

KIC 010420301

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})
010420301-01	OBS	No	318.030709	250.743131	1103.3	12.393	19.8	13.4	0.56	4371	1.84	0.17
010420301-02	OBS	3257.01	45.433250	172.941835	786.6	6.071	12.1	15.1	0.56	4371	2.10	2.35
010420301-03	OBS	No	363.482932	250.714038	1103.3	12.814	9.8	10.5	0.56	4371	3.28	0.15
010420301-04	OBS	No	181.725309	296.196534	783.5	6.850	8.8	8.0	0.56	4371	1.65	0.37

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010420301-01	OBS	FP	0.00	1	0	0	1	INCONSISTENT_TRANS—CENT_FEW_DIFFS—EPHEM_MATCH
010420301-02	OBS	FP	0.00	1	0	1	1	SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET—EPHEM_MATCH
010420301-03	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_MARSHALL_SKYE—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET—EPHEM_MATCH
010420301-04	OBS	FP	0.00	1	0	1	1	SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET—EPHEM_MATCH

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 010420301-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
010420301-01	10420301	010420279-01	10420279	7:1	13.1	2	2	14.77	15.77	391.02	Direct-PRF	0	3.96	0.23

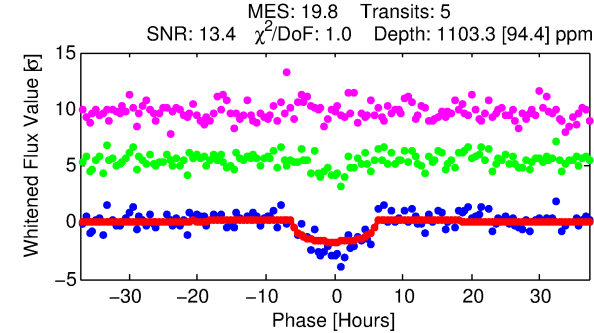
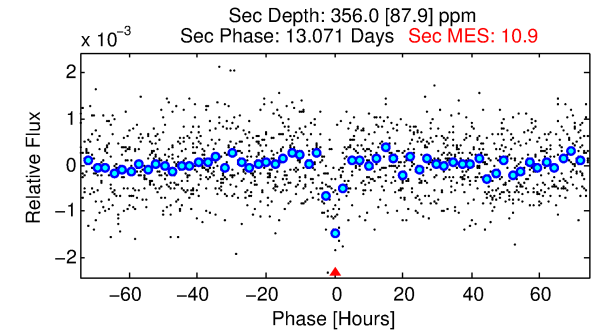
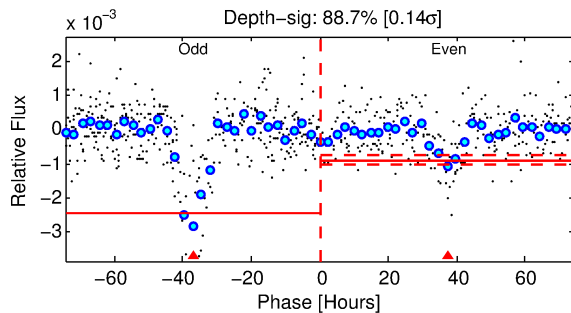
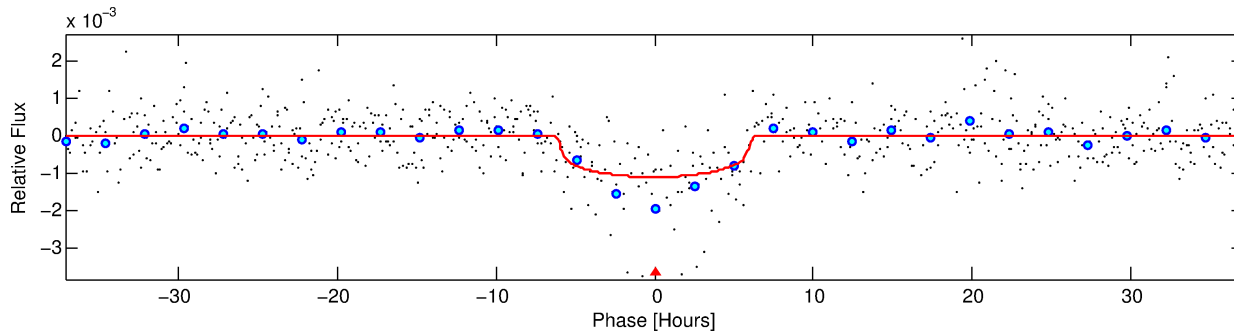
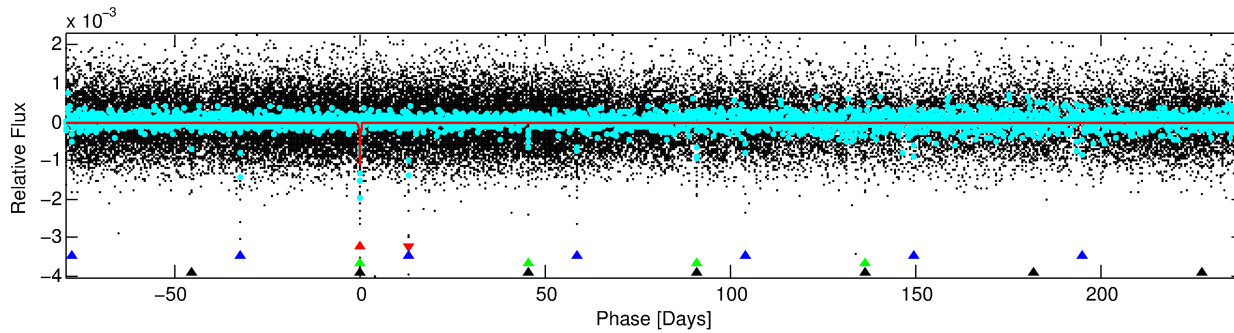
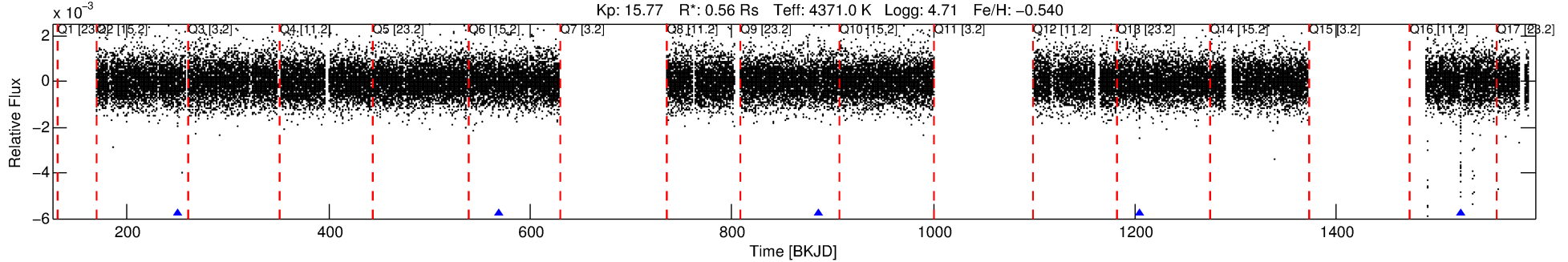
Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 10420301 Candidate: 1 of 4 Period: 318.031 d

KOI: K03257 Corr: No Ephemeris Match

Kp: 15.77 R*: 0.56 Rs Teff: 4371.0 K Logg: 4.71 Fe/H: -0.540



DV Fit Results:

Period = 318.03071 [0.00538] d
Epoch = 250.7431 [0.0124] BKJD
Rp/R* = 0.0302 [0.0189]
a/R* = 185.65 [390.73]
b = 0.41 [4.40]
Seff = 0.18 [0.03]
Teq = 165 [7] K
Rp = 1.84 [1.17] Re
a = 0.7637 [0.0585] AU
Ag = 33593.82 [42903.18] [0.78σ]
Teffp = 3453 [1105] K [2.98σ]

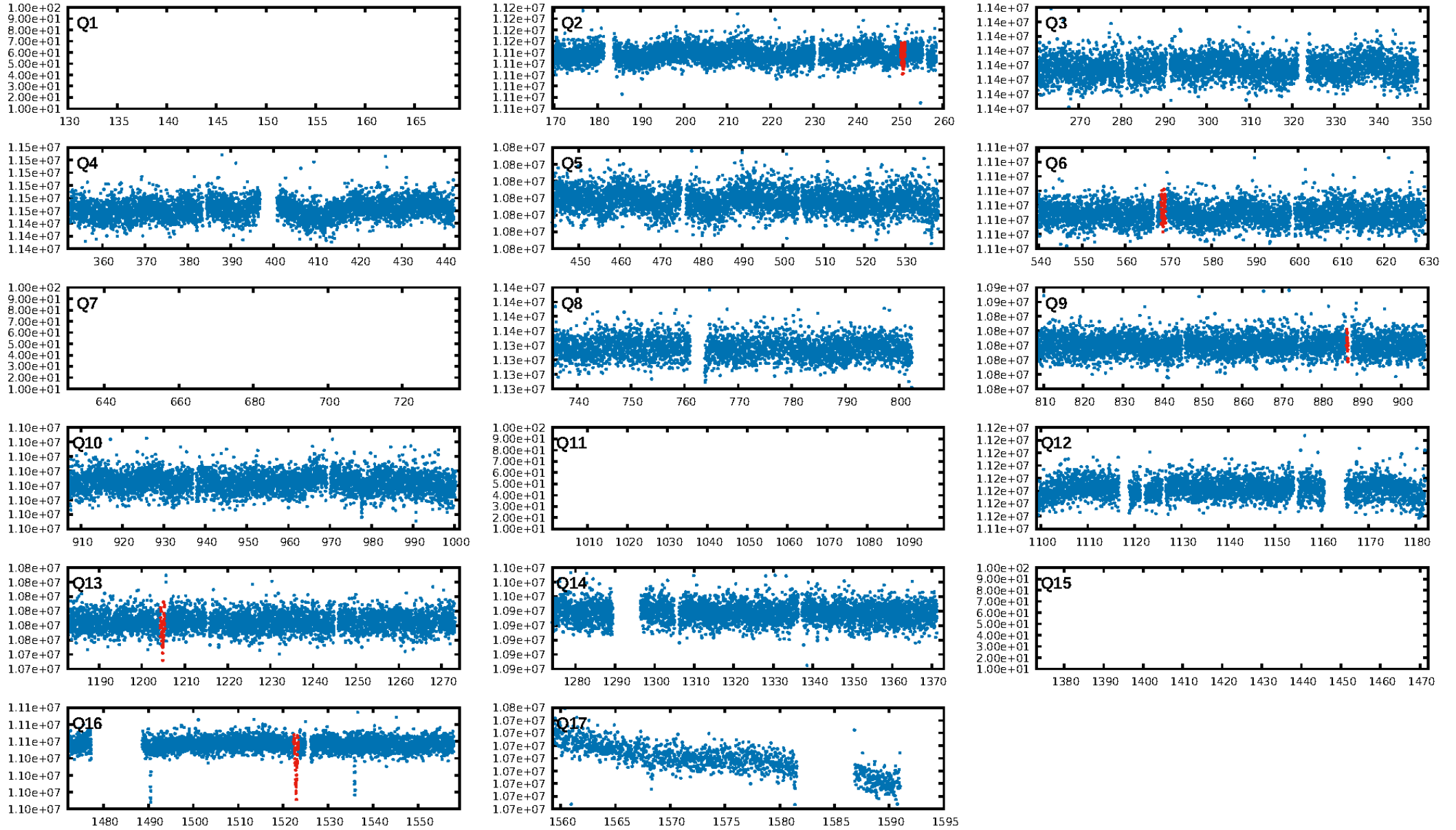
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [231.03σ]
LongPeriod-sig: 100.0% [61.19σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 7.93e-71
RollingBand-fgt: 1.00 [5/5]
GhostDiagnostic-chr: -0.6224
Centroid-sig: N/A
Centroid-so: 129.755 arcsec [129.47σ]
OotOffset-rm: N/A
KicOffset-rm: N/A
OotOffset-st: 0/0/0/0 [0]
KicOffset-st: 0/0/0/0 [0]
DiffImageQuality-fgm: N/A
DiffImageOverlap-fno: 0.33 [1/3]

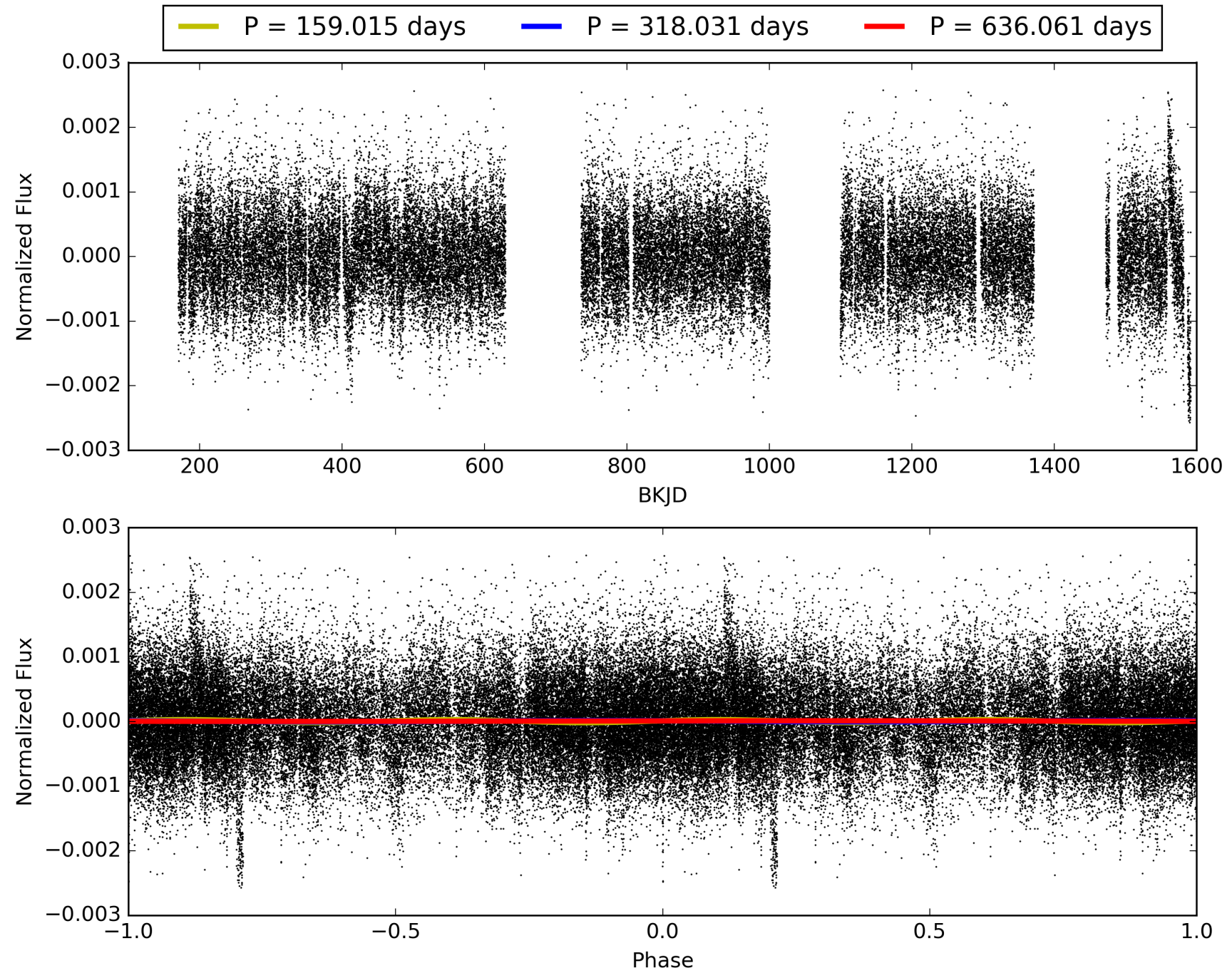
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 010420301-01, PDC Light Curves

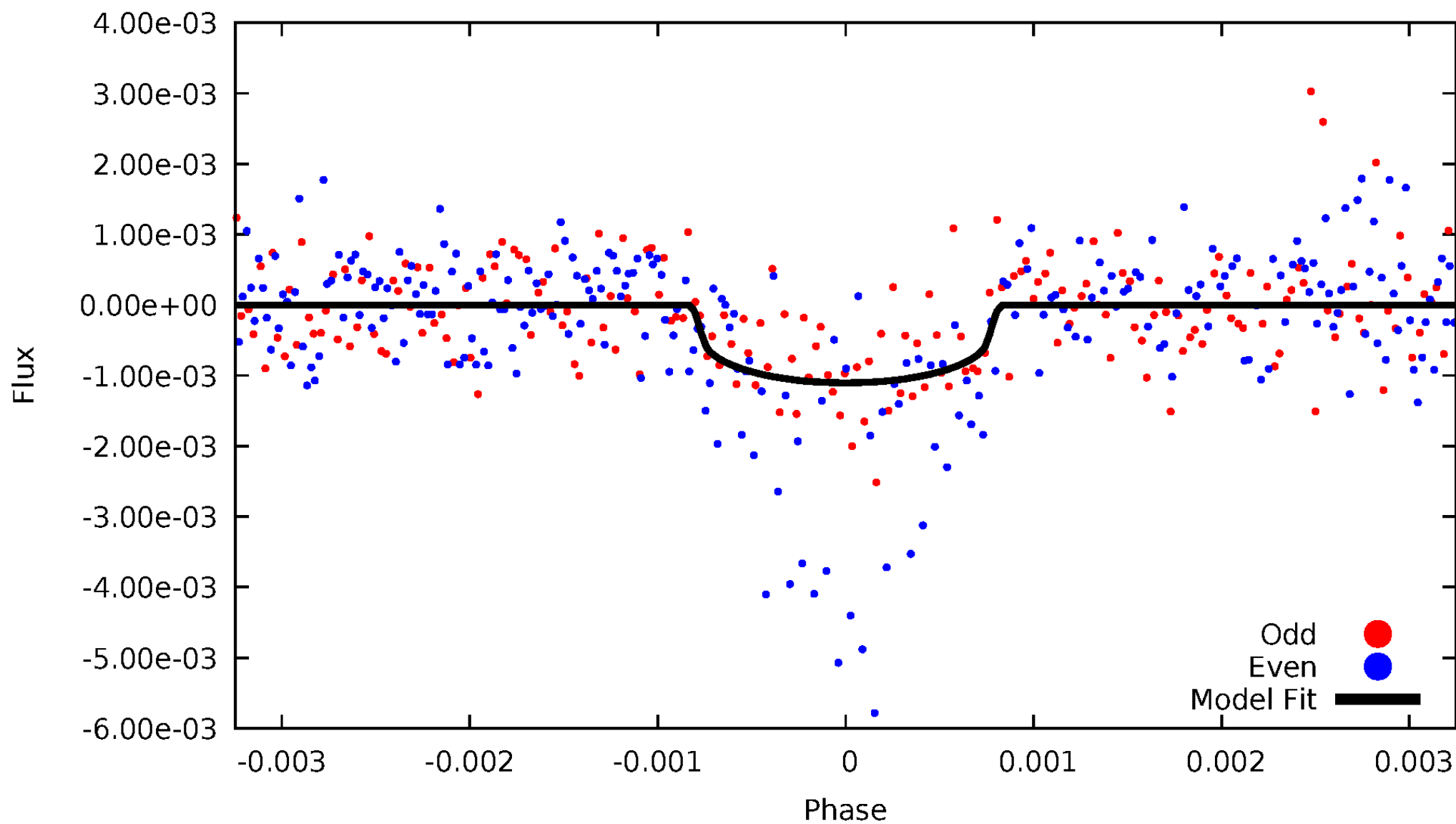


TCE 010420301-01



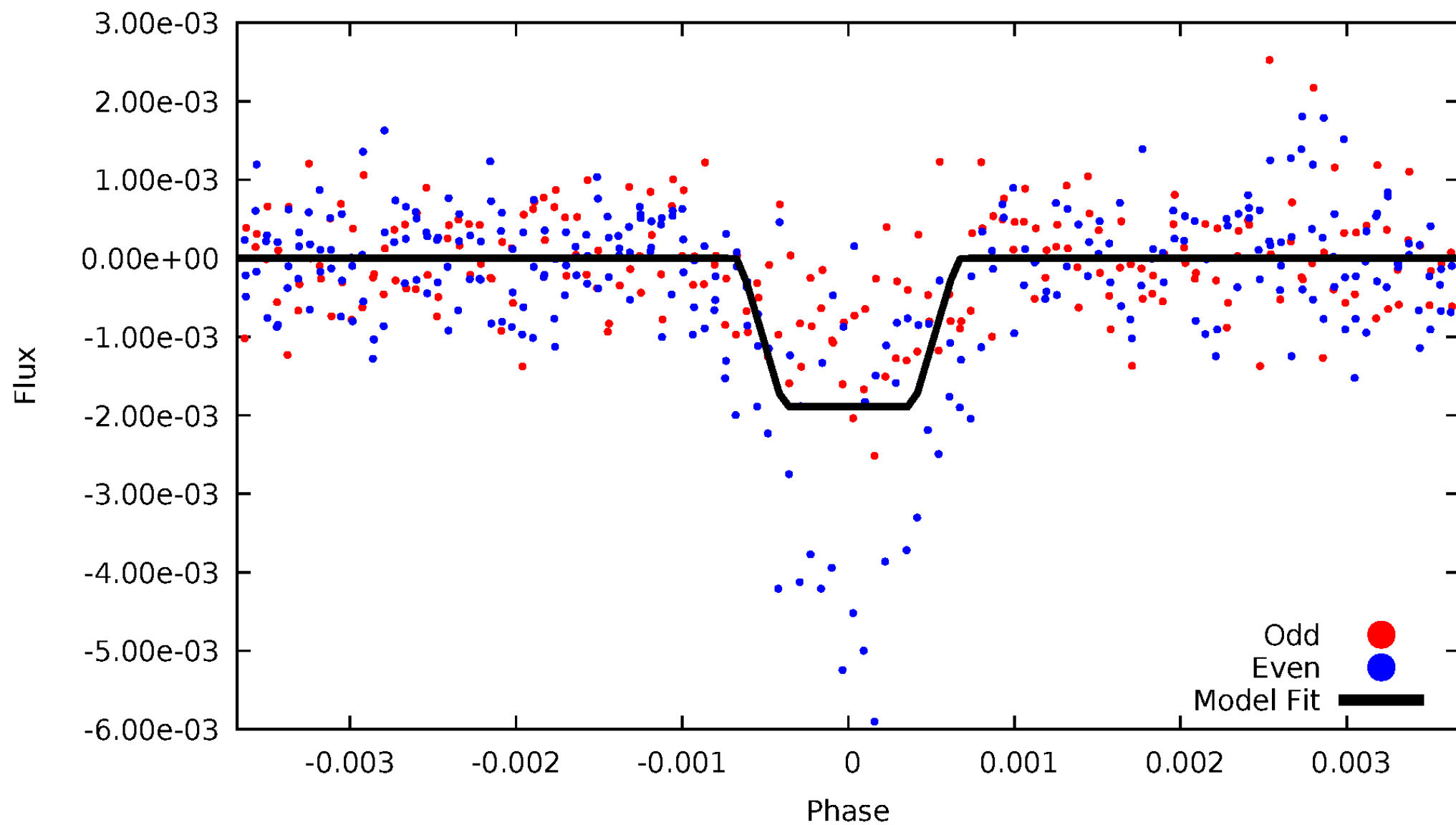
DV Odd/Even

TCE 010420301-01



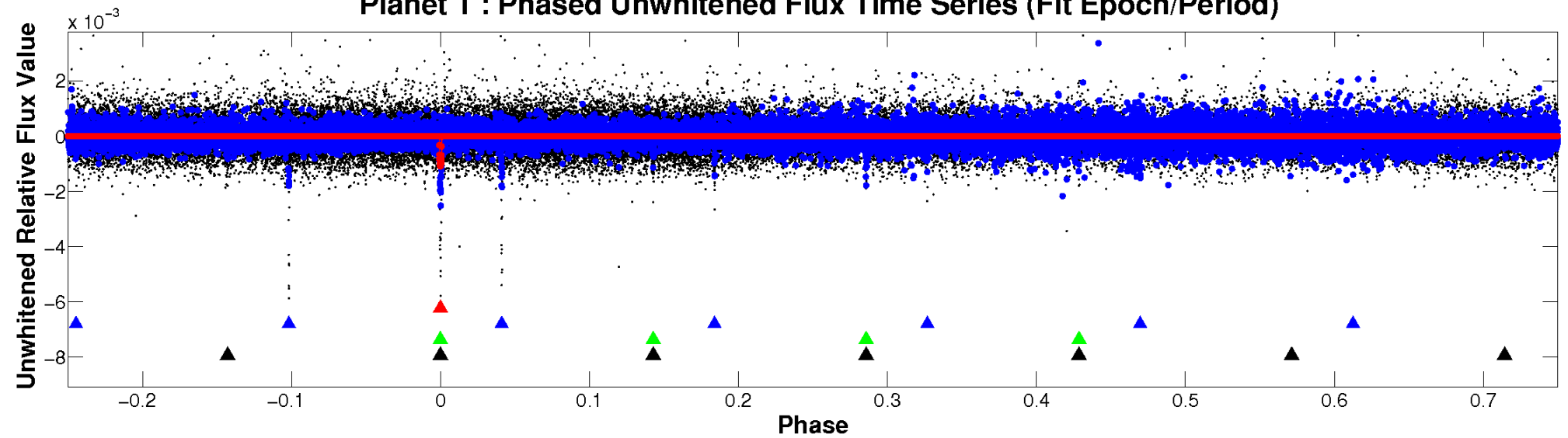
ALT Odd/Even

TCE 010420301-01

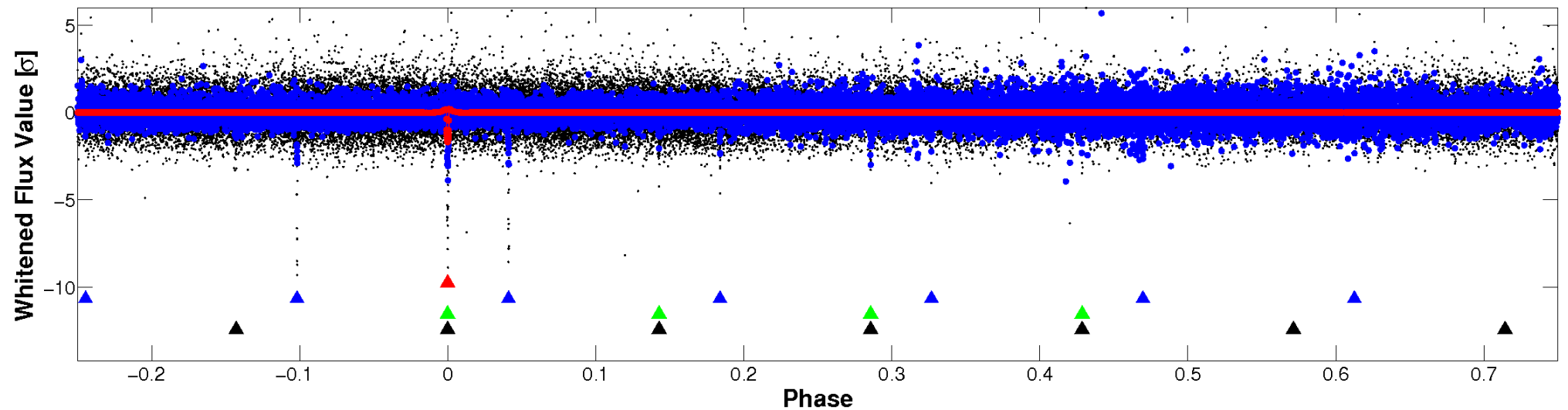


Non-Whitened Vs. Whitened Light Curve

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

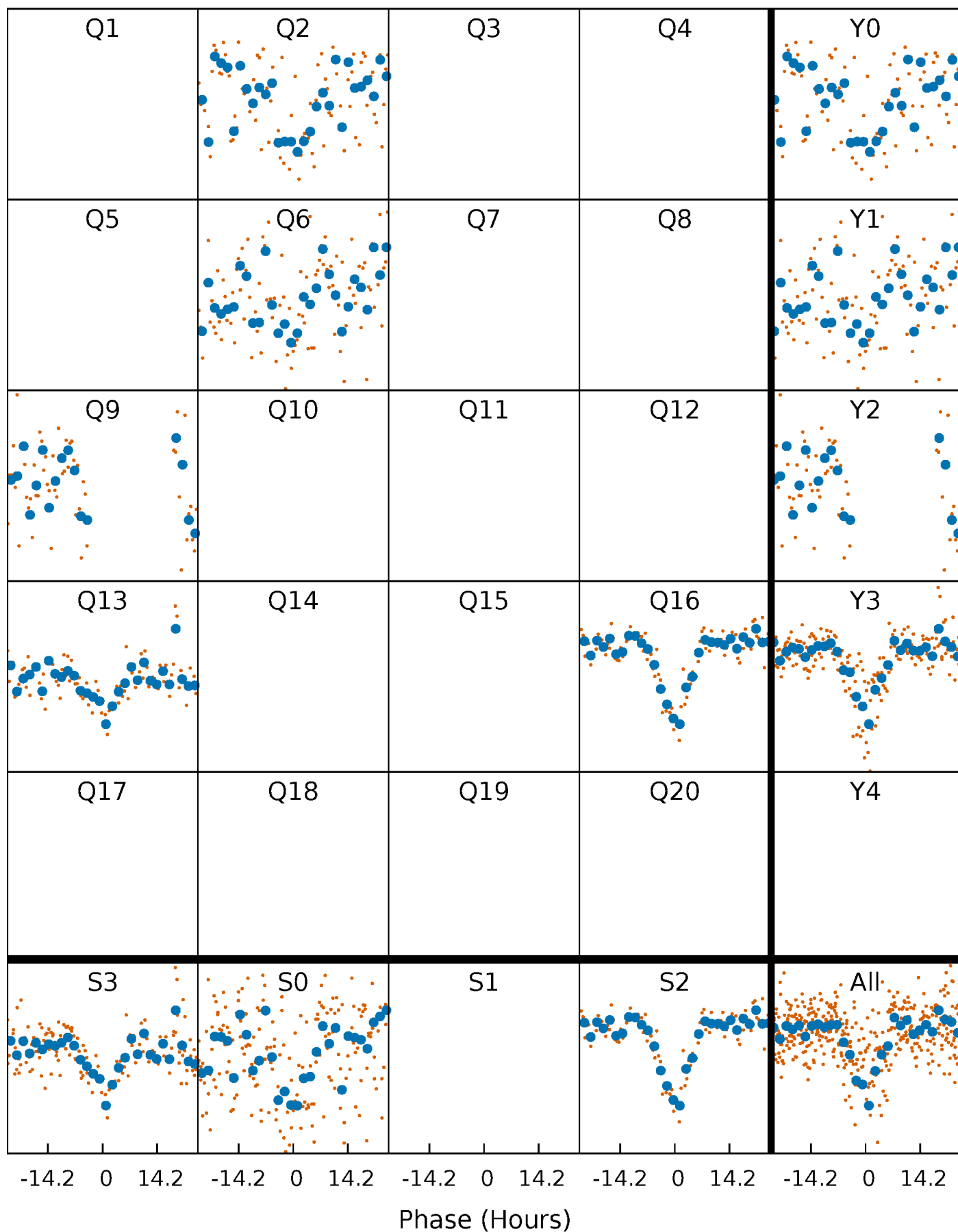


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



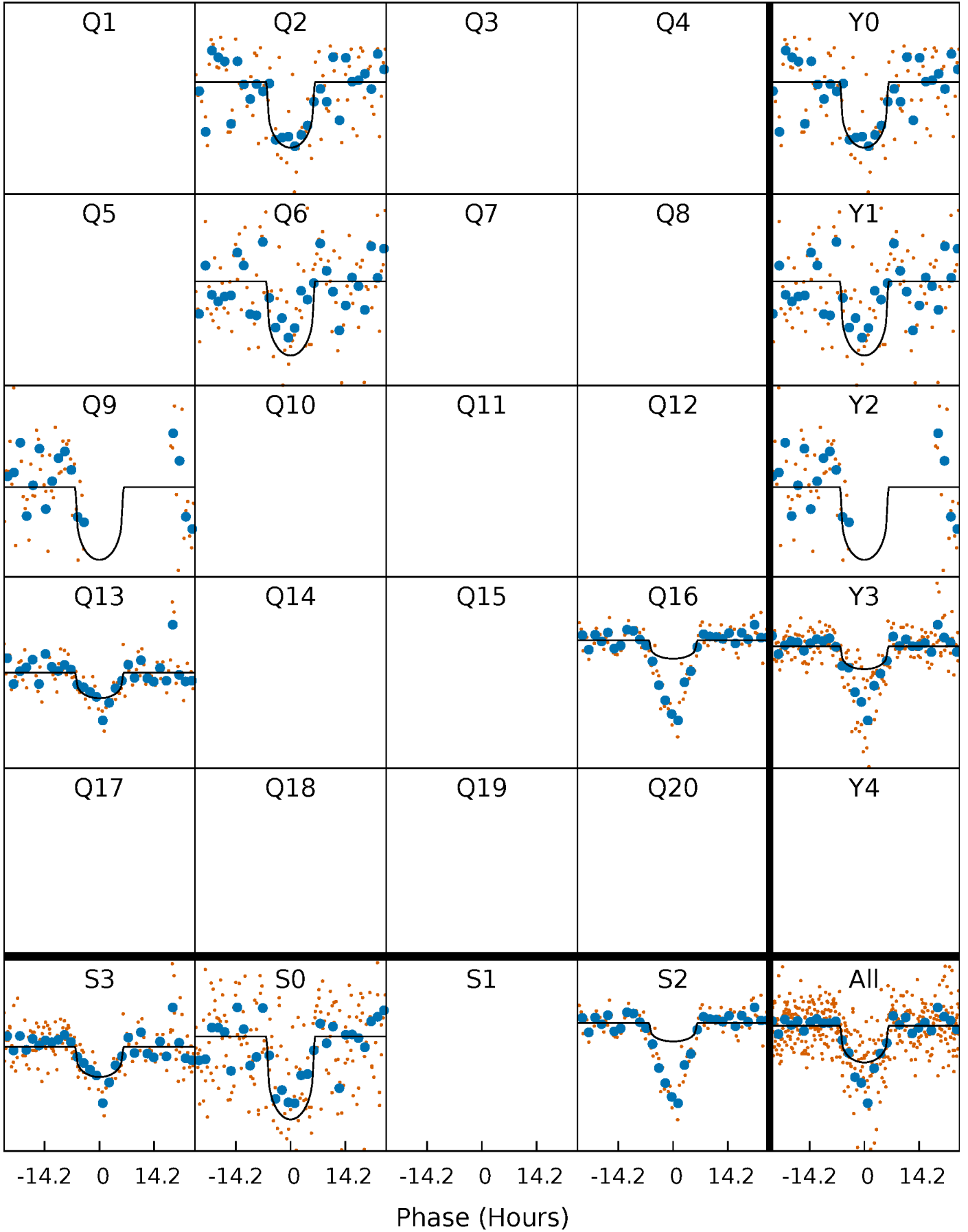
PDC Quarter-Phased Transit Curves

TCE 010420301-01 P=318.030709 Days $T_0=250.743131$ (BKJD)



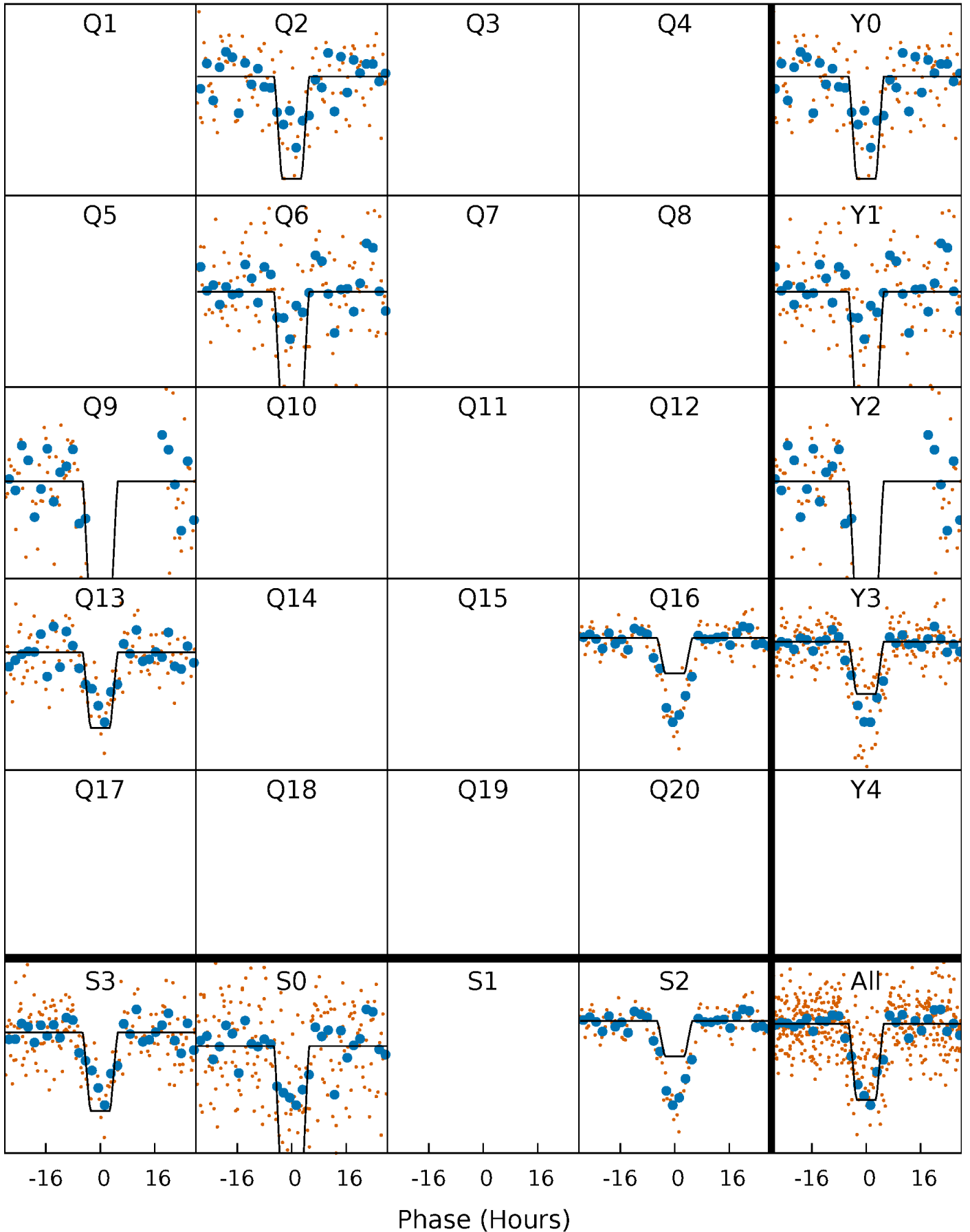
DV Quarter-Phased Transit Curves

TCE 010420301-01 P=318.030709 Days $T_0=250.743131$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

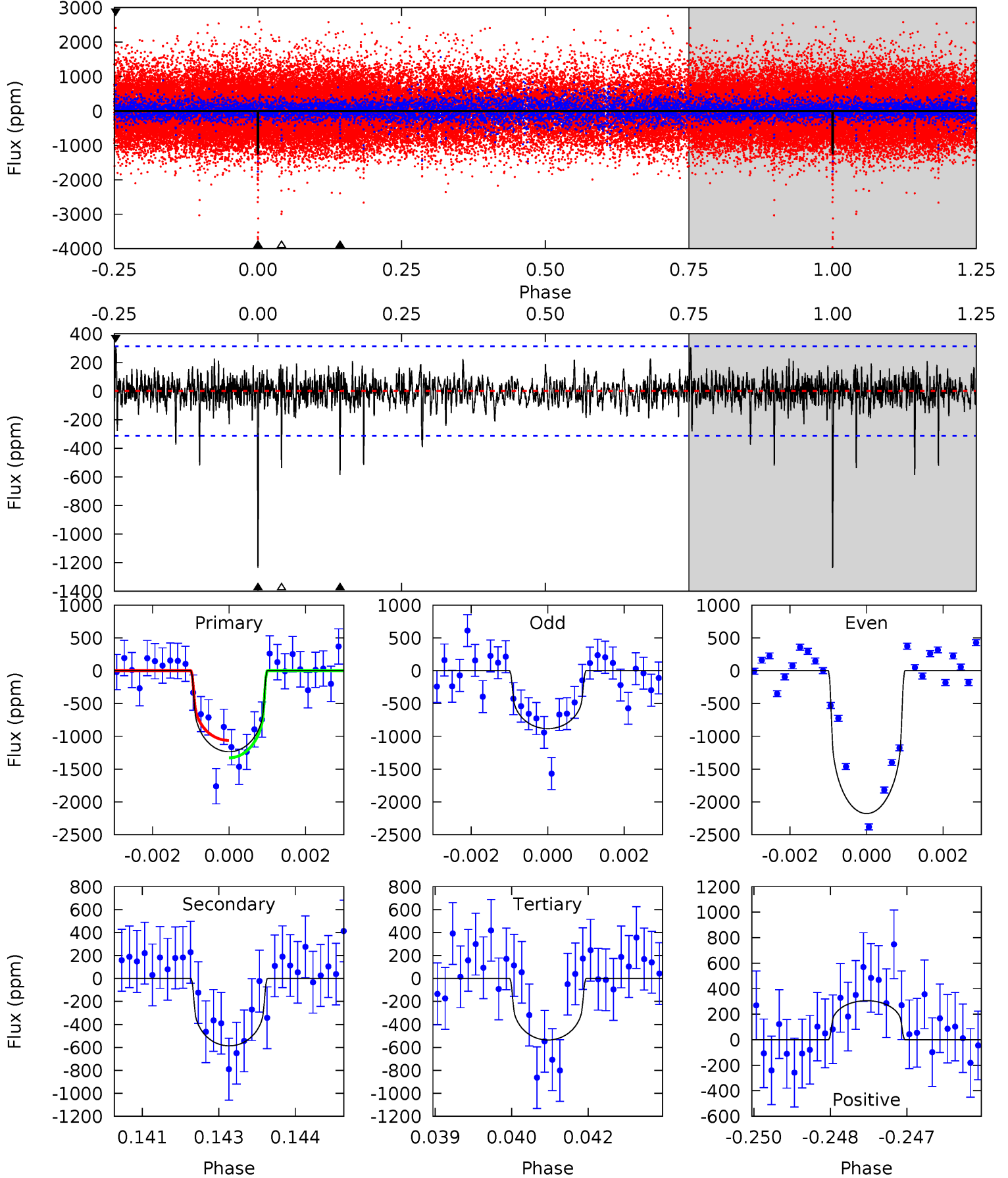
TCE 010420301-01 P=318.027928 Days $T_0=250.753136$ (BKJD)



DV Model-Shift Uniqueness Test

010420301-01, P = 318.030709 Days, E = 250.743131 Days

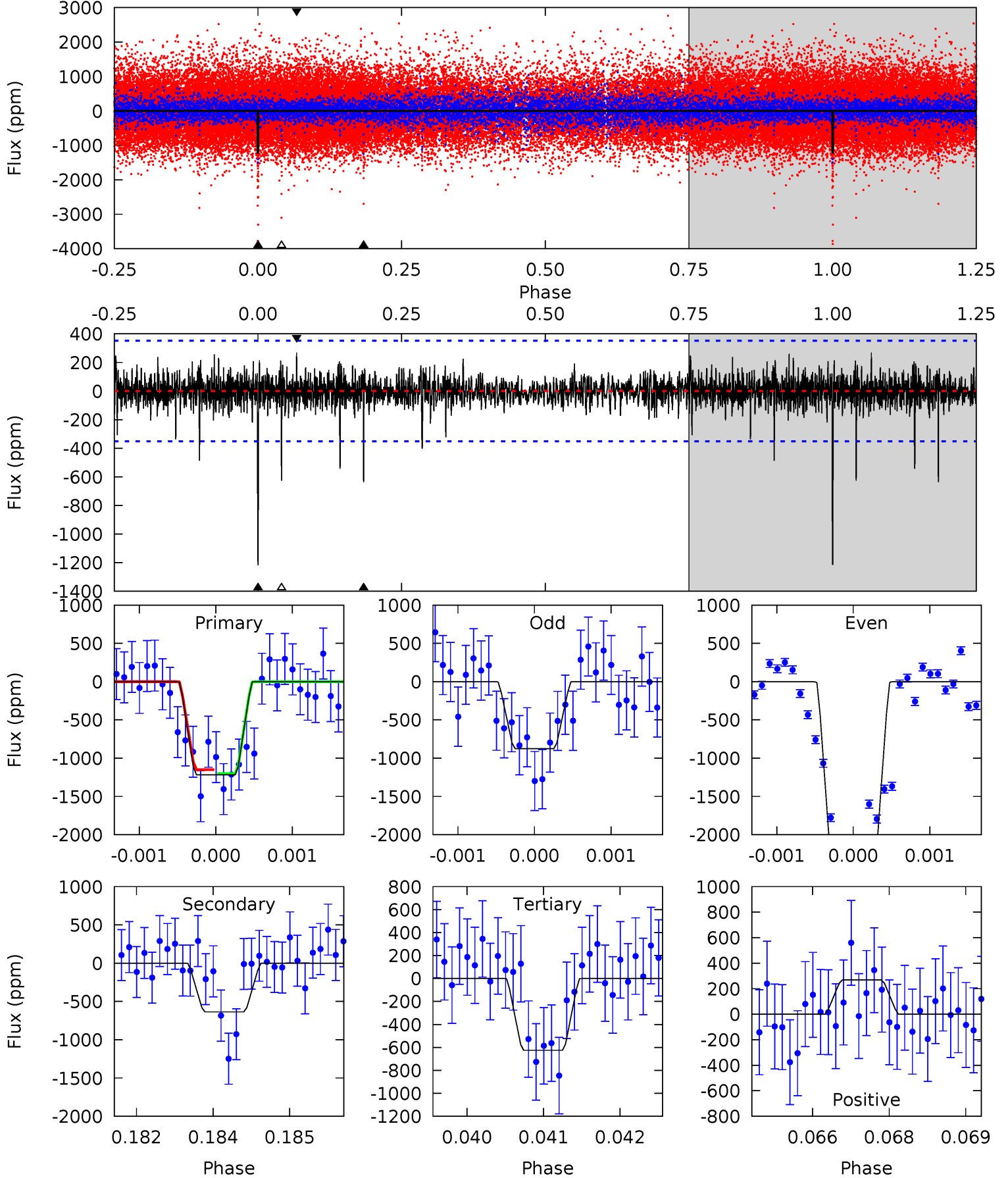
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.1	10.0	9.16	5.23	5.36	3.14	1.33	12.0	15.9	0.87	4.80	11.5	1.44	0.20	2.26



Alt Model-Shift Uniqueness Test

010420301-01, P = 318.027928 Days, E = 250.753136 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.6	9.74	9.57	4.11	5.39	3.19	1.17	9.04	14.5	0.17	5.63	13.9	1.38	0.18	0.38



Stellar Parameters For KIC 010420301

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4371^{+118}_{-144}	$4.712^{+0.036}_{-0.049}$	$-0.540^{+0.300}_{-0.300}$	$0.559^{+0.056}_{-0.045}$	$0.587^{+0.053}_{-0.053}$	$4.728^{+0.849}_{-0.864}$
	+3%/-3%	+1%/-1%	+56%/-56%	+10%/-8%	+9%/-9%	+18%/-18%
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 010420301-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-587 ± 58	$1.96^{+1.18}_{-1.03}$	231^{+8}_{-8}	3932^{+1456}_{-549}	$48092^{+173772}_{-28740}$
Alt.	-636 ± 65	$2.57^{+1.10}_{-1.11}$	231^{+8}_{-8}	3639^{+824}_{-409}	30881^{+62607}_{-16025}

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 $A_{obs} \gg 1.0$

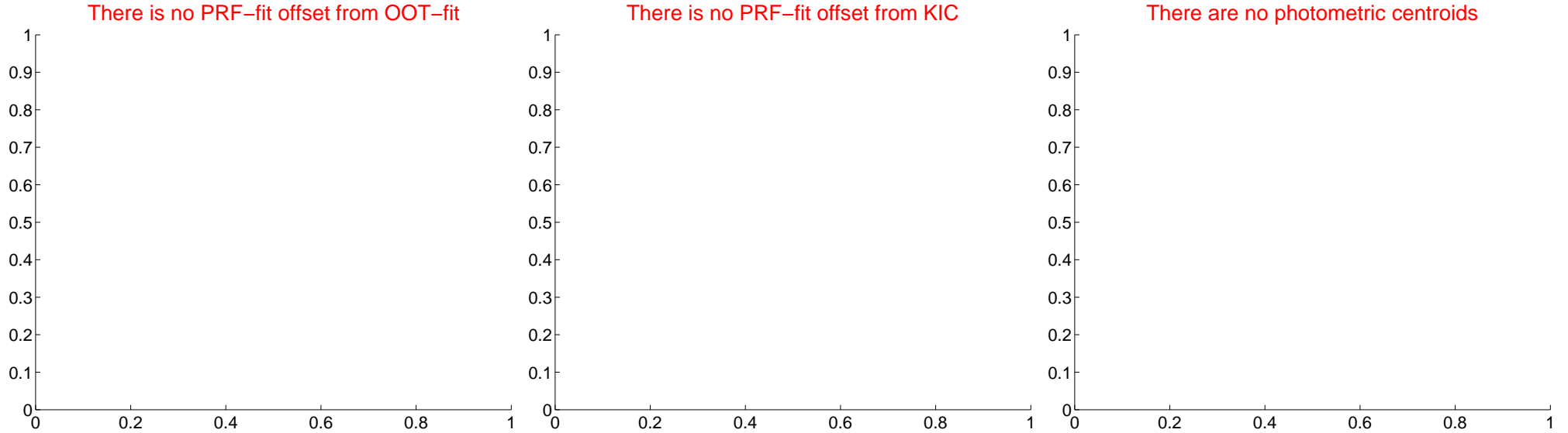
DV Centroid Data

Supplemental centroid analysis for 010420301-01. Kepler magnitude: 15.77. Transit SNR 13.41

There are 0 quarters with good PRF difference image offsets

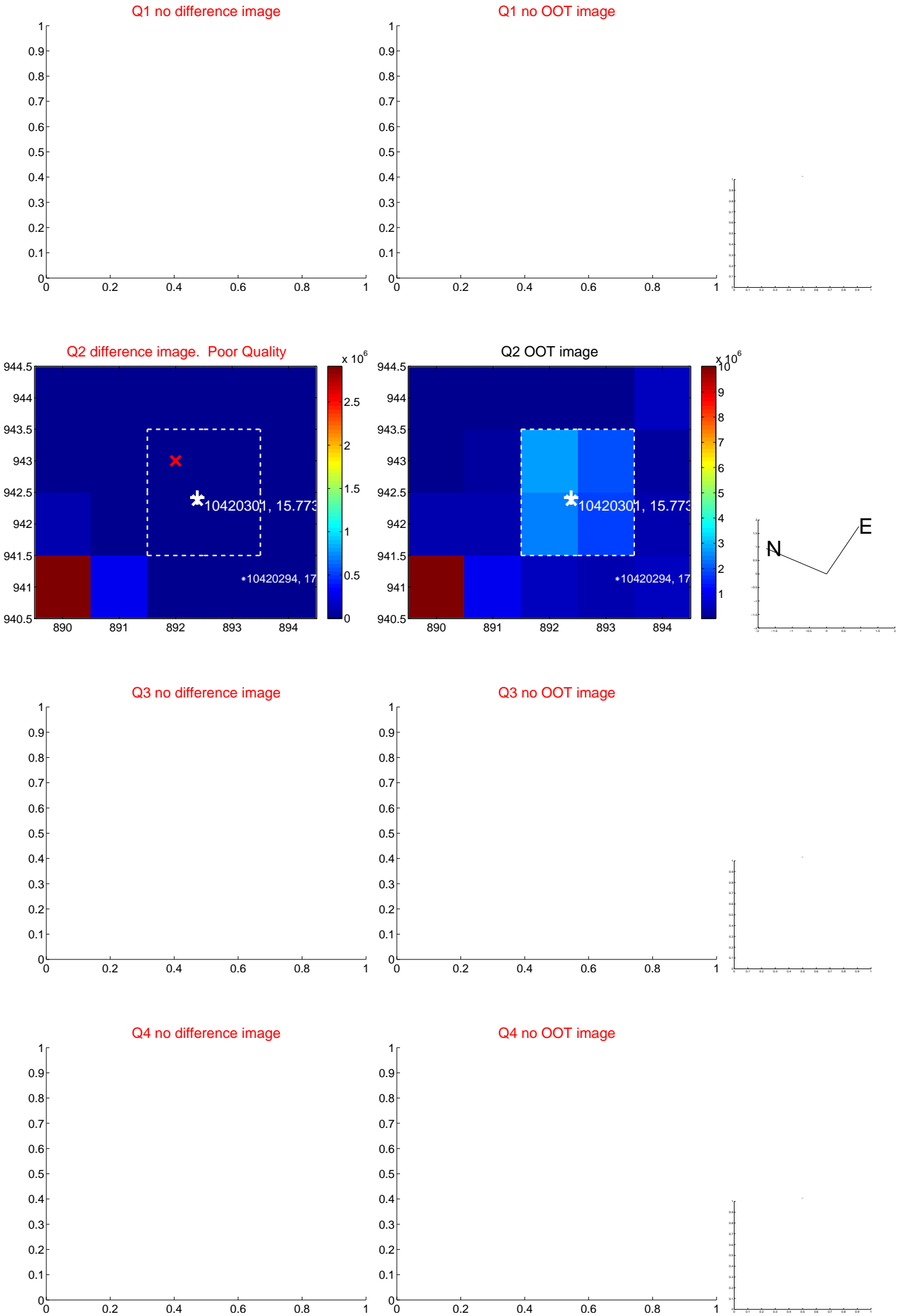
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	—	—	—	—



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



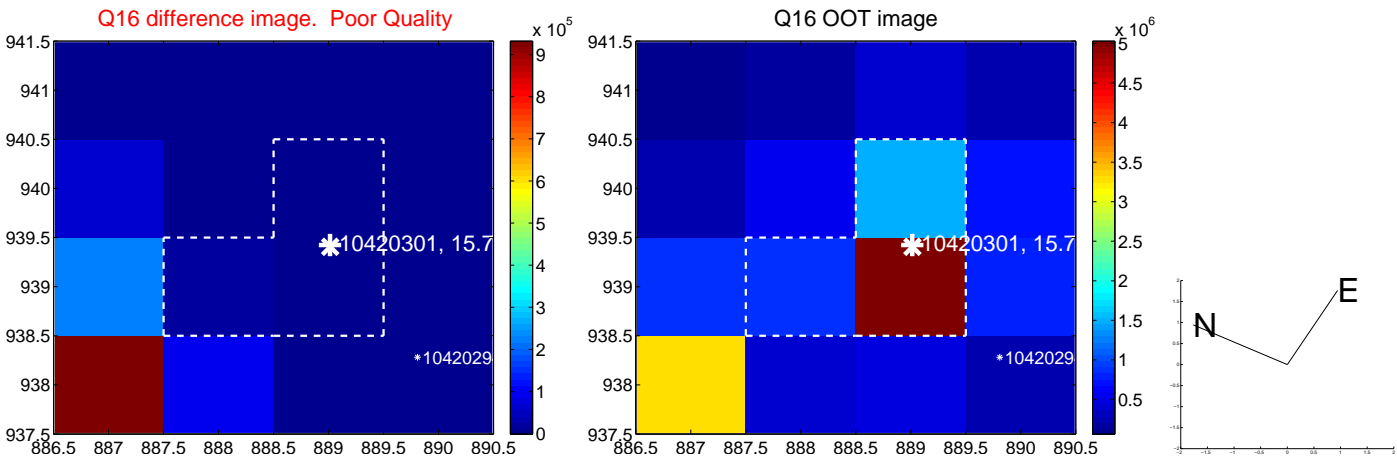
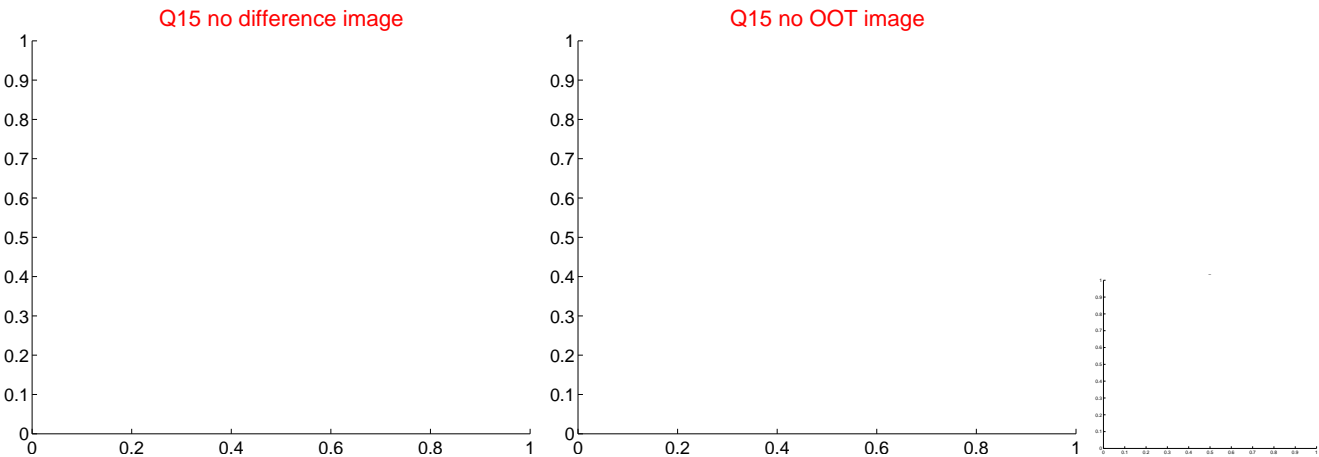
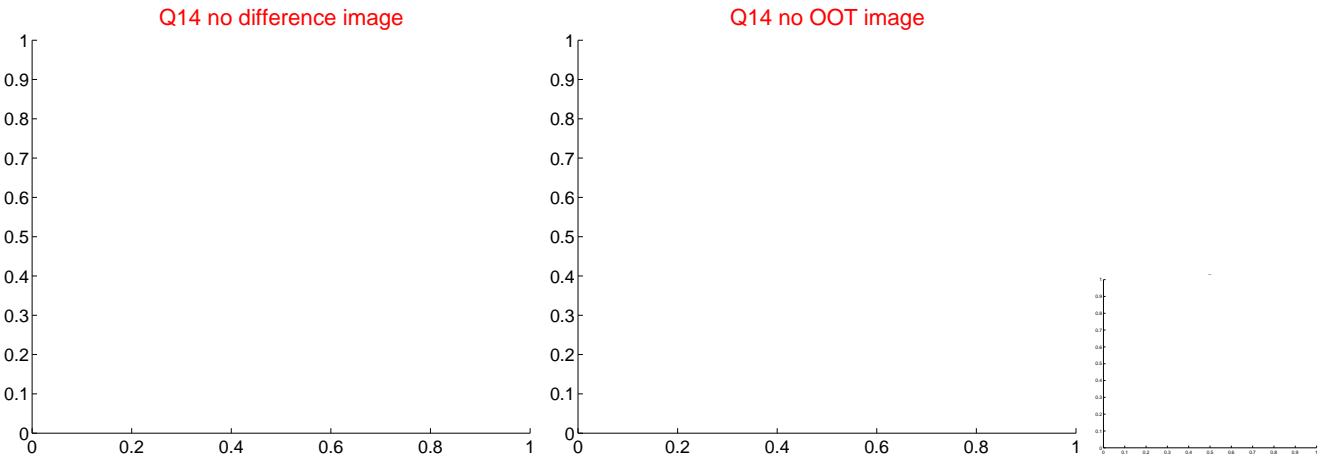
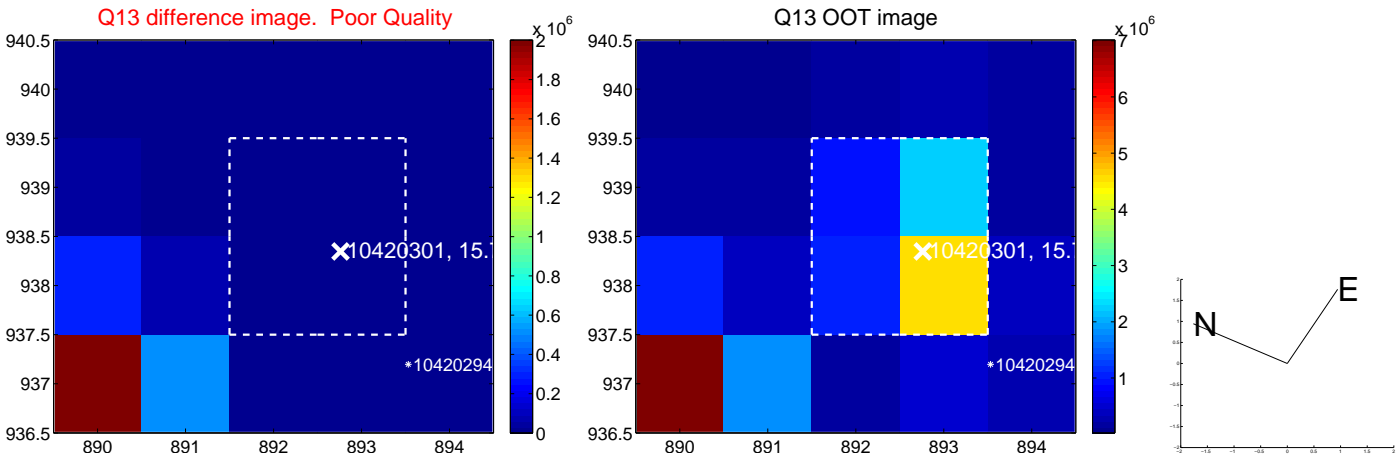
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



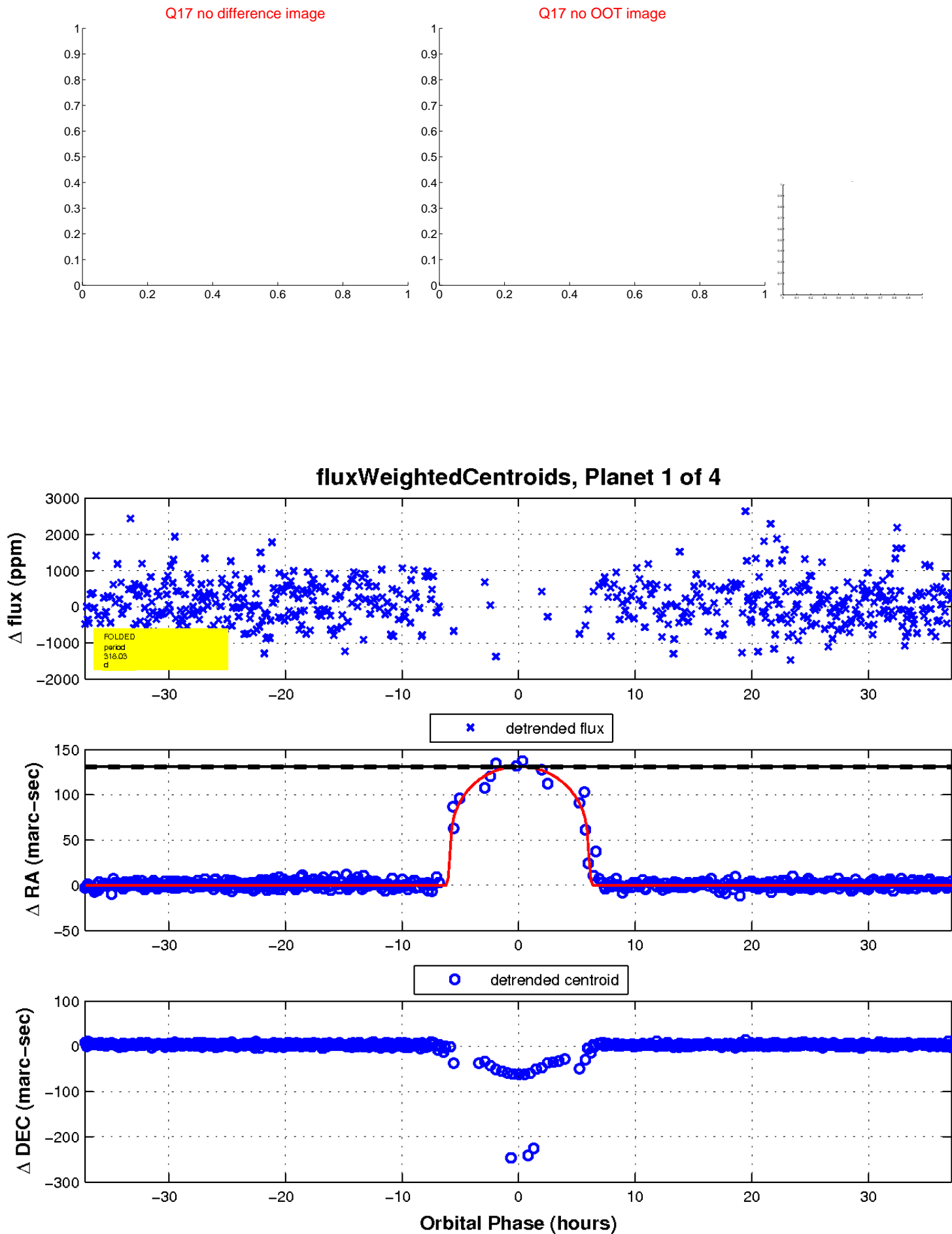
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

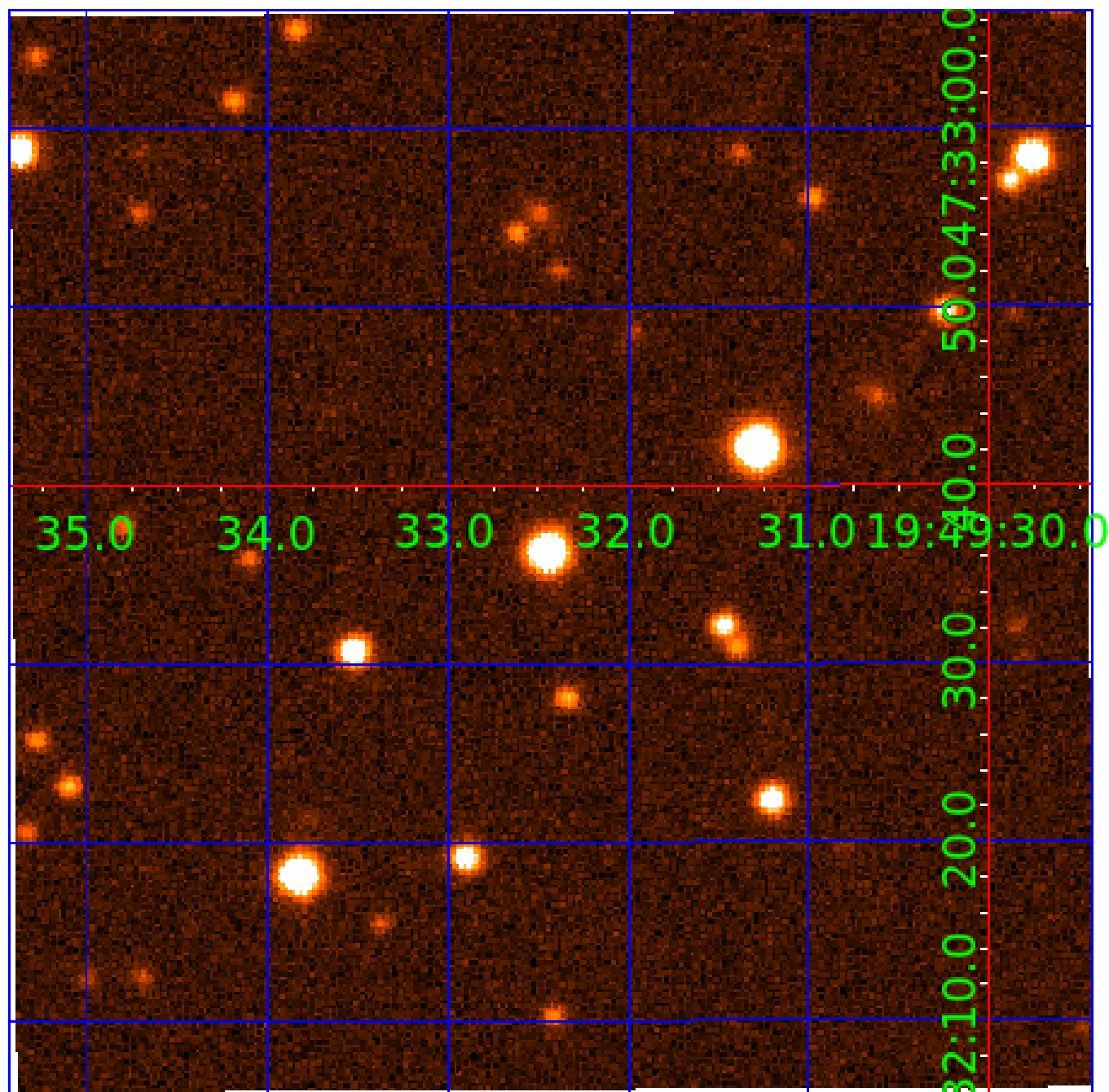


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010420301

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})
010420301-01	OBS	No	318.030709	250.743131	1103.3	12.393	19.8	13.4	0.56	4371	1.84	0.17
010420301-02	OBS	3257.01	45.433250	172.941835	786.6	6.071	12.1	15.1	0.56	4371	2.10	2.35
010420301-03	OBS	No	363.482932	250.714038	1103.3	12.814	9.8	10.5	0.56	4371	3.28	0.15
010420301-04	OBS	No	181.725309	296.196534	783.5	6.850	8.8	8.0	0.56	4371	1.65	0.37

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010420301-01	OBS	FP	0.00	1	0	0	1	INCONSISTENT_TRANS—CENT_FEW_DIFFS—EPHEM_MATCH
010420301-02	OBS	FP	0.00	1	0	1	1	SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET—EPHEM_MATCH
010420301-03	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_MARSHALL_SKYE—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET—EPHEM_MATCH
010420301-04	OBS	FP	0.00	1	0	1	1	SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET—EPHEM_MATCH

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 010420301-02

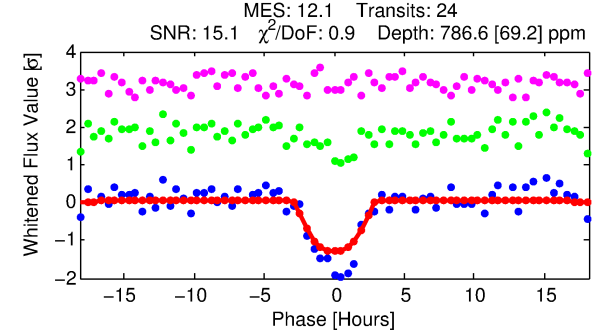
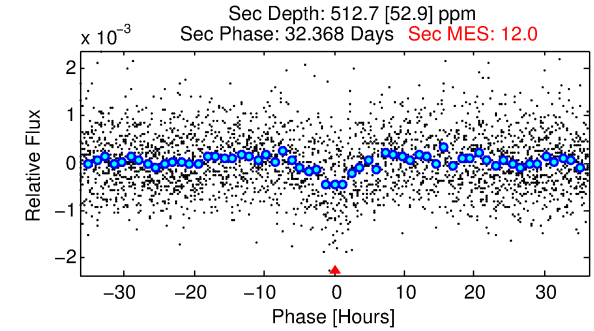
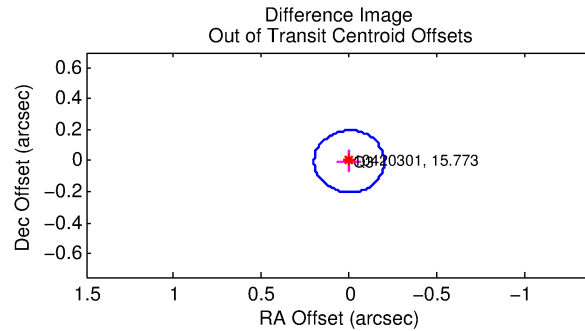
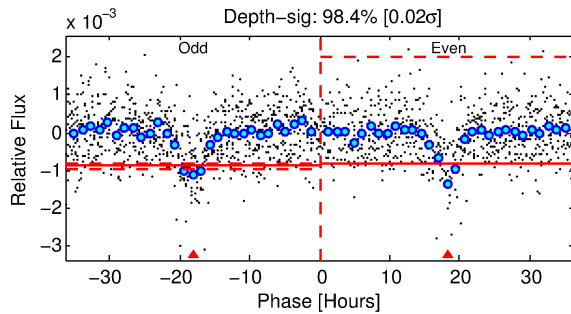
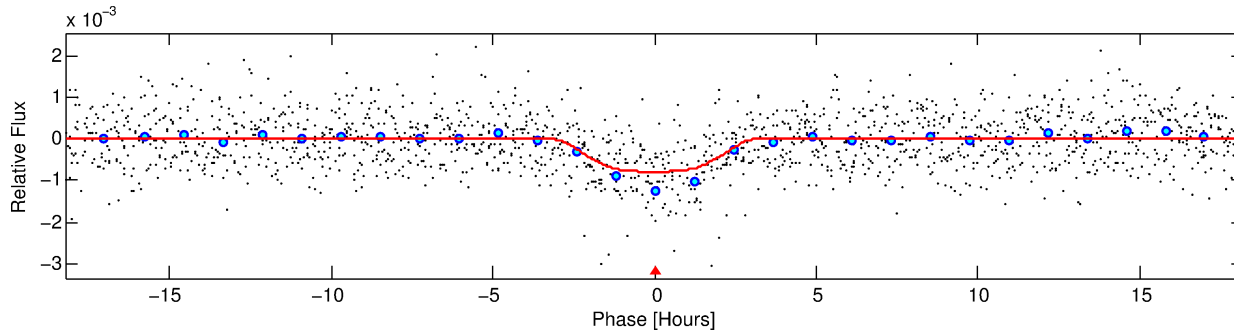
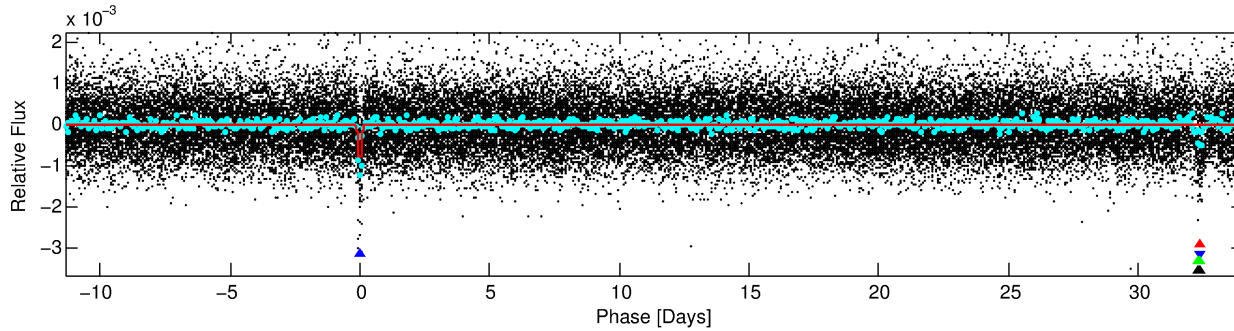
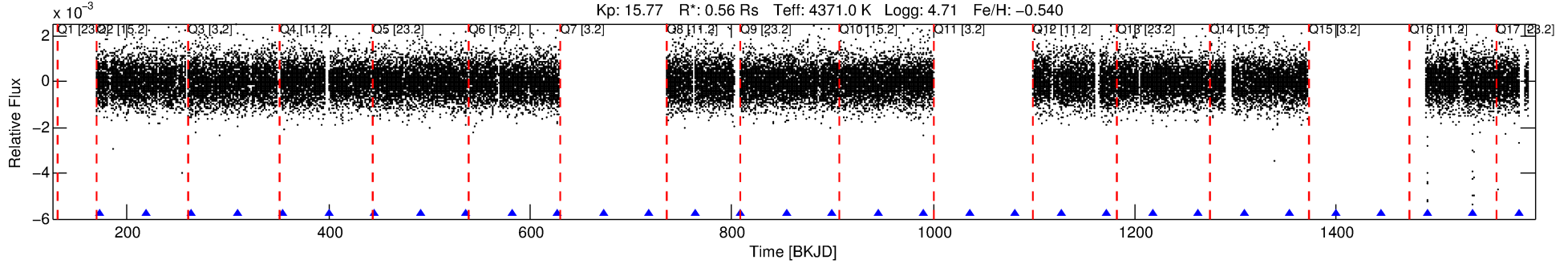
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
010420301-02	10420301	010420279-02	10420279	1:1	13.1	2	2	14.77	15.77	626.73	Direct-PRF	0	0.20	0.10

Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 10420301 Candidate: 2 of 4 Period: 45.433 d
KOI: K03257.01 Corr: 0.915

Kp: 15.77 R*: 0.56 Rs Teff: 4371.0 K Logg: 4.71 Fe/H: -0.540



DV Fit Results:

Period = 45.43325 [0.00051] d
Epoch = 172.9418 [0.0091] BKJD
Rp/R* = 0.0344 [0.0026]
a/R* = 22.47 [3.70]
b = 0.96 [0.02]
Seff = 2.35 [0.39]
Teq = 316 [13] K
Rp = 2.10 [0.26] Re
a = 0.2087 [0.0160] AU
Ag = 2796.77 [585.66] [4.77σ]
Teffp = 3548 [201] K [16.09σ]

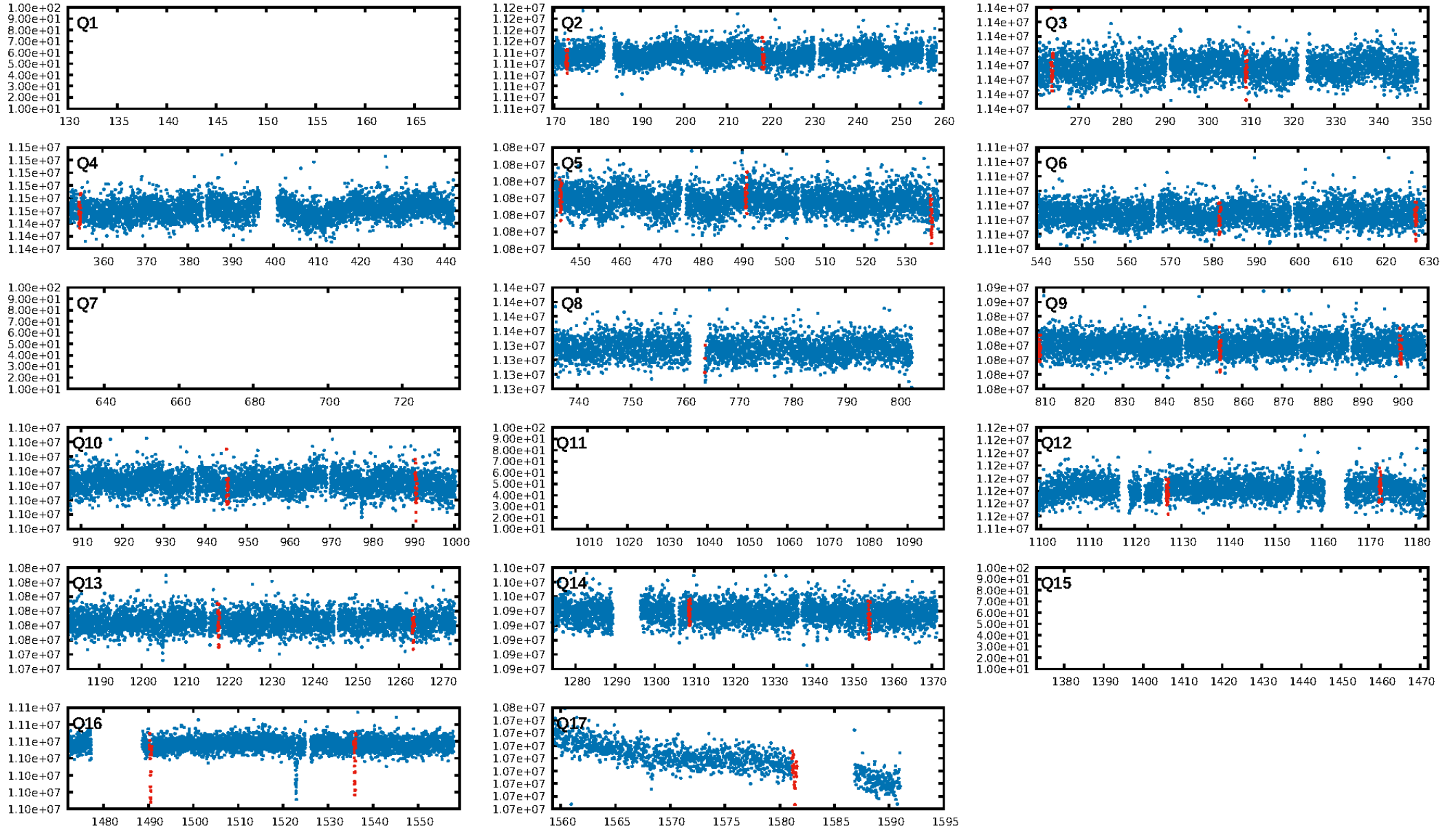
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [357.36σ]
ModelChiSquare2-sig: 0.2%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.74e-33
RollingBand-fgt: 1.00 [23/23]
GhostDiagnostic-chr: -0.3999
Centroid-sig: N/A
Centroid-so: N/A
OotOffset-rm: 0.004 arcsec [0.06σ]
KicOffset-rm: 13.097 arcsec [196.35σ]
OotOffset-st: 0/1/0/0 [1]
KicOffset-st: 0/1/0/0 [1]
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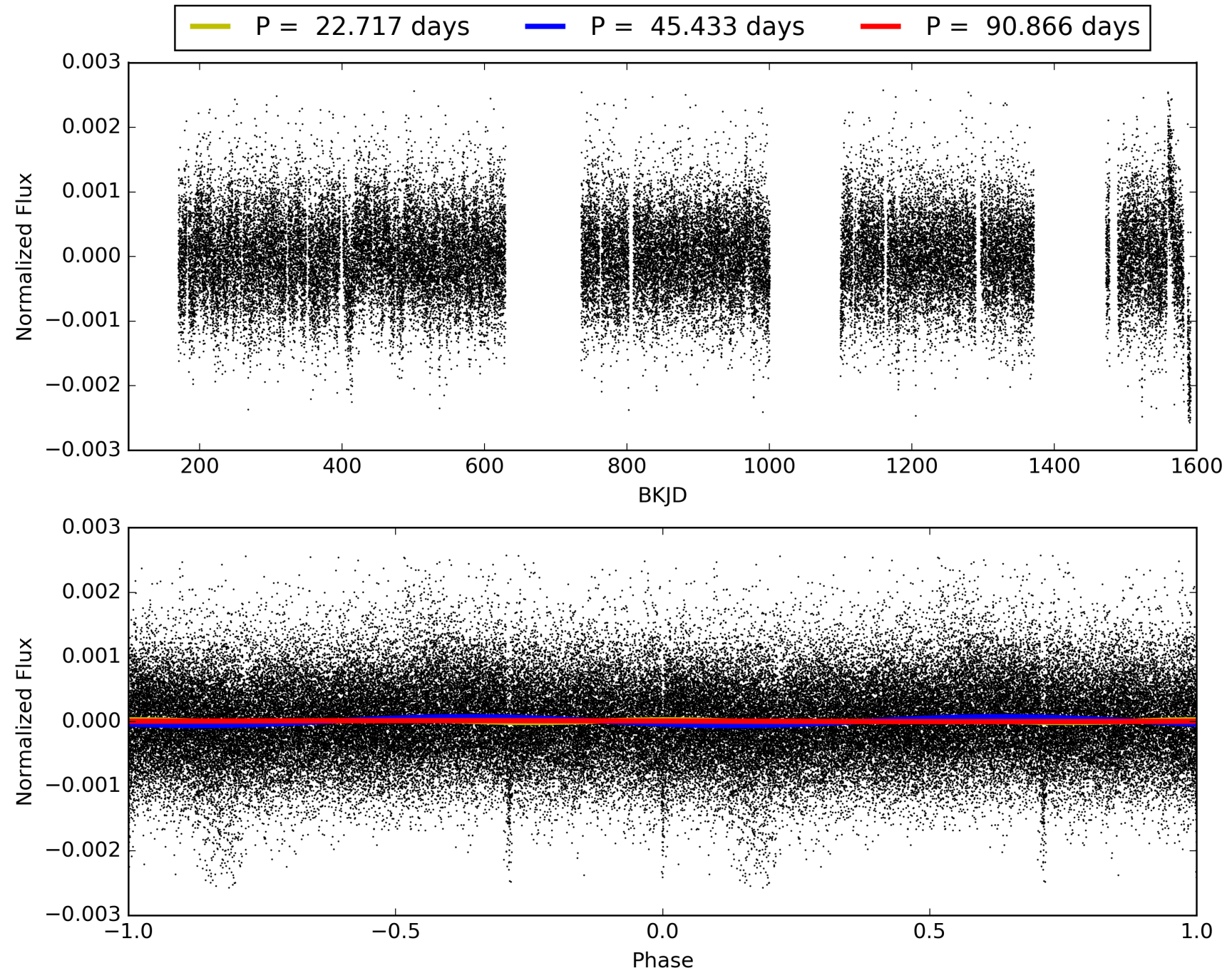
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 09:34:55 Z

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

TCE 010420301-02, PDC Light Curves

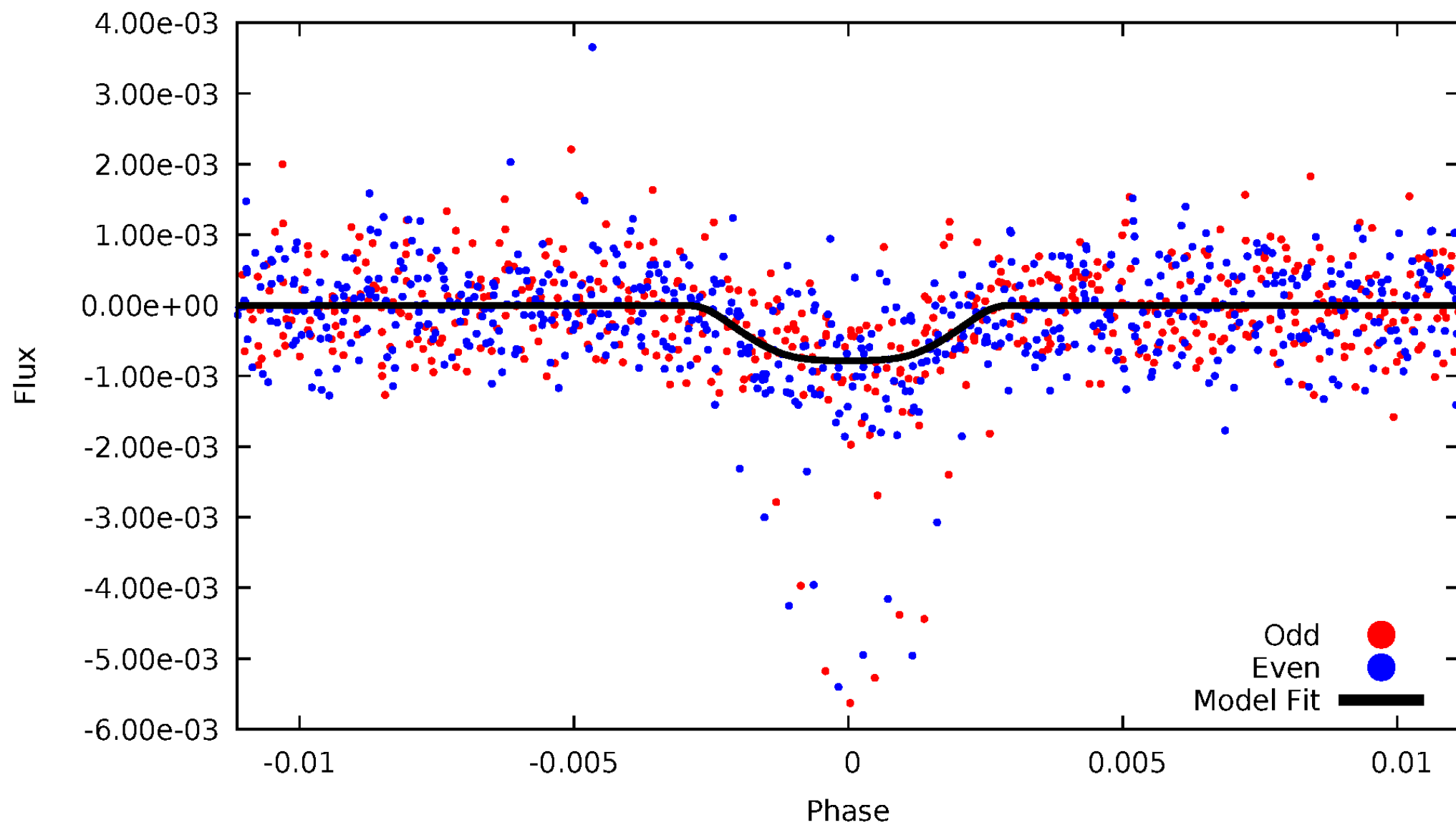


TCE 010420301-02



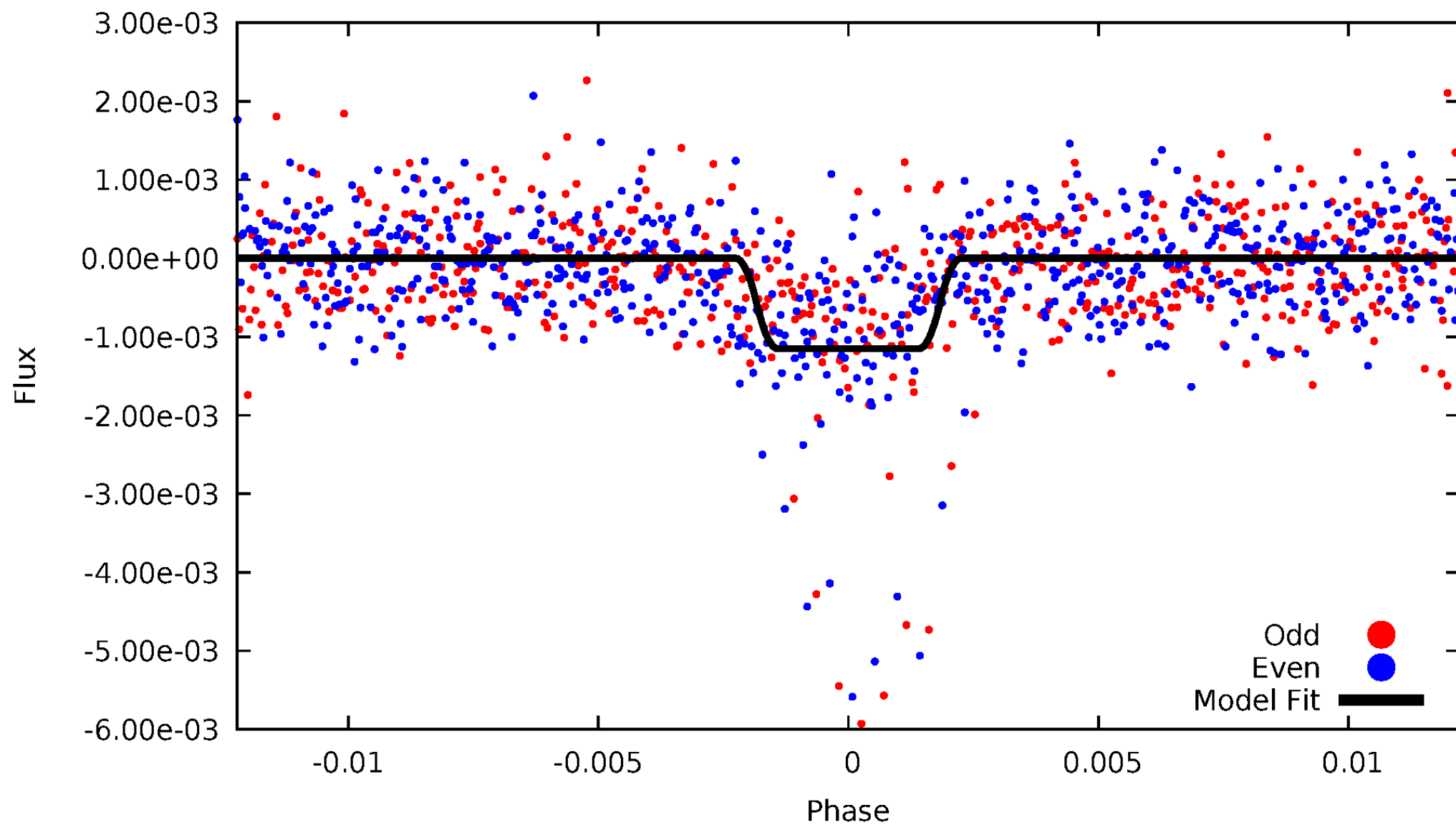
DV Odd/Even

TCE 010420301-02



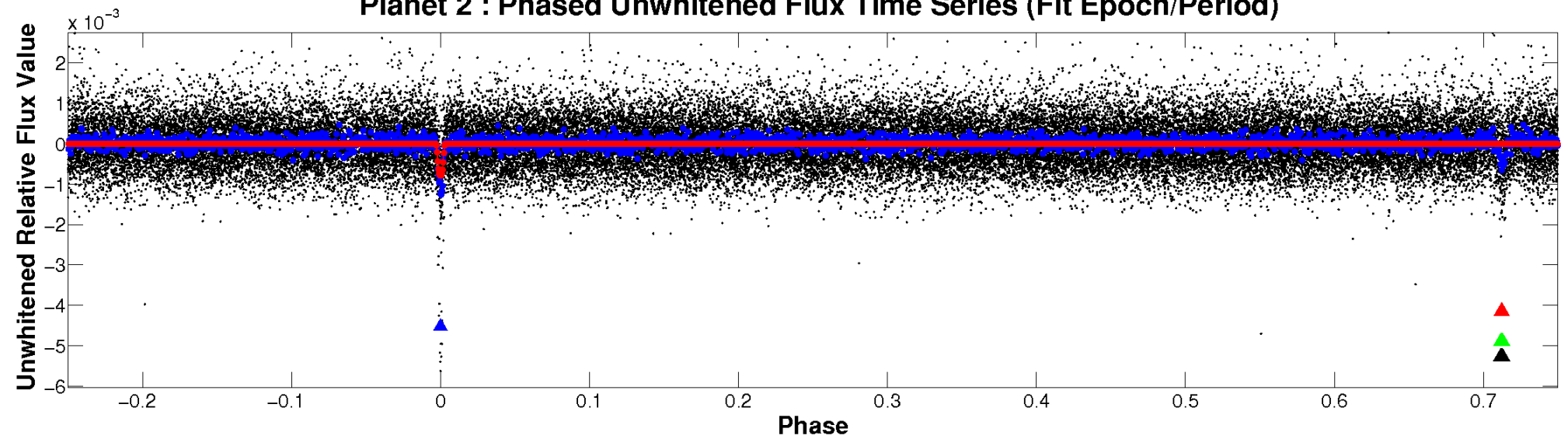
ALT Odd/Even

TCE 010420301-02

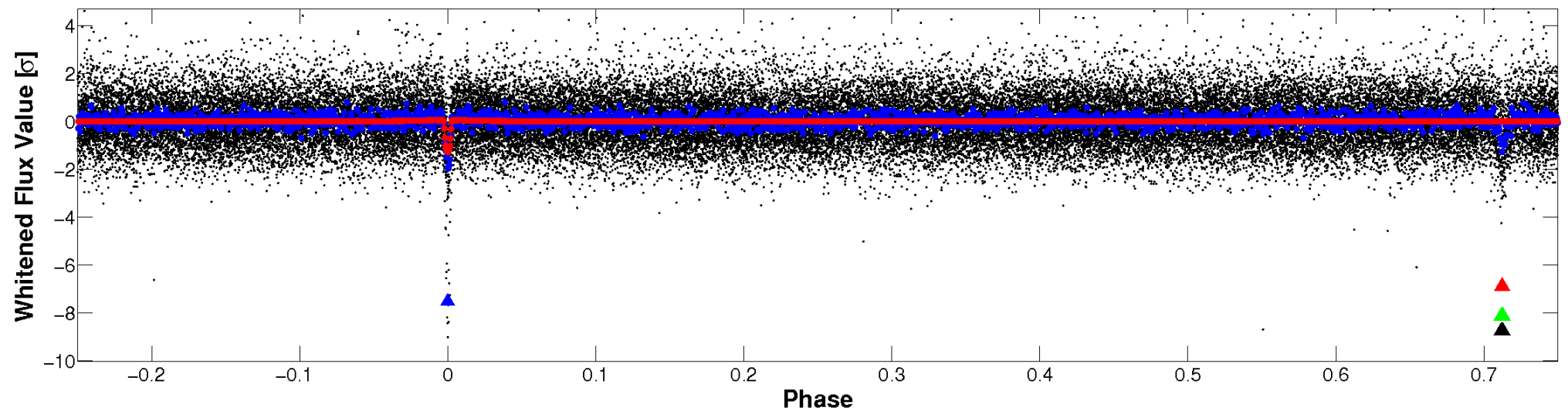


Non-Whitened Vs. Whitened Light Curve

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

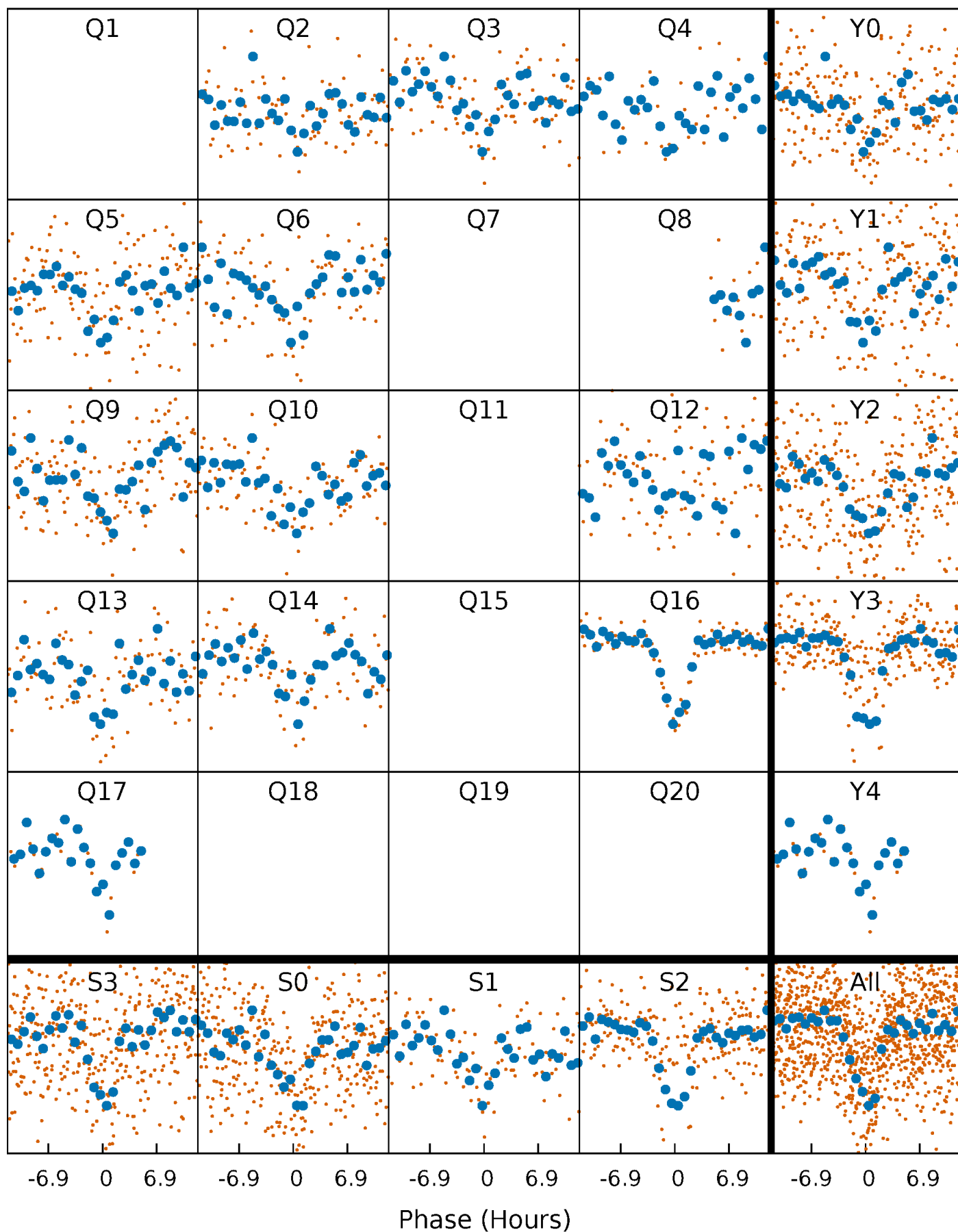


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



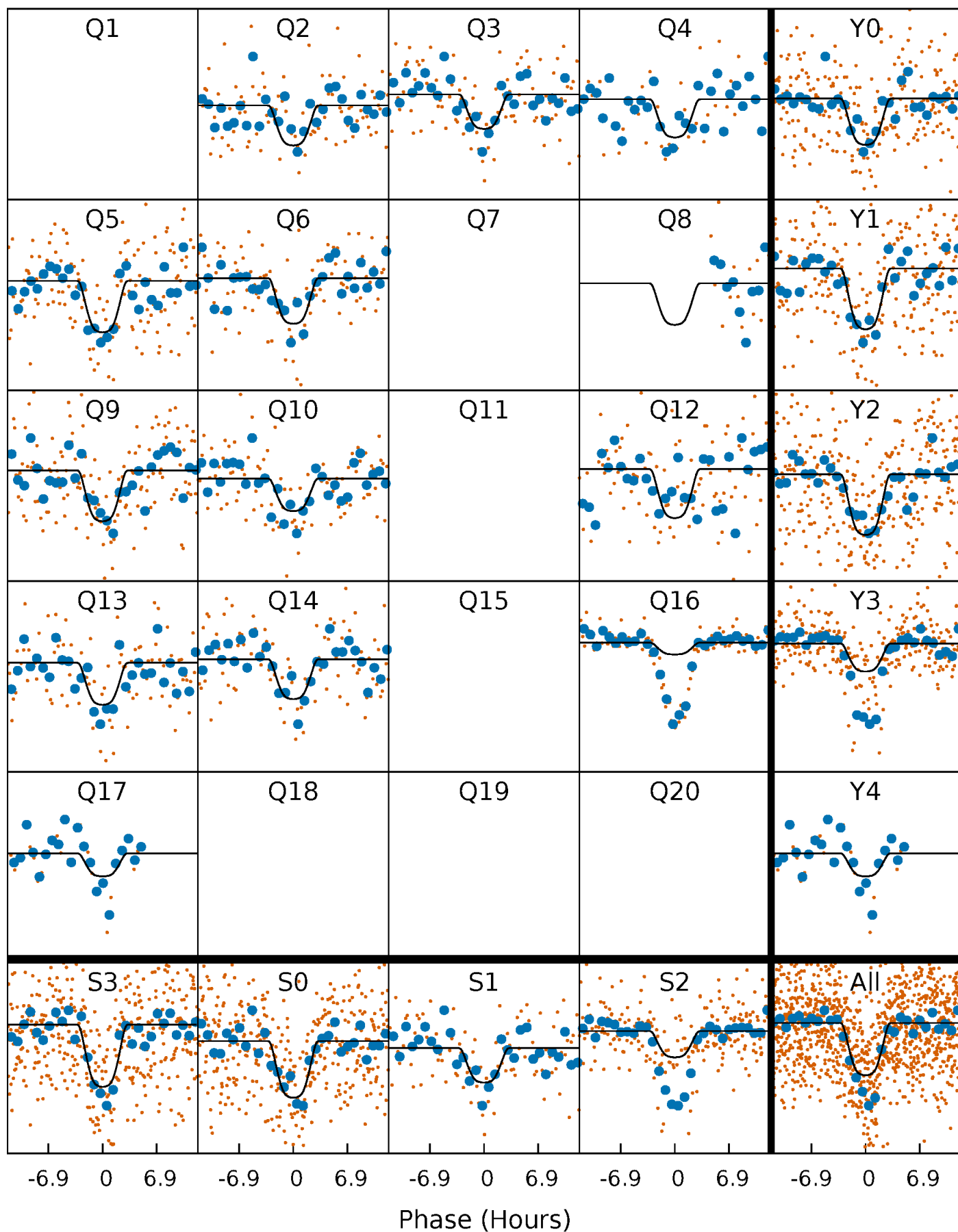
PDC Quarter-Phased Transit Curves

TCE 010420301-02 P= 45.433250 Days $T_0=172.941835$ (BKJD)



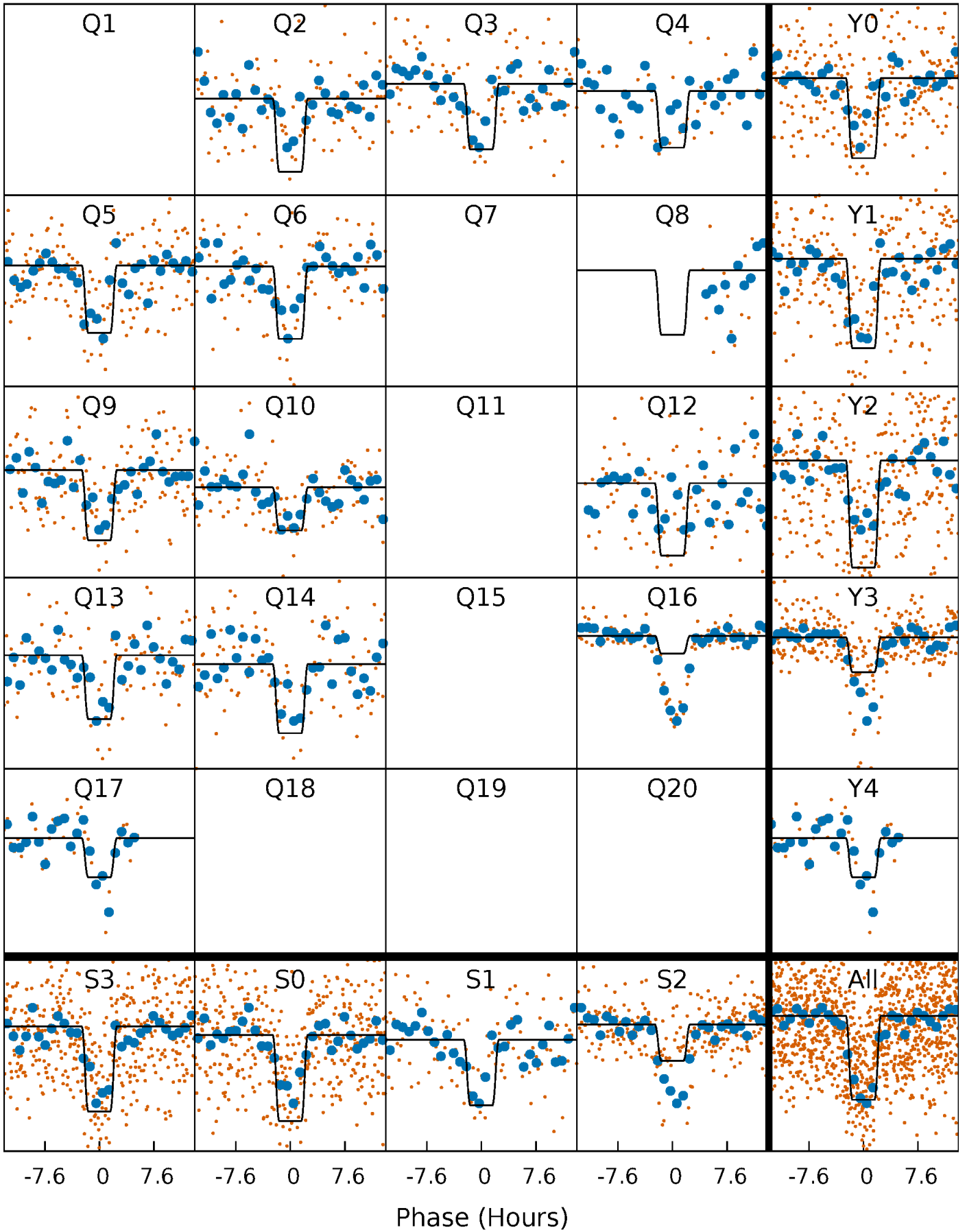
DV Quarter-Phased Transit Curves

TCE 010420301-02 P= 45.433250 Days $T_0=172.941835$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

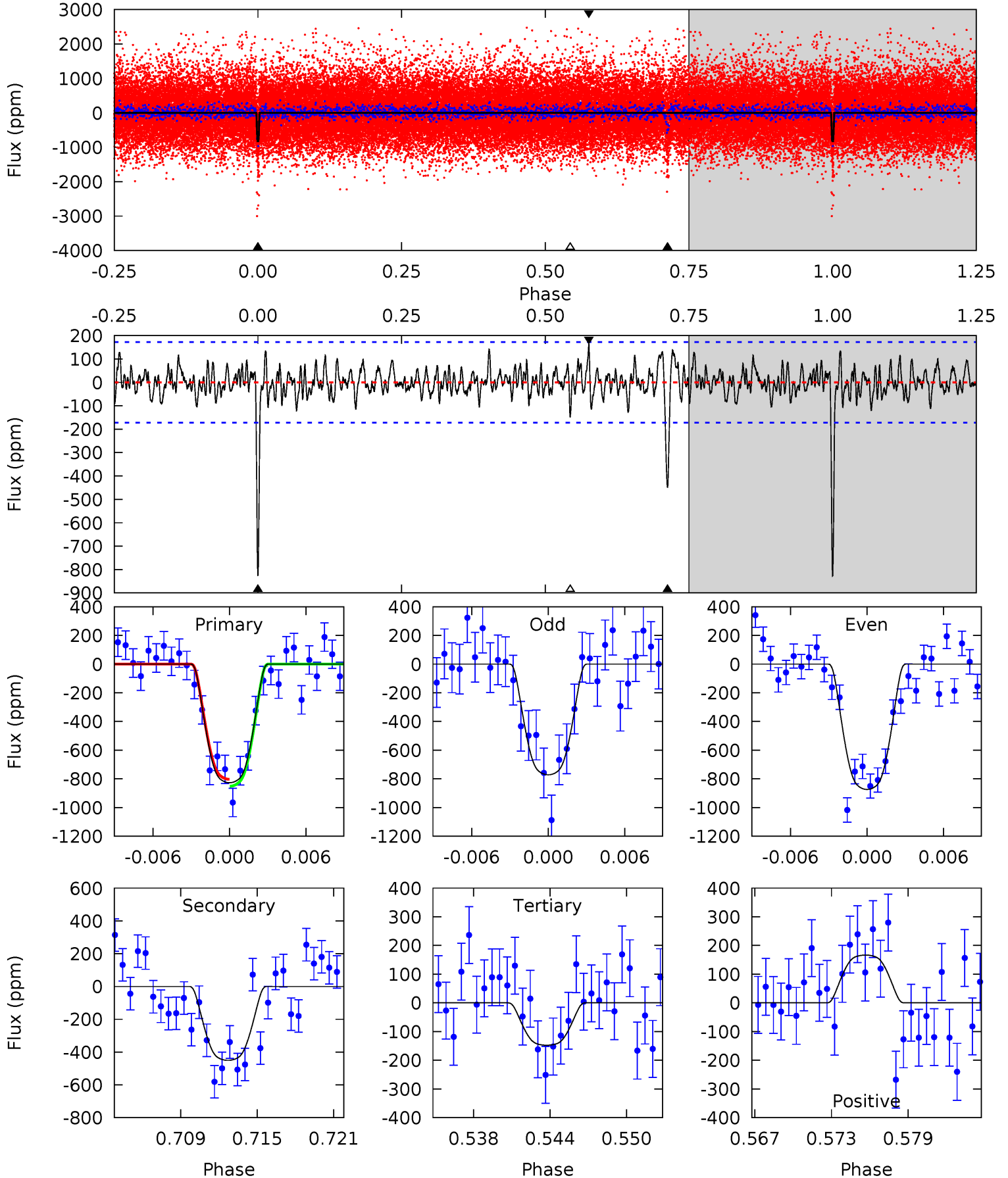
TCE 010420301-02 P= 45.431710 Days $T_0=172.976220$ (BKJD)



DV Model-Shift Uniqueness Test

010420301-02, $P = 45.433250$ Days, $E = 127.508585$ Days

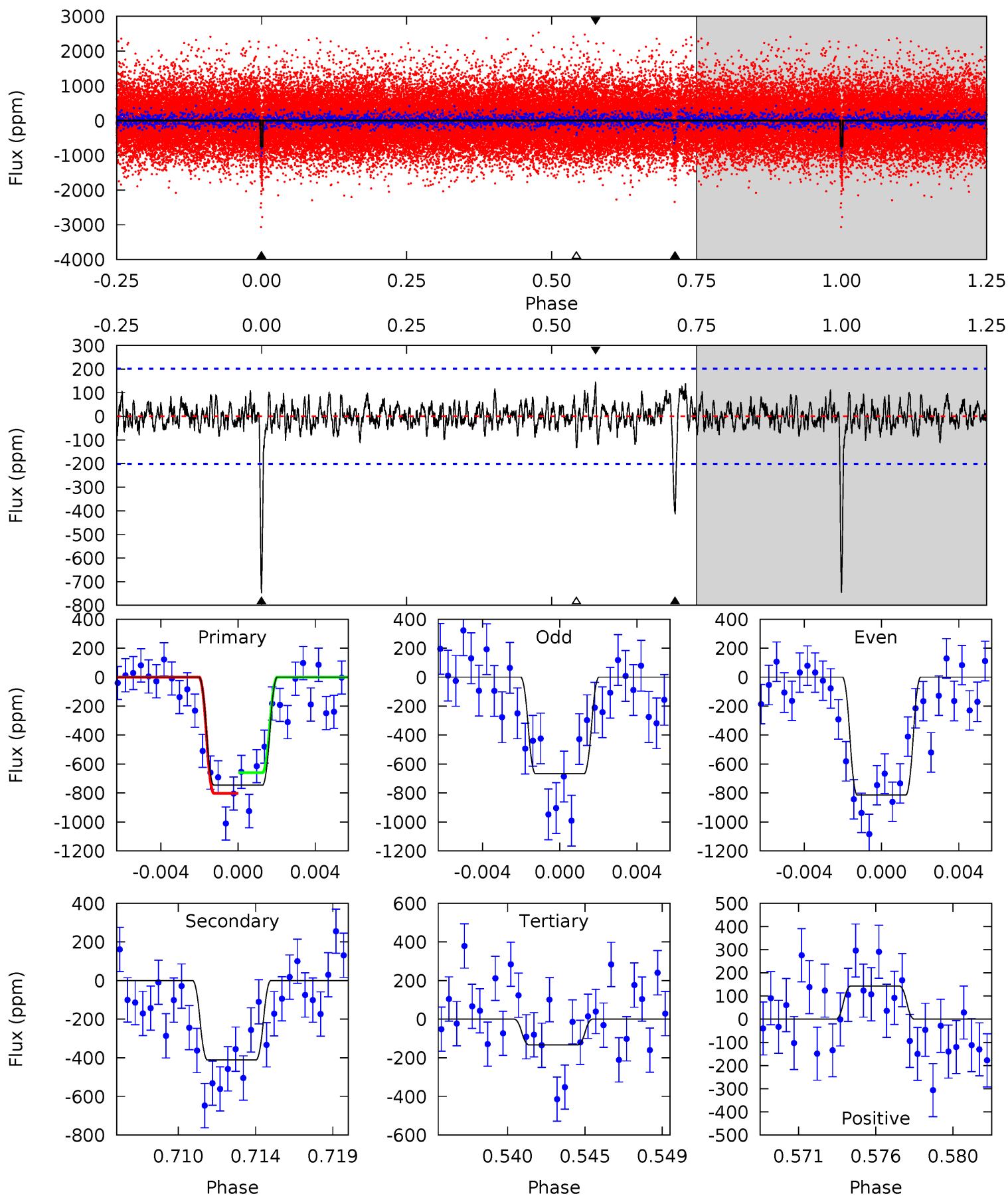
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.6	13.4	4.39	4.95	5.13	2.75	1.40	20.2	19.6	9.00	8.44	1.52	1.32	0.17	0.72



Alt Model-Shift Uniqueness Test

010420301-02, P = 45.431710 Days, E = 127.544510 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.2	10.6	3.42	3.68	5.18	2.84	1.06	15.7	15.5	7.13	6.88	1.88	1.36	0.16	1.81



Stellar Parameters For KIC 010420301

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4371^{+118}_{-144}	$4.712^{+0.036}_{-0.049}$	$-0.540^{+0.300}_{-0.300}$	$0.559^{+0.056}_{-0.045}$	$0.587^{+0.053}_{-0.053}$	$4.728^{+0.849}_{-0.864}$
	+3%/-3%	+1%/-1%	+56%/-56%	+10%/-8%	+9%/-9%	+18%/-18%
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 010420301-02 / KOI 3257.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-450 ± 34	$2.11^{+0.19}_{-0.20}$	442^{+15}_{-16}	3683^{+138}_{-143}	2424^{+483}_{-400}
Alt.	-411 ± 39	$2.09^{+0.18}_{-0.20}$	442^{+15}_{-17}	3648^{+139}_{-137}	2286^{+490}_{-383}

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

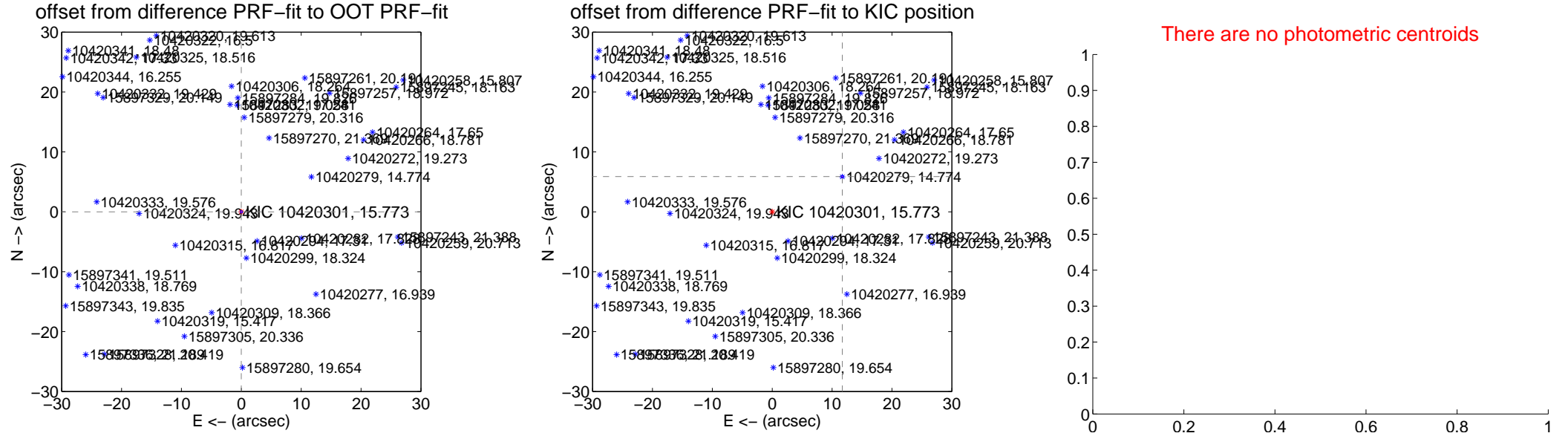
DV Centroid Data

Supplemental centroid analysis for 010420301-02. Kepler magnitude: 15.77. Transit SNR 15.11

There are 1 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 13.10 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

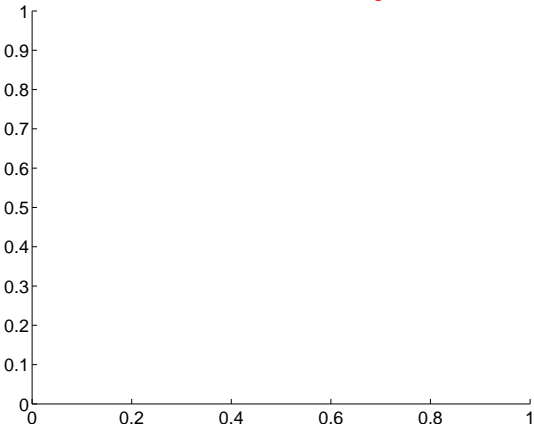
	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.004 ± 0.067	0.06	0.001 ± 0.067	-0.004 ± 0.067
PRF-fit source offset from KIC position	13.097 \pm 0.067	196.35	-11.703 ± 0.067	5.879 ± 0.067
photometric centroid source offset	—	—	—	—



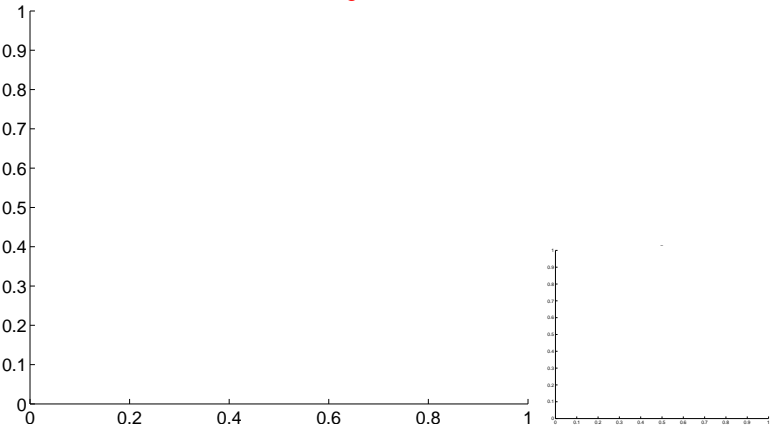
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

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

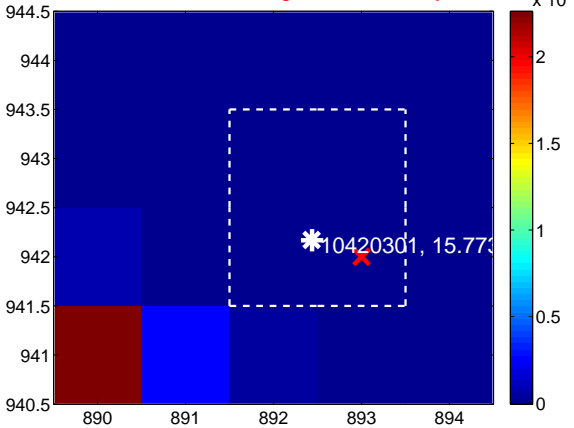
Q1 no difference image



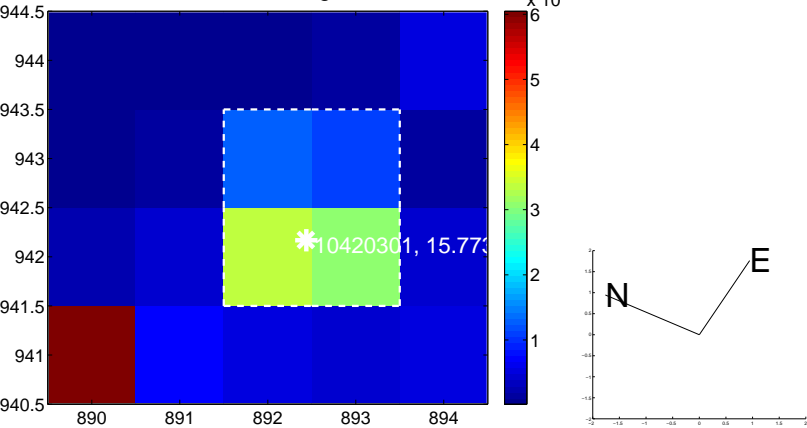
Q1 no OOT image



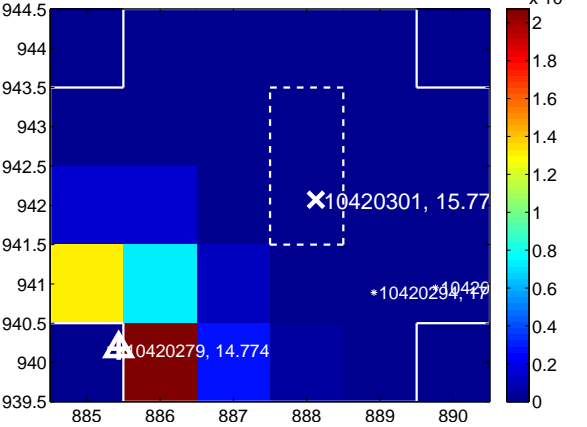
Q2 difference image. Poor Quality



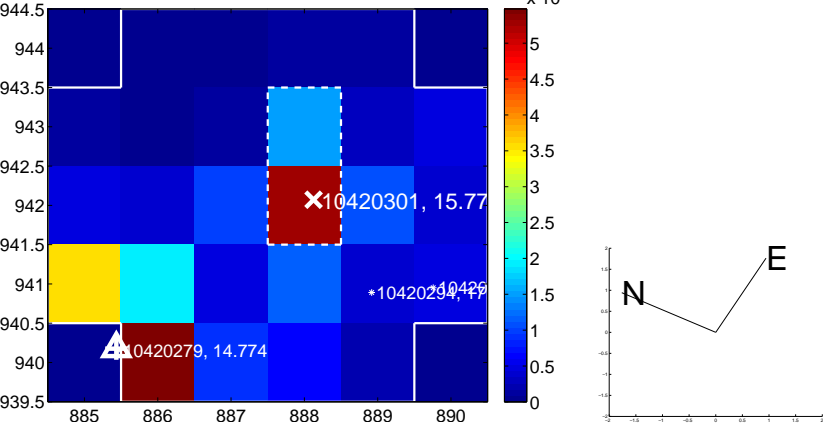
Q2 OOT image



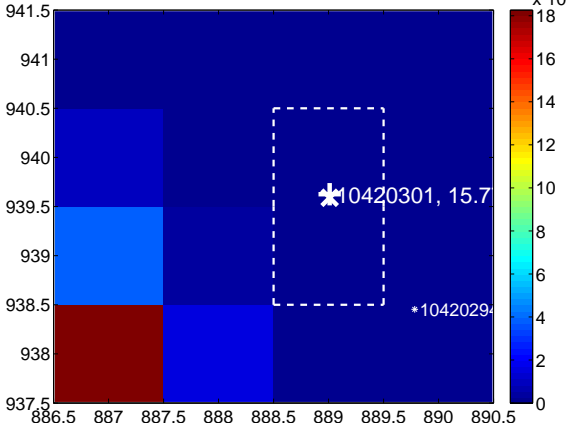
Q3 difference image



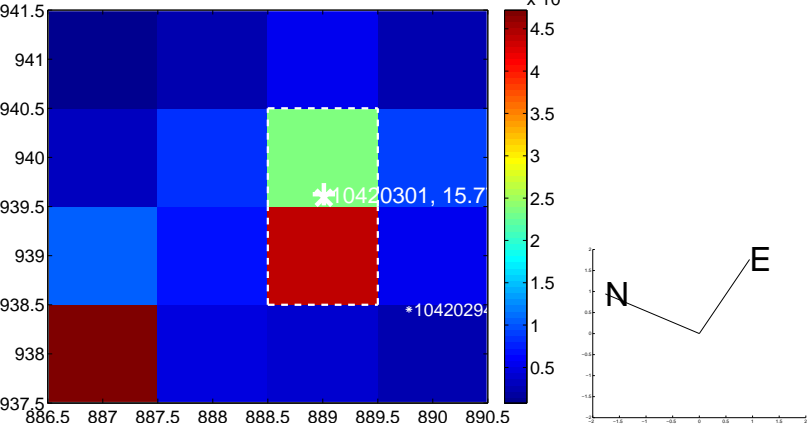
Q3 OOT image



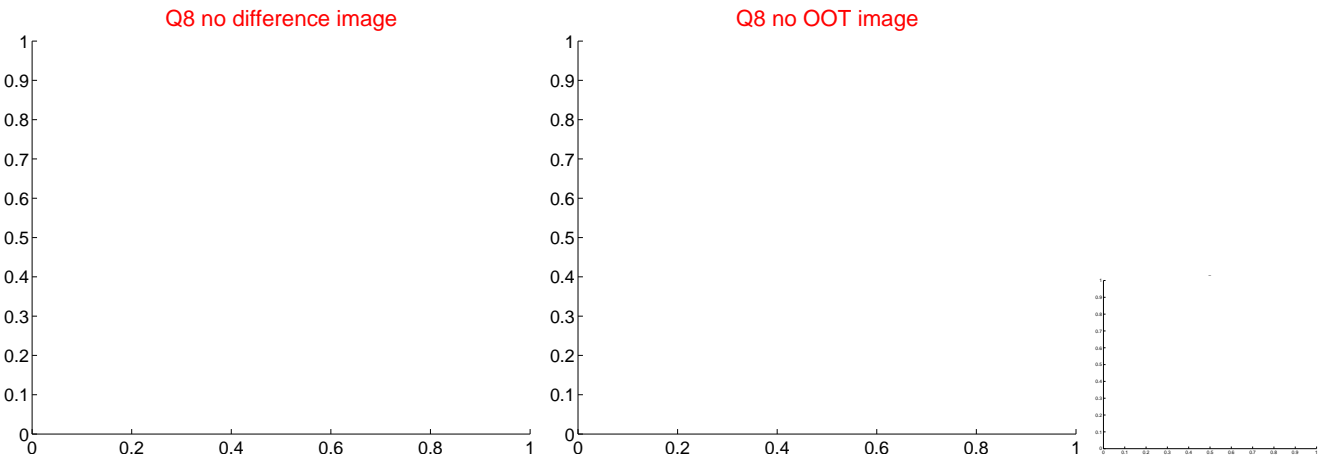
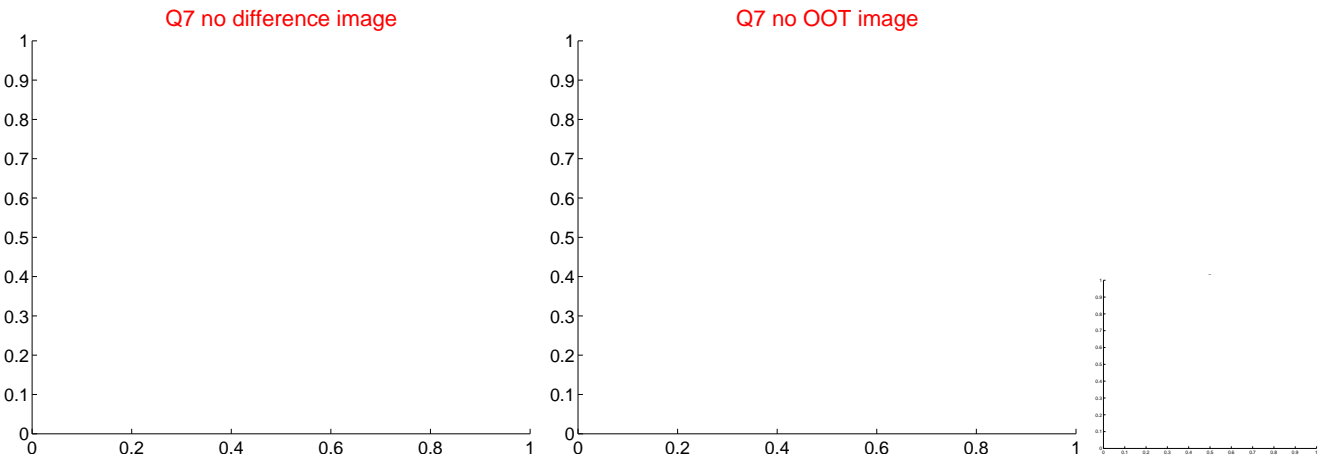
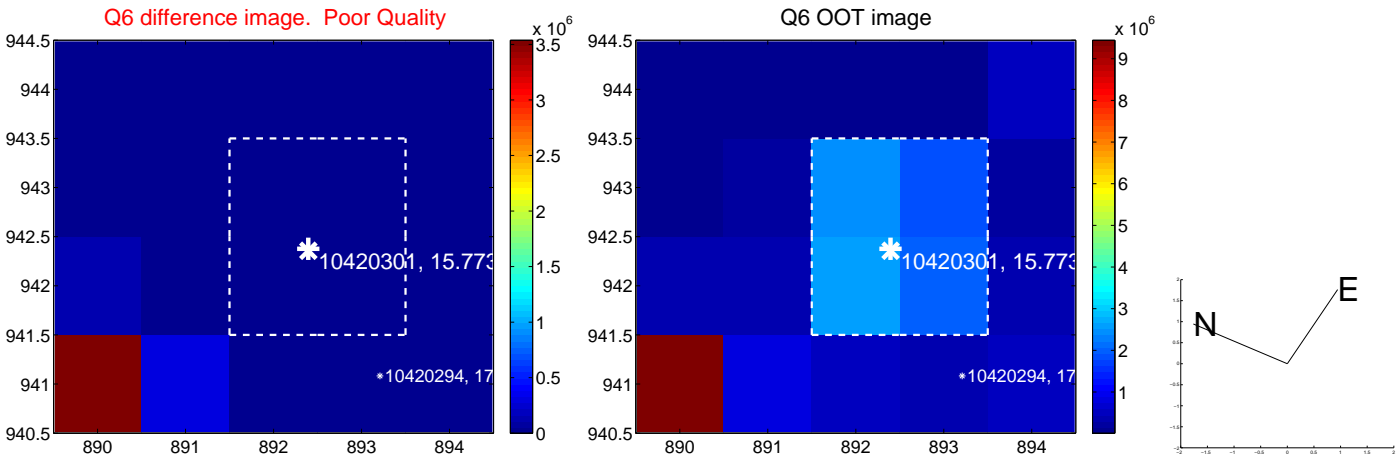
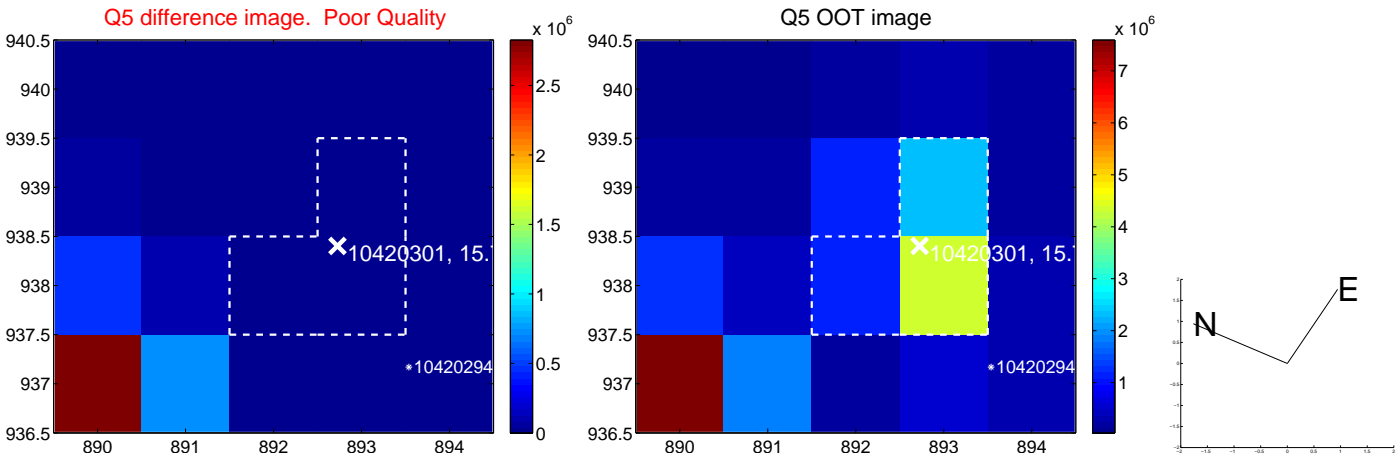
Q4 difference image. Poor Quality



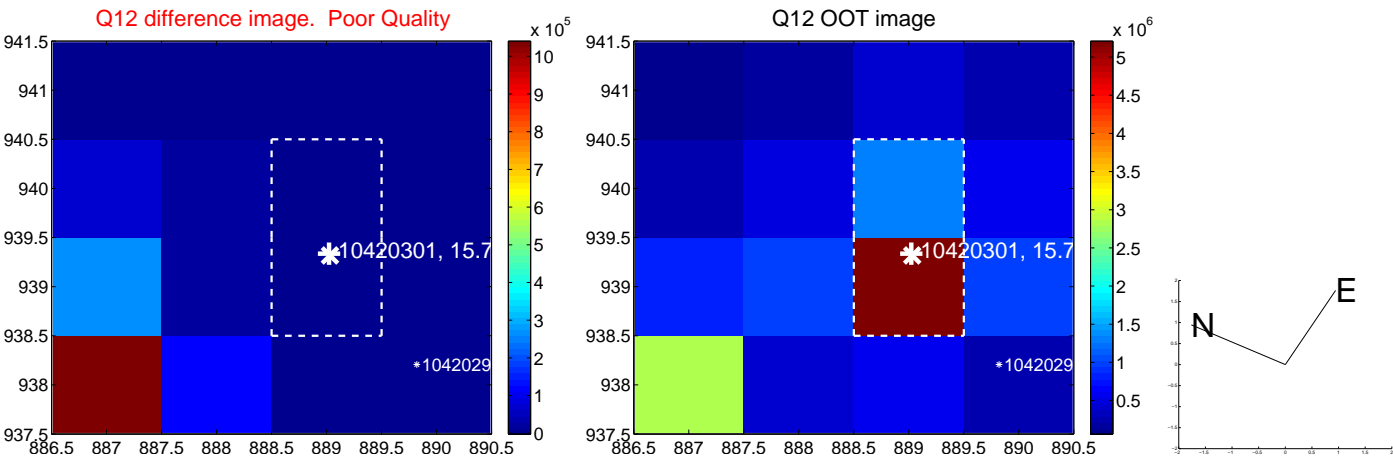
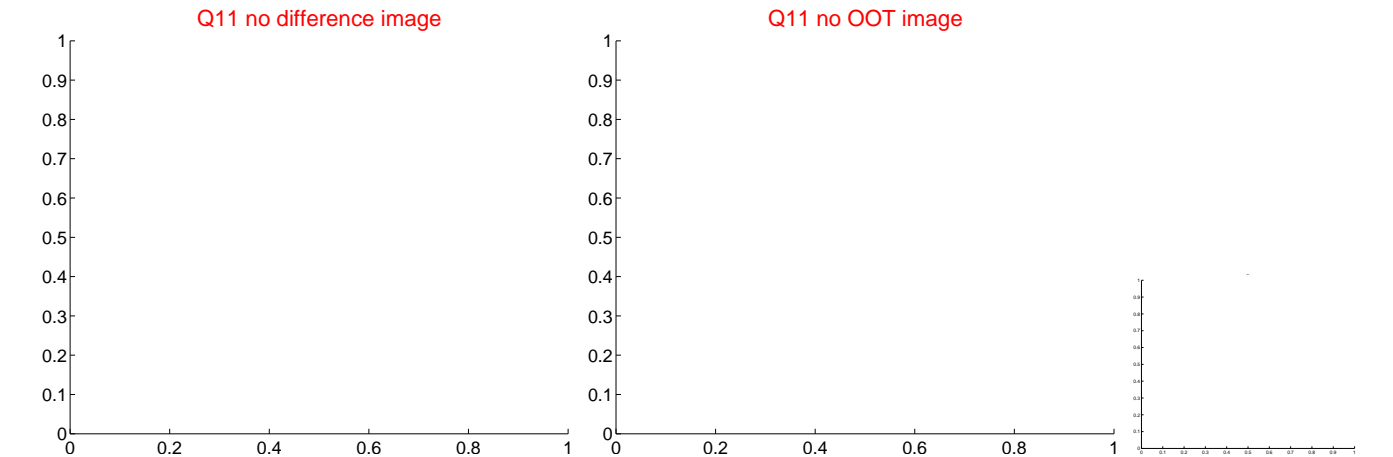
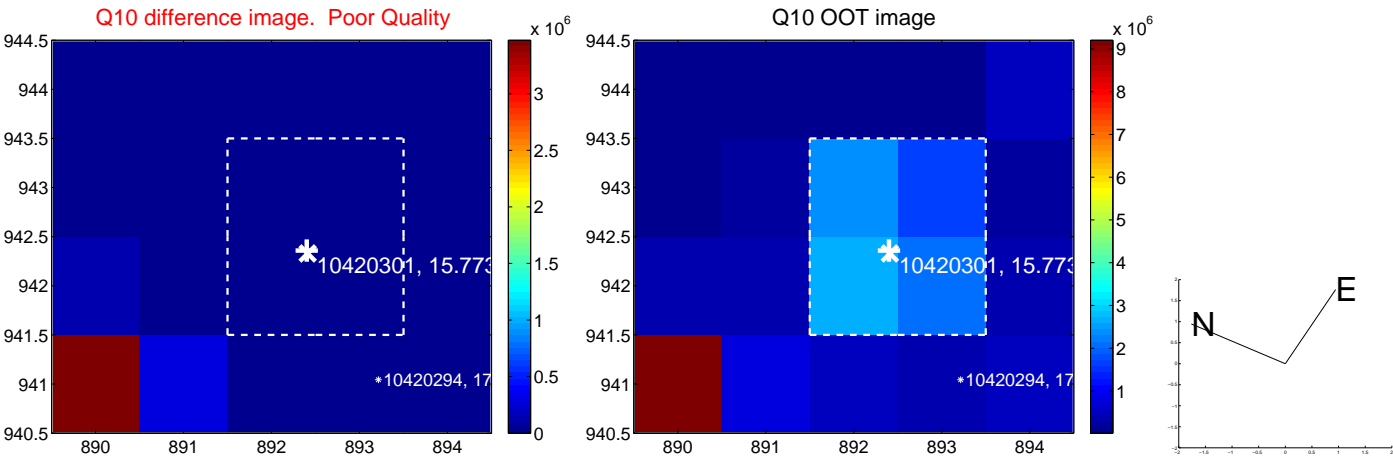
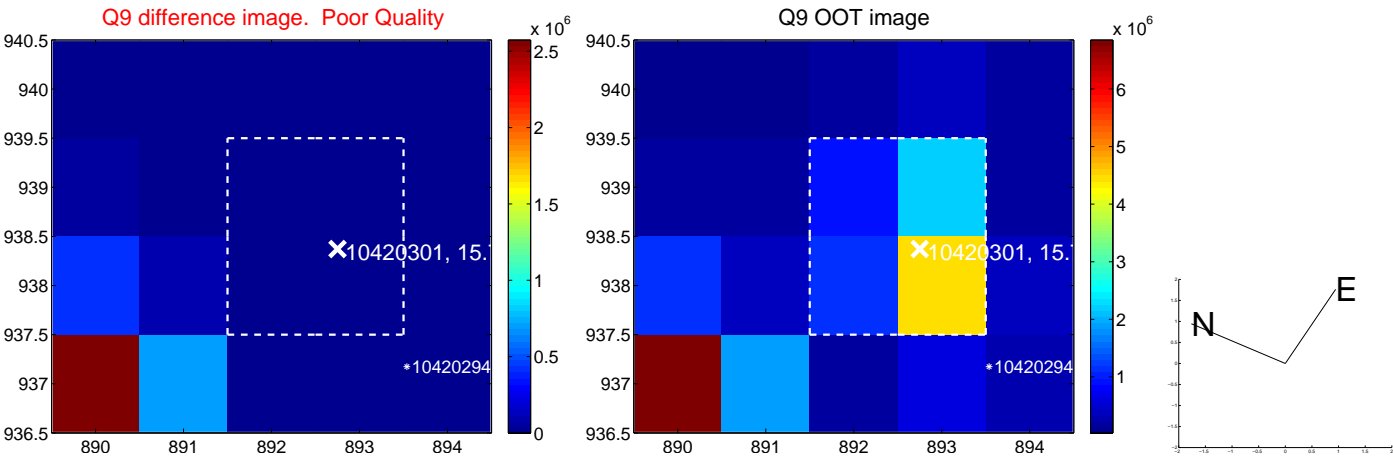
Q4 OOT image



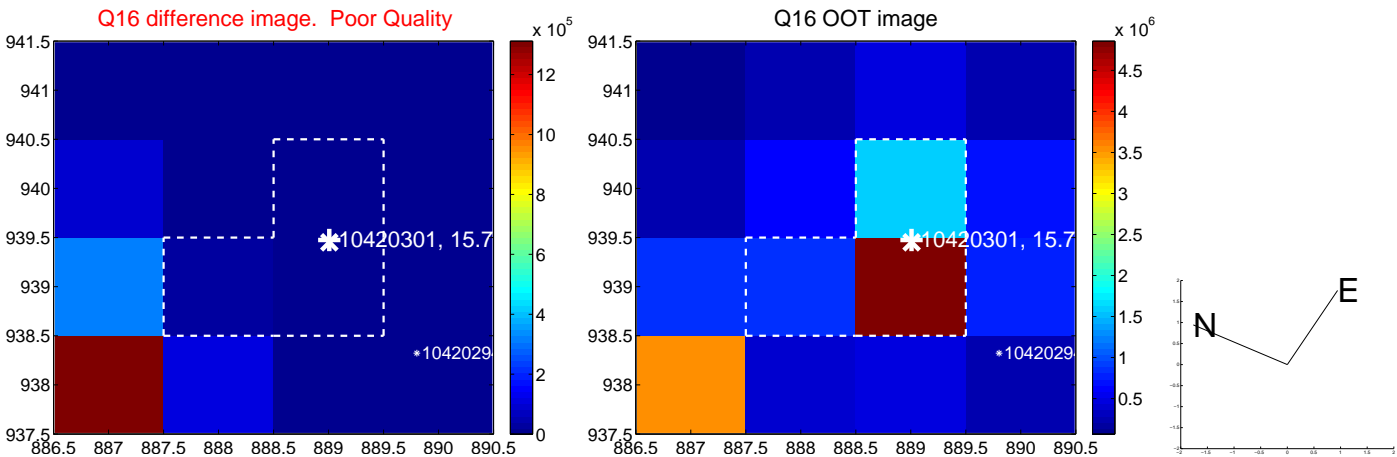
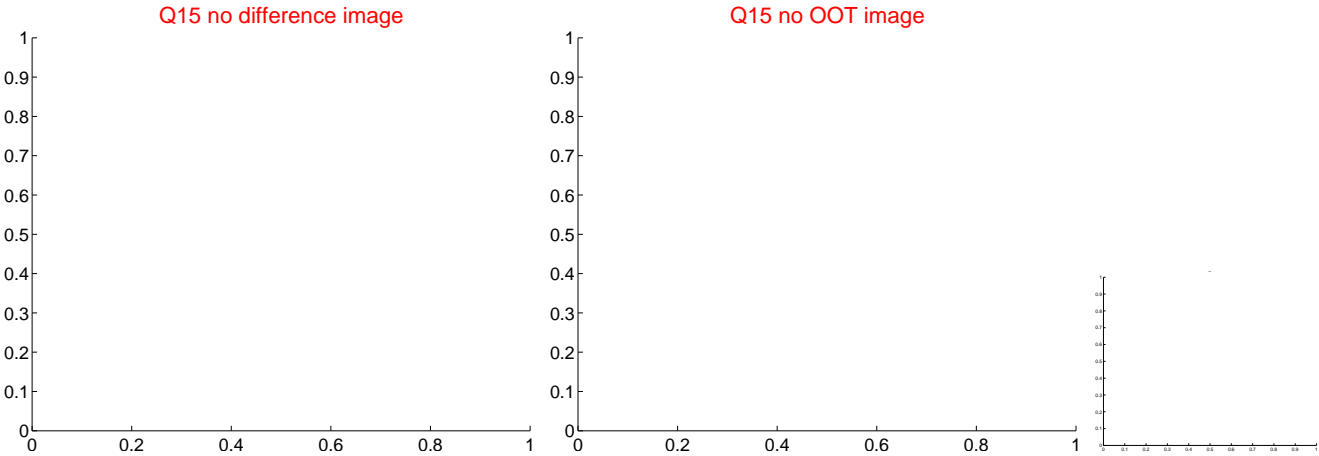
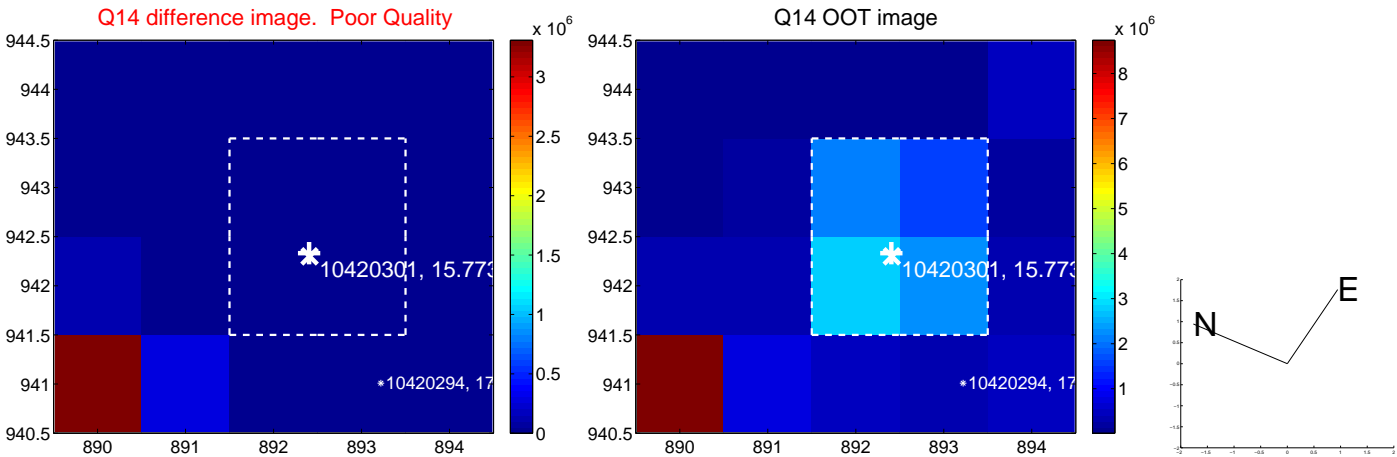
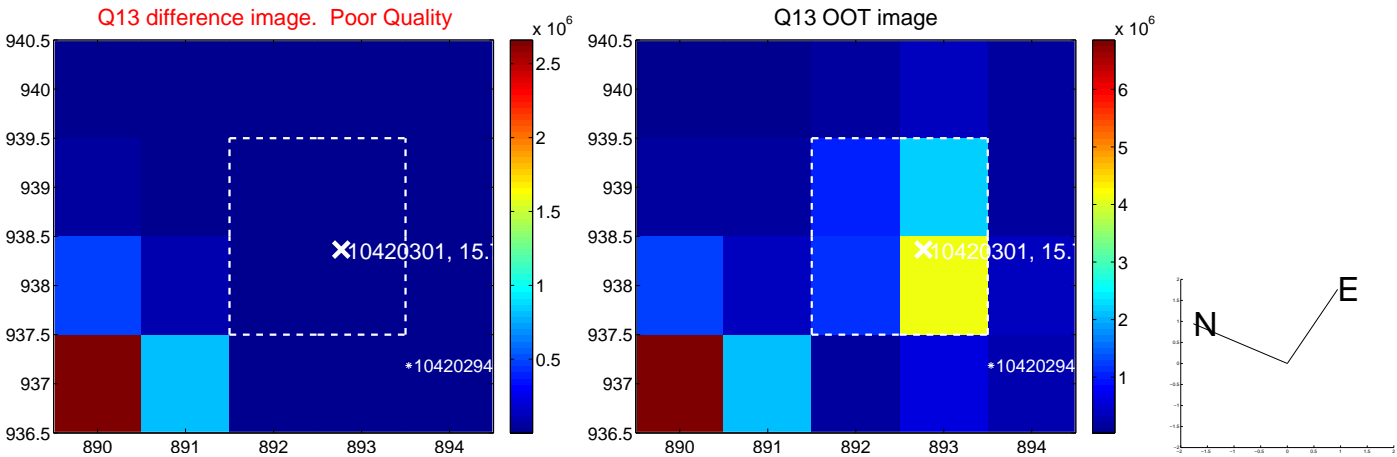
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



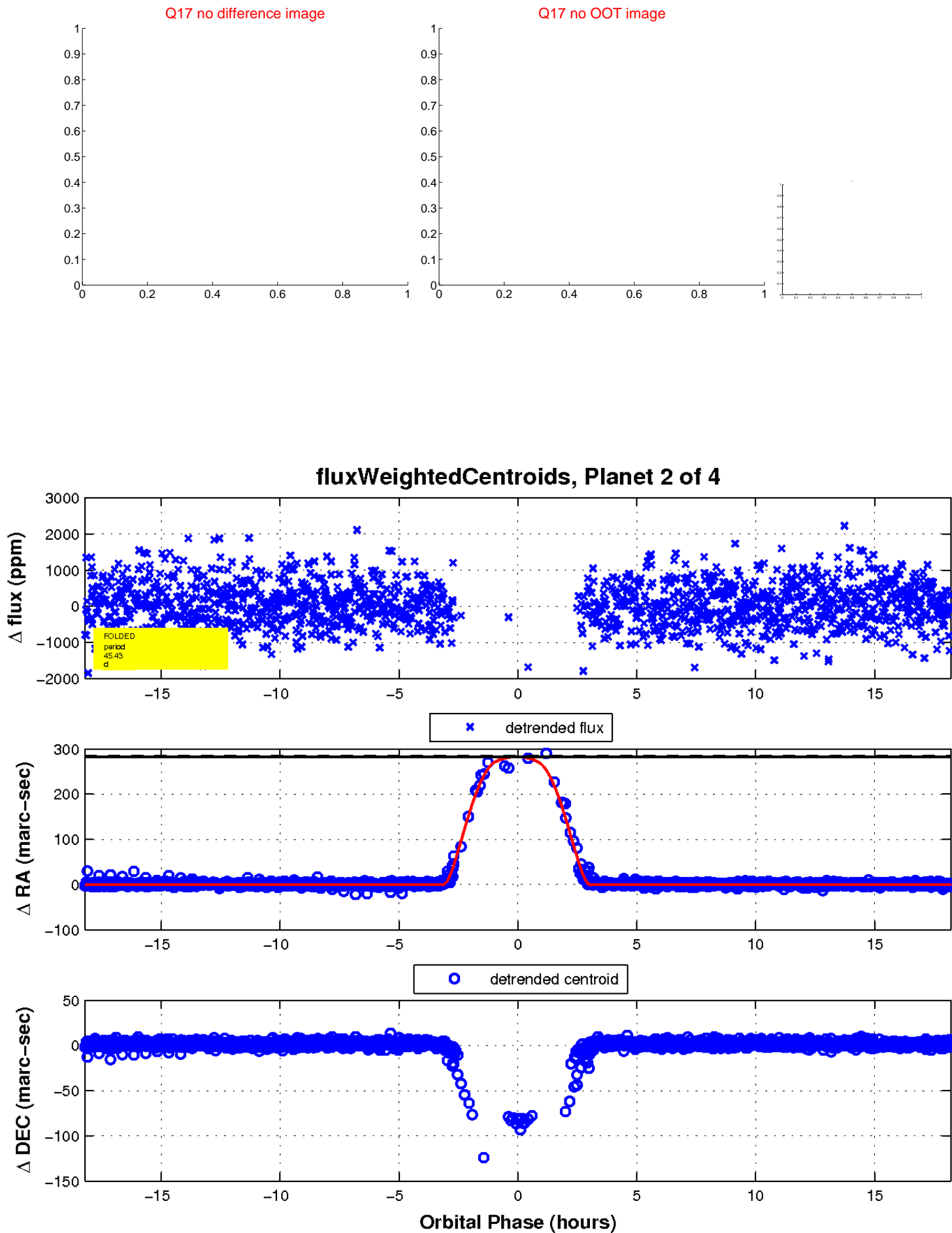
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

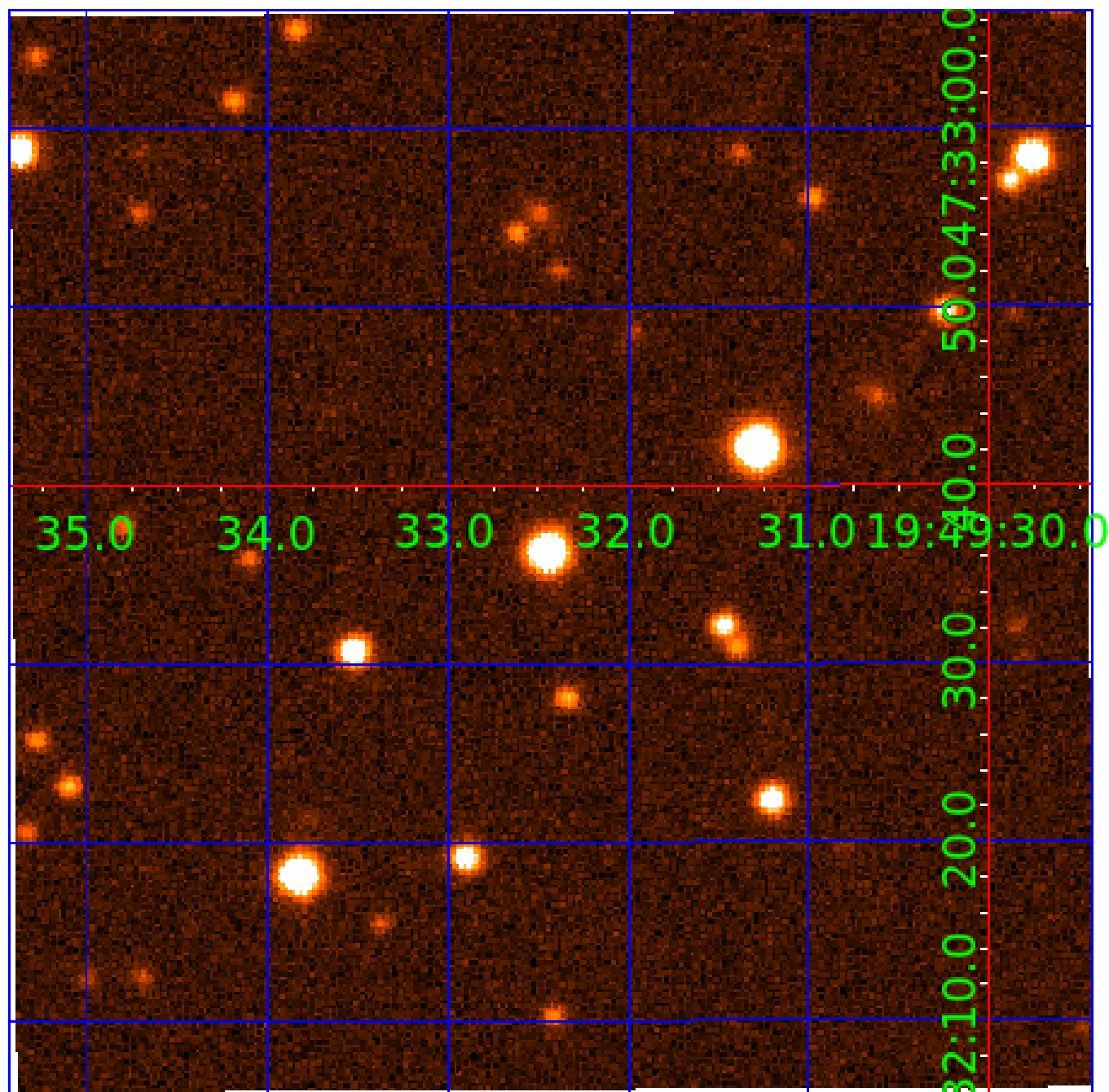


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010420301

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})
010420301-01	OBS	No	318.030709	250.743131	1103.3	12.393	19.8	13.4	0.56	4371	1.84	0.17
010420301-02	OBS	3257.01	45.433250	172.941835	786.6	6.071	12.1	15.1	0.56	4371	2.10	2.35
010420301-03	OBS	No	363.482932	250.714038	1103.3	12.814	9.8	10.5	0.56	4371	3.28	0.15
010420301-04	OBS	No	181.725309	296.196534	783.5	6.850	8.8	8.0	0.56	4371	1.65	0.37

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010420301-01	OBS	FP	0.00	1	0	0	1	INCONSISTENT_TRANS—CENT_FEW_DIFFS—EPHEM_MATCH
010420301-02	OBS	FP	0.00	1	0	1	1	SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET—EPHEM_MATCH
010420301-03	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_MARSHALL_SKYE—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET—EPHEM_MATCH
010420301-04	OBS	FP	0.00	1	0	1	1	SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET—EPHEM_MATCH

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 010420301-03

TCE (1)	KIC	Parent (2)	Parent KIC	P ₁ :P ₂	Dist (μ)	Δ Row	Δ Col	m ₂	m ₁	D ₂ /D ₁	Mechanism	Flag	σ_P	σ_T
010420301-03	10420301	010420279-01	10420279	8:1	13.1	2	2	14.77	15.77	391.02	Direct-PRF	0	4.73	0.31

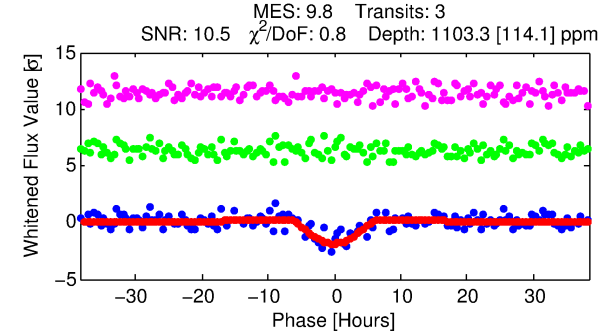
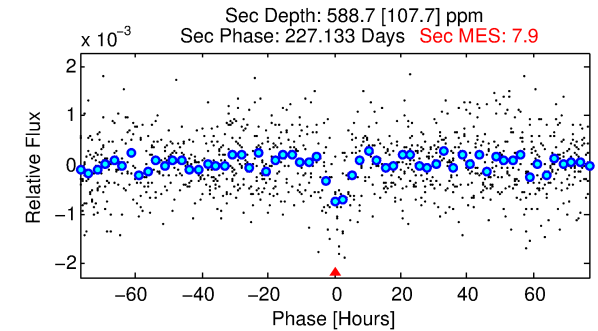
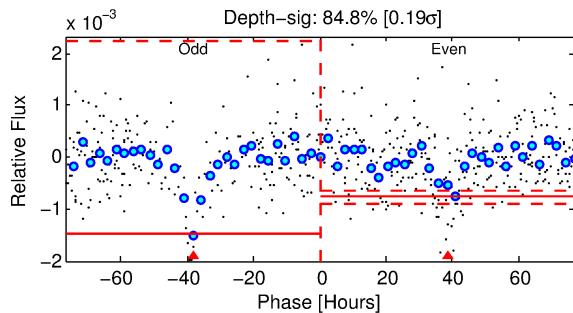
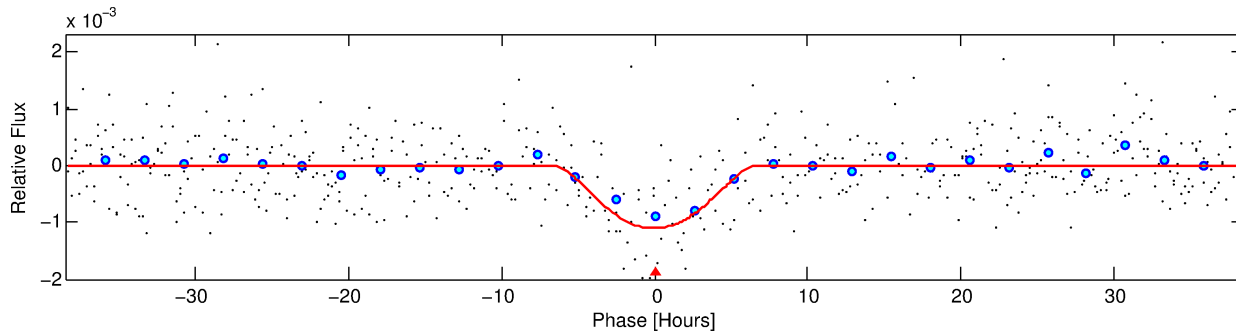
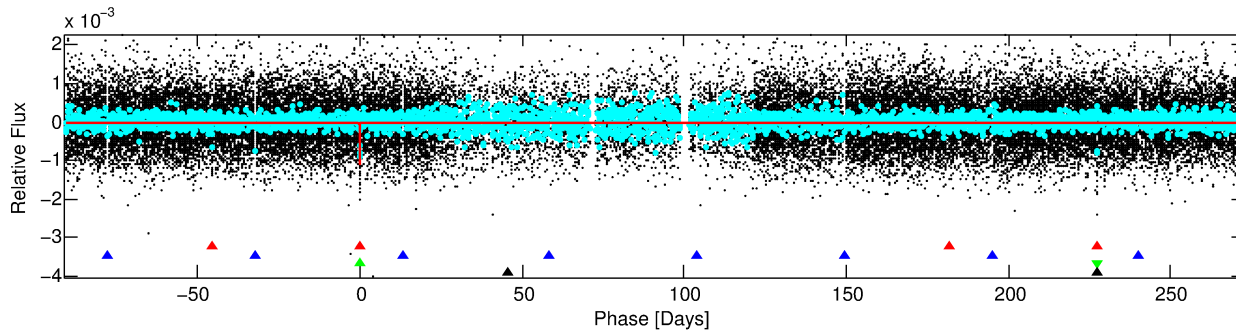
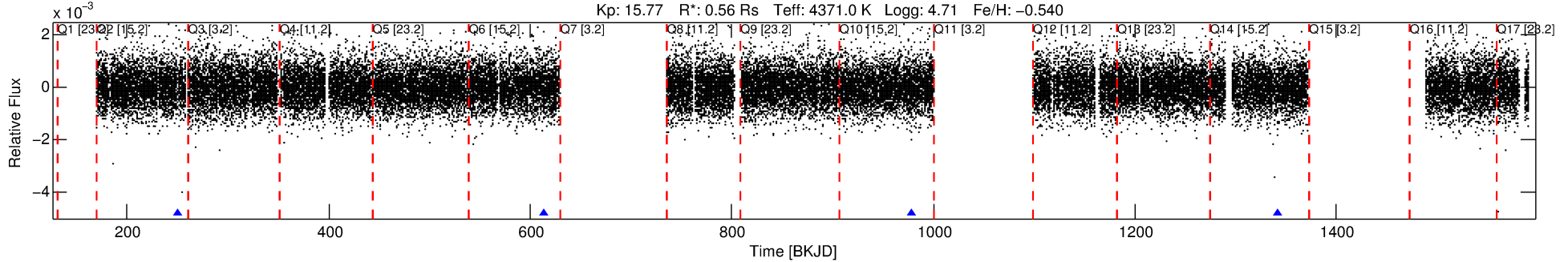
Notes: P₁:P₂ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m₂ and m₁ are the magnitudes of the parent and child. D₂/D₁ is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 10420301 Candidate: 3 of 4 Period: 363.483 d

KOI: K03257 Corr: No Ephemeris Match

Kp: 15.77 R*: 0.56 Rs Teff: 4371.0 K Logg: 4.71 Fe/H: -0.540



DV Fit Results:

Period = 363.48293 [0.01743] d
Epoch = 250.7140 [0.0392] BKJD
Rp/R* = 0.0537 [0.1323]
a/R* = 79.34 [55.42]
b = 0.99 [0.22]
Seff = 0.15 [0.02]
Teq = 158 [7] K
Rp = 3.28 [8.08] Re
a = 0.8349 [0.0640] AU
Ag = 21025.05 [103648.99] [0.20σ]
Teffp = 2938 [3621] K [0.77σ]

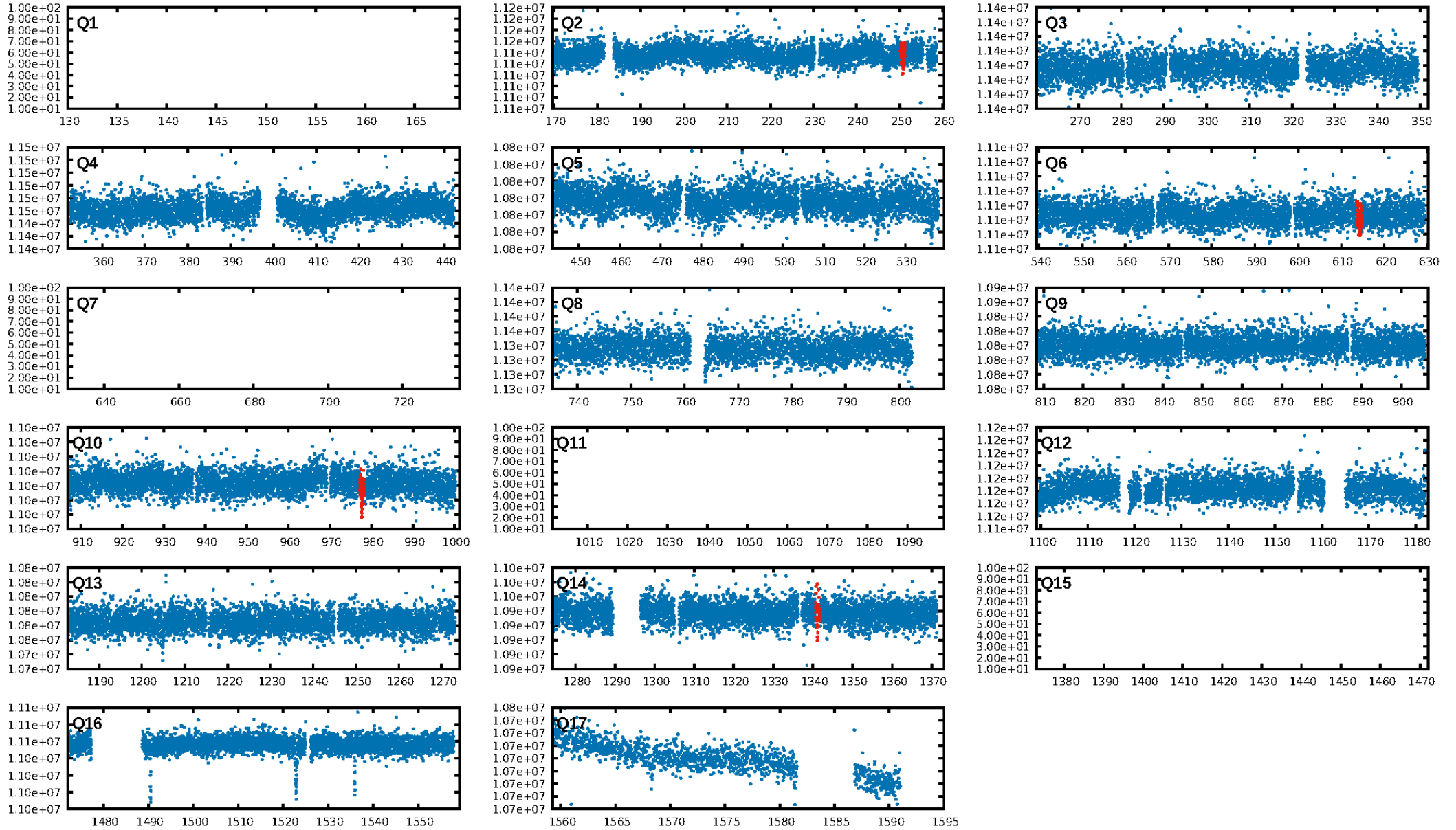
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [61.19σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 13.4%
ModelChiSquareGof-sig: 99.3%
Bootstrap-pfa: 1.39e-19
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.403
Centroid-sig: N/A
Centroid-so: 157.862 arcsec [119.91σ]
OotOffset-rm: N/A
KicOffset-rm: N/A
OotOffset-st: 0/0/0/0 [0]
KicOffset-st: 0/0/0/0 [0]
DiffImageQuality-fgm: N/A
DiffImageOverlap-fno: 0.75 [3/4]

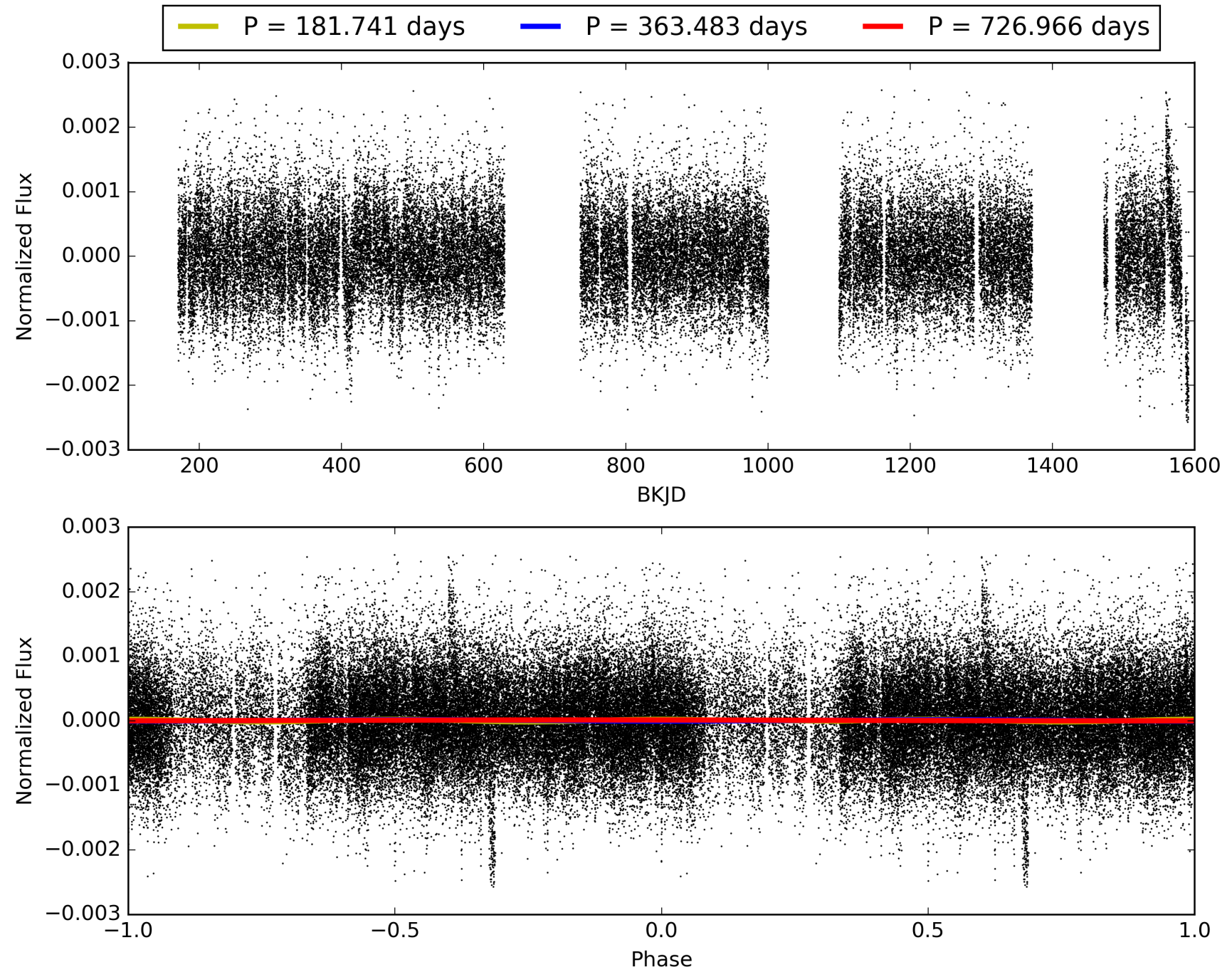
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 09:35:03 Z

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

TCE 010420301-03, PDC Light Curves

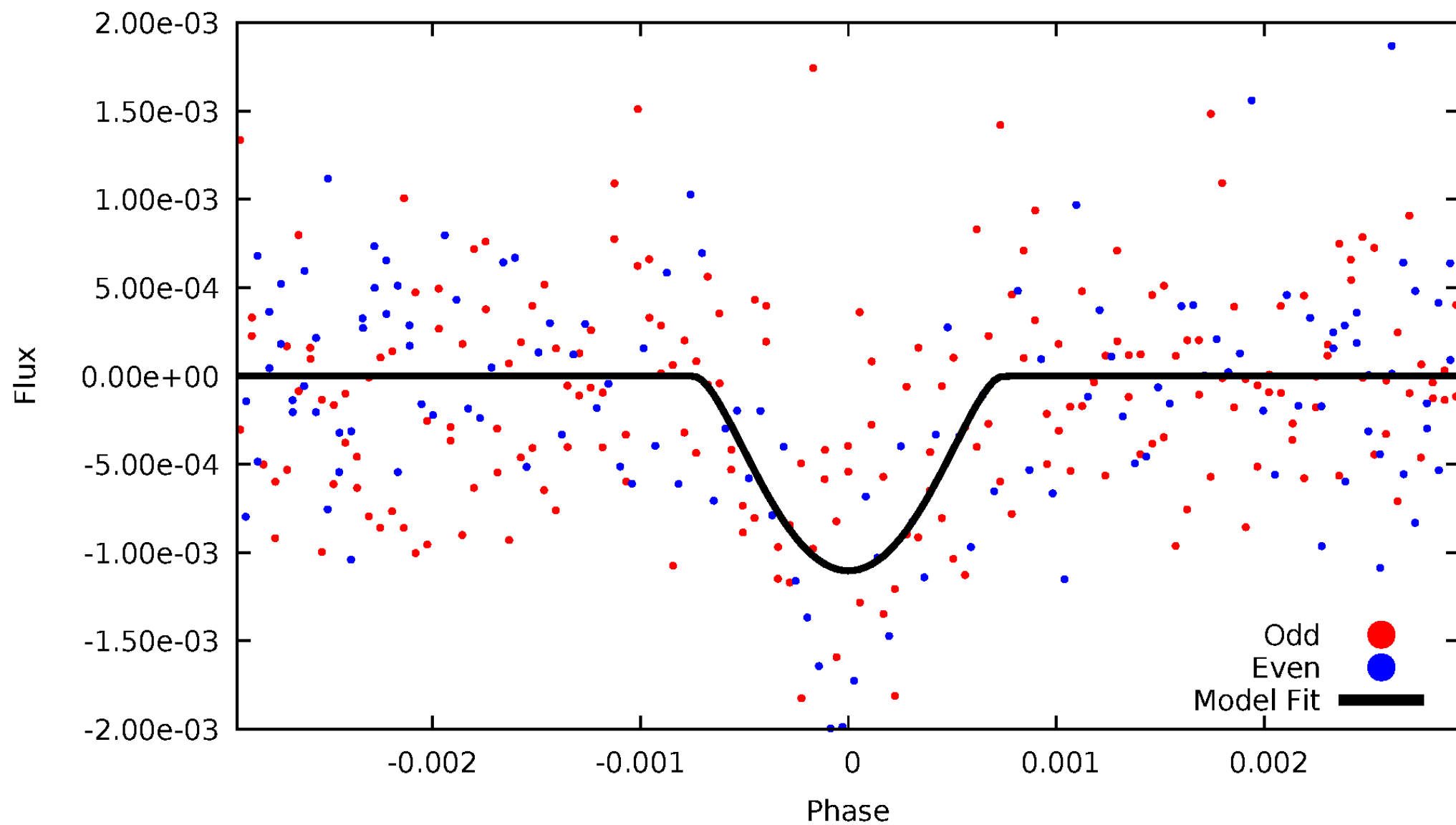


TCE 010420301-03



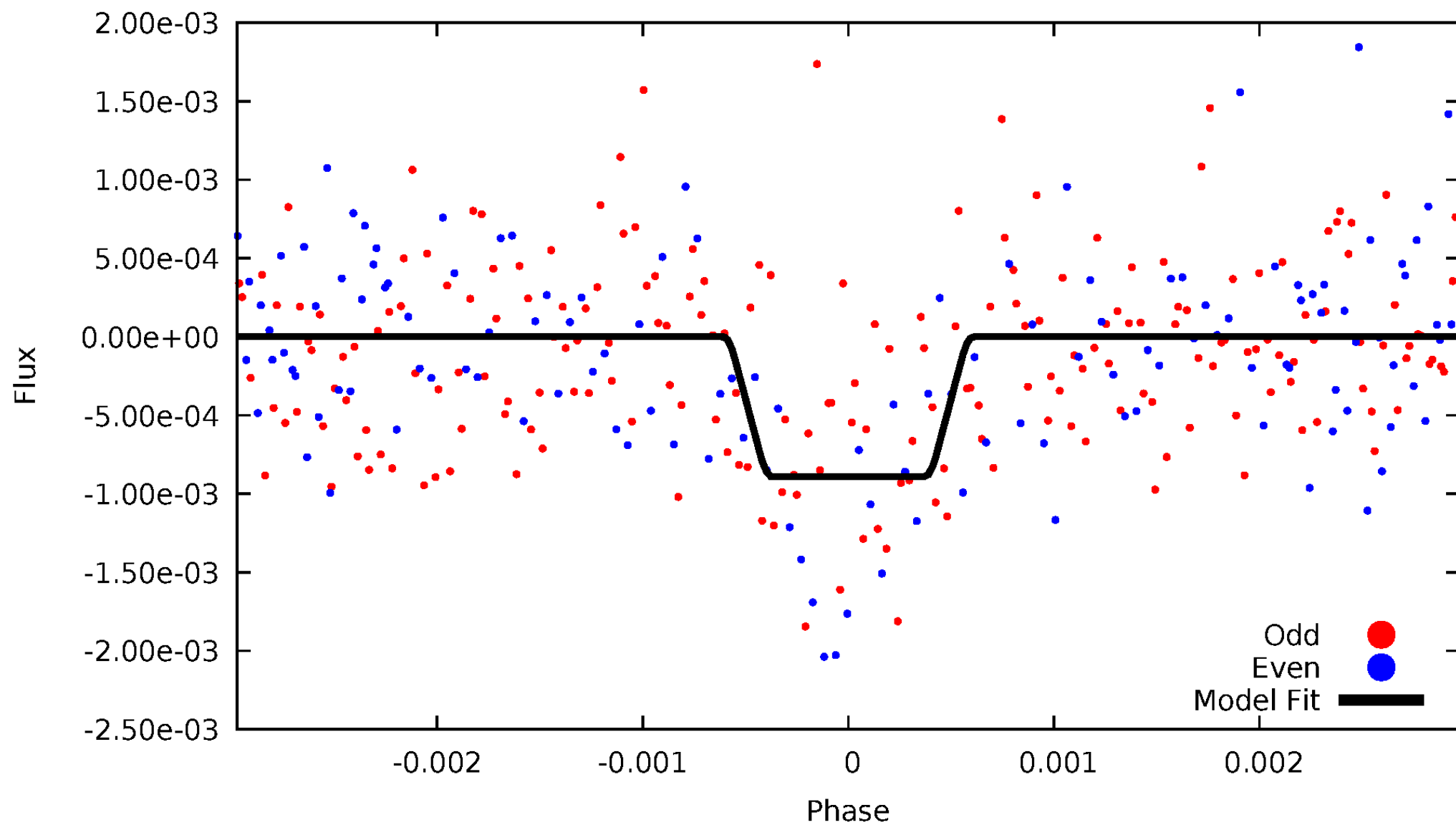
DV Odd/Even

TCE 010420301-03



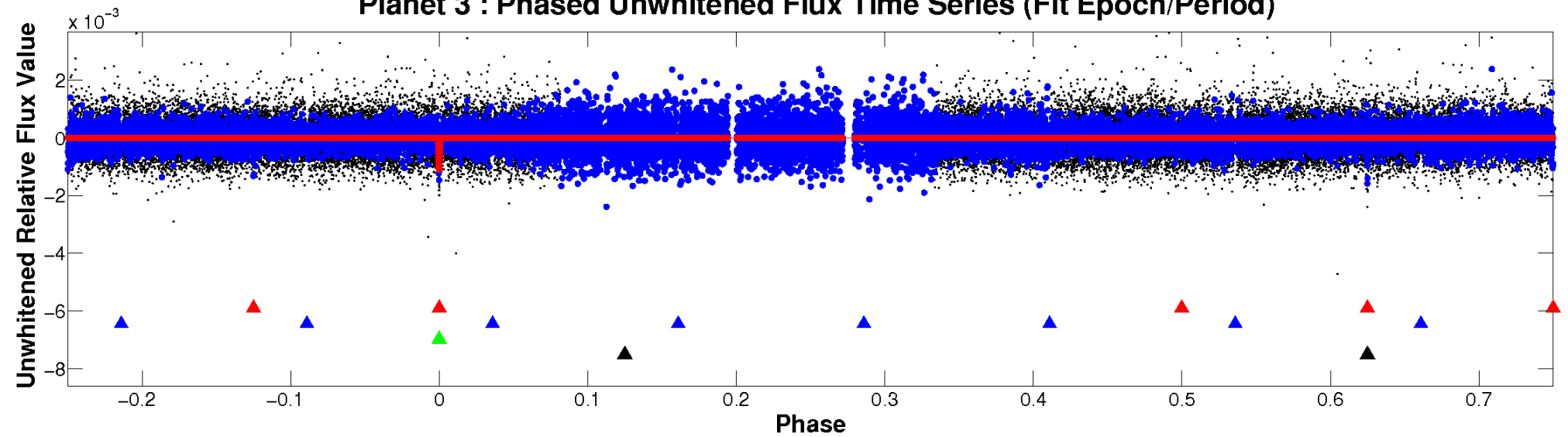
ALT Odd/Even

TCE 010420301-03

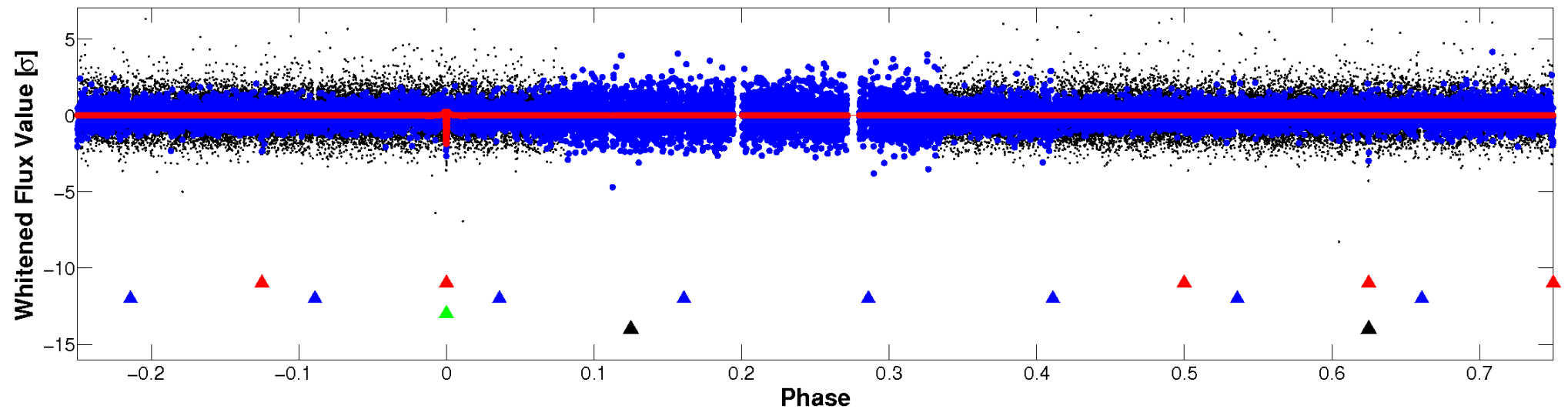


Non-Whitened Vs. Whitened Light Curve

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

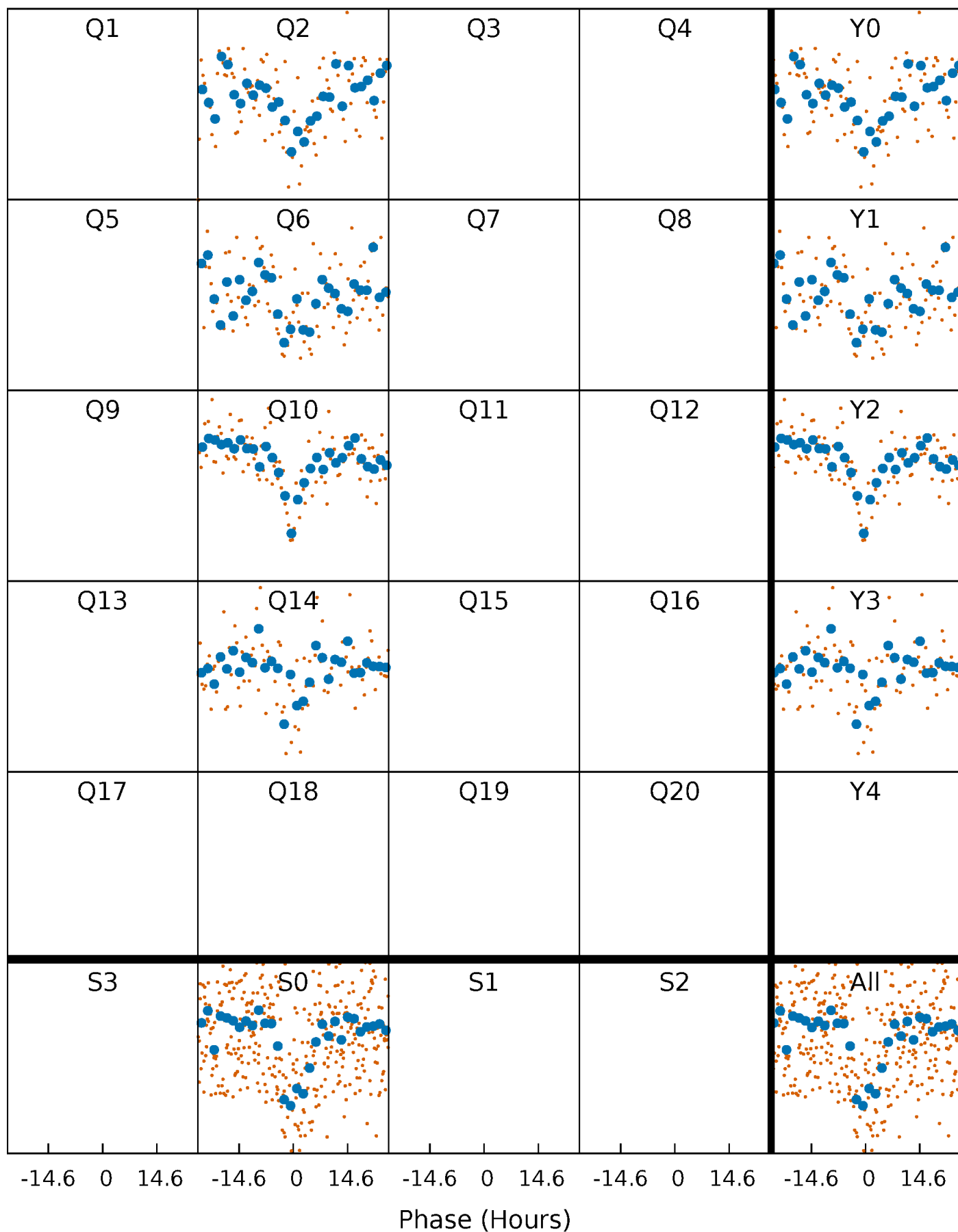


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



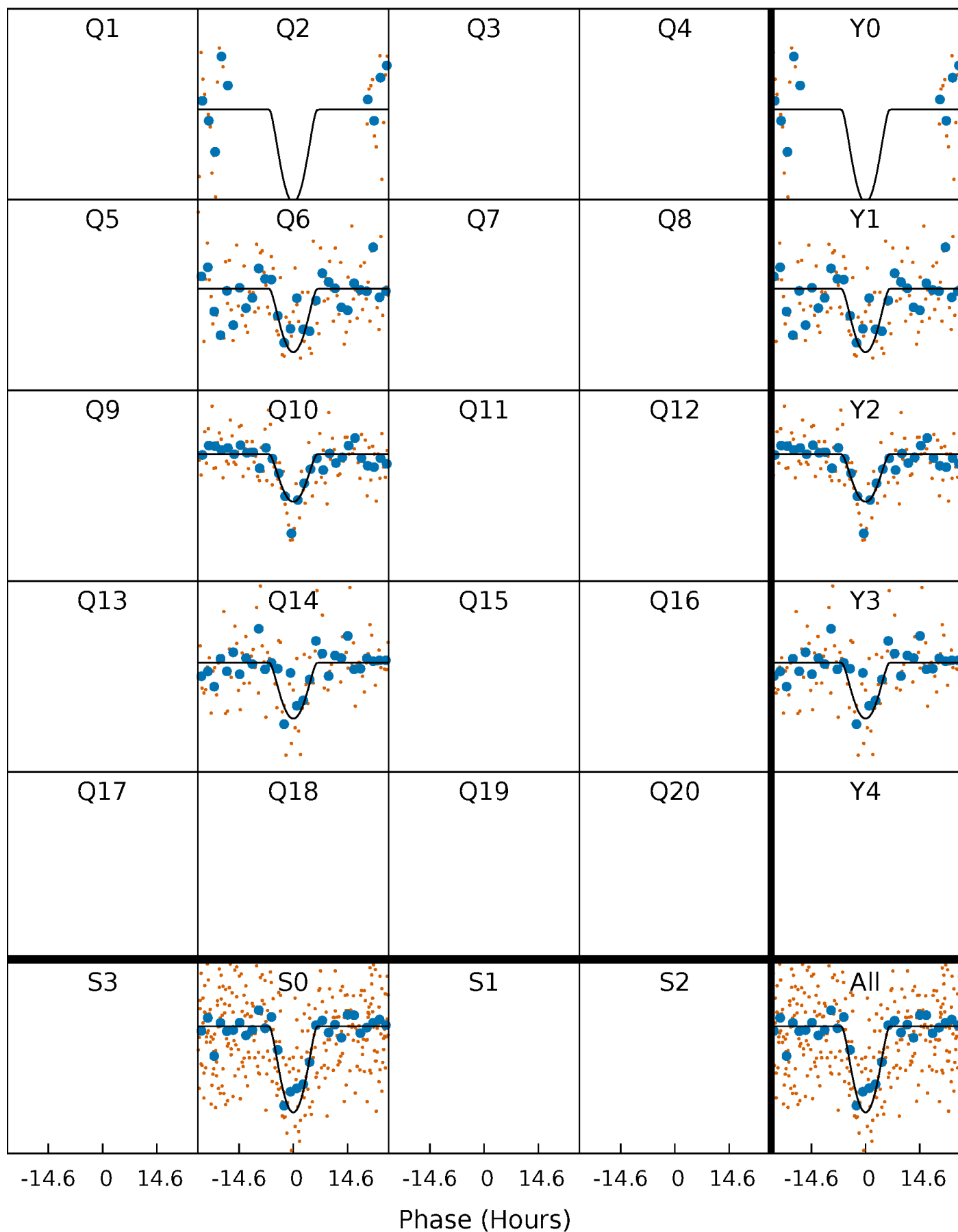
PDC Quarter-Phased Transit Curves

TCE 010420301-03 $P=363.482932$ Days $T_0=250.714038$ (BKJD)



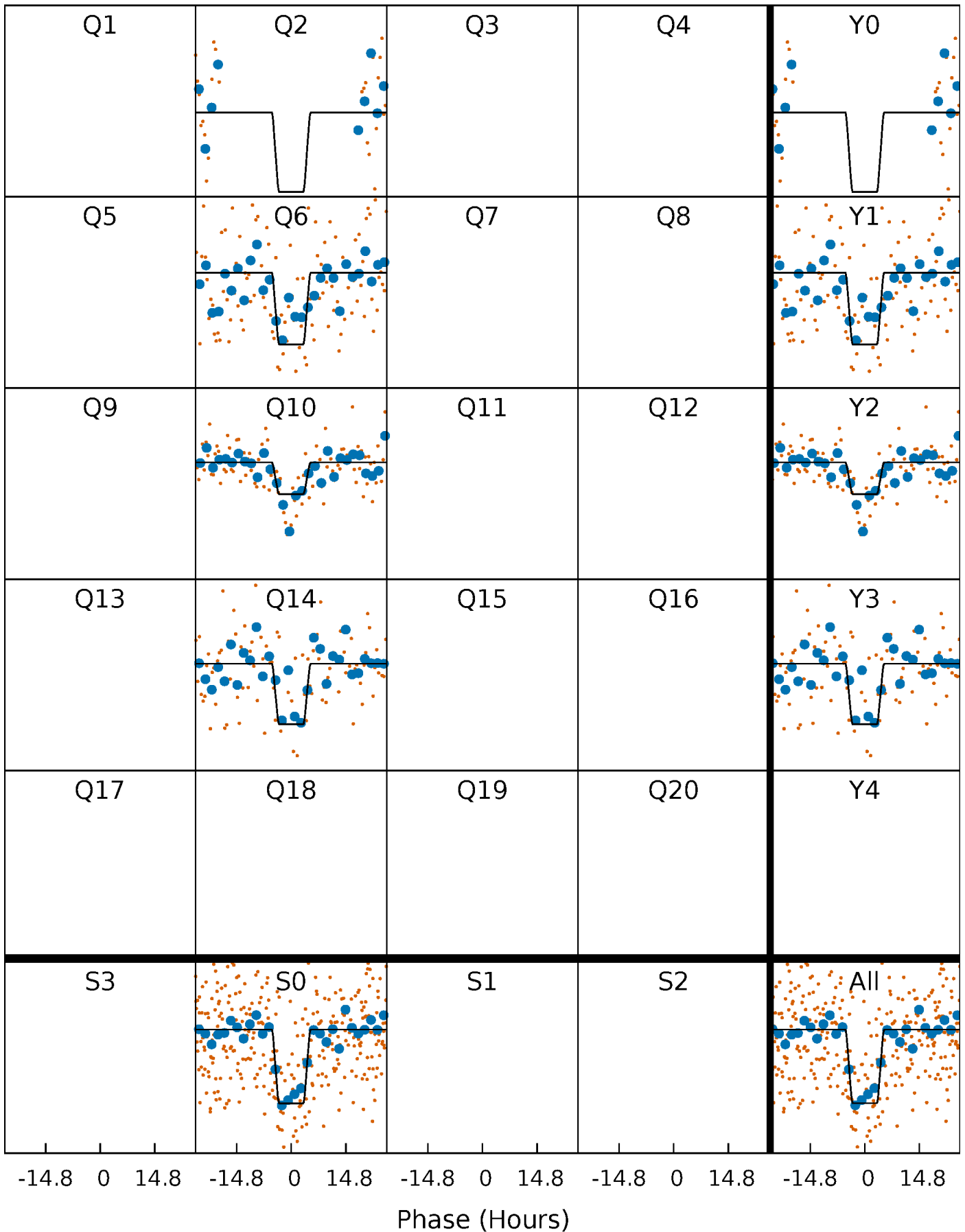
DV Quarter-Phased Transit Curves

TCE 010420301-03 P=363.482932 Days $T_0=250.714038$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

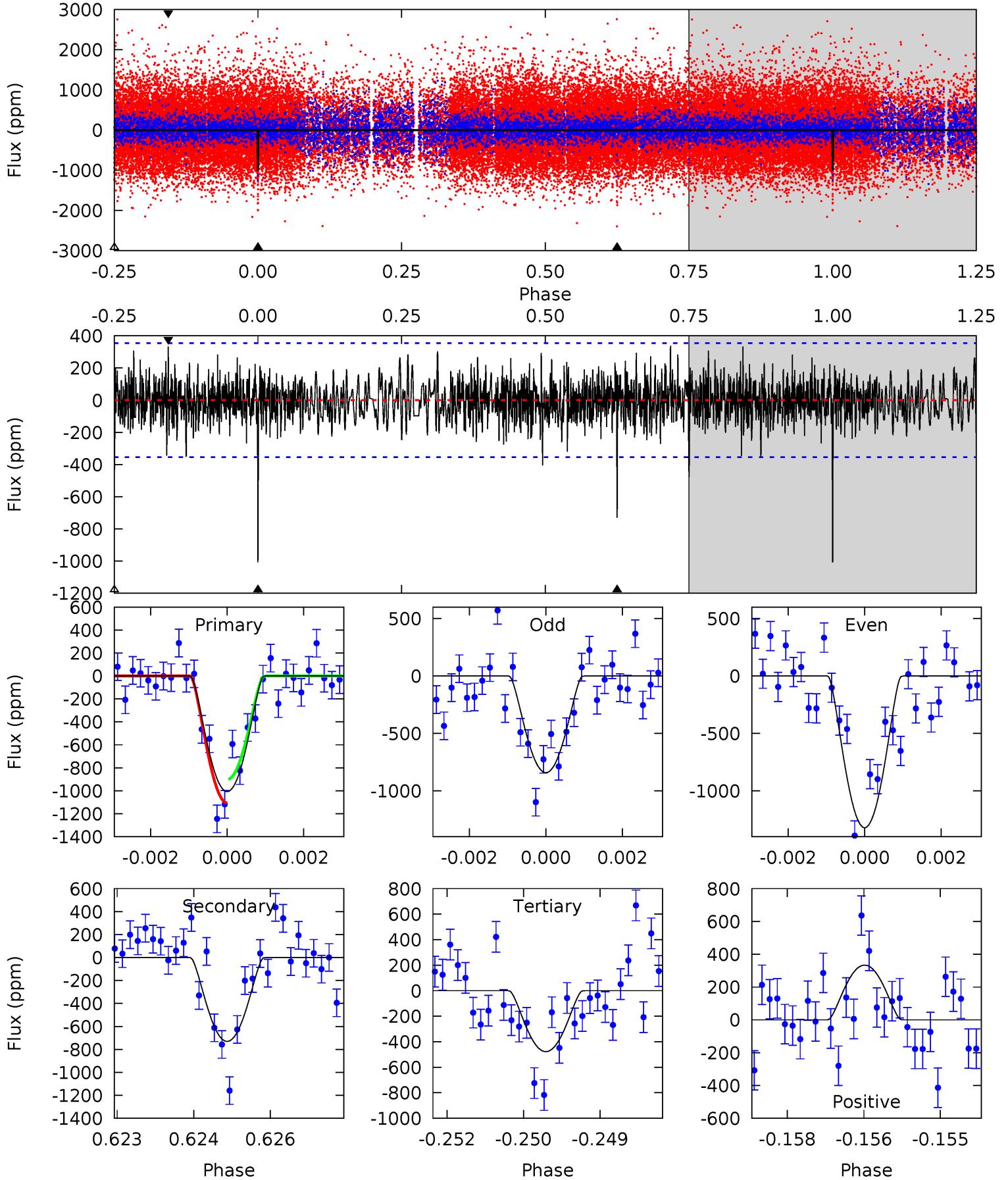
TCE 010420301-03 $P=363.465354$ Days $T_0=250.760866$ (BKJD)



DV Model-Shift Uniqueness Test

010420301-03, P = 363.482932 Days, E = 250.714038 Days

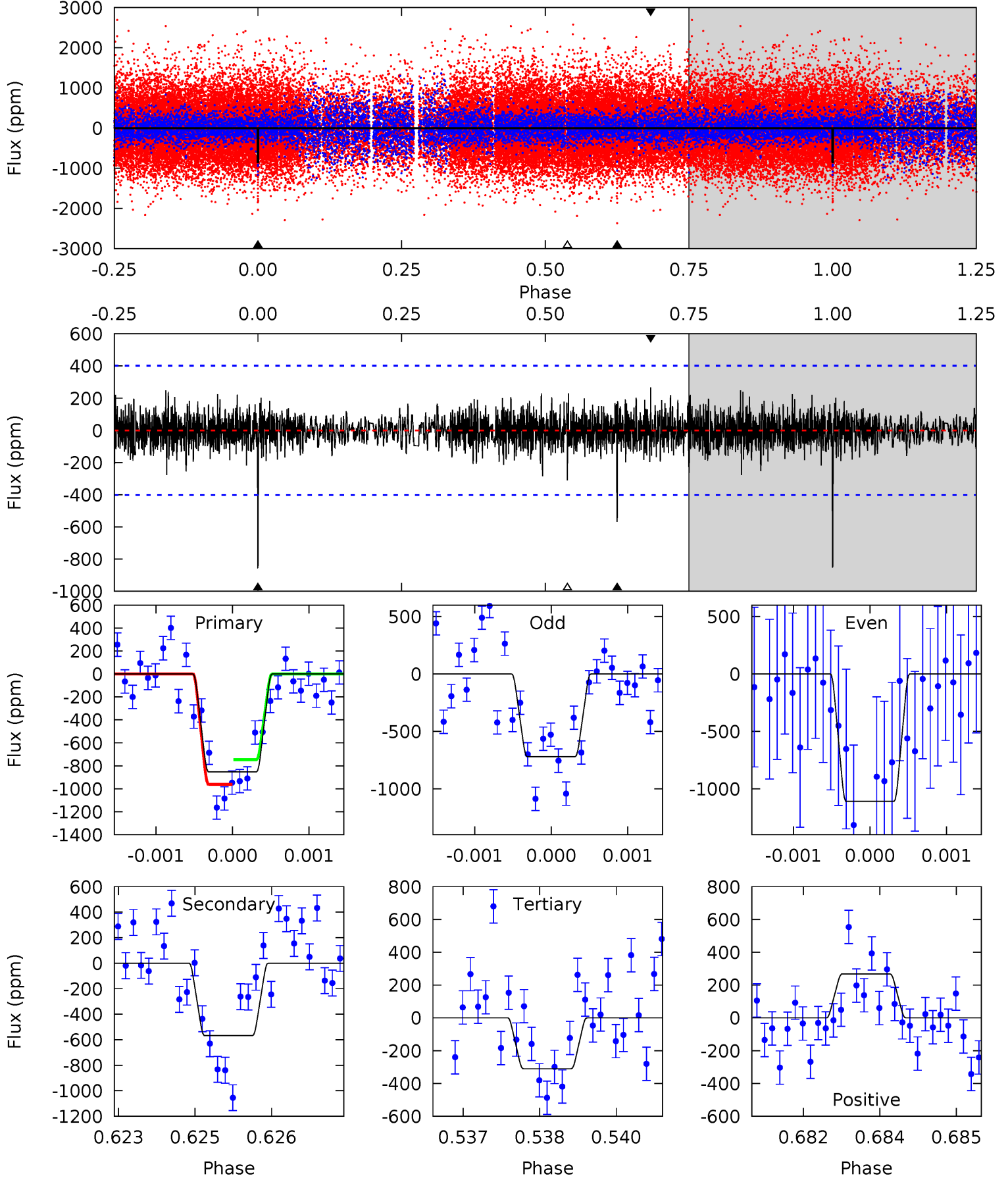
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.3	11.1	7.25	5.06	5.37	3.17	1.49	8.04	10.2	3.84	6.03	3.46	1.22	0.25	1.55



Alt Model-Shift Uniqueness Test

010420301-03, P = 363.465354 Days, E = 250.760866 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.5	7.67	4.19	3.61	5.42	3.24	0.97	7.32	7.89	3.48	4.06	2.49	1.22	0.24	1.44



Stellar Parameters For KIC 010420301

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4371^{+118}_{-144}	$4.712^{+0.036}_{-0.049}$	$-0.540^{+0.300}_{-0.300}$	$0.559^{+0.056}_{-0.045}$	$0.587^{+0.053}_{-0.053}$	$4.728^{+0.849}_{-0.864}$
	+3%/-3%	+1%/-1%	+56%/-56%	+10%/-8%	+9%/-9%	+18%/-18%
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 010420301-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-731 ± 66	$6.69^{+6.86}_{-4.68}$	221^{+7}_{-8}	2805^{+1219}_{-455}	6000^{+61956}_{-4462}
Alt.	-568 ± 74	$5.97^{+6.54}_{-3.91}$	220^{+8}_{-8}	2777^{+1051}_{-450}	5724^{+41943}_{-4361}

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

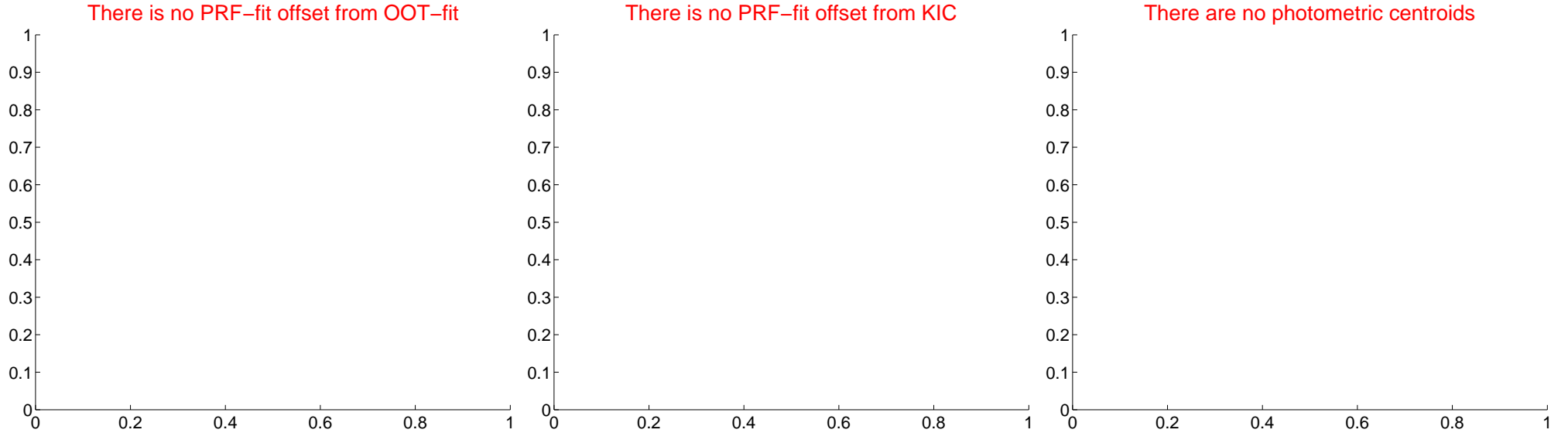
DV Centroid Data

Supplemental centroid analysis for 010420301-03. Kepler magnitude: 15.77. Transit SNR 10.50

There are 0 quarters with good PRF difference image offsets

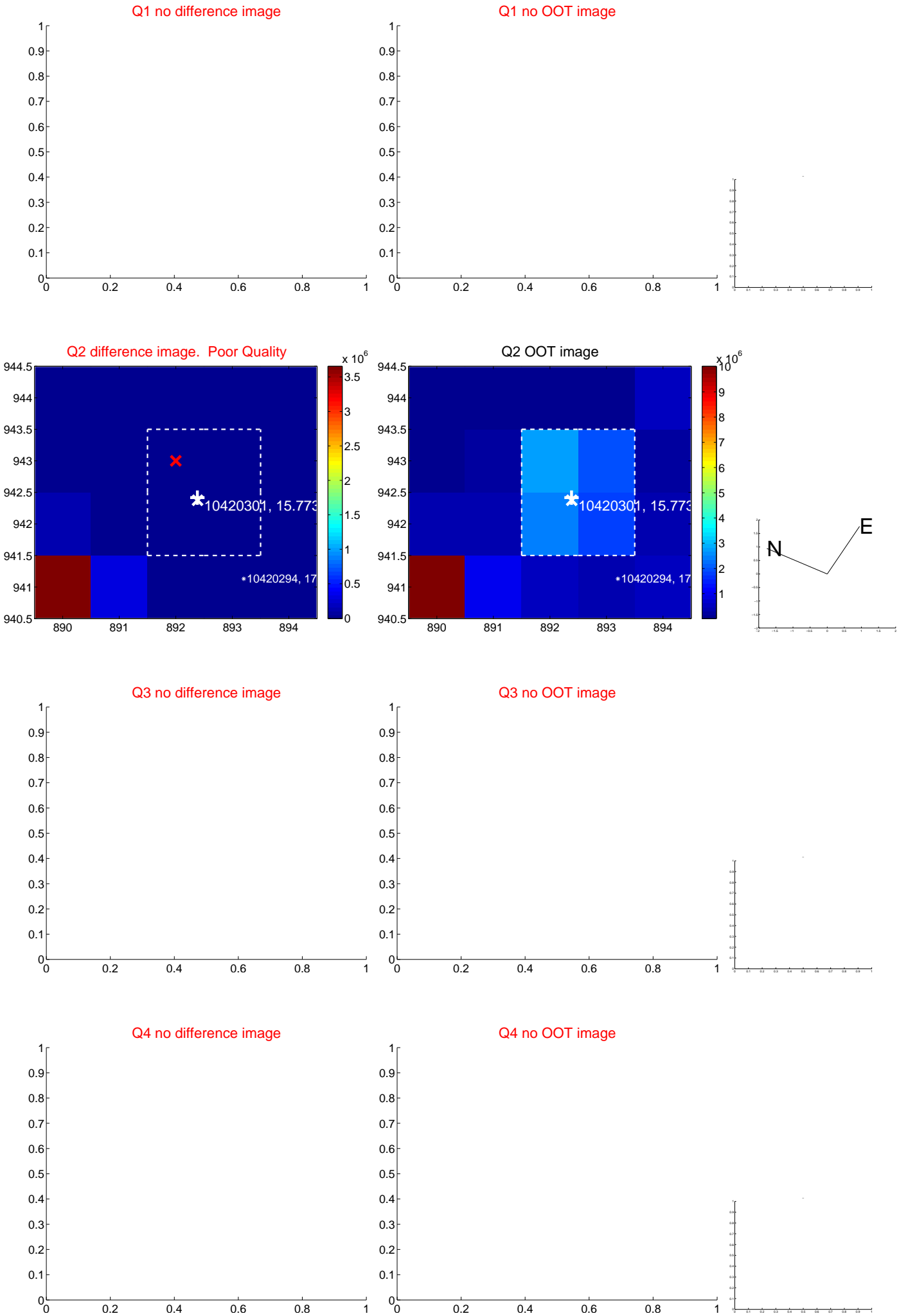
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	—	—	—	—

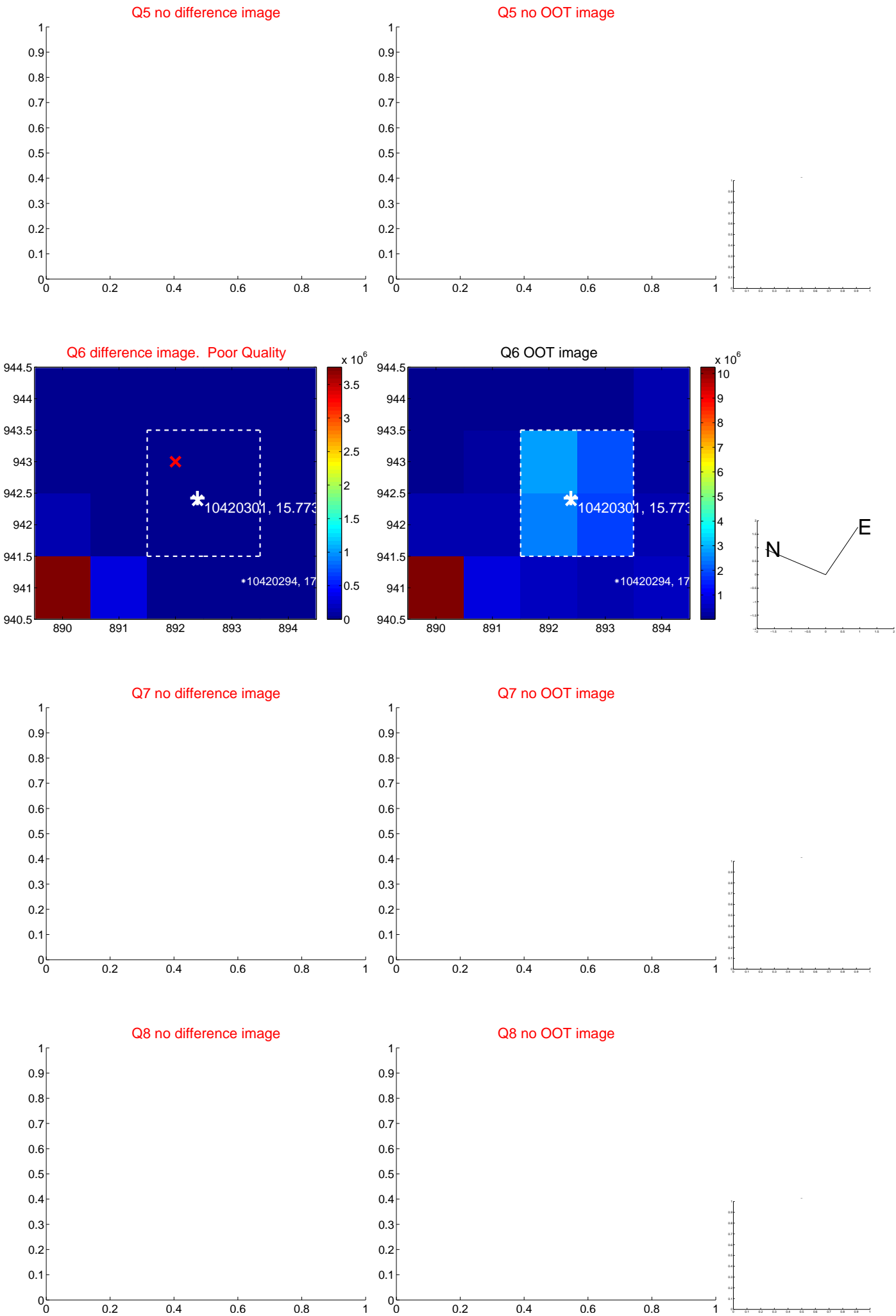


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

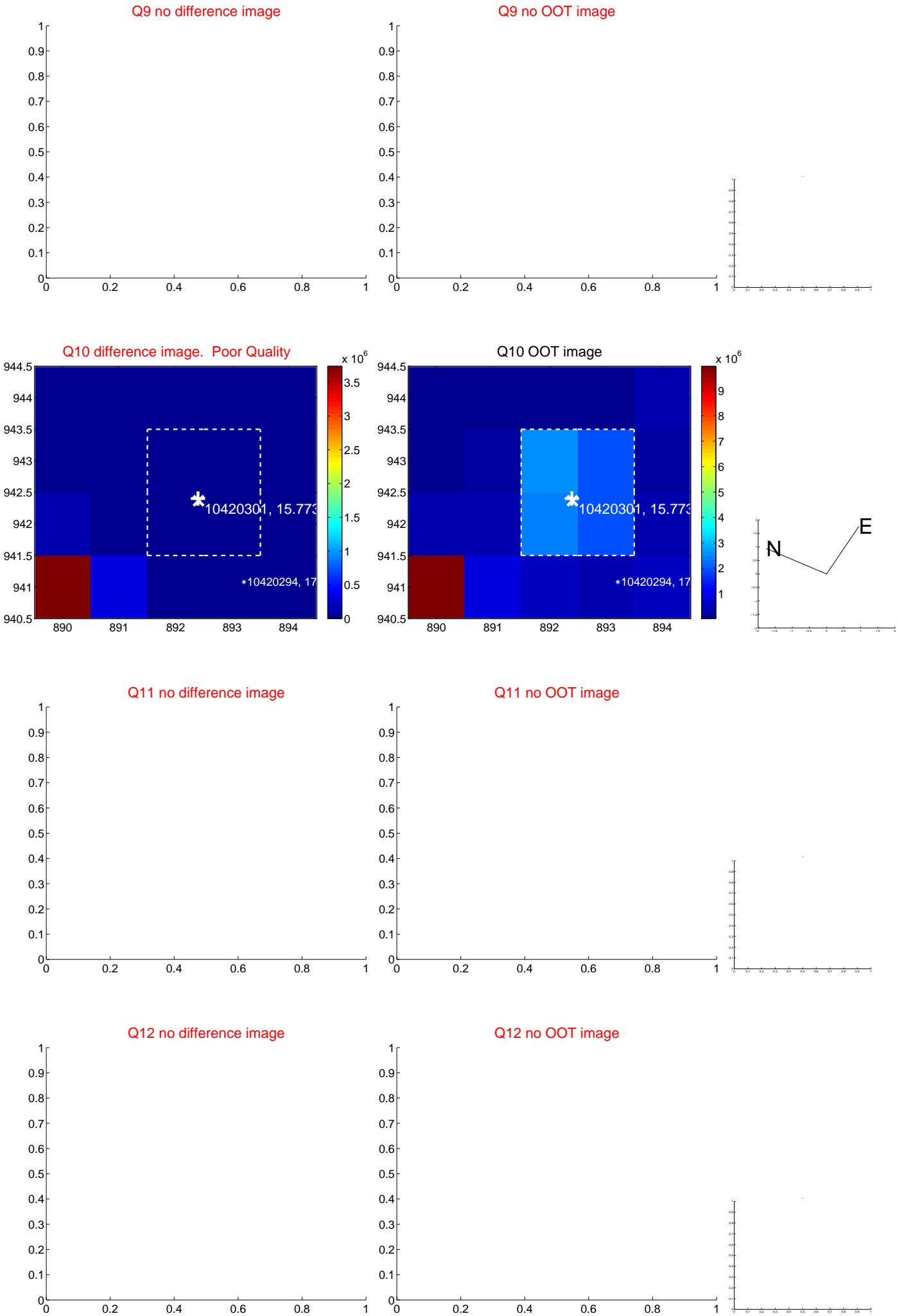
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



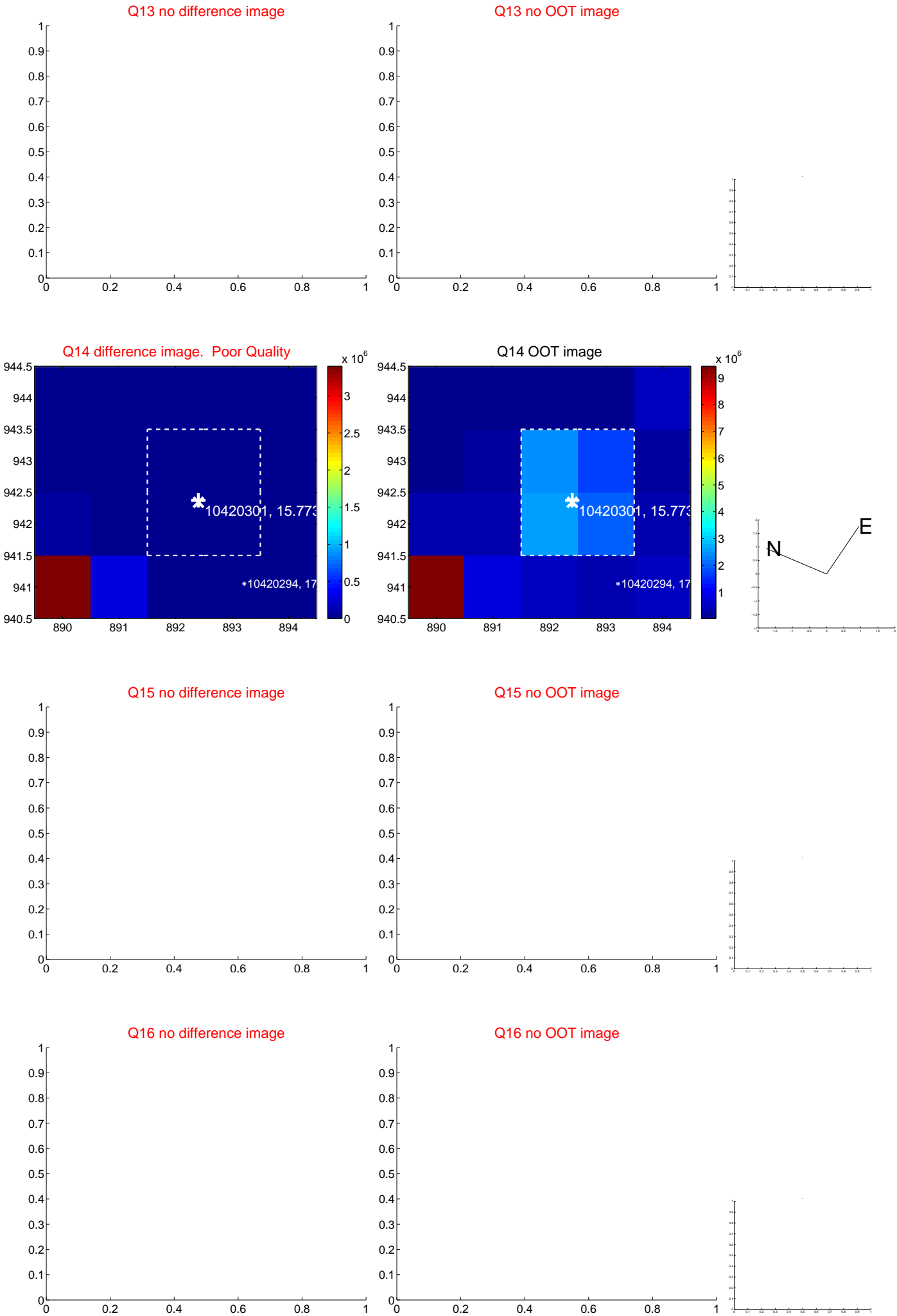
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



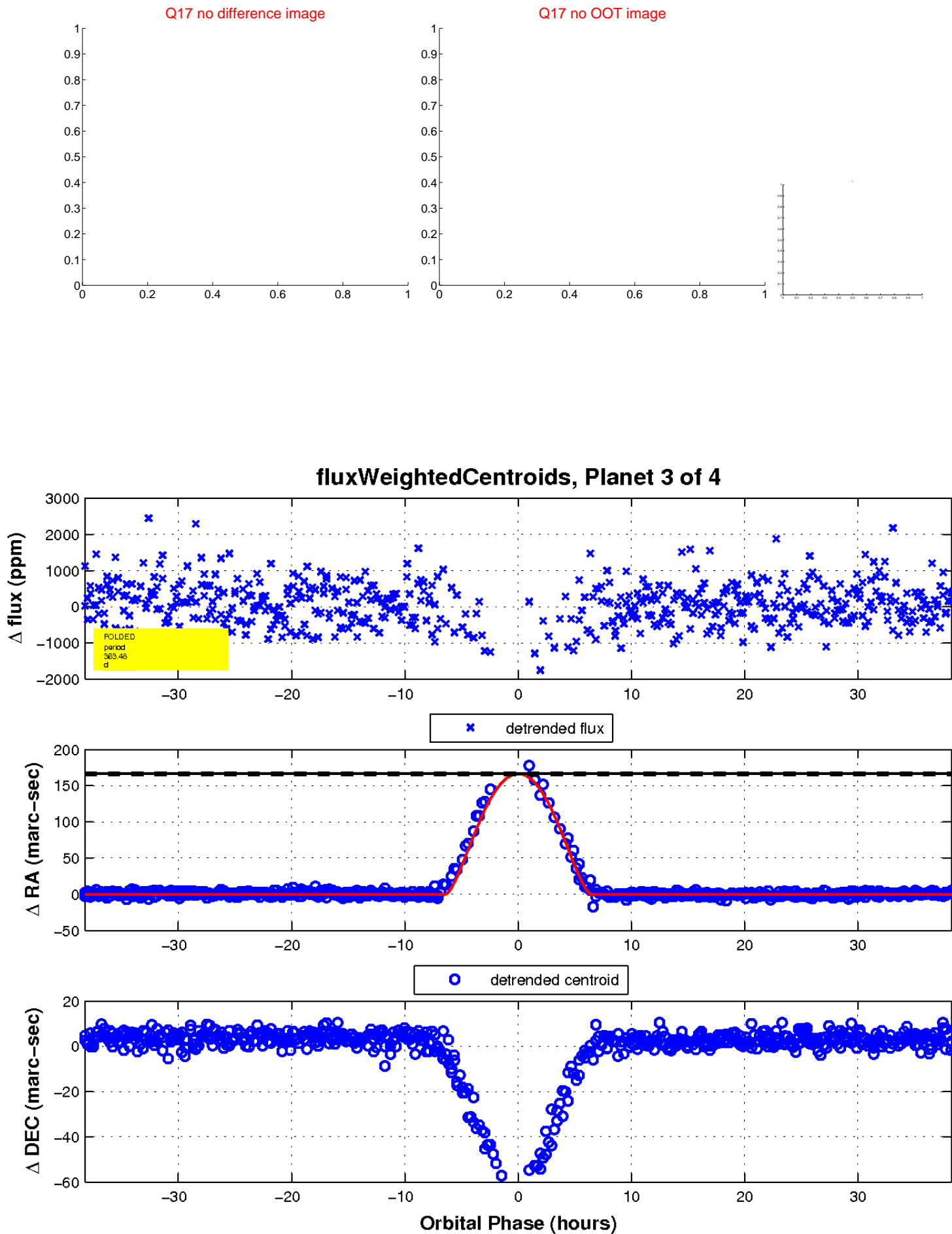
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

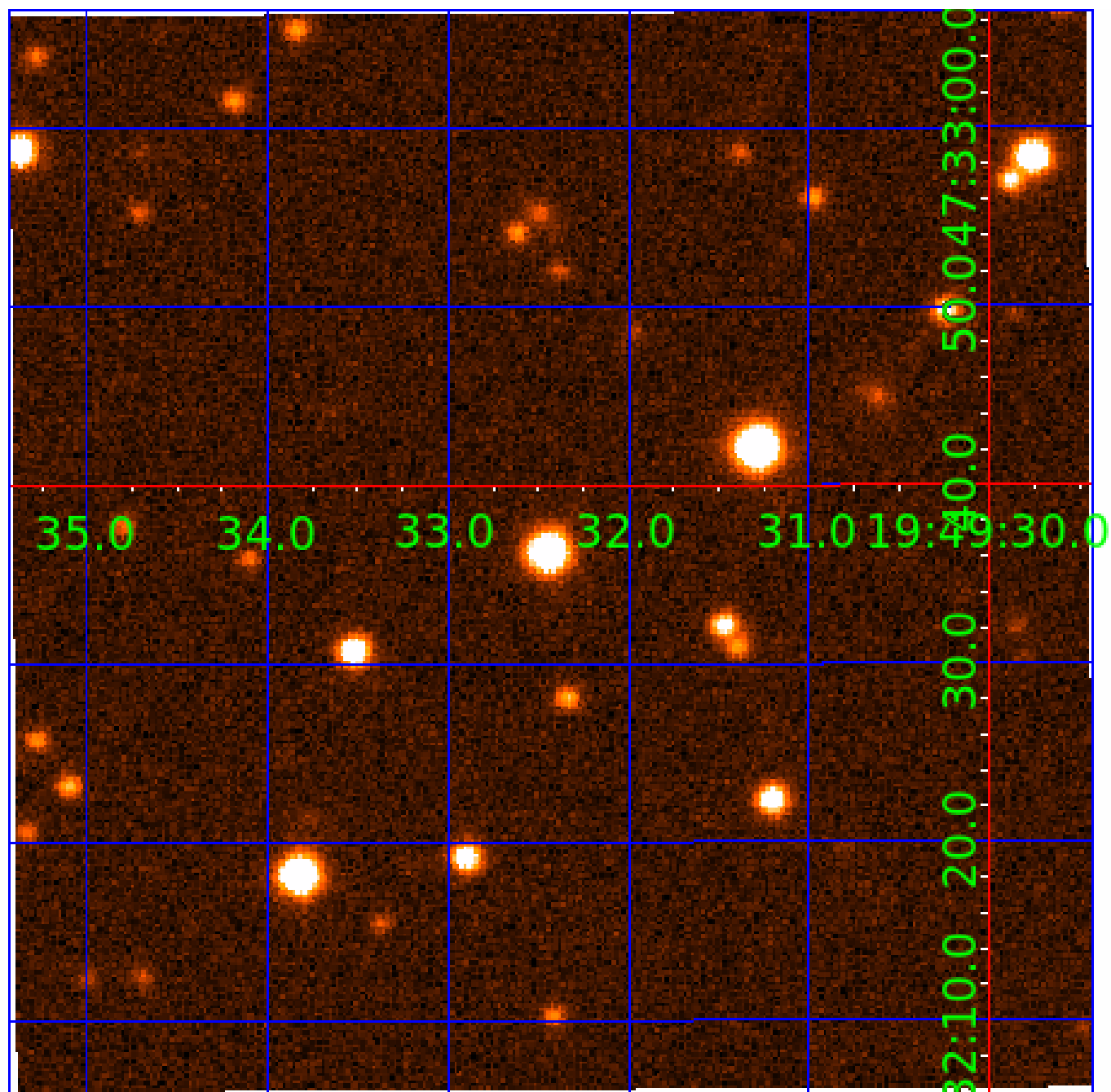


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010420301

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})
010420301-01	OBS	No	318.030709	250.743131	1103.3	12.393	19.8	13.4	0.56	4371	1.84	0.17
010420301-02	OBS	3257.01	45.433250	172.941835	786.6	6.071	12.1	15.1	0.56	4371	2.10	2.35
010420301-03	OBS	No	363.482932	250.714038	1103.3	12.814	9.8	10.5	0.56	4371	3.28	0.15
010420301-04	OBS	No	181.725309	296.196534	783.5	6.850	8.8	8.0	0.56	4371	1.65	0.37

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010420301-01	OBS	FP	0.00	1	0	0	1	INCONSISTENT_TRANS—CENT_FEW_DIFFS—EPHEM_MATCH
010420301-02	OBS	FP	0.00	1	0	1	1	SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET—EPHEM_MATCH
010420301-03	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_MARSHALL_SKYE—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET—EPHEM_MATCH
010420301-04	OBS	FP	0.00	1	0	1	1	SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET—EPHEM_MATCH

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 010420301-04

TCE (1)	KIC	Parent (2)	Parent KIC	P ₁ :P ₂	Dist ($''$)	Δ Row	Δ Col	m ₂	m ₁	D ₂ /D ₁	Mechanism	Flag	σ_P	σ_T
010420301-04	10420301	7325.01	10420279	4:1	13.1	2	2	14.77	15.77	535.84	Direct-PRF	0	3.69	0.48

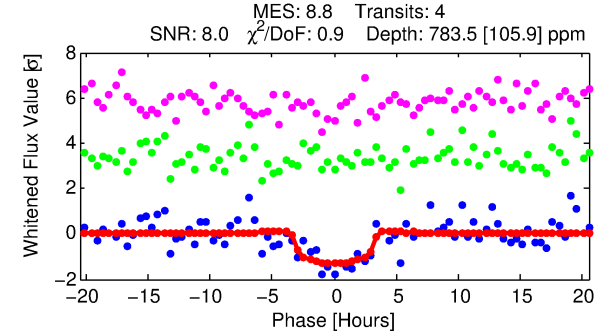
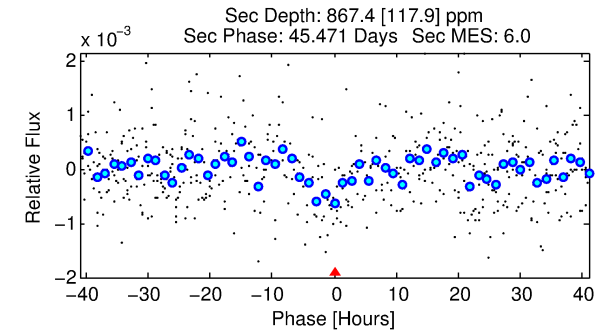
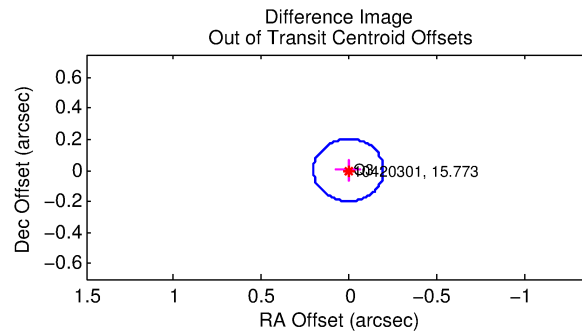
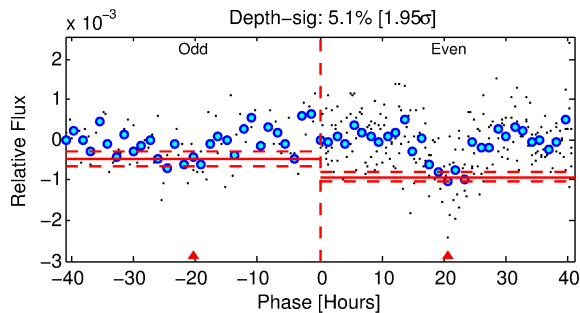
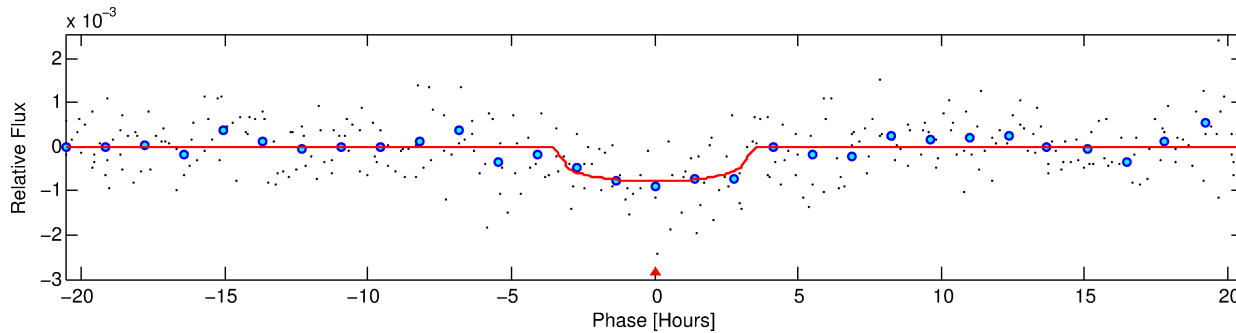
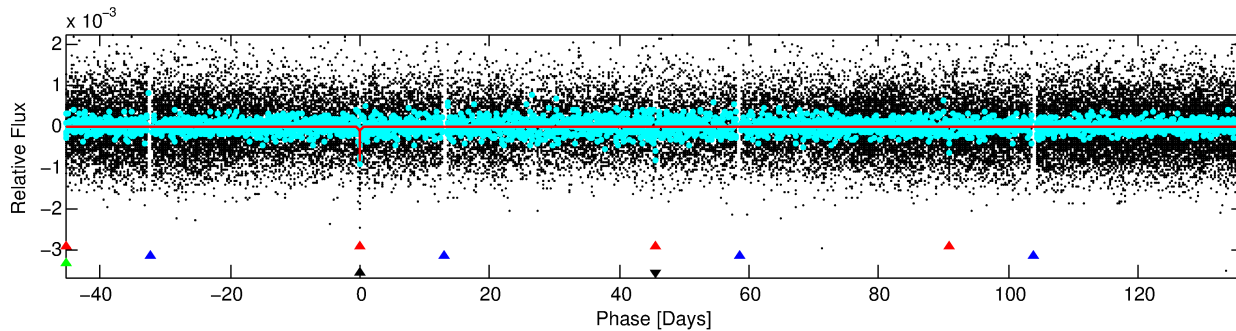
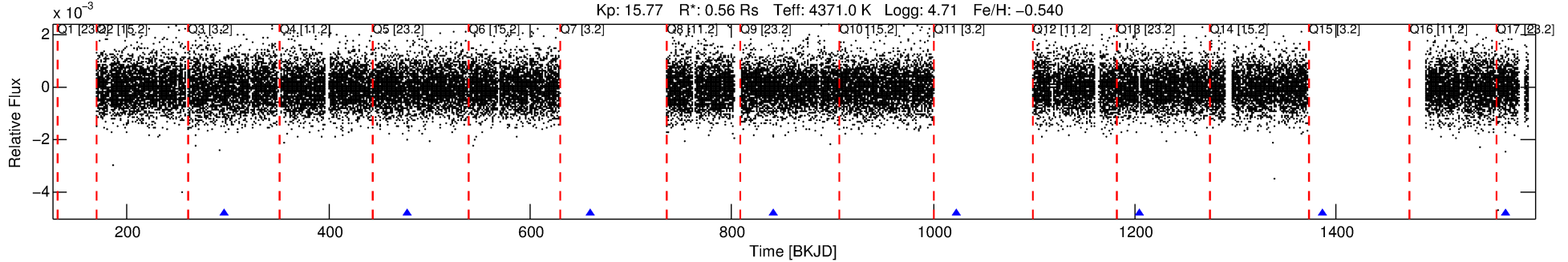
Notes: P₁:P₂ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m₂ and m₁ are the magnitudes of the parent and child. D₂/D₁ is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 10420301 Candidate: 4 of 4 Period: 181.725 d

KOI: K03257 Corr: No Ephemeris Match

Kp: 15.77 R*: 0.56 Rs Teff: 4371.0 K Logg: 4.71 Fe/H: -0.540



DV Fit Results:

Period = 181.72531 [0.00314] d
Epoch = 296.1965 [0.0123] BKJD
Rp/R* = 0.0271 [0.0298]
a/R* = 157.80 [608.16]
b = 0.67 [3.24]
Seff = 0.37 [0.06]
Teq = 199 [8] K
Rp = 1.65 [1.82] Re
a = 0.5259 [0.0403] AU
Ag = 48371.84 [106638.95] [0.45σ]
Teffp = 4558 [2514] K [1.73σ]

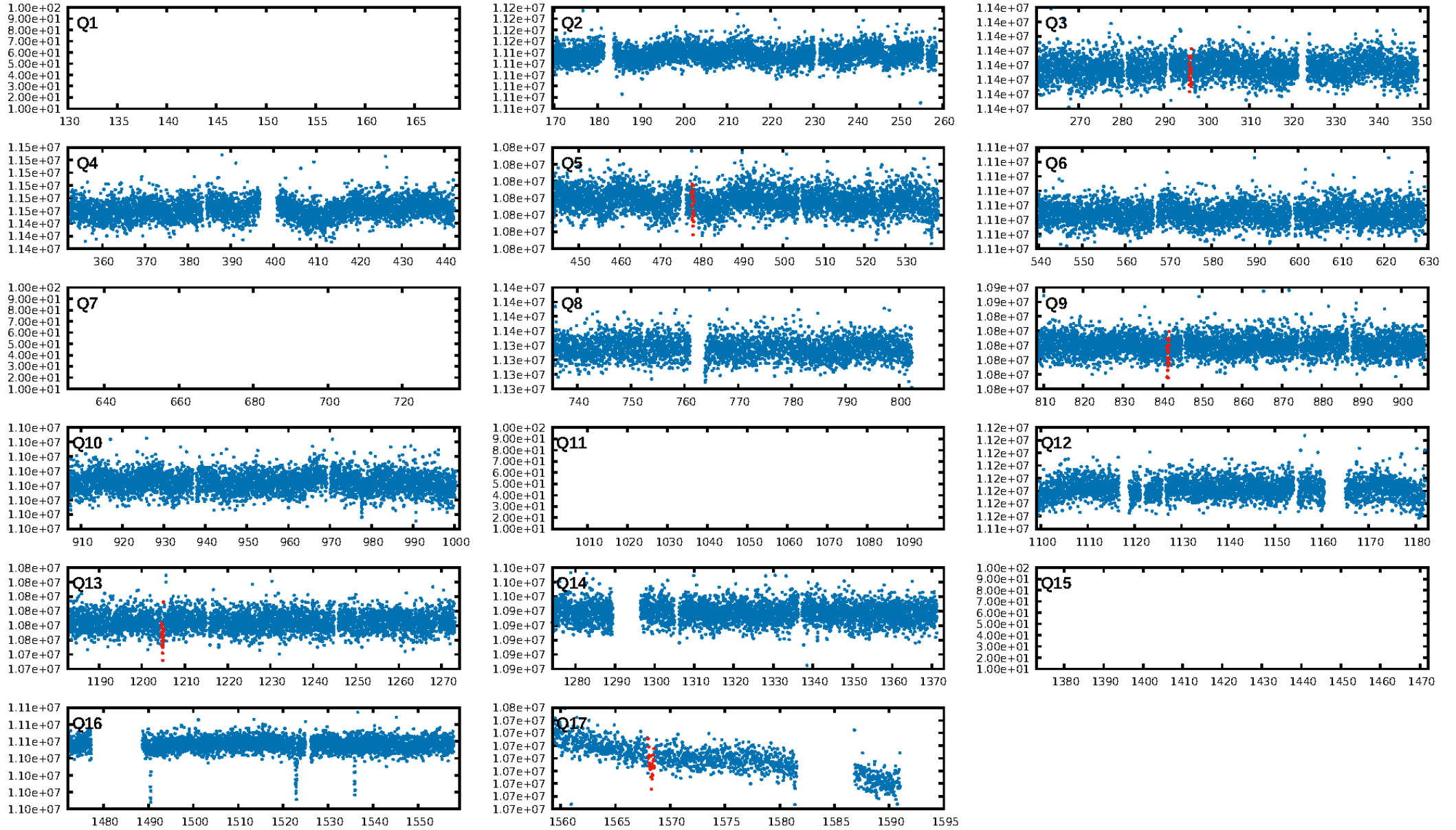
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [357.36σ]
LongPeriod-sig: 100.0% [231.03σ]
ModelChiSquare2-sig: 11.0%
ModelChiSquareGof-sig: 98.6%
Bootstrap-pfa: 4.06e-18
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.564
Centroid-sig: N/A
Centroid-so: N/A
OotOffset-rm: 0.005 arcsec [0.08σ]
KicOffset-rm: 13.096 arcsec [196.33σ]
OotOffset-st: 0/1/0/0 [1]
KicOffset-st: 0/1/0/0 [1]
DiffImageQuality-fgm: 1.00 [1/1]
DiffImageOverlap-fno: 0.80 [4/5]

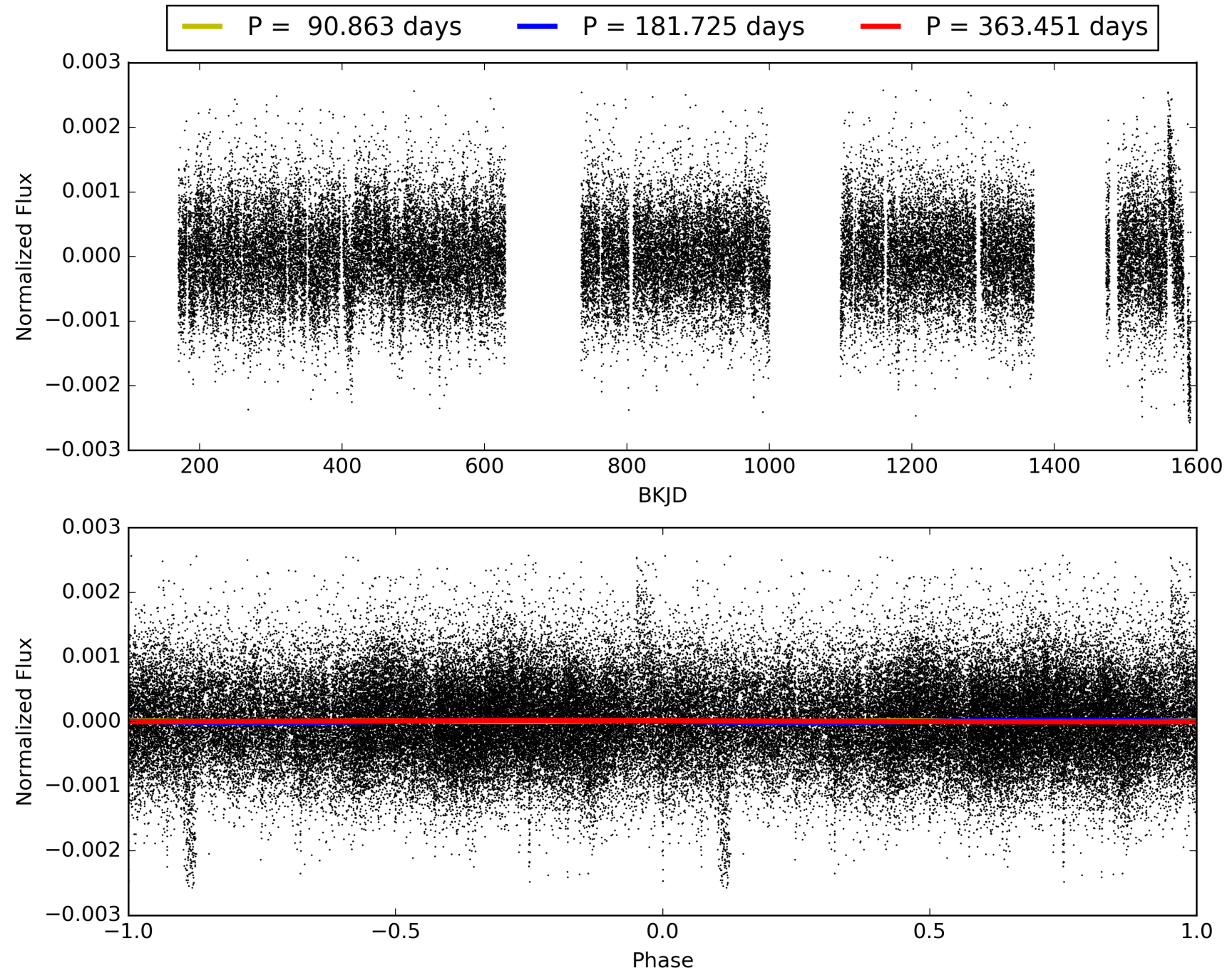
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 09:35:10 Z

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

TCE 010420301-04, PDC Light Curves

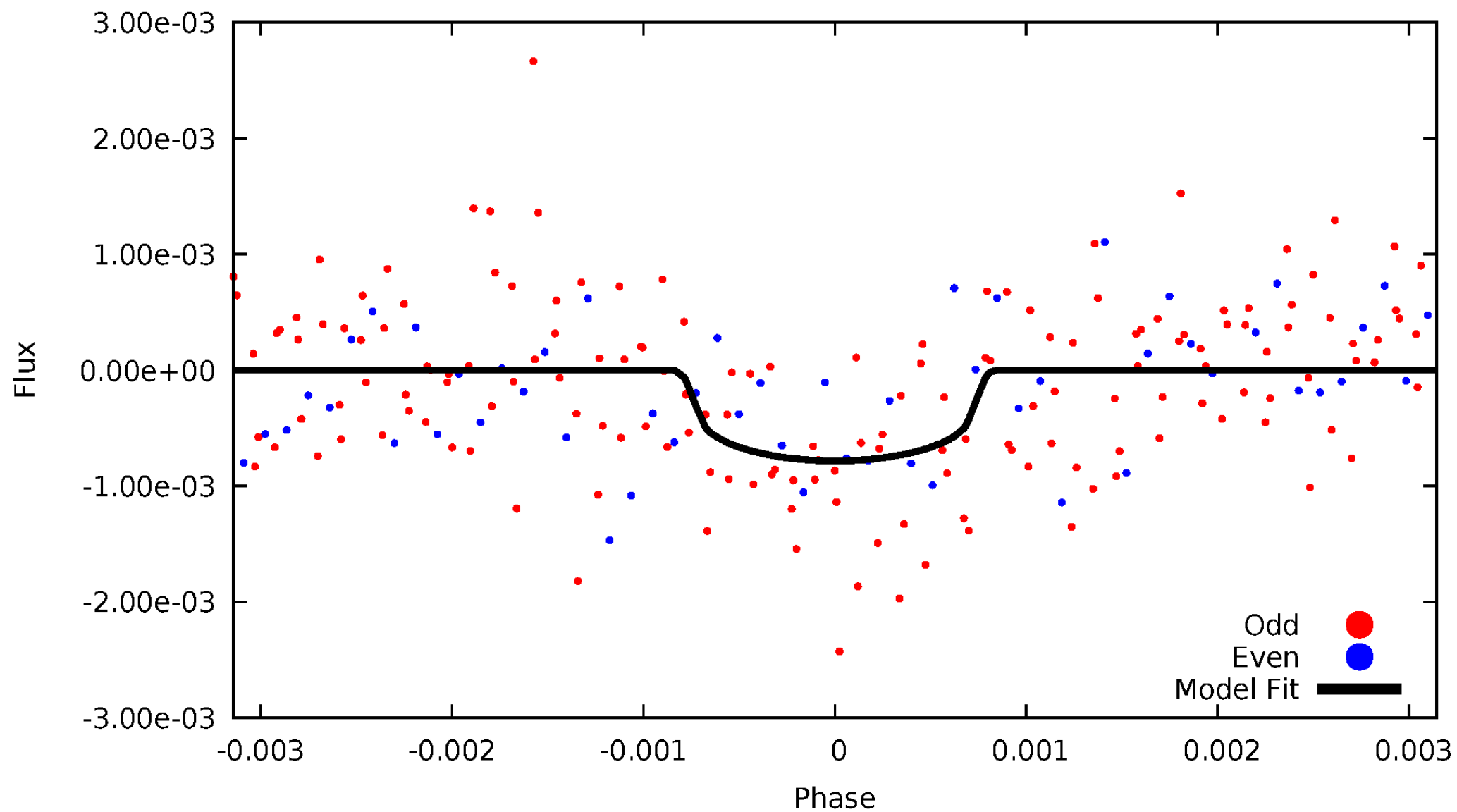


TCE 010420301-04



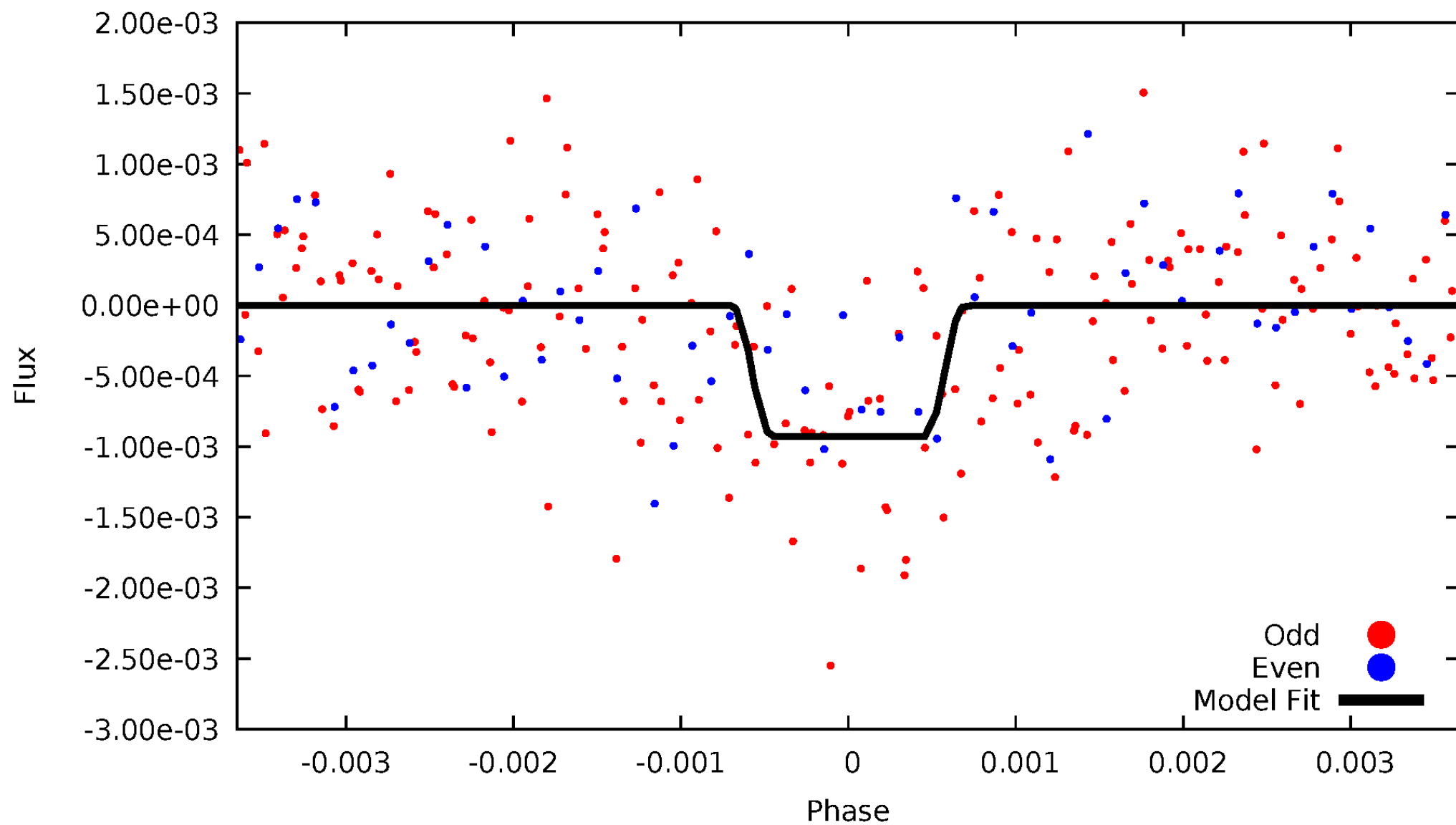
DV Odd/Even

TCE 010420301-04



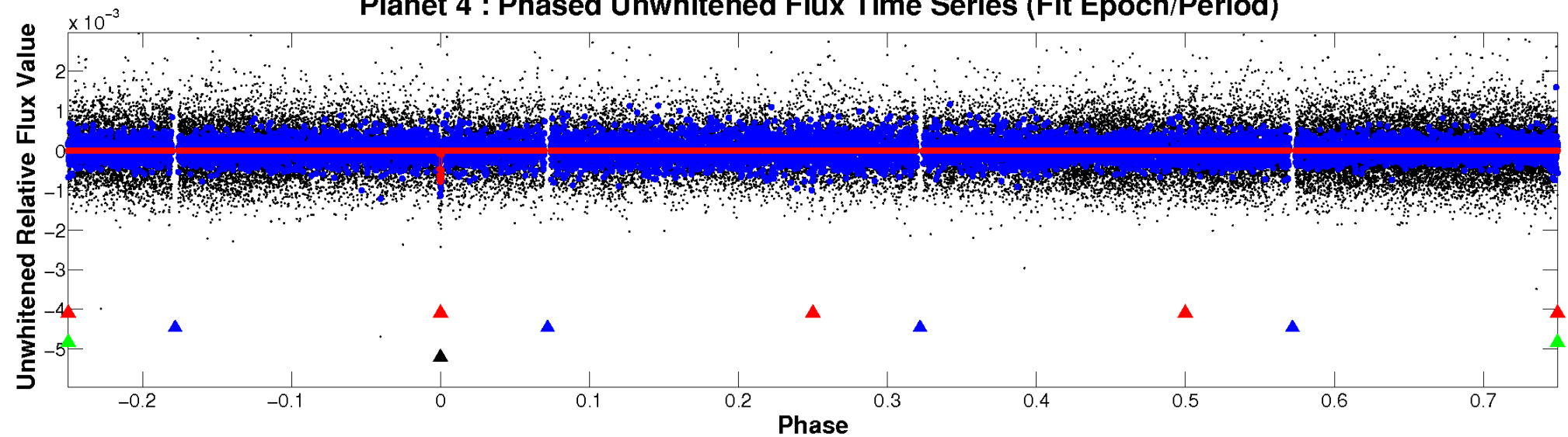
ALT Odd/Even

TCE 010420301-04

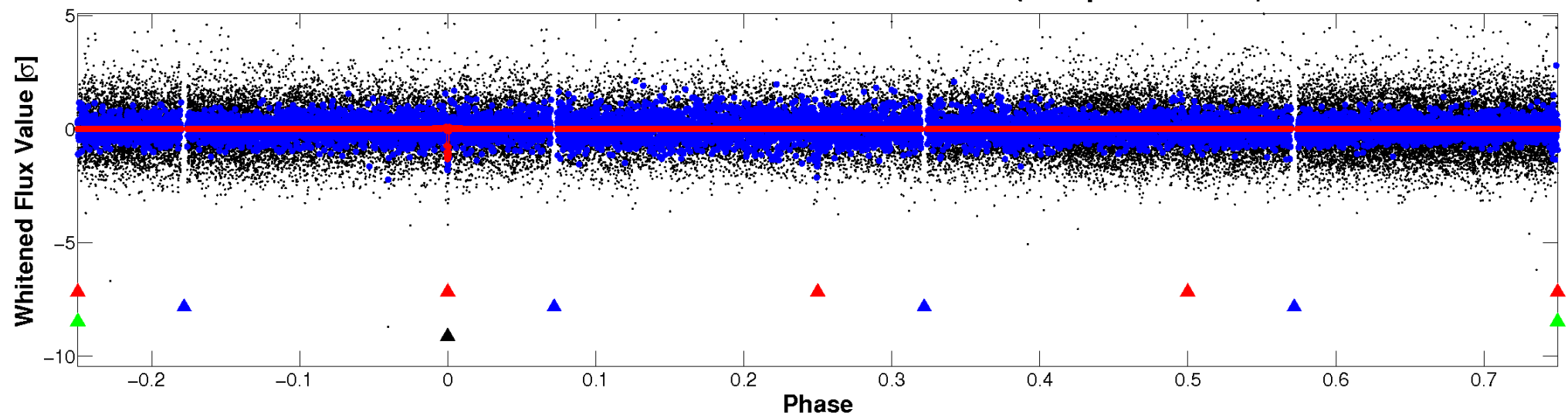


Non-Whitened Vs. Whitened Light Curve

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

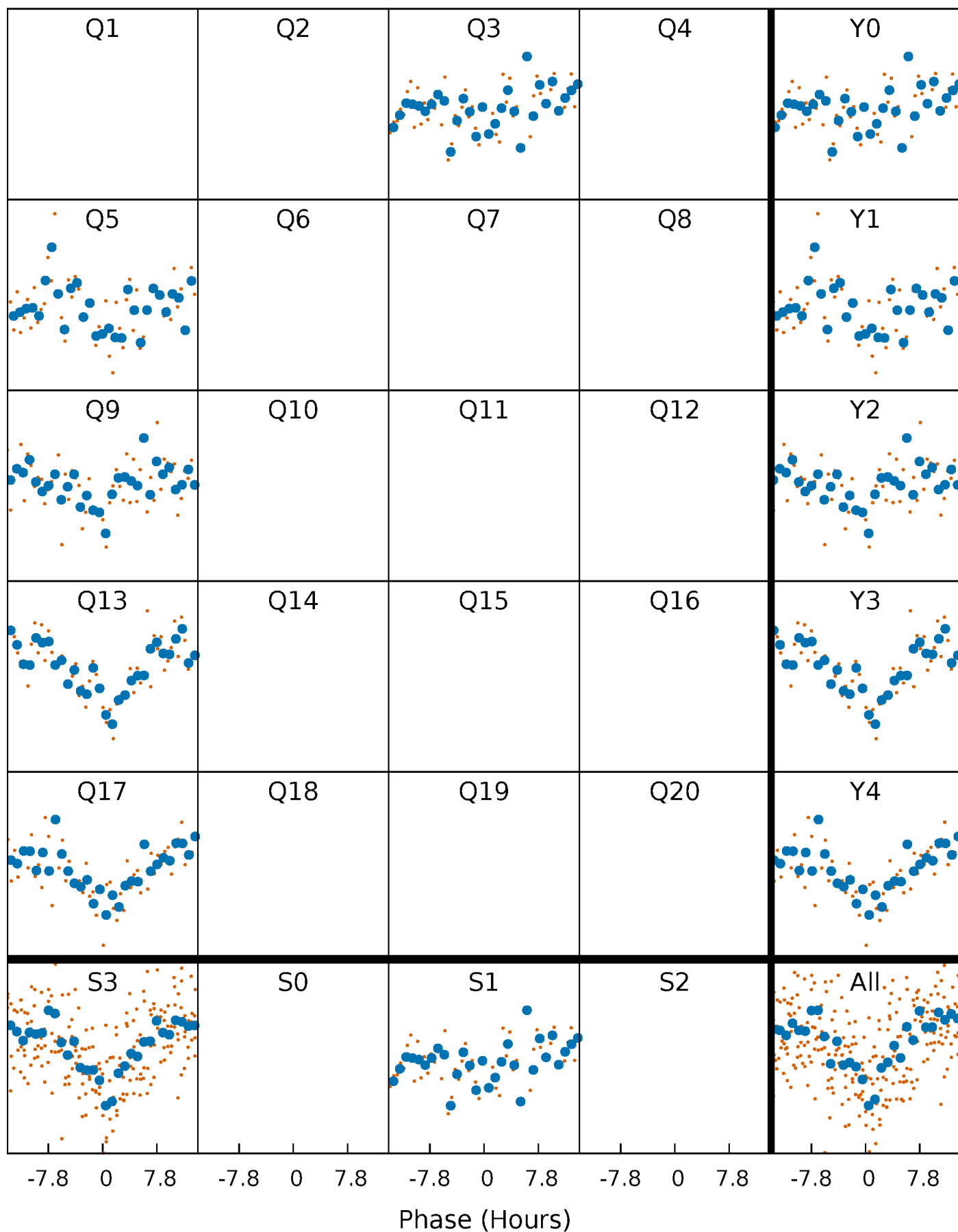


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



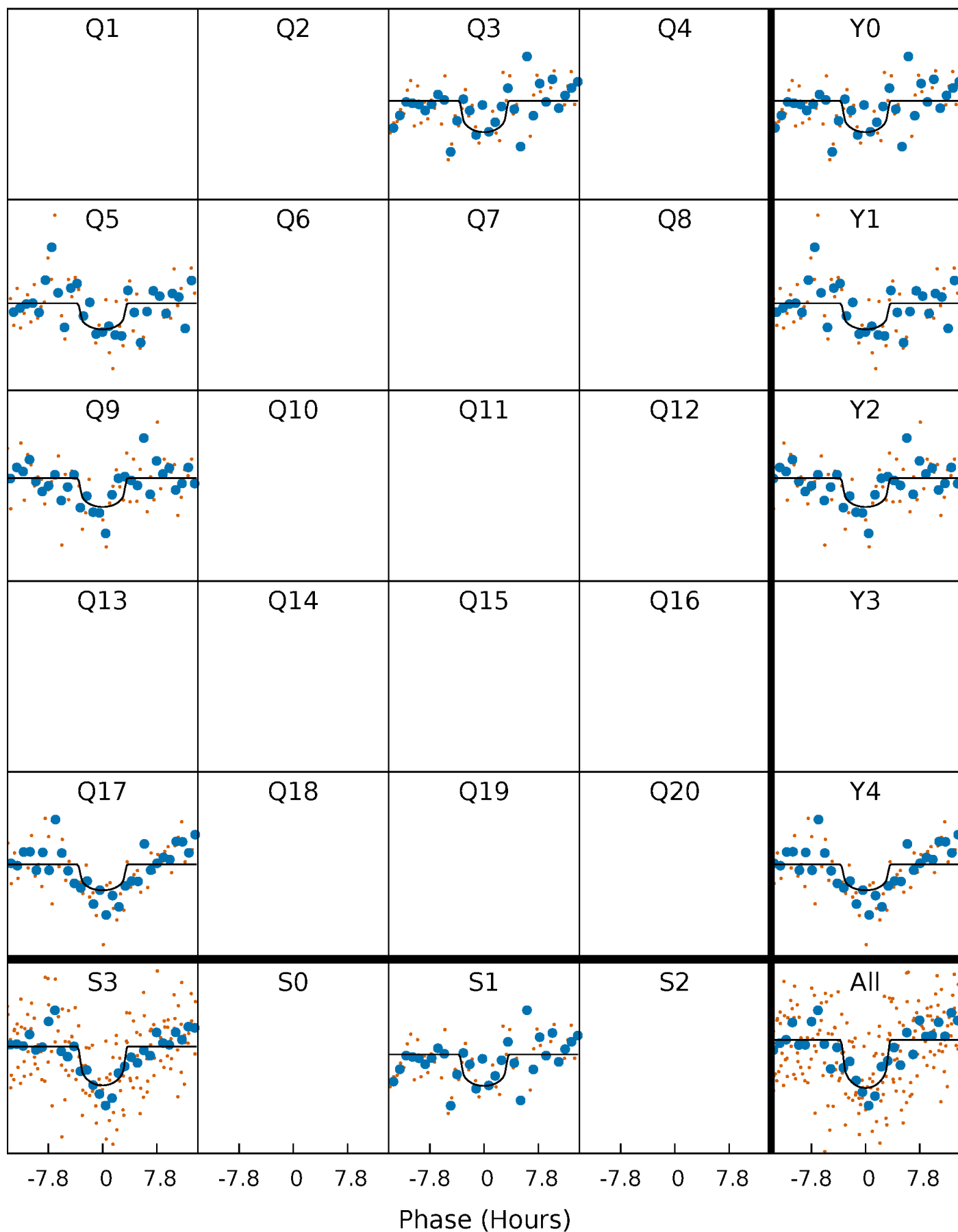
PDC Quarter-Phased Transit Curves

TCE 010420301-04 $P=181.725309$ Days $T_0=296.196534$ (BKJD)



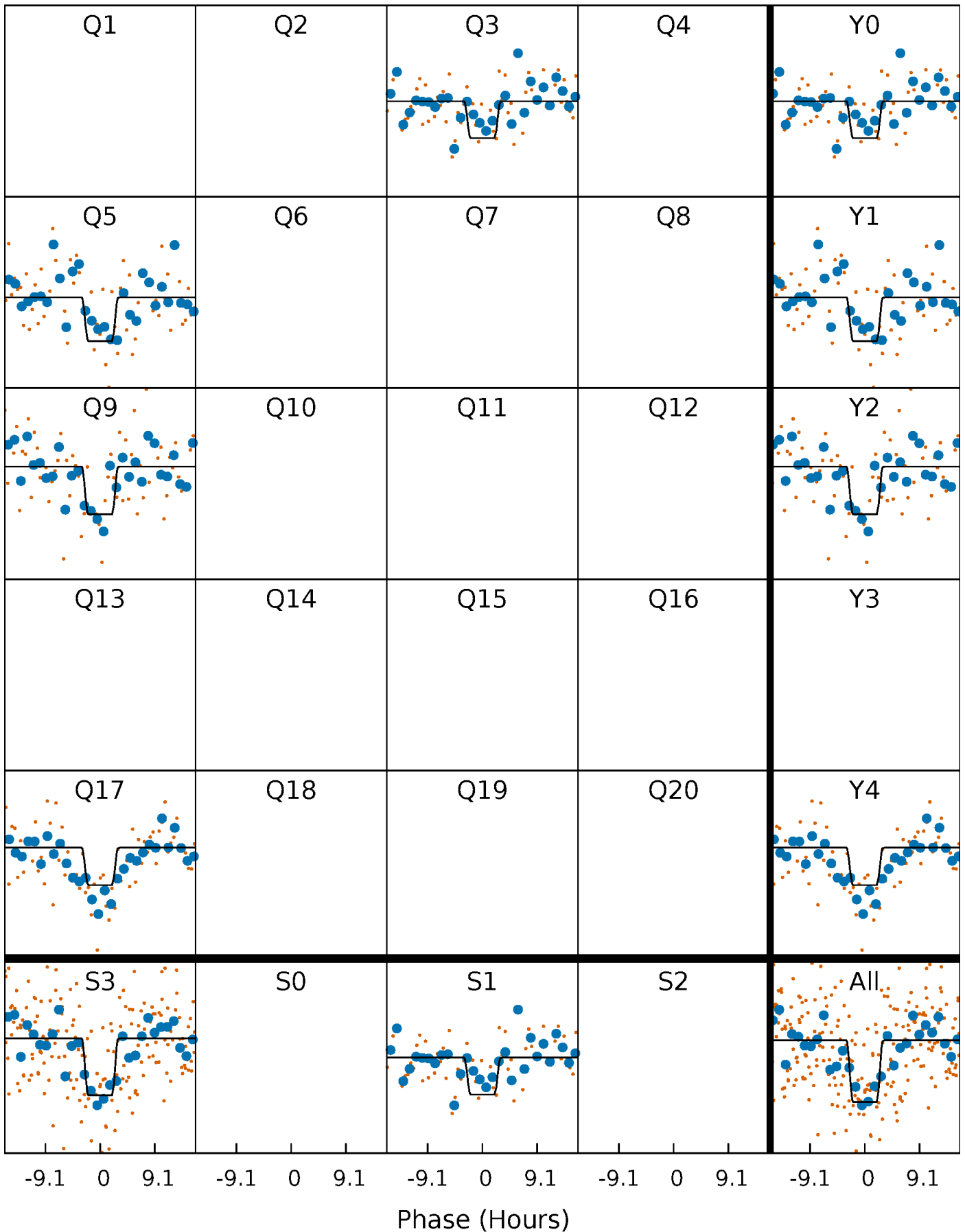
DV Quarter-Phased Transit Curves

TCE 010420301-04 $P=181.725309$ Days $T_0=296.196534$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

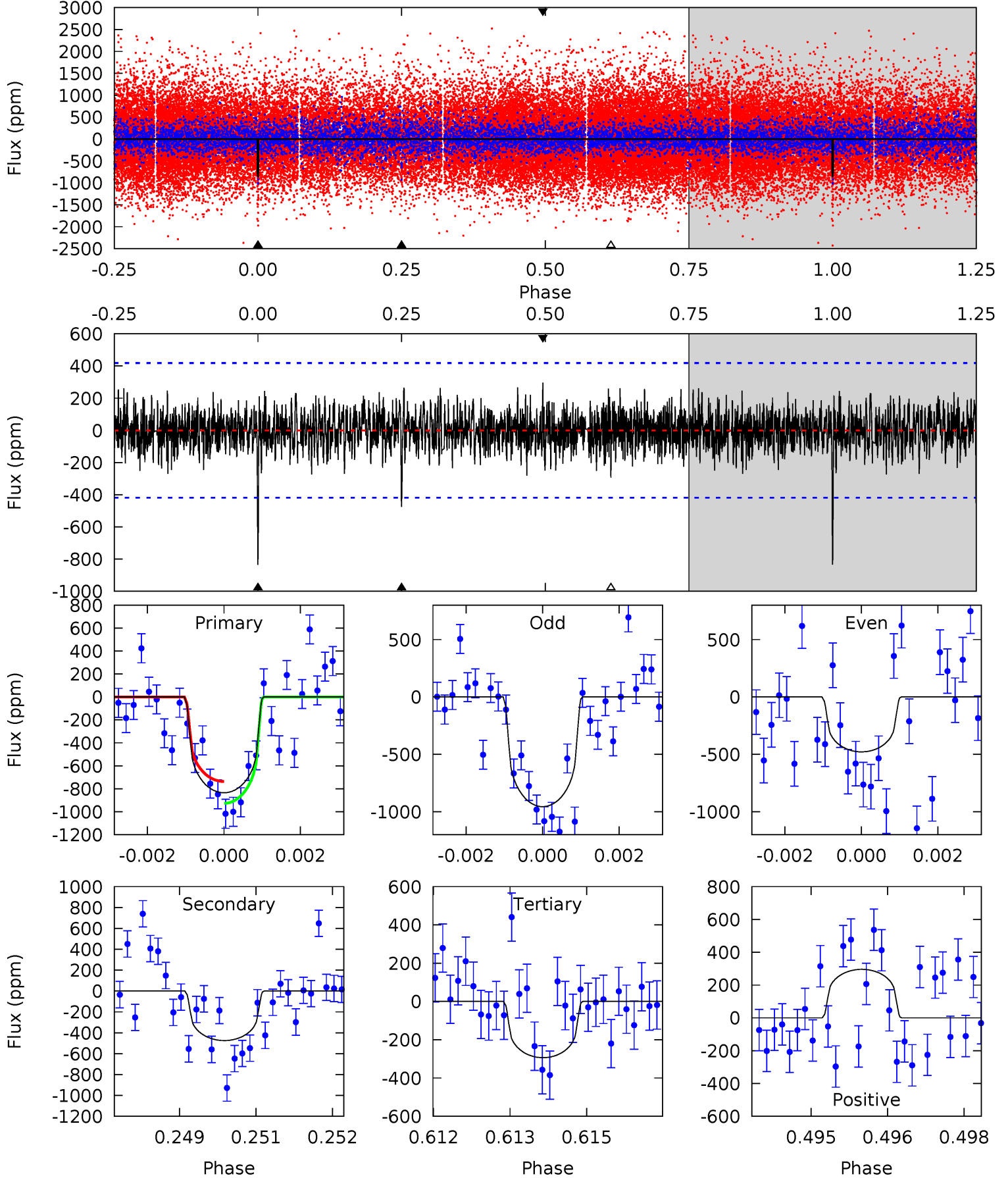
TCE 010420301-04 $P=181.729206$ Days $T_0=296.192832$ (BKJD)



DV Model-Shift Uniqueness Test

010420301-04, P = 181.725309 Days, E = 114.471225 Days

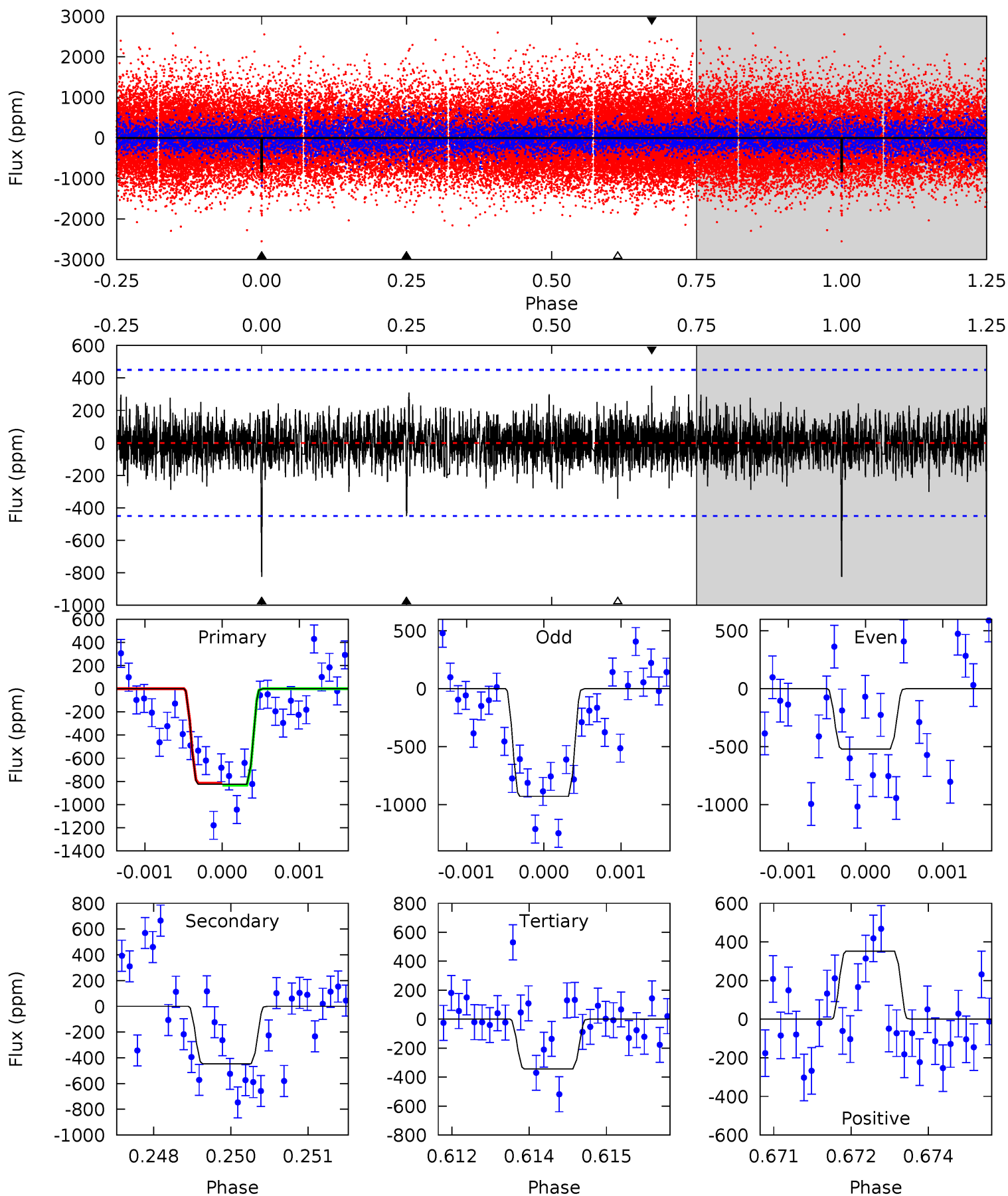
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.7	6.09	3.77	3.80	5.36	3.15	1.12	6.94	6.91	2.32	2.29	2.64	1.01	0.26	1.22



Alt Model-Shift Uniqueness Test

010420301-04, P = 181.729206 Days, E = 114.463626 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.87	5.34	4.11	4.22	5.39	3.19	1.05	5.76	5.66	1.23	1.13	2.11	1.18	0.30	0.12



Stellar Parameters For KIC 010420301

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4371^{+118}_{-144}	$4.712^{+0.036}_{-0.049}$	$-0.540^{+0.300}_{-0.300}$	$0.559^{+0.056}_{-0.045}$	$0.587^{+0.053}_{-0.053}$	$4.728^{+0.849}_{-0.864}$
	+3%/-3%	+1%/-1%	+56%/-56%	+10%/-8%	+9%/-9%	+18%/-18%
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 010420301-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-475 ± 78	$2.04^{+1.64}_{-1.28}$	278^{+10}_{-10}	3722^{+1851}_{-620}	$17082^{+112933}_{-11740}$
Alt.	-446 ± 83	$2.15^{+1.70}_{-1.38}$	279^{+9}_{-10}	3636^{+1776}_{-604}	$14111^{+103046}_{-9670}$

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

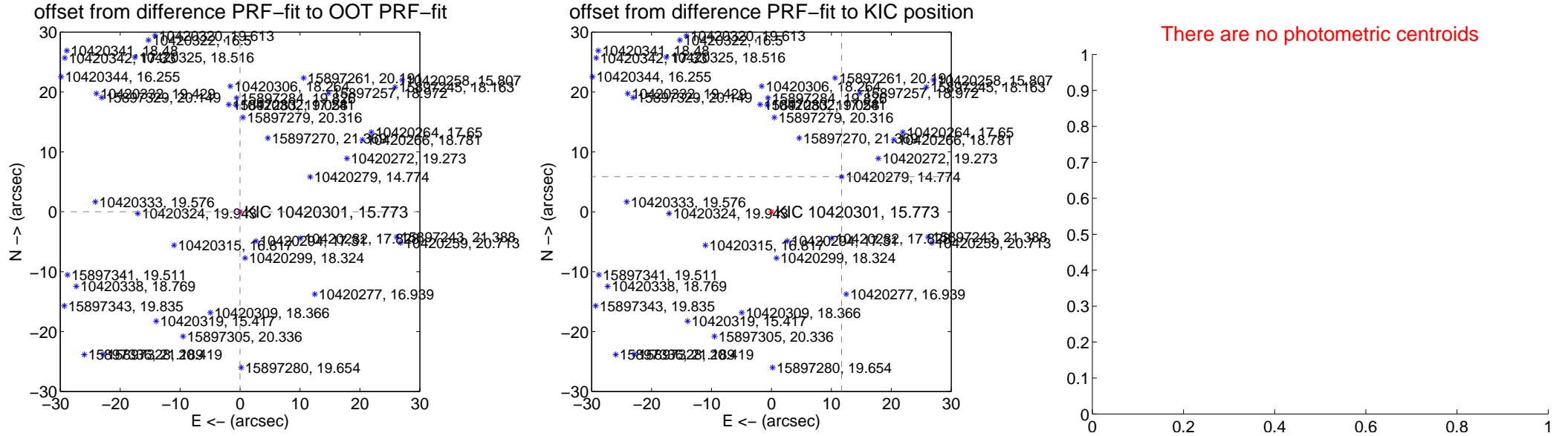
DV Centroid Data

Supplemental centroid analysis for 010420301-04. Kepler magnitude: 15.77. Transit SNR 8.02

There are 1 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 13.10 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

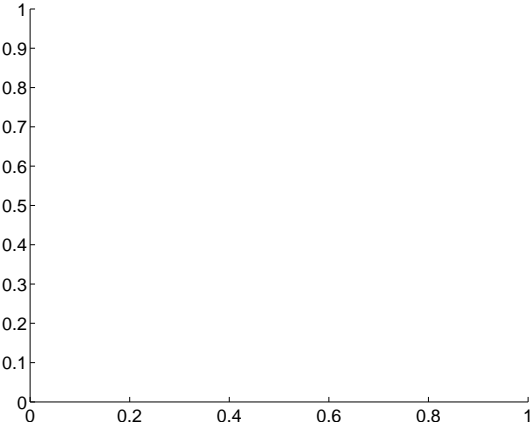
	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.005 ± 0.067	0.08	0.005 ± 0.067	0.002 ± 0.067
PRF-fit source offset from KIC position	13.096 ± 0.067	196.33	-11.703 ± 0.067	5.878 ± 0.067
photometric centroid source offset	—	—	—	—



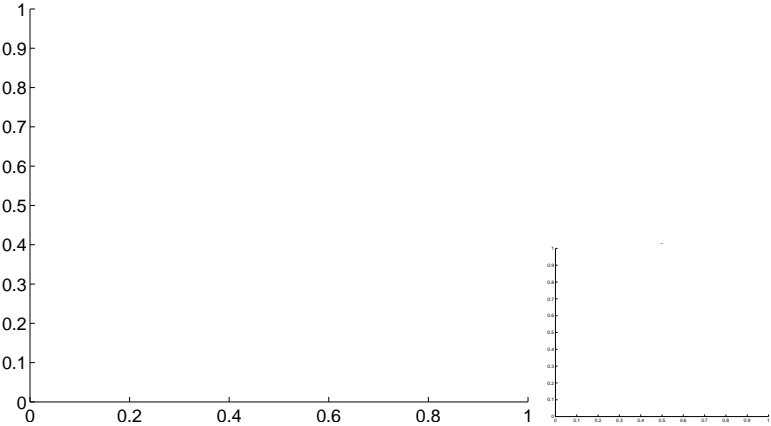
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

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

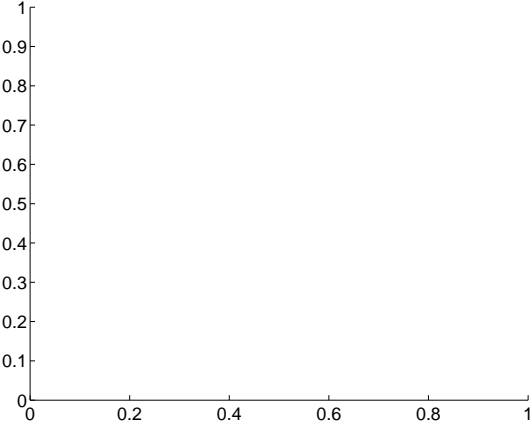
Q1 no difference image



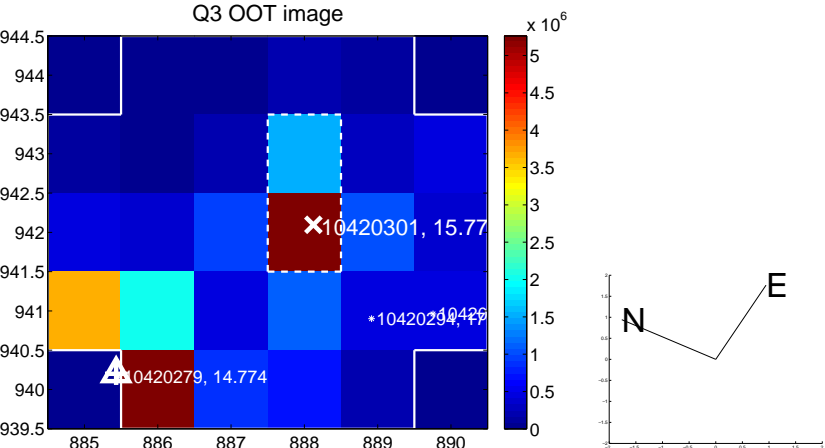
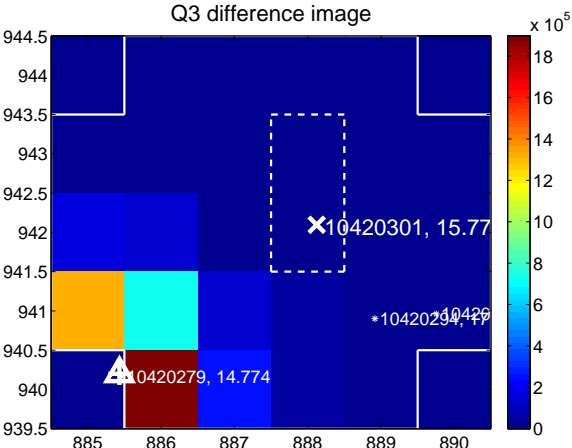
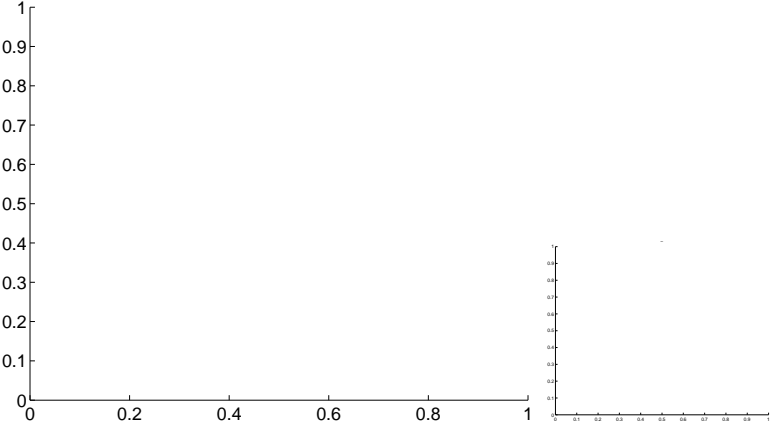
Q1 no OOT image



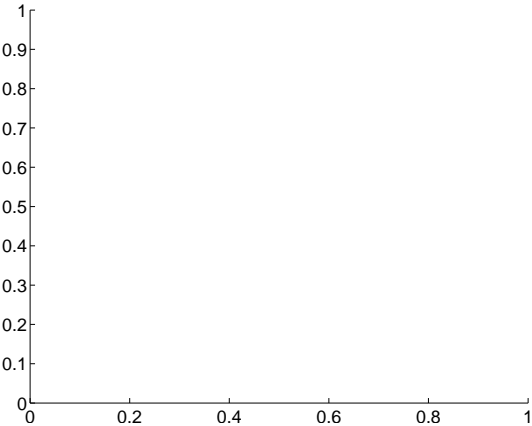
Q2 no difference image



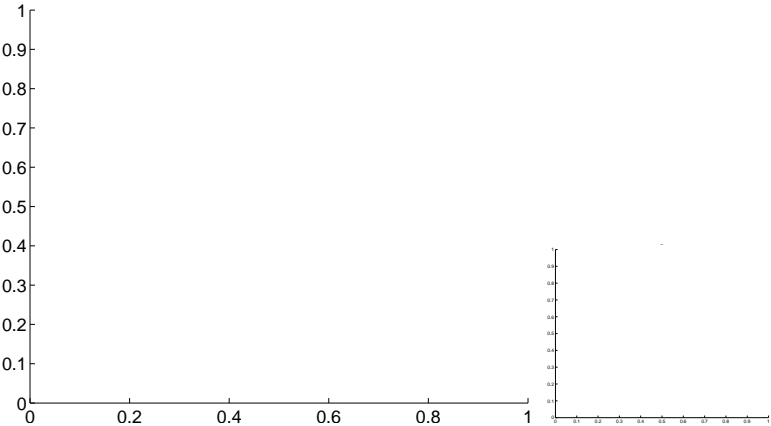
Q2 no OOT image



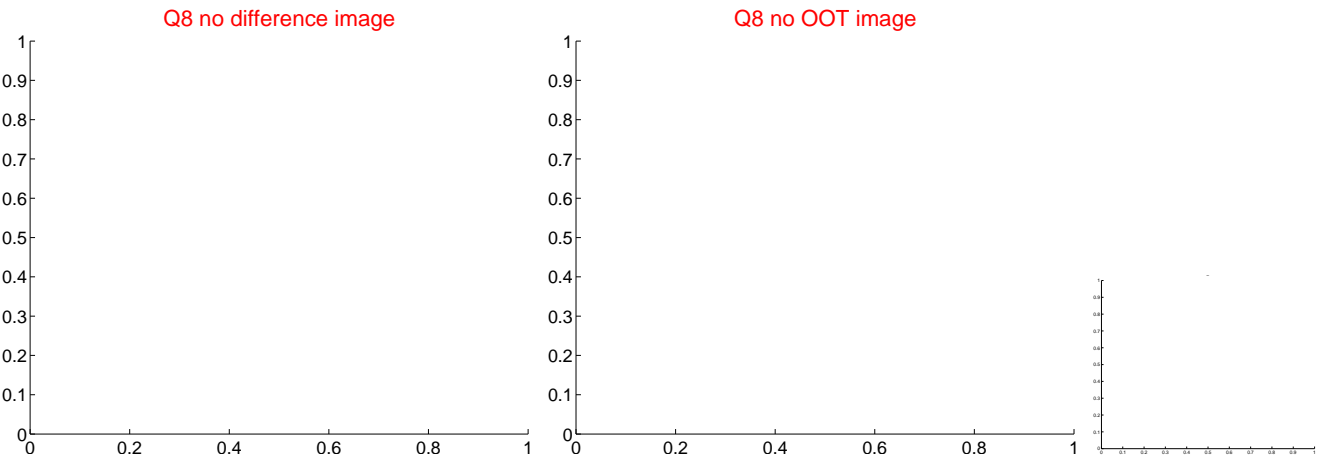
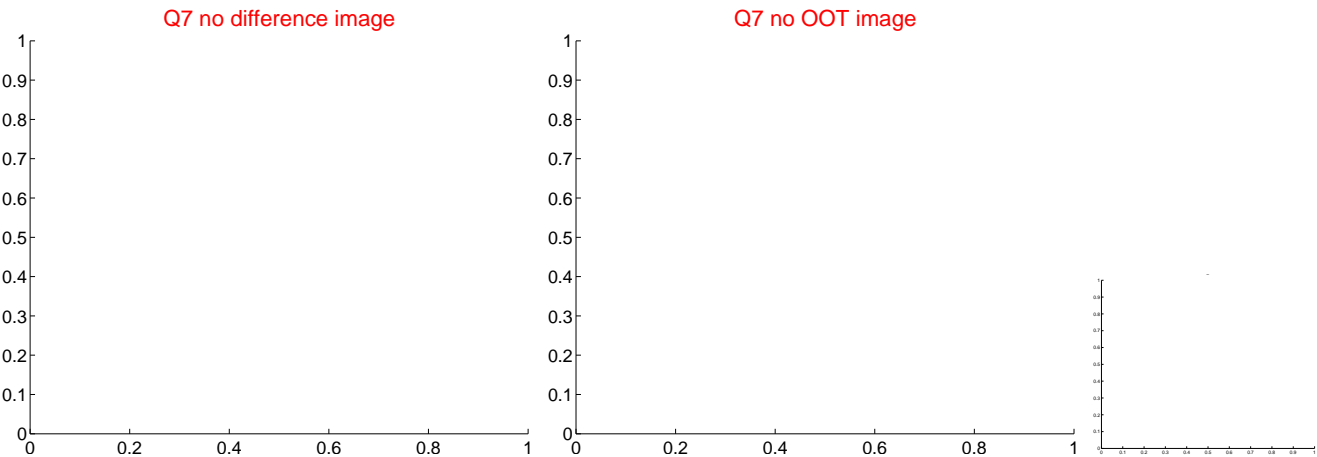
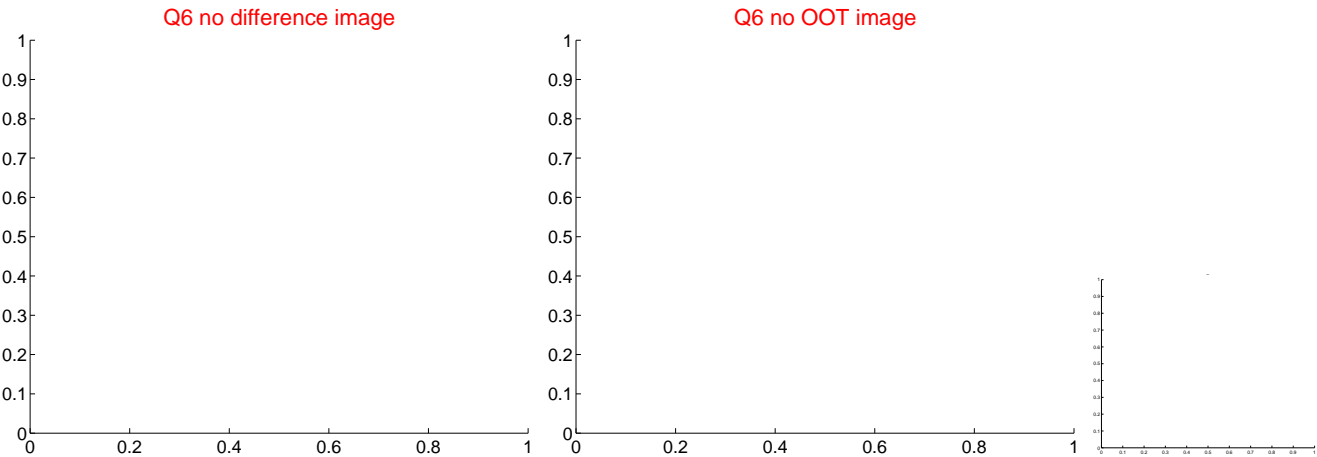
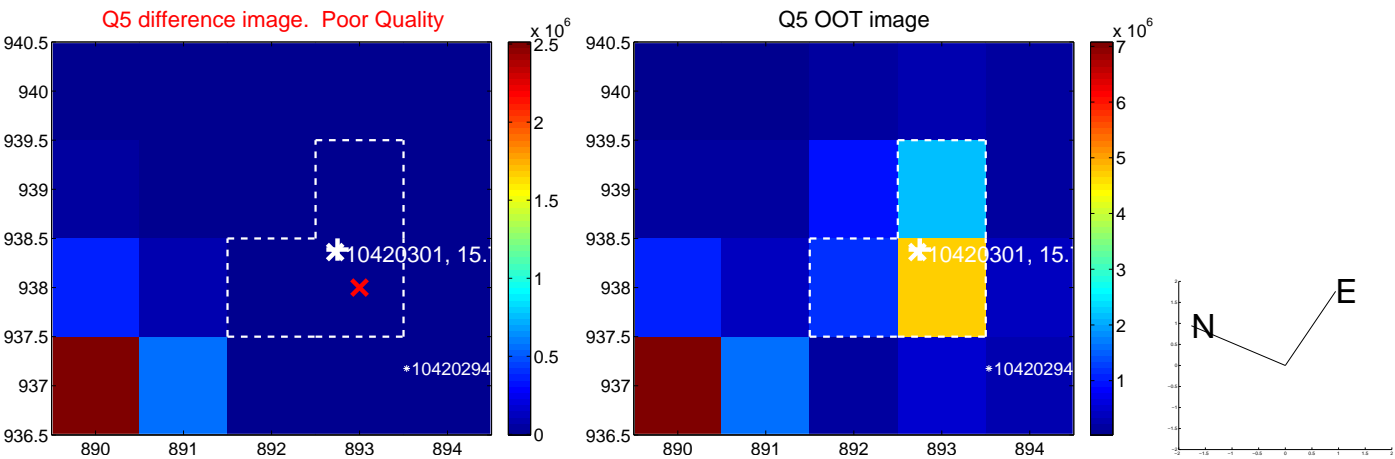
Q4 no difference image



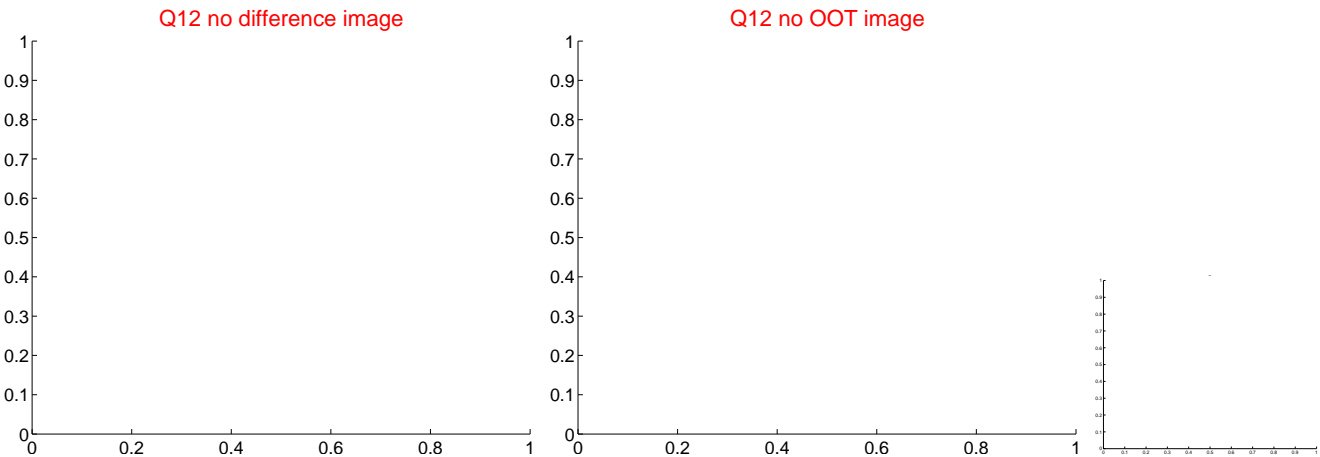
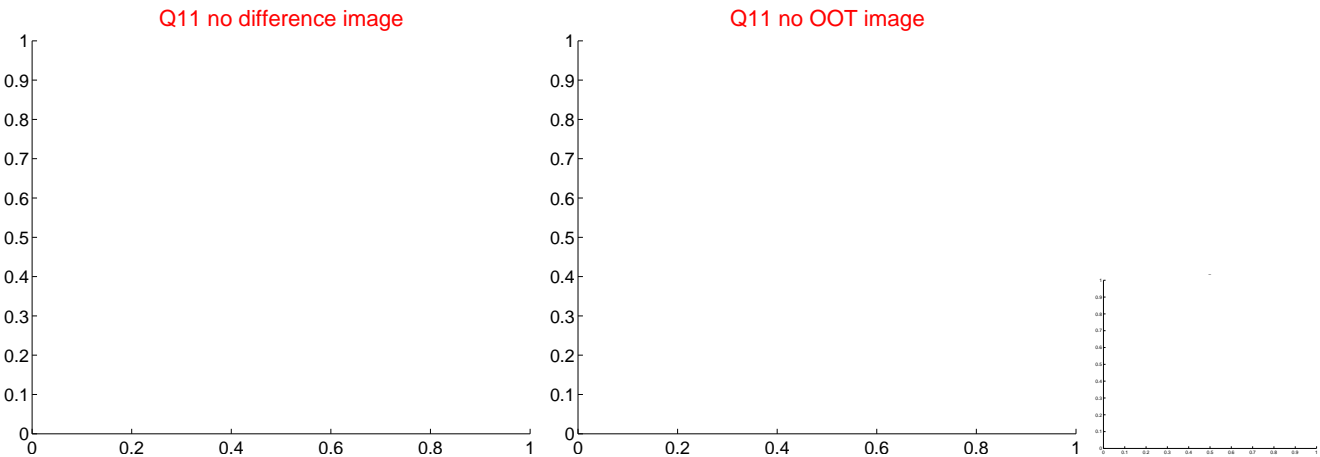
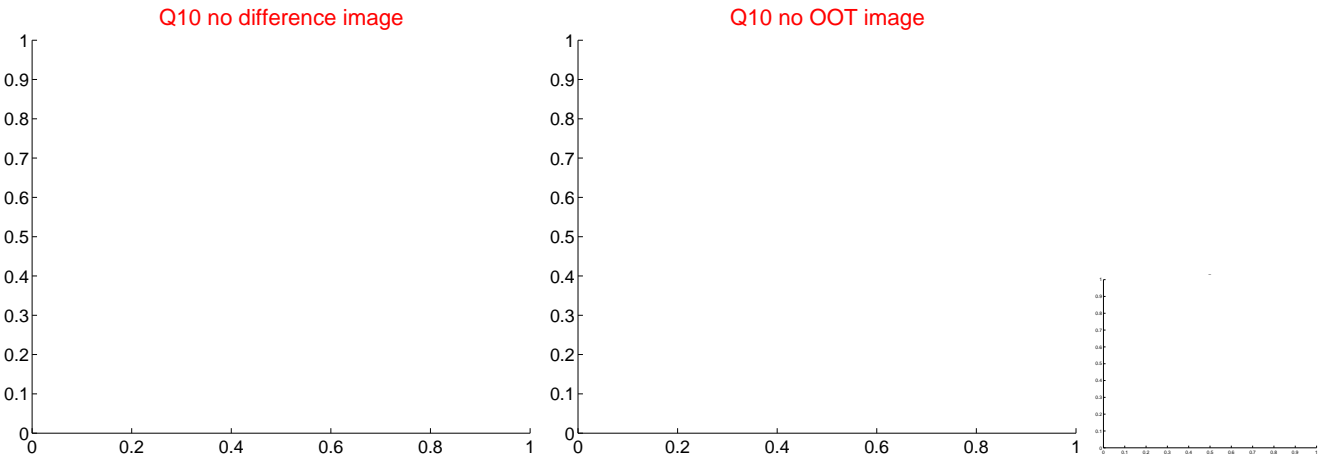
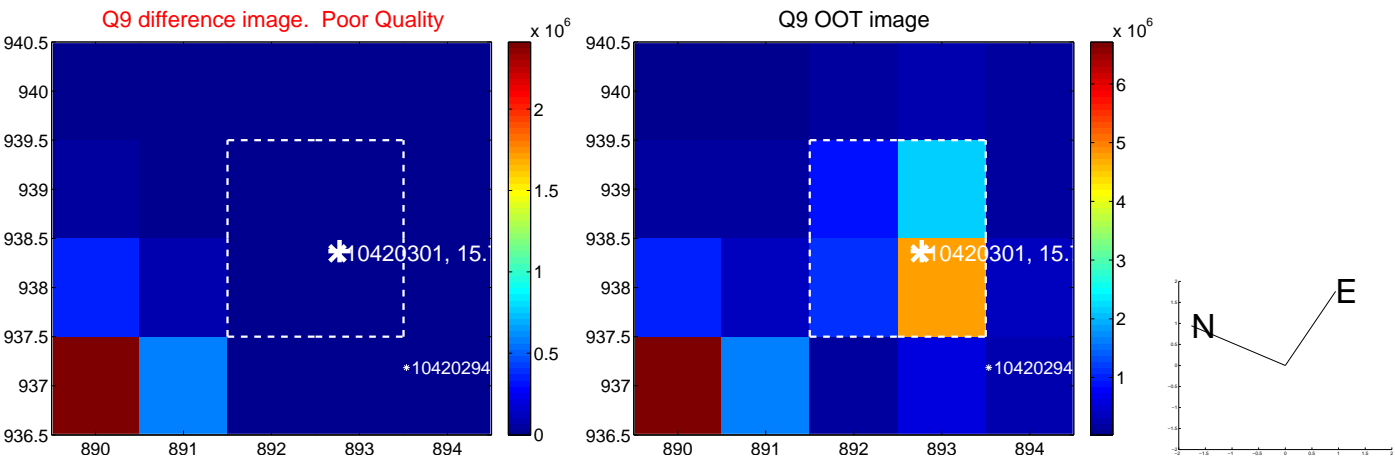
Q4 no OOT image



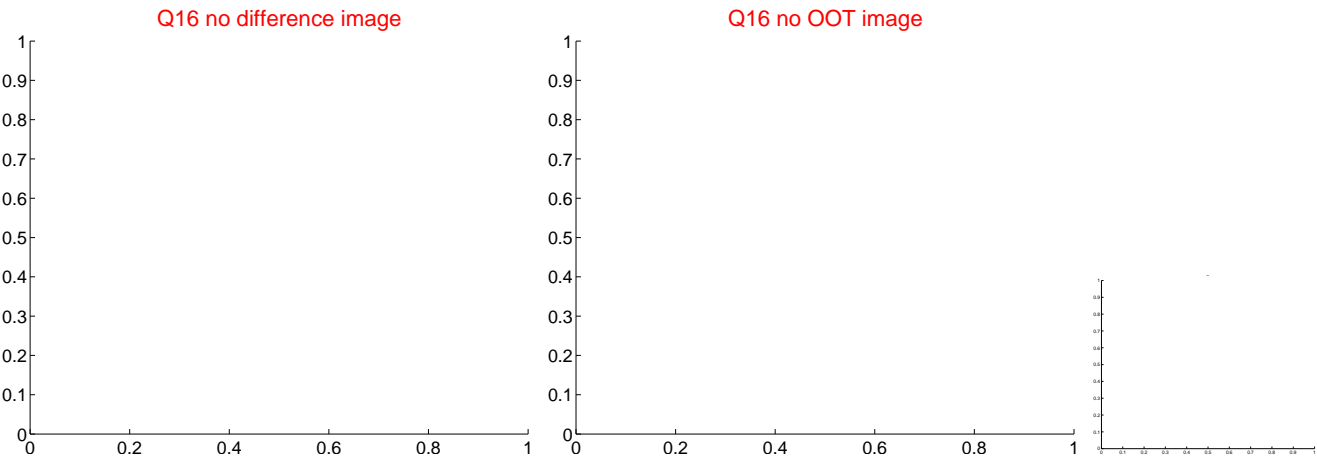
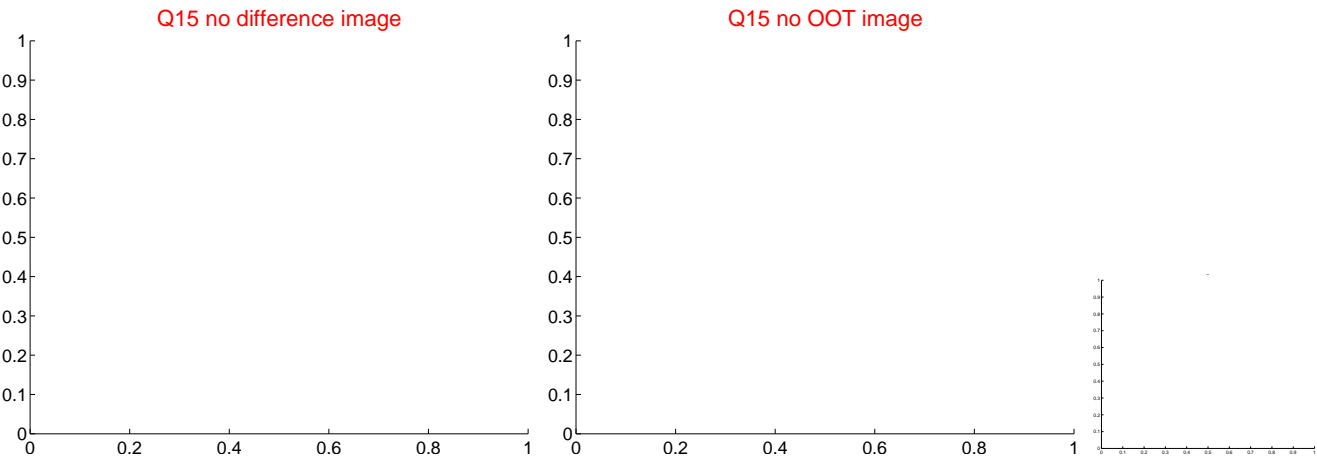
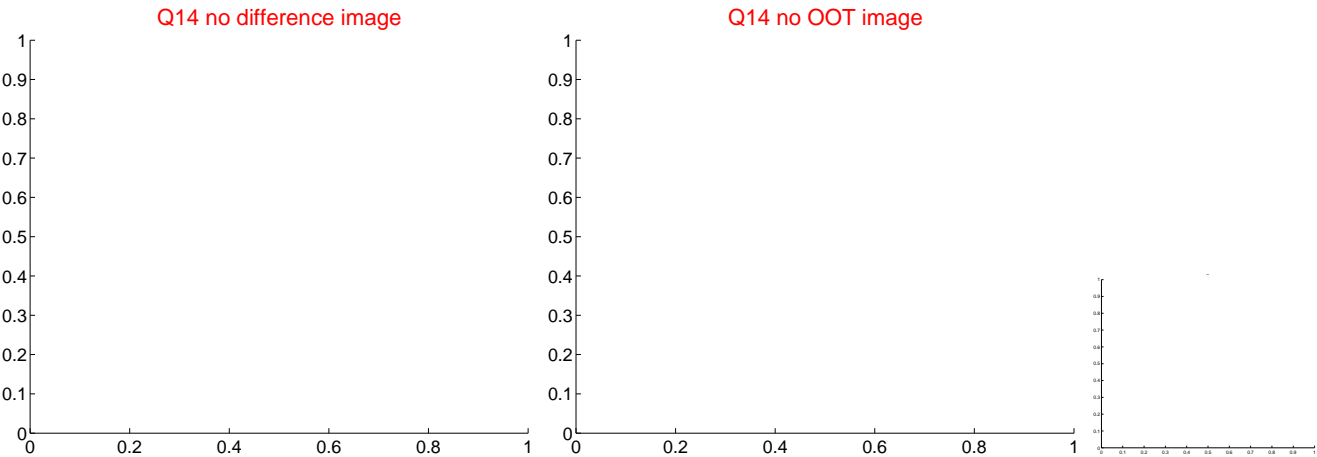
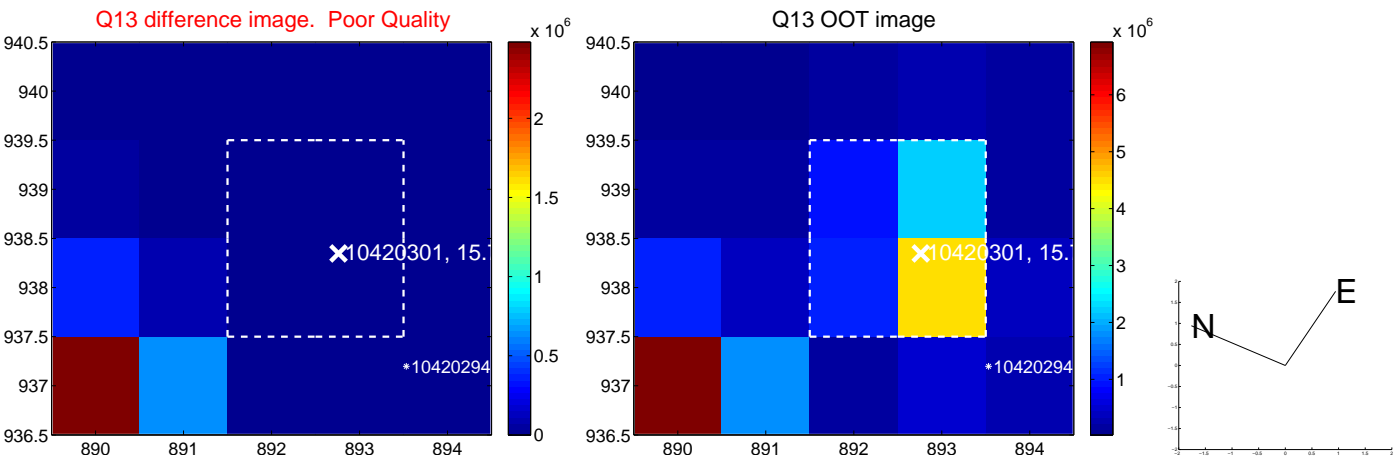
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



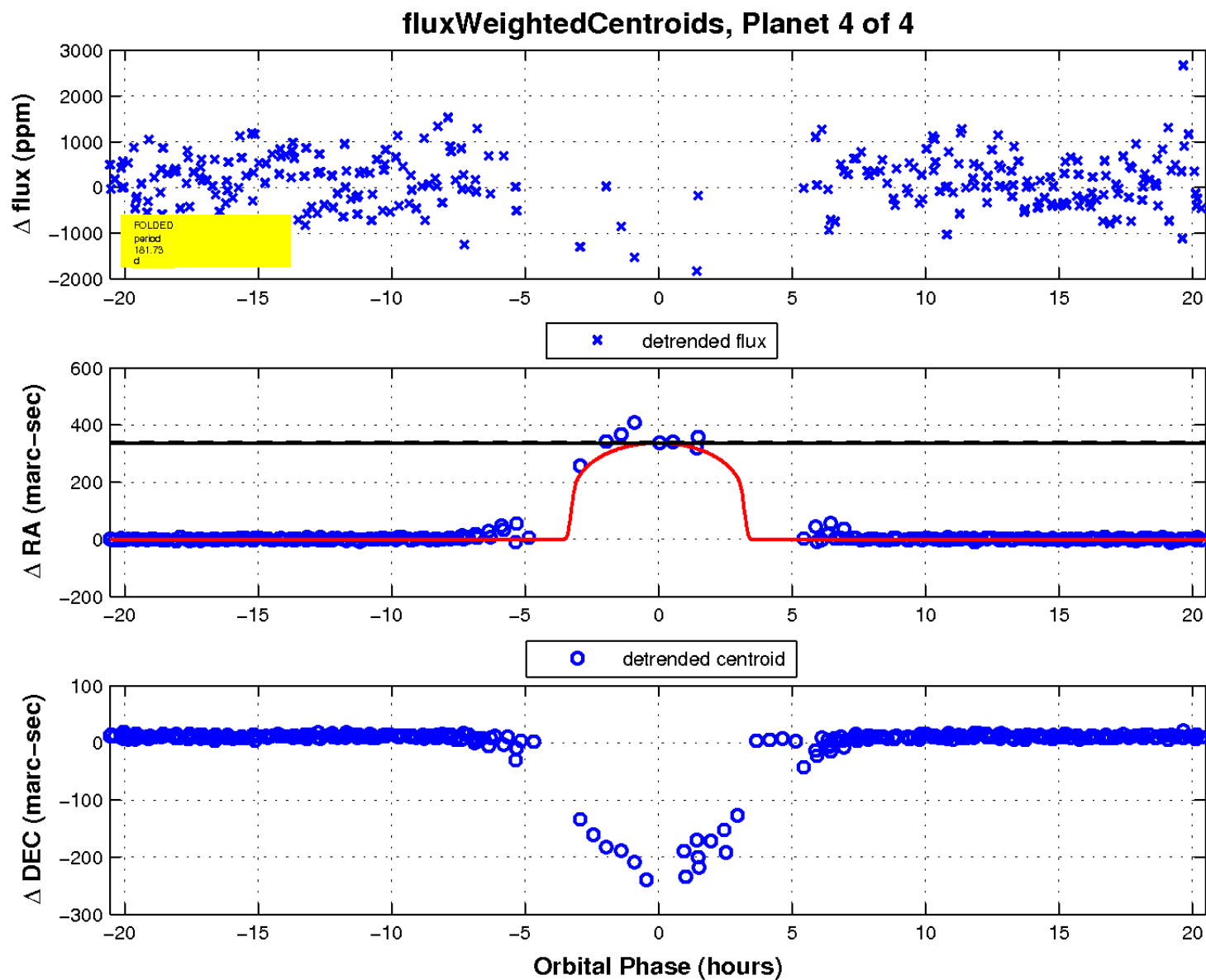
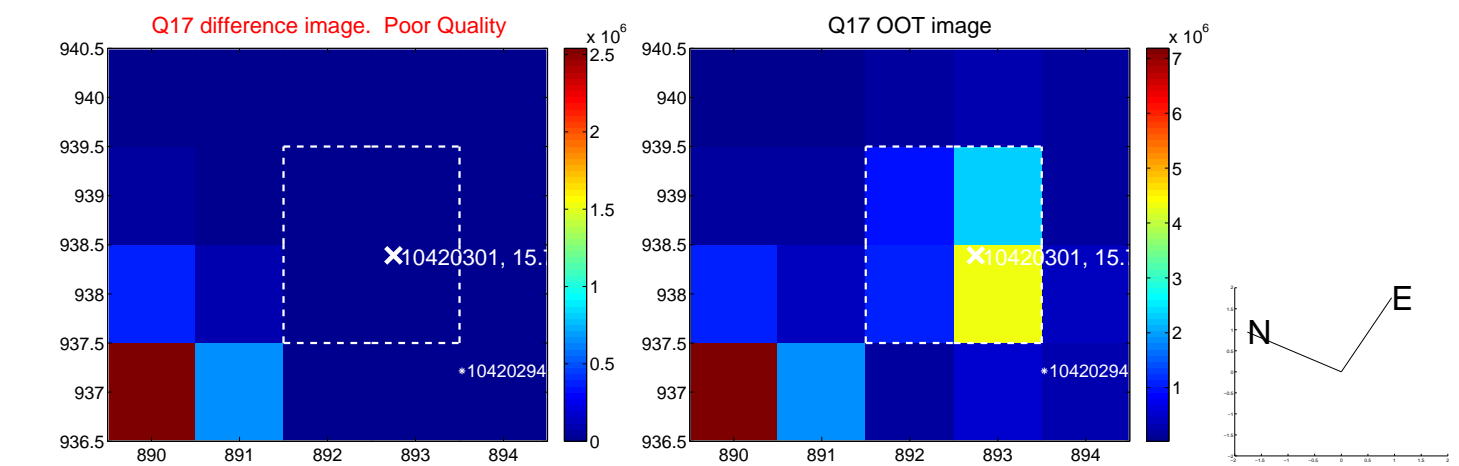
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

