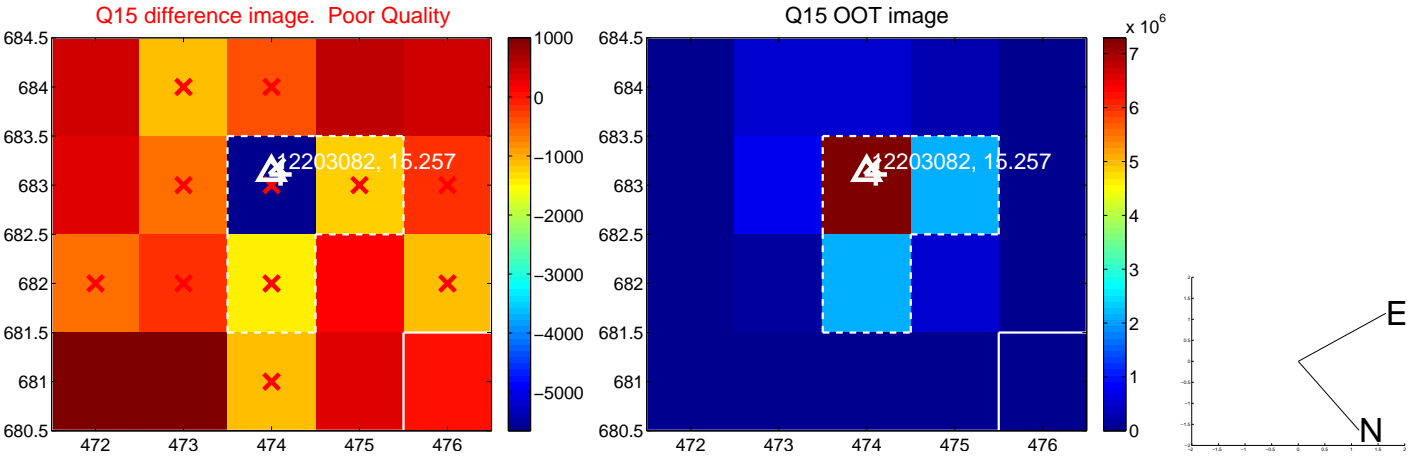
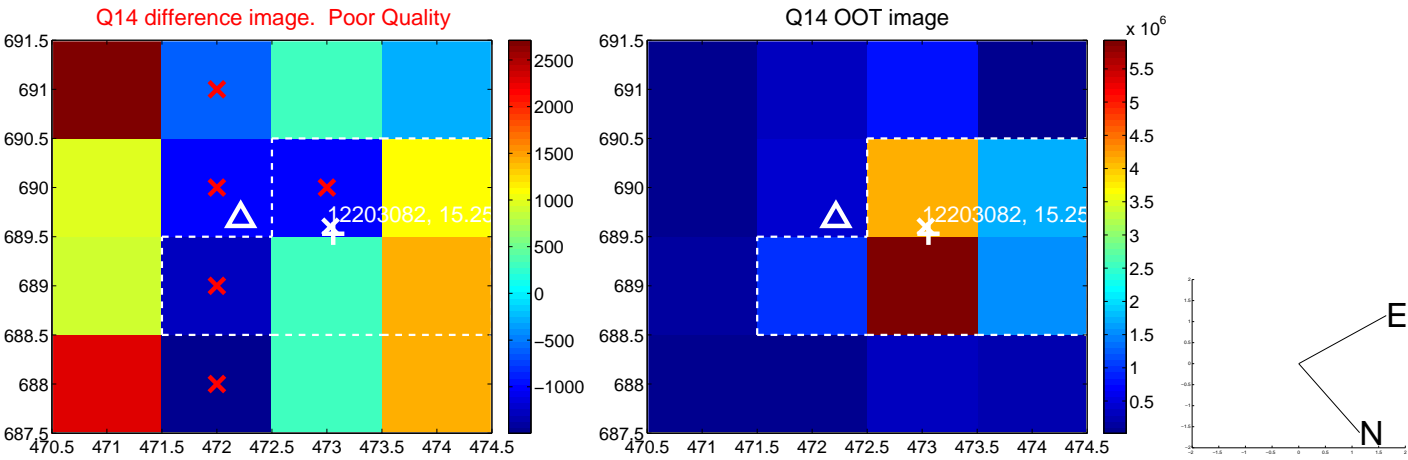
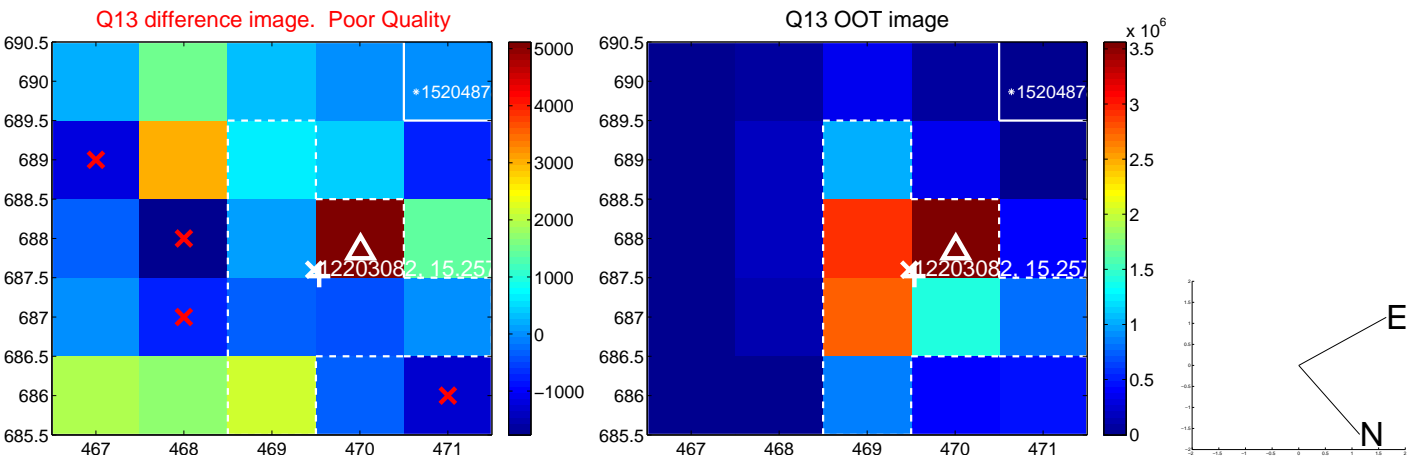
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



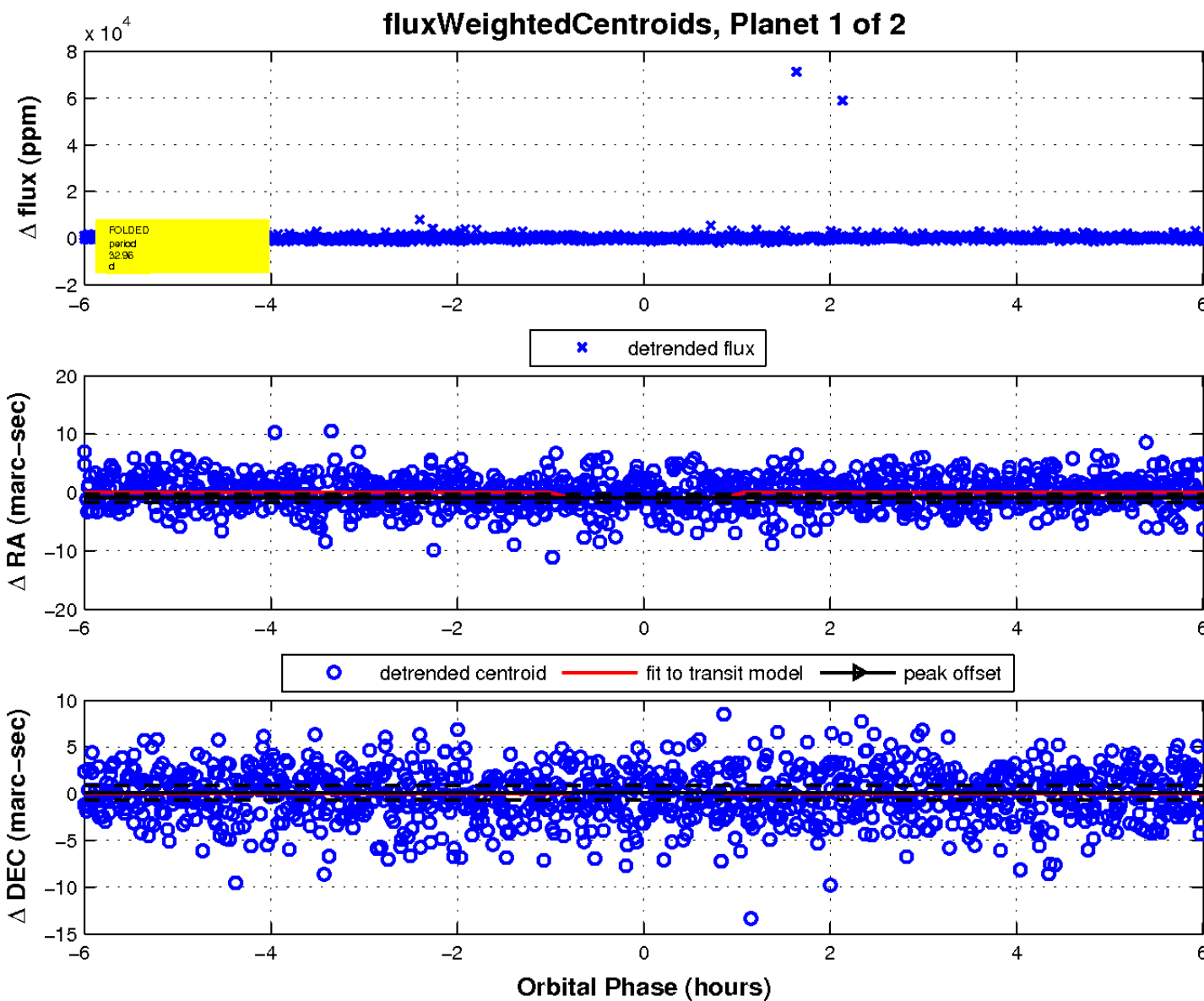
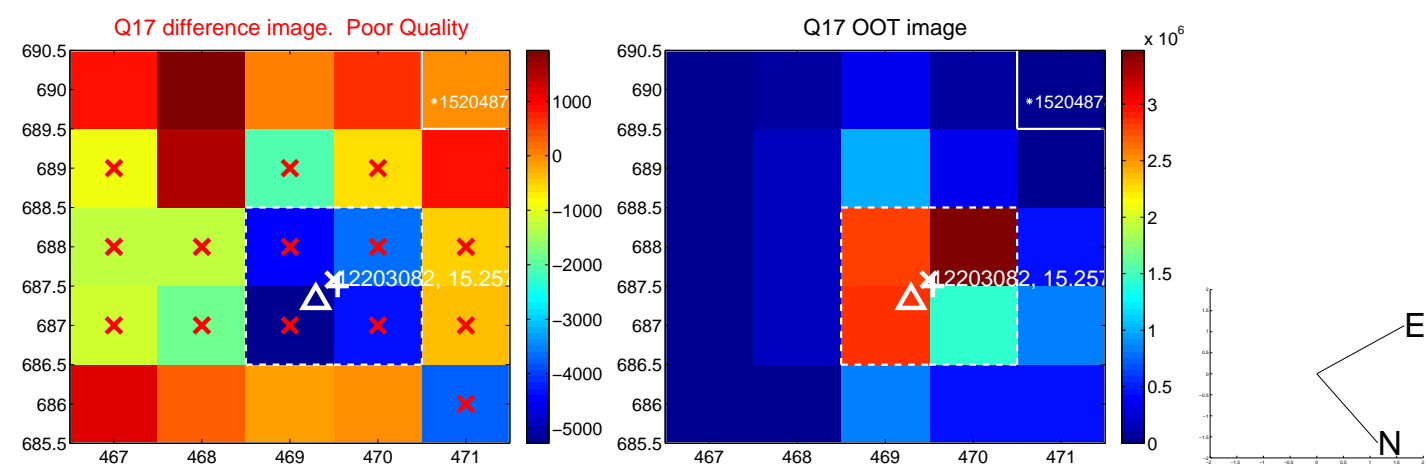
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

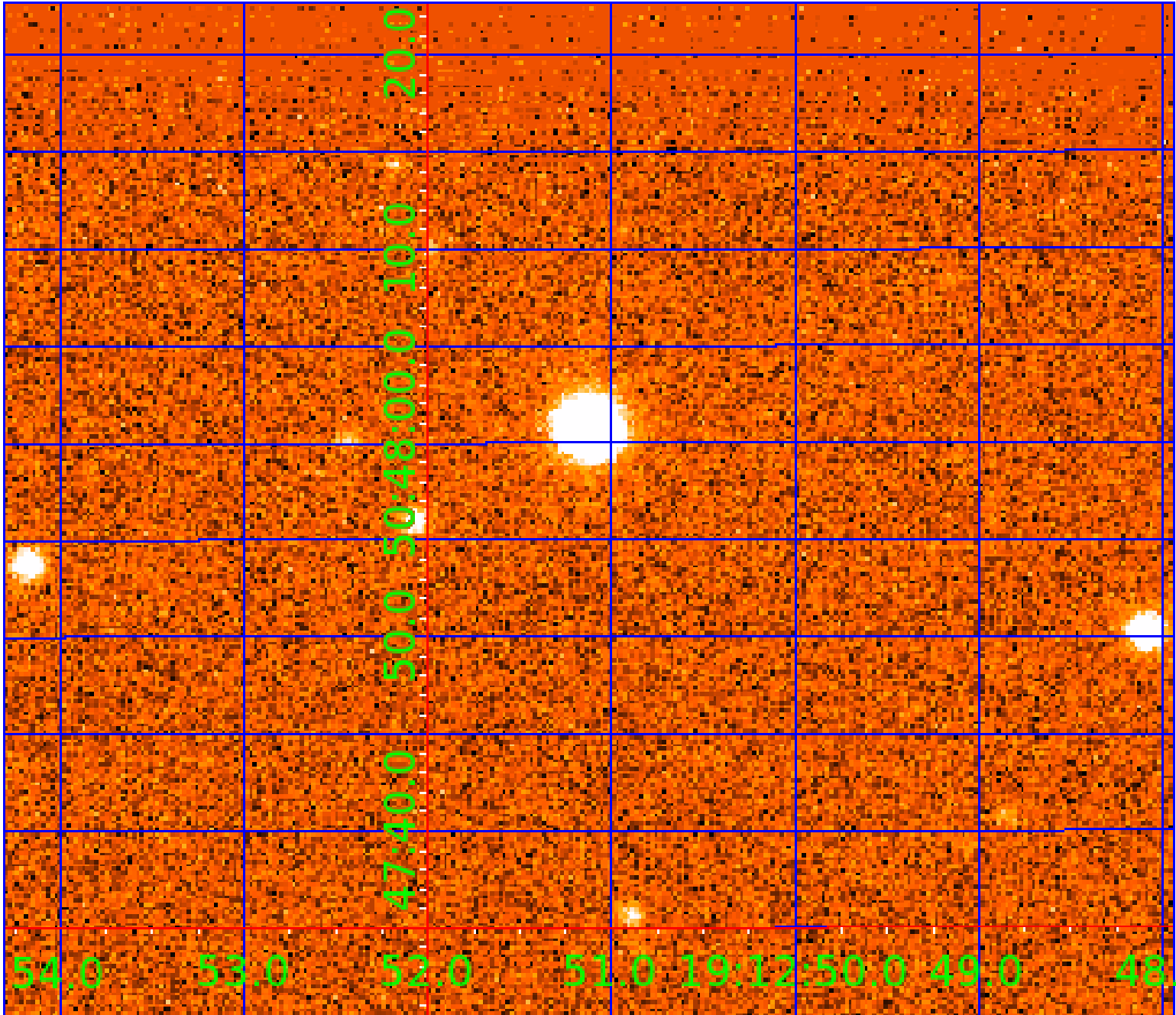


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 012203082

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})
012203082-01	OBS	No	32.960807	158.580960	336.3	2.006	7.6	4.6	0.51	3805	0.94	1.89
012203082-02	OBS	No	487.763311	379.613347	1478.3	6.654	8.9	6.5	0.51	3805	2.06	0.05

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012203082-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS
012203082-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_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.

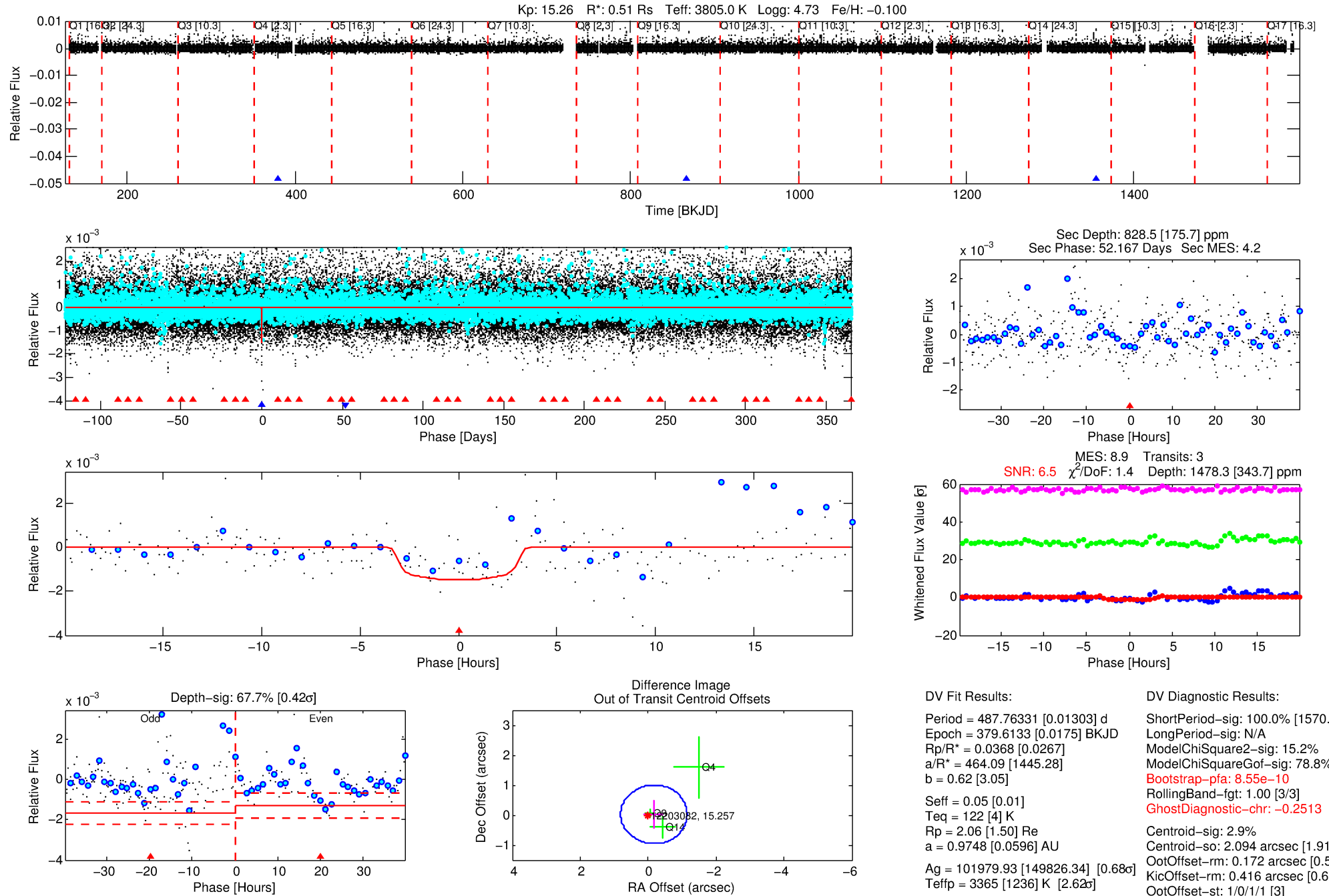
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012203082-02

No Significant Match Found

DV One-Page Summary

KIC: 12203082 Candidate: 2 of 2 Period: 487.763 d



DV Fit Results:

Period = 487.76331 [0.01303] d
Epoch = 379.6133 [0.0175] BKJD
Rp/R* = 0.0368 [0.0267]
a/R* = 464.09 [1445.28]
b = 0.62 [3.05]
Seff = 0.05 [0.01]
Teq = 122 [4] K
Rp = 2.06 [1.50] Re
a = 0.9748 [0.0596] AU
Ag = 101979.93 [149826.34] [0.68σ]
Teffp = 3365 [1236] K [2.62σ]

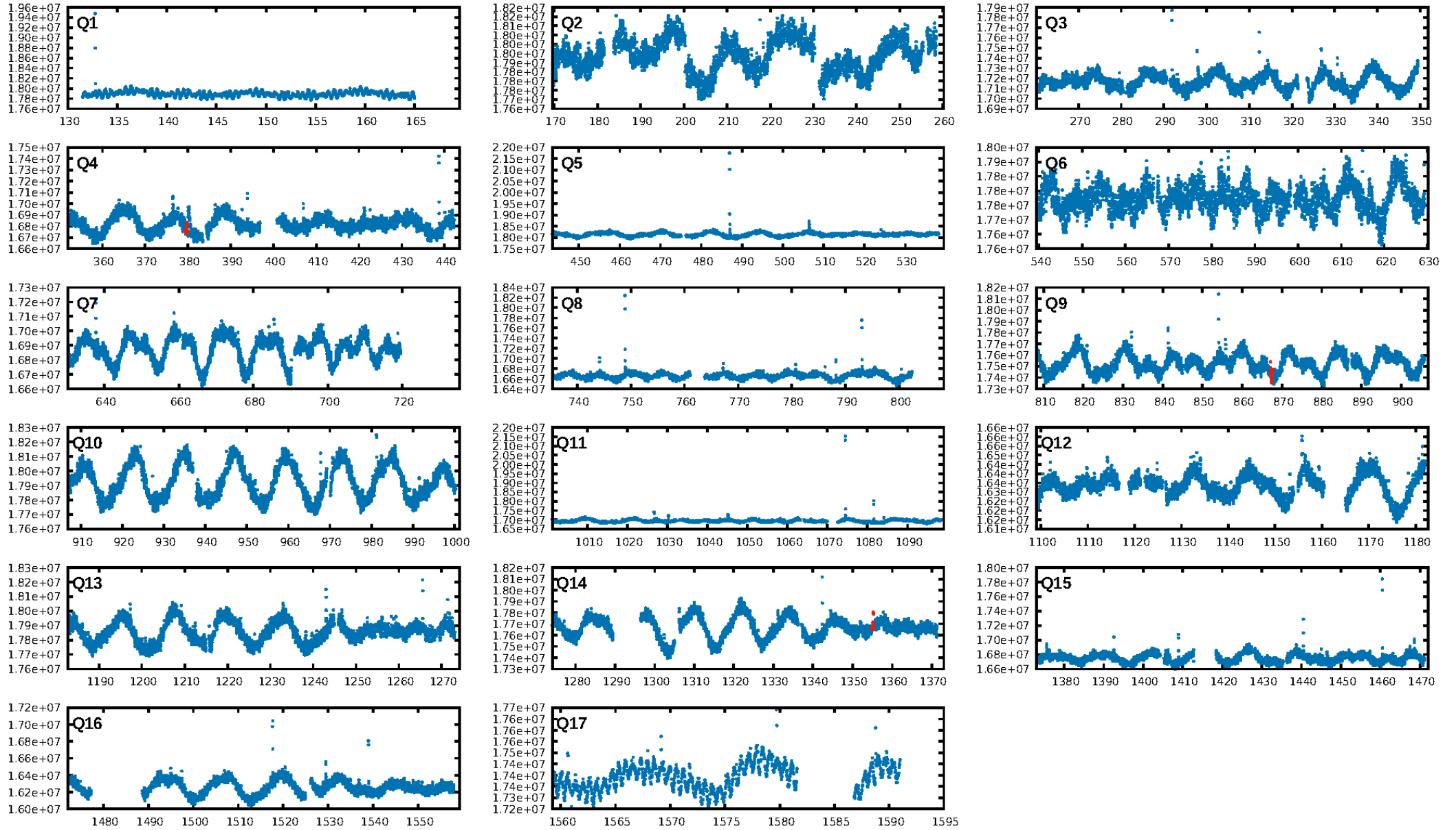
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1570.66σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 15.2%
ModelChiSquareGof-sig: 78.8%
Bootstrap-pfa: 8.55e-10
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.2513
Centroid-sig: 2.9%
Centroid-so: 2.094 arcsec [1.91σ]
OotOffset-rm: 0.172 arcsec [0.53σ]
KicOffset-rm: 0.416 arcsec [0.65σ]
OotOffset-st: 1/0/1/1 [3]
KicOffset-st: 1/0/1/1 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 1.00 [3/3]

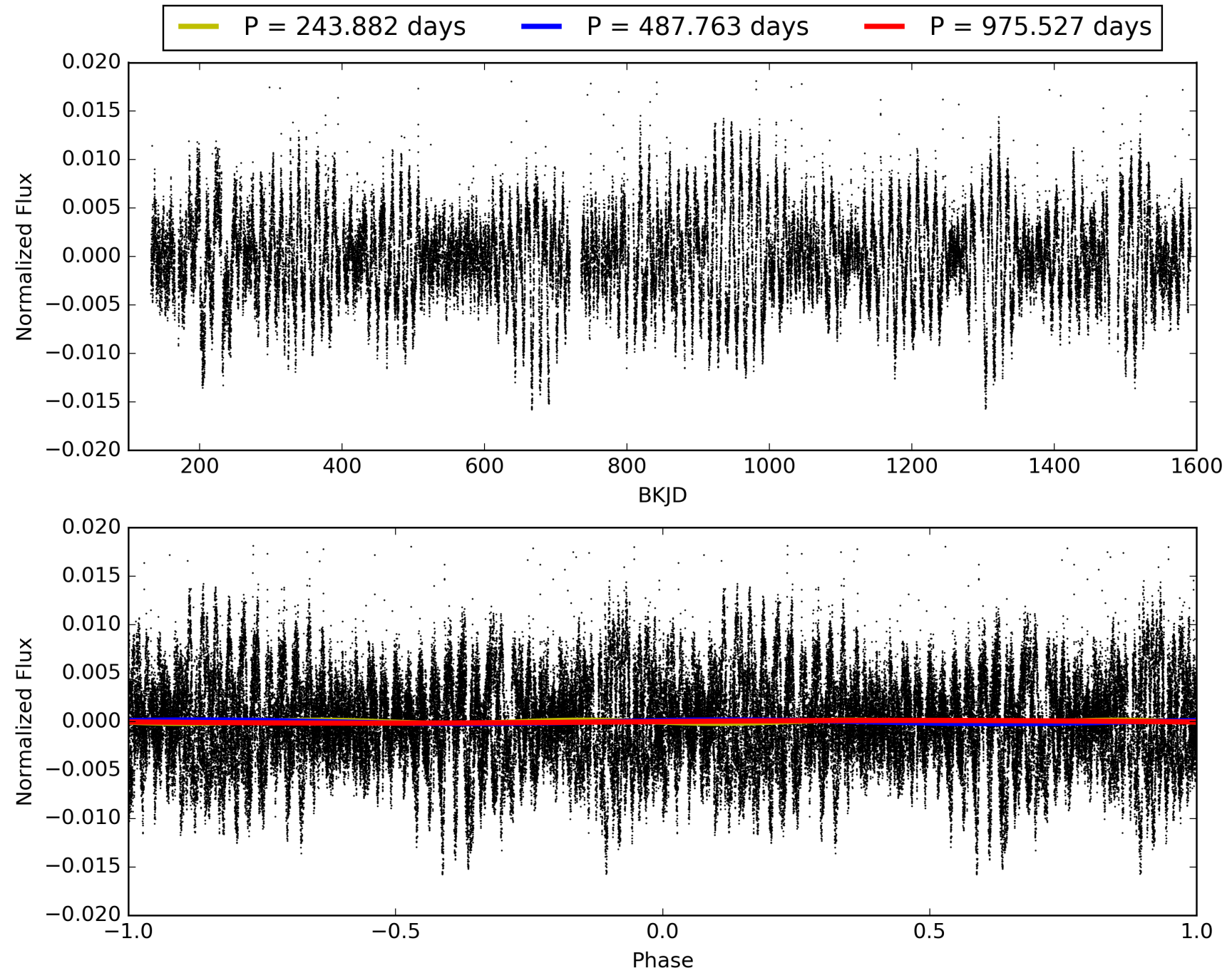
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 03:46:48 Z

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TCE 012203082-02, PDC Light Curves

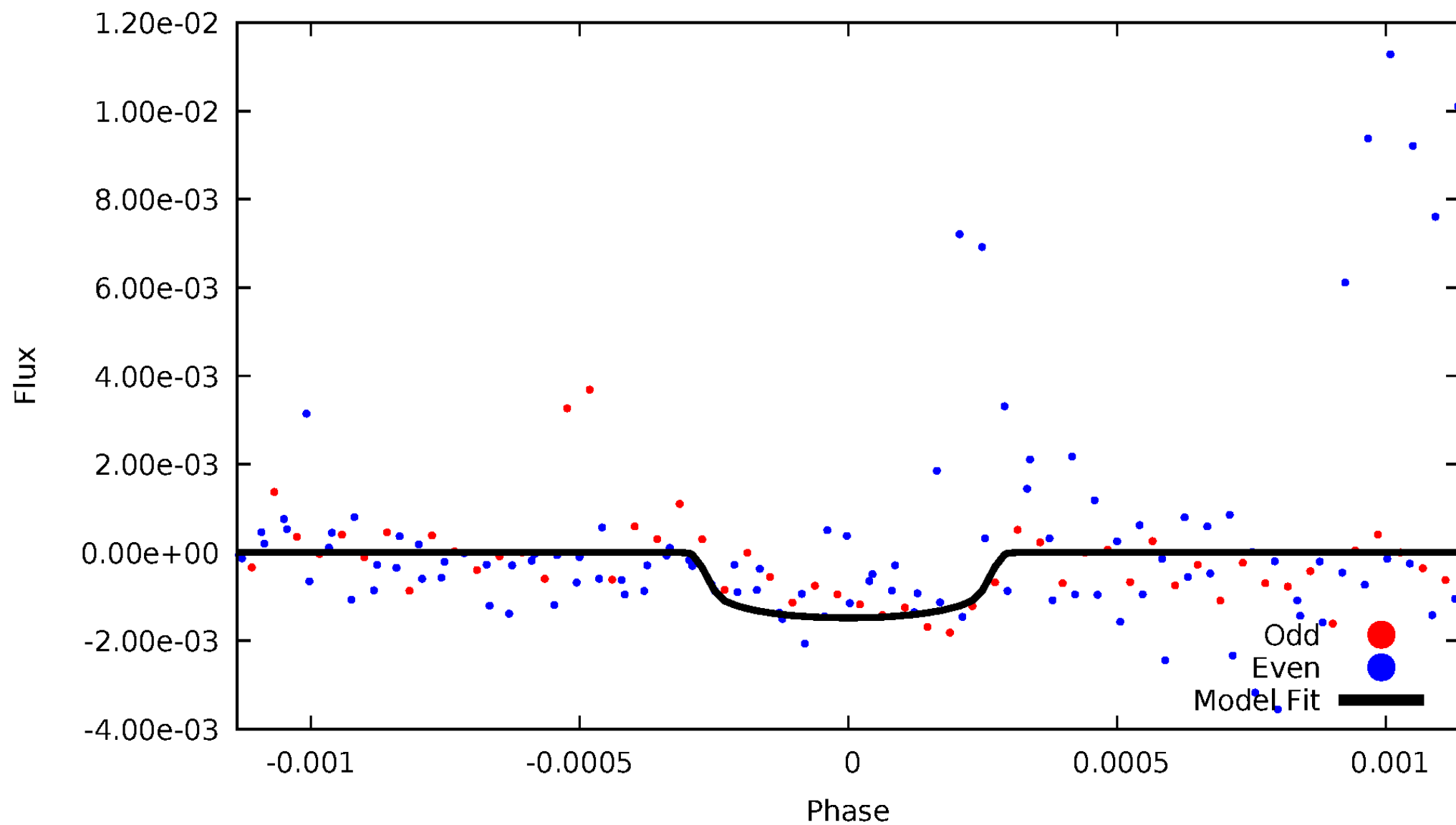


TCE 012203082-02



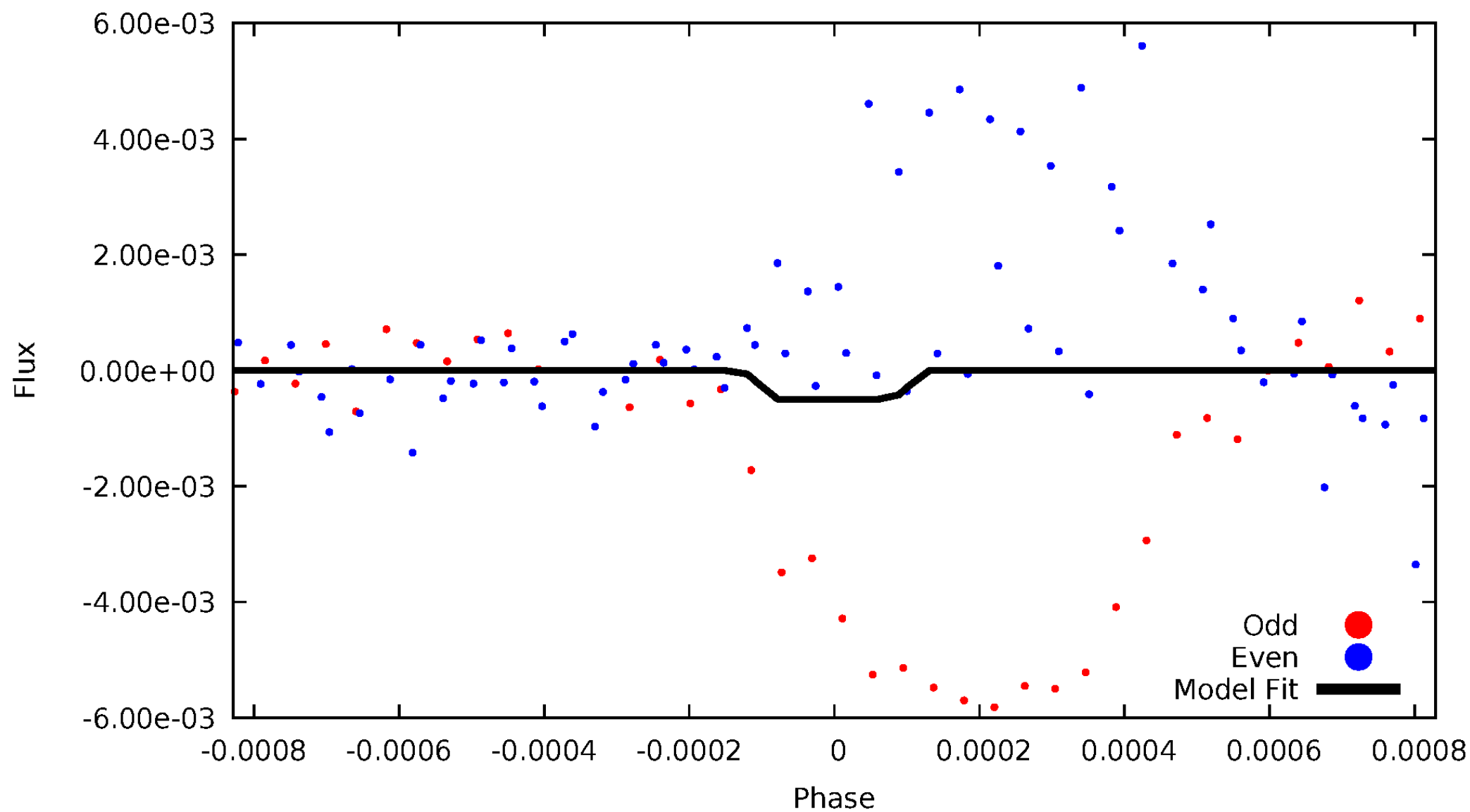
DV Odd/Even

TCE 012203082-02



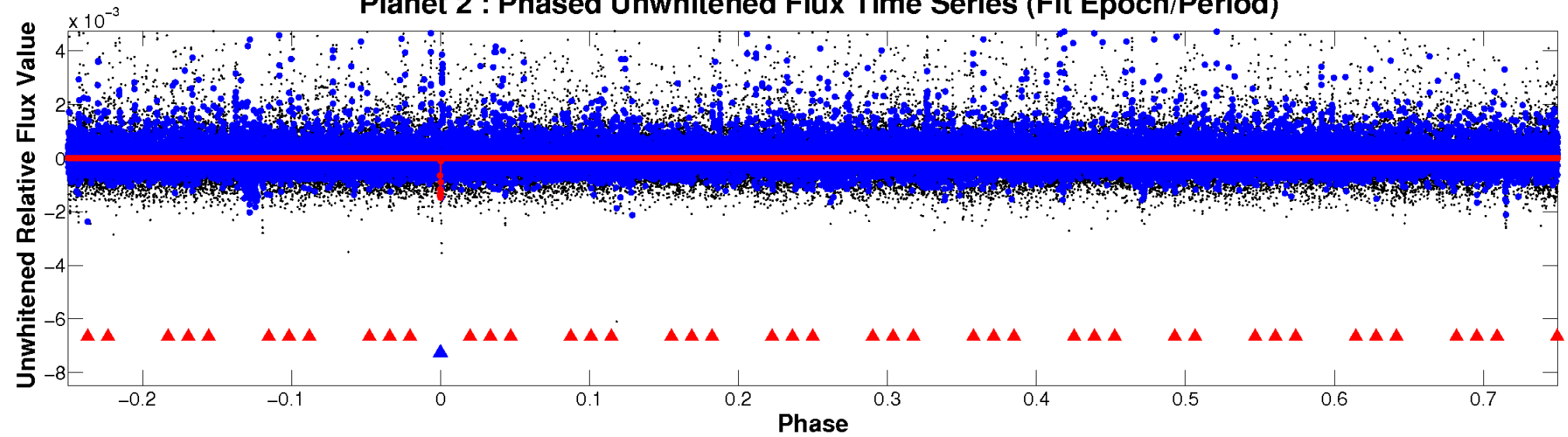
ALT Odd/Even

TCE 012203082-02

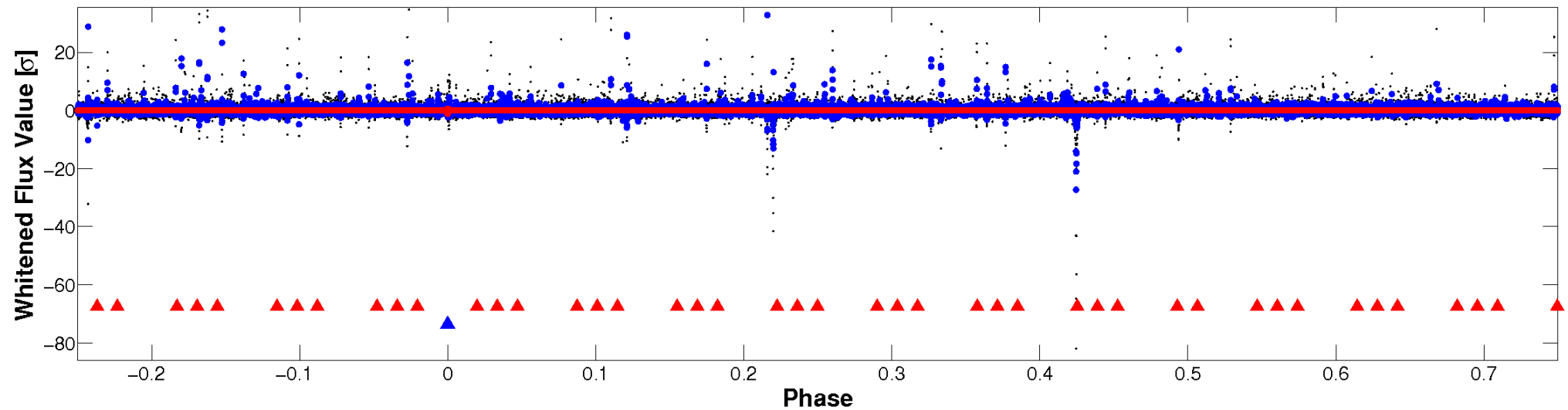


Non-Whitened Vs. Whitened Light Curve

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

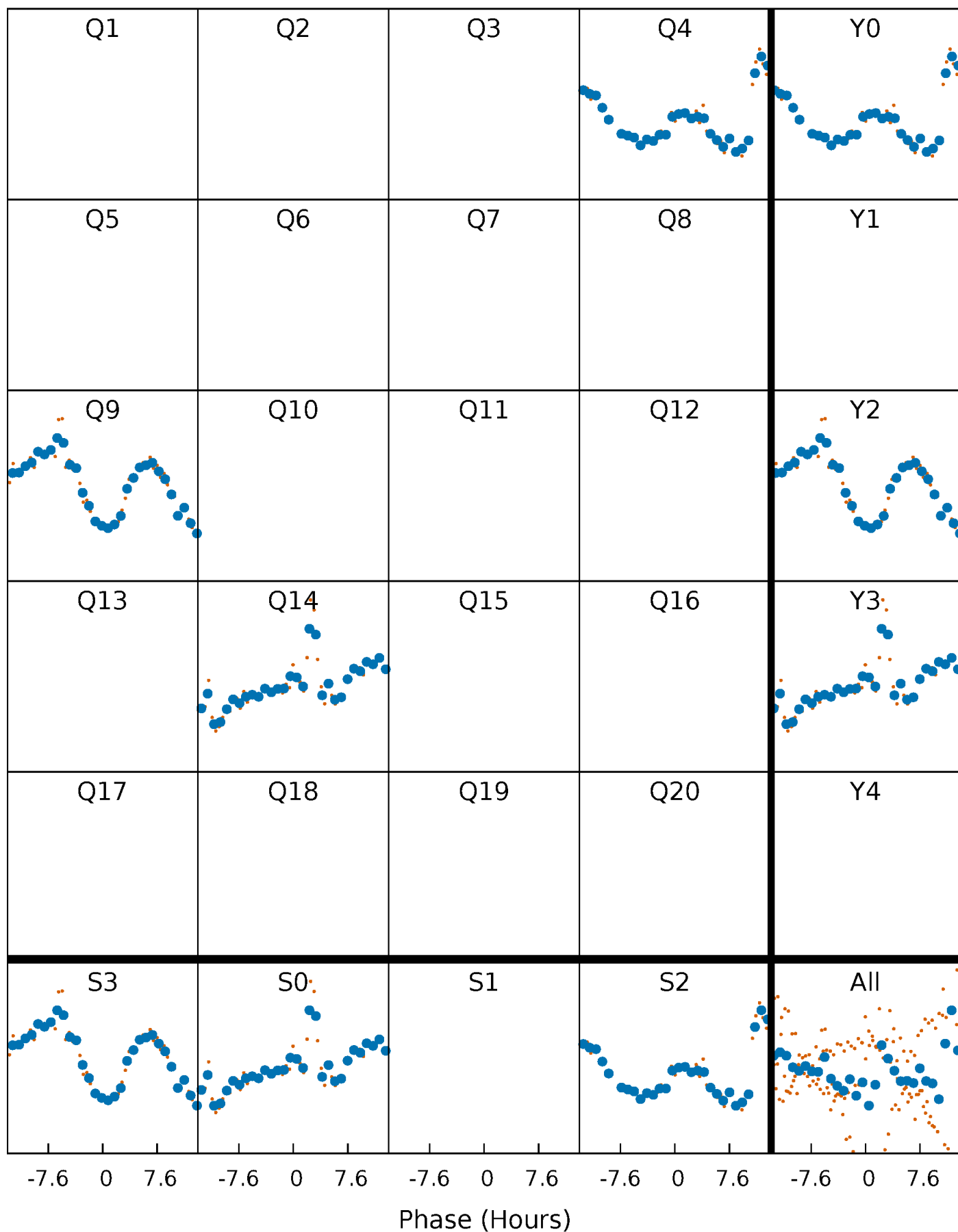


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



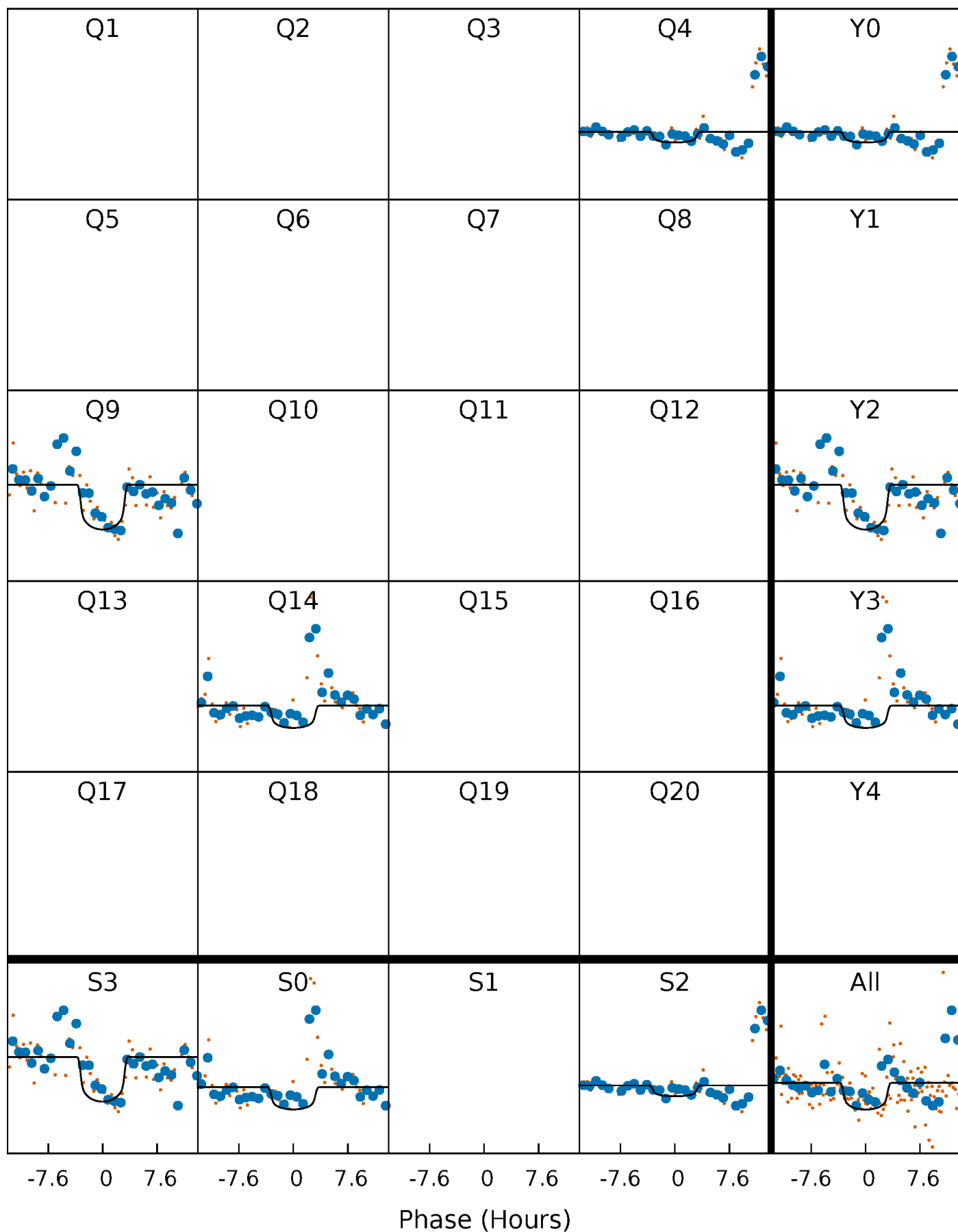
PDC Quarter-Phased Transit Curves

TCE 012203082-02 P=487.763311 Days $T_0=379.613347$ (BKJD)



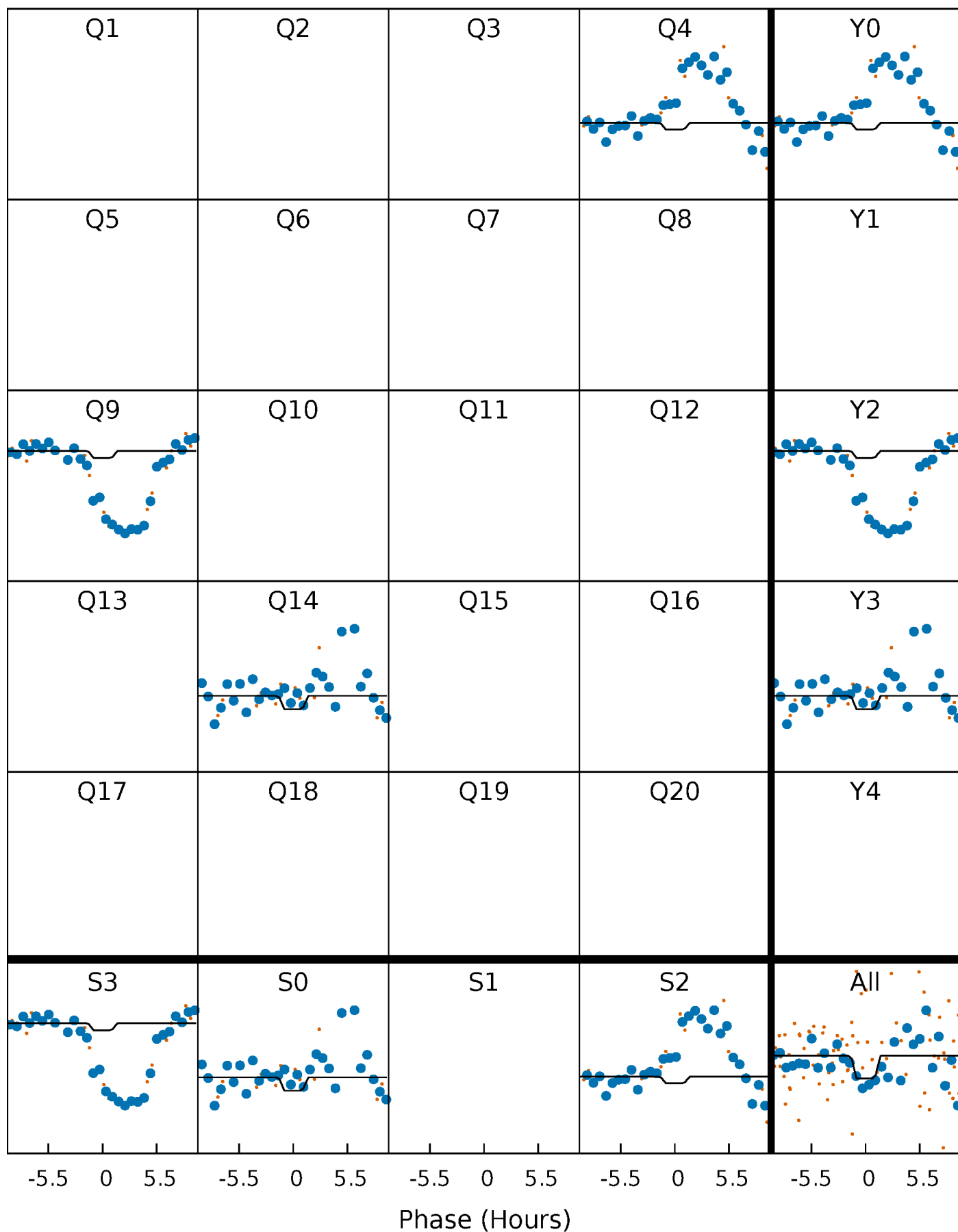
DV Quarter-Phased Transit Curves

TCE 012203082-02 $P=487.763311$ Days $T_0=379.613347$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

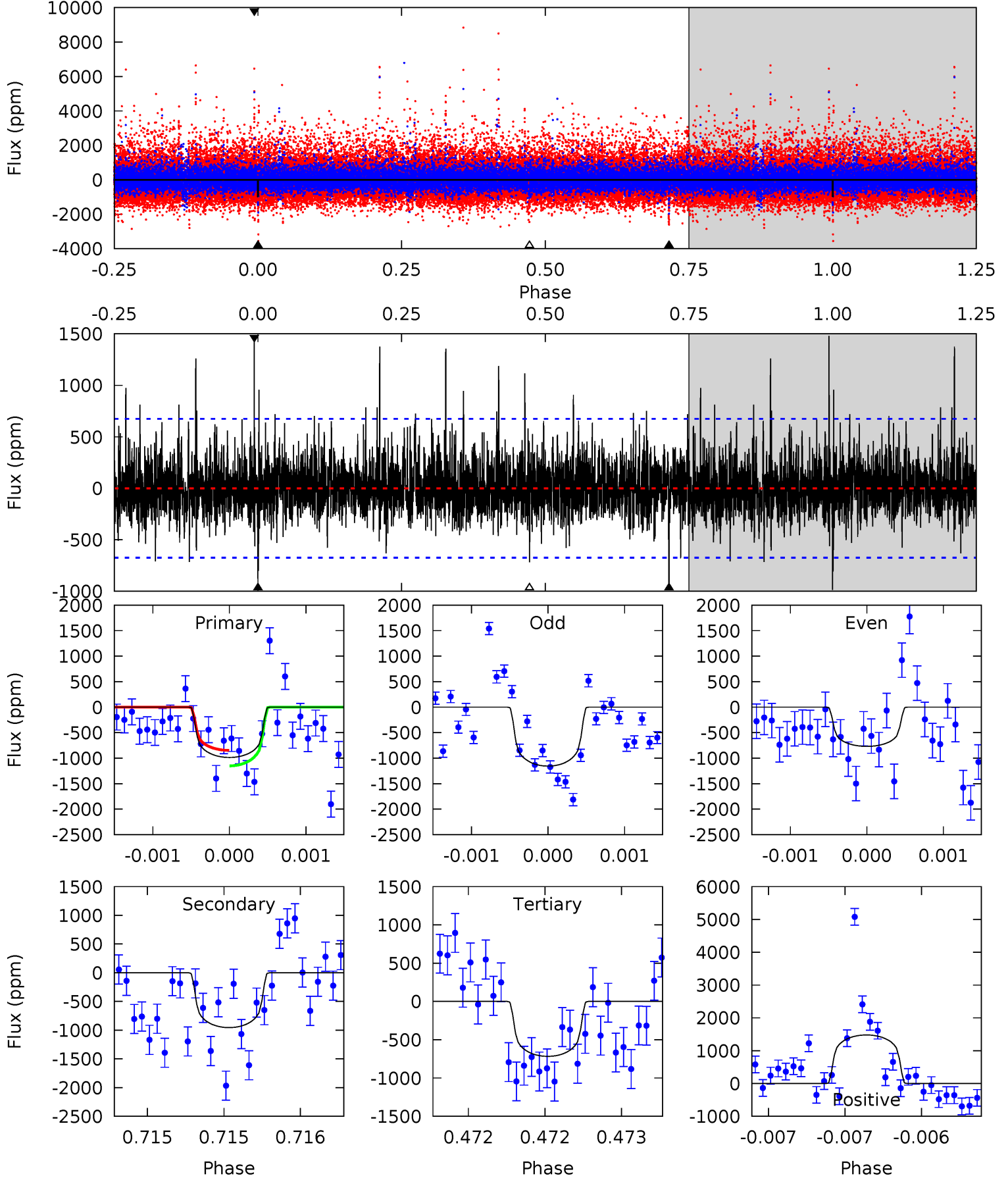
TCE 012203082-02 $P=487.728644$ Days $T_0=379.571322$ (BKJD)



DV Model-Shift Uniqueness Test

012203082-02, P = 487.763311 Days, E = 379.613347 Days

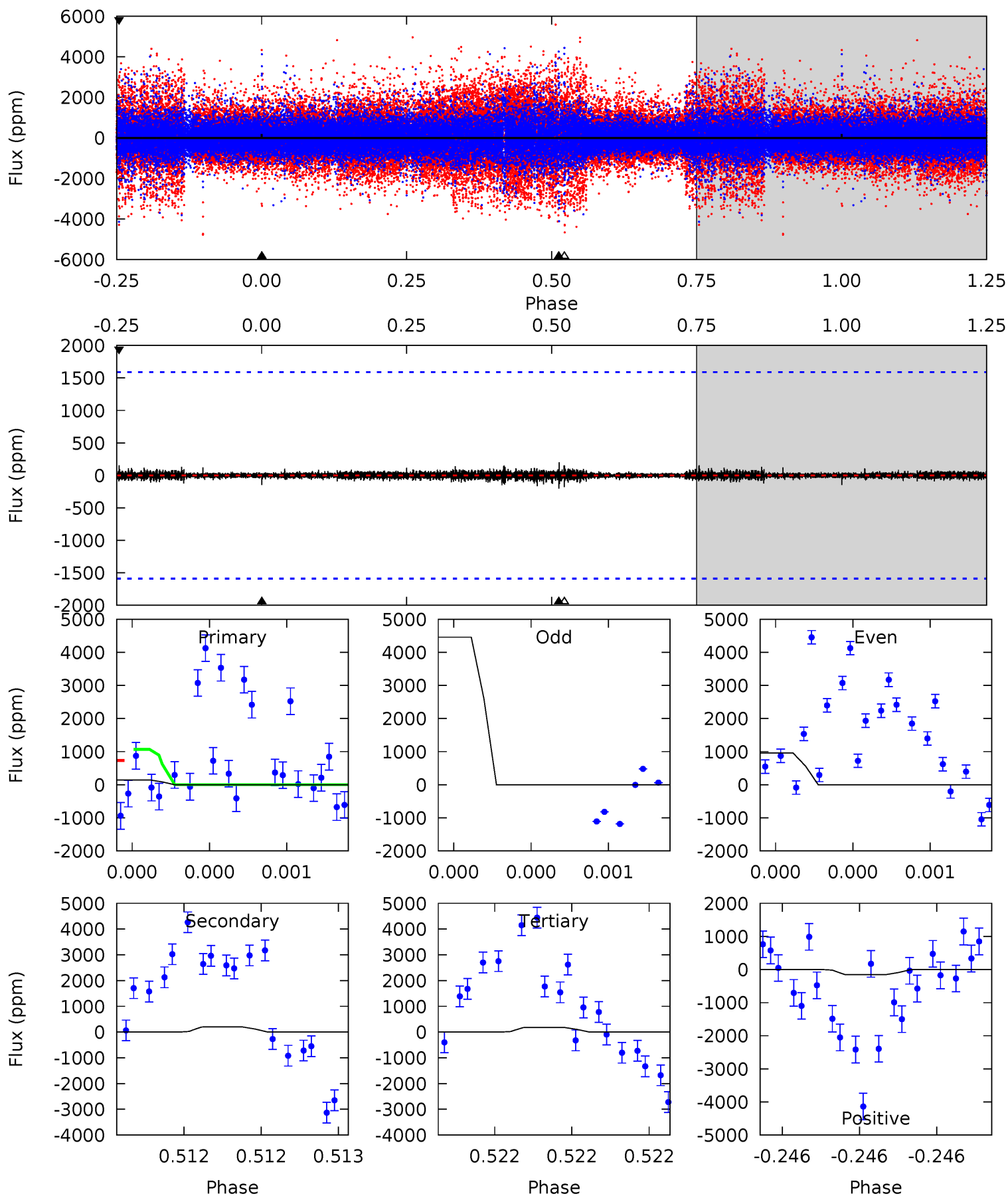
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.11	7.86	5.90	12.2	5.54	3.44	1.74	2.21	-4.06	1.96	-4.31	0.65	0.60	0.60	1.24



Alt Model-Shift Uniqueness Test

012203082-02, P = 487.728644 Days, E = 379.571322 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.52	0.71	0.64	0.55	5.69	3.65	0.10	-0.11	-0.03	0.08	0.16	6.94	-14.5	0.50	0.60



Stellar Parameters For KIC 012203082

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	3805^{+76}_{-92}	$4.733^{+0.042}_{-0.024}$	$-0.100^{+0.100}_{-0.100}$	$0.513^{+0.029}_{-0.040}$	$0.519^{+0.033}_{-0.033}$	$5.426^{+1.065}_{-0.567}$
	+2%/-2%	+1%/-1%	+100%/-100%	+6%/-8%	+6%/-6%	+20%/-10%
Source	PHO2	PHO2	PHO2	DSEP		

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

Secondary Eclipse Parameters for KIC 012203082-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-956 ± 122	$2.28^{+1.40}_{-1.27}$	169^{+4}_{-4}	3453^{+1137}_{-464}	$95761^{+398582}_{-59176}$
Alt.	-200 ± 279	$1.74^{+1.26}_{-1.08}$	169^{+4}_{-4}	2869^{+1140}_{-5311}	$26659^{+211147}_{-34390}$

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

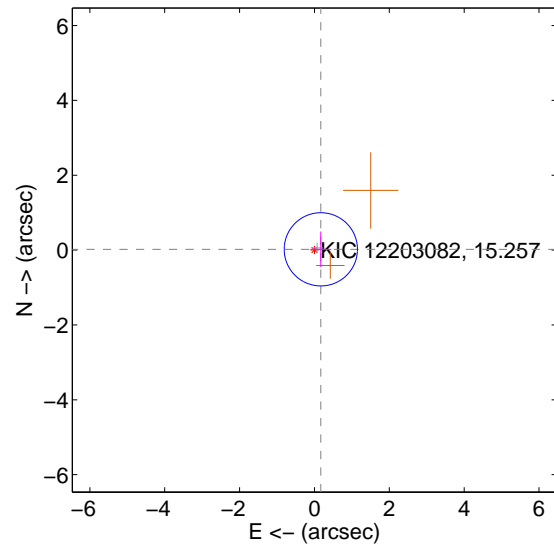
Supplemental centroid analysis for 012203082-02. Kepler magnitude: 15.26. Transit SNR 6.50

There are 1 quarters with good PRF difference image offsets

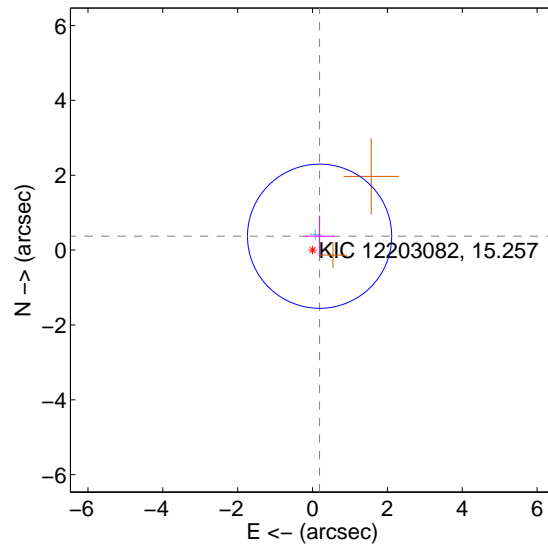
The direct PRF centroid is offset from the target star catalog position by about 0.30 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.172 ± 0.326	0.53	-0.171 ± 0.276	0.021 ± 0.476
PRF-fit source offset from KIC position	0.416 ± 0.642	0.65	-0.189 ± 0.388	0.370 ± 0.549
photometric centroid source offset	2.09 ± 1.10	1.91	-0.69 ± 1.09	1.98 ± 1.10

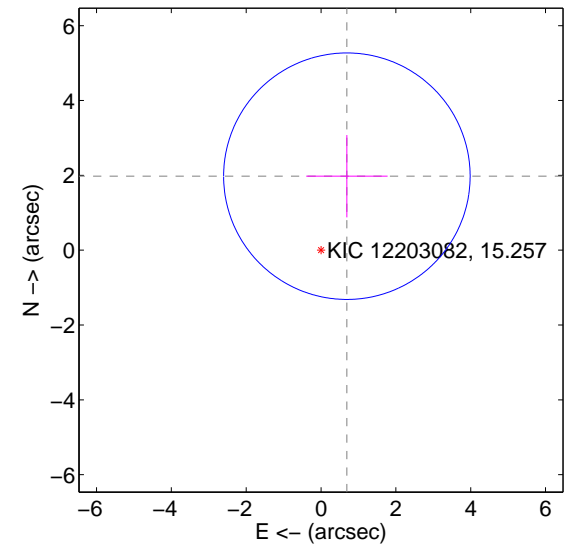
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

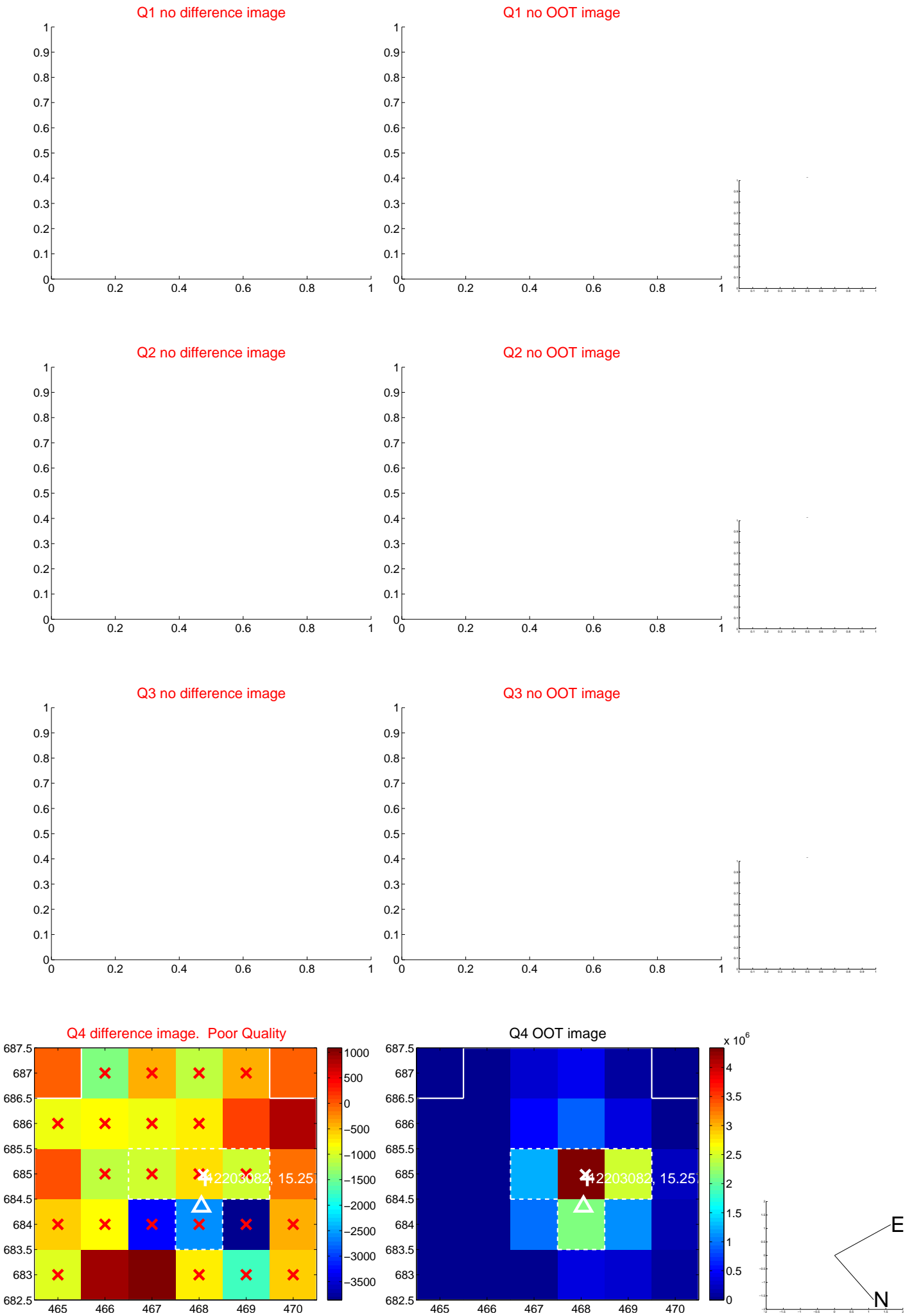


offset from photometric centroids

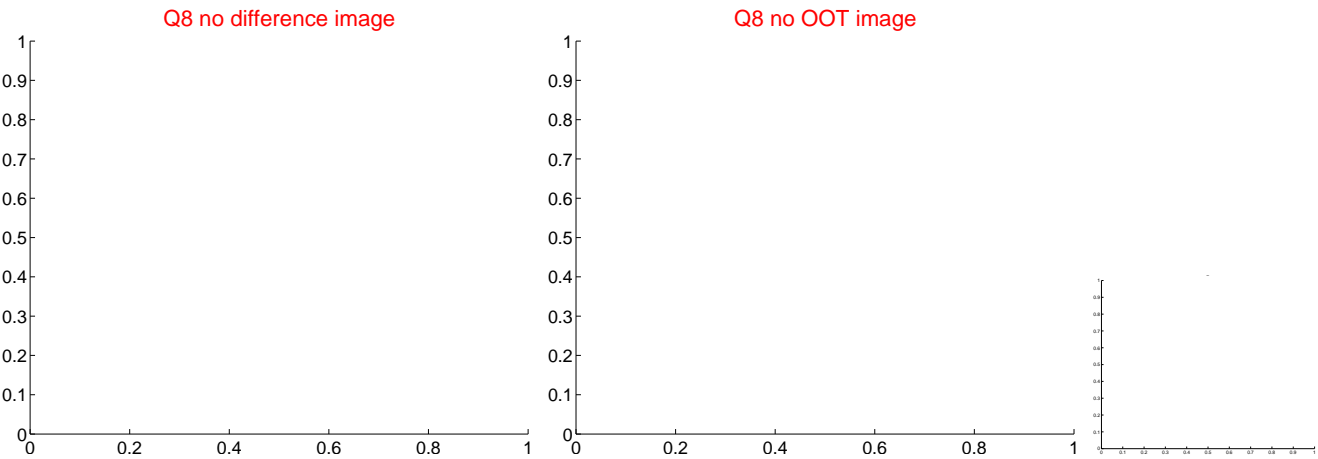
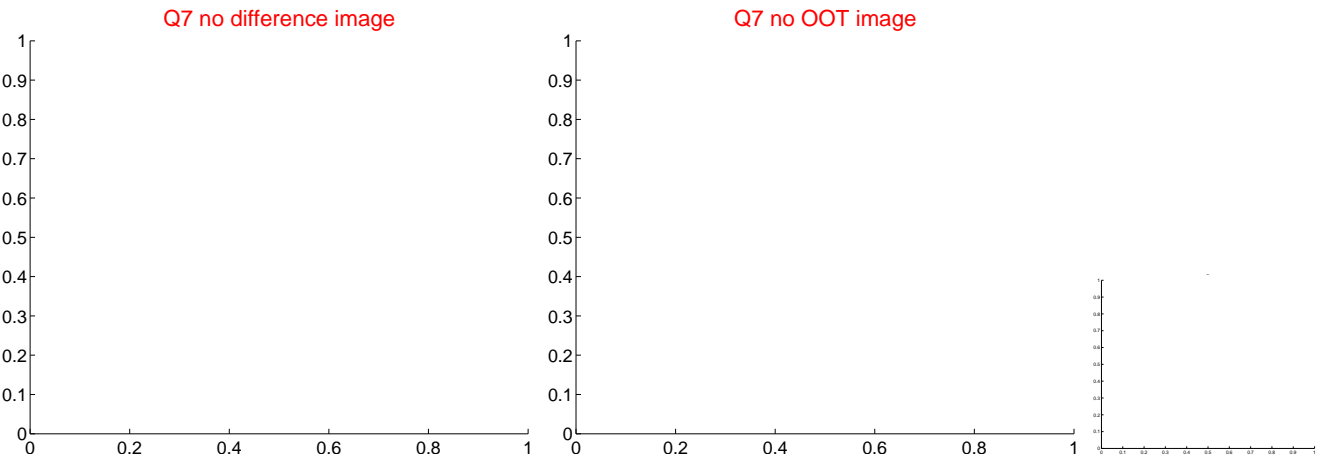
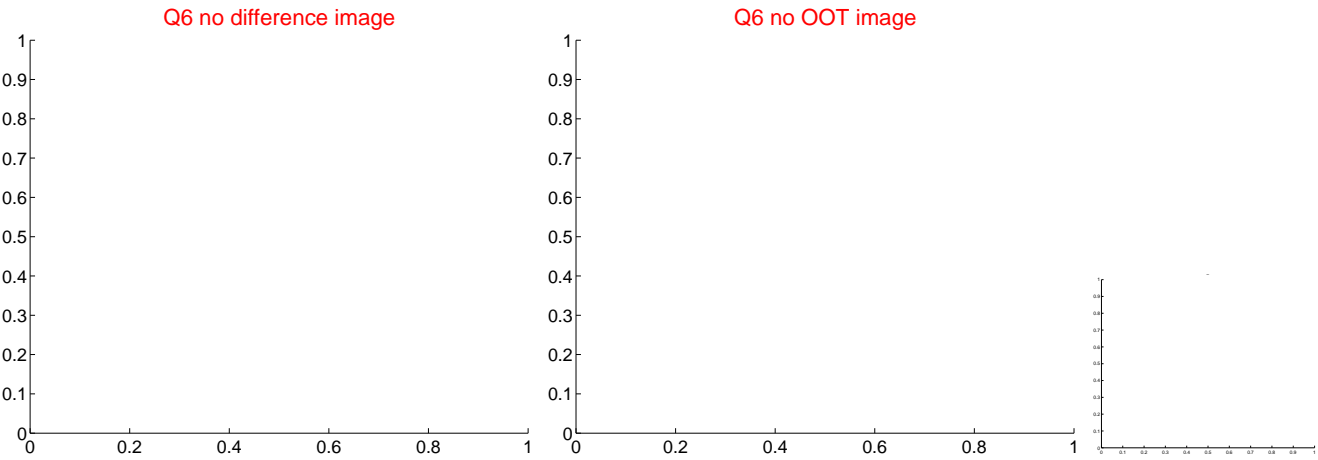
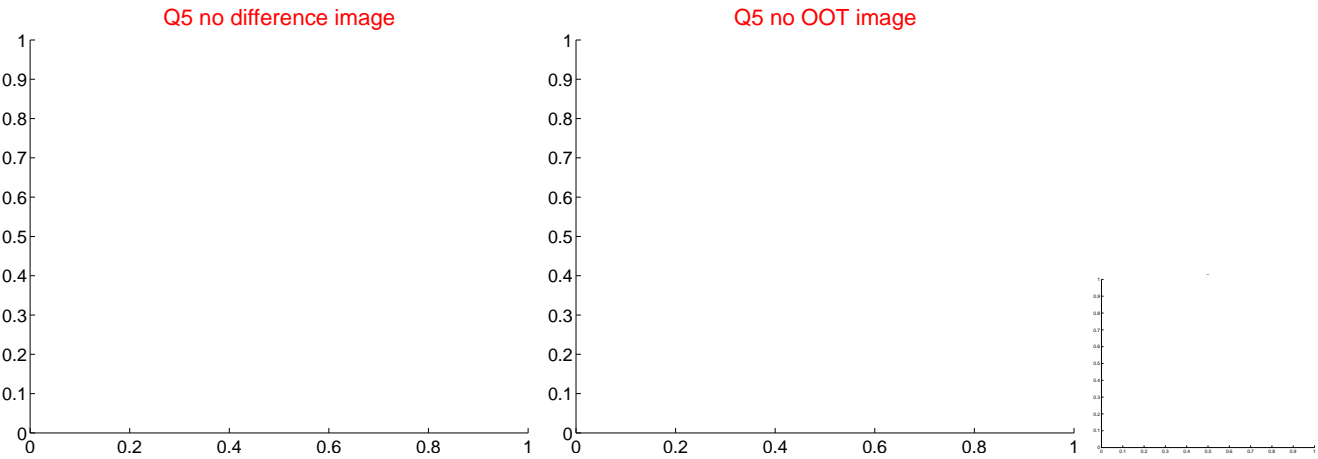


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

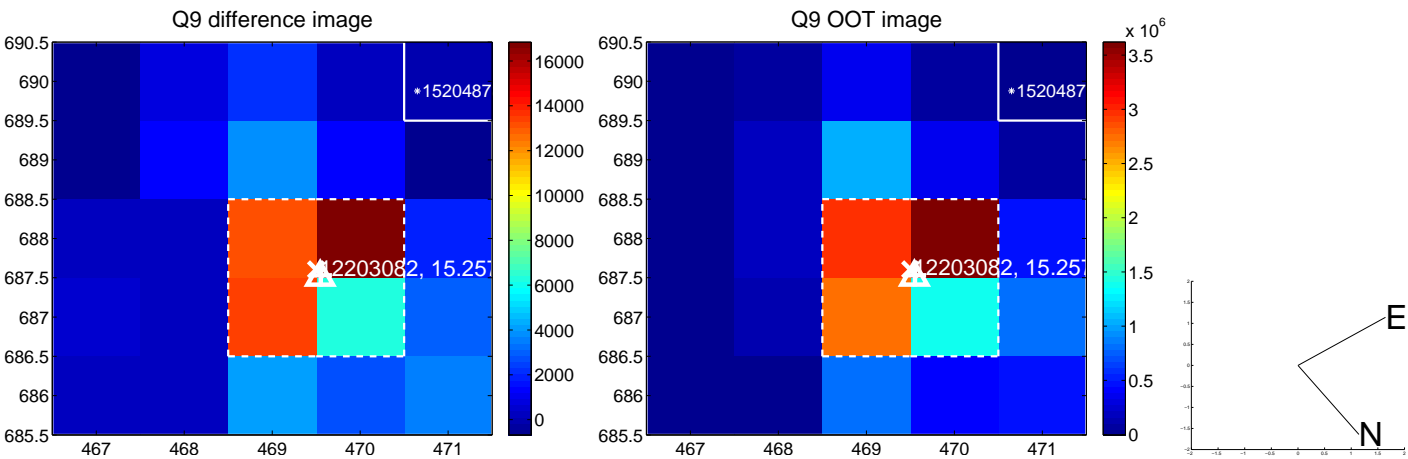
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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

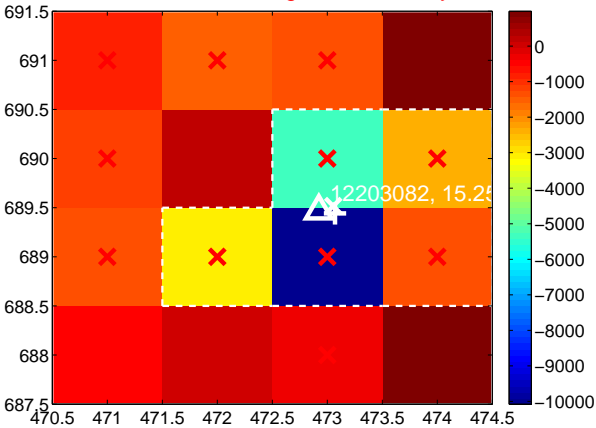
Q13 no difference image



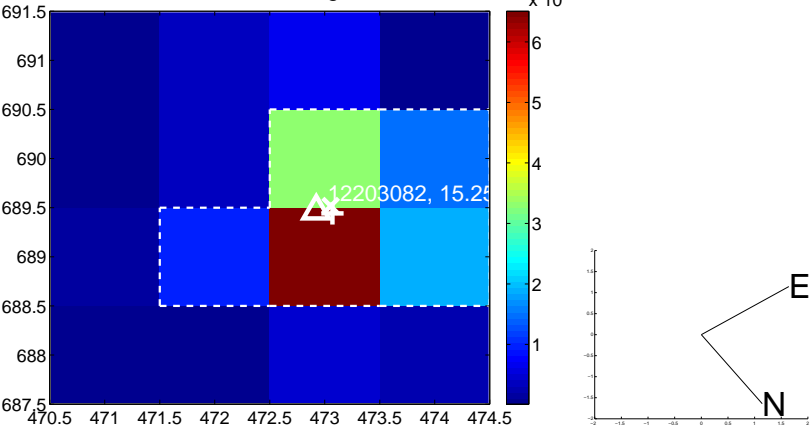
Q13 no OOT image



Q14 difference image. Poor Quality



Q14 OOT image



Q15 no difference image



Q15 no OOT image



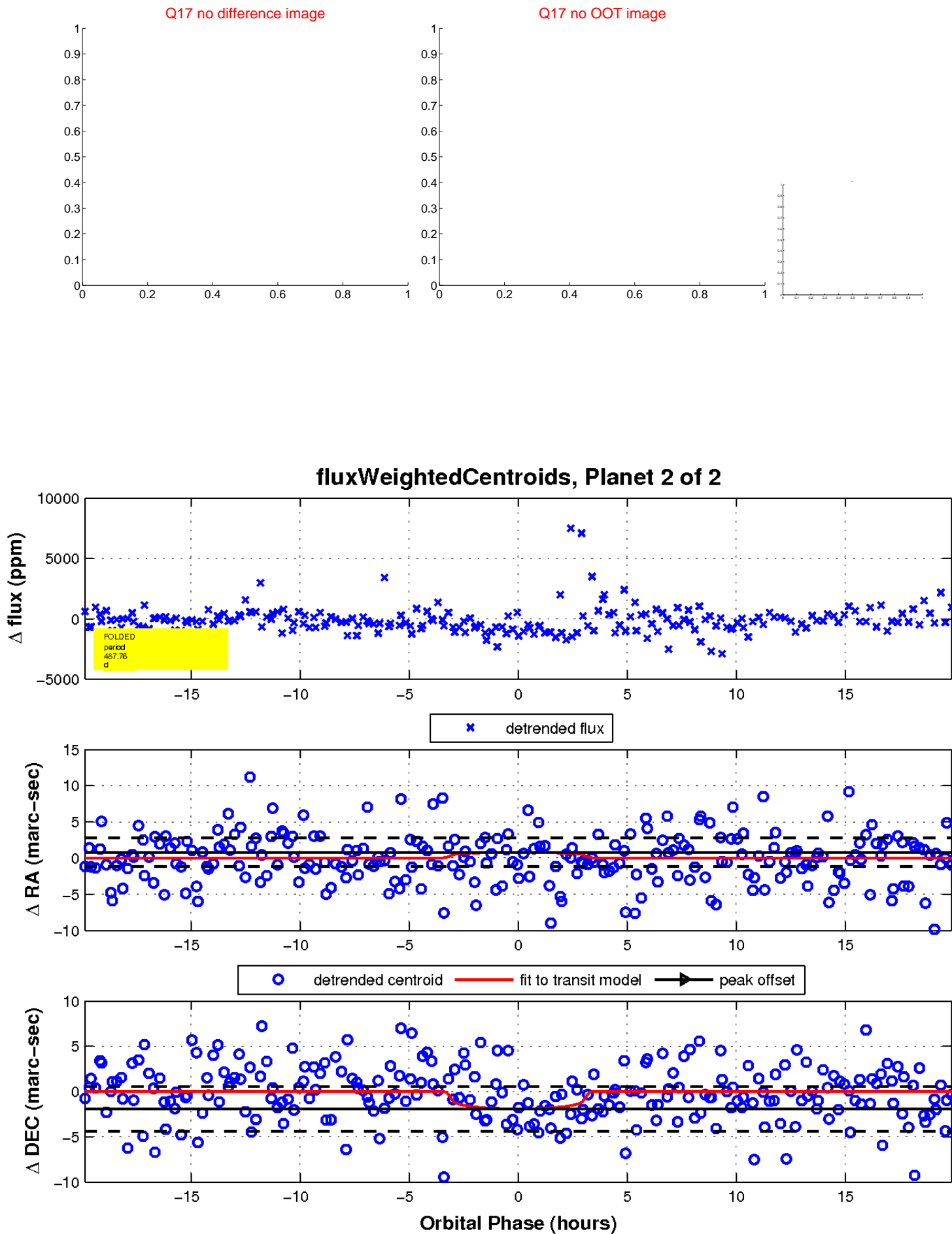
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

