

KIC 012121936

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})
012121936-01	OBS	No	447.522551	420.841363	805.0	3.787	13.6	5.7	0.54	4732	1.51	0.15
012121936-02	OBS	No	160.851925	192.588708	287.5	2.038	13.1	4.0	0.54	4732	0.98	0.59
012121936-03	OBS	No	573.241902	409.317385	865.5	4.993	12.7	5.4	0.54	4732	1.69	0.11
012121936-04	OBS	No	444.014474	573.159725	752.4	1.945	14.6	5.8	0.54	4732	1.47	0.15

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012121936-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012121936-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS
012121936-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012121936-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

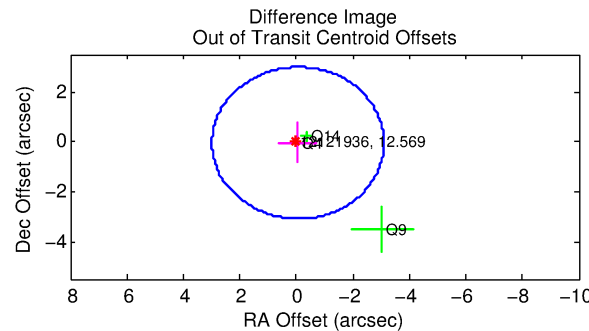
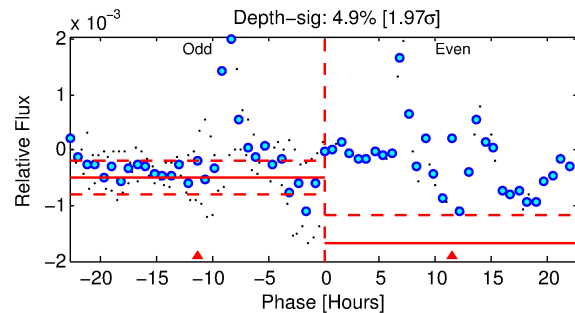
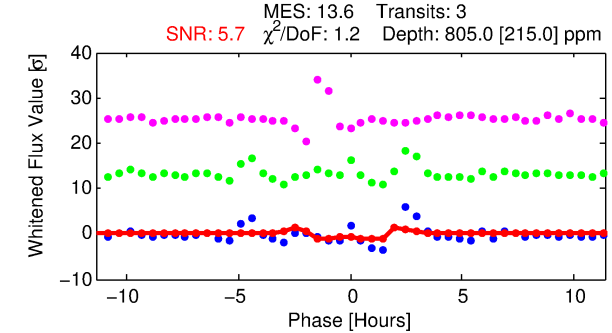
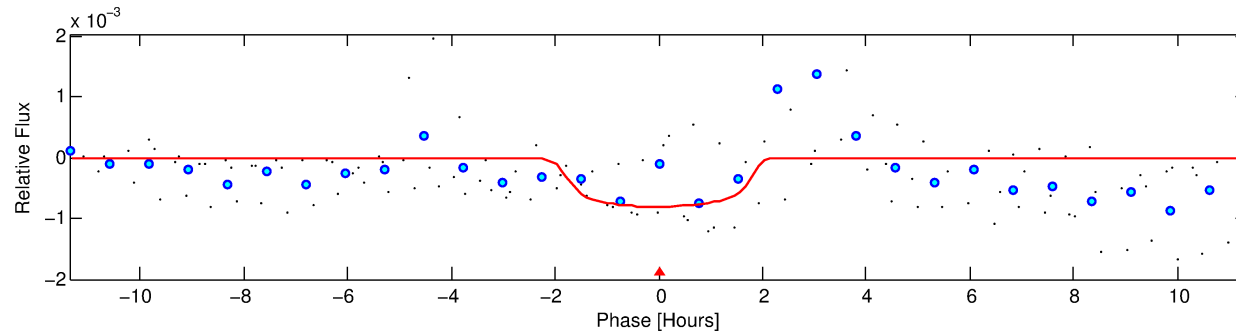
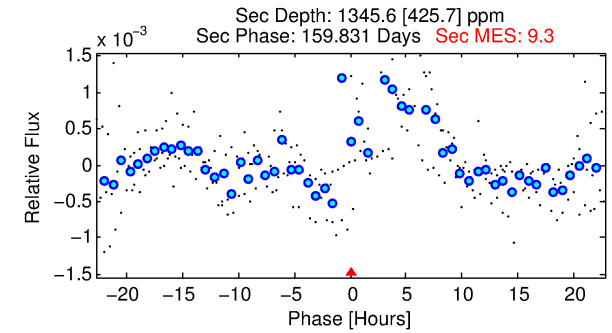
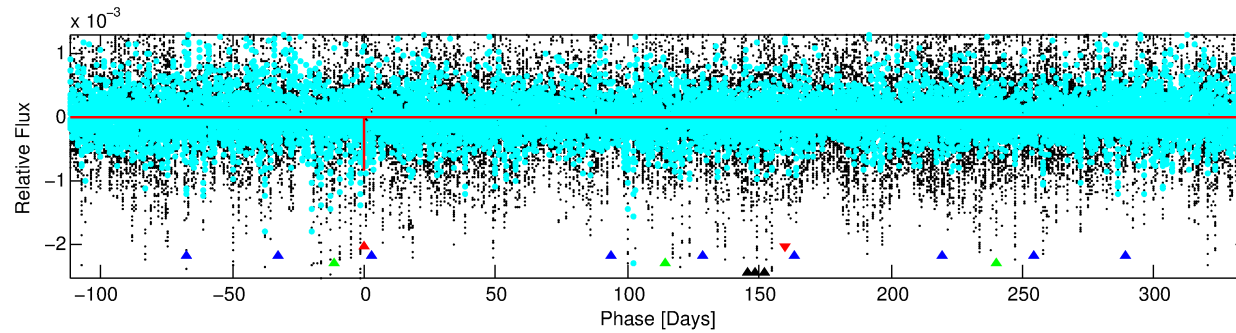
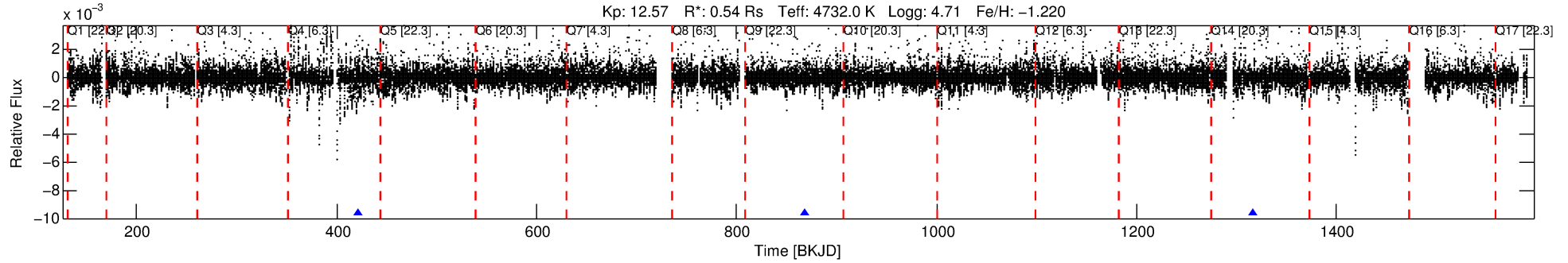
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012121936-01

No Significant Match Found

DV One-Page Summary

KIC: 12121936 Candidate: 1 of 4 Period: 447.523 d



DV Fit Results:

Period = 447.52255 [0.00630] d
Epoch = 420.8414 [0.0076] BKJD
Rp/R* = 0.0255 [0.0901]
a/R* = 913.71 [12612.96]
b = 0.17 [81.74]
Seff = 0.15 [0.02]
Teq = 159 [6] K
Rp = 1.51 [5.33] Re
a = 0.9359 [0.0522] AU
Ag = 284251.96 [2008978.11] [0.14 σ]
Teffp = 5671 [10021] K [0.55 σ]

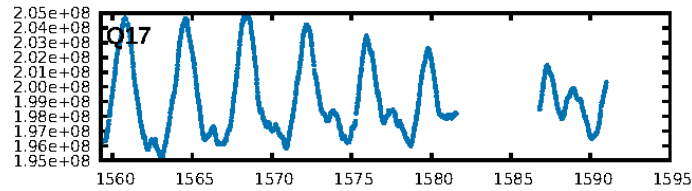
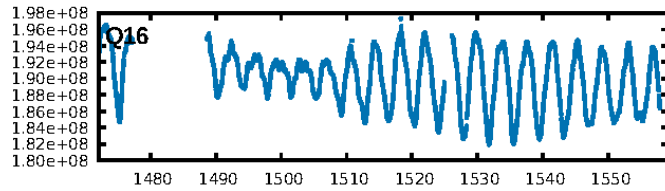
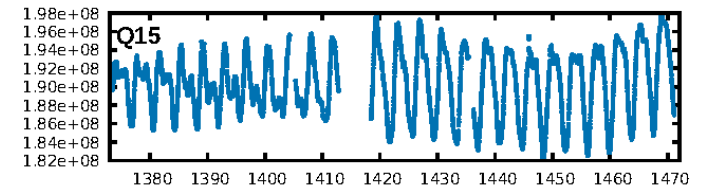
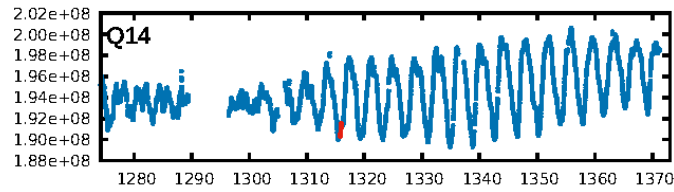
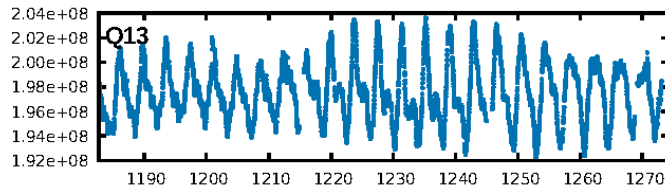
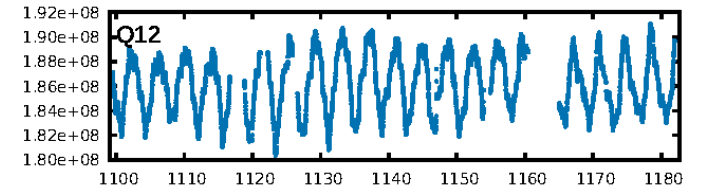
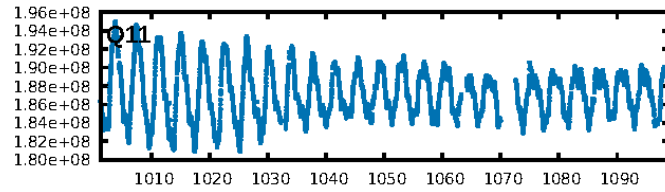
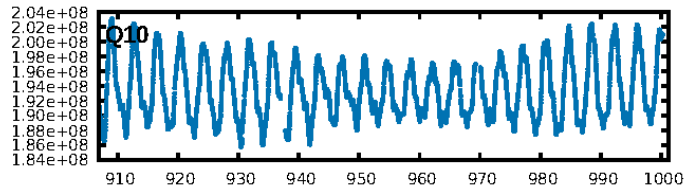
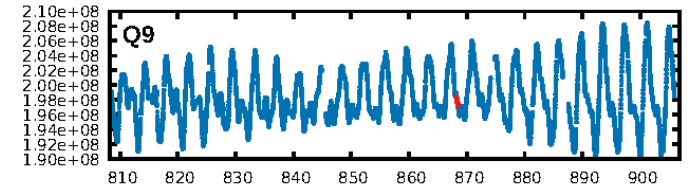
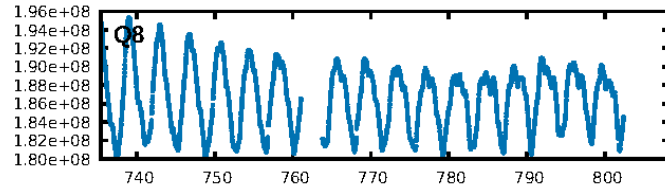
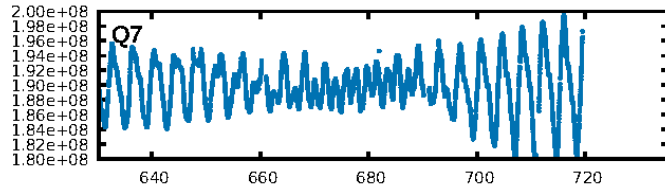
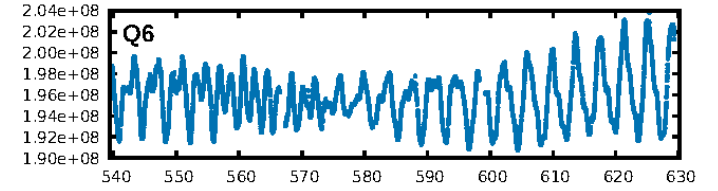
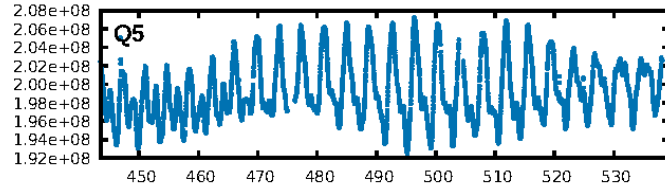
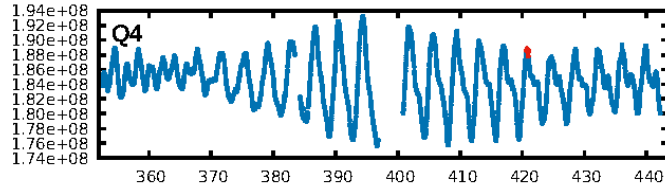
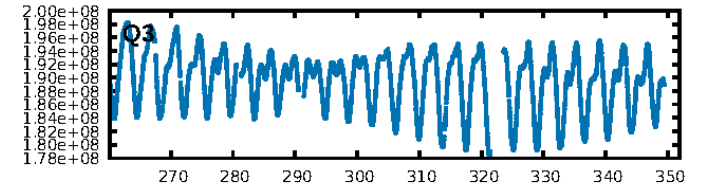
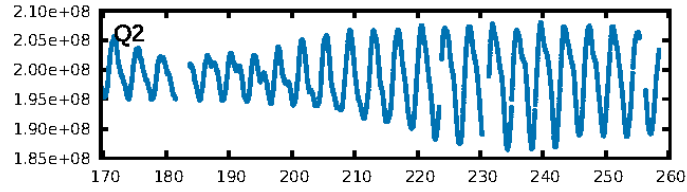
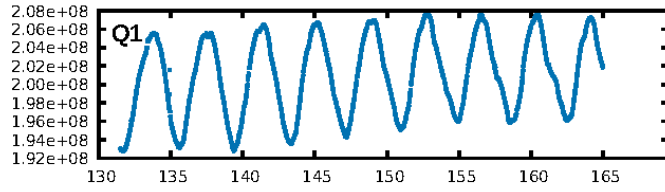
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [19.78 σ]
LongPeriod-sig: 100.0% [481.47 σ]
ModelChiSquare2-sig: 16.1%
ModelChiSquareGof-sig: 87.8%
Bootstrap-pfa: 9.71e-09
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.4367
Centroid-sig: 0.5%
Centroid-so: 1.243 arcsec [1.52 σ]
OotOffset-rm: 0.075 arcsec [0.07 σ]
OotOffset-st: 1/0/1/1 [3]
KicOffset-rm: 0.274 arcsec [0.30 σ]
KicOffset-st: 1/0/1/1 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 1.00 [3/3]

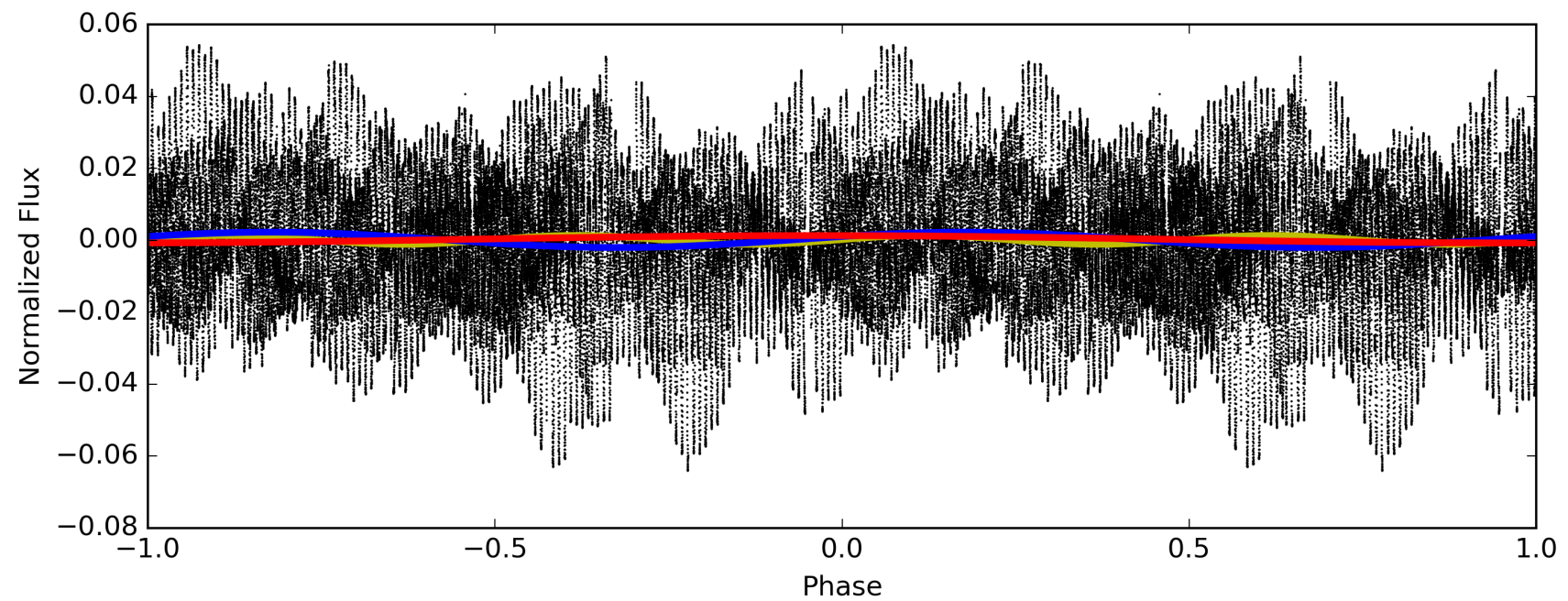
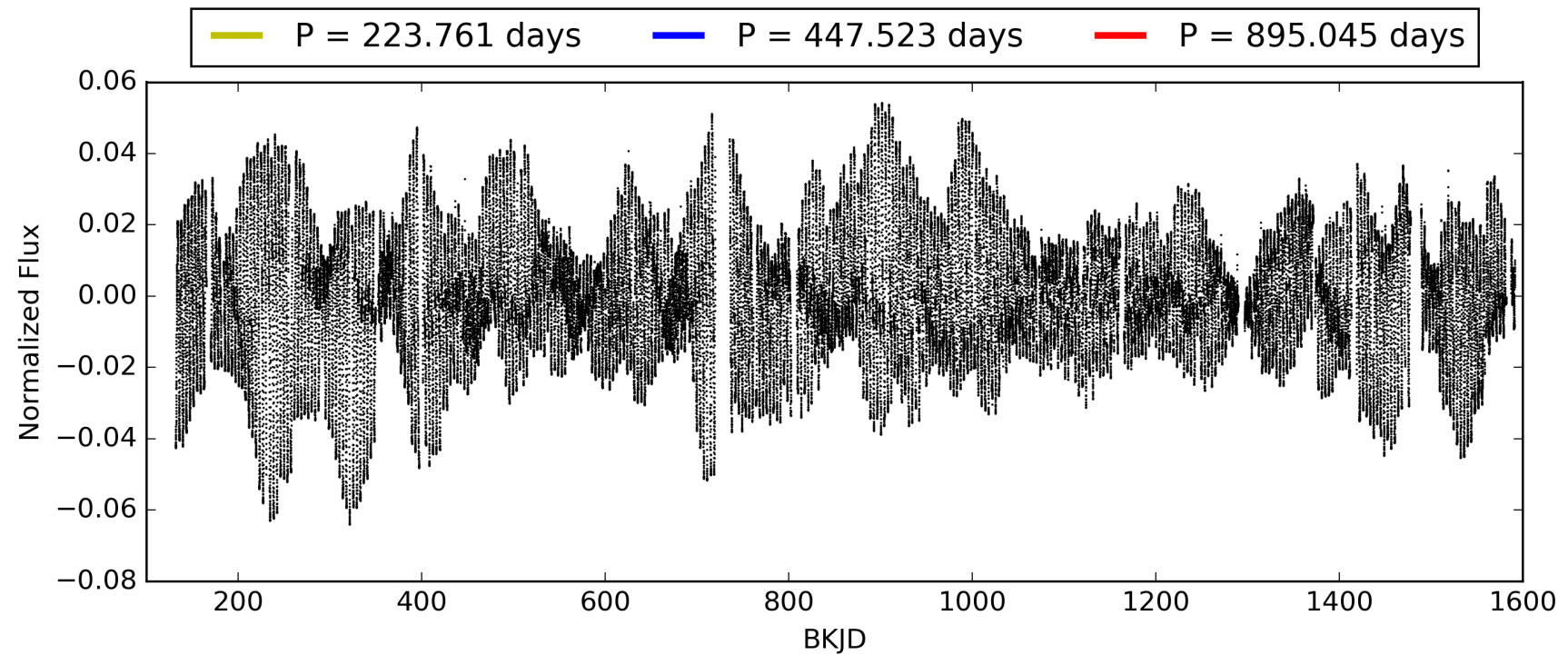
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:05:47 Z

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

TCE 012121936-01, PDC Light Curves

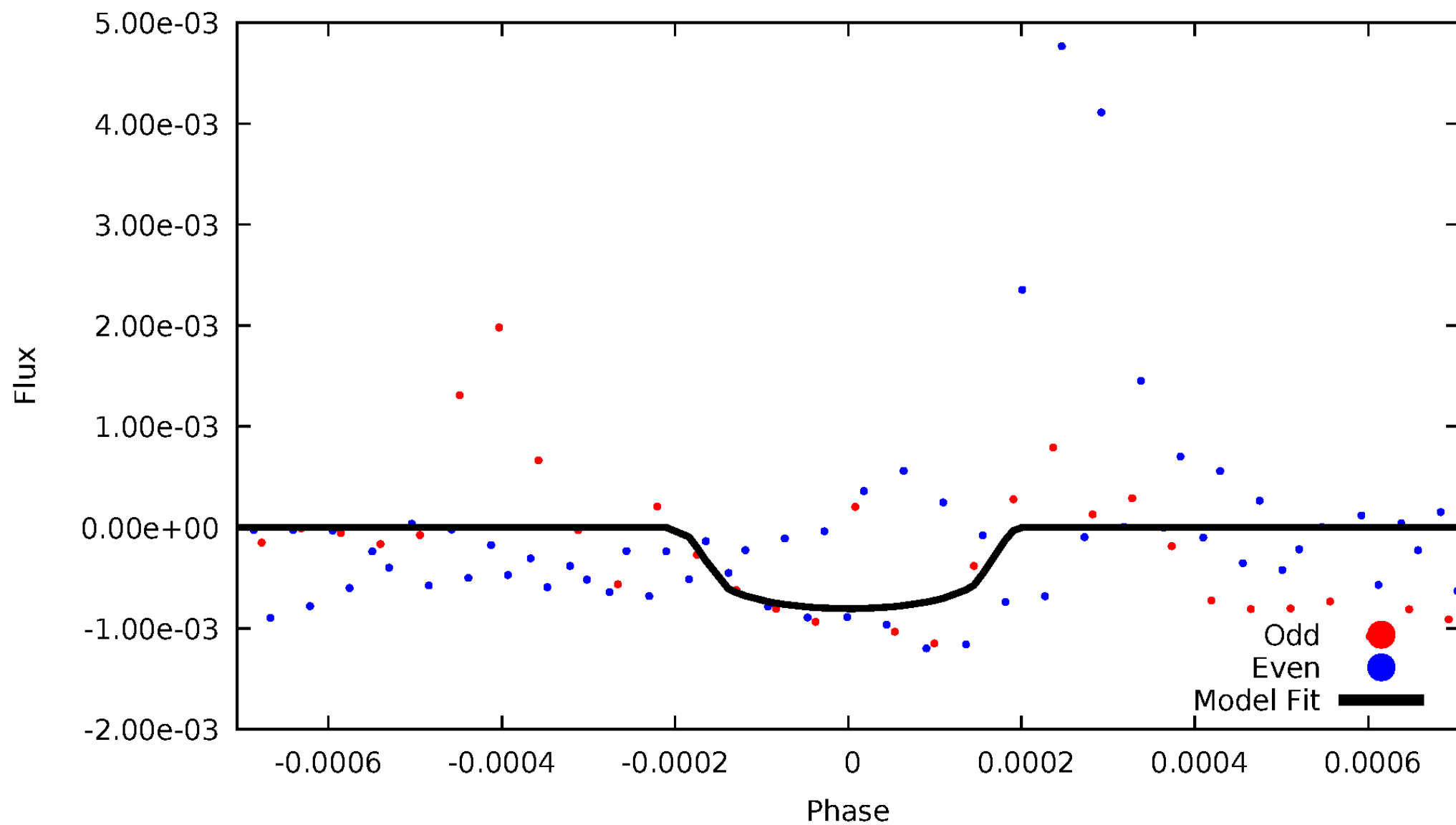


TCE 012121936-01



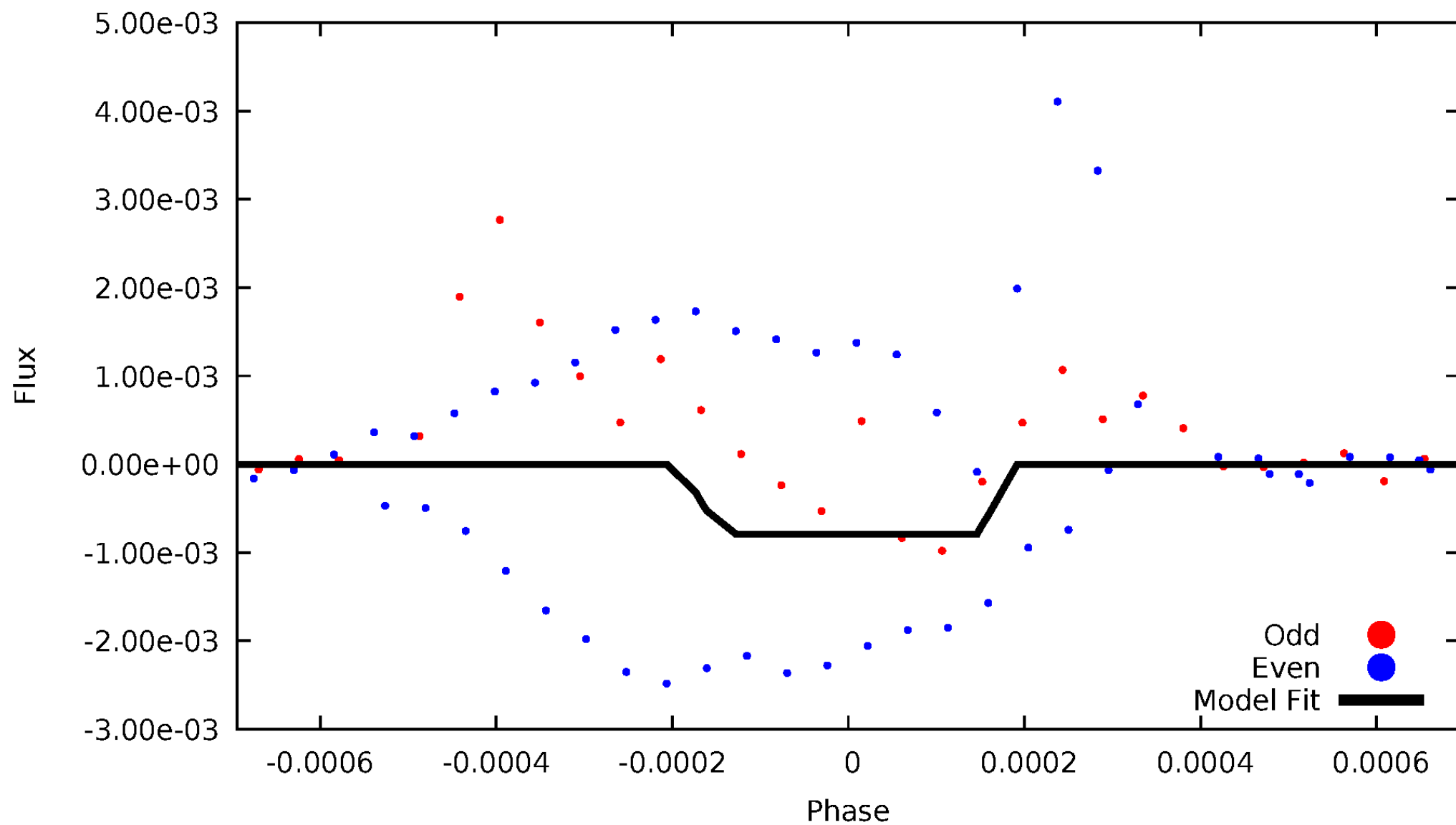
DV Odd/Even

TCE 012121936-01

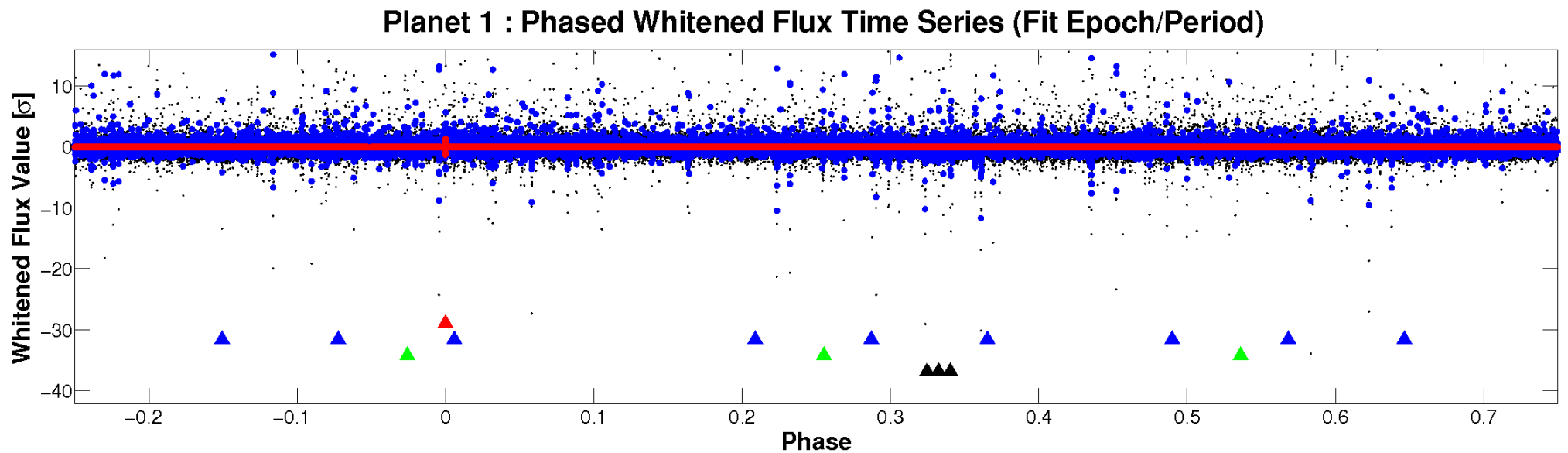
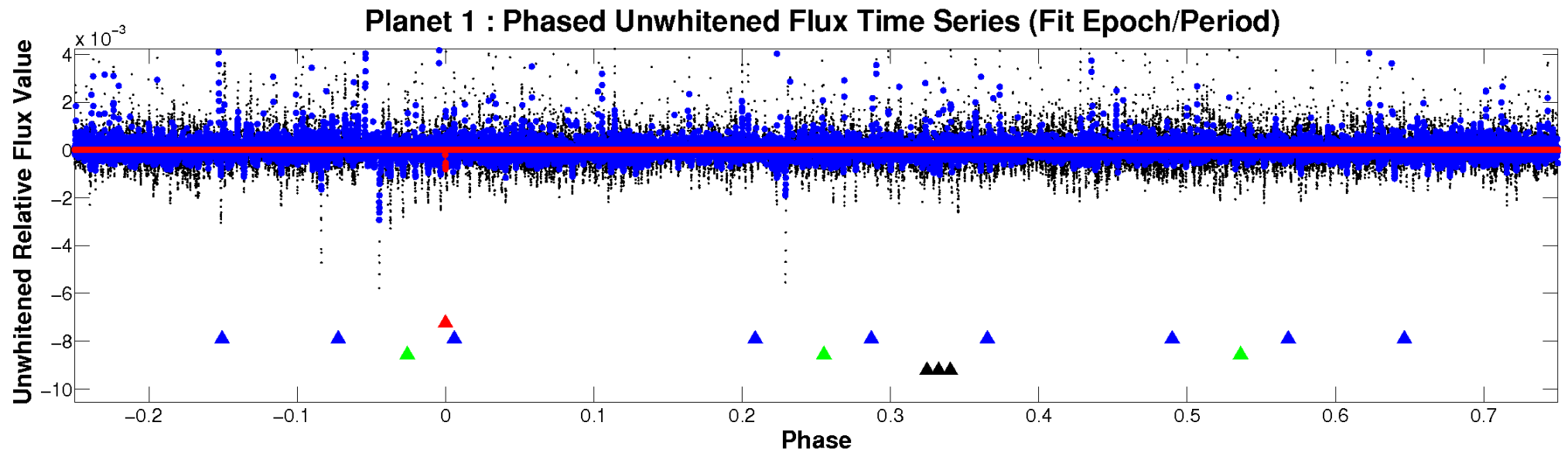


ALT Odd/Even

TCE 012121936-01

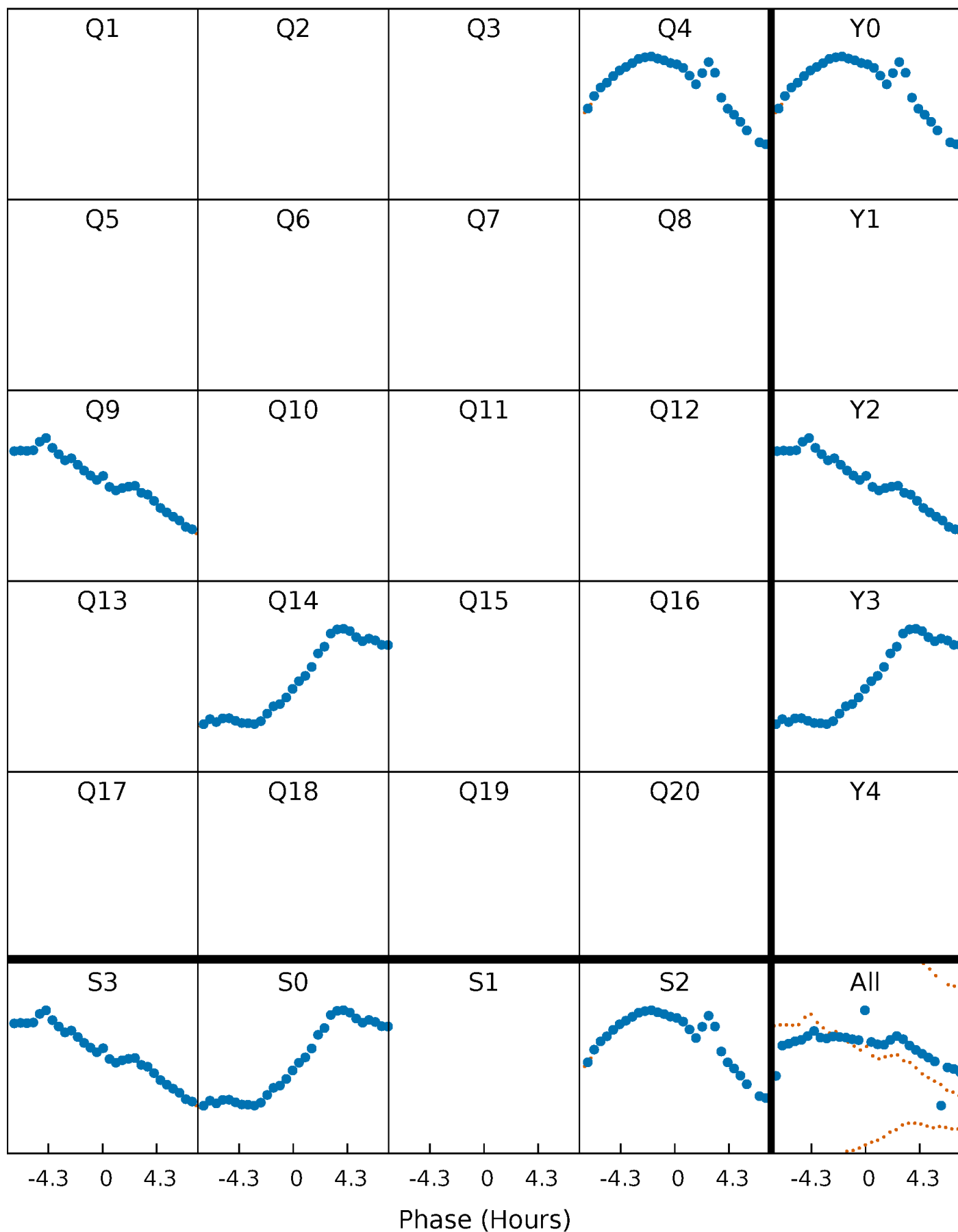


Non-Whitened Vs. Whitened Light Curve



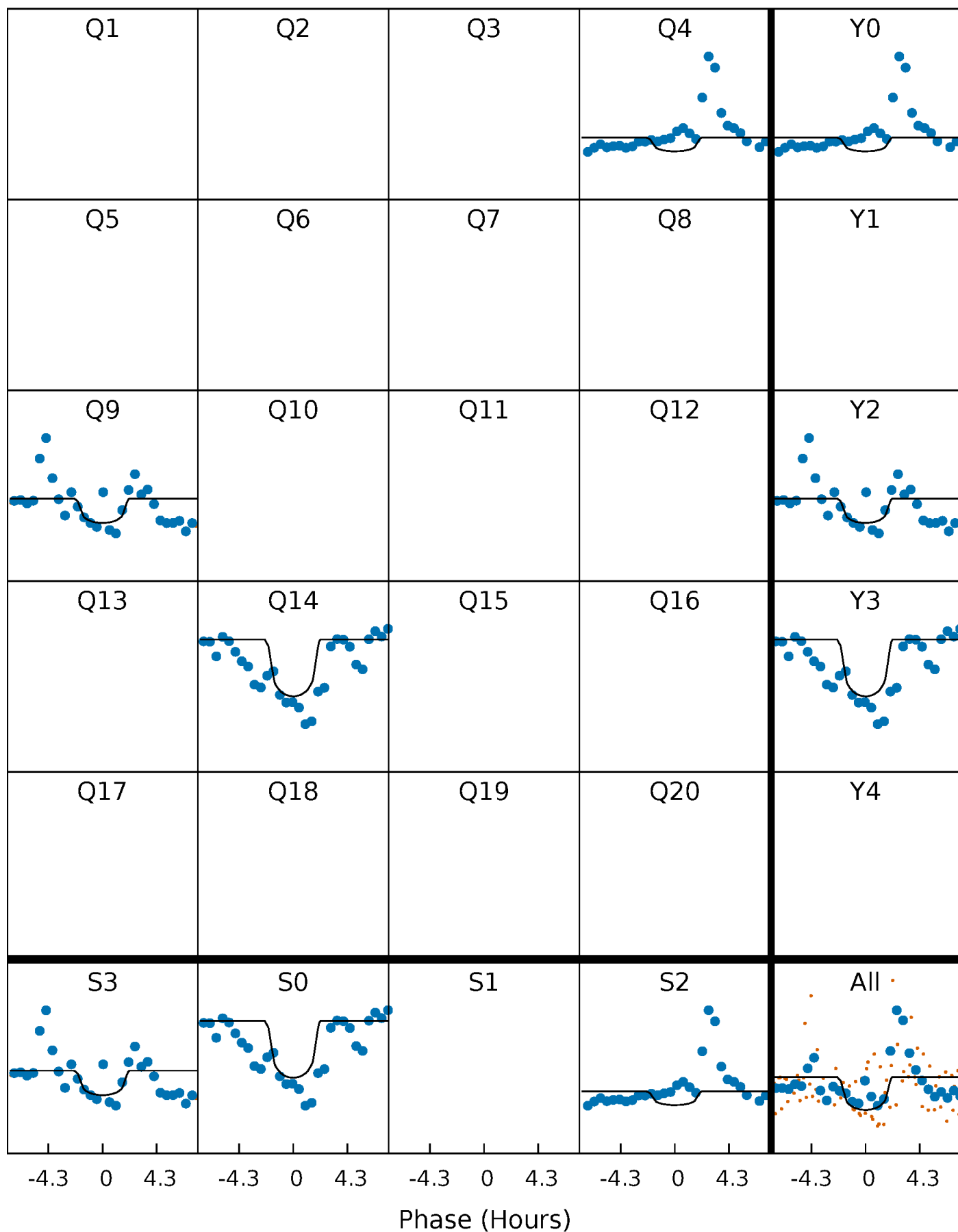
PDC Quarter-Phased Transit Curves

TCE 012121936-01 P=447.522551 Days $T_0=420.841363$ (BKJD)



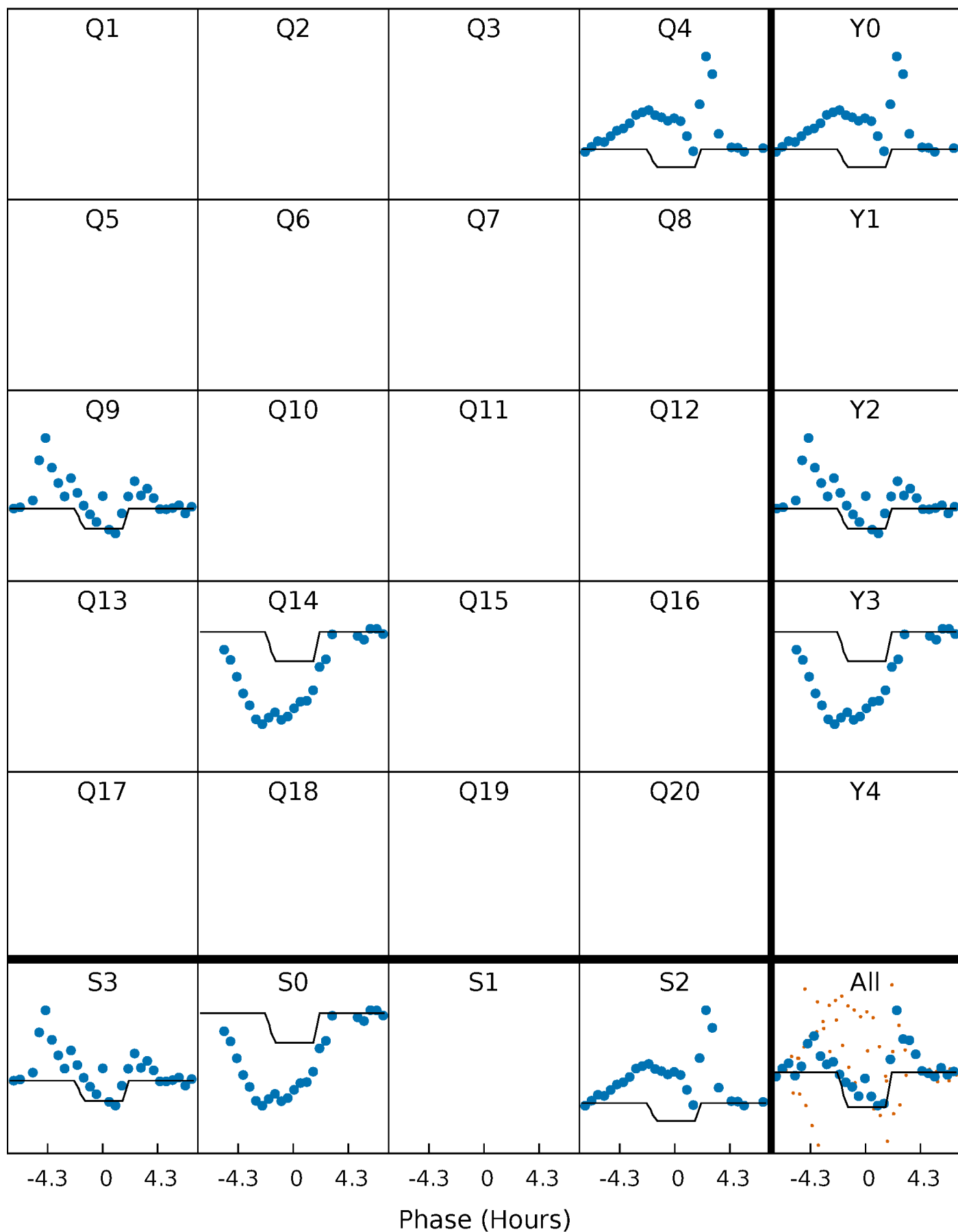
DV Quarter-Phased Transit Curves

TCE 012121936-01 P=447.522551 Days $T_0=420.841363$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

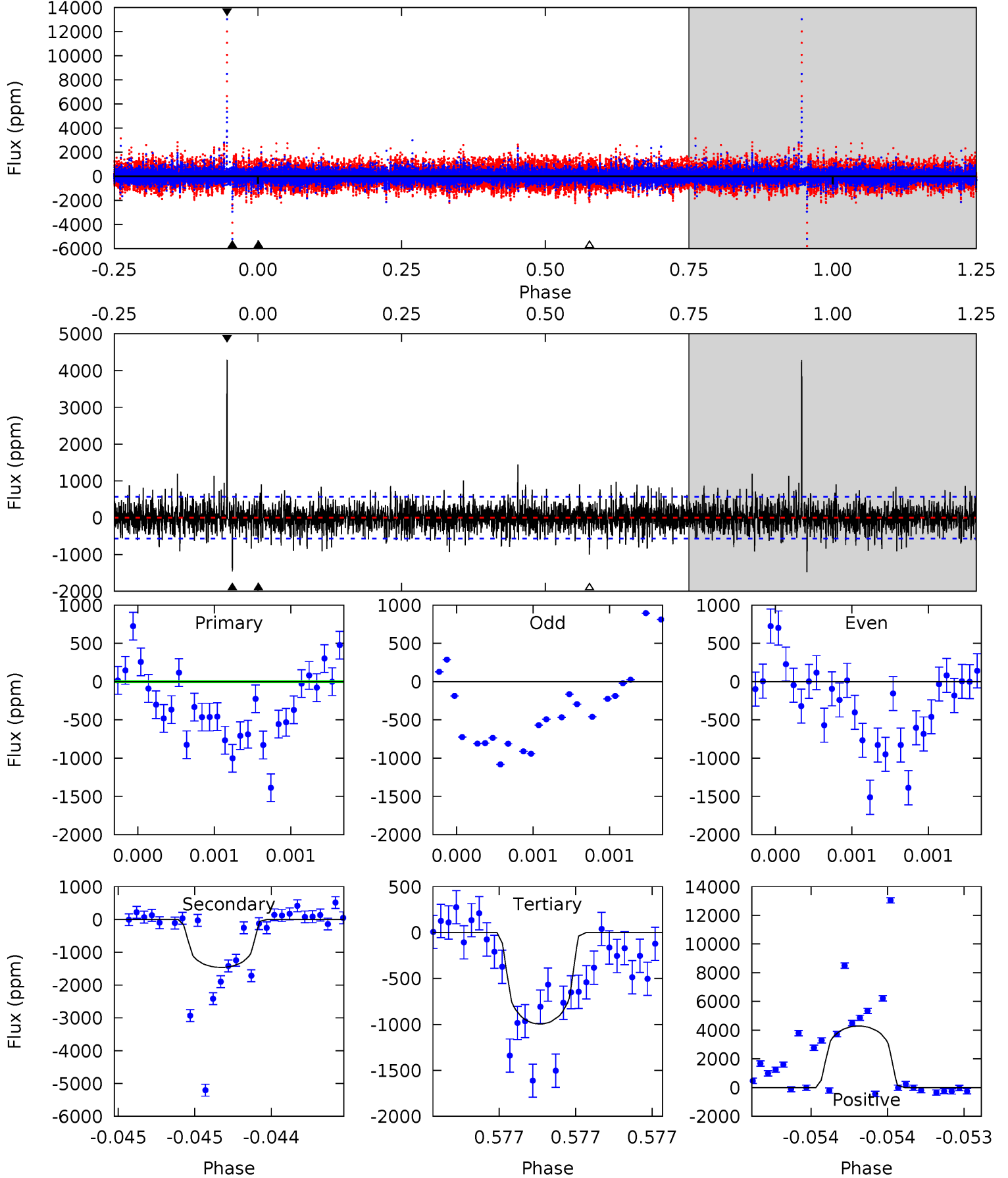
TCE 012121936-01 P=447.515398 Days $T_0=420.845287$ (BKJD)



DV Model-Shift Uniqueness Test

012121936-01, P = 447.522551 Days, E = 420.841363 Days

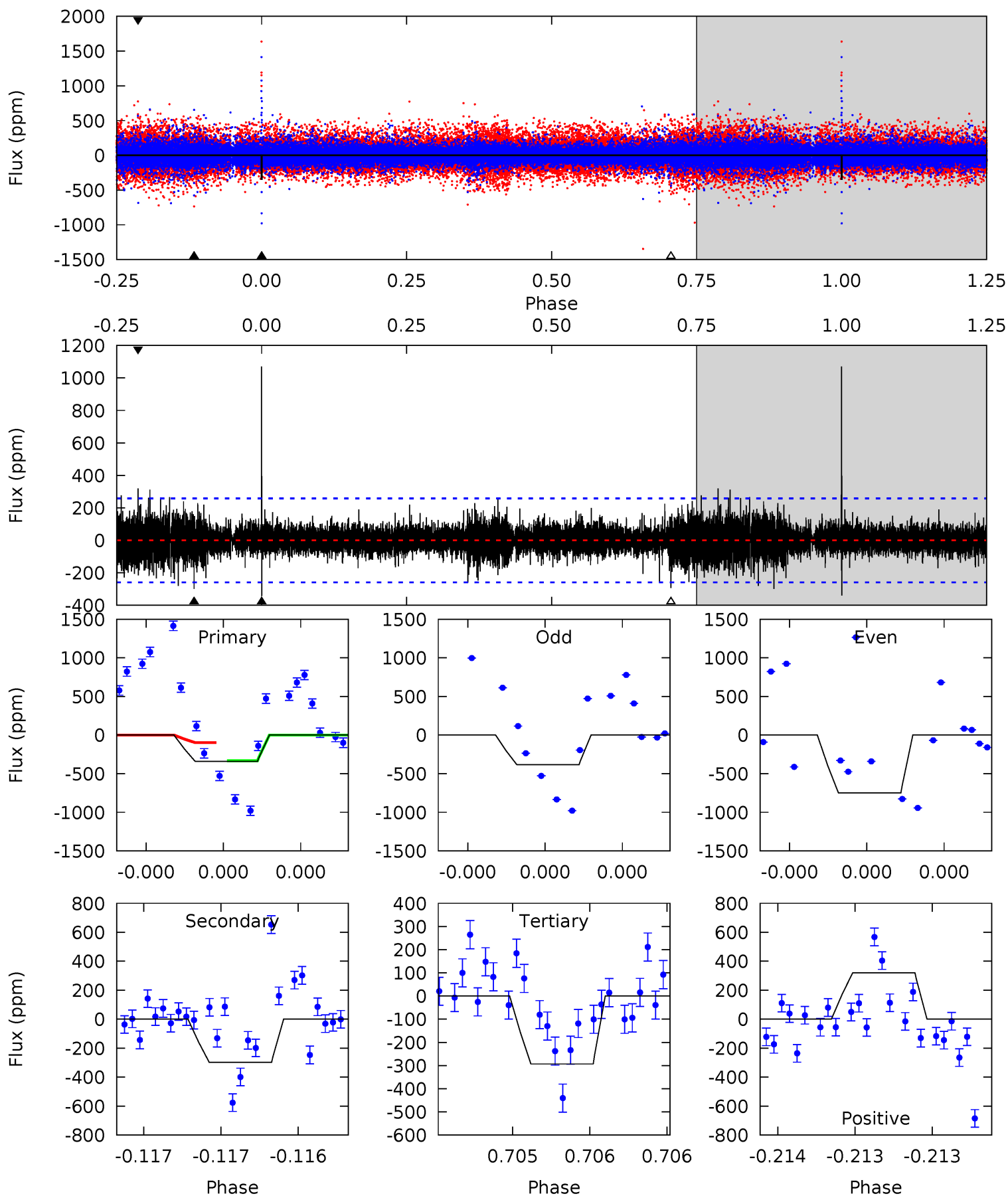
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.11	14.5	9.88	42.6	5.62	3.56	2.48	-3.78	-36.5	4.63	-28.0	1.26	0.74	0.75	0.19



Alt Model-Shift Uniqueness Test

012121936-01, P = 447.515398 Days, E = 420.845287 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.41	6.51	6.40	6.98	5.64	3.59	1.13	1.01	0.43	0.10	-0.47	5.85	1.72	0.76	0



Stellar Parameters For KIC 012121936

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4732^{+139}_{-139}	$4.707^{+0.048}_{-0.028}$	$-1.220^{+0.300}_{-0.300}$	$0.542^{+0.031}_{-0.034}$	$0.546^{+0.040}_{-0.020}$	$4.824^{+0.873}_{-0.566}$
	+3%/-3%	+1%/-1%	+25%/-25%	+6%/-6%	+7%/-4%	+18%/-12%
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 012121936-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-1463 ± 101	$4.29^{+4.26}_{-2.91}$	221^{+8}_{-7}	3733^{+2046}_{-725}	$39411^{+323004}_{-29739}$
Alt.	-298 ± 46	$4.19^{+4.14}_{-2.85}$	221^{+7}_{-7}	2961^{+1246}_{-503}	8303^{+64071}_{-6243}

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

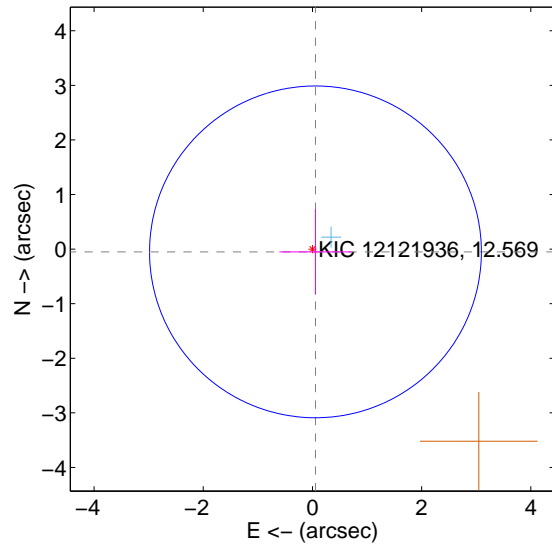
Supplemental centroid analysis for 012121936-01. Kepler magnitude: 12.57. Transit SNR 5.65

There are 1 quarters with good PRF difference image offsets

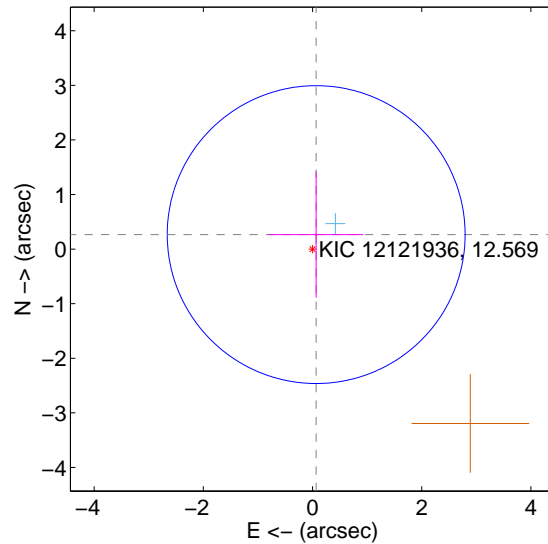
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.075 ± 1.013	0.07	-0.055 ± 0.661	-0.051 ± 0.784
PRF-fit source offset from KIC position	0.274 ± 0.909	0.30	-0.067 ± 0.867	0.266 ± 1.154
photometric centroid source offset	1.24 ± 0.82	1.52	-0.07 ± 0.63	-1.24 ± 0.82

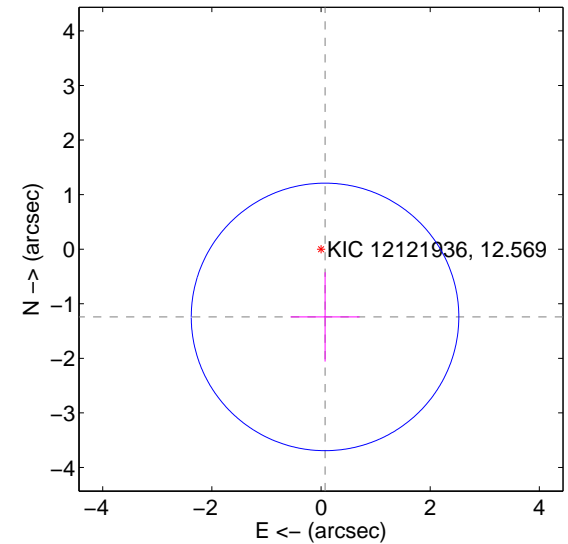
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

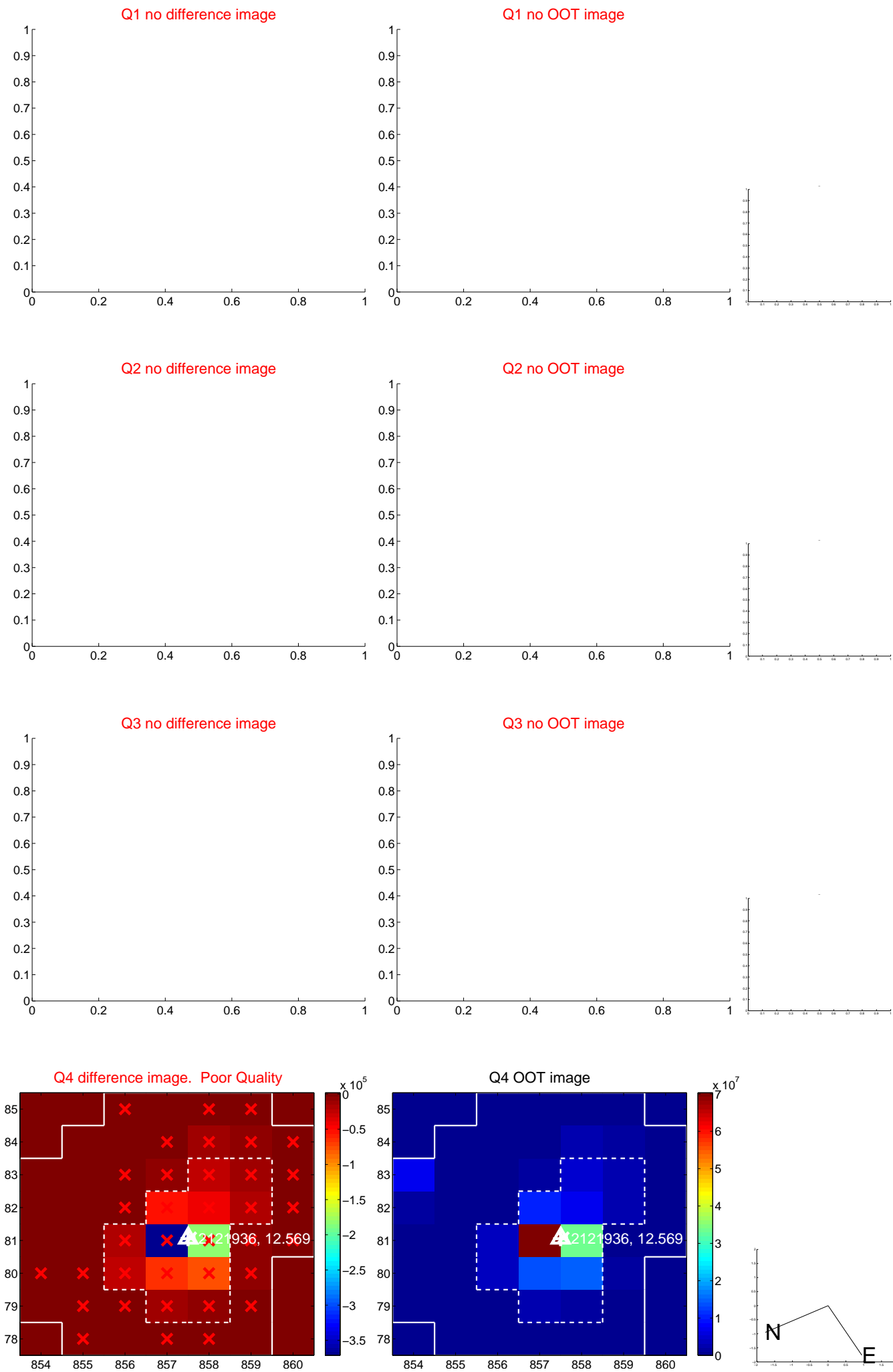


offset from photometric centroids



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.

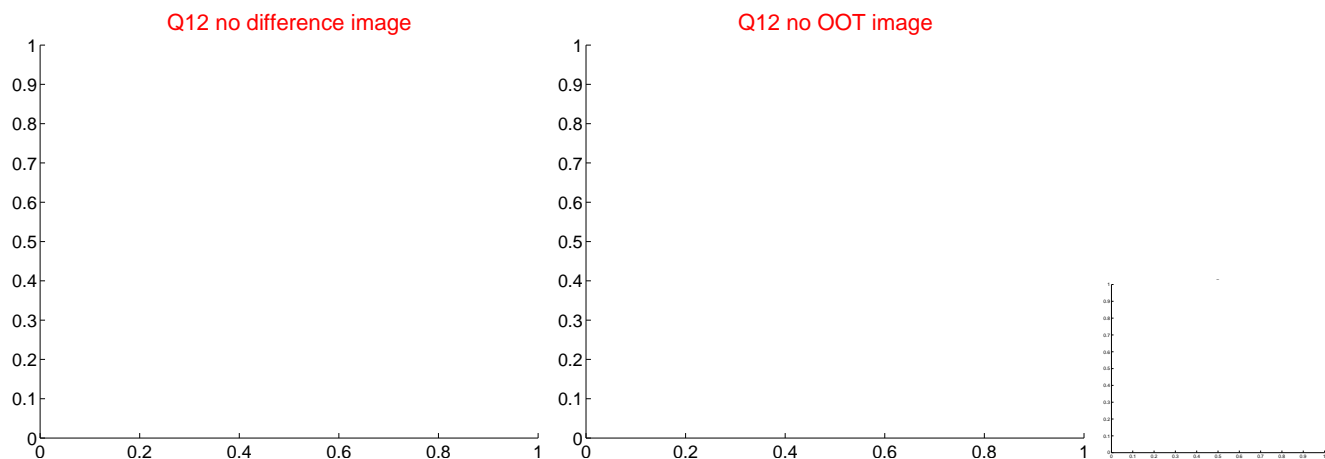
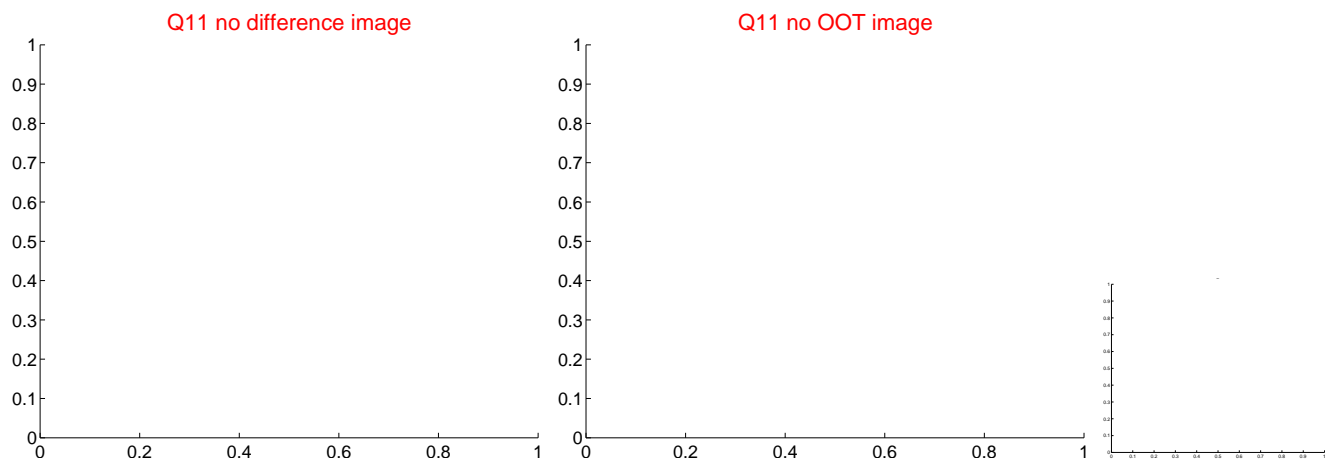
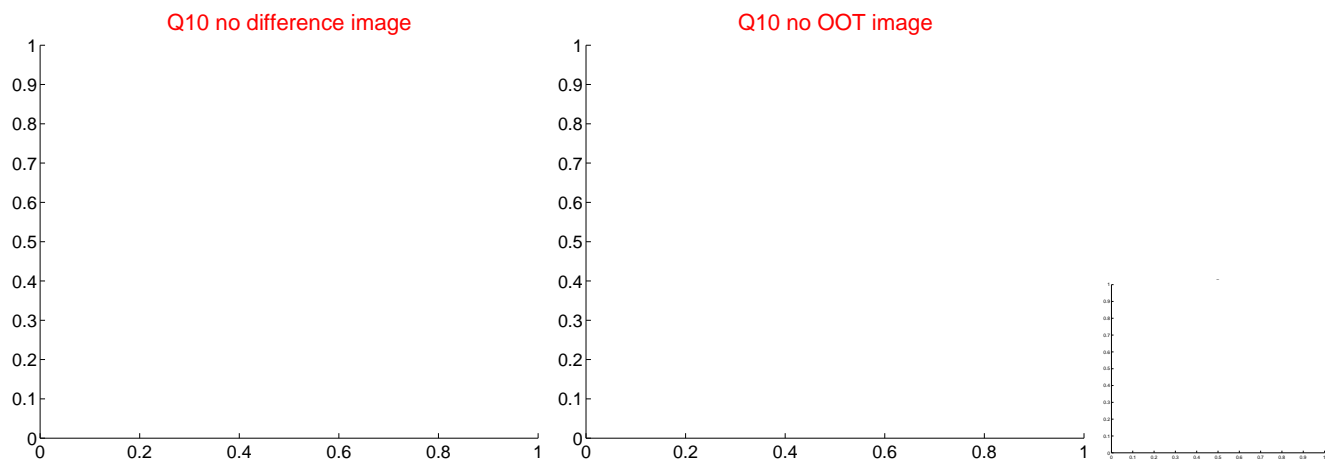
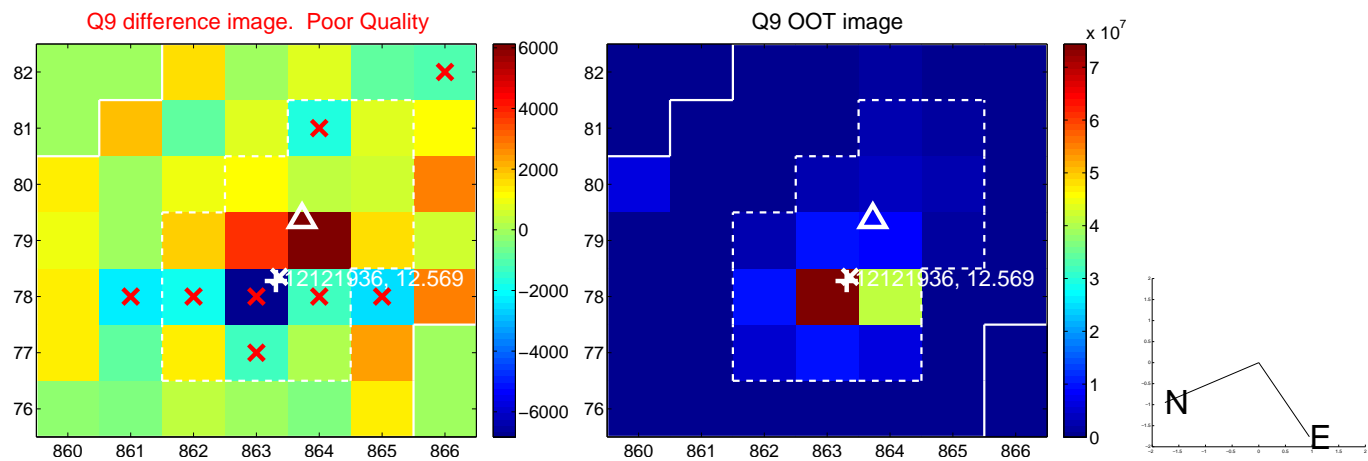
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



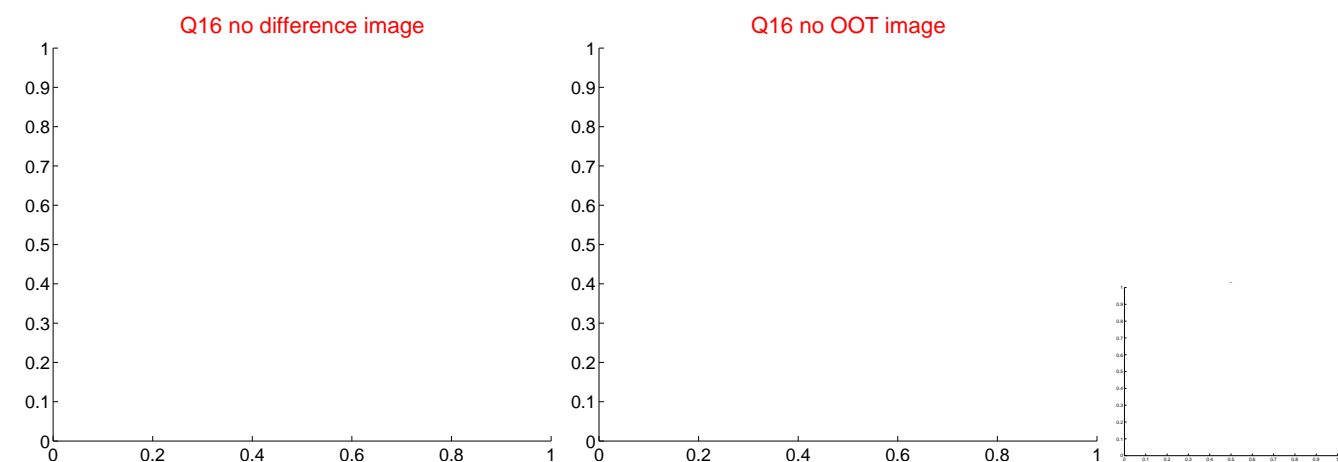
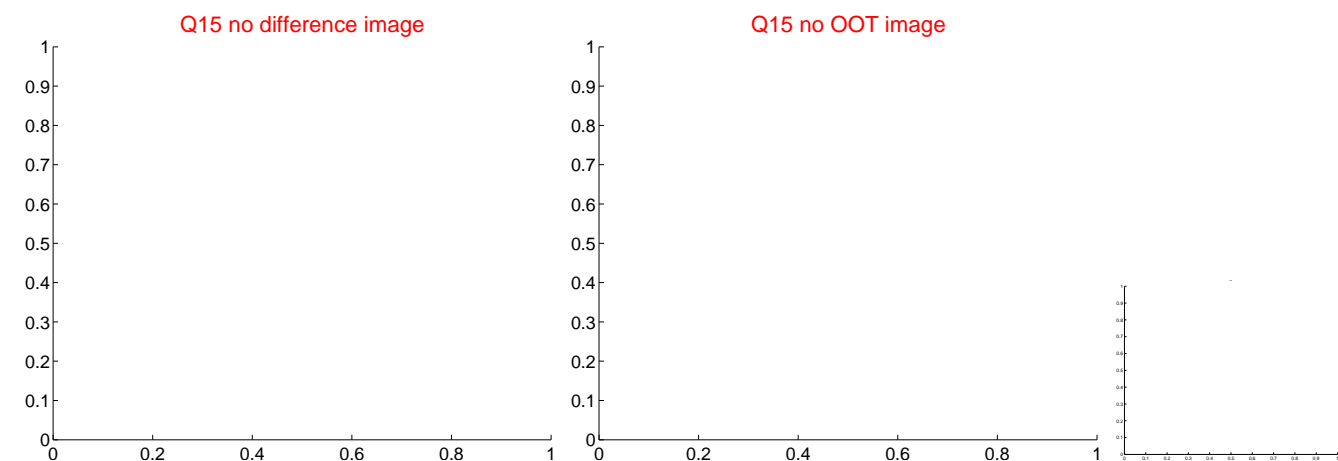
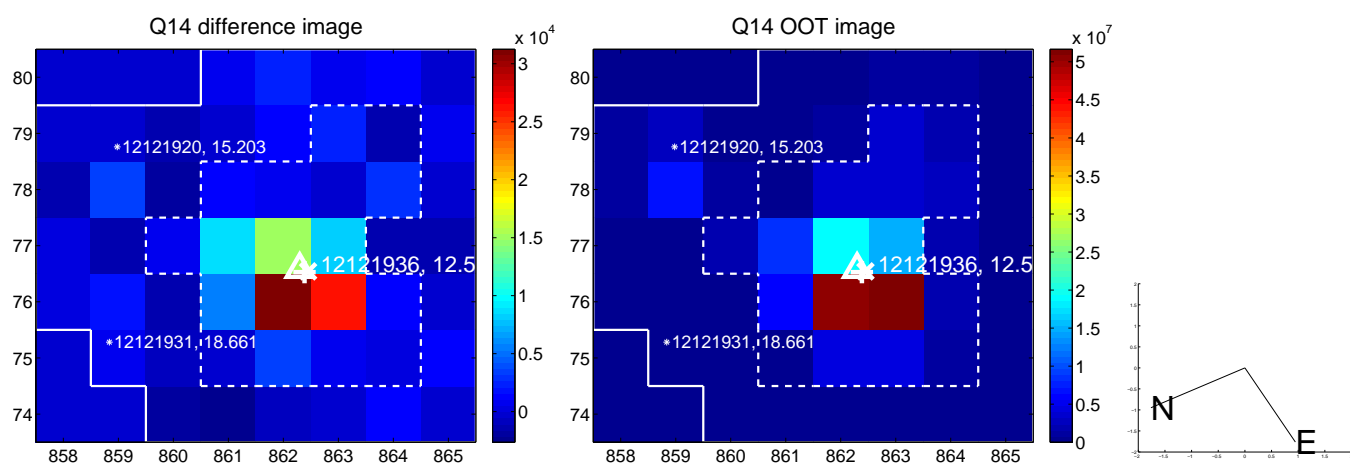
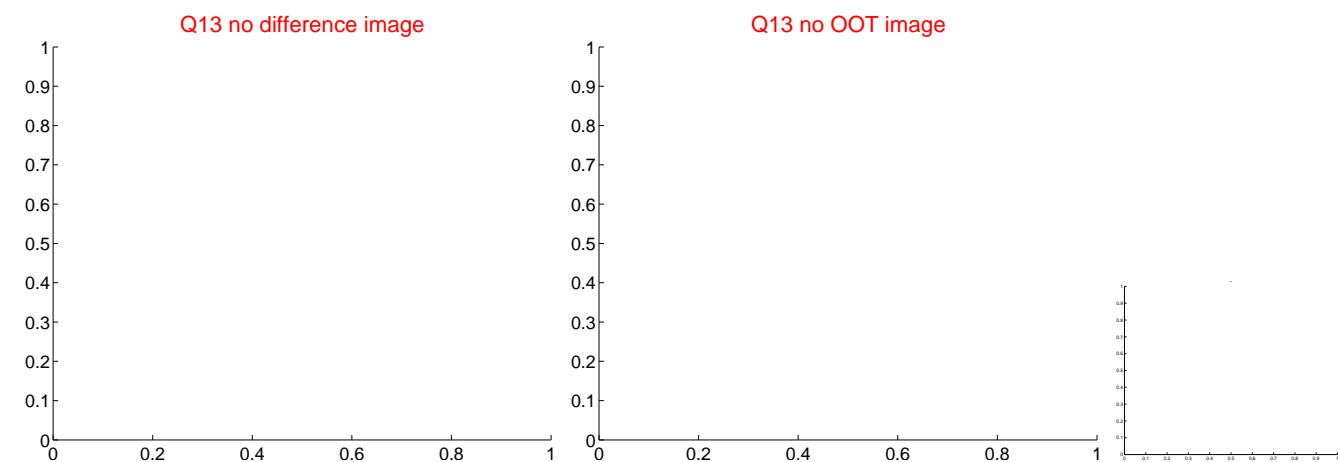
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



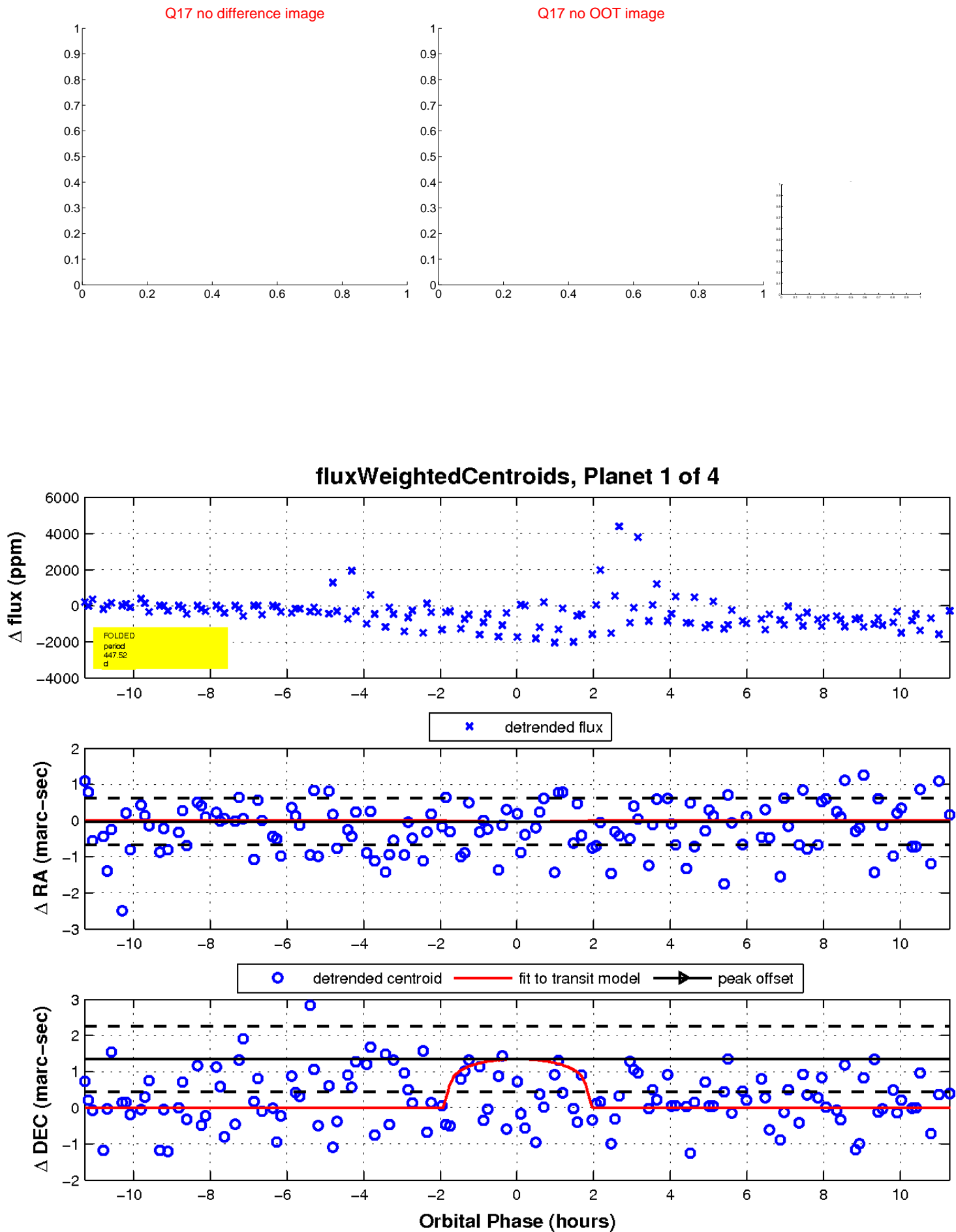
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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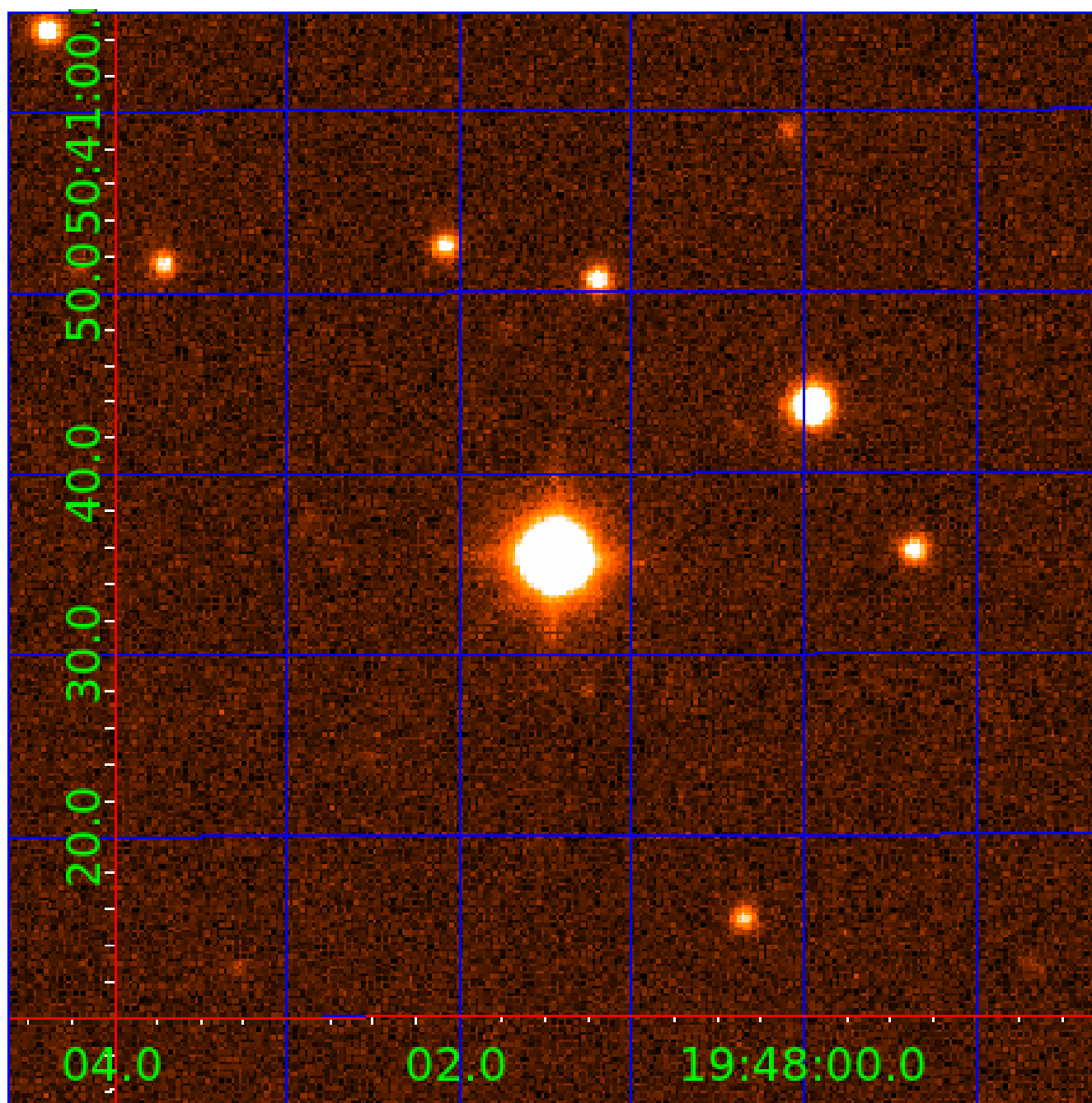


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 012121936

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	R_{\star} (R_{\odot})	T_{\star} (K)	R_p (R_{\oplus})	S_p (S_{\oplus})
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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012121936-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS
012121936-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012121936-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

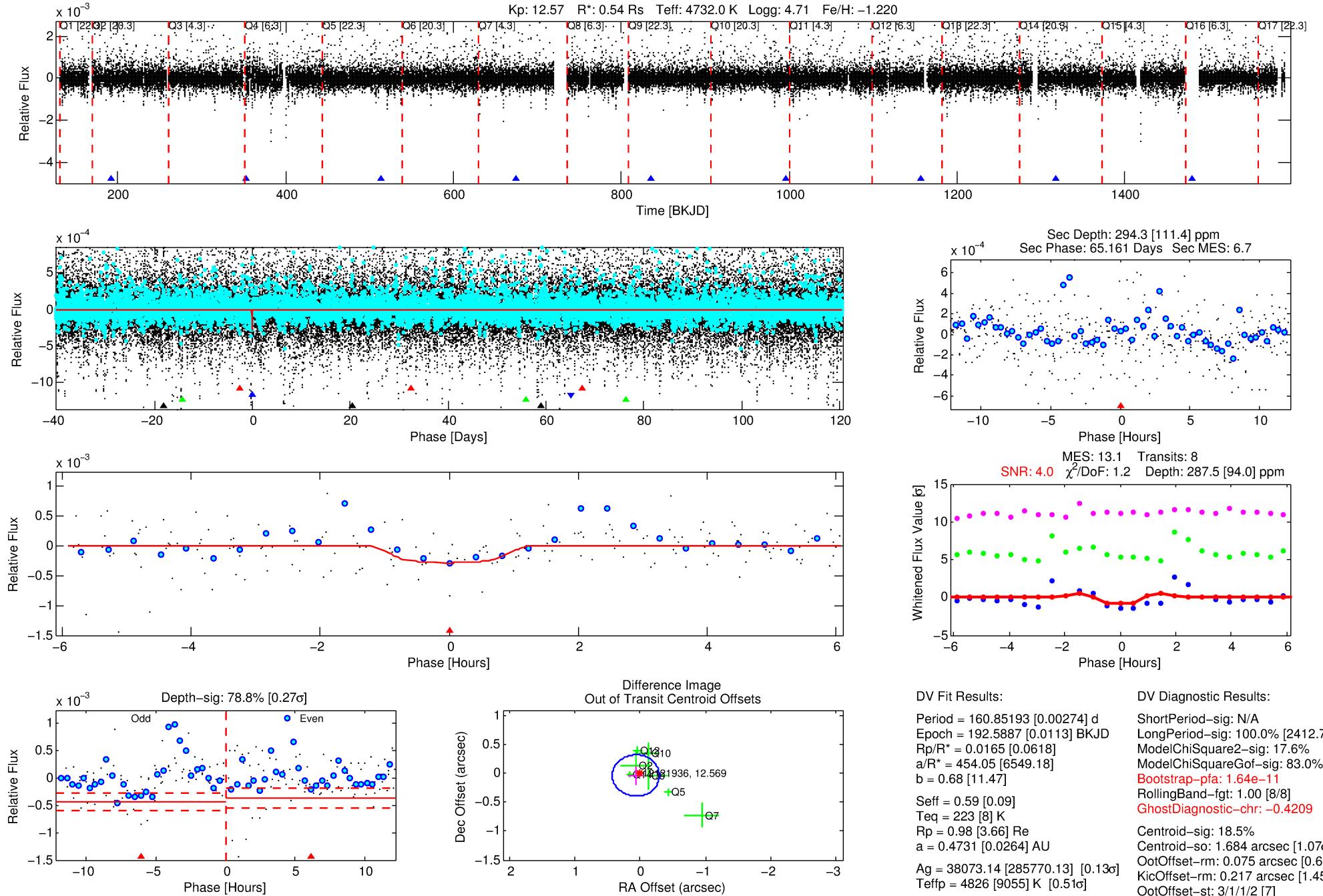
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012121936-02

No Significant Match Found

DV One-Page Summary

KIC: 12121936 Candidate: 2 of 4 Period: 160.852 d



DV Fit Results:

Period = 160.85193 [0.00274] d
Epoch = 192.5887 [0.0113] BKJD
Rp/R* = 0.0165 [0.0618]
a/R* = 454.05 [6549.18]
b = 0.68 [11.47]
Seff = 0.59 [0.09]
Teq = 223 [8] K
Rp = 0.98 [3.66] Re
a = 0.4731 [0.0264] AU
Ag = 38073.14 [285770.13] [0.13σ]
Teffp = 4826 [9055] K [0.51σ]

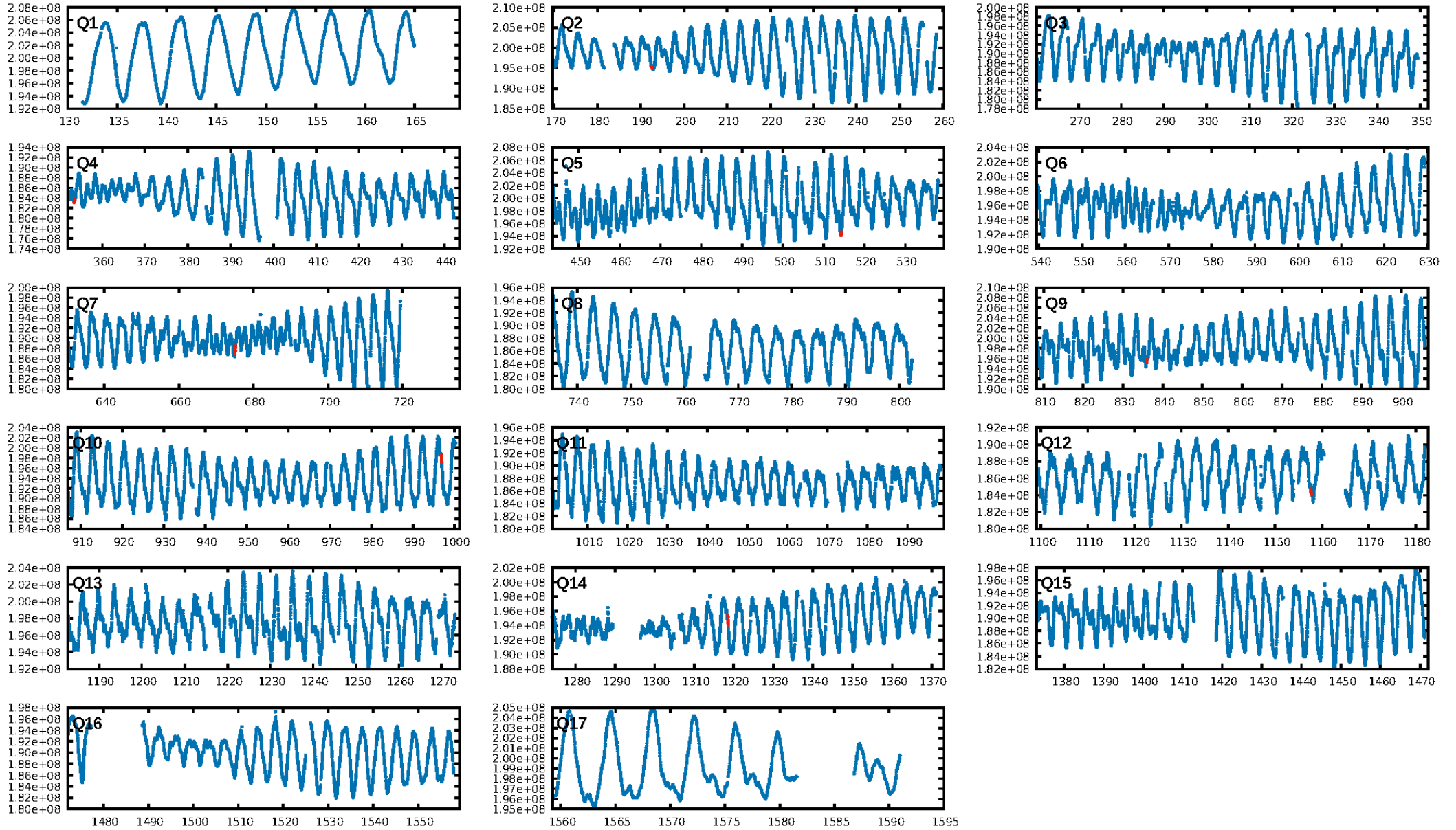
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [2412.77σ]
ModelChiSquare2-sig: 17.6%
ModelChiSquareGof-sig: 83.0%
Bootstrap-pfa: 1.64e-11
RollingBand-fgt: 1.00 [8/8]
GhostDiagnostic-chr: -0.4209
Centroid-sig: 18.5%
Centroid-so: 1.684 arcsec [1.07σ]
OotOffset-rm: 0.075 arcsec [0.63σ]
OotOffset-st: 3/1/1/2 [7]
KicOffset-rm: 0.217 arcsec [1.45σ]
KicOffset-st: 3/1/1/2 [7]
DiffImageQuality-fgm: 0.43 [3/7]
DiffImageOverlap-fno: 1.00 [7/7]

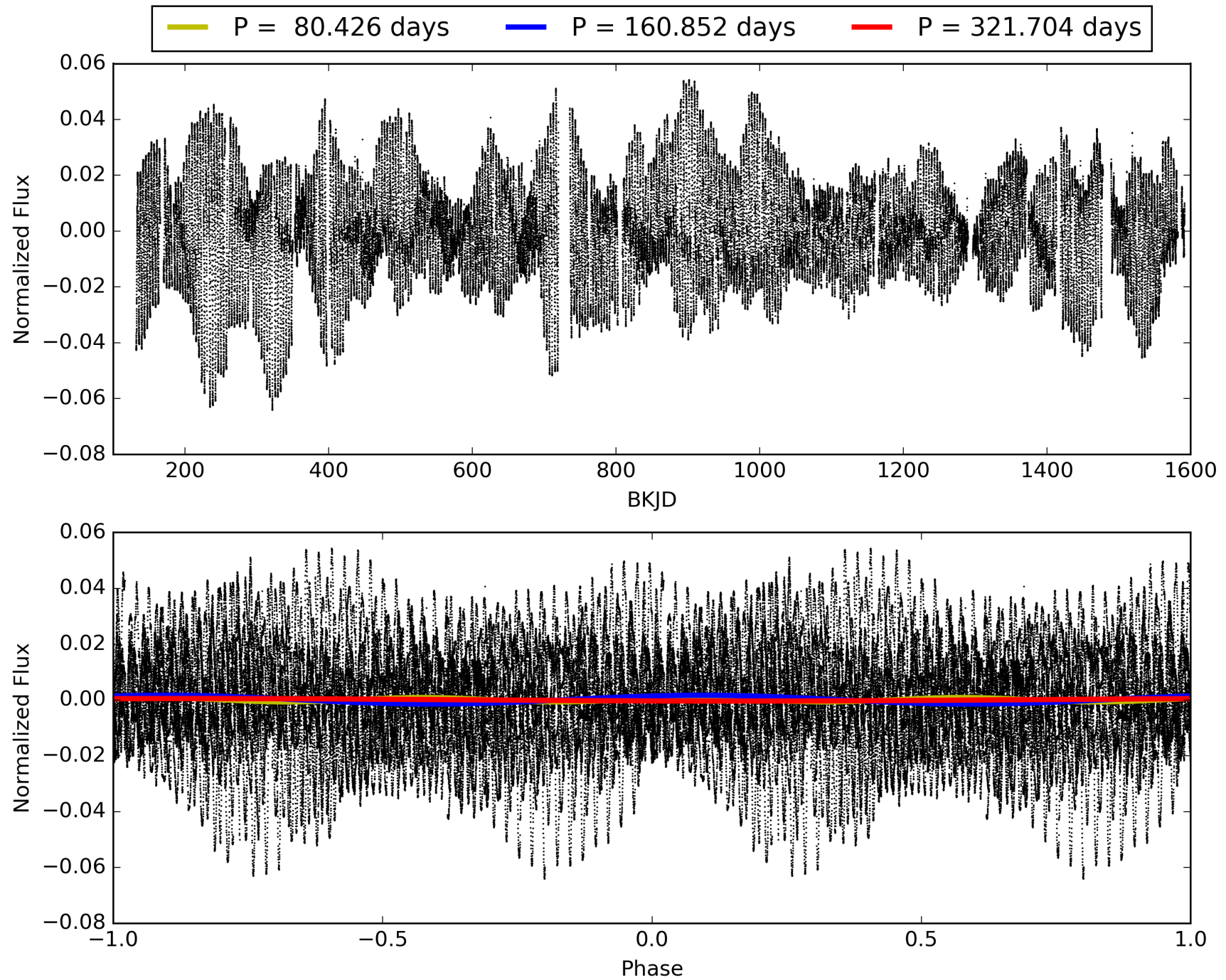
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:06:01 Z

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

TCE 012121936-02, PDC Light Curves

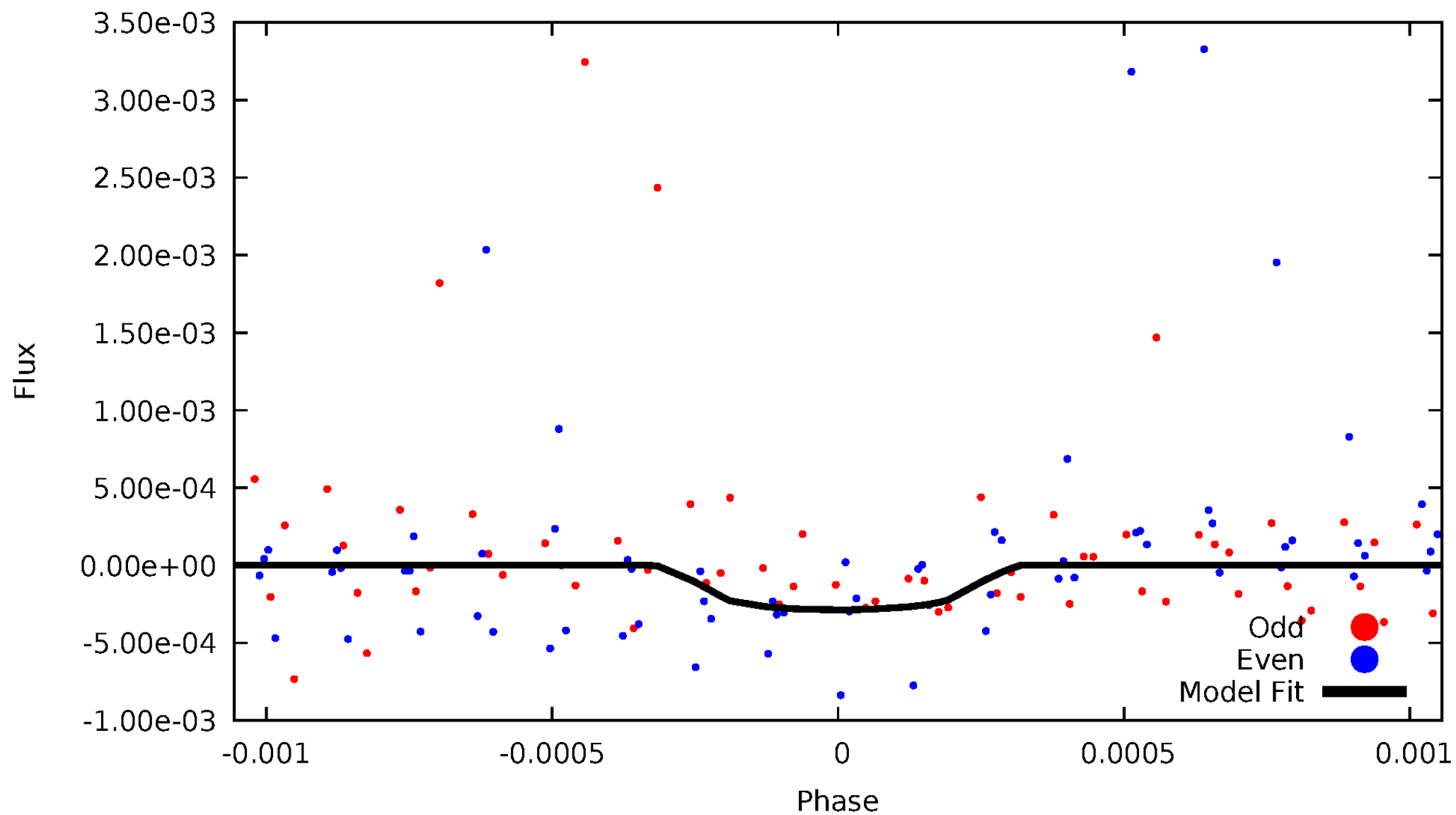


TCE 012121936-02



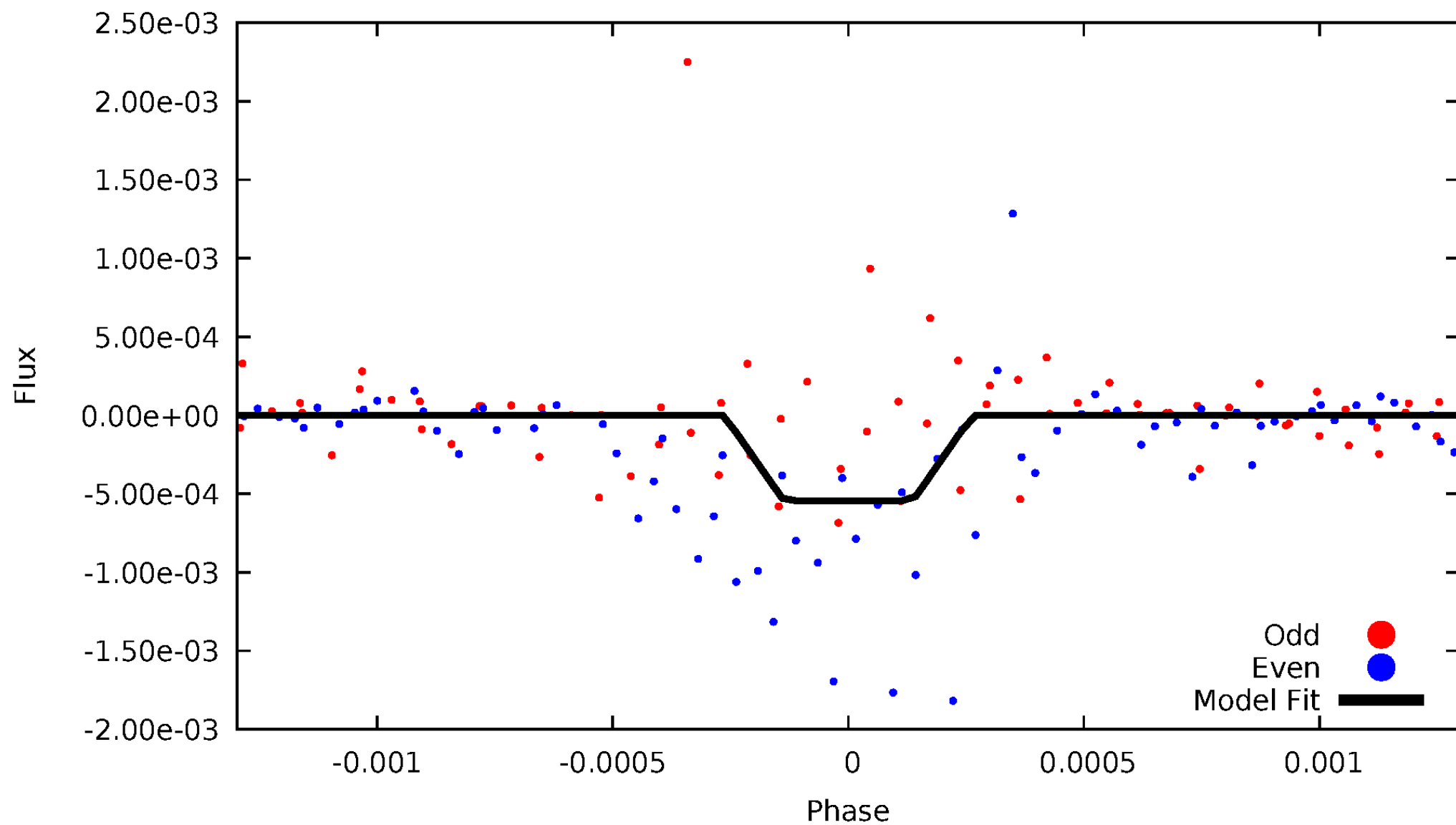
DV Odd/Even

TCE 012121936-02



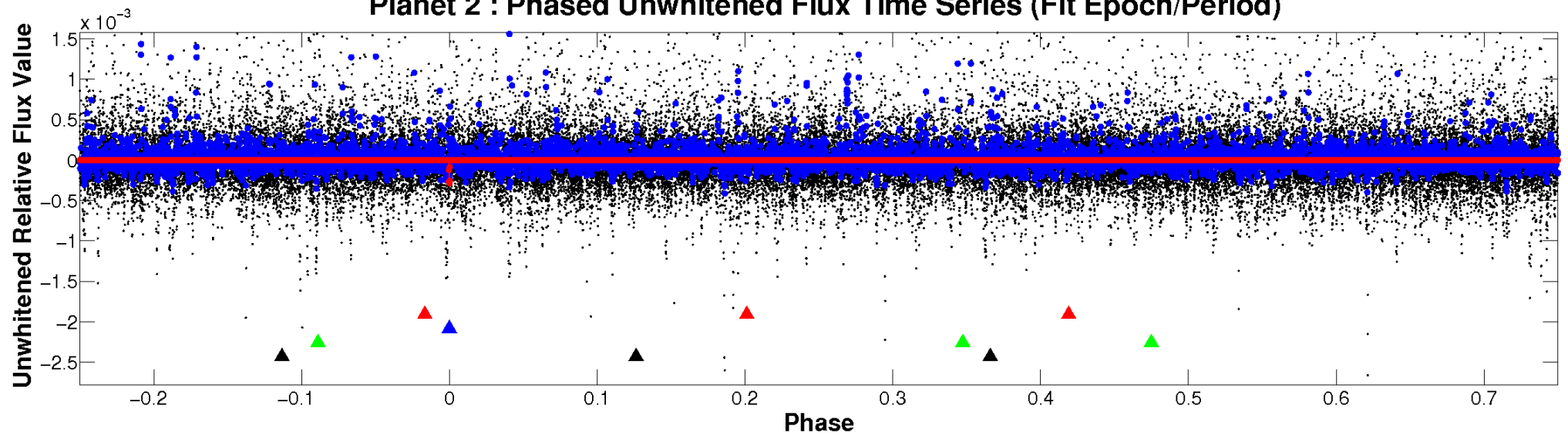
ALT Odd/Even

TCE 012121936-02

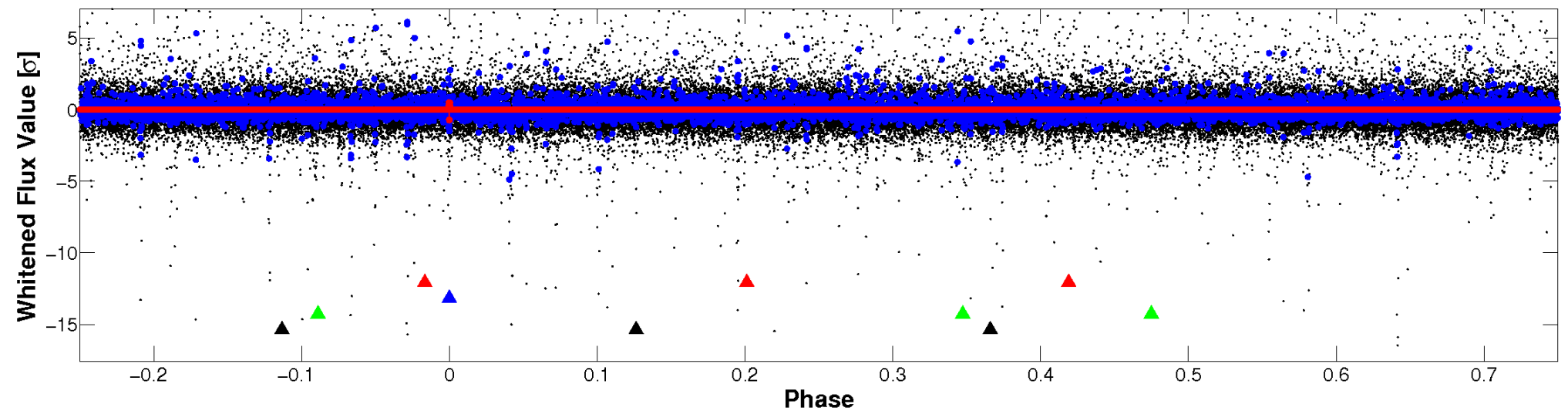


Non-Whitened Vs. Whitened Light Curve

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

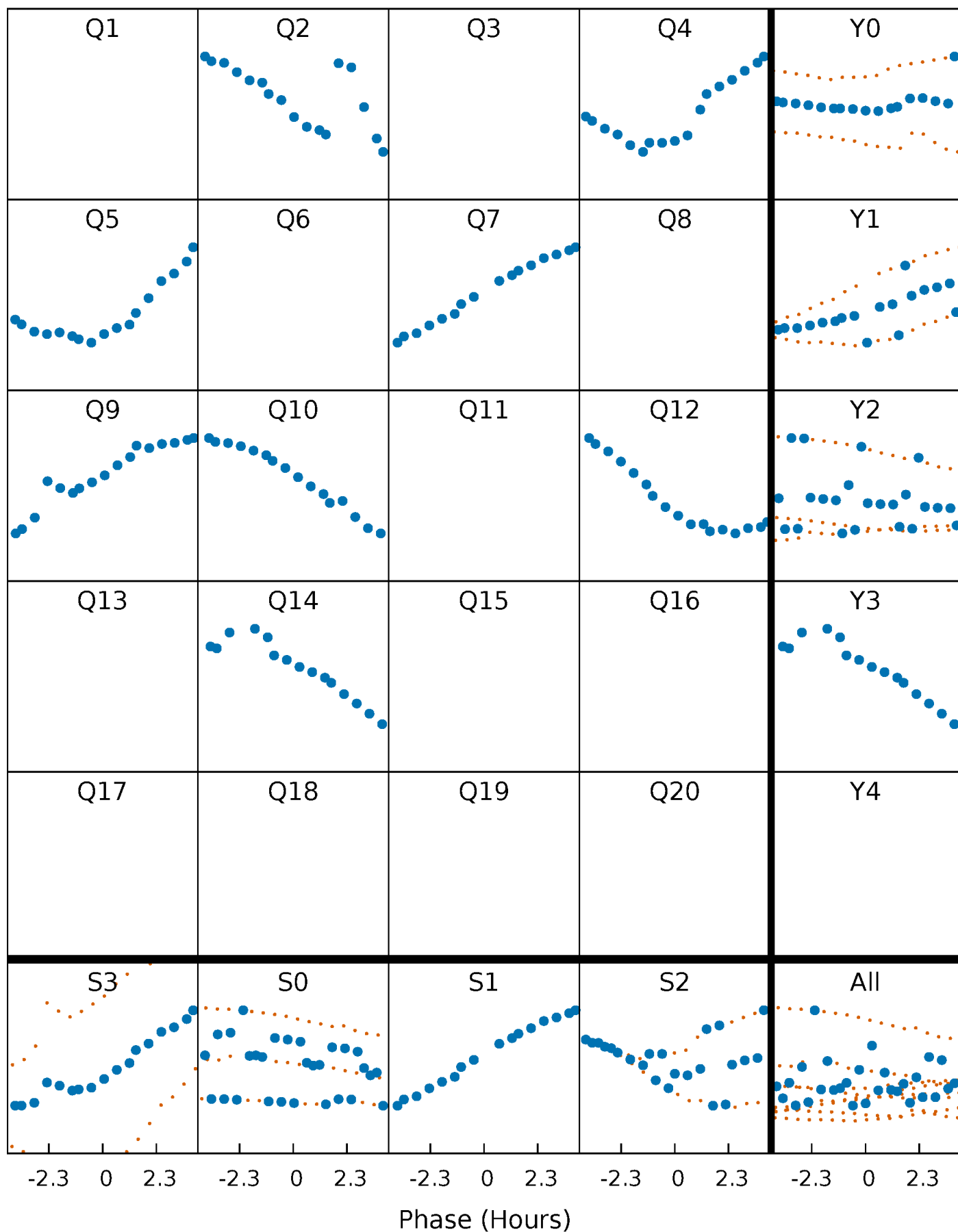


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



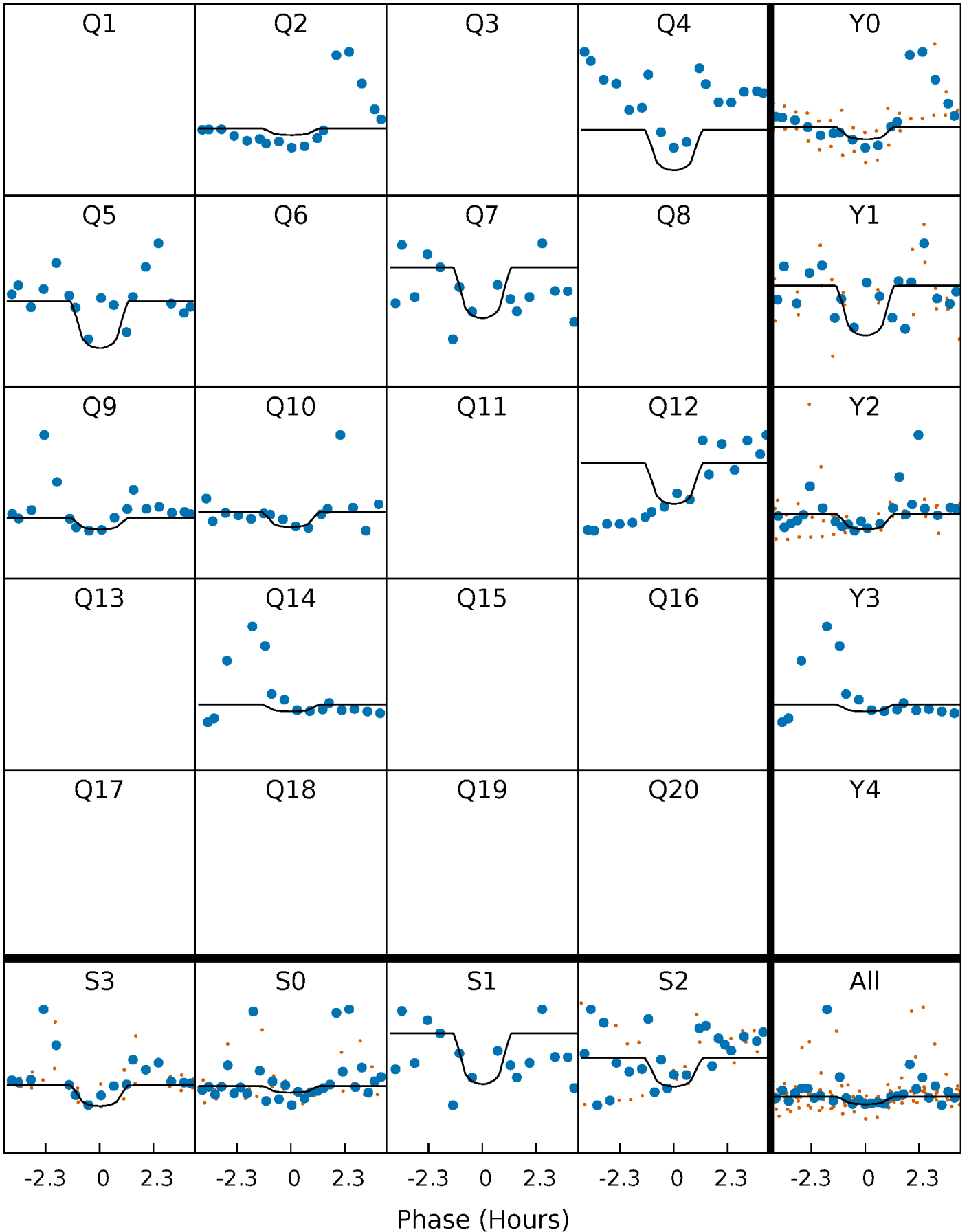
PDC Quarter-Phased Transit Curves

TCE 012121936-02 $P=160.851925$ Days $T_0=192.588707$ (BKJD)



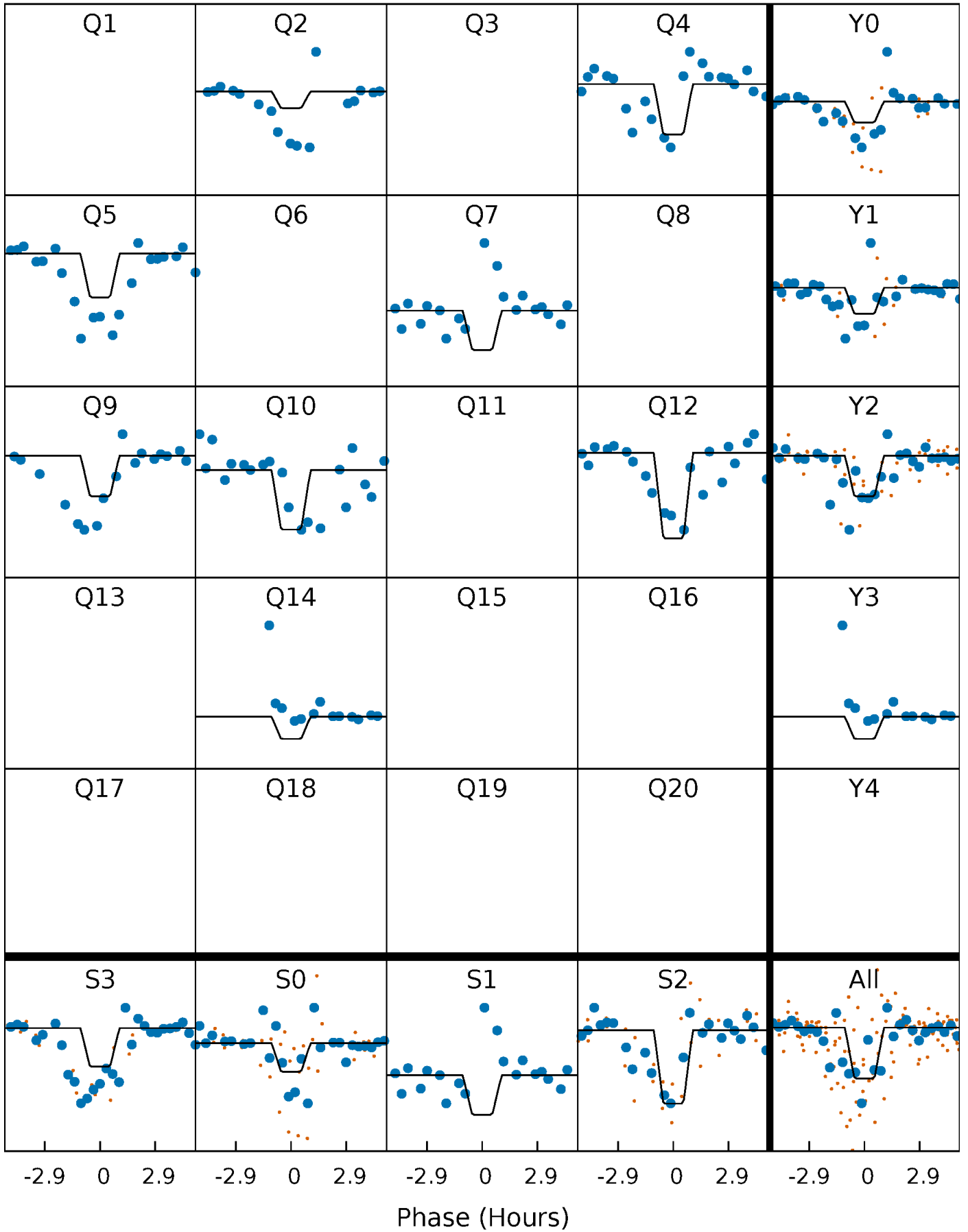
DV Quarter-Phased Transit Curves

TCE 012121936-02 P=160.851925 Days $T_0=192.588707$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

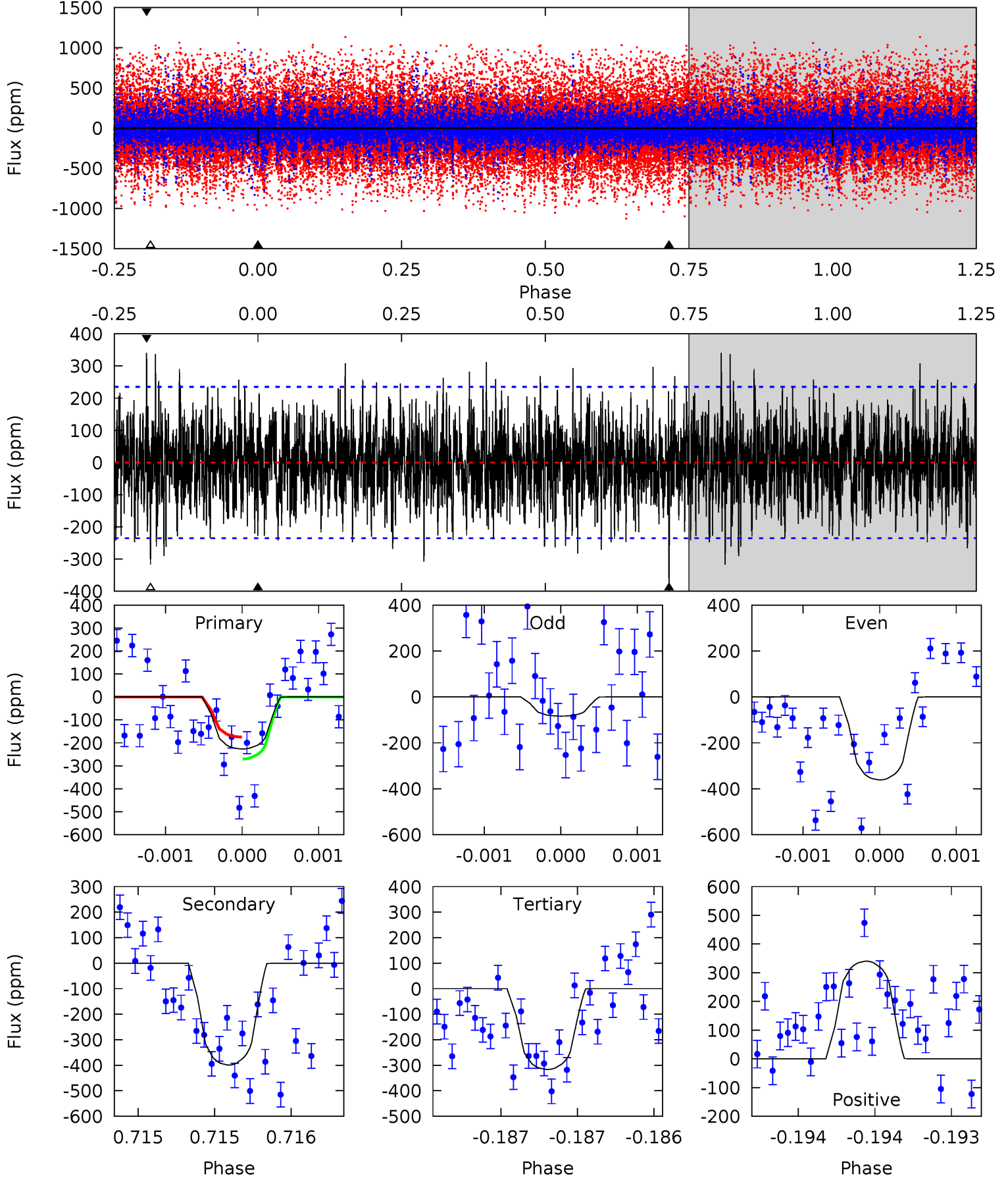
TCE 012121936-02 P=160.848753 Days $T_0=192.615019$ (BKJD)



DV Model-Shift Uniqueness Test

012121936-02, $P = 160.851925$ Days, $E = 31.736782$ Days

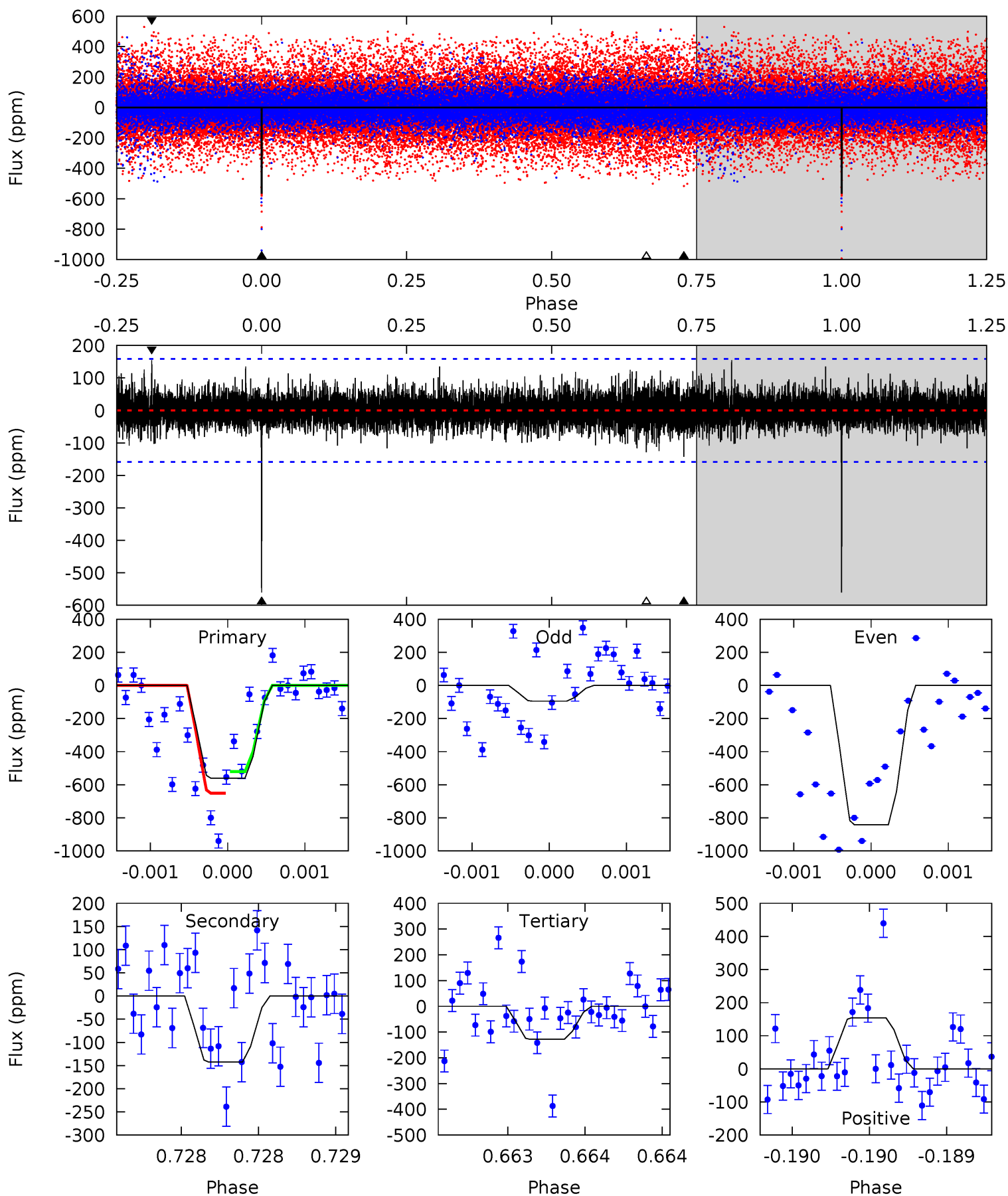
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.34	9.40	7.45	8.01	5.53	3.42	2.10	-2.11	-2.68	1.95	1.39	3.23	1.05	0.46	1.13



Alt Model-Shift Uniqueness Test

012121936-02, $P = 160.848753$ Days, $E = 31.766266$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.7	4.99	4.49	5.41	5.57	3.48	1.15	15.2	14.3	0.50	-0.42	13.8	1.24	0.22	2.25



Stellar Parameters For KIC 012121936

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4732^{+139}_{-139}	$4.707^{+0.048}_{-0.028}$	$-1.220^{+0.300}_{-0.300}$	$0.542^{+0.031}_{-0.034}$	$0.546^{+0.040}_{-0.020}$	$4.824^{+0.873}_{-0.566}$
	+3%/-3%	+1%/-1%	+25%/-25%	+6%/-6%	+7%/-4%	+18%/-12%
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 012121936-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-399 ± 42	$2.93^{+2.85}_{-1.97}$	311^{+10}_{-10}	3425^{+1804}_{-612}	5772^{+46511}_{-4284}
Alt.	-142 ± 28	$3.05^{+2.93}_{-1.98}$	311^{+10}_{-10}	2928^{+1084}_{-487}	1886^{+13477}_{-1413}

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

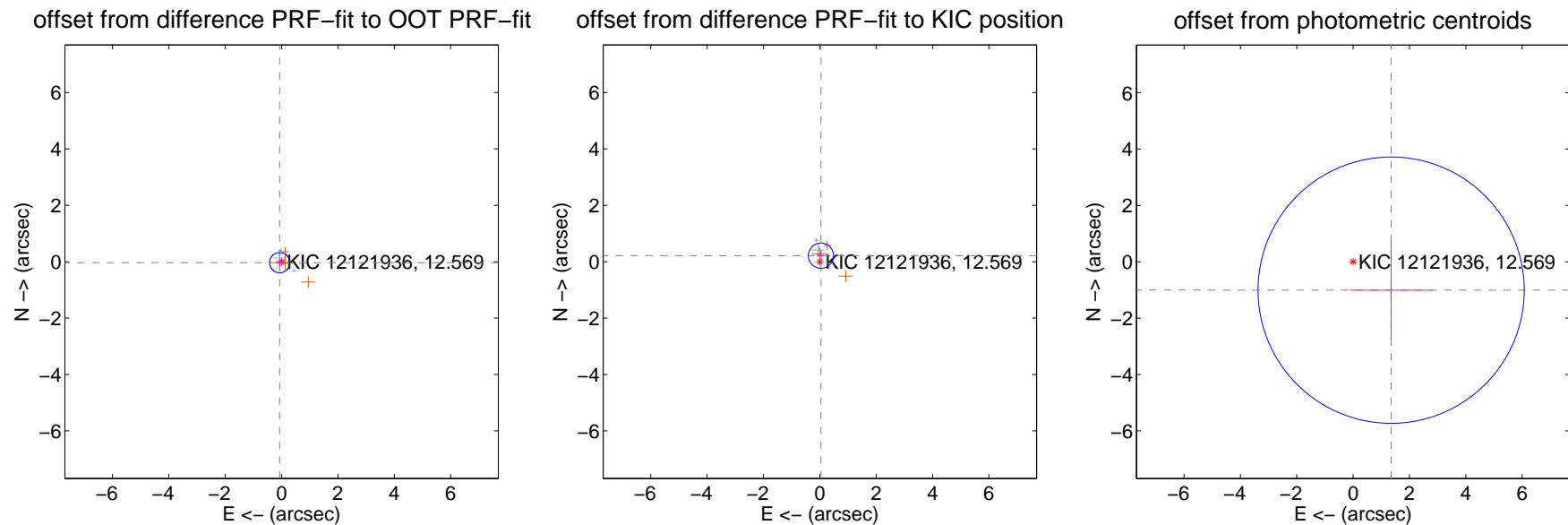
DV Centroid Data

Supplemental centroid analysis for 012121936-02. Kepler magnitude: 12.57. Transit SNR 4.01

There are 3 quarters with good PRF difference image offsets

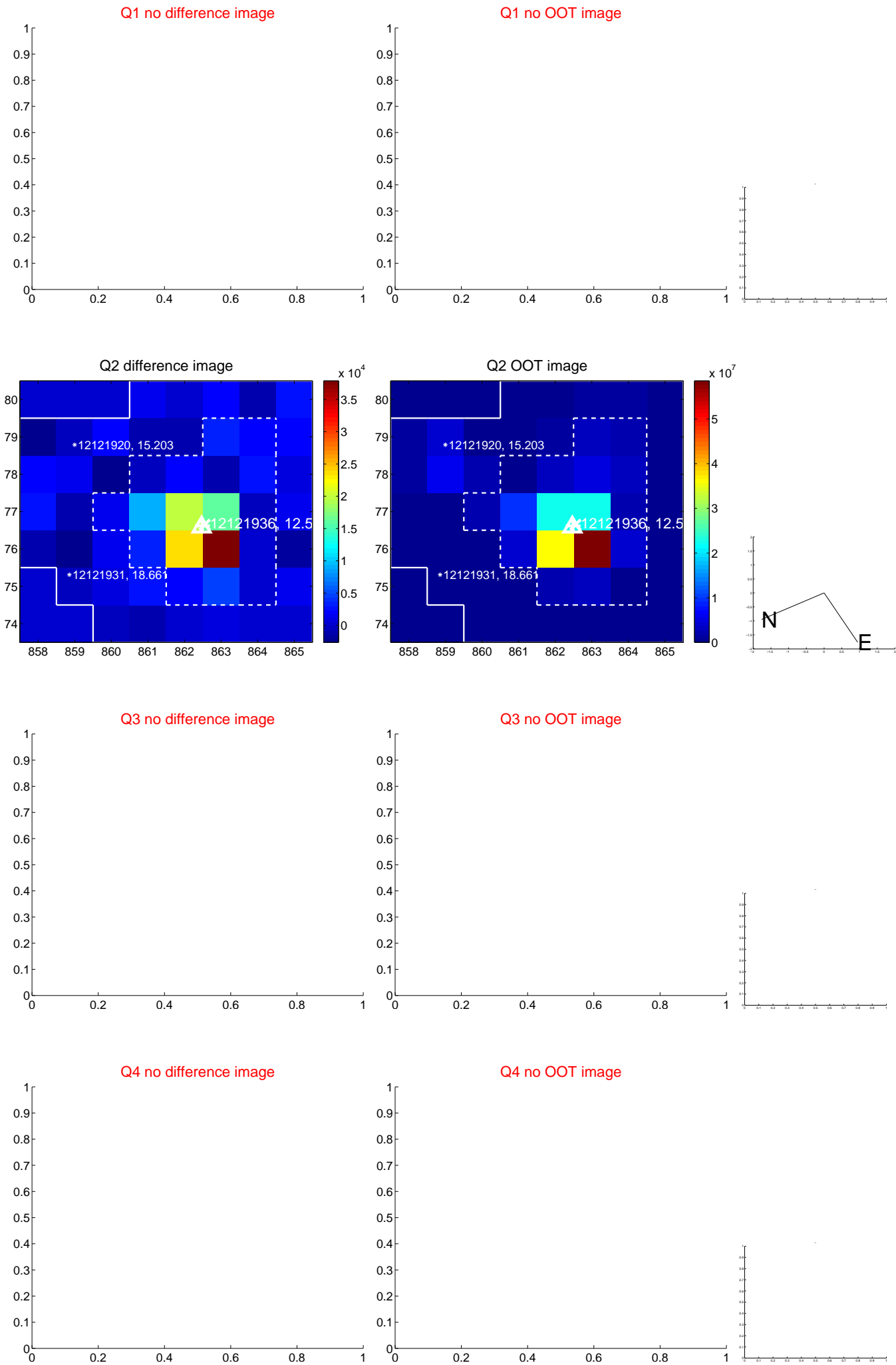
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.075 ± 0.120	0.63	0.067 ± 0.112	-0.035 ± 0.146
PRF-fit source offset from KIC position	0.217 ± 0.149	1.45	-0.041 ± 0.107	0.213 ± 0.150
photometric centroid source offset	1.68 ± 1.57	1.07	-1.35 ± 1.46	-1.01 ± 1.76

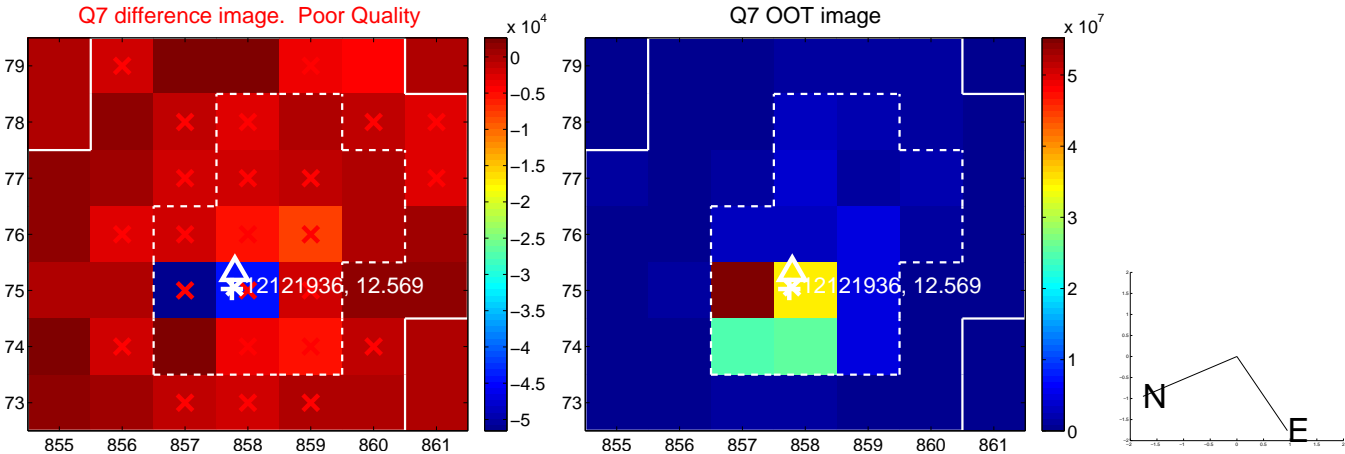
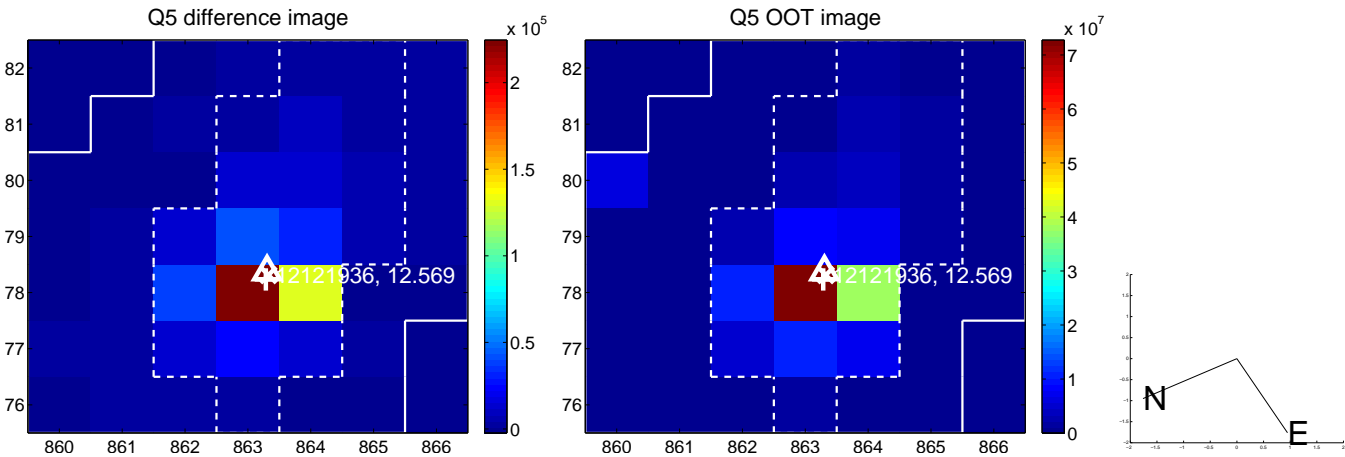


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

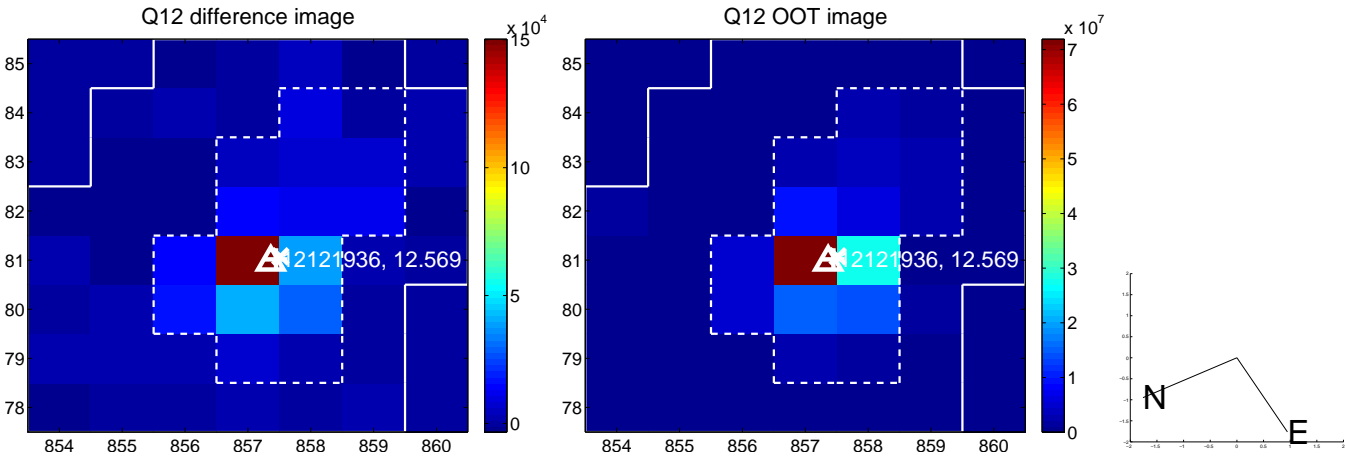
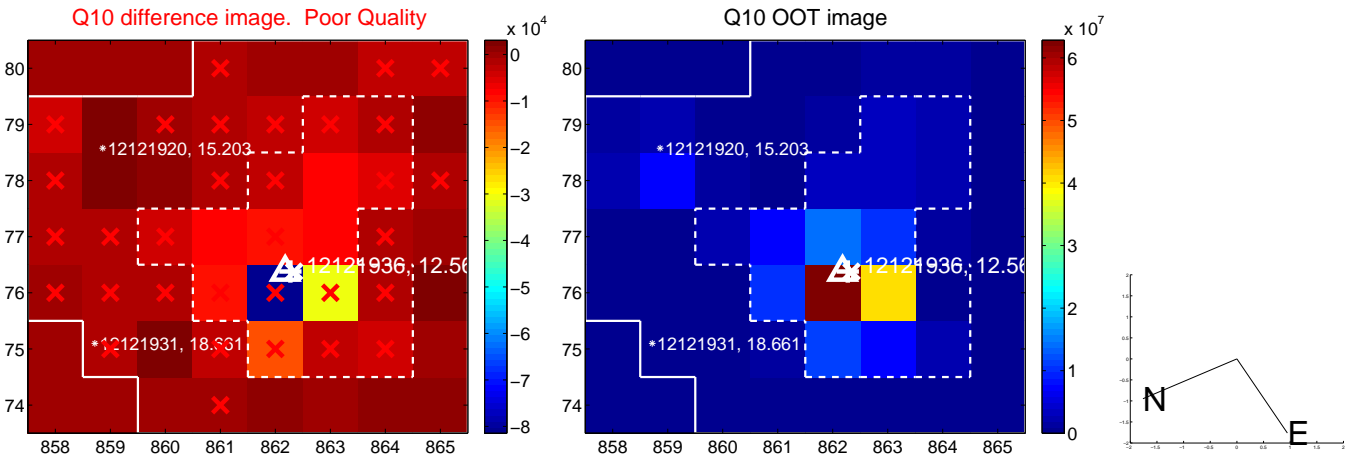
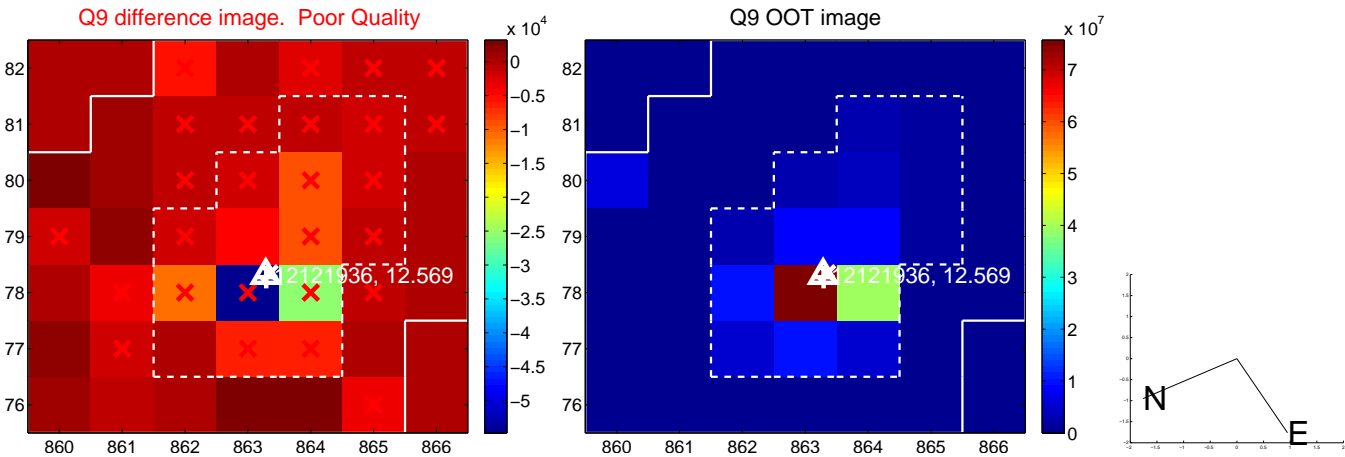
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



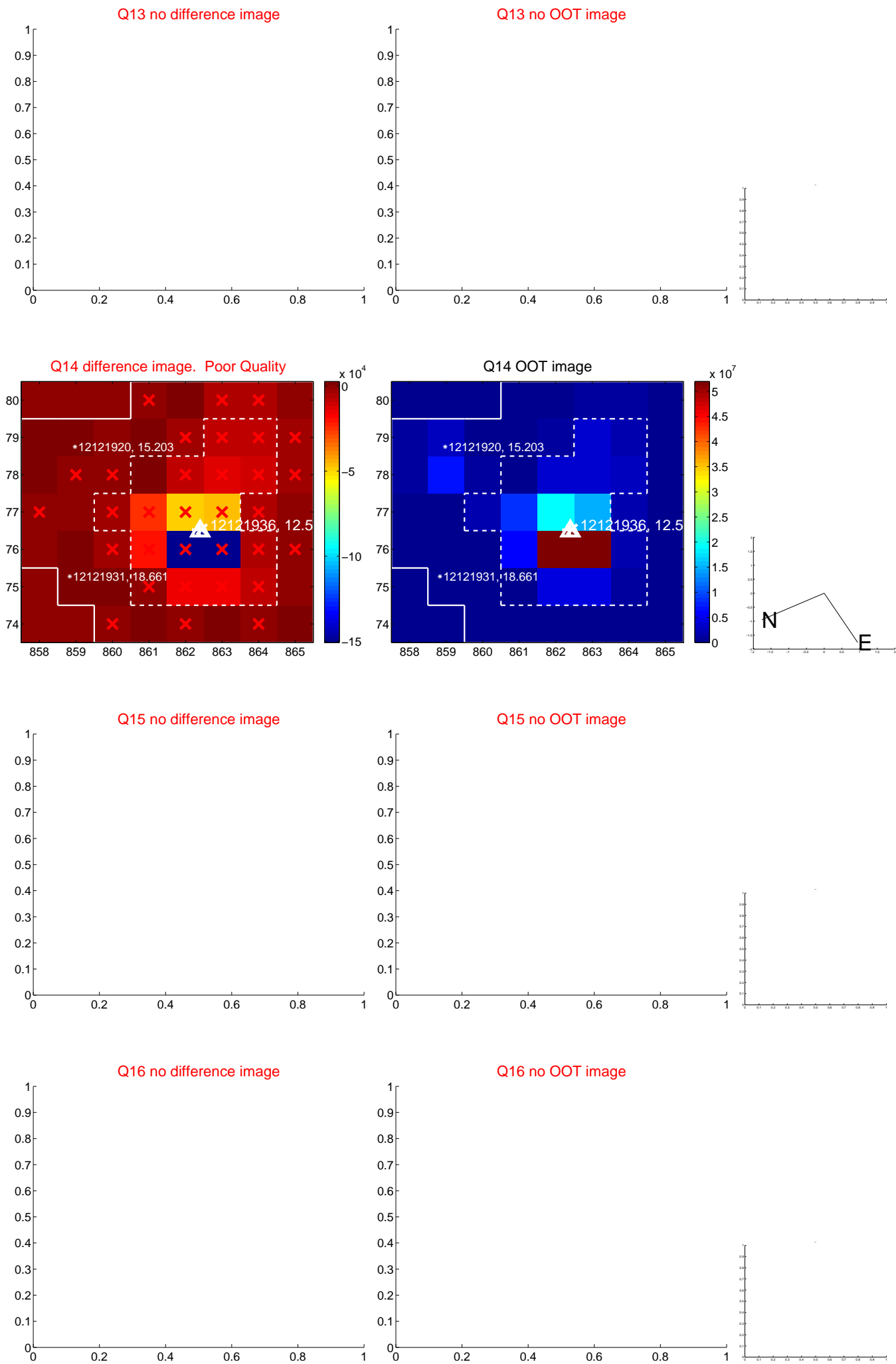
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



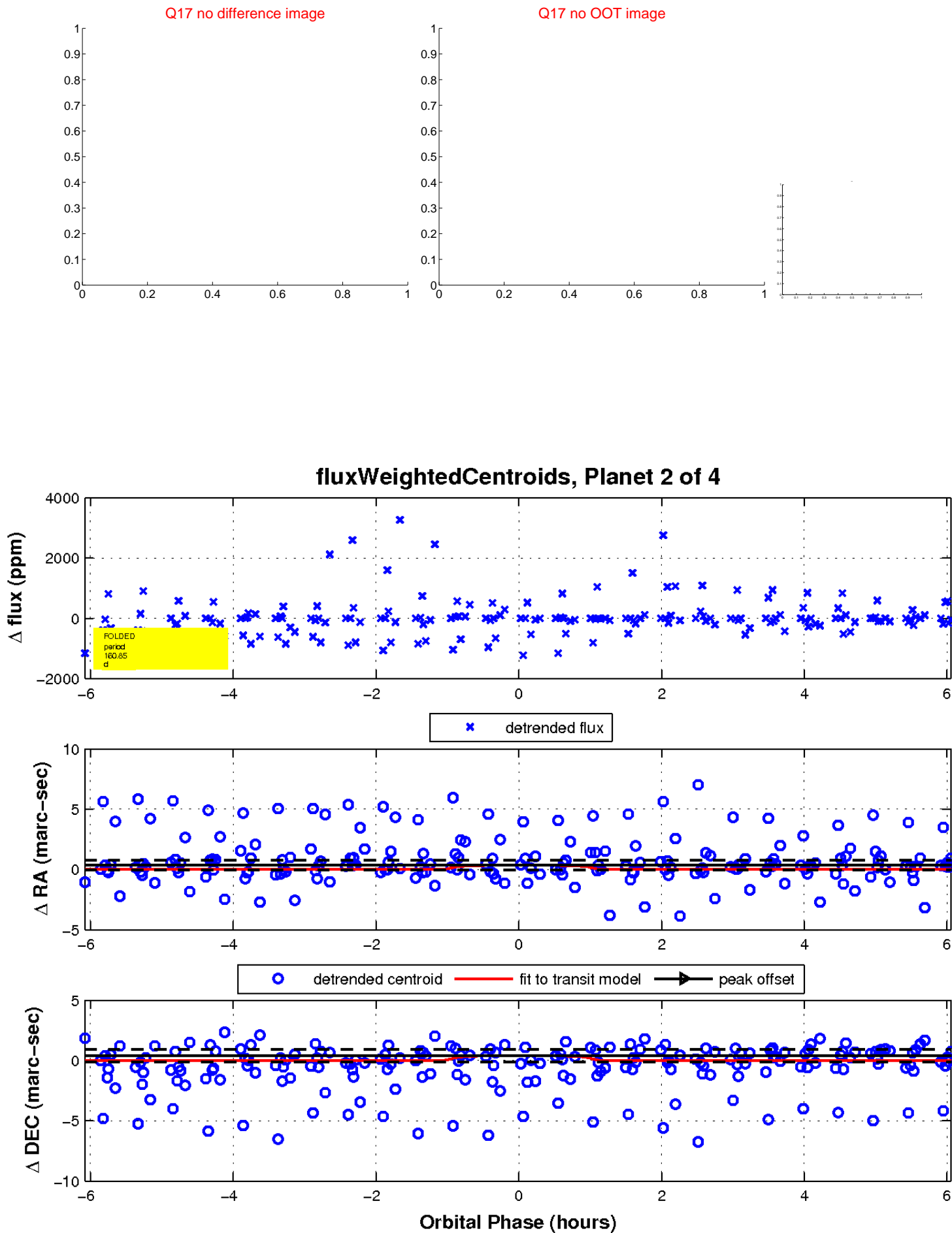
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

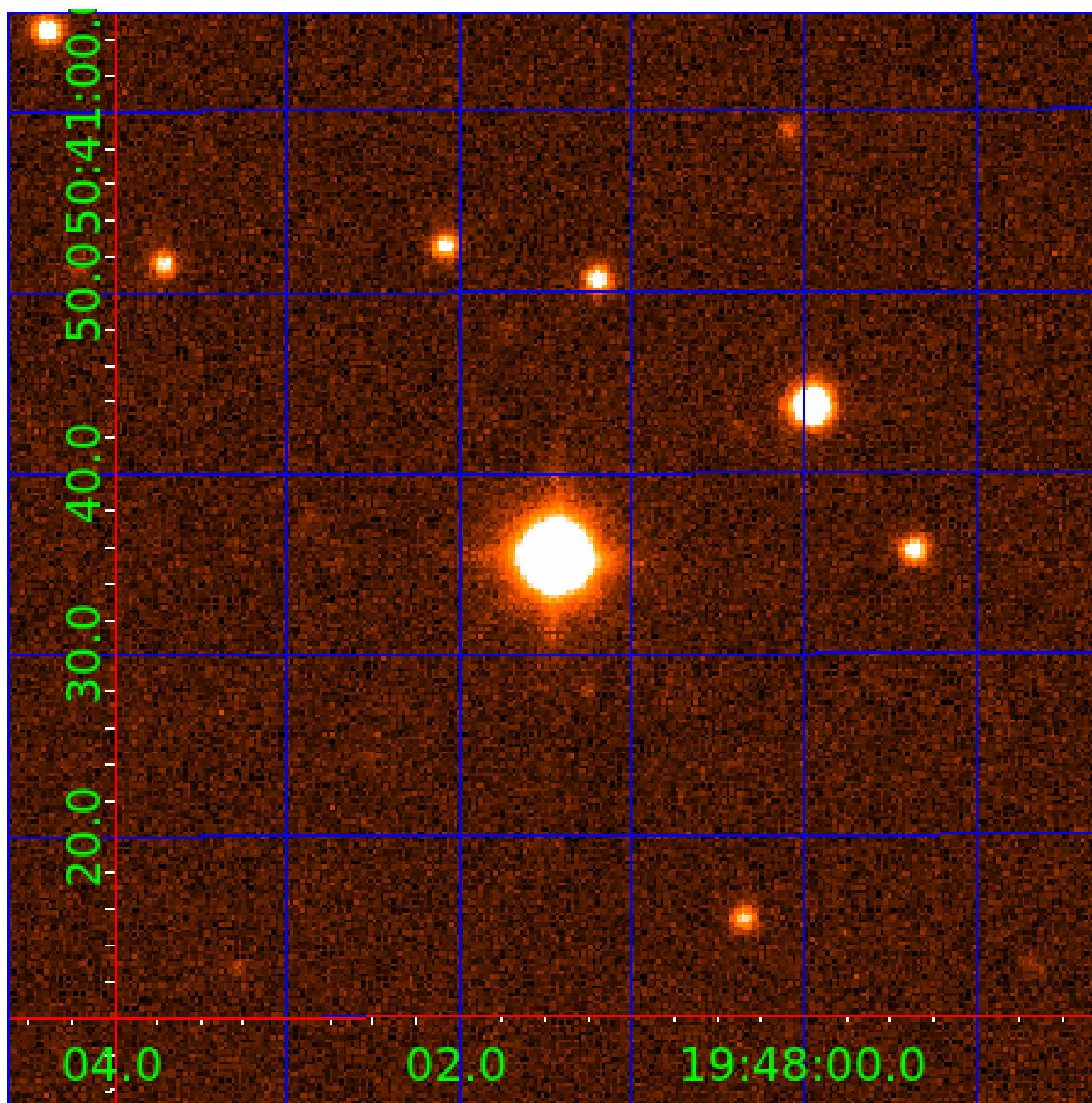


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 012121936

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})
012121936-01	OBS	No	447.522551	420.841363	805.0	3.787	13.6	5.7	0.54	4732	1.51	0.15
012121936-02	OBS	No	160.851925	192.588708	287.5	2.038	13.1	4.0	0.54	4732	0.98	0.59
012121936-03	OBS	No	573.241902	409.317385	865.5	4.993	12.7	5.4	0.54	4732	1.69	0.11
012121936-04	OBS	No	444.014474	573.159725	752.4	1.945	14.6	5.8	0.54	4732	1.47	0.15

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012121936-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012121936-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS
012121936-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012121936-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

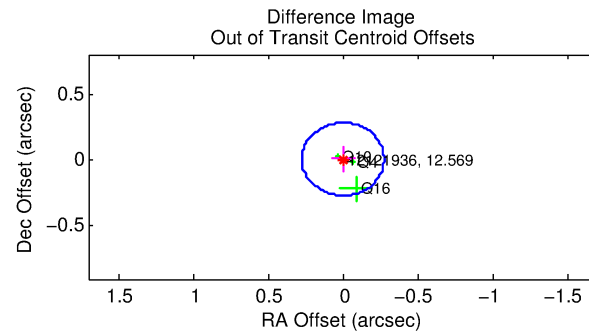
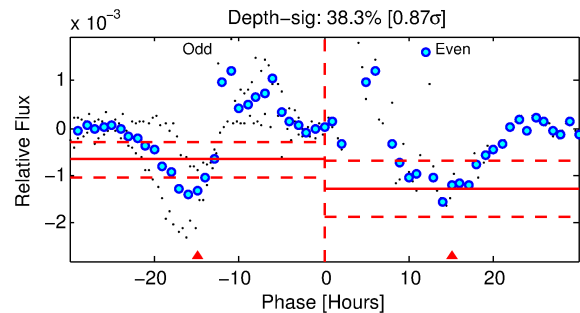
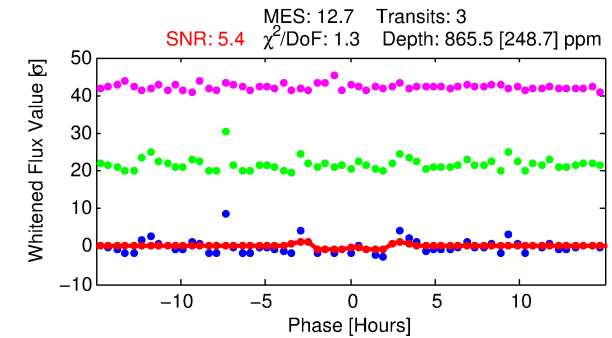
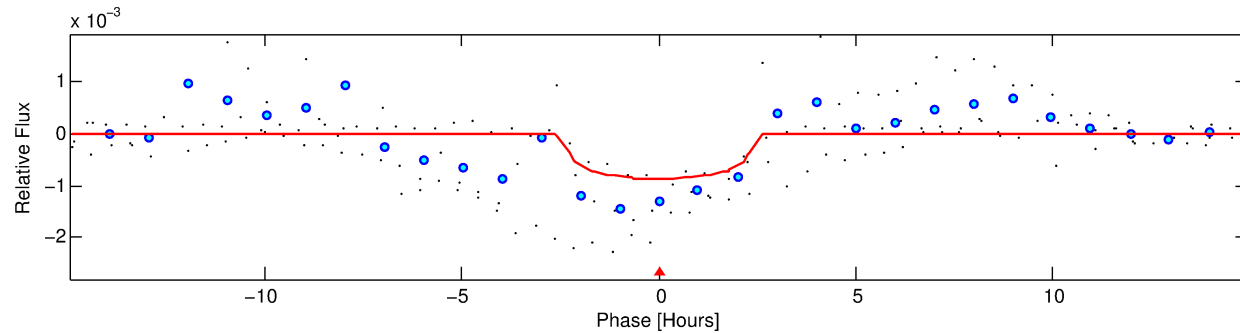
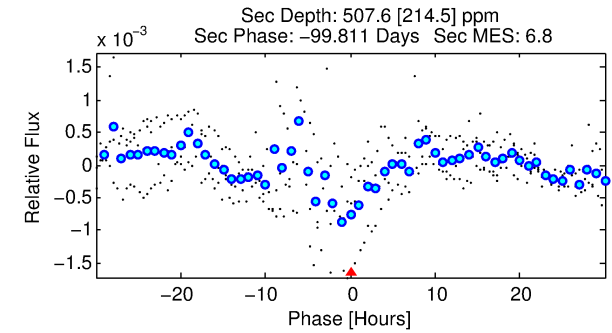
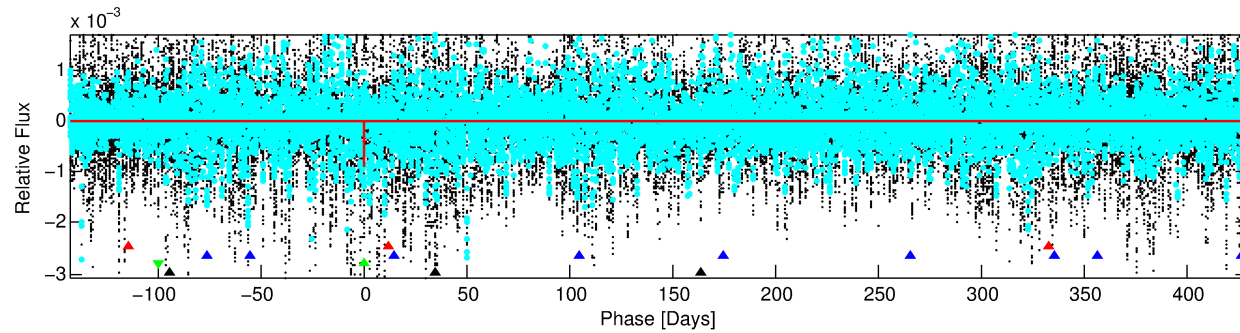
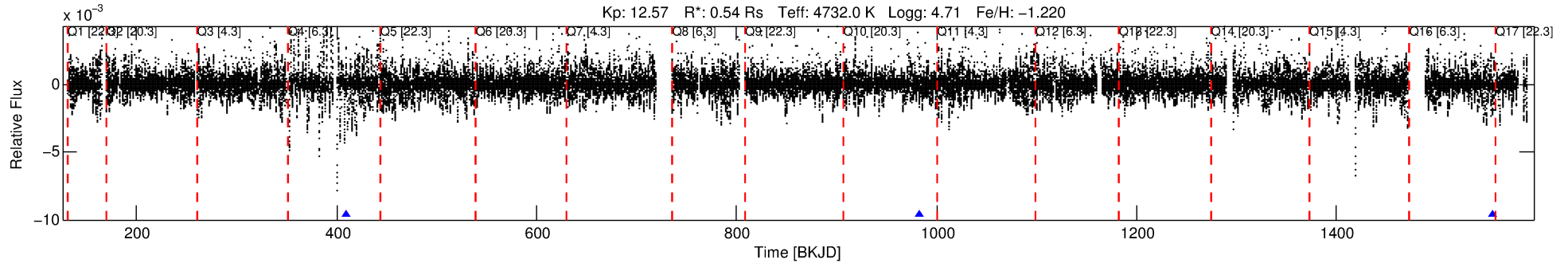
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012121936-03

No Significant Match Found

DV One-Page Summary

KIC: 12121936 Candidate: 3 of 4 Period: 573.242 d



DV Fit Results:

Period = 573.24190 [0.00585] d
Epoch = 409.3174 [0.0075] BKJD
Rp/R* = 0.0285 [0.0195]
a/R* = 678.48 [1647.70]
b = 0.68 [1.95]
Seff = 0.11 [0.02]
Teq = 146 [5] K
Rp = 1.69 [1.16] Re
a = 1.1039 [0.0615] AU
Ag = 119507.88 [171678.01] [0.70]
Teffp = 4205 [1513] K [2.68 σ]

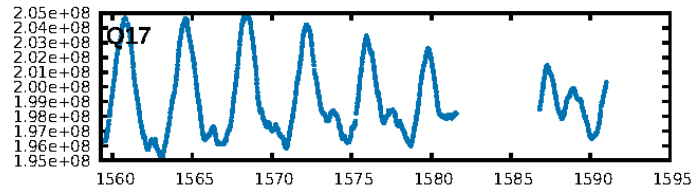
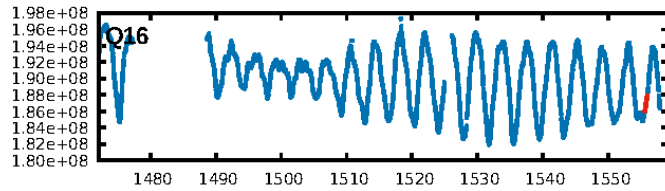
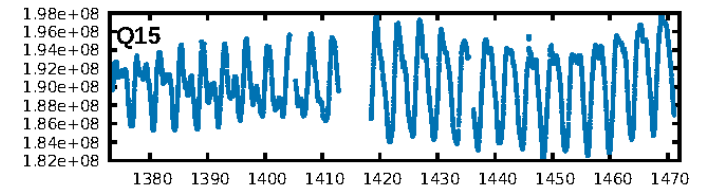
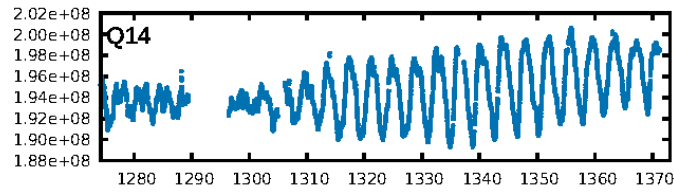
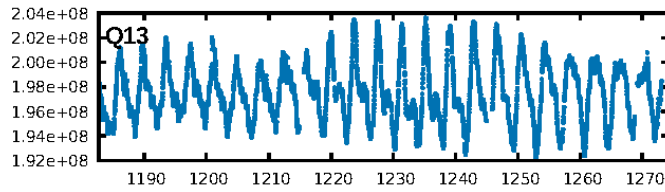
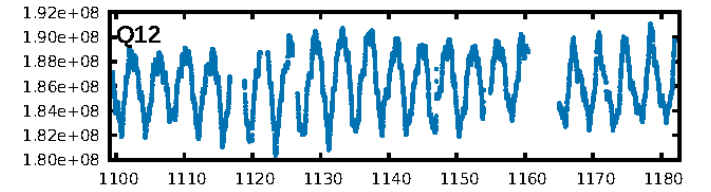
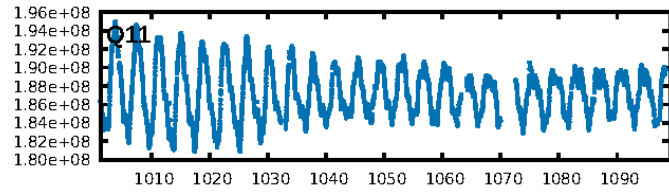
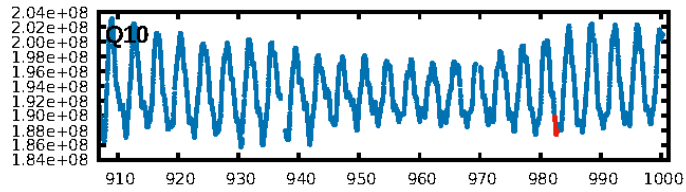
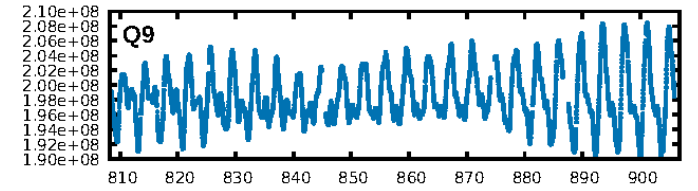
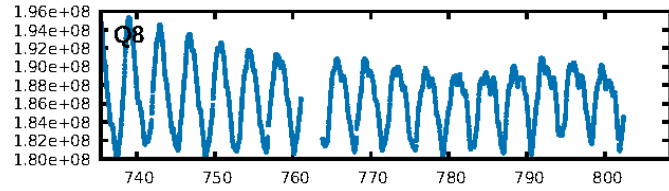
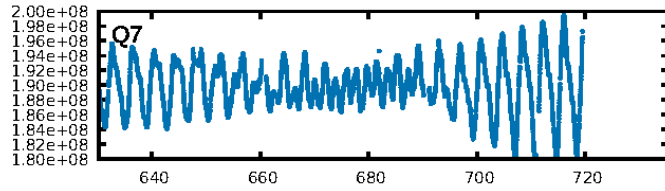
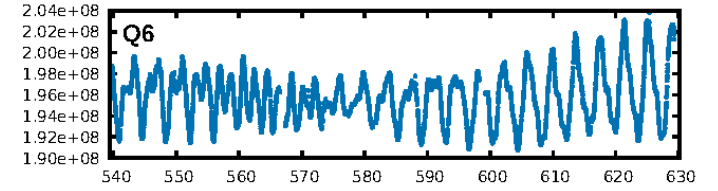
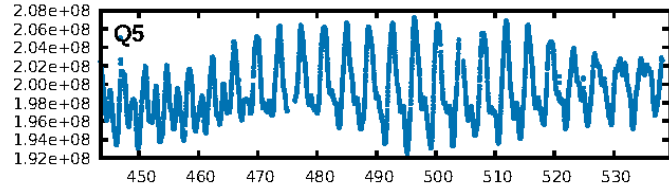
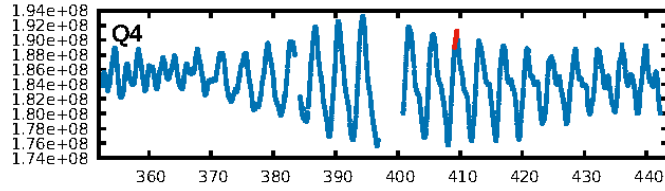
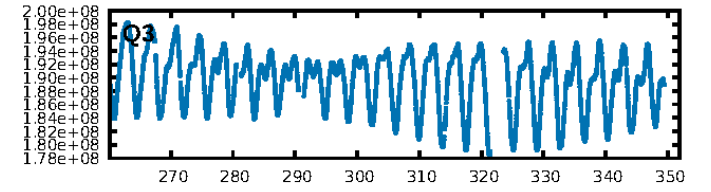
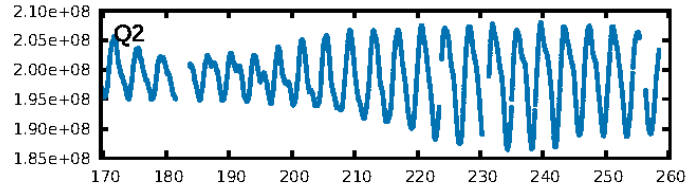
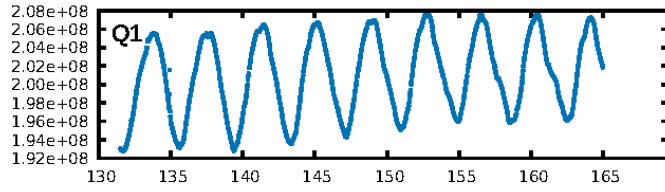
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [481.47 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 6.3%
ModelChiSquareGof-sig: 77.2%
Bootstrap-pfa: 3.58e-08
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 18.89
Centroid-sig: 0.2%
Centroid-so: 0.855 arcsec [1.21 σ]
OotOffset-rm: 0.007 arcsec [0.08 σ]
KicOffset-rm: 0.295 arcsec [3.59 σ]
OotOffset-st: 1/0/2/0 [3]
KicOffset-st: 1/0/2/0 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

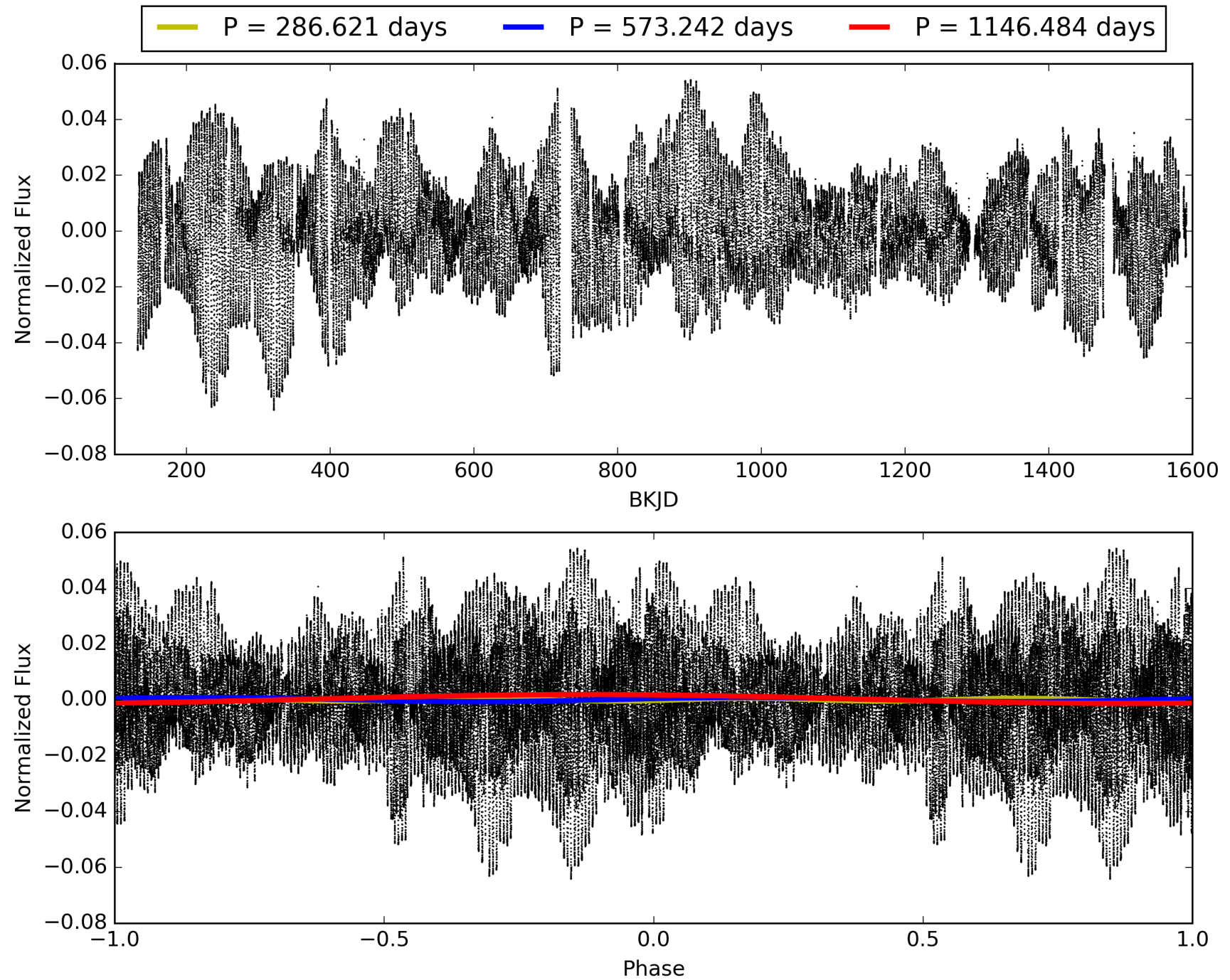
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:06:18 Z

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

TCE 012121936-03, PDC Light Curves

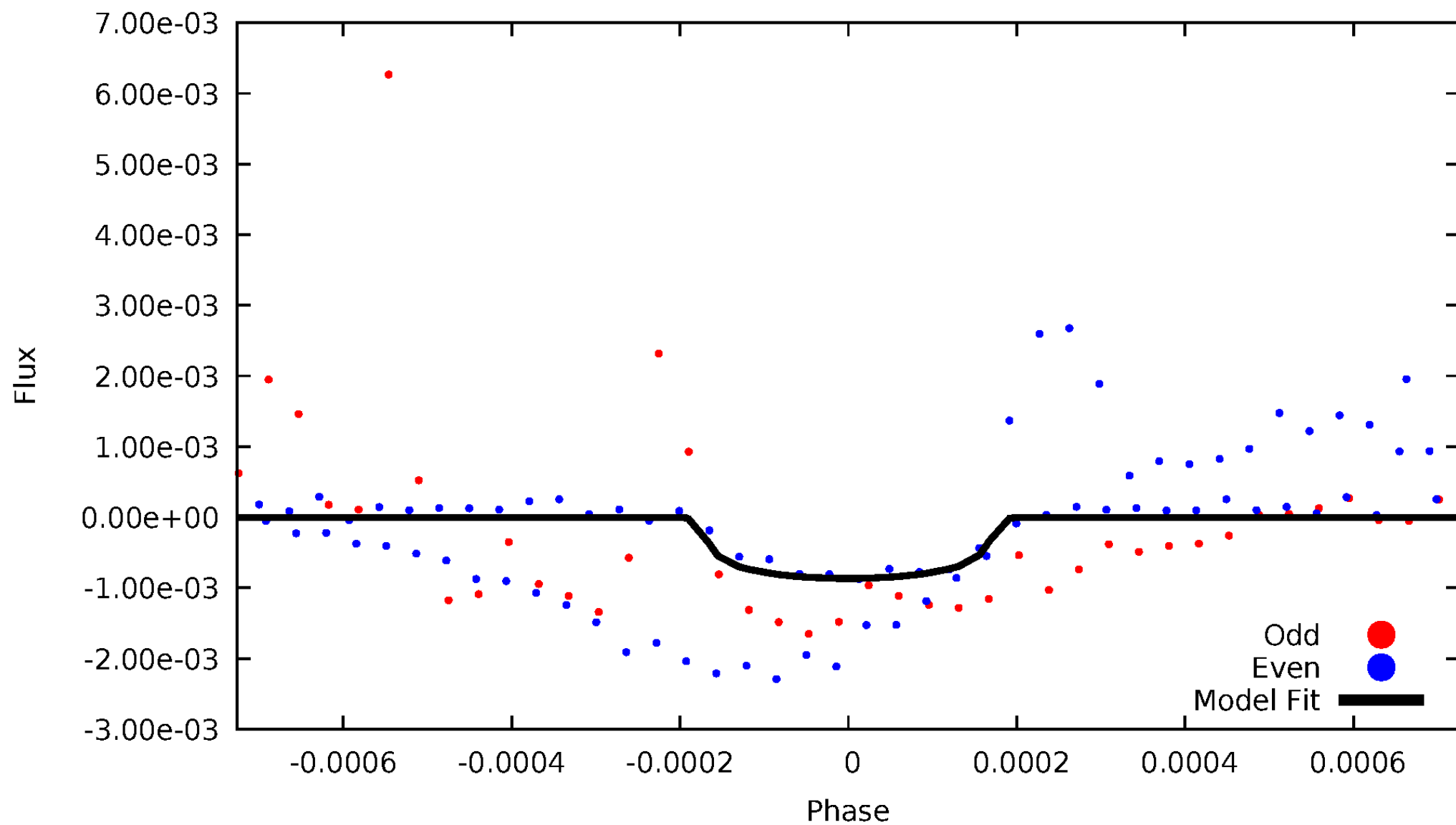


TCE 012121936-03



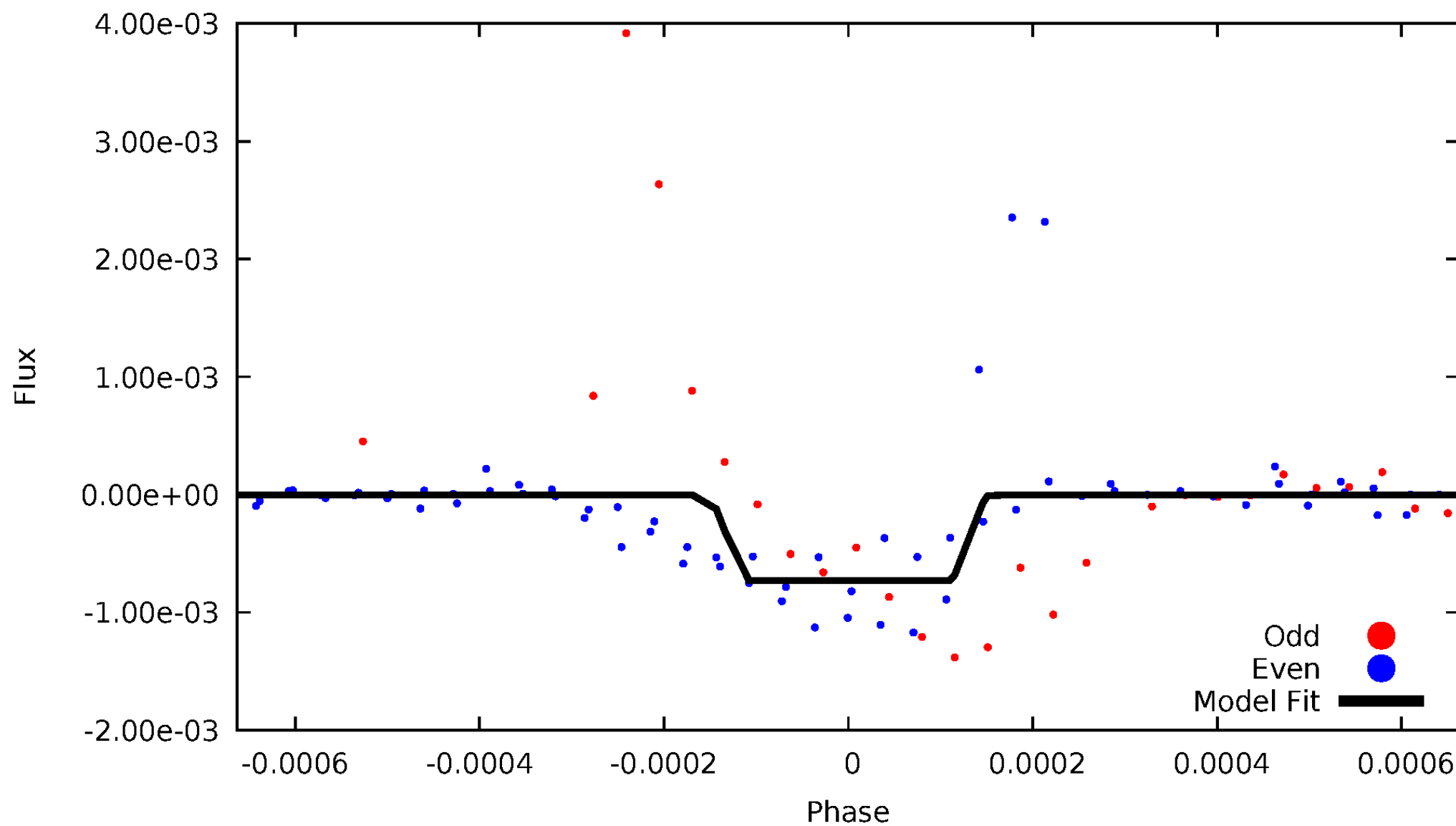
DV Odd/Even

TCE 012121936-03



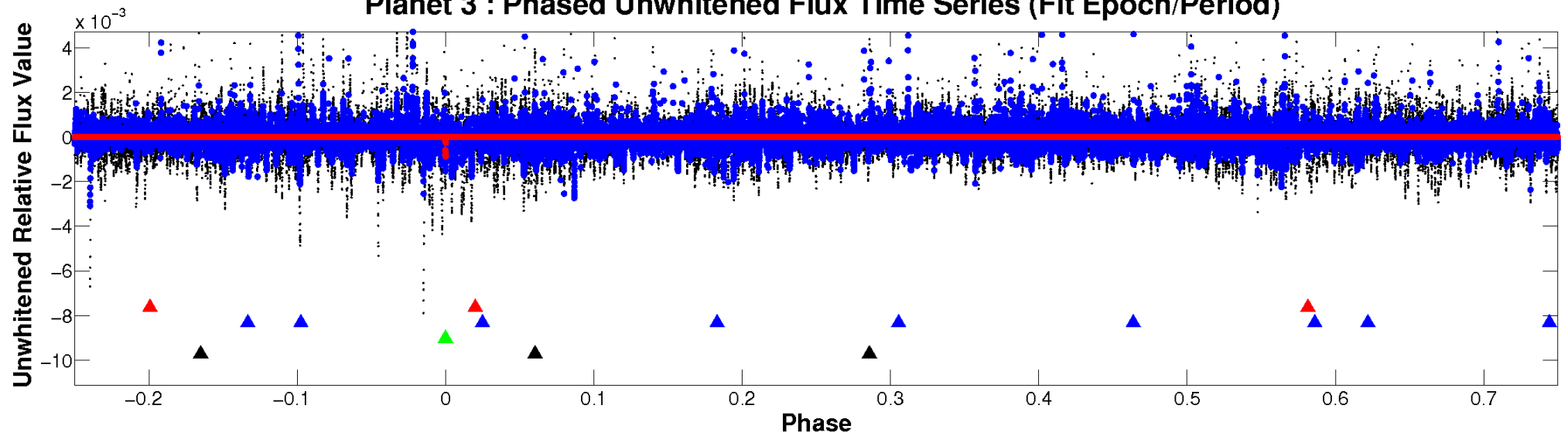
ALT Odd/Even

TCE 012121936-03

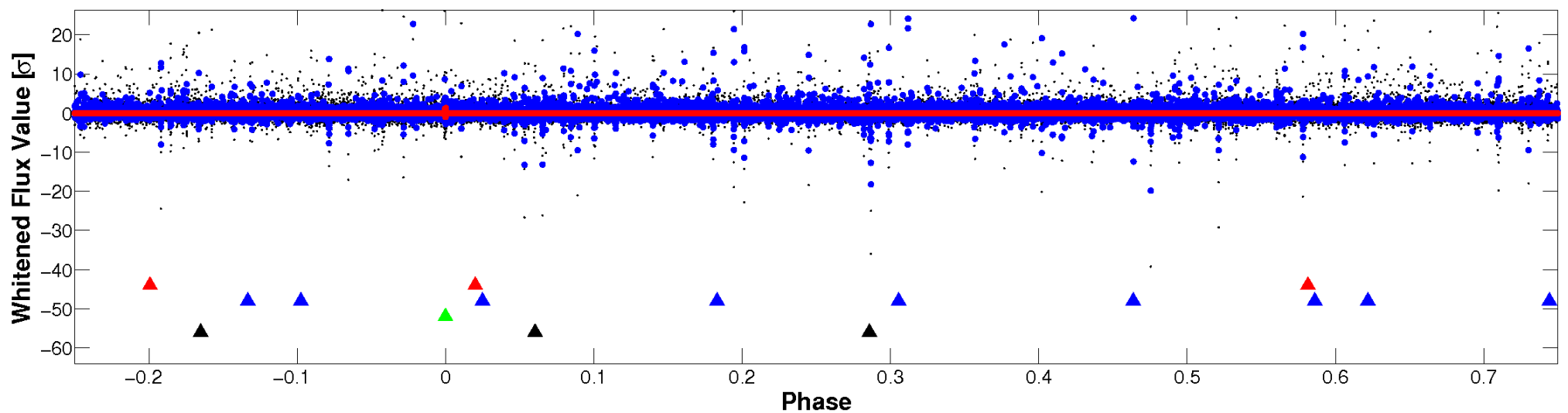


Non-Whitened Vs. Whitened Light Curve

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

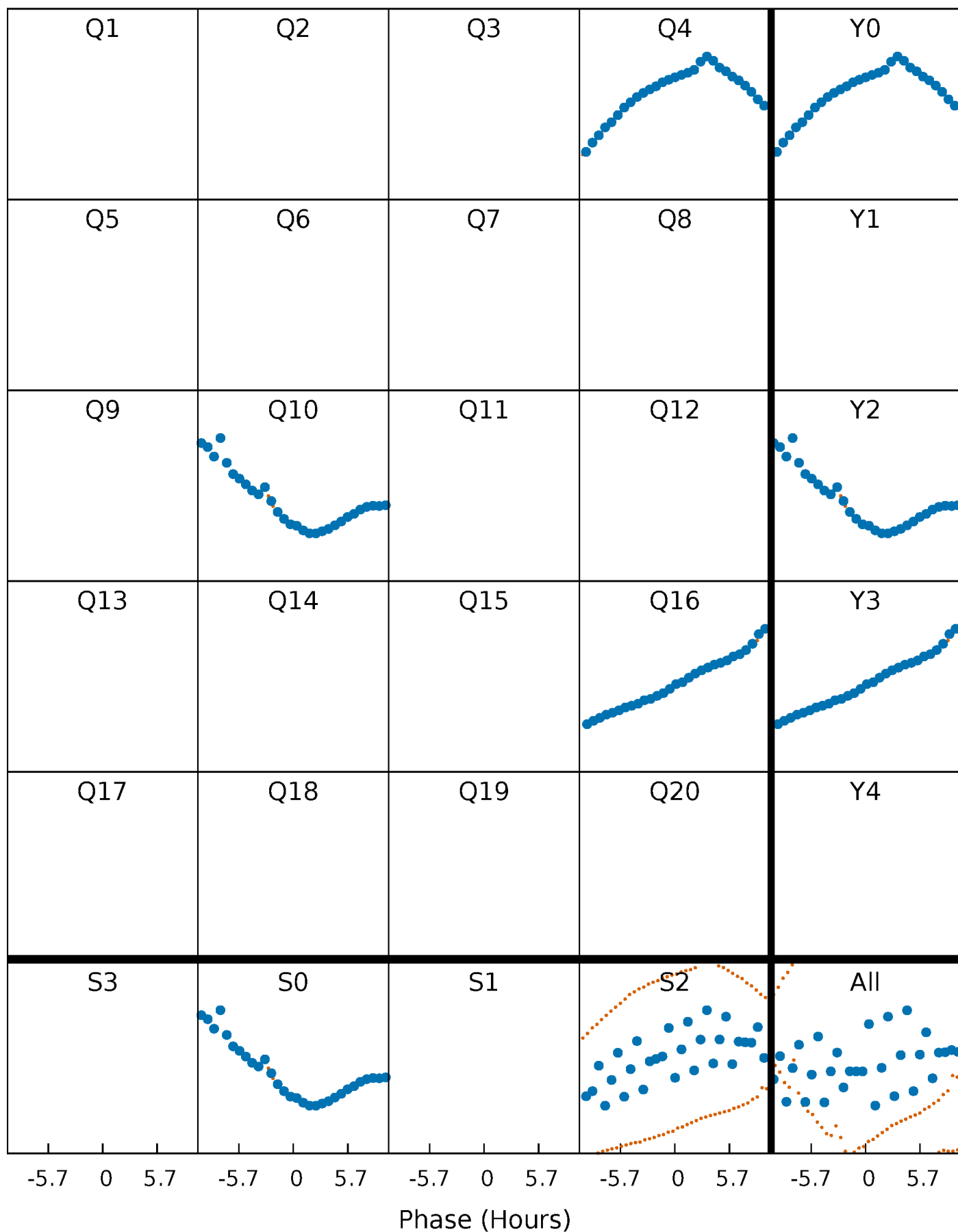


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



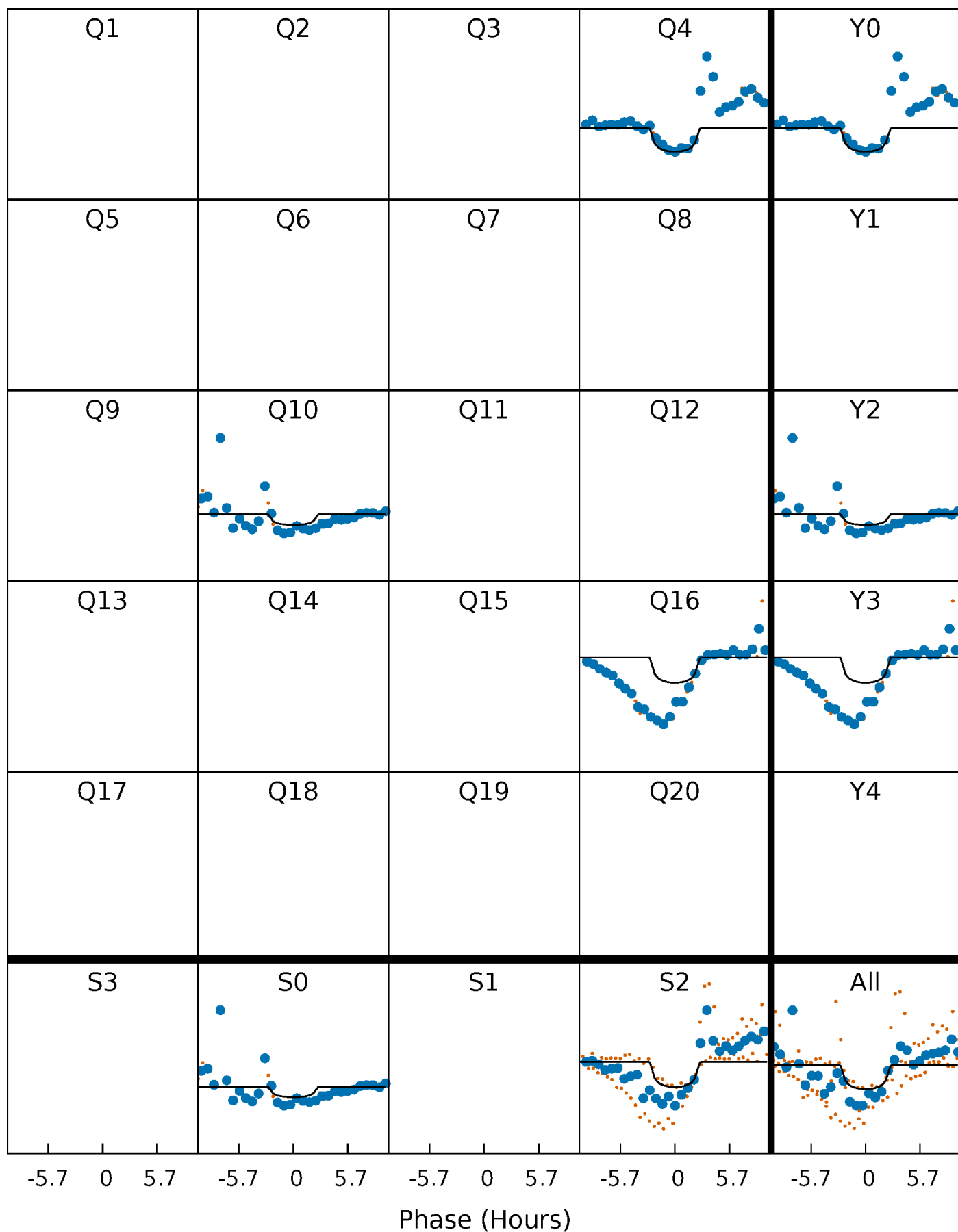
PDC Quarter-Phased Transit Curves

TCE 012121936-03 P=573.241902 Days $T_0=409.317385$ (BKJD)



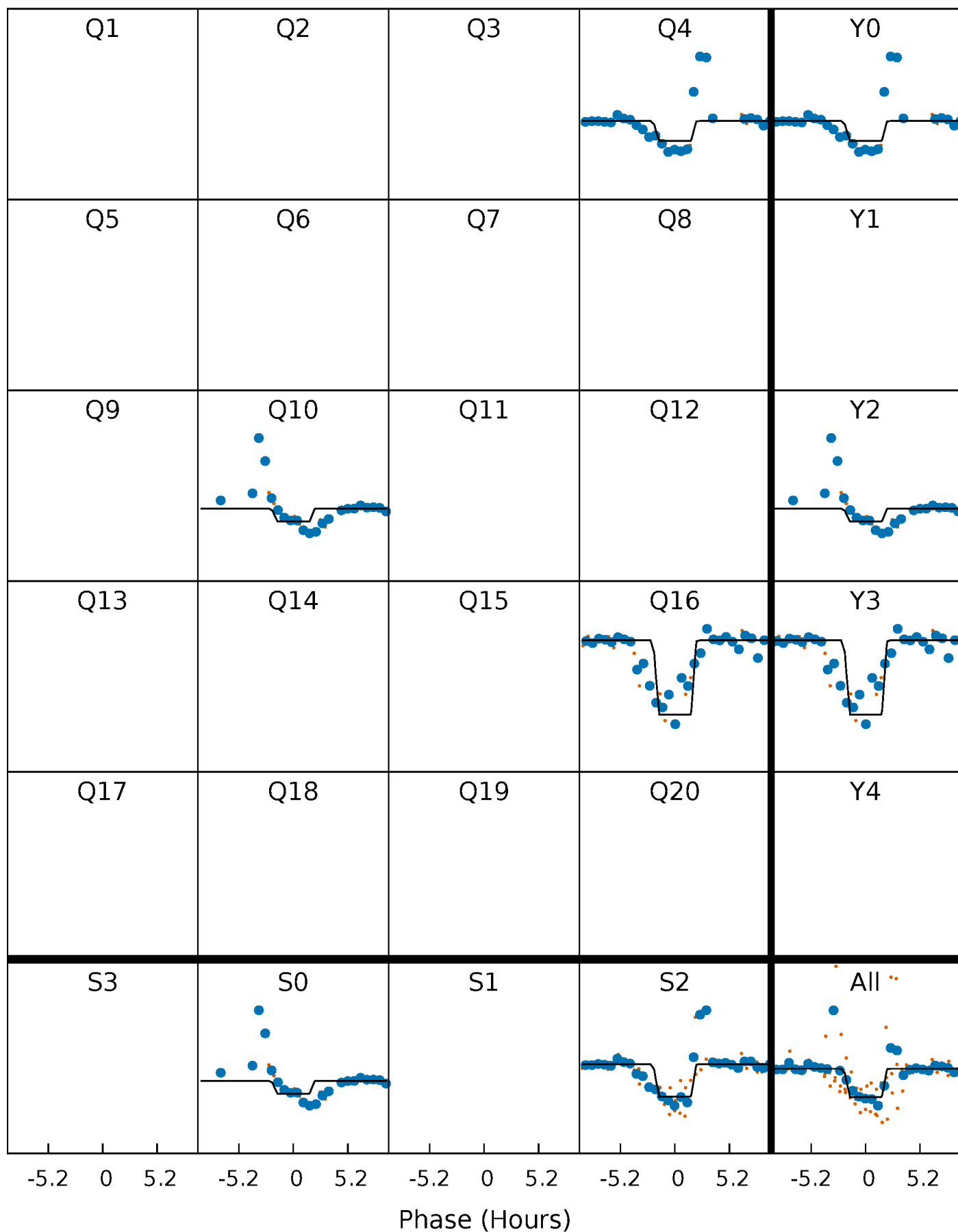
DV Quarter-Phased Transit Curves

TCE 012121936-03 $P=573.241902$ Days $T_0=409.317385$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

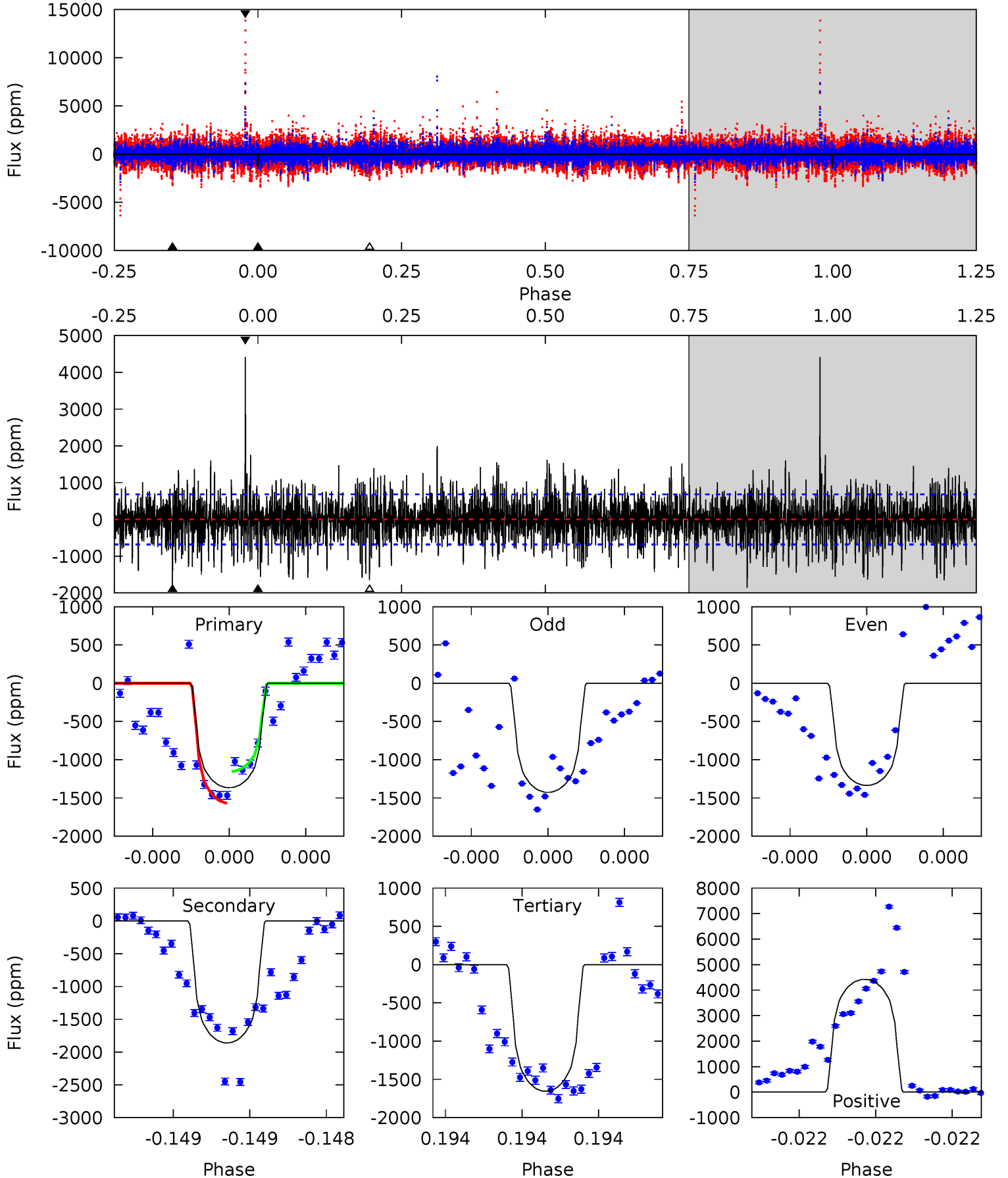
TCE 012121936-03 $P=573.222659$ Days $T_0=409.345707$ (BKJD)



DV Model-Shift Uniqueness Test

012121936-03, P = 573.241902 Days, E = 409.317385 Days

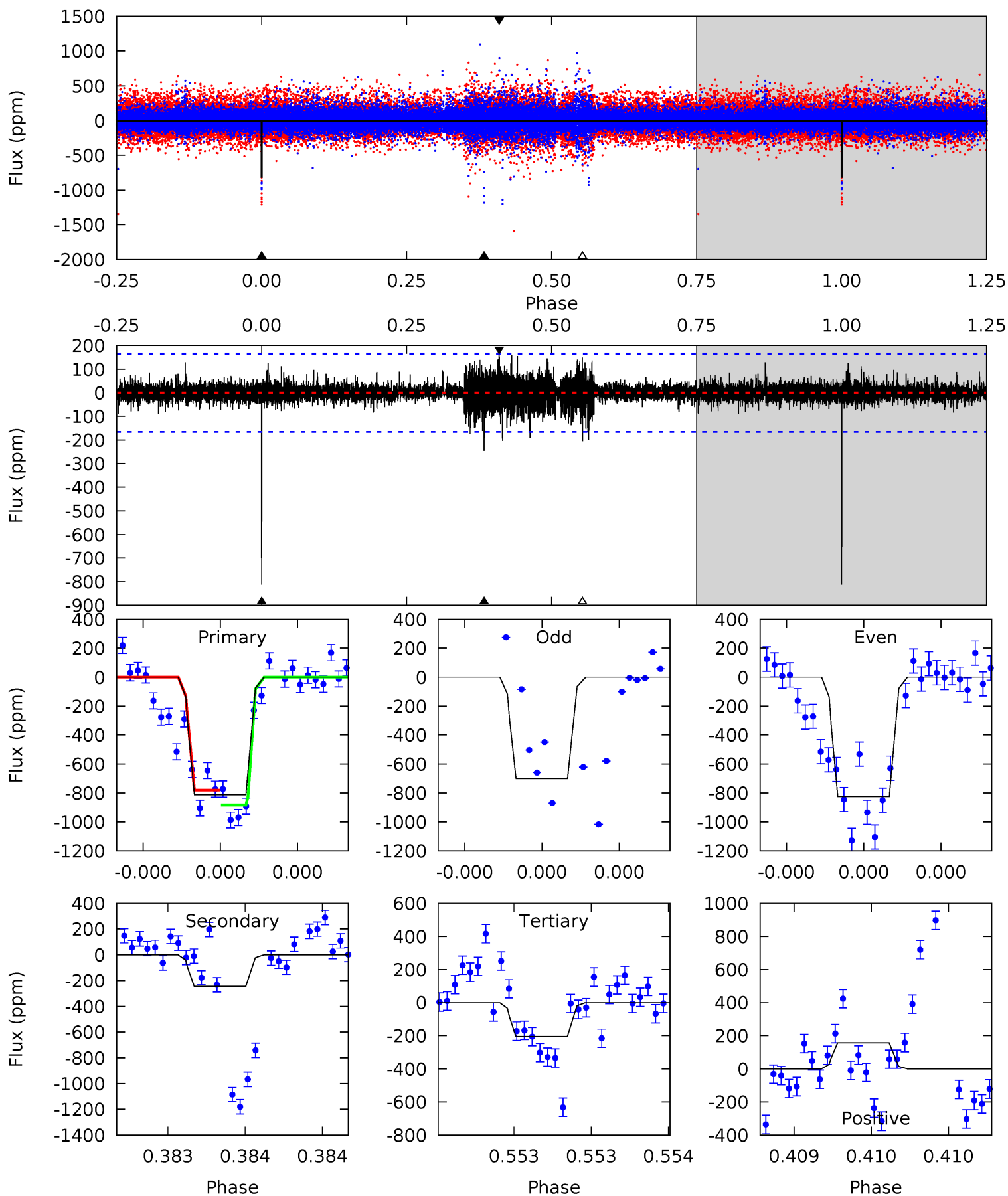
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.2	15.3	13.6	36.4	5.62	3.55	3.60	-2.38	-25.1	1.69	-21.1	0.34	0.96	0.70	1.71



Alt Model-Shift Uniqueness Test

012121936-03, P = 573.222659 Days, E = 409.345707 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.7	8.37	6.96	5.38	5.65	3.60	0.97	20.7	22.3	1.41	2.99	1.83	1.07	0.16	1.80



Stellar Parameters For KIC 012121936

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4732^{+139}_{-139}	$4.707^{+0.048}_{-0.028}$	$-1.220^{+0.300}_{-0.300}$	$0.542^{+0.031}_{-0.034}$	$0.546^{+0.040}_{-0.020}$	$4.824^{+0.873}_{-0.566}$
	+3%/-3%	+1%/-1%	+25%/-25%	+6%/-6%	+7%/-4%	+18%/-12%
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 012121936-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-1859 ± 121	$1.81^{+1.03}_{-1.06}$	204^{+6}_{-7}	5478^{+3235}_{-950}	$383400^{+1823829}_{-225501}$
Alt.	-245 ± 29	$1.66^{+1.14}_{-0.96}$	203^{+7}_{-6}	3789^{+1598}_{-591}	$57199^{+293941}_{-37010}$

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

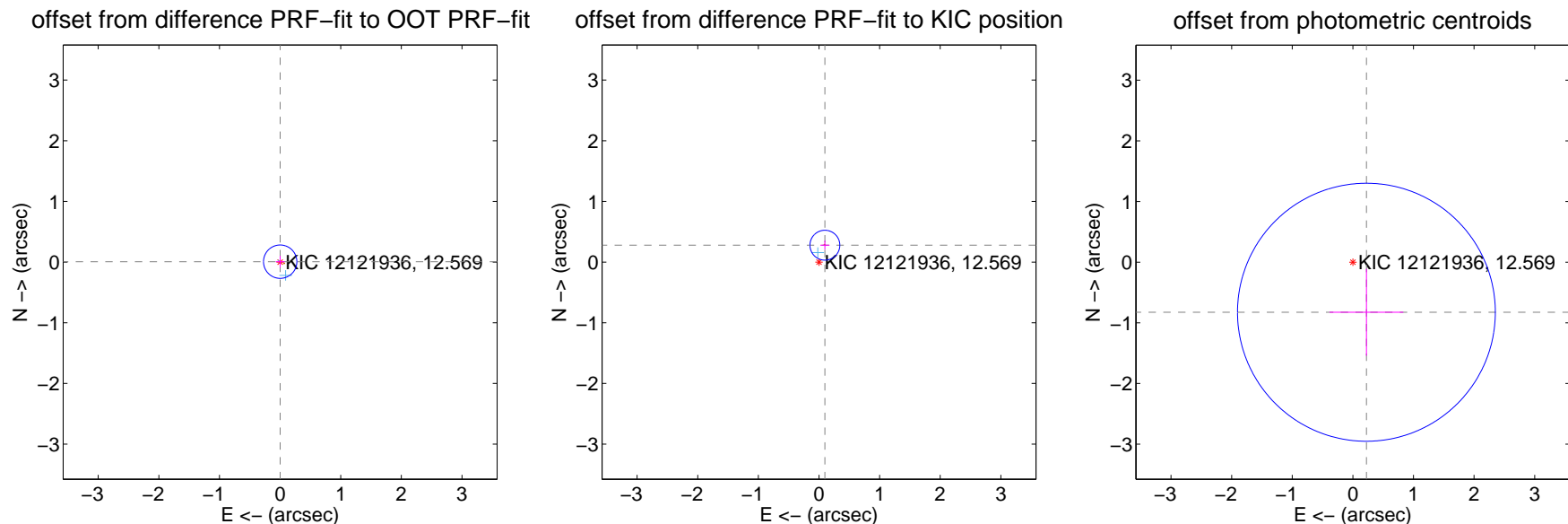
DV Centroid Data

Supplemental centroid analysis for 012121936-03. Kepler magnitude: 12.57. Transit SNR 5.44

There are 2 quarters with good PRF difference image offsets

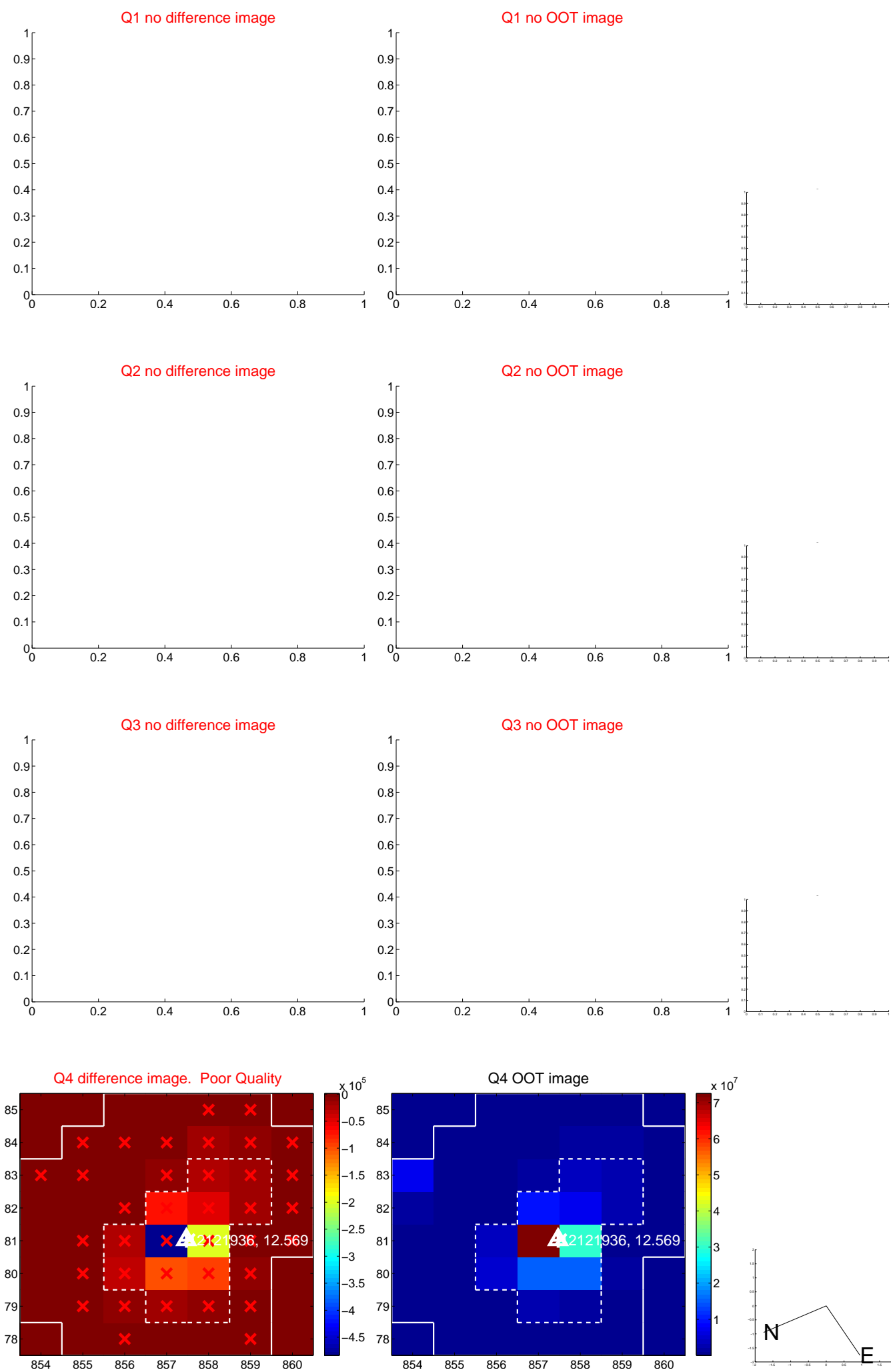
The direct PRF centroid is offset from the target star catalog position by about 0.39 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.007 ± 0.092	0.08	-0.001 ± 0.074	0.007 ± 0.096
PRF-fit source offset from KIC position	0.295 ± 0.082	3.59	-0.097 ± 0.076	0.278 ± 0.077
photometric centroid source offset	0.86 ± 0.71	1.21	-0.22 ± 0.61	-0.83 ± 0.72



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.

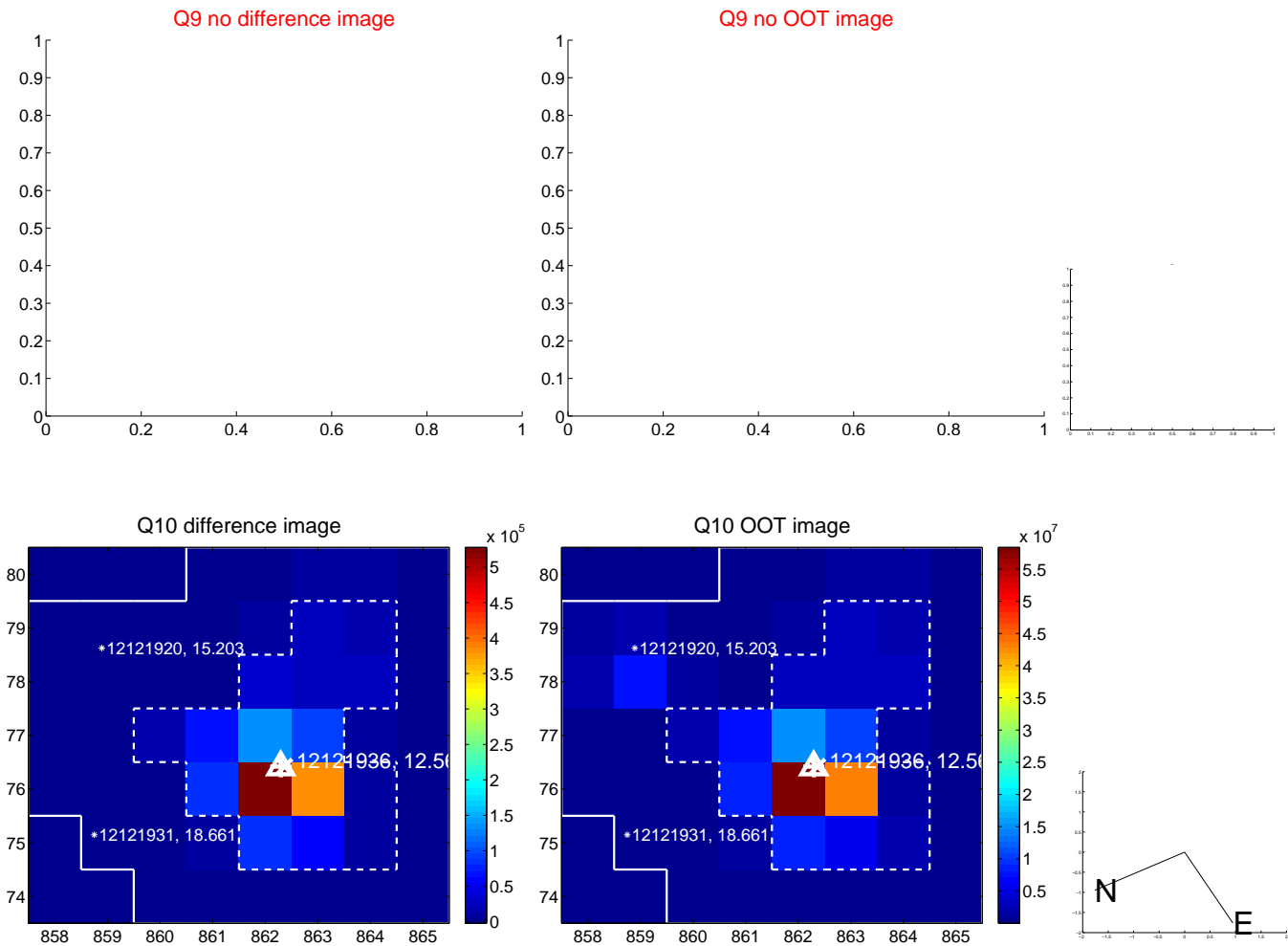
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



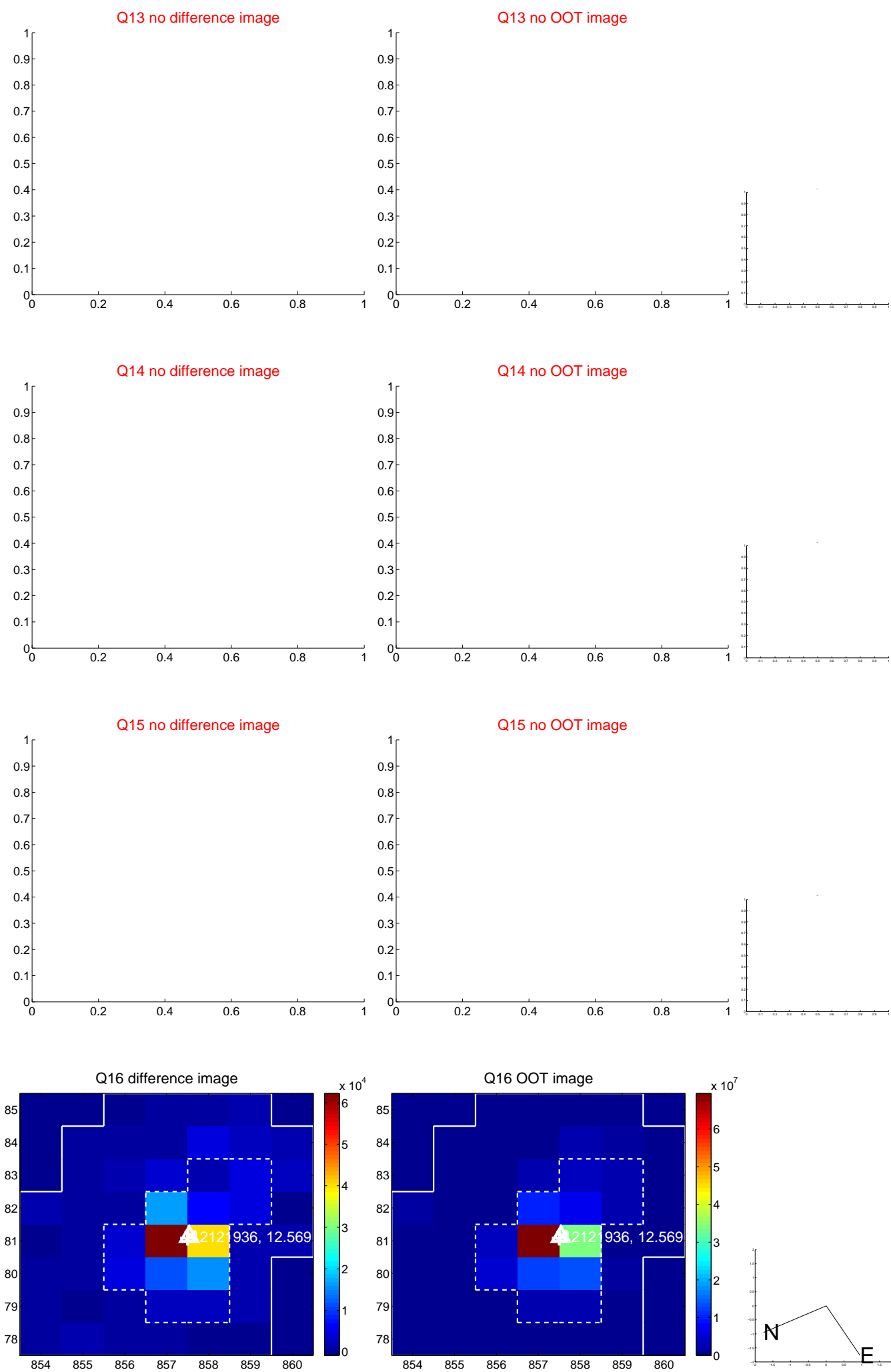
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



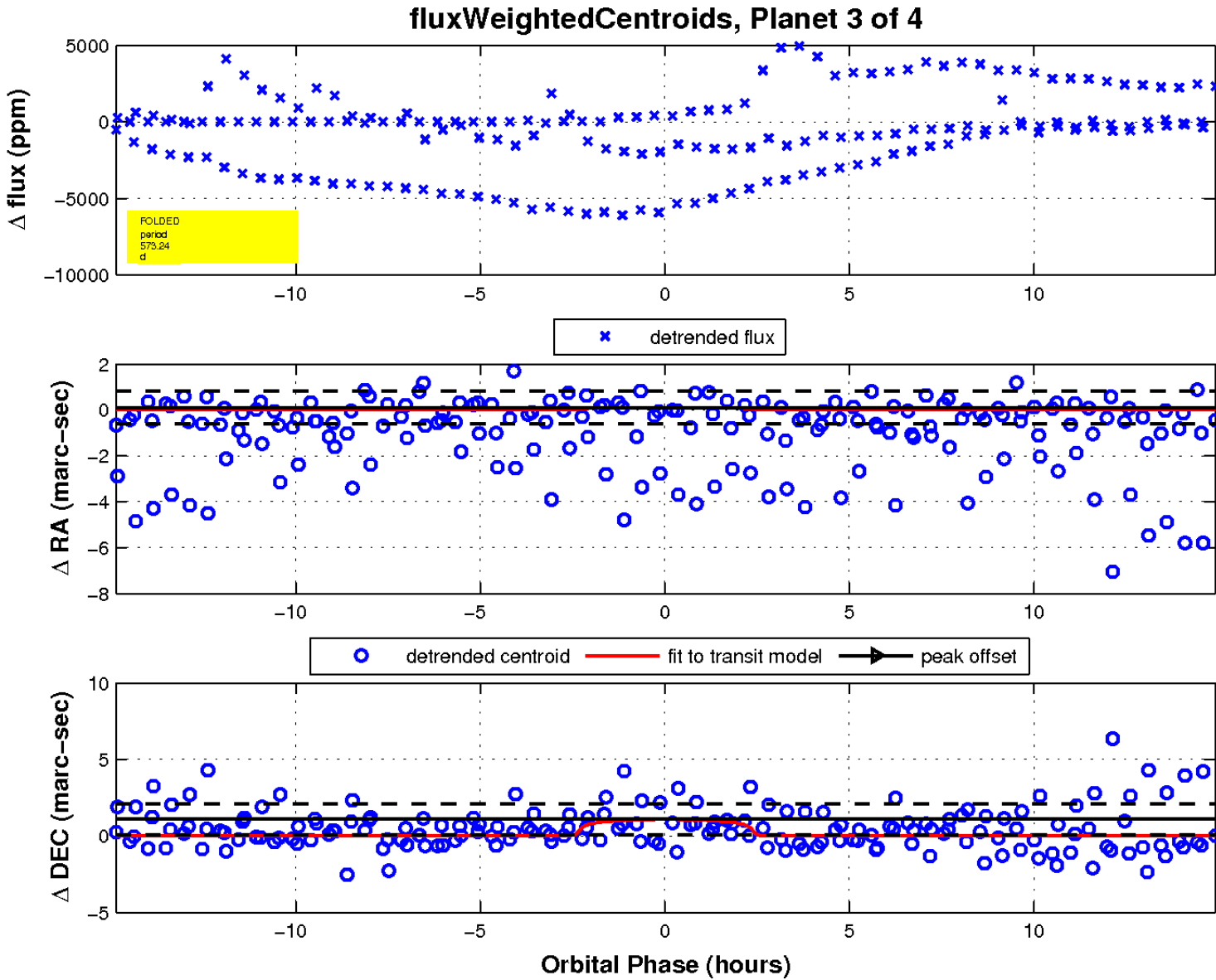
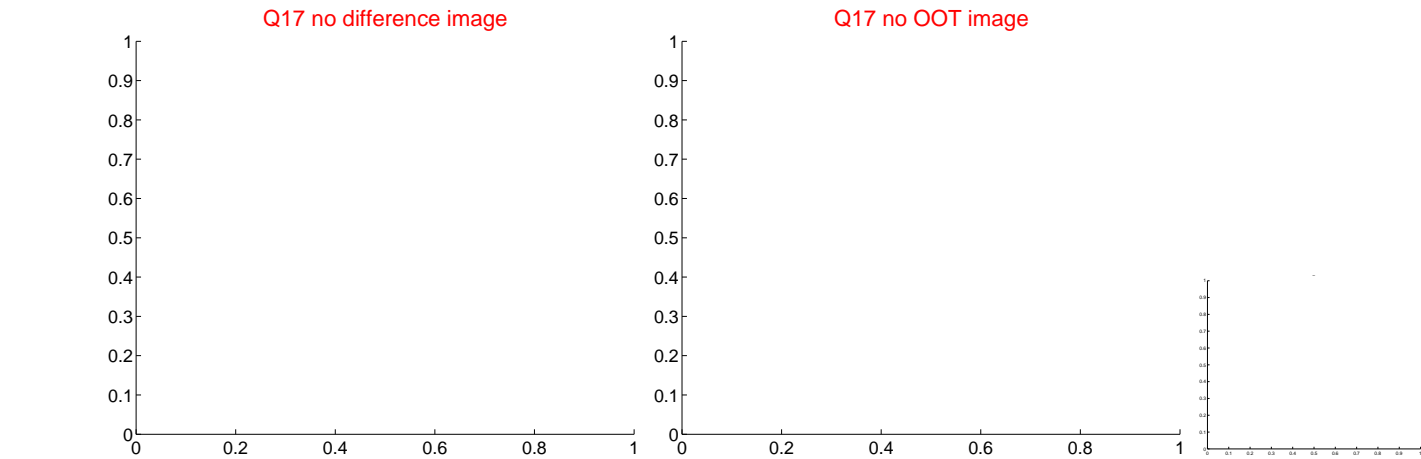
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



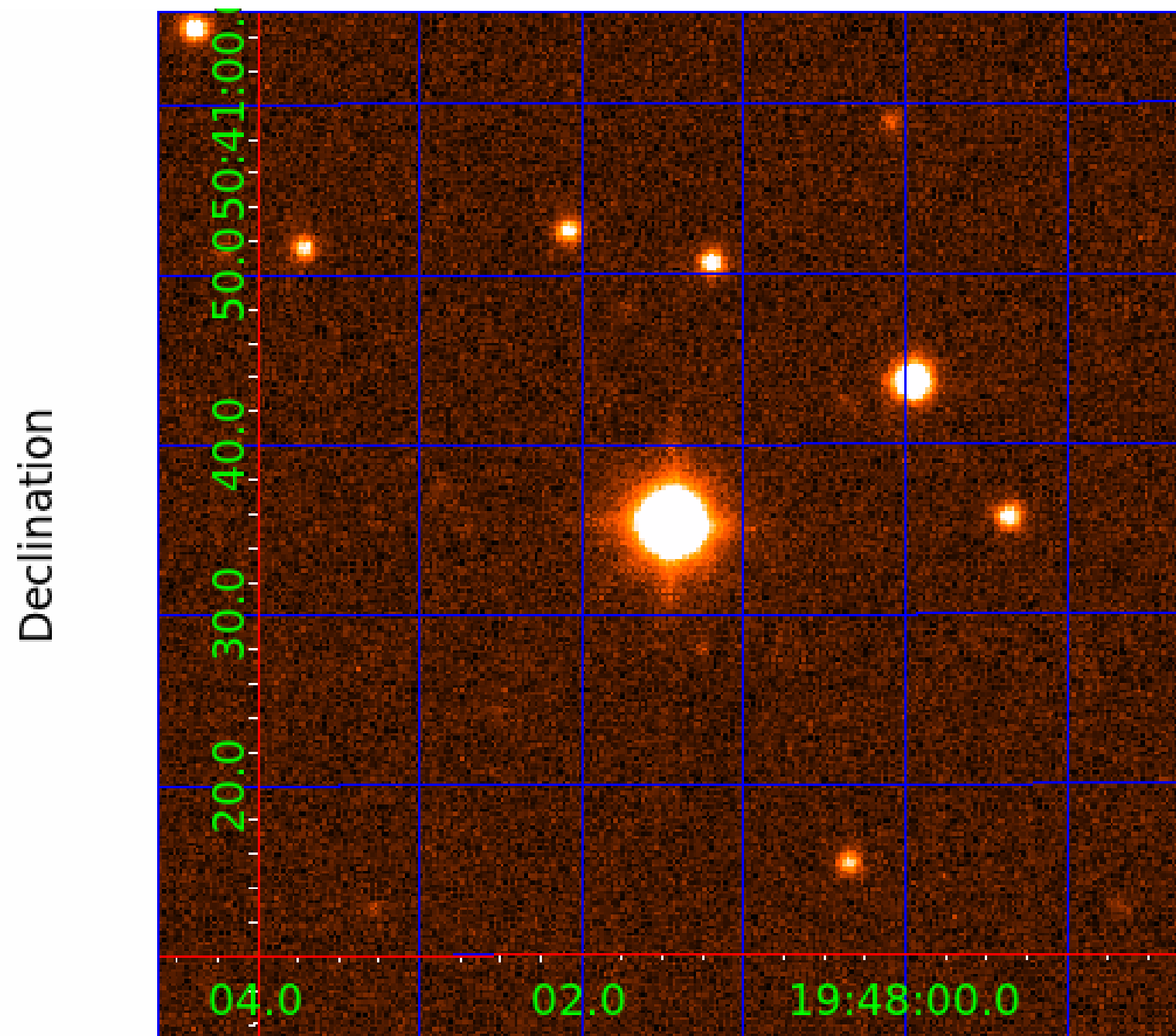
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 012121936

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})
012121936-01	OBS	No	447.522551	420.841363	805.0	3.787	13.6	5.7	0.54	4732	1.51	0.15
012121936-02	OBS	No	160.851925	192.588708	287.5	2.038	13.1	4.0	0.54	4732	0.98	0.59
012121936-03	OBS	No	573.241902	409.317385	865.5	4.993	12.7	5.4	0.54	4732	1.69	0.11
012121936-04	OBS	No	444.014474	573.159725	752.4	1.945	14.6	5.8	0.54	4732	1.47	0.15

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012121936-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012121936-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS
012121936-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012121936-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

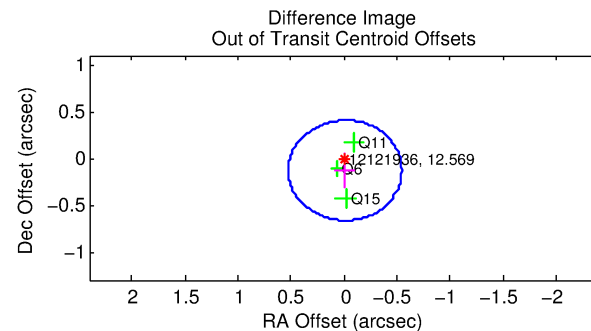
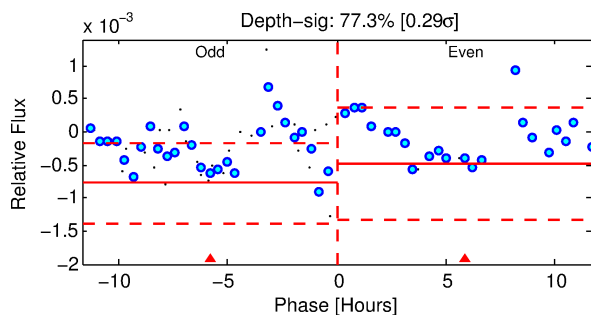
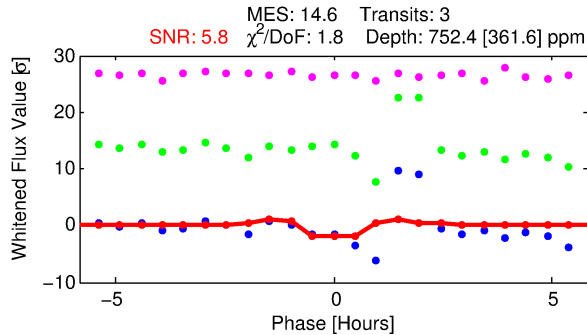
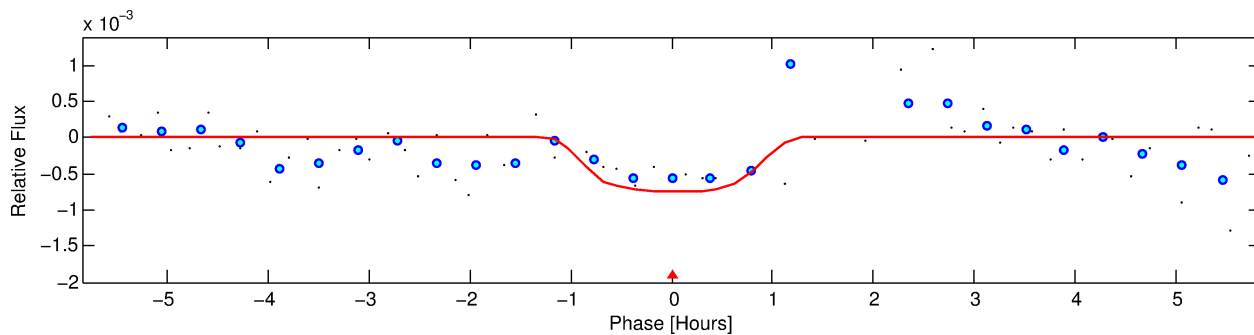
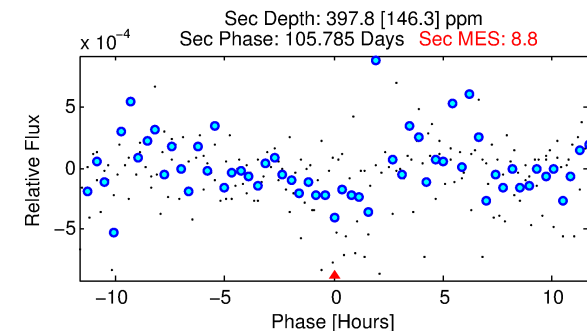
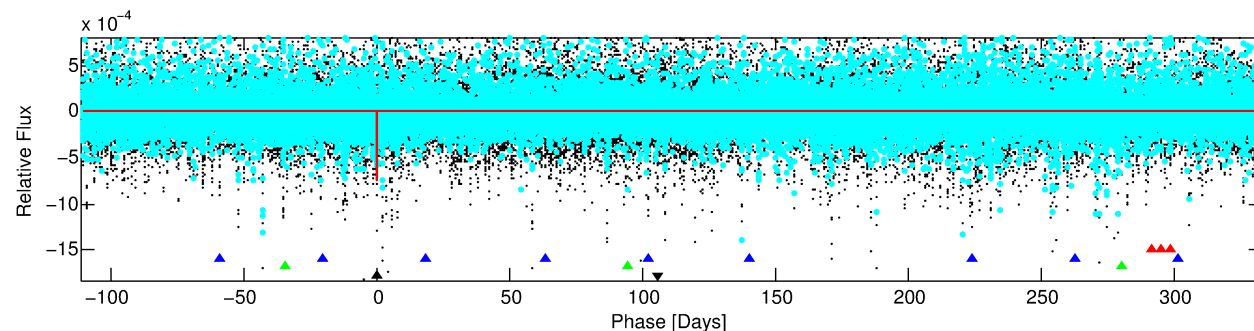
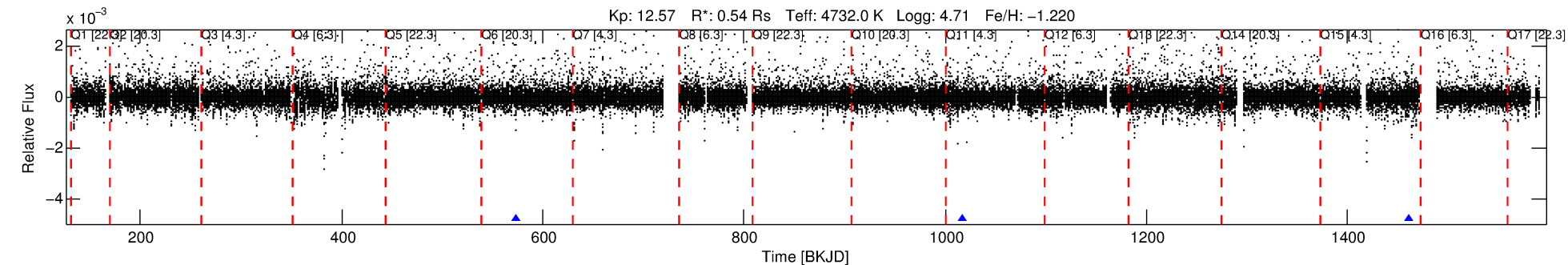
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012121936-04

No Significant Match Found

DV One-Page Summary

KIC: 12121936 Candidate: 4 of 4 Period: 444.014 d



DV Fit Results:

Period = 444.01447 [0.01105] d
Epoch = 573.1597 [0.0108] BKJD
Rp/R* = 0.0249 [0.2548]
a/R* = 1733.58 [71078.52]
b = 0.25 [152.90]
Seff = 0.15 [0.02]
Teq = 159 [6] K
Rp = 1.47 [15.07] Re
a = 0.9310 [0.0519] AU
Ag = 87710.41 [1797853.51] [0.05 σ]
Teffp = 4238 [21718] K [0.19 σ]

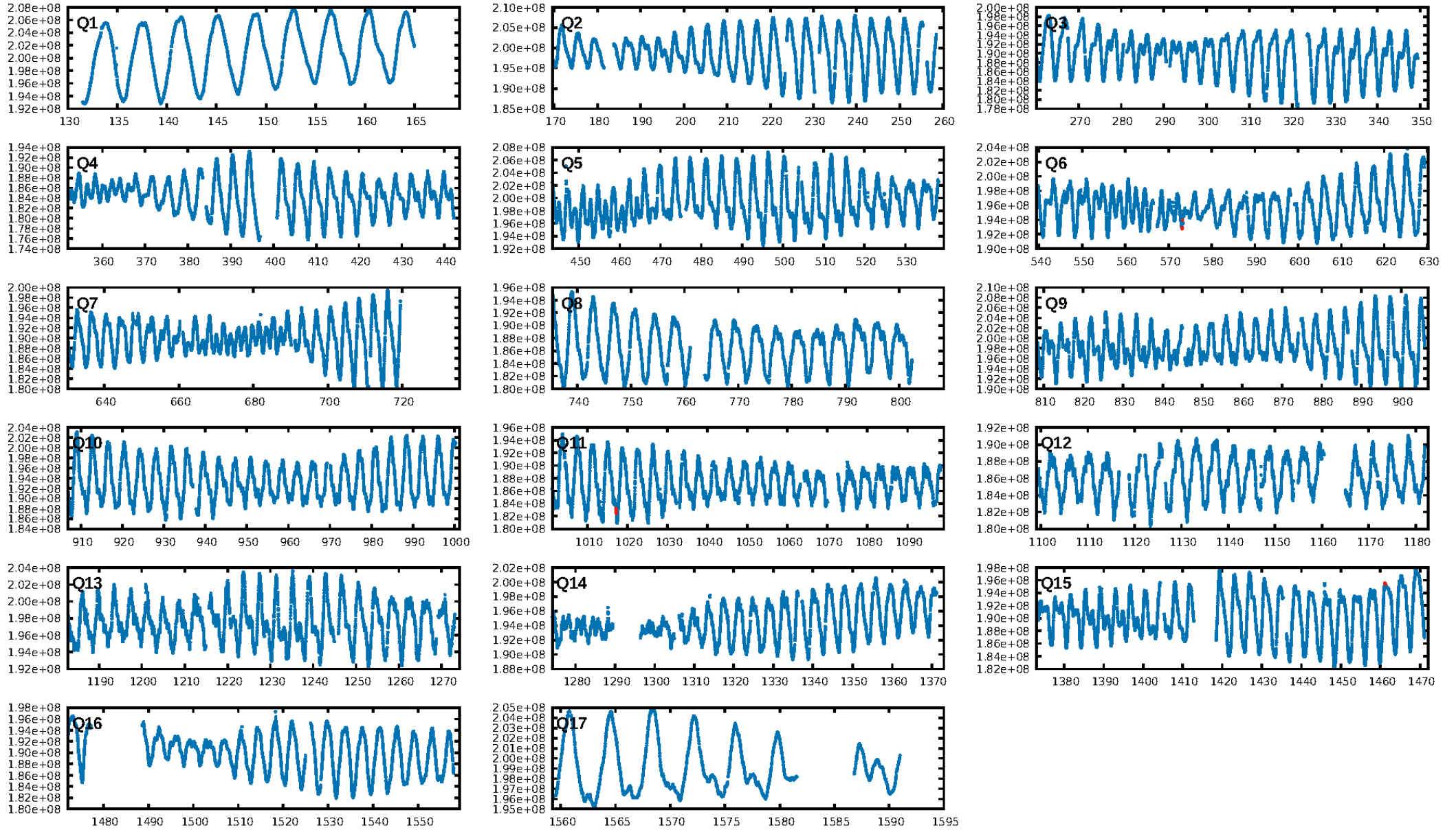
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [2412.77 σ]
LongPeriod-sig: 100.0% [19.78 σ]
ModelChiSquare2-sig: 1.4%
ModelChiSquareGof-sig: 41.9%
Bootstrap-pfa: 8.16e-10
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 1.336
Centroid-sig: 3.6%
Centroid-so: 1.214 arcsec [1.05 σ]
OotOffset-rm: 0.130 arcsec [0.73 σ]
KicOffset-rm: 0.118 arcsec [0.73 σ]
OotOffset-st: 1/2/0/0 [3]
KicOffset-st: 1/2/0/0 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 1.00 [3/3]

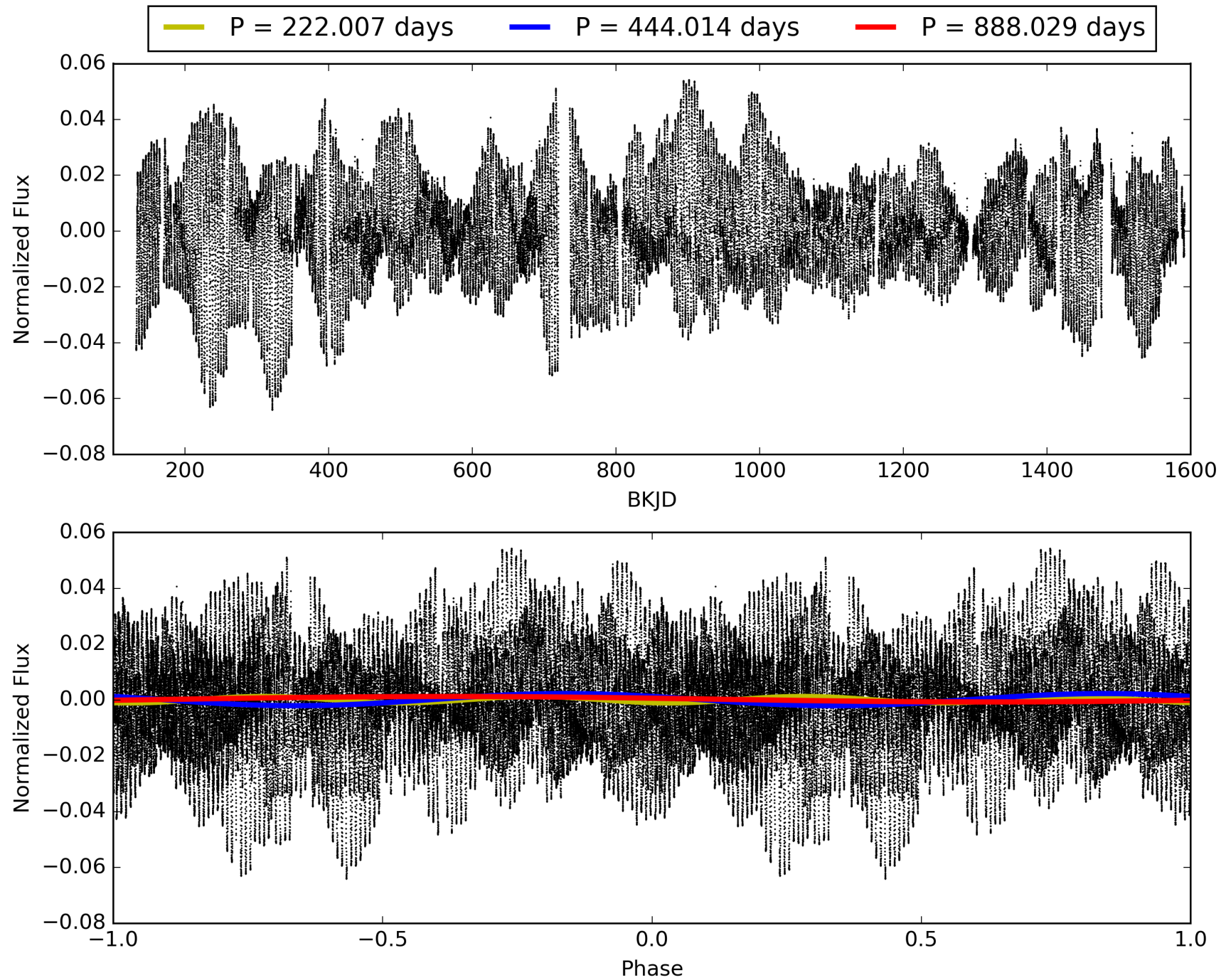
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:06:47 Z

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

TCE 012121936-04, PDC Light Curves

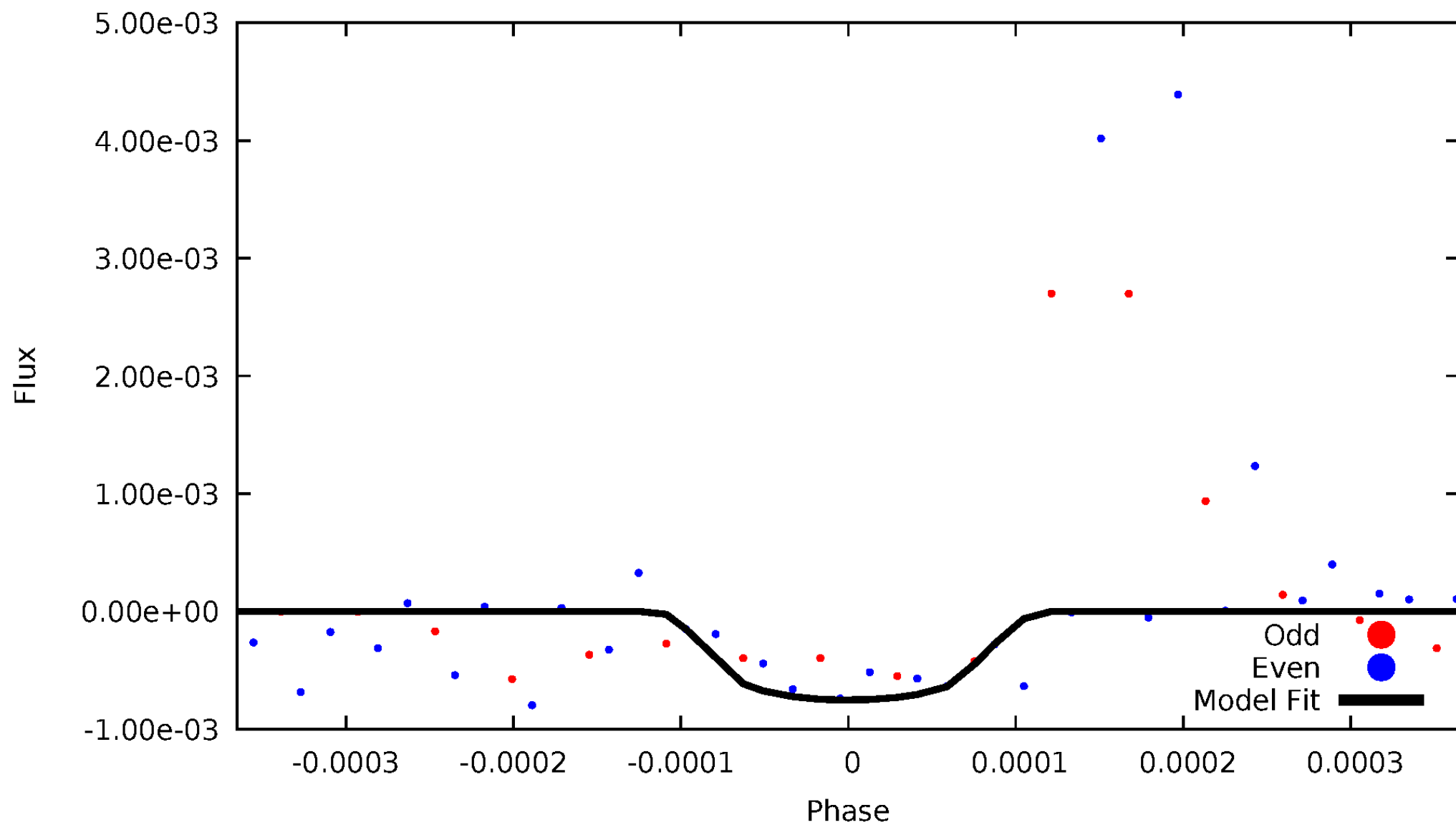


TCE 012121936-04



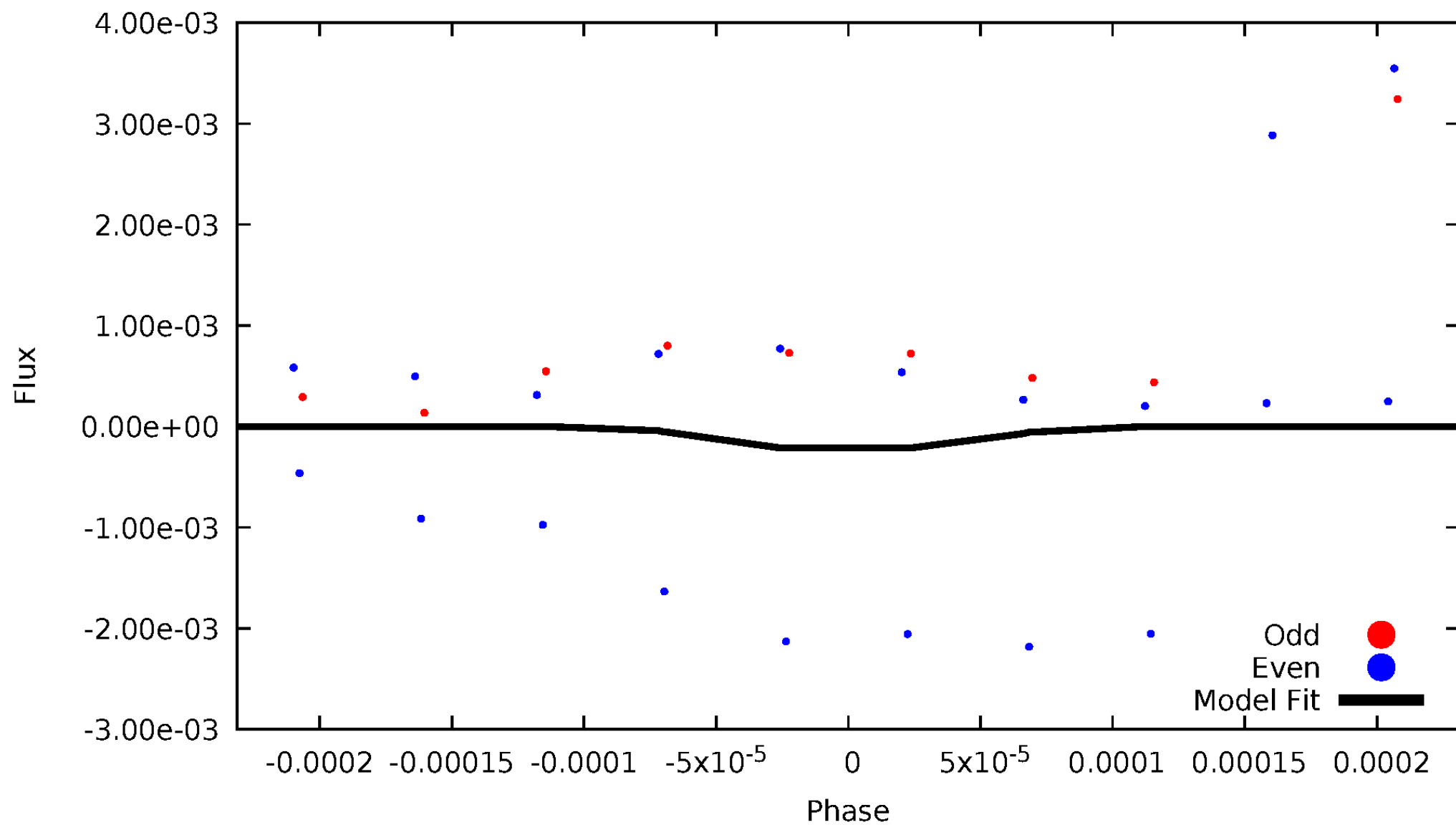
DV Odd/Even

TCE 012121936-04



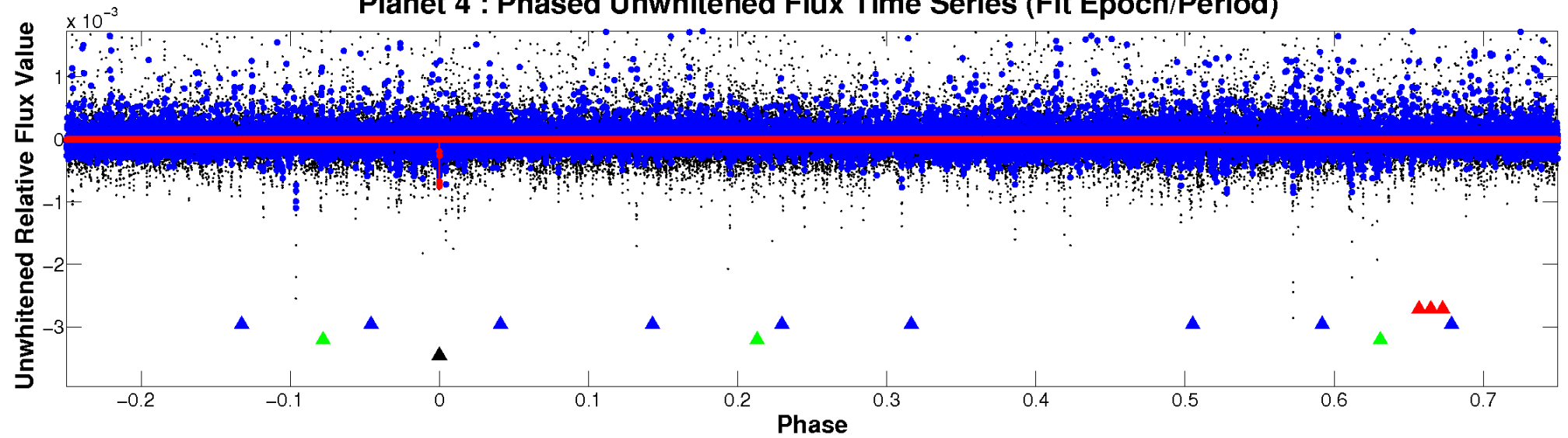
ALT Odd/Even

TCE 012121936-04

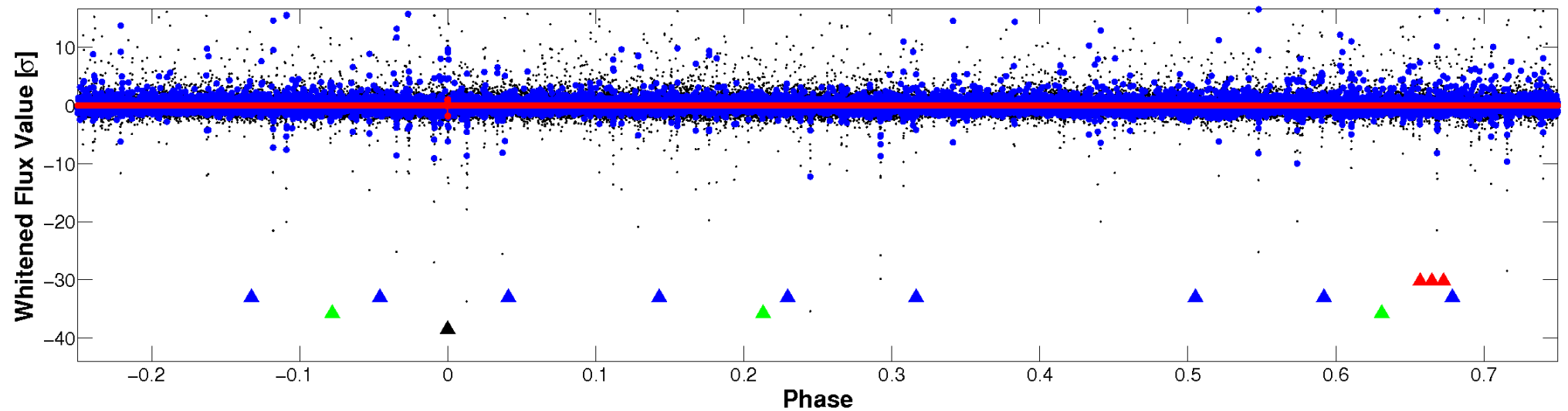


Non-Whitened Vs. Whitened Light Curve

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

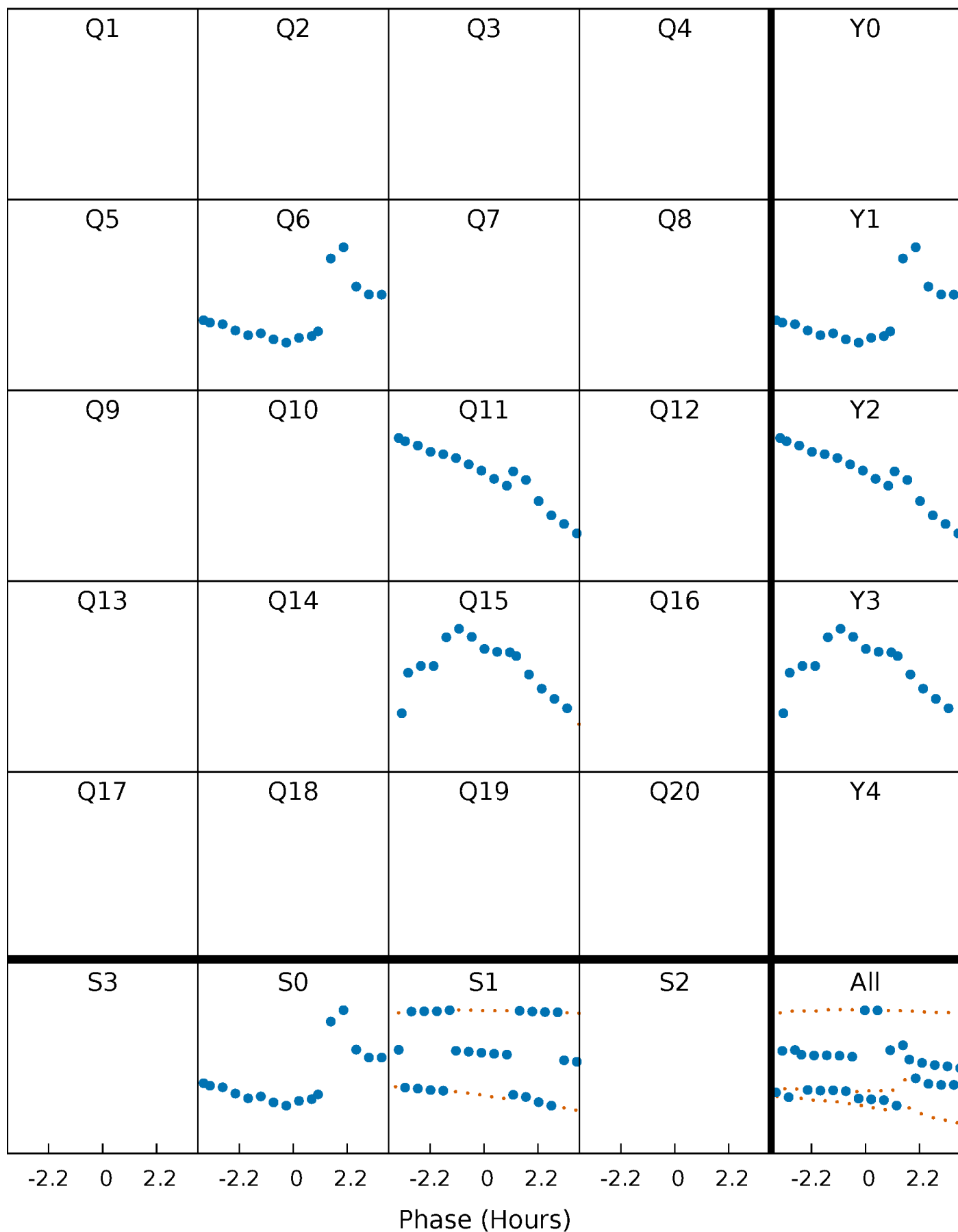


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



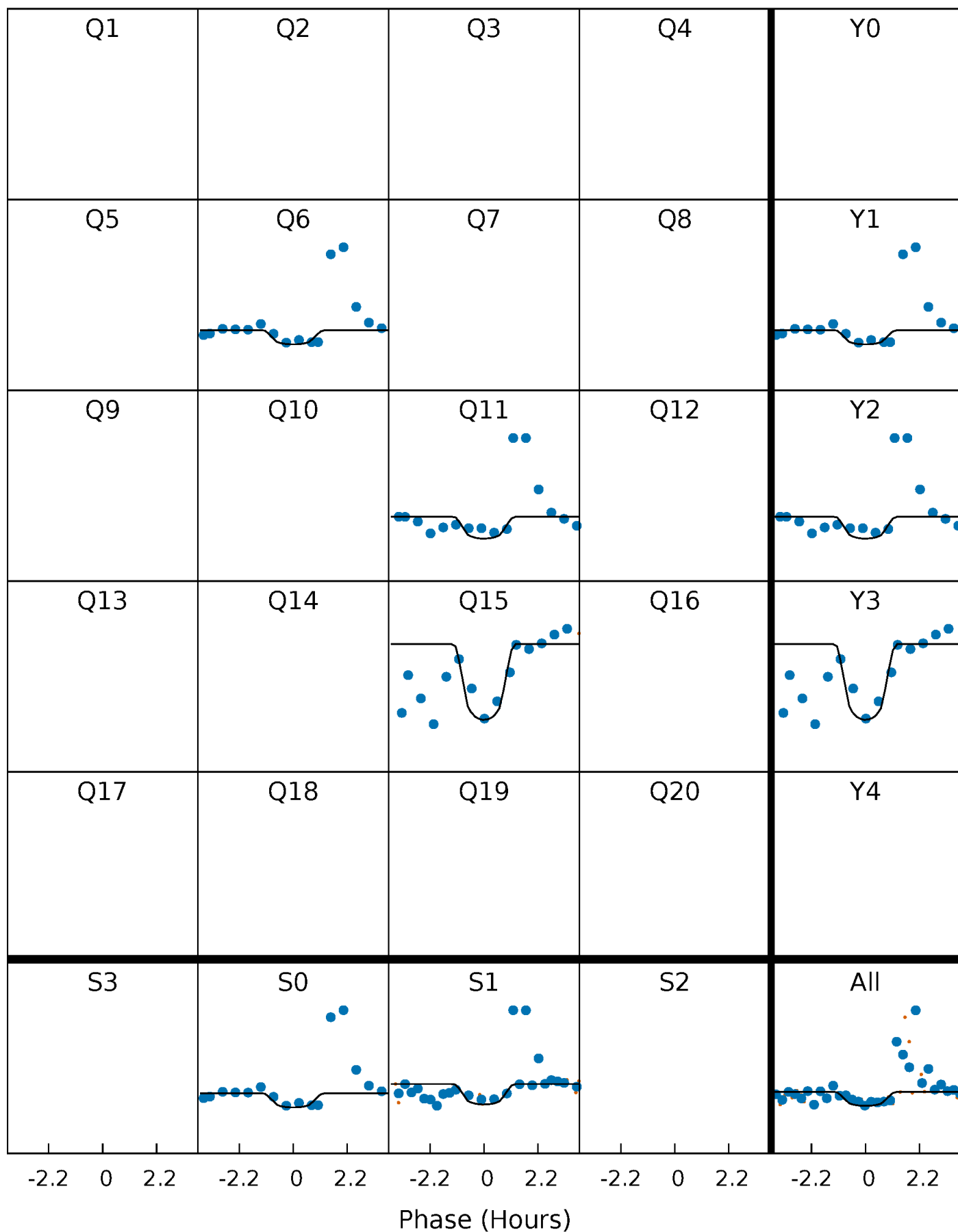
PDC Quarter-Phased Transit Curves

TCE 012121936-04 P=444.014475 Days $T_0=573.159725$ (BKJD)



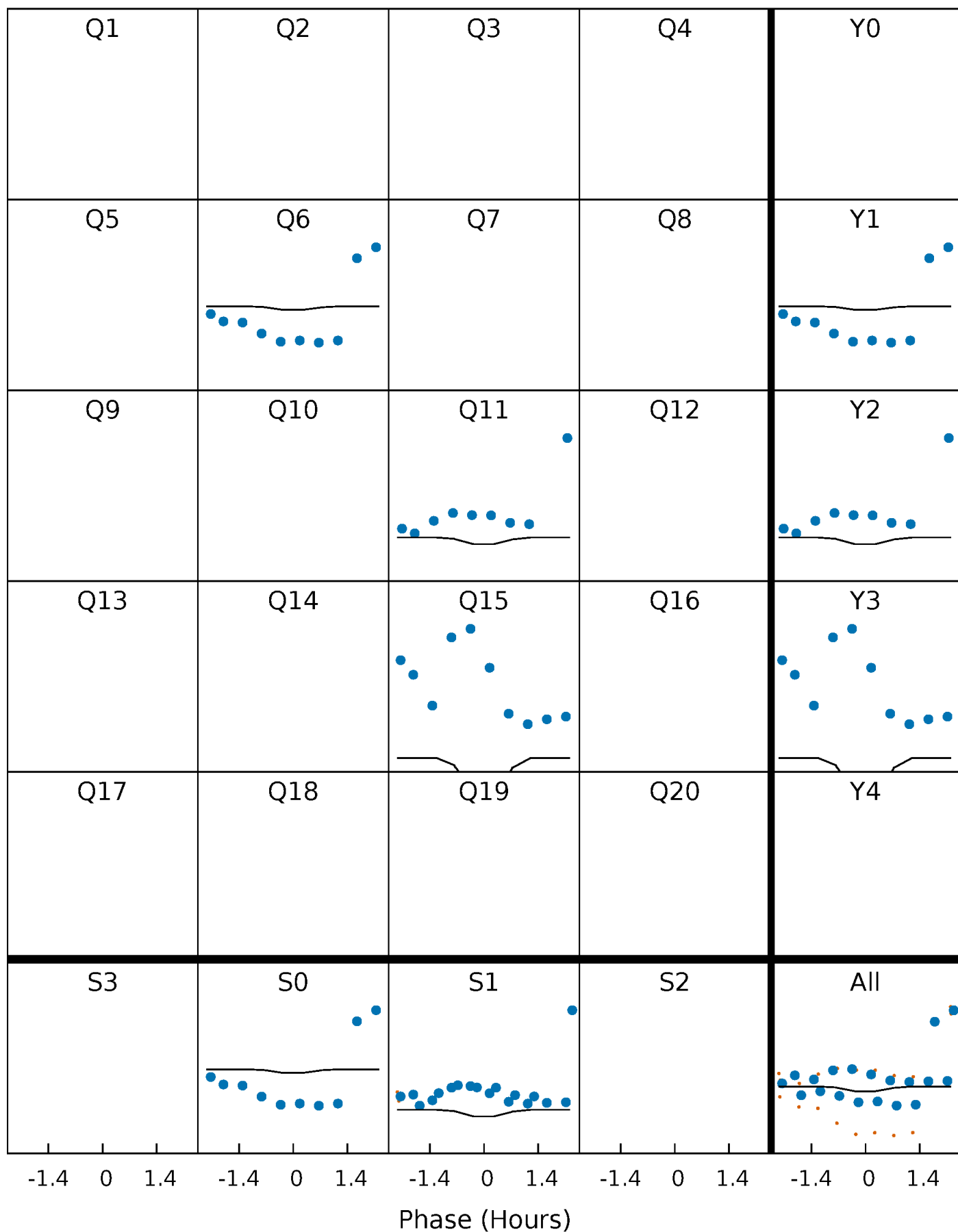
DV Quarter-Phased Transit Curves

TCE 012121936-04 P=444.014475 Days $T_0=573.159725$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

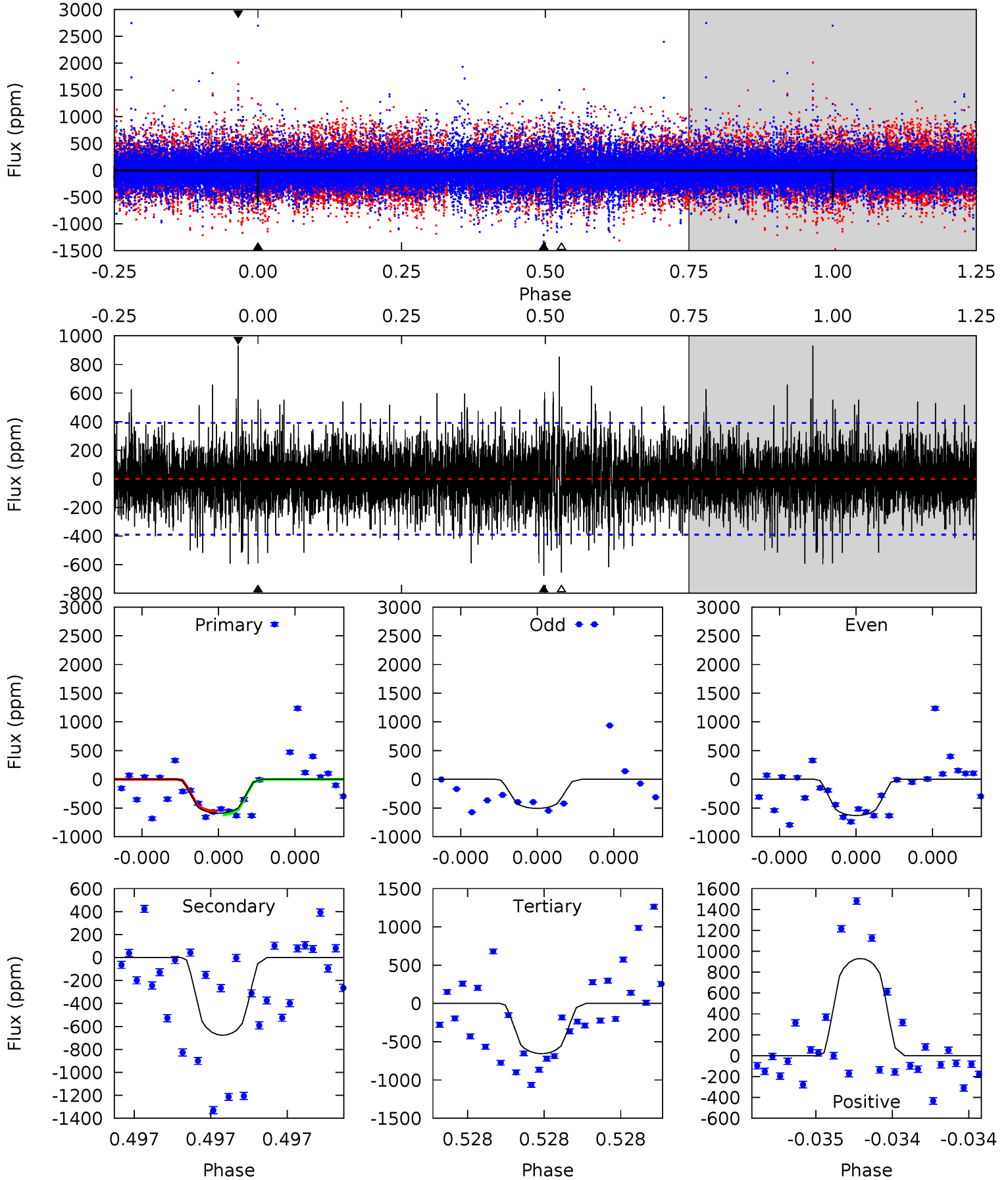
TCE 012121936-04 P=444.000825 Days $T_0=573.155458$ (BKJD)



DV Model-Shift Uniqueness Test

012121936-04, P = 444.014475 Days, E = 129.145250 Days

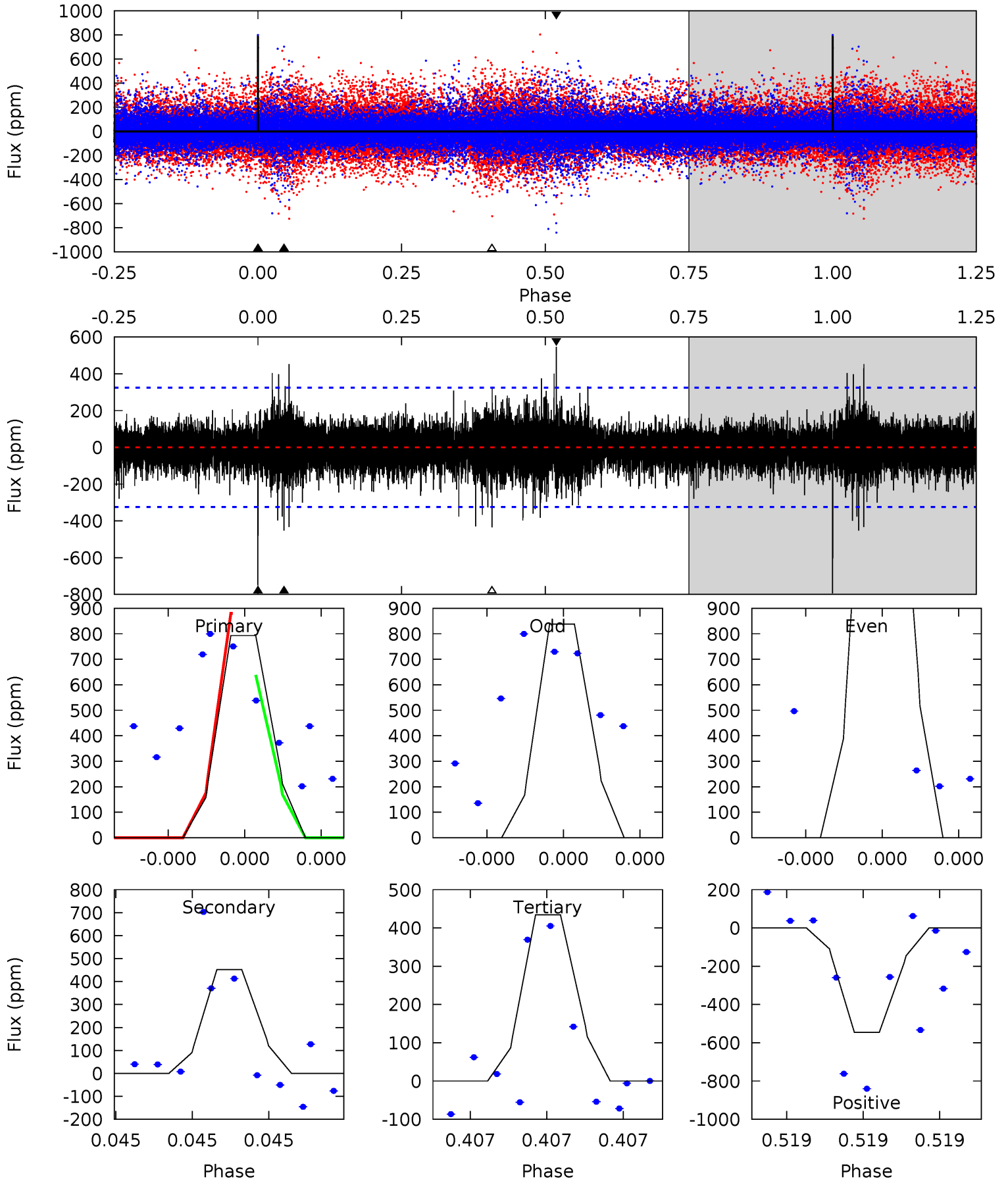
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.62	9.88	9.56	13.6	5.71	3.68	2.00	-0.94	-4.95	0.31	-3.70	0.70	0.94	0.58	0.47



Alt Model-Shift Uniqueness Test

012121936-04, P = 444.000825 Days, E = 129.154633 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.2	8.07	7.75	9.75	5.79	3.81	1.16	6.41	4.41	0.32	-1.68	10.3	-0.41	0.41	2.10



Stellar Parameters For KIC 012121936

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4732^{+139}_{-139}	$4.707^{+0.048}_{-0.028}$	$-1.220^{+0.300}_{-0.300}$	$0.542^{+0.031}_{-0.034}$	$0.546^{+0.040}_{-0.020}$	$4.824^{+0.873}_{-0.566}$
	+3%/-3%	+1%/-1%	+25%/-25%	+6%/-6%	+7%/-4%	+18%/-12%
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 012121936-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-677 ± 69	$10.75^{+10.66}_{-7.59}$	221^{+8}_{-7}	2579^{+1078}_{-403}	2889^{+29600}_{-2181}
Alt.	-452 ± 56	$10.64^{+10.30}_{-7.46}$	222^{+7}_{-7}	2467^{+907}_{-375}	1928^{+18750}_{-1447}

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 $A_{obs} \gg 1.0$

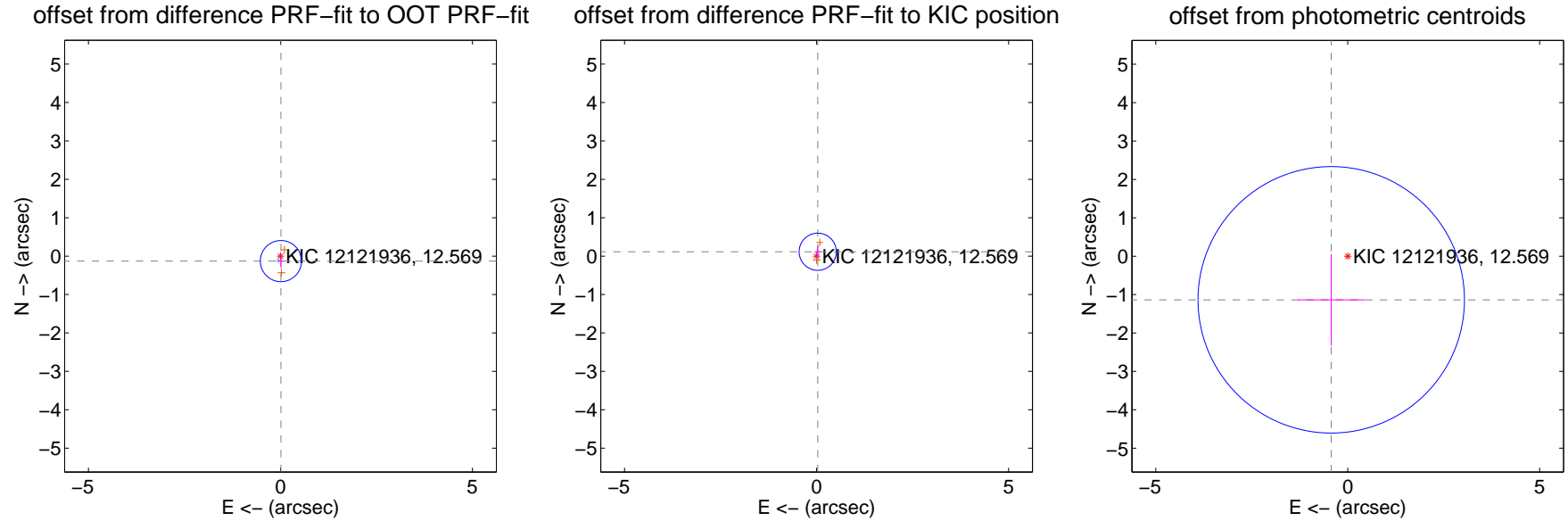
DV Centroid Data

Supplemental centroid analysis for 012121936-04. Kepler magnitude: 12.57. Transit SNR 5.83

There are 1 quarters with good PRF difference image offsets

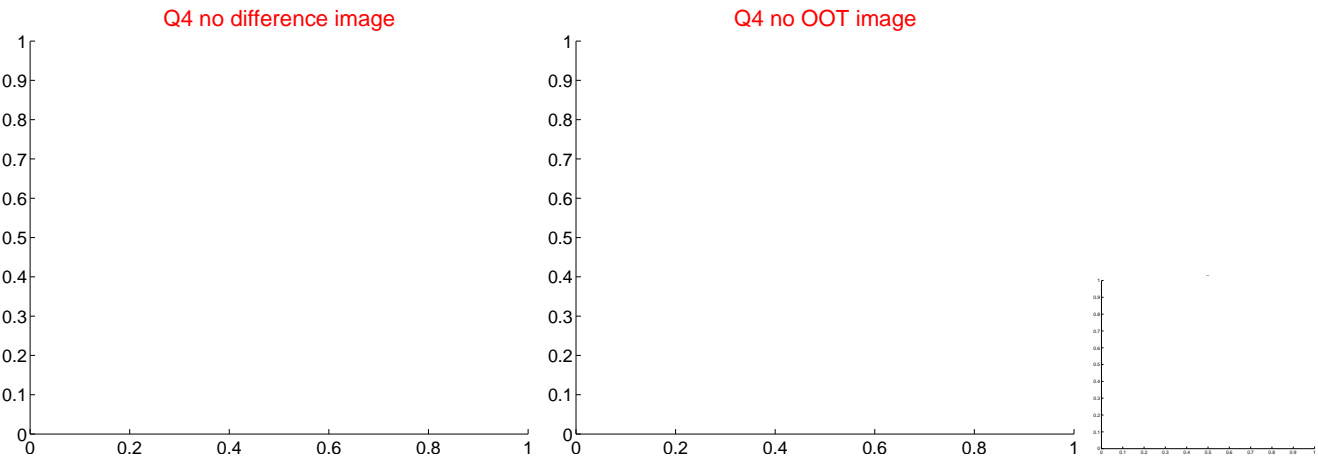
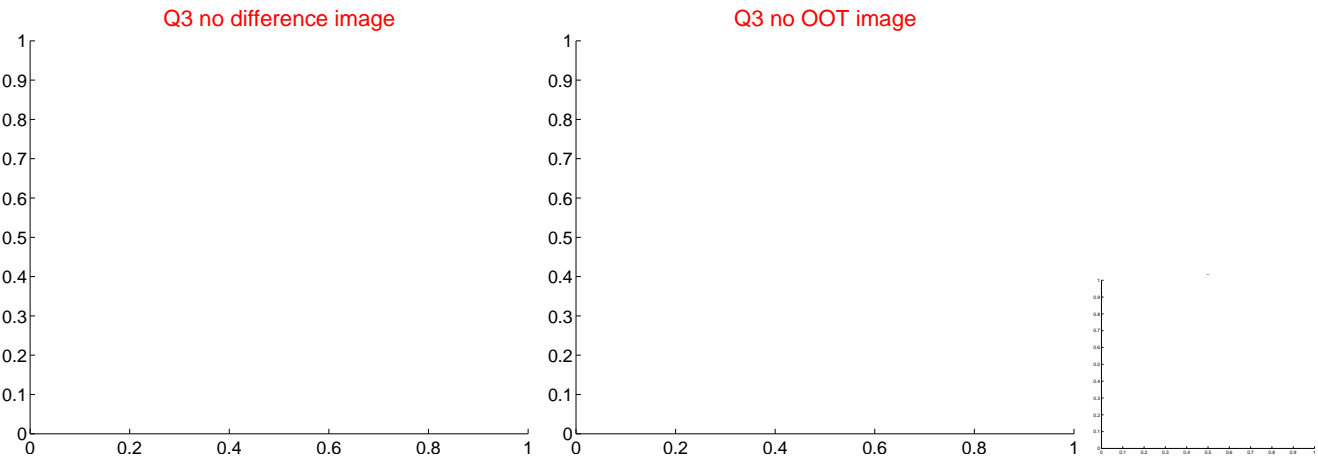
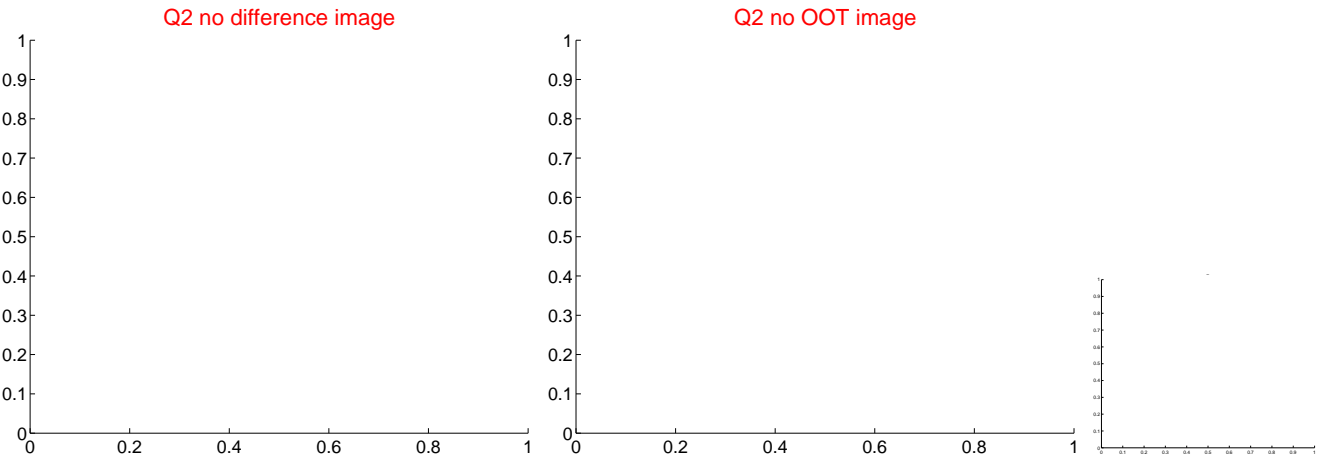
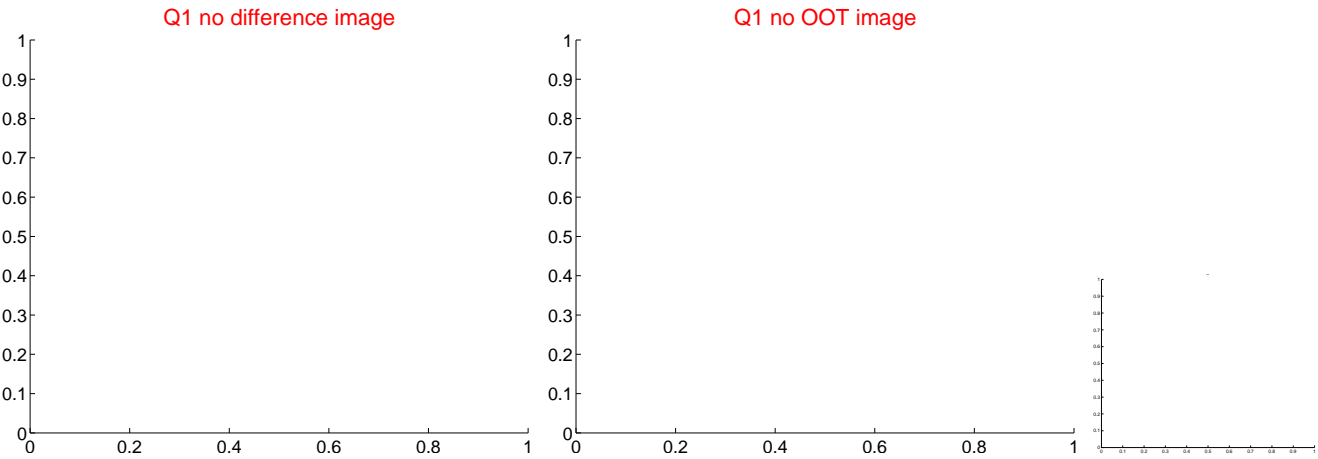
The direct PRF centroid is offset from the target star catalog position by about 0.33 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.130 ± 0.179	0.73	-0.012 ± 0.084	-0.129 ± 0.179
PRF-fit source offset from KIC position	0.118 ± 0.161	0.73	-0.030 ± 0.070	0.114 ± 0.161
photometric centroid source offset	1.21 ± 1.16	1.05	0.43 ± 0.87	-1.14 ± 1.19

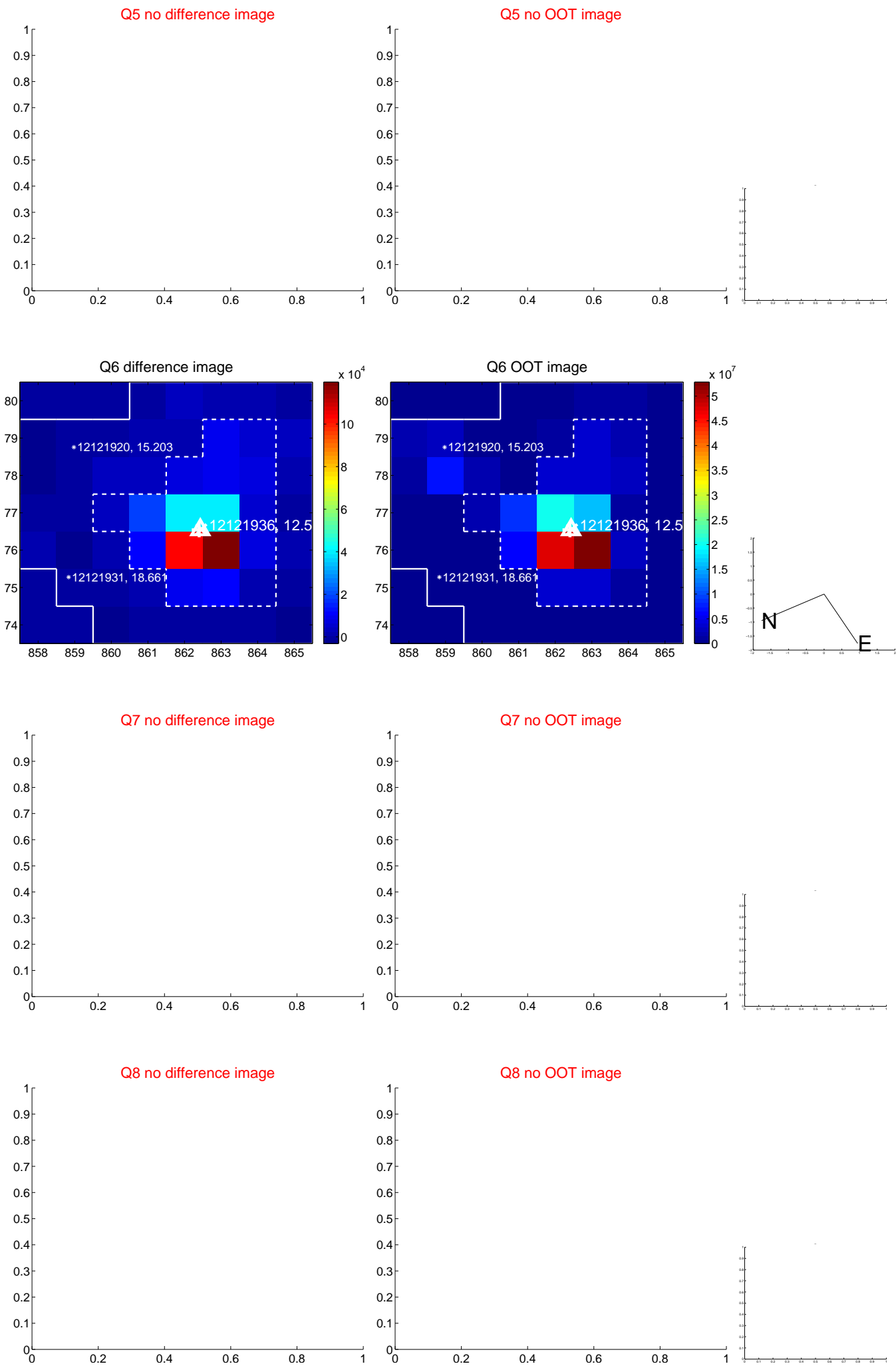


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

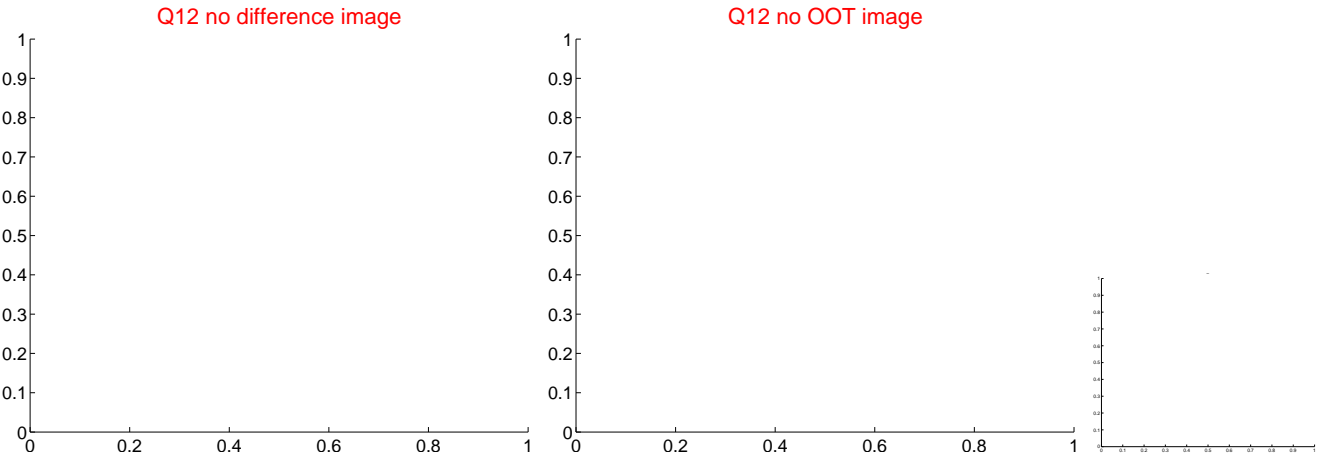
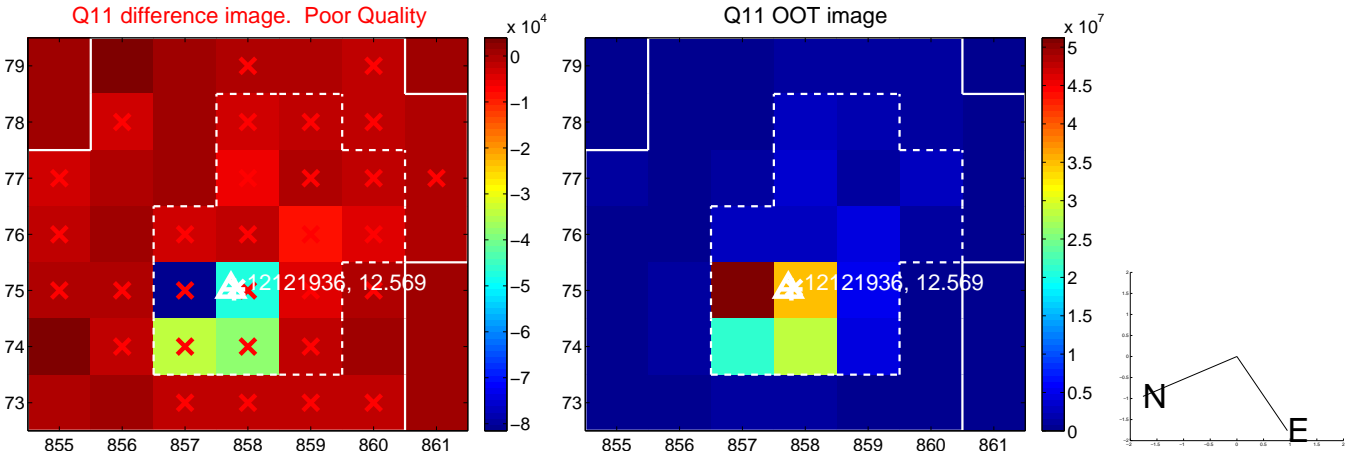
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



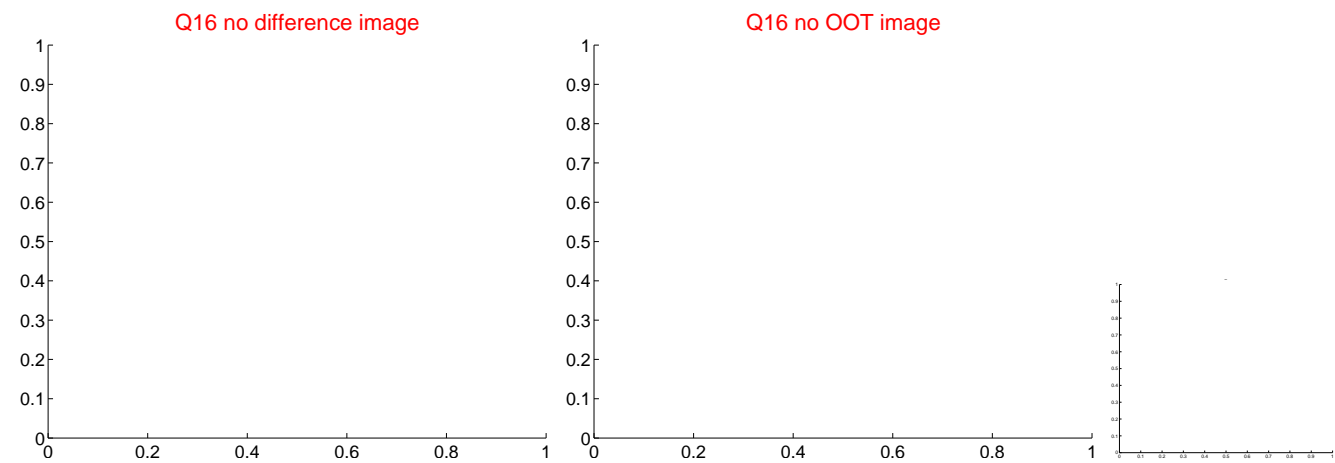
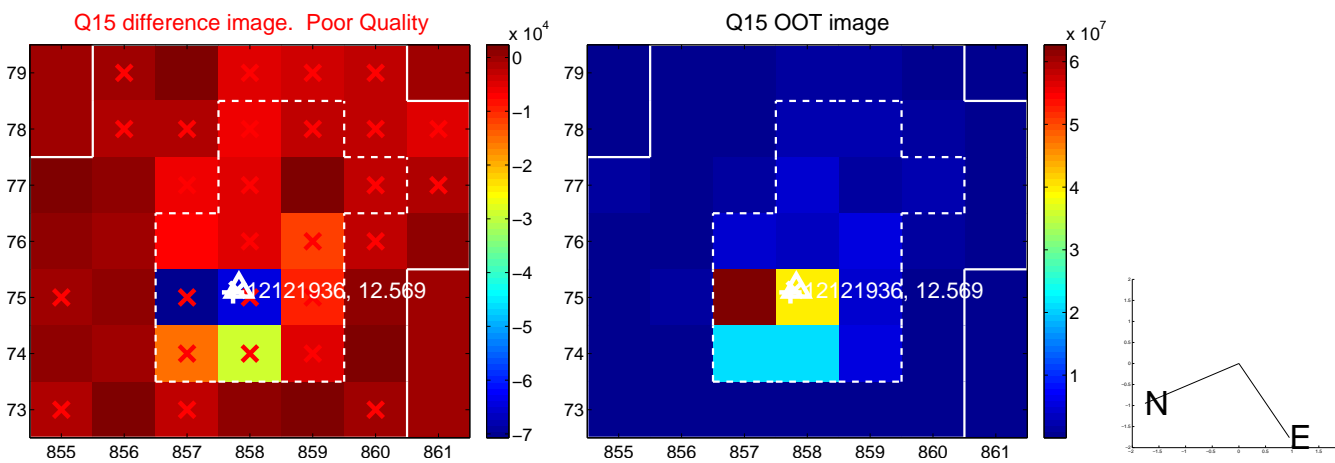
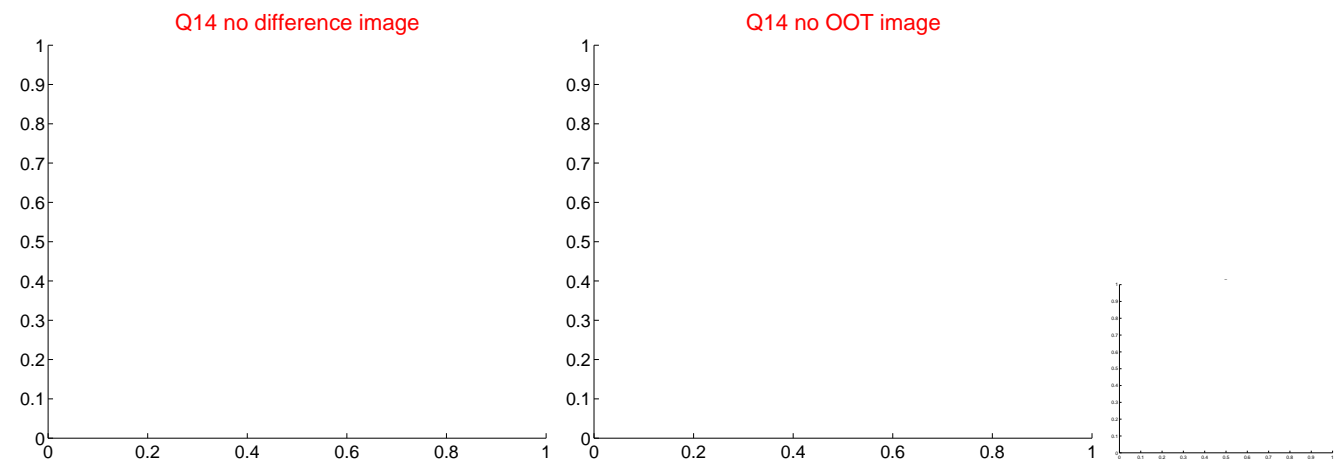
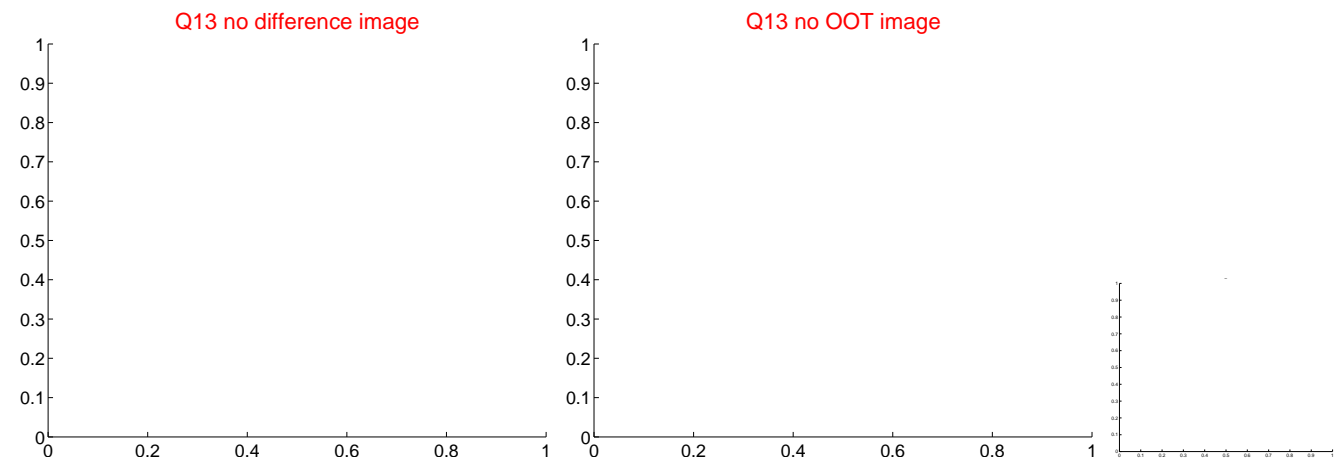
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



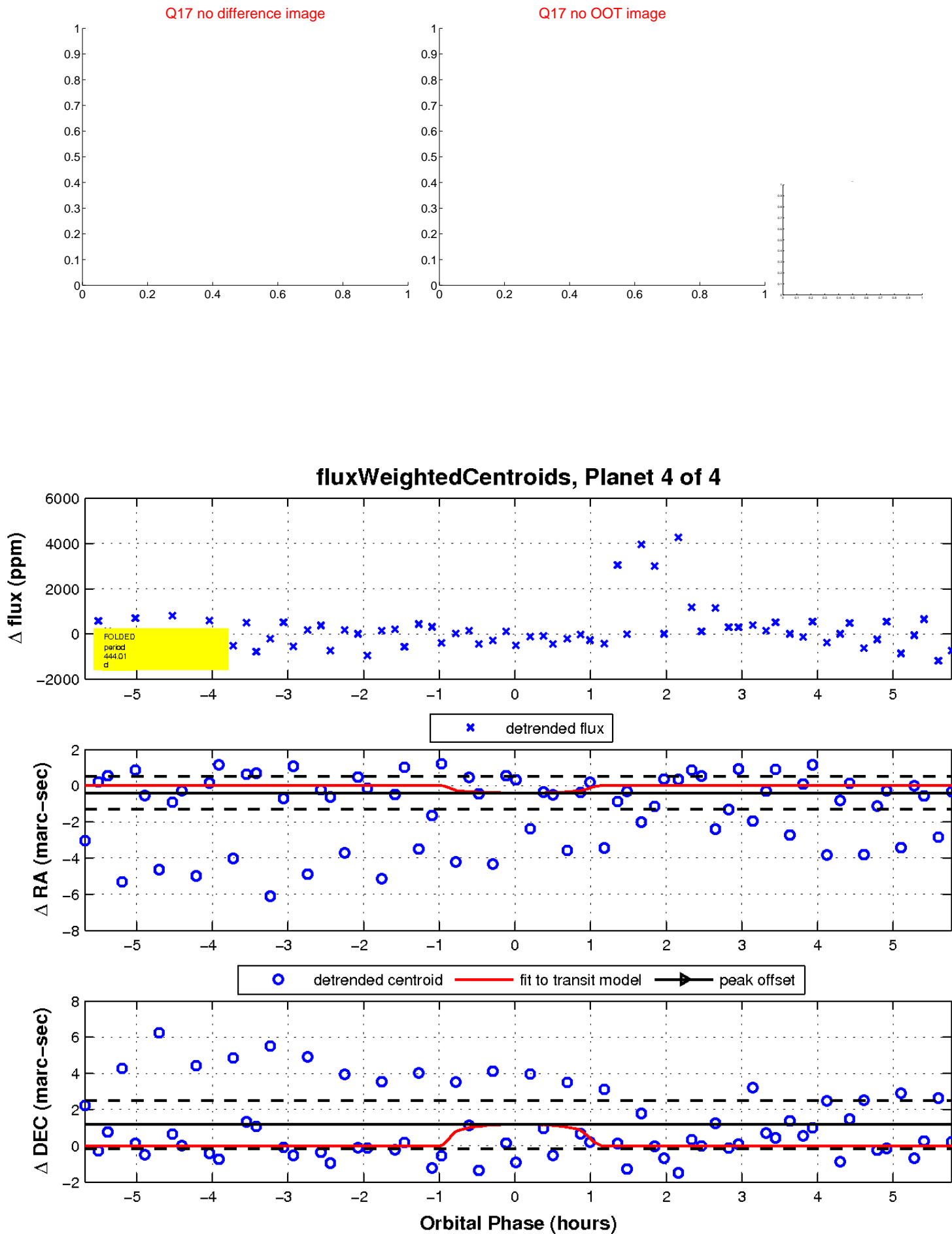
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

