

KIC 003644653

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})
003644653-01	OBS	2596.01	119.682441	176.097834	1526.5	30.680	27.0	27.6	0.91	5778	6.13	3.60
003644653-02	OBS	No	119.678372	154.536978	1257.7	16.193	18.7	20.5	0.91	5778	5.32	3.60

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003644653-01	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_SKYE—CENT_FEW_DIFFS—HALO_GHOST—EPHEM_MATCH
003644653-02	OBS	FP	0.00	1	0	1	1	SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET—HALO_GHOST—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 003644653-01

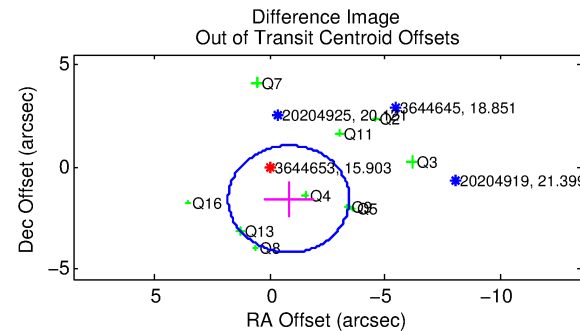
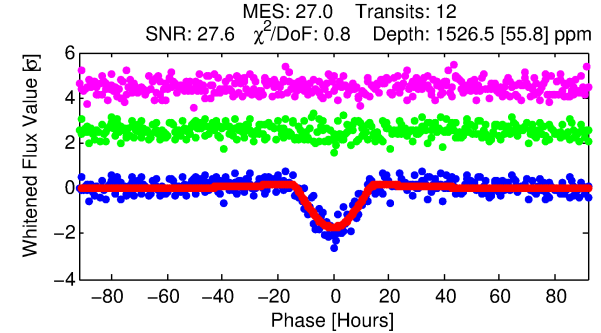
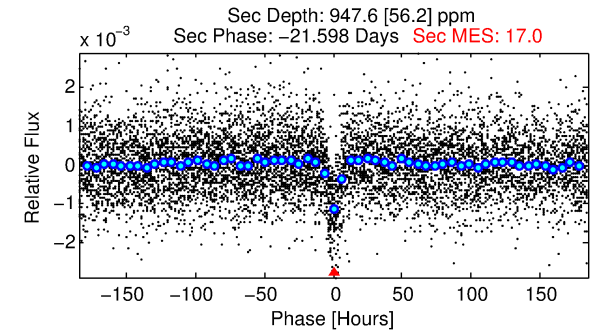
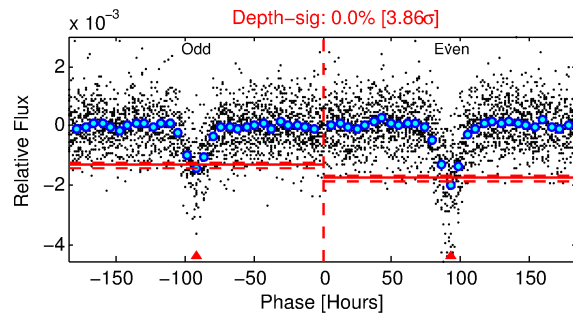
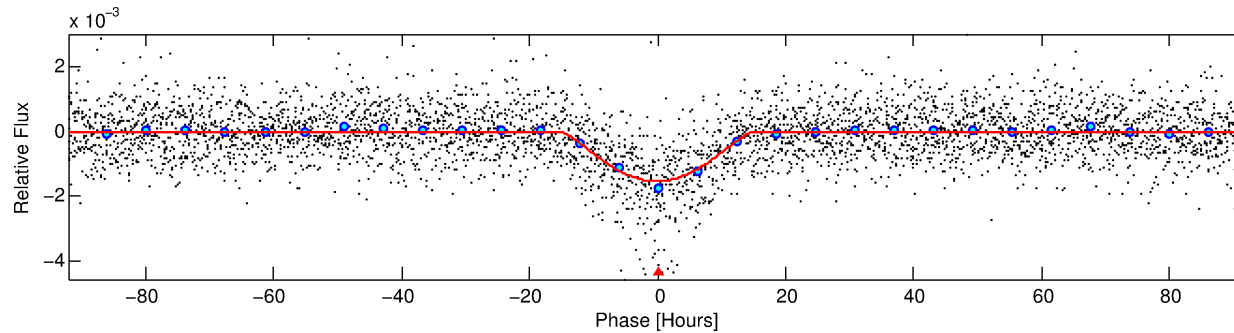
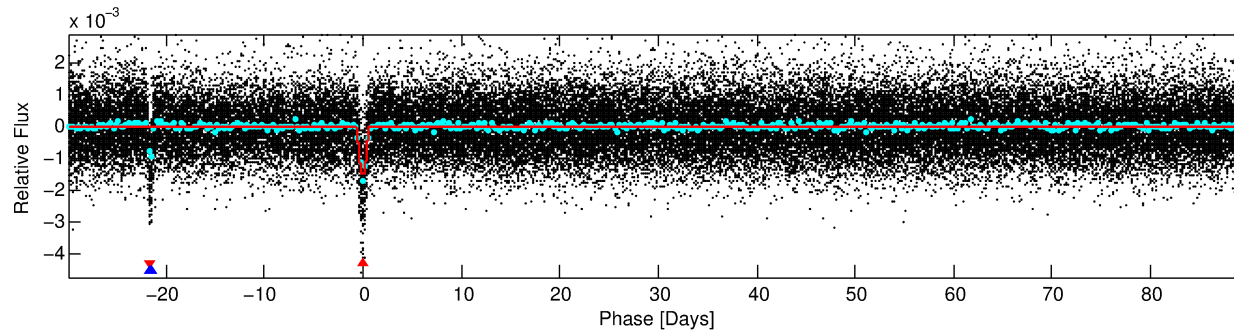
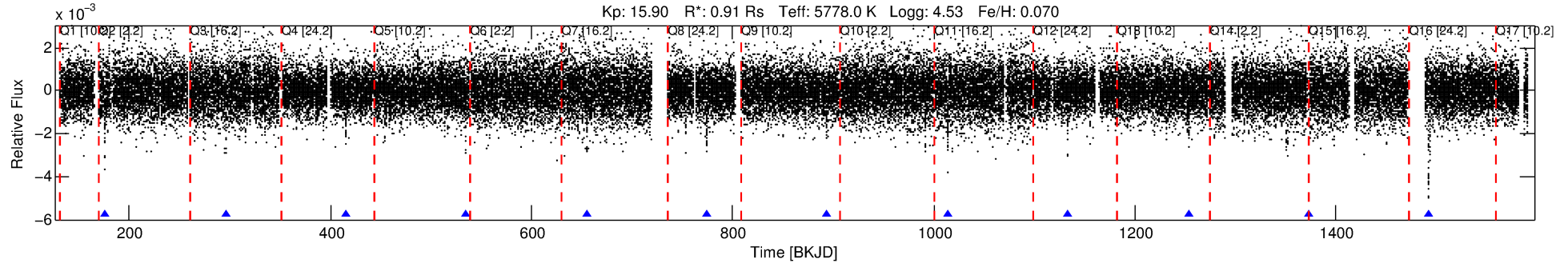
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
003644653-01	3644653	3511.01	3644542	1:1	105.4	25	-10	8.35	15.90	195.82	Direct-PRF	0	0.35	0.11

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: 3644653 Candidate: 1 of 2 Period: 119.682 d

KOI: K02596.01 Corr: 0.968



DV Fit Results:

Period = 119.68244 [0.00359] d
Epoch = 176.0978 [0.0220] BKJD
Rp/R* = 0.0617 [0.0486]
a/R* = 11.57 [2.43]
b = 0.99 [0.08]
Seff = 3.60 [1.36]
Teq = 351 [33] K
Rp = 6.13 [5.13] Re
a = 0.4798 [0.1156] AU
Ag = 3190.29 [5157.65] [0.62σ]
Teffp = 4081 [1614] K [2.31σ]

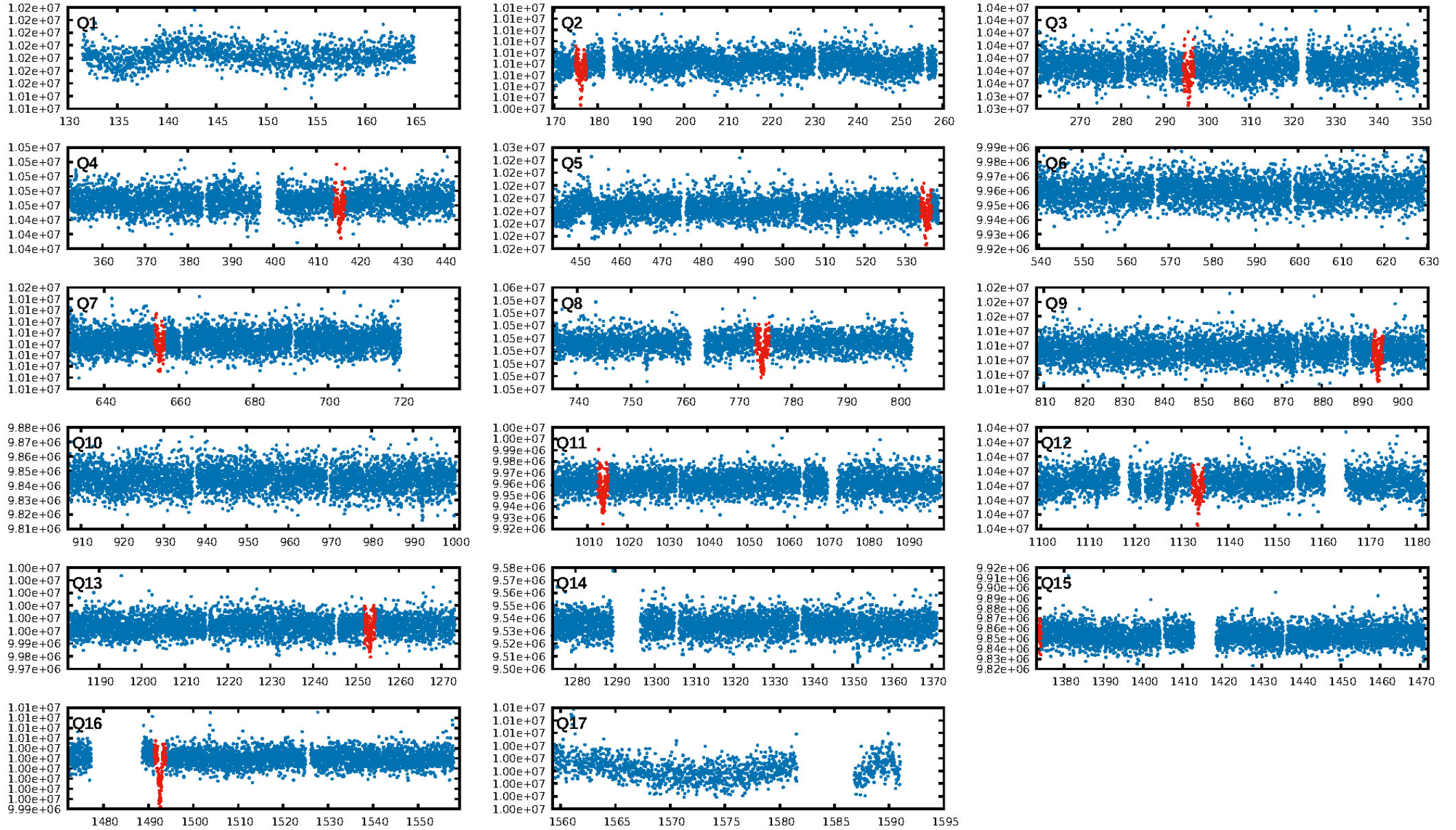
DV Diagnostic Results:

ShortPeriod-sig: 0.2% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 3.87e-160
RollingBand-fgt: 1.00 [12/12]
GhostDiagnostic-chr: -0.06117
Centroid-sig: 0.0%
Centroid-so: 2.703 arcsec [5.58σ]
OotOffset-rm: 1.787 arcsec [2.05σ]
KicOffset-rm: 1.664 arcsec [1.94σ]
OotOffset-st: 1/3/3/3 [10]
KicOffset-st: 1/3/3/3 [10]
DiffImageQuality-fgm: 0.20 [2/10]
DiffImageOverlap-fno: 1.00 [10/10]

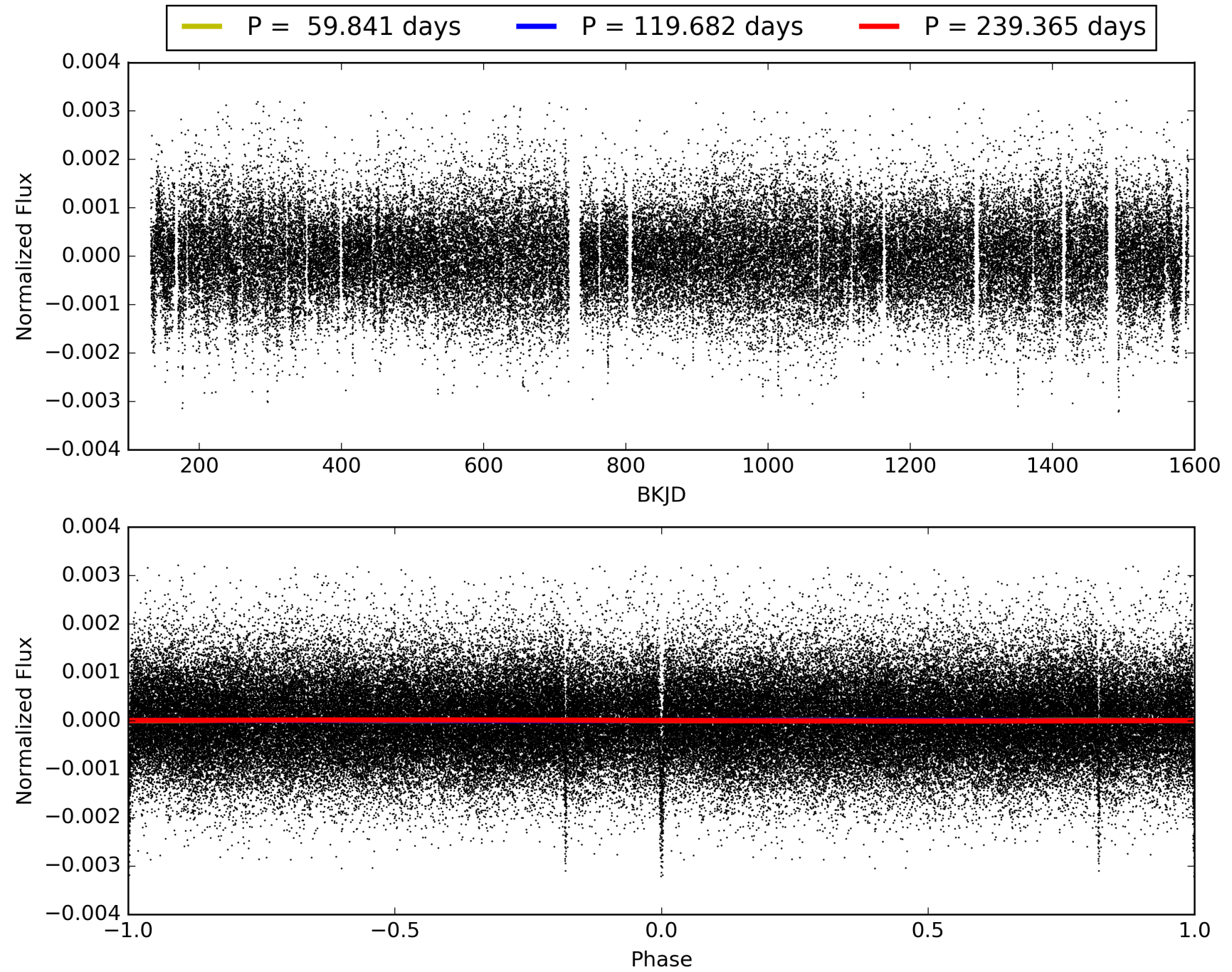
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 02:10:27 Z

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

TCE 003644653-01, PDC Light Curves

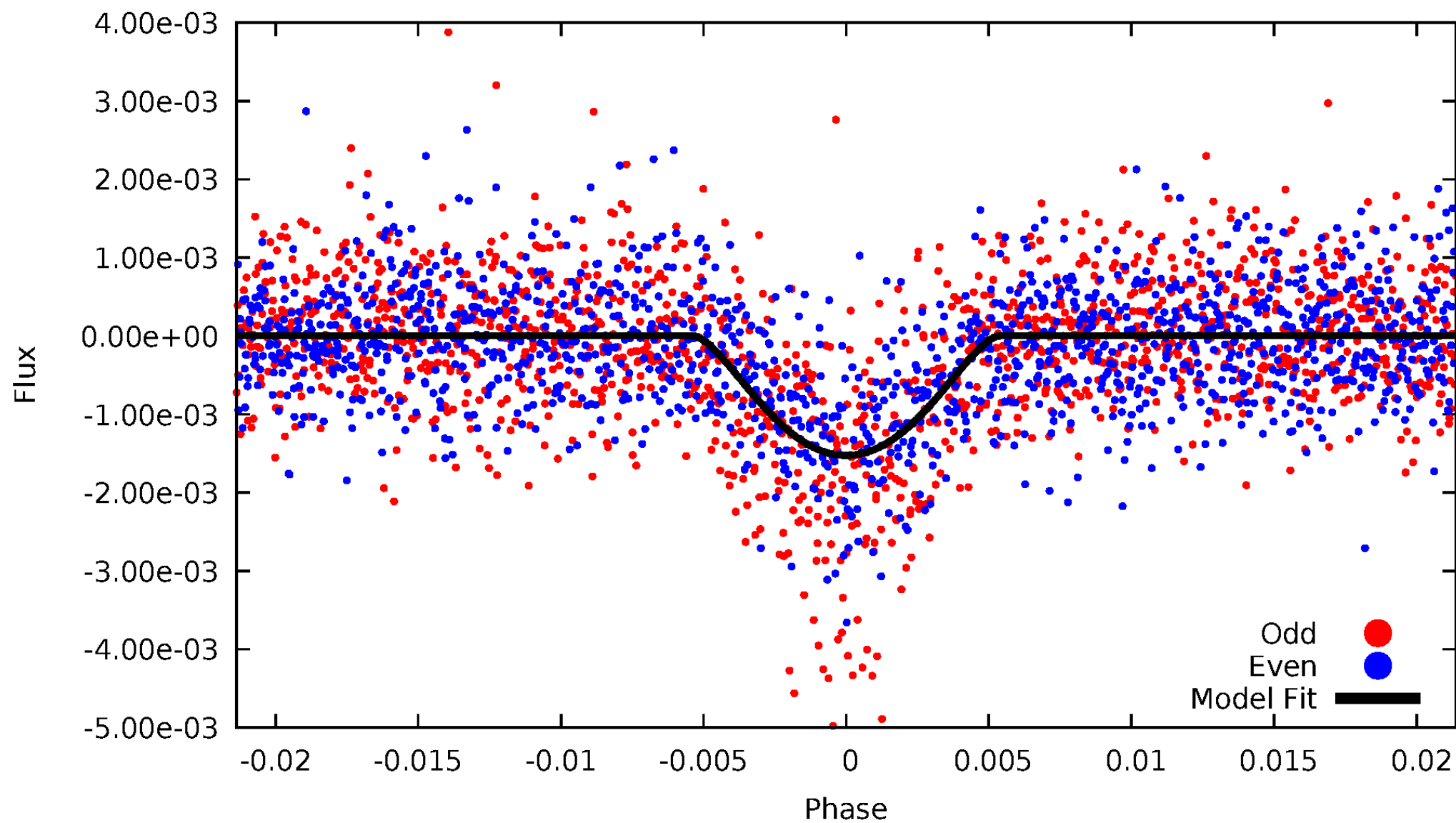


TCE 003644653-01



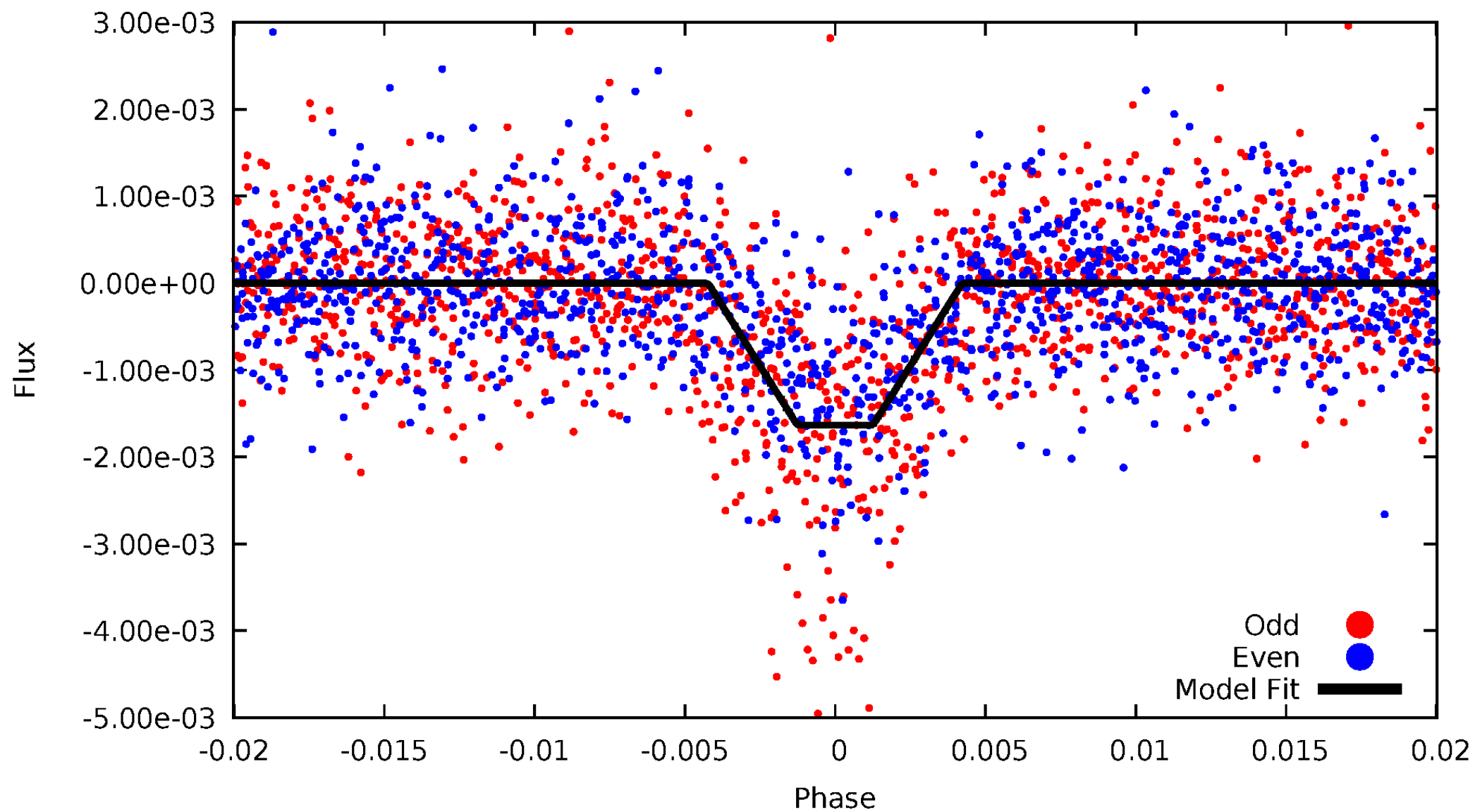
DV Odd/Even

TCE 003644653-01



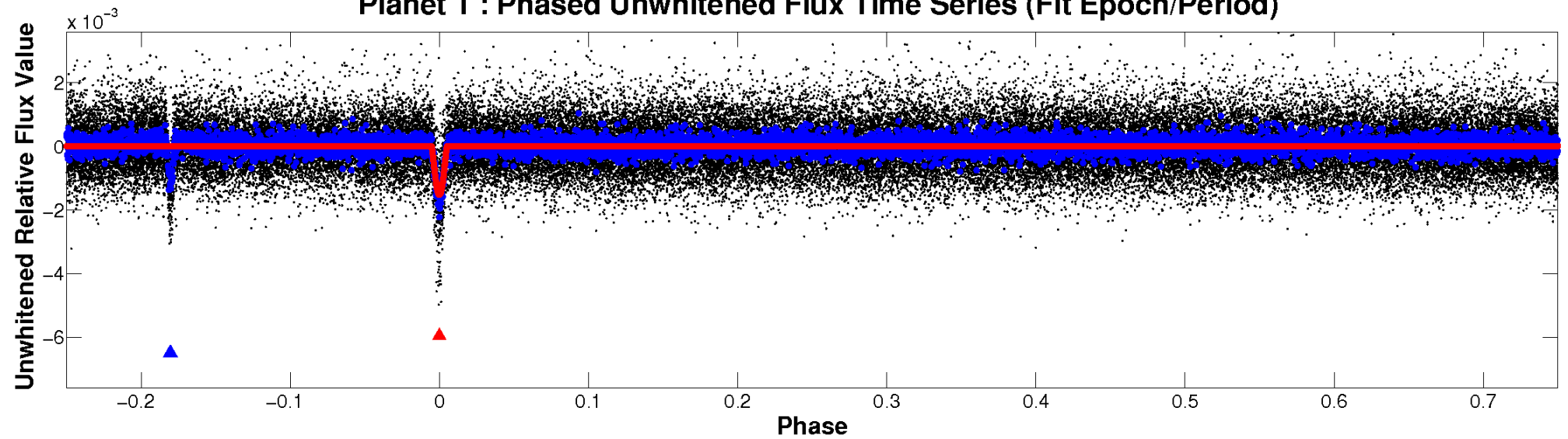
ALT Odd/Even

TCE 003644653-01

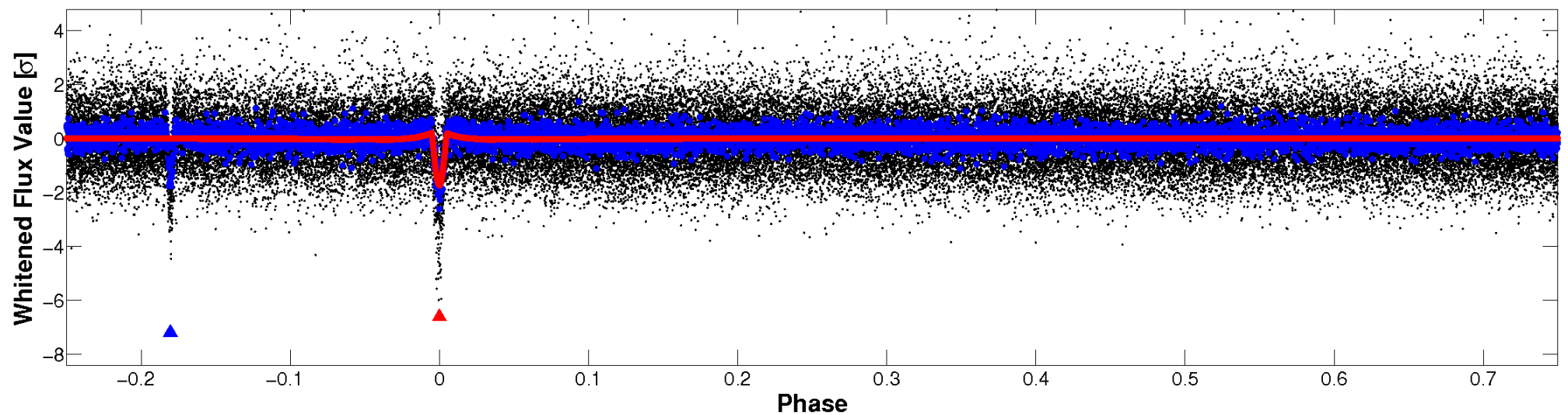


Non-Whitened Vs. Whitened Light Curve

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

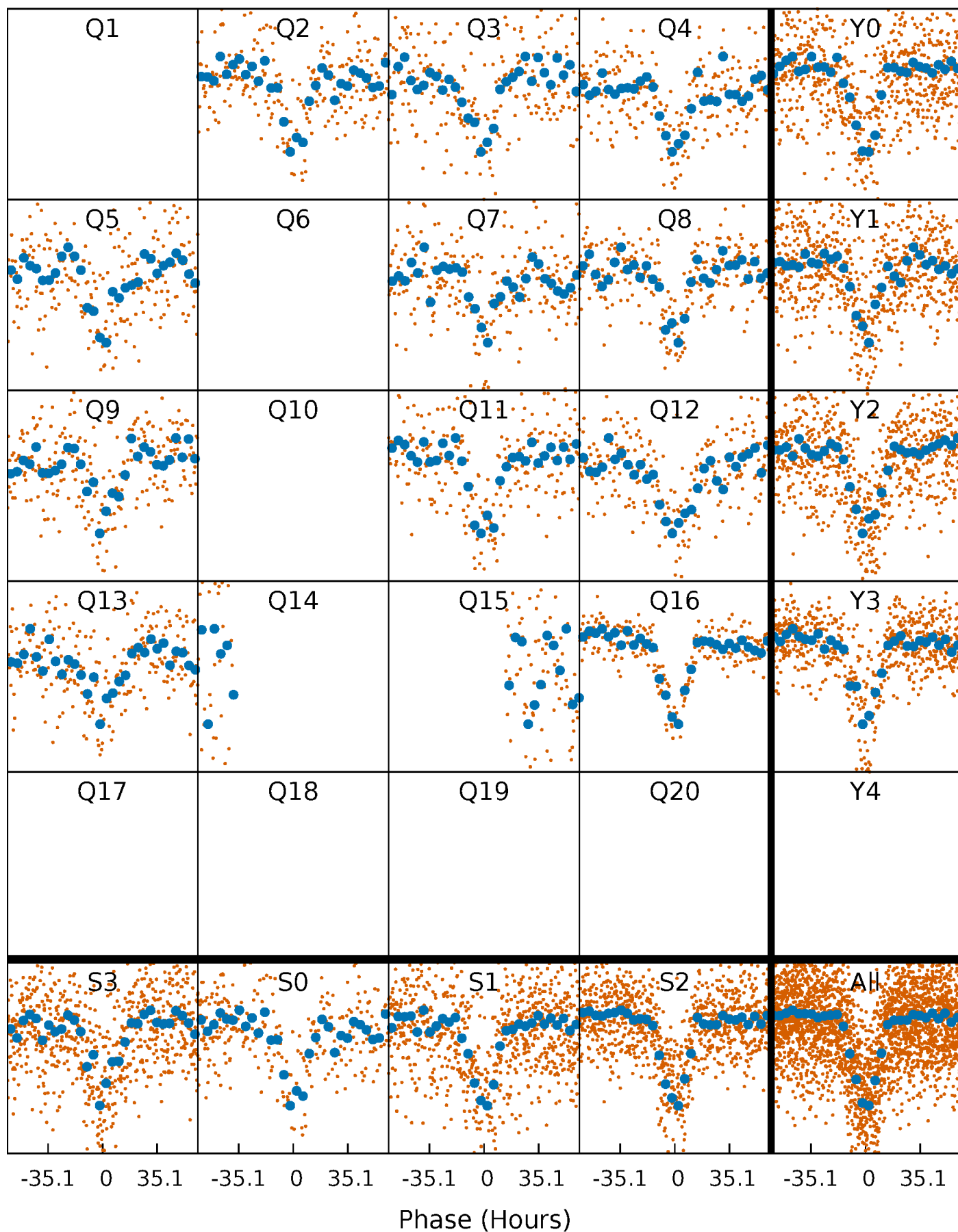


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



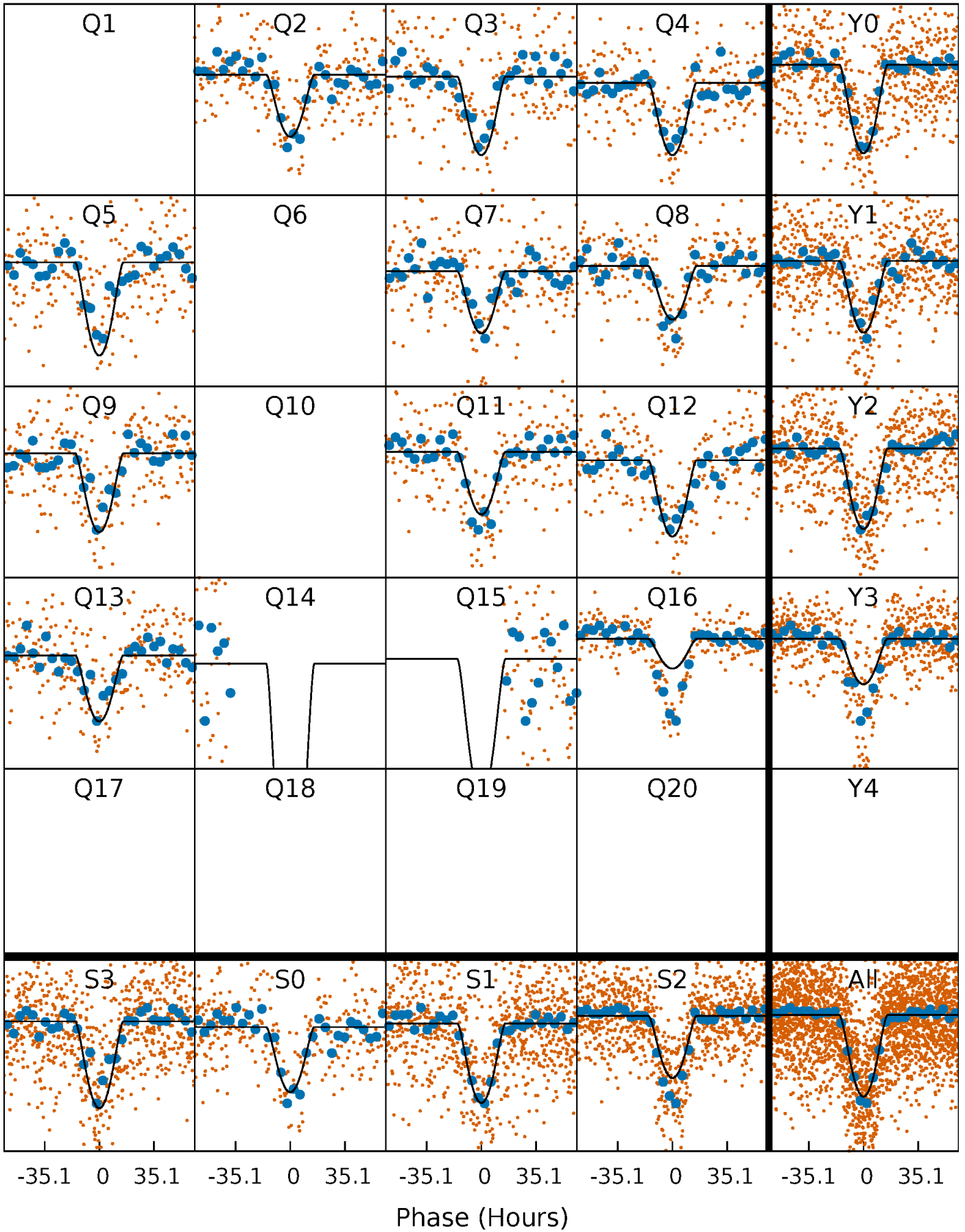
PDC Quarter-Phased Transit Curves

TCE 003644653-01 P=119.682441 Days $T_0=176.097834$ (BKJD)



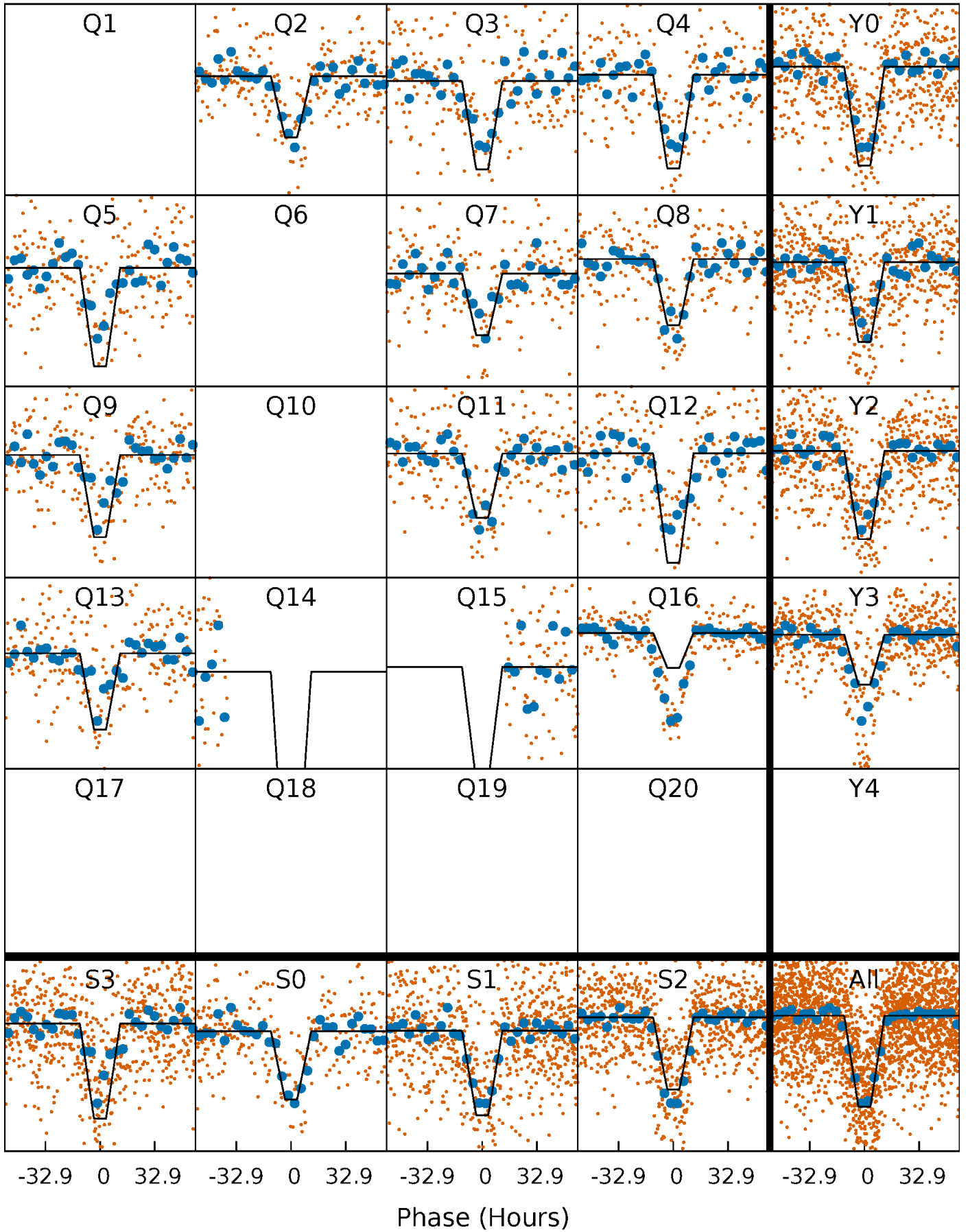
DV Quarter-Phased Transit Curves

TCE 003644653-01 P=119.682441 Days $T_0=176.097834$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

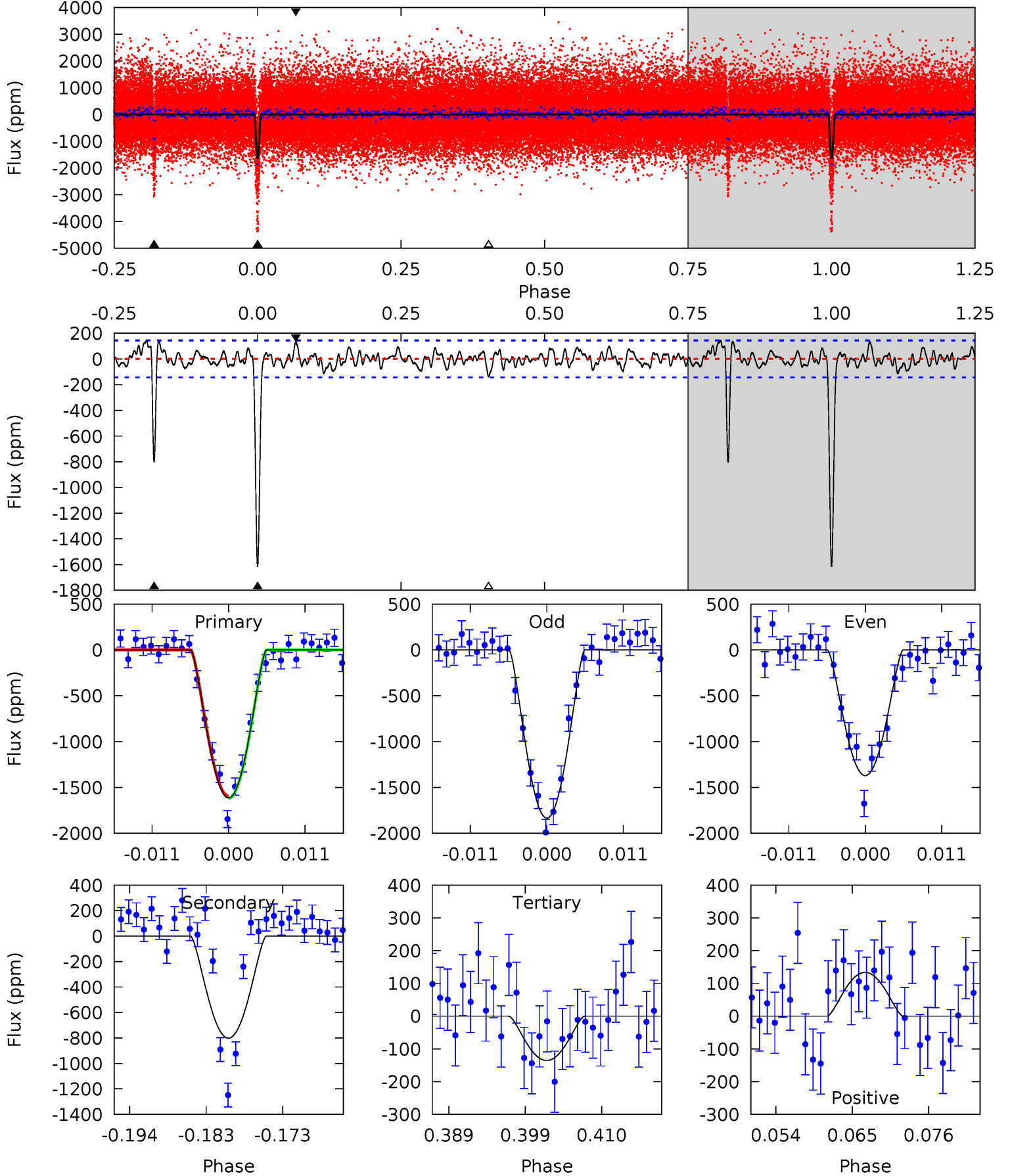
TCE 003644653-01 P=119.686172 Days $T_0=176.070968$ (BKJD)



DV Model-Shift Uniqueness Test

003644653-01, P = 119.682441 Days, E = 56.415393 Days

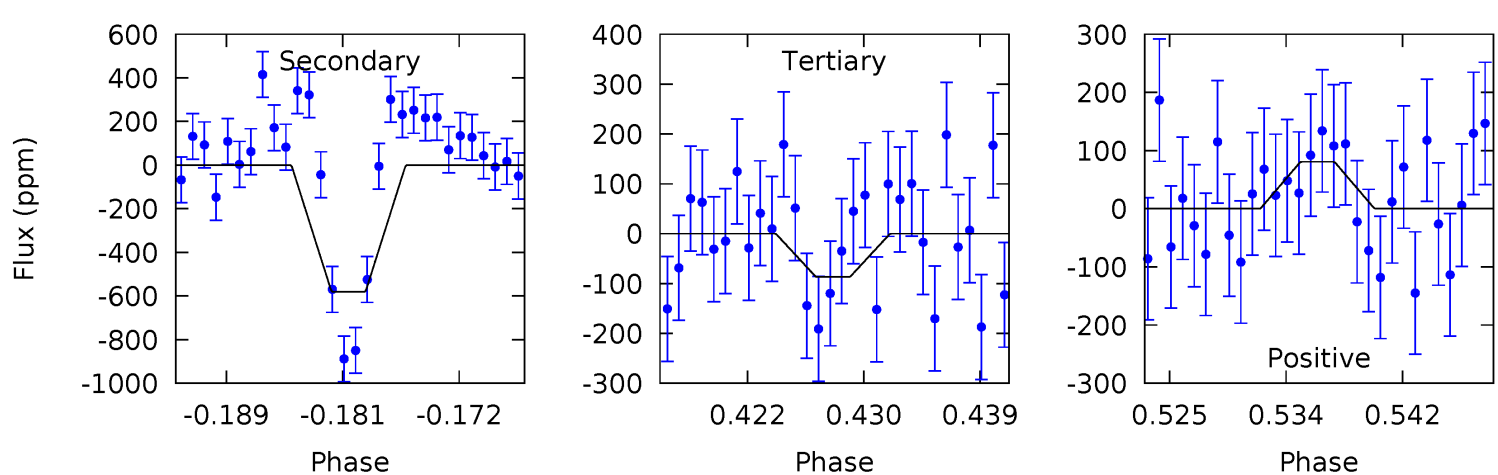
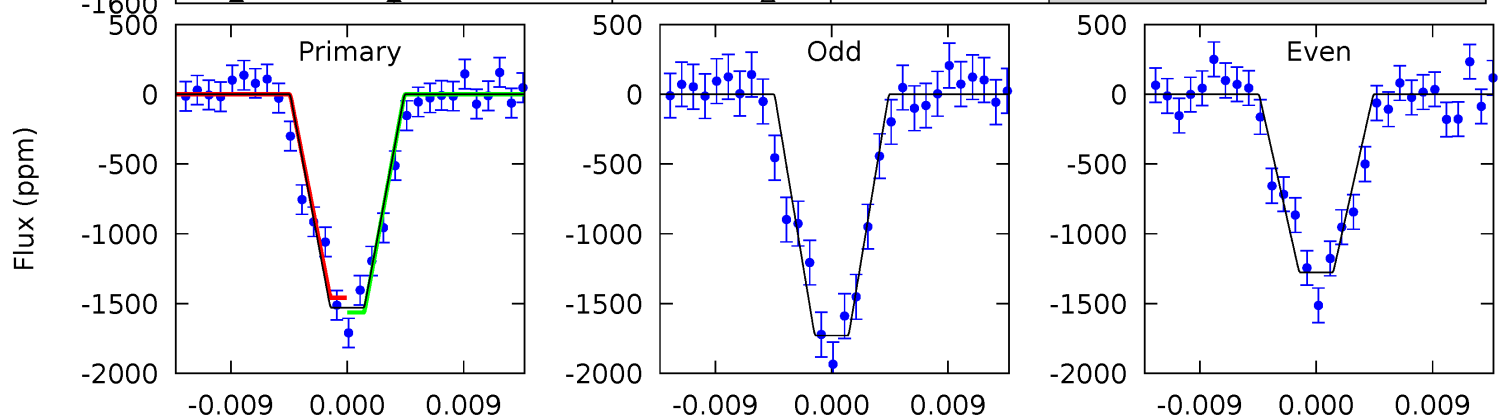
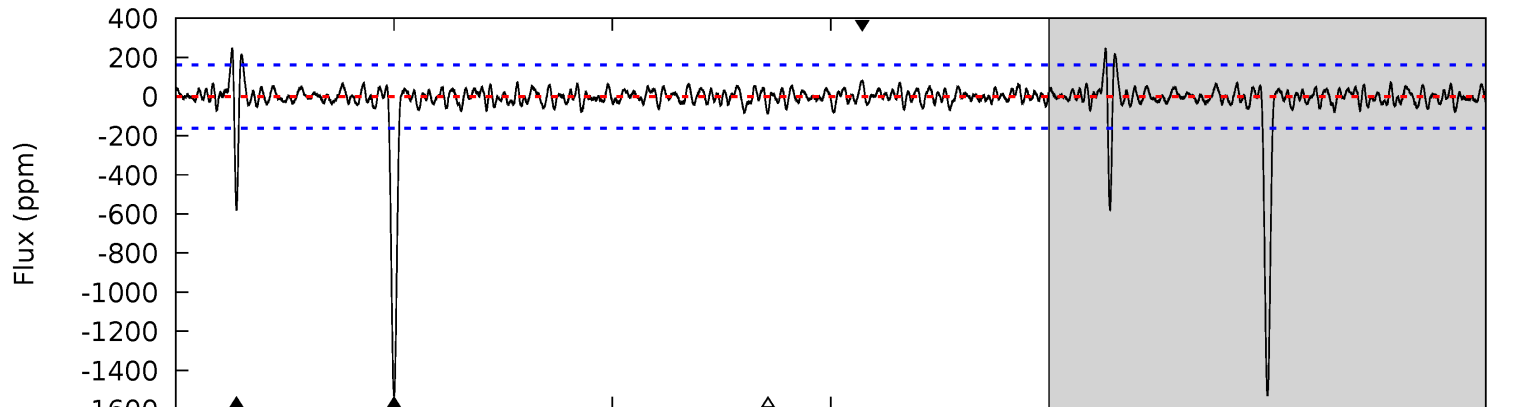
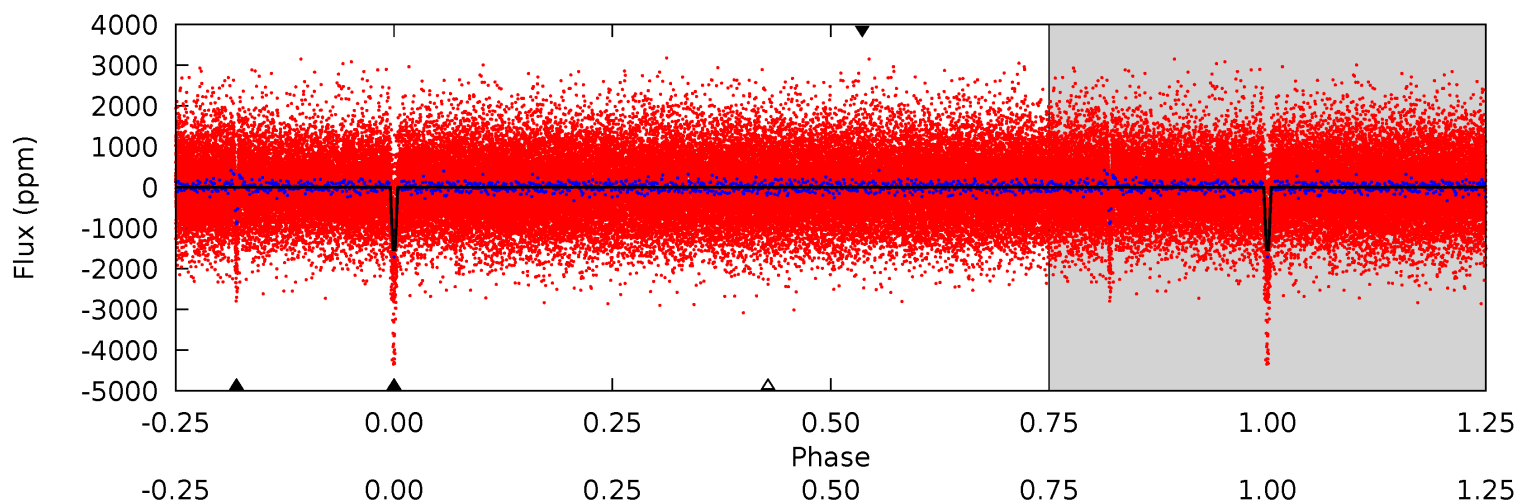
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
56.1	27.9	4.70	4.64	5.01	2.55	1.59	51.4	51.4	23.2	23.2	8.06	1.01	0.08	0.40



Alt Model-Shift Uniqueness Test

003644653-01, P = 119.686172 Days, E = 56.384796 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
47.8	18.1	2.72	2.52	5.05	2.63	0.92	45.1	45.3	15.4	15.6	7.05	1.23	0.14	1.65



Stellar Parameters For KIC 003644653

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5778^{+162}_{-182}	$4.531^{+0.035}_{-0.196}$	$0.070^{+0.250}_{-0.300}$	$0.911^{+0.257}_{-0.086}$	$1.028^{+0.100}_{-0.125}$	$1.914^{+0.362}_{-0.964}$
	+3%/-3%	+1%/-4%	+357%/-429%	+28%/-9%	+10%/-12%	+19%/-50%
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 003644653-01 / KOI 2596.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-802 ± 29	$7.41^{+4.47}_{-4.31}$	503^{+33}_{-24}	3980^{+1587}_{-598}	1841^{+8695}_{-1125}
Alt.	-581 ± 32	$5.62^{+4.19}_{-3.61}$	500^{+33}_{-21}	4114^{+2287}_{-711}	2300^{+16219}_{-1552}

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

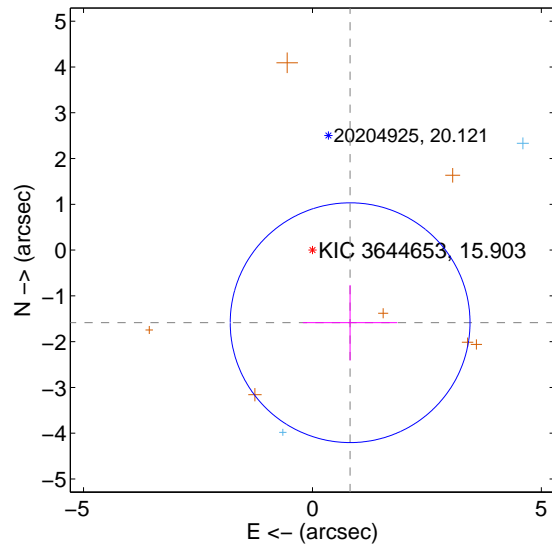
Supplemental centroid analysis for 003644653-01. Kepler magnitude: 15.90. Transit SNR 27.63

There are 2 quarters with good PRF difference image offsets

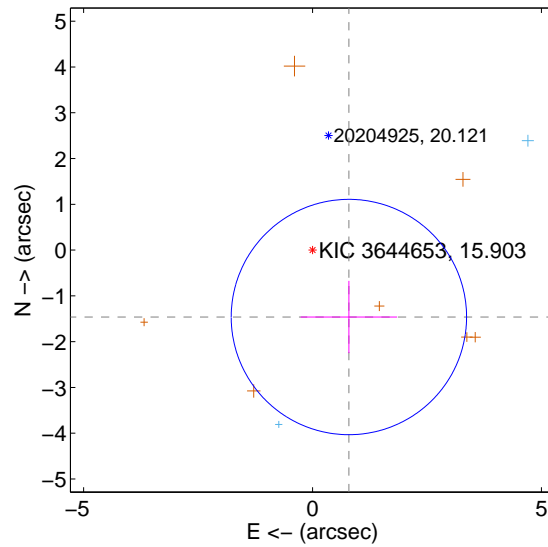
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.787 ± 0.873	2.05	-0.823 ± 1.031	-1.586 ± 0.825
PRF-fit source offset from KIC position	1.664 ± 0.857	1.94	-0.794 ± 1.054	-1.462 ± 0.789
photometric centroid source offset	2.70 ± 0.48	5.58	-2.67 ± 0.48	-0.44 ± 0.47

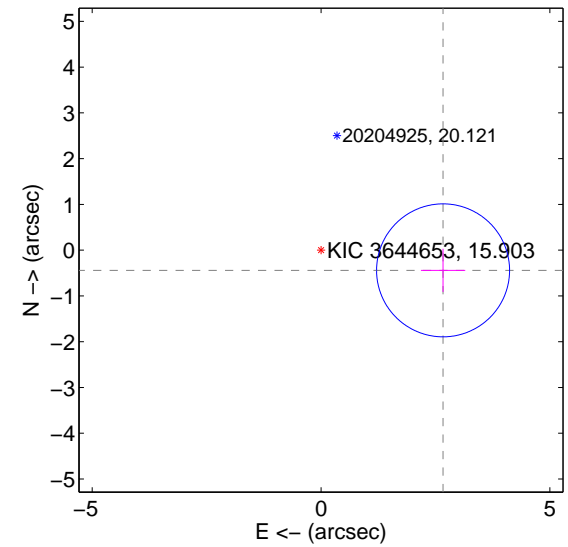
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

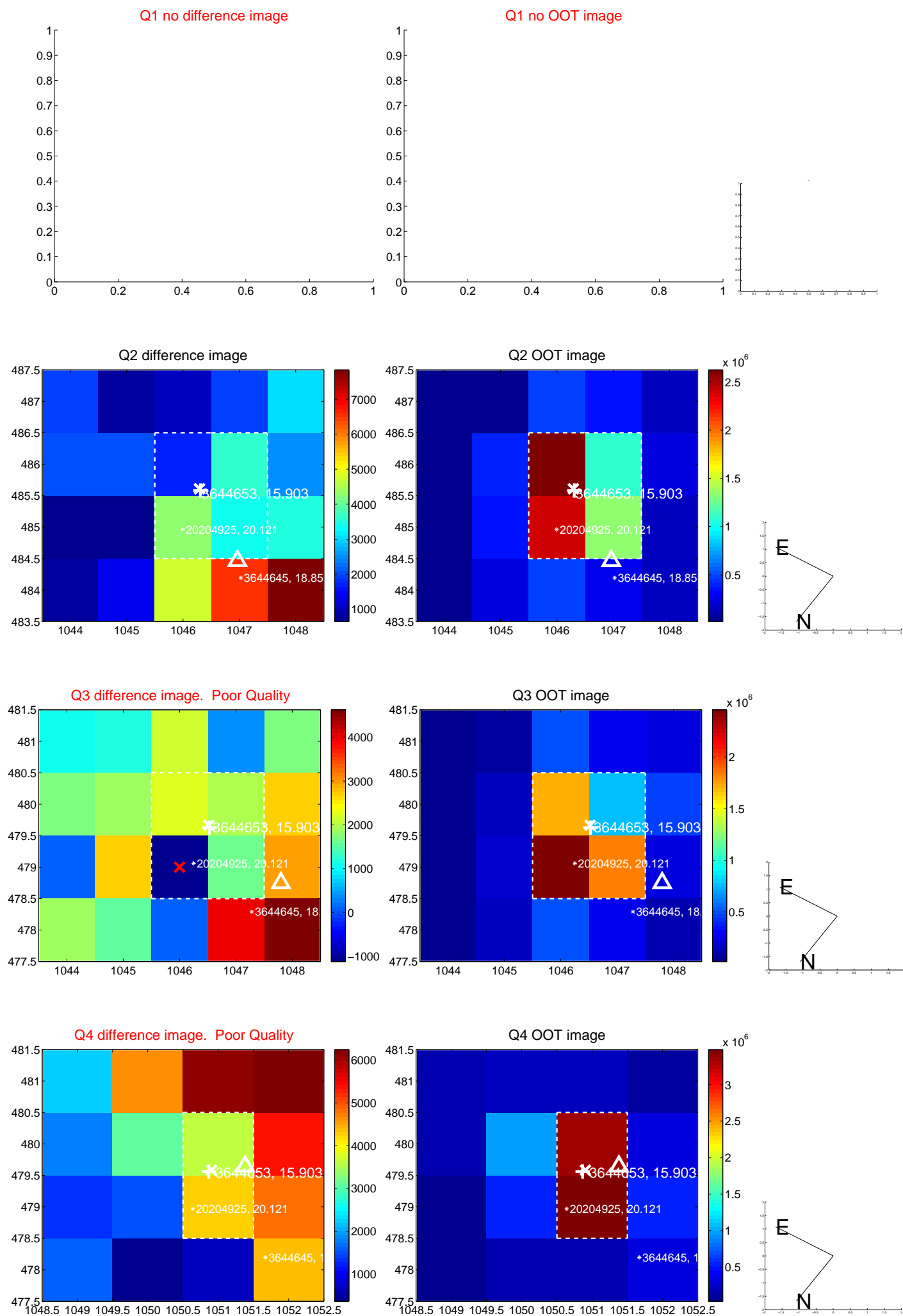


offset from photometric centroids

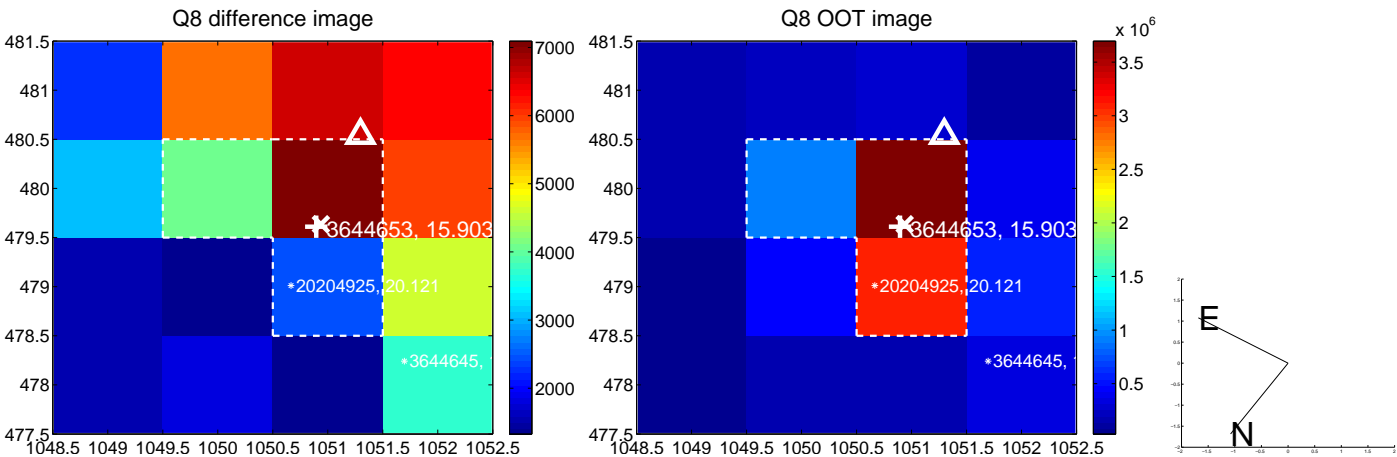
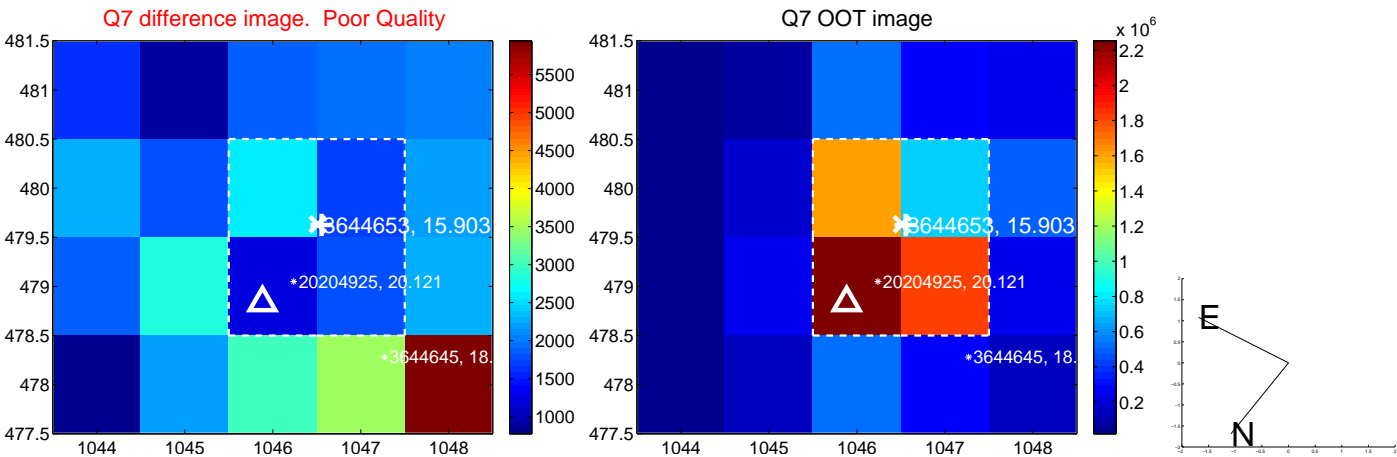
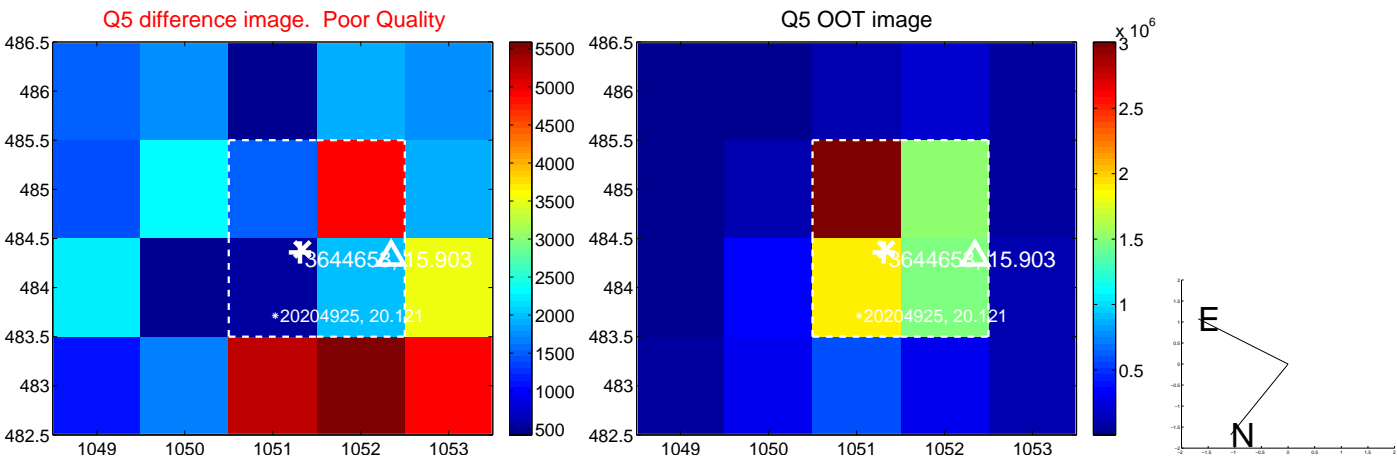


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

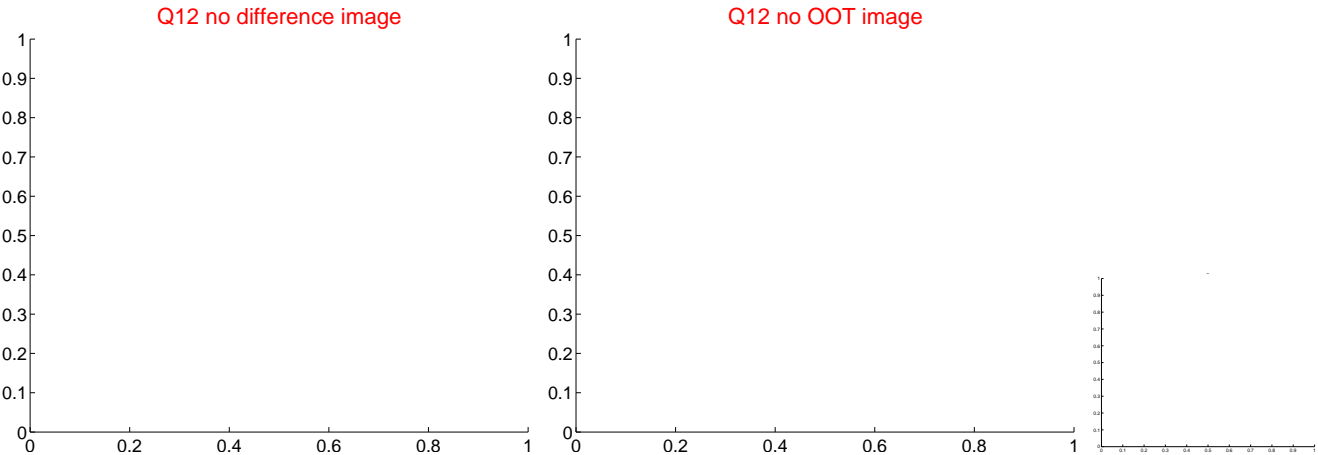
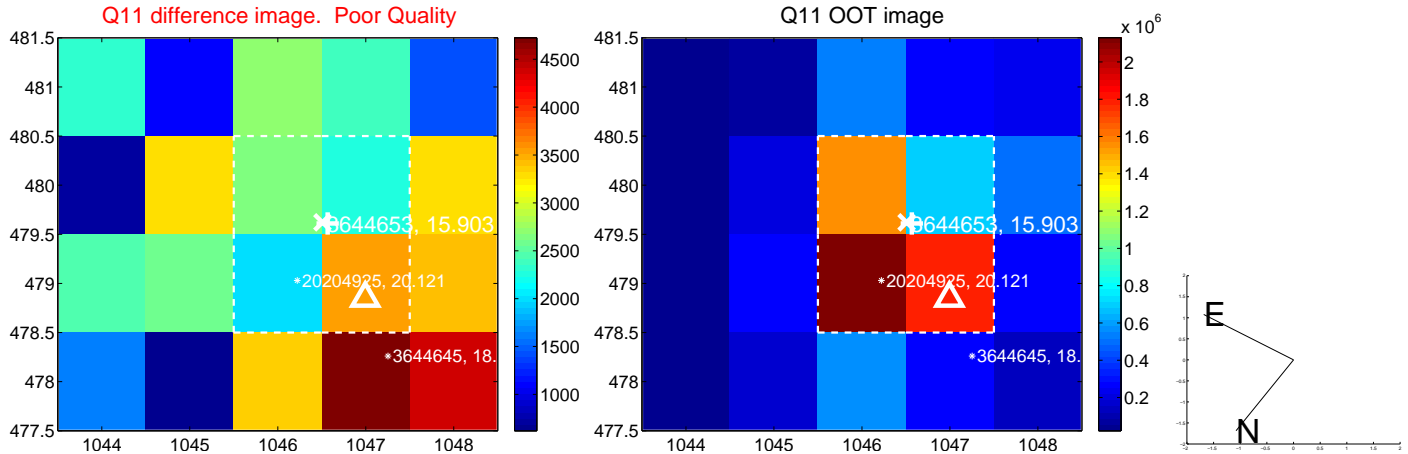
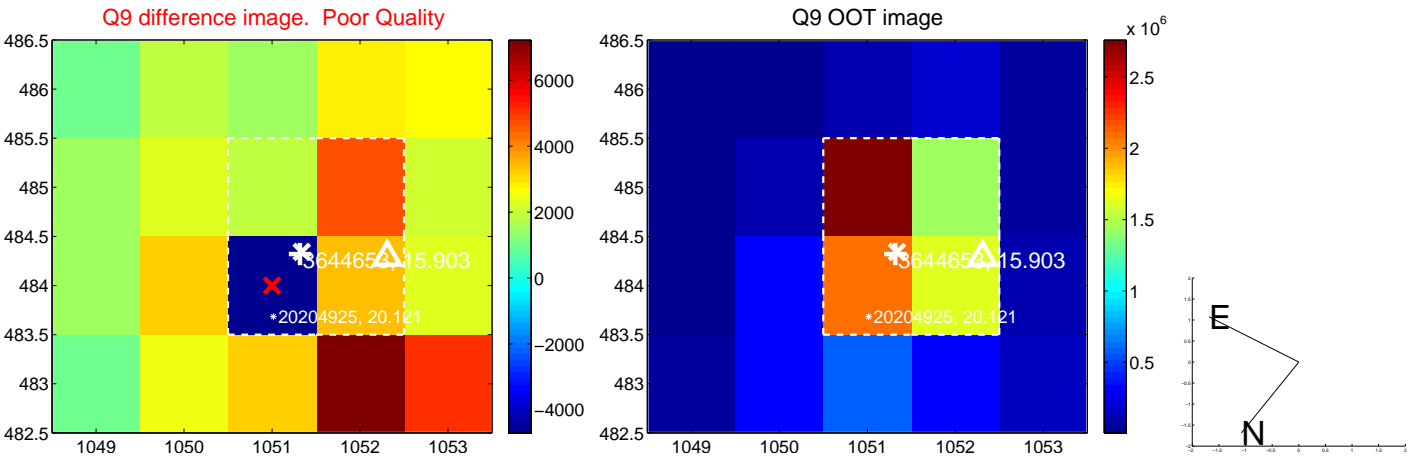
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



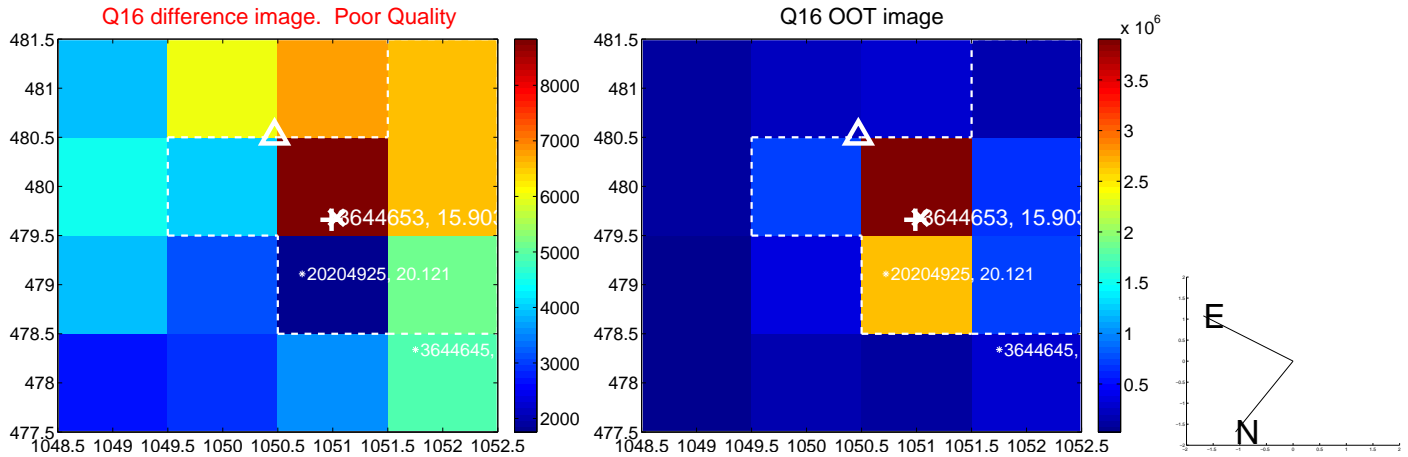
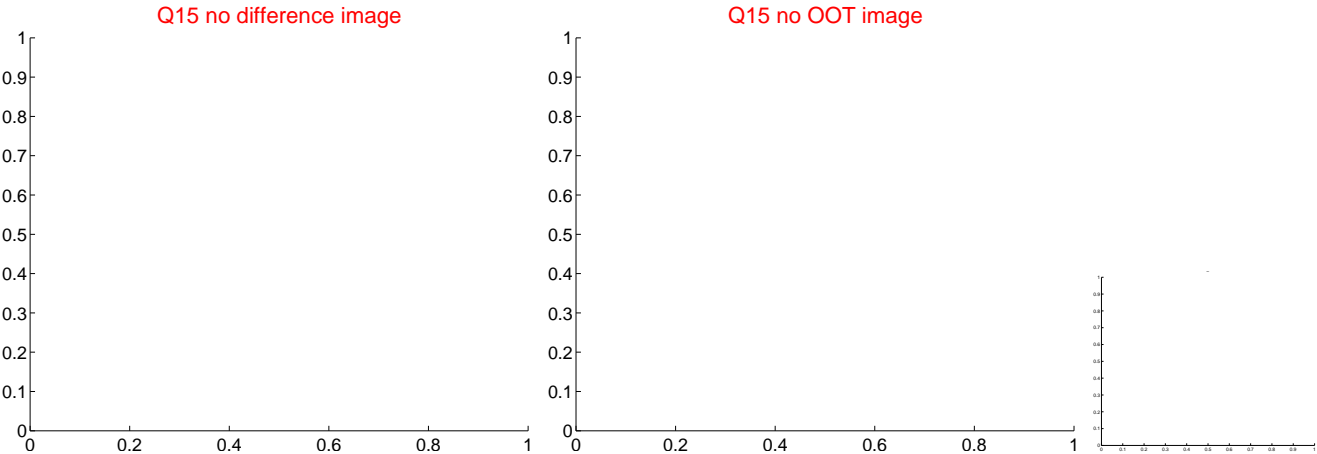
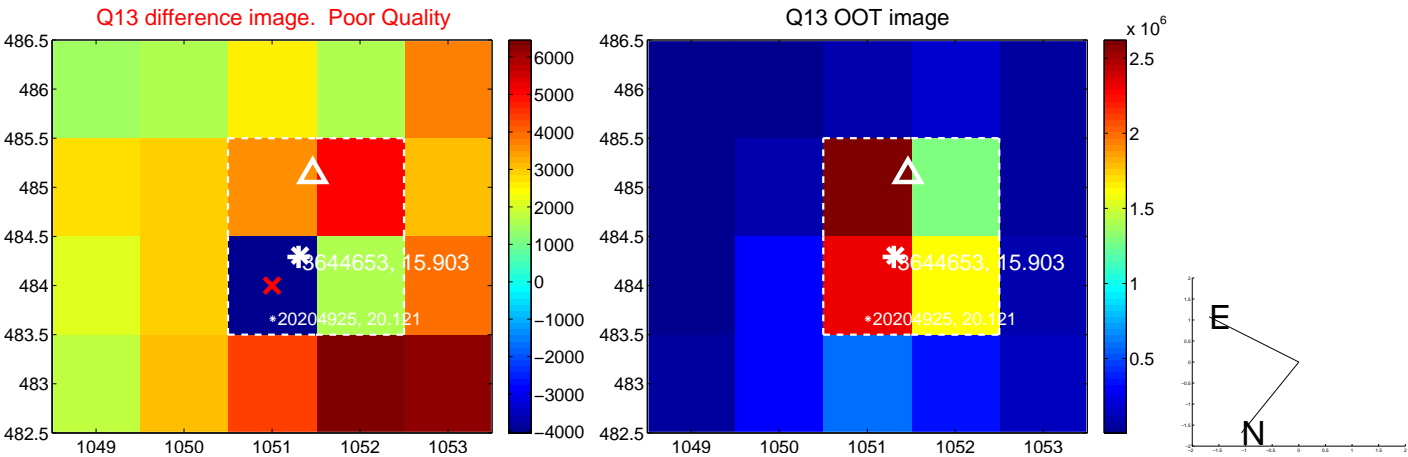
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



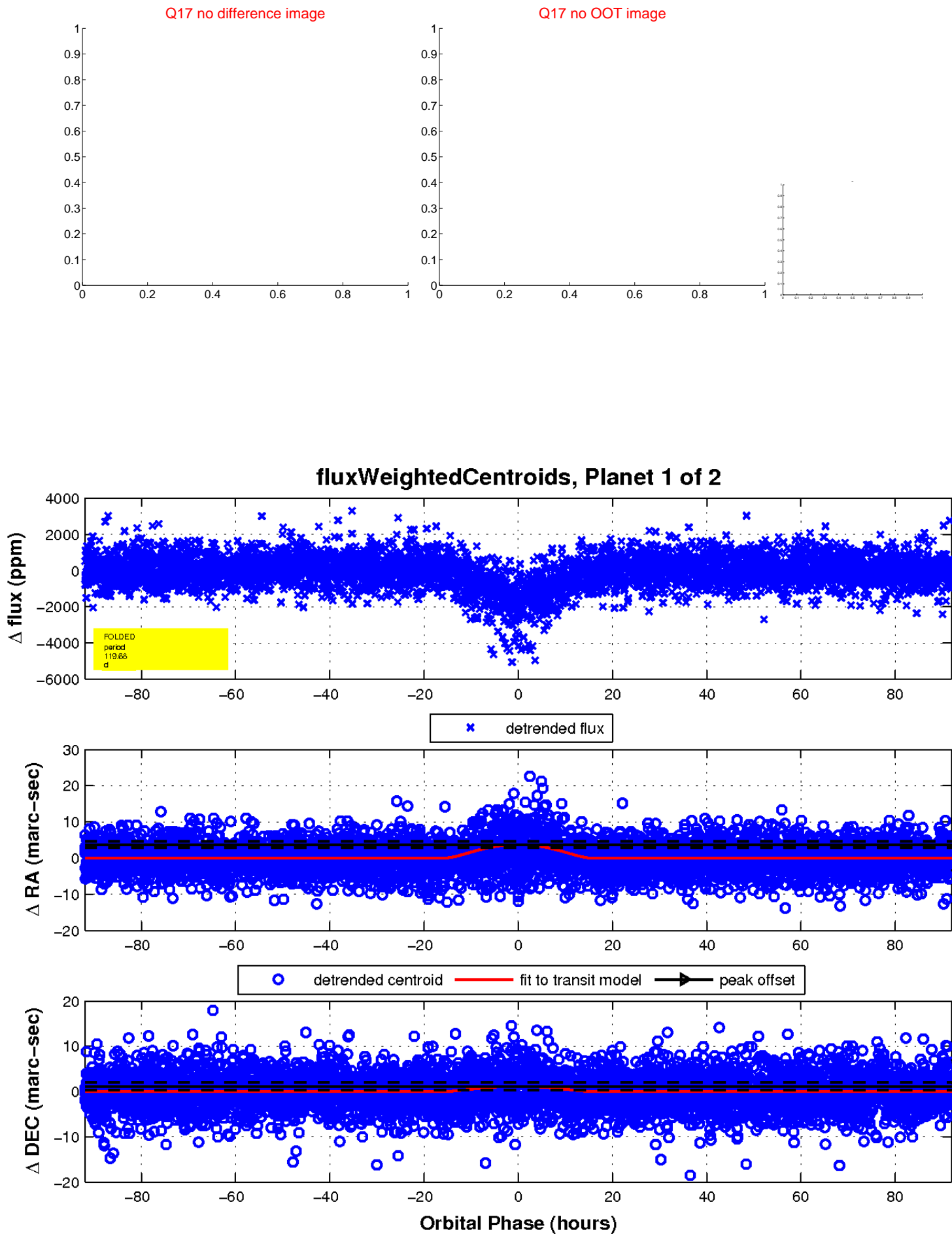
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

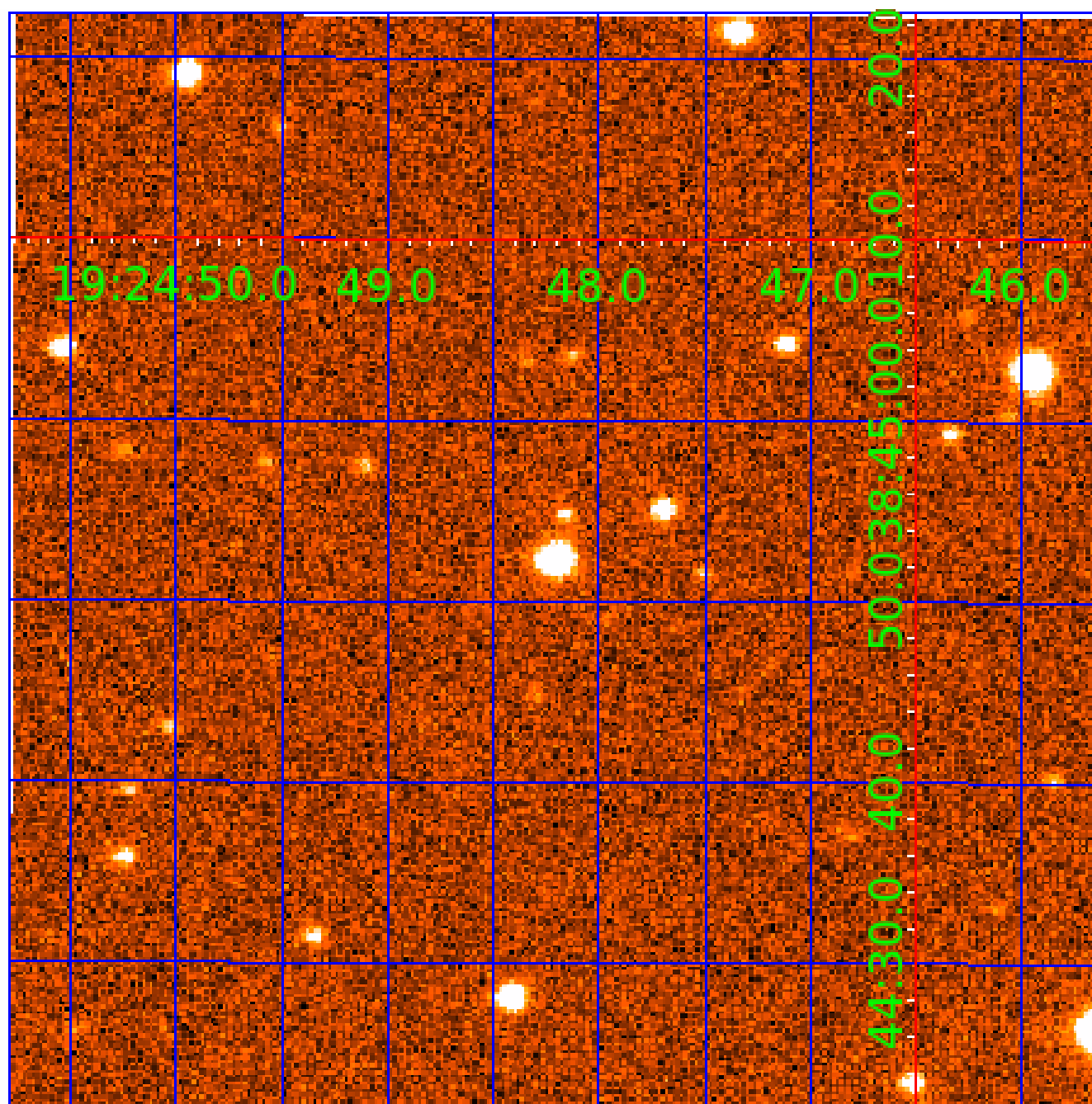


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 003644653

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})
003644653-01	OBS	2596.01	119.682441	176.097834	1526.5	30.680	27.0	27.6	0.91	5778	6.13	3.60
003644653-02	OBS	No	119.678372	154.536978	1257.7	16.193	18.7	20.5	0.91	5778	5.32	3.60

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003644653-01	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_SKYE—CENT_FEW_DIFFS—HALO_GHOST—EPHEM_MATCH
003644653-02	OBS	FP	0.00	1	0	1	1	SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET—HALO_GHOST—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 003644653-02

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
003644653-02	3644653	003644542-sec	3644542	1:1	105.4	25	-10	8.35	15.90	204.29	Direct-PRF	0	0.18	0.05

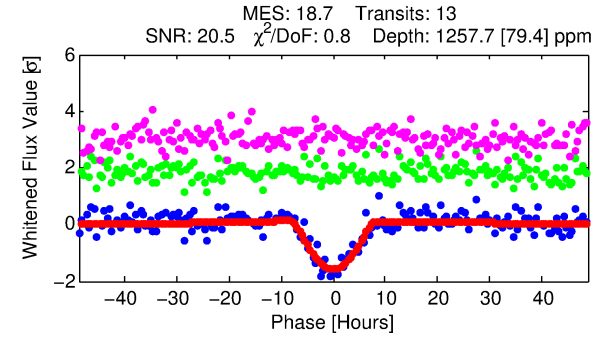
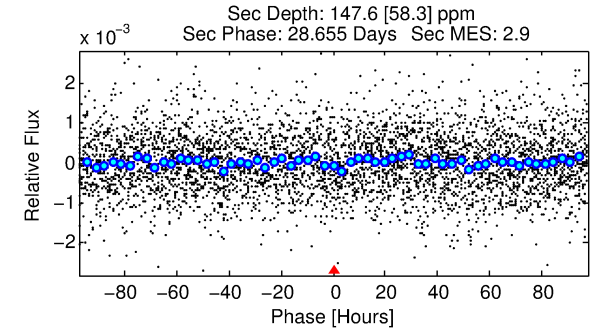
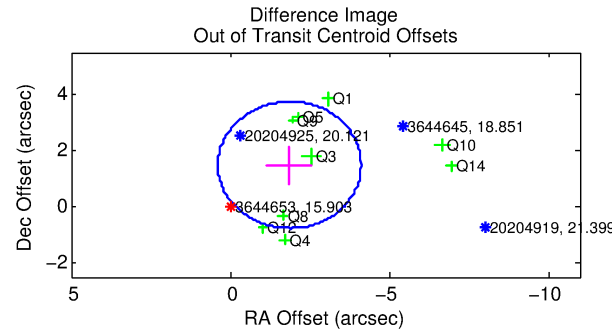
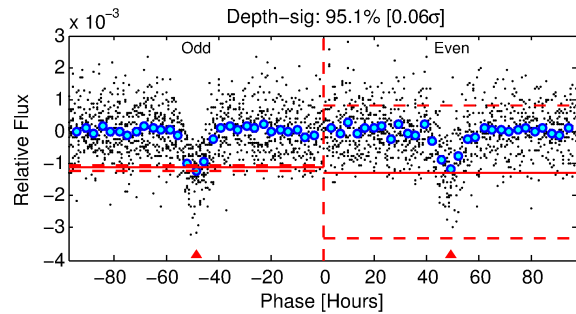
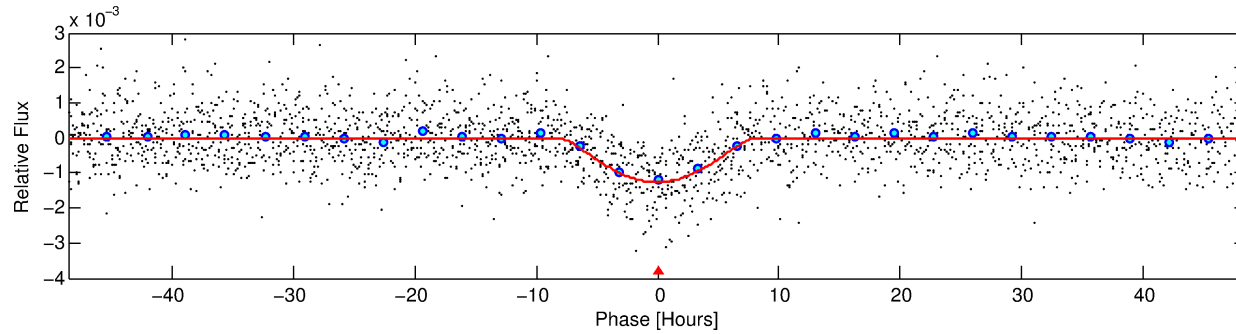
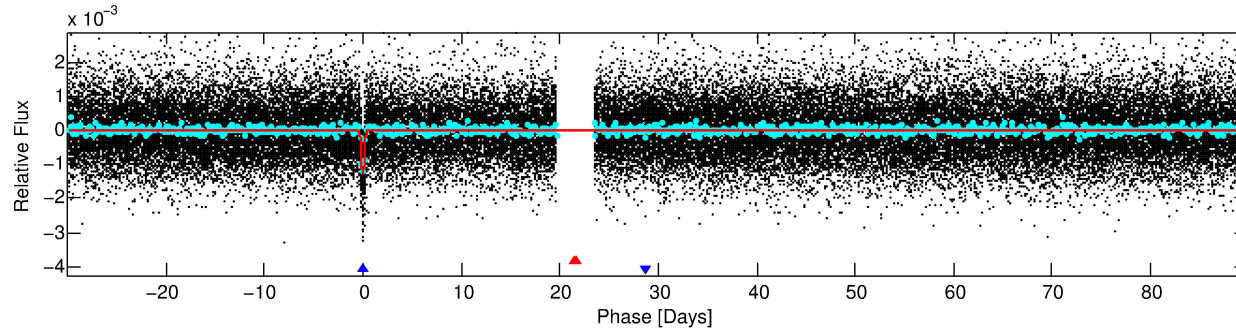
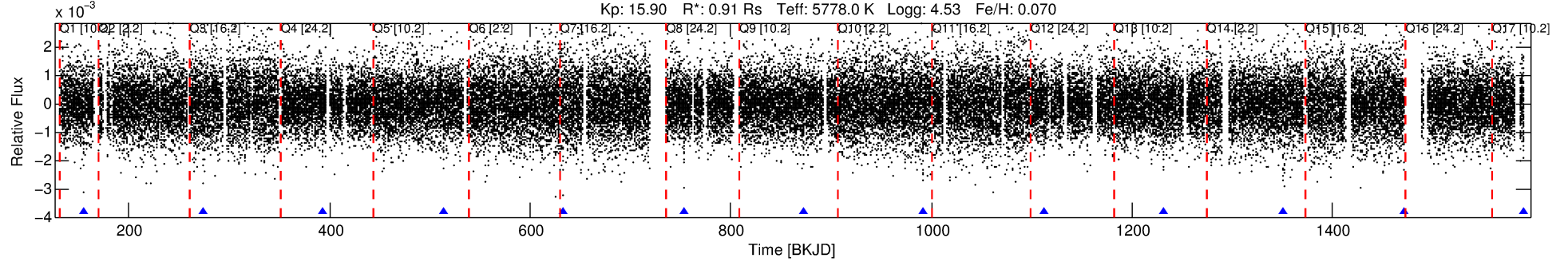
Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match 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: 3644653 Candidate: 2 of 2 Period: 119.678 d

KOI: K02596 Corr: No Ephemeris Match

Kp: 15.90 R*: 0.91 Rs Teff: 5778.0 K Logg: 4.53 Fe/H: 0.070



DV Fit Results:

Period = 119.67837 [0.00251] d
Epoch = 154.5370 [0.0170] BKJD
Rp/R* = 0.0535 [0.0527]
a/R* = 21.13 [6.40]
b = 0.98 [0.09]
Seff = 3.60 [1.36]
Teq = 351 [33] K
Rp = 5.32 [5.45] Re
a = 0.4798 [0.1156] AU
Ag = 659.96 [1346.32] [0.49σ]
Teffp = 2753 [1385] K [1.73σ]

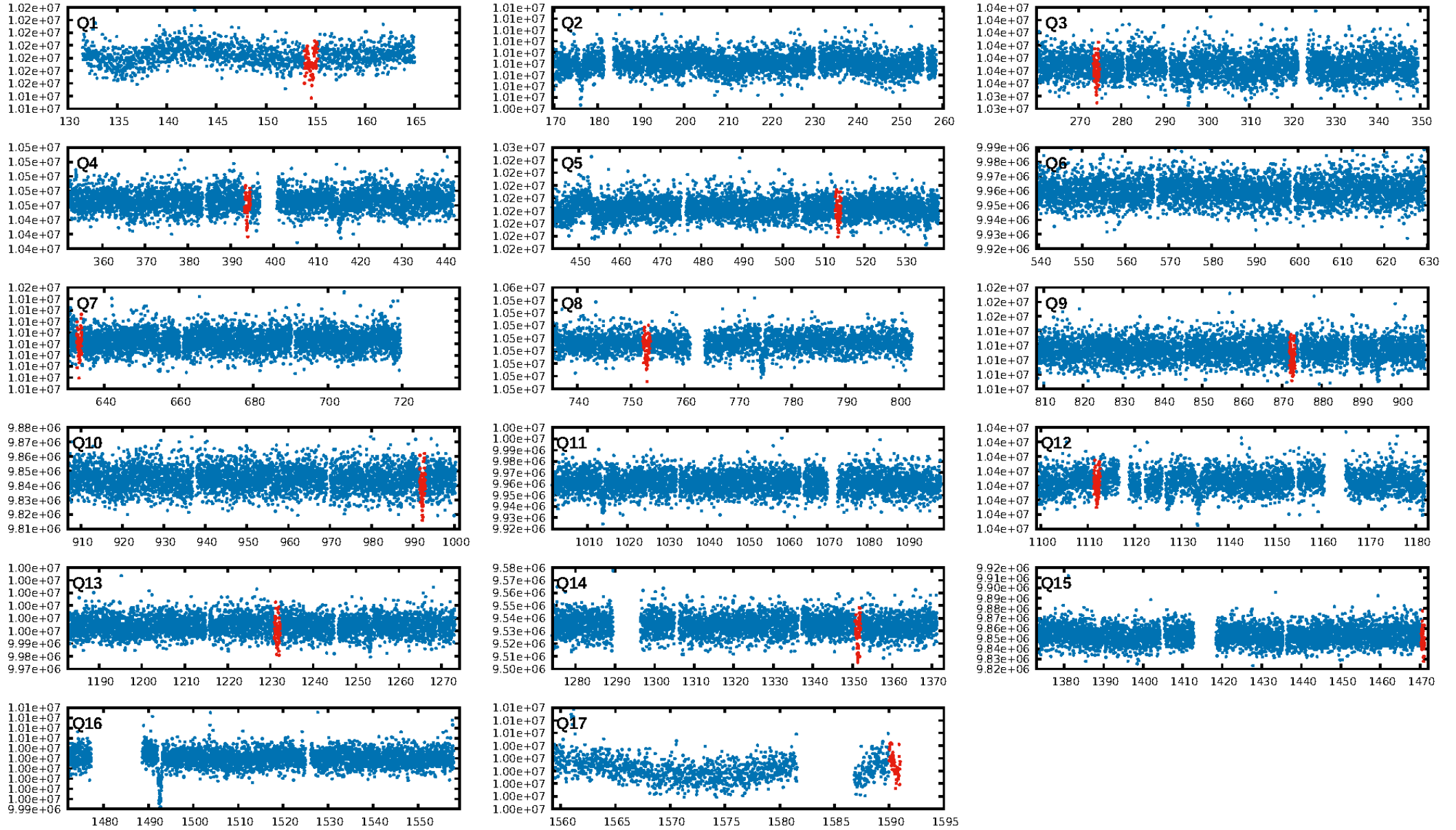
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.2% [0.00σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 9.25e-76
RollingBand-fgt: 1.00 [11/11]
GhostDiagnostic-chr: -0.001749
Centroid-sig: 77.7%
Centroid-so: 0.648 arcsec [0.92σ]
OotOffset-rm: 2.389 arcsec [3.18σ]
KicOffset-rm: 2.425 arcsec [2.99σ]
OotOffset-st: 2/1/3/3 [9]
KicOffset-st: 2/1/3/3 [9]
DiffImageQuality-fgm: 0.22 [2/9]
DiffImageOverlap-fno: 1.00 [9/9]

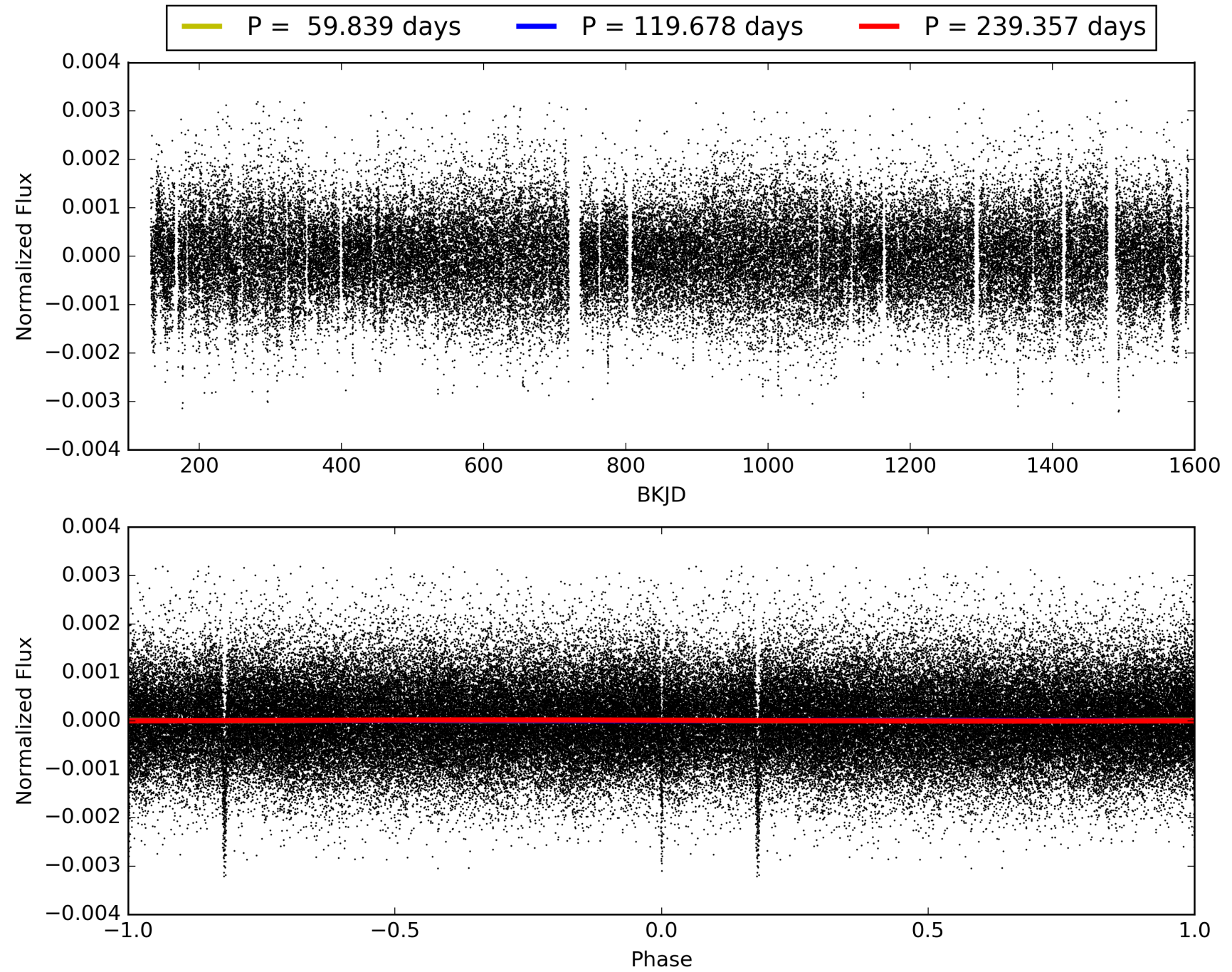
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 02:10:34 Z

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

TCE 003644653-02, PDC Light Curves

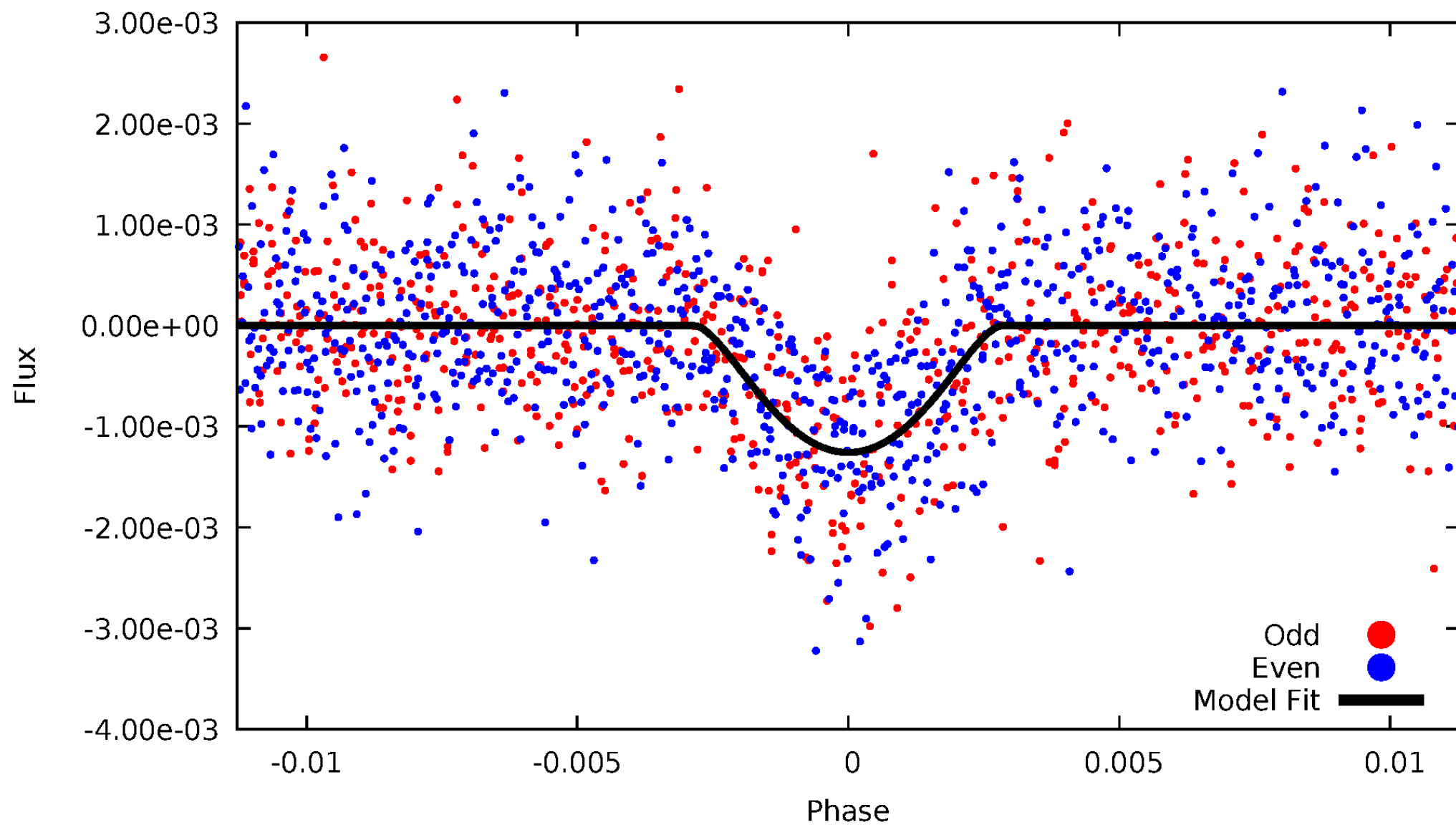


TCE 003644653-02



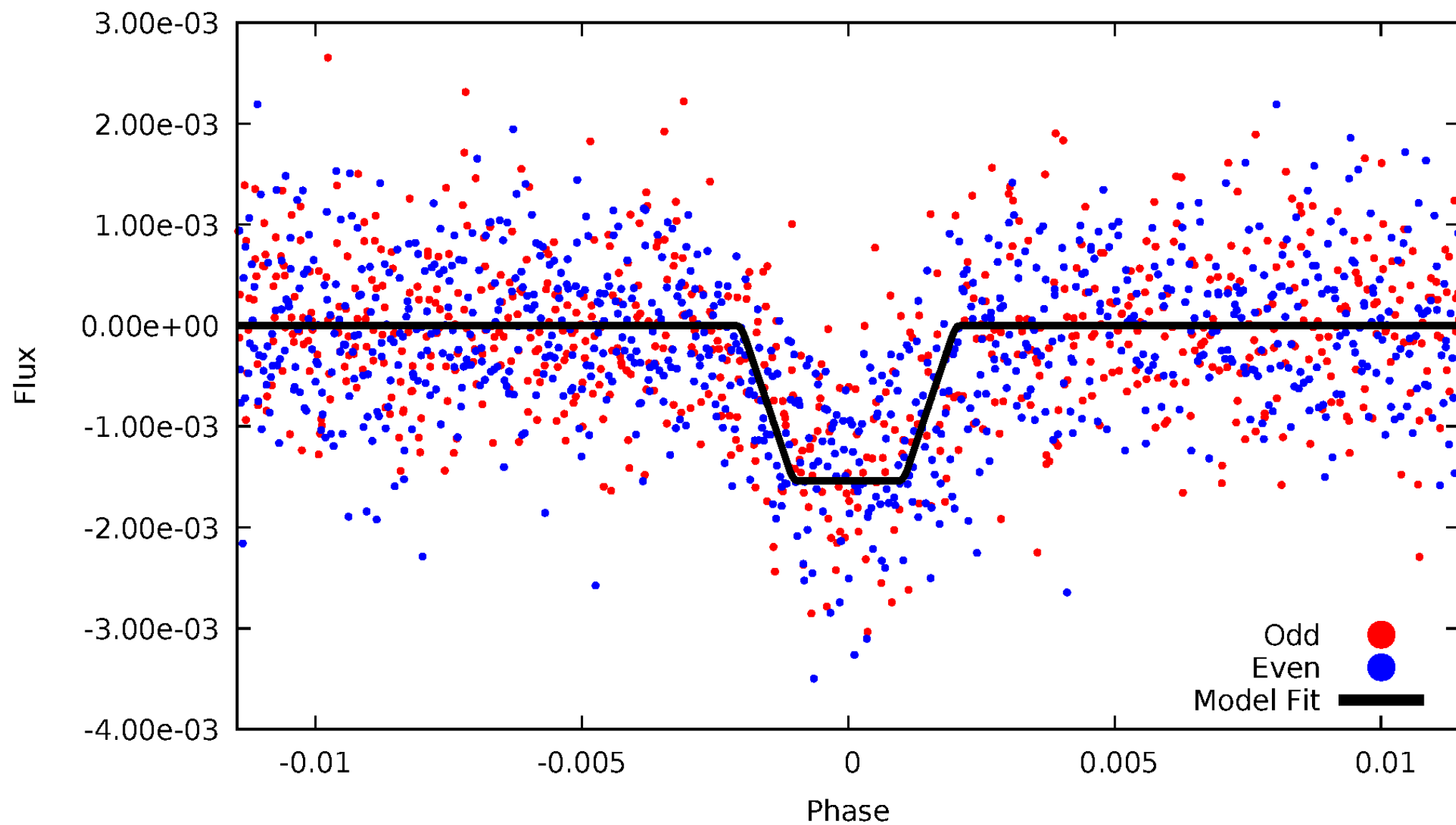
DV Odd/Even

TCE 003644653-02



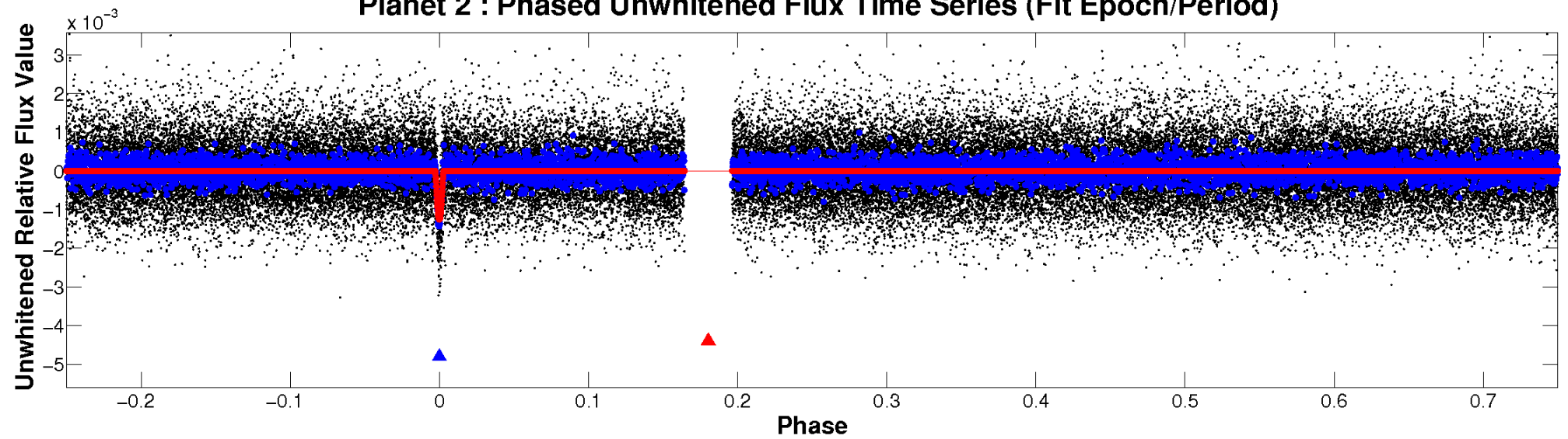
ALT Odd/Even

TCE 003644653-02

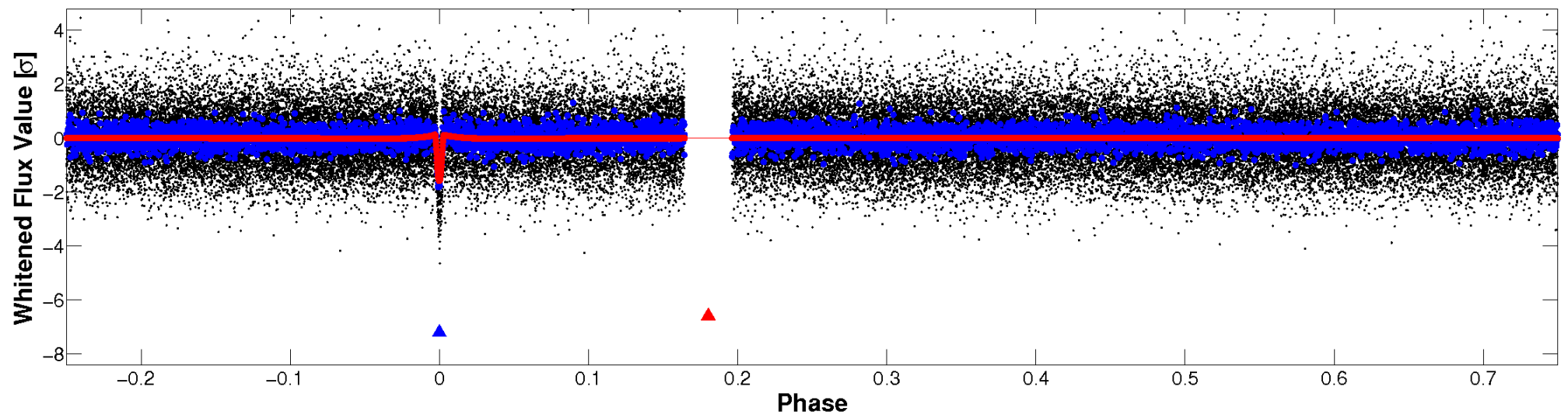


Non-Whitened Vs. Whitened Light Curve

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

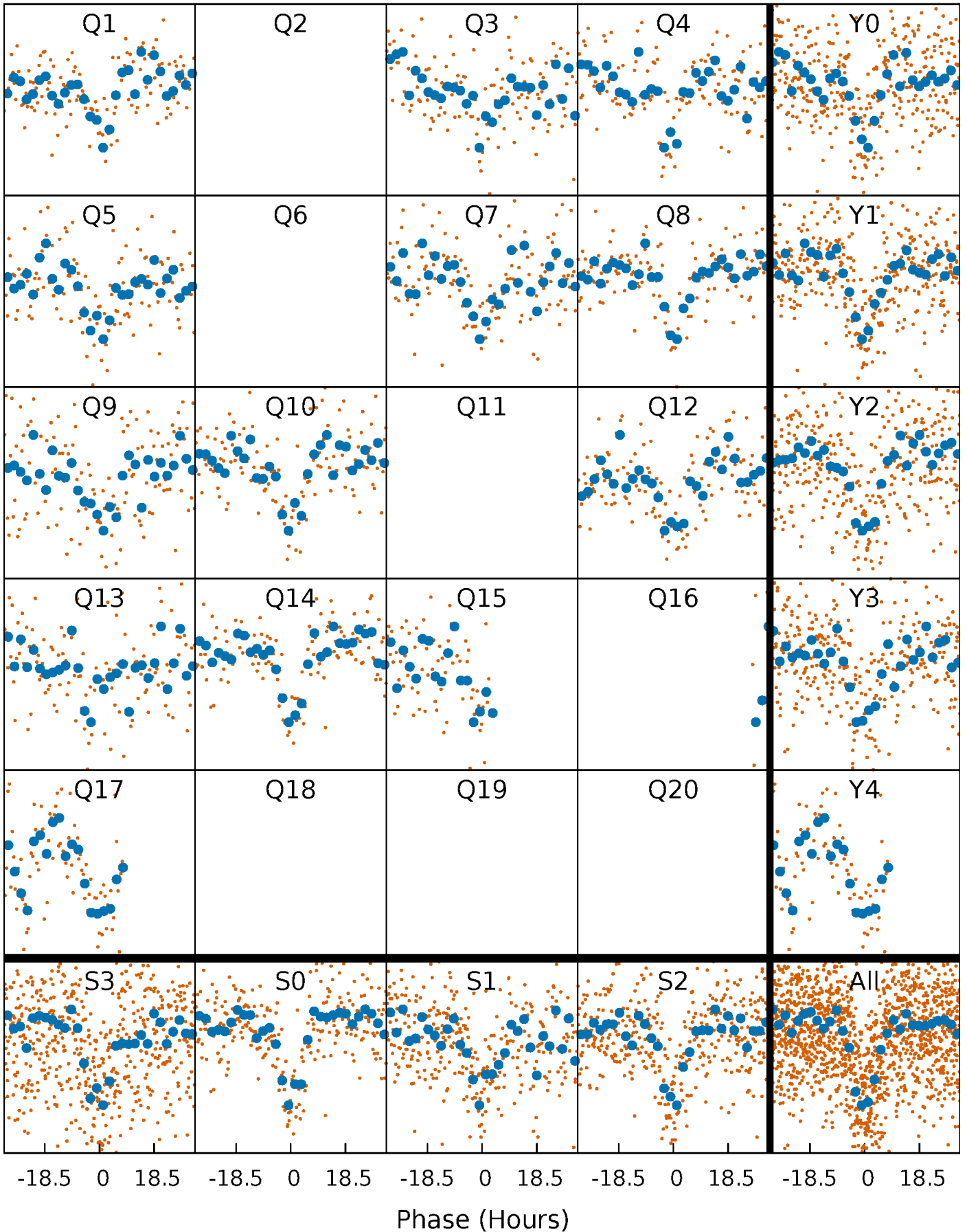


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



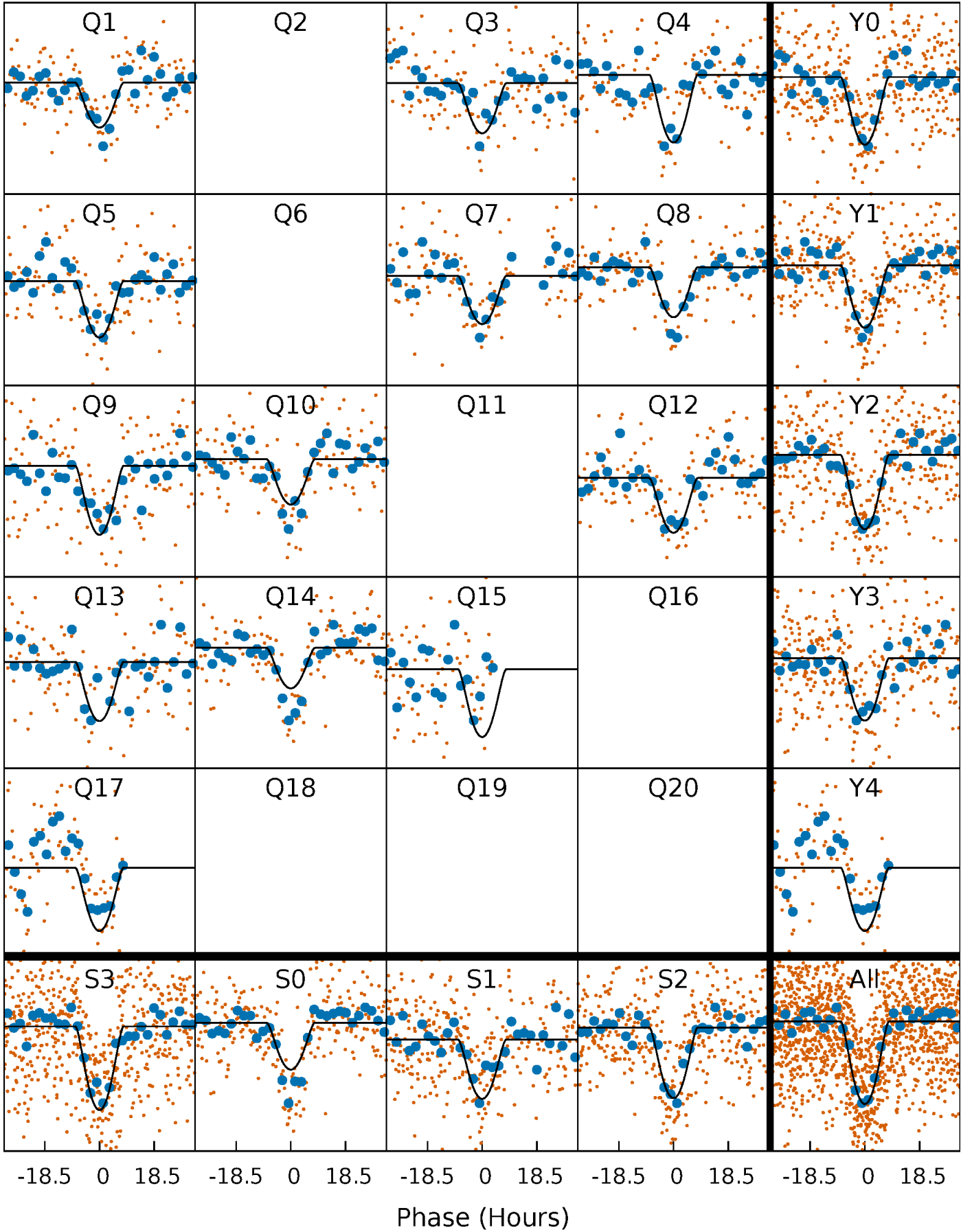
PDC Quarter-Phased Transit Curves

TCE 003644653-02 P=119.678372 Days $T_0=154.536978$ (BKJD)



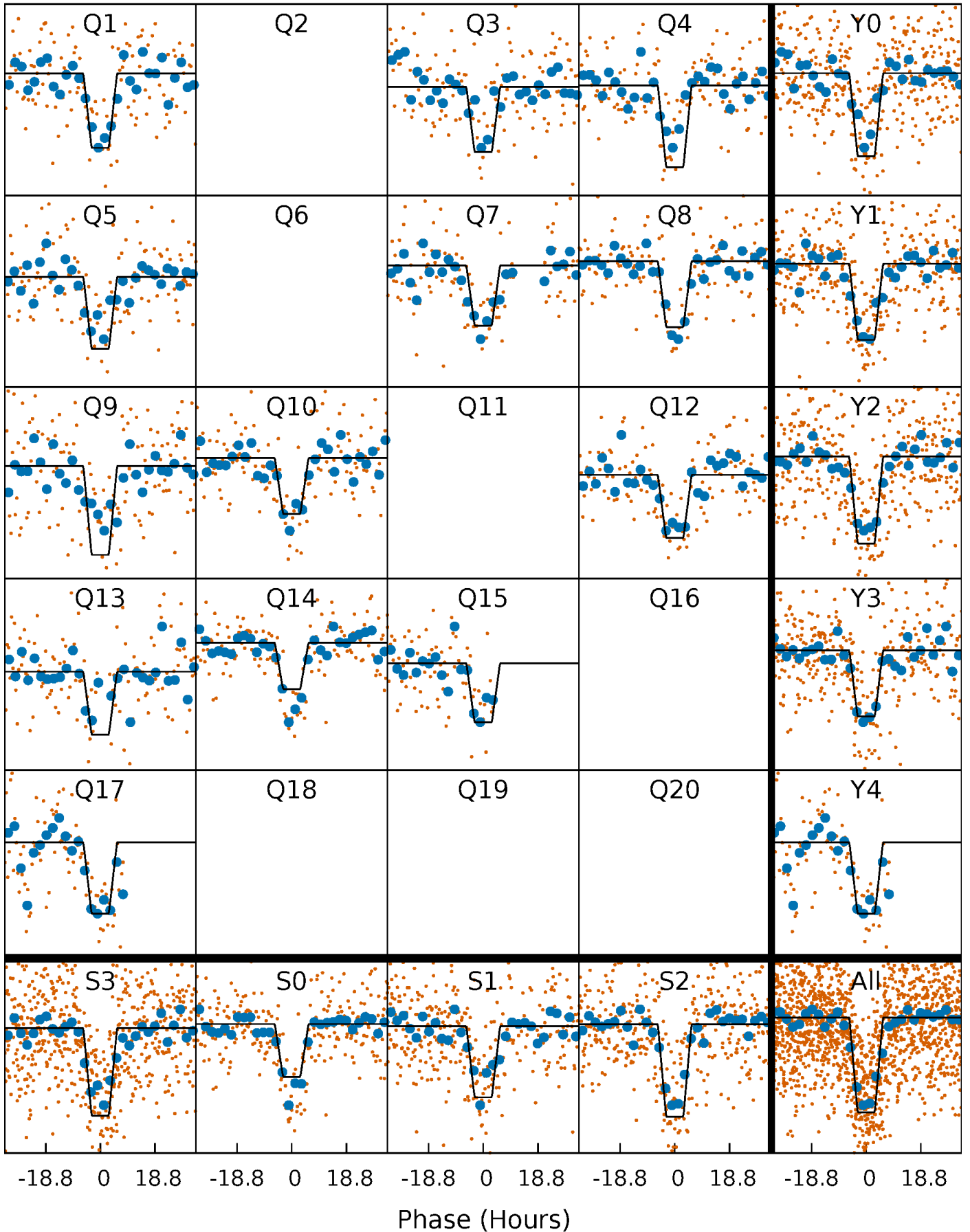
DV Quarter-Phased Transit Curves

TCE 003644653-02 P=119.678372 Days $T_0=154.536978$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

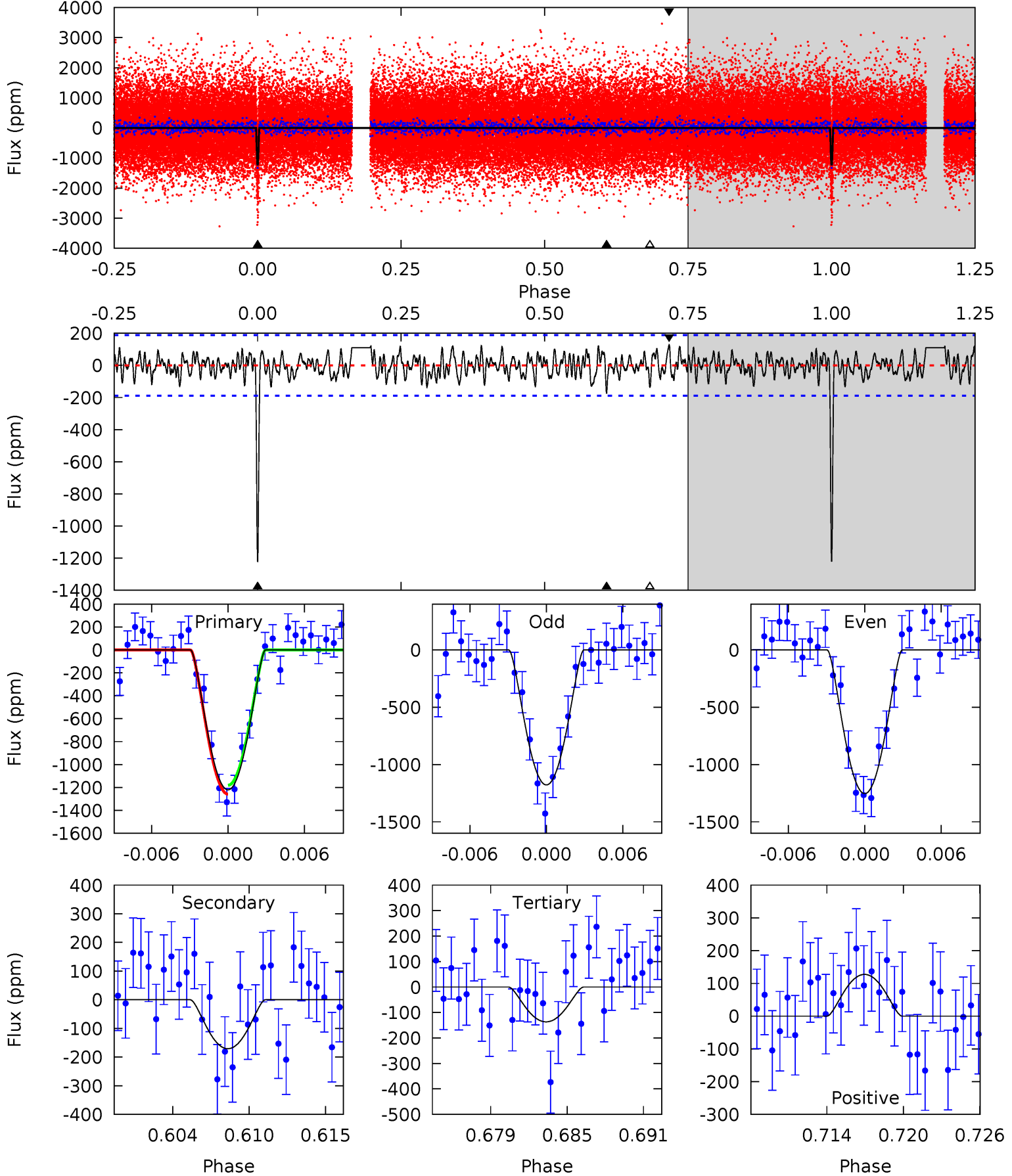
TCE 003644653-02 P=119.676880 Days $T_0=154.548981$ (BKJD)



DV Model-Shift Uniqueness Test

003644653-02, $P = 119.678372$ Days, $E = 34.858606$ Days

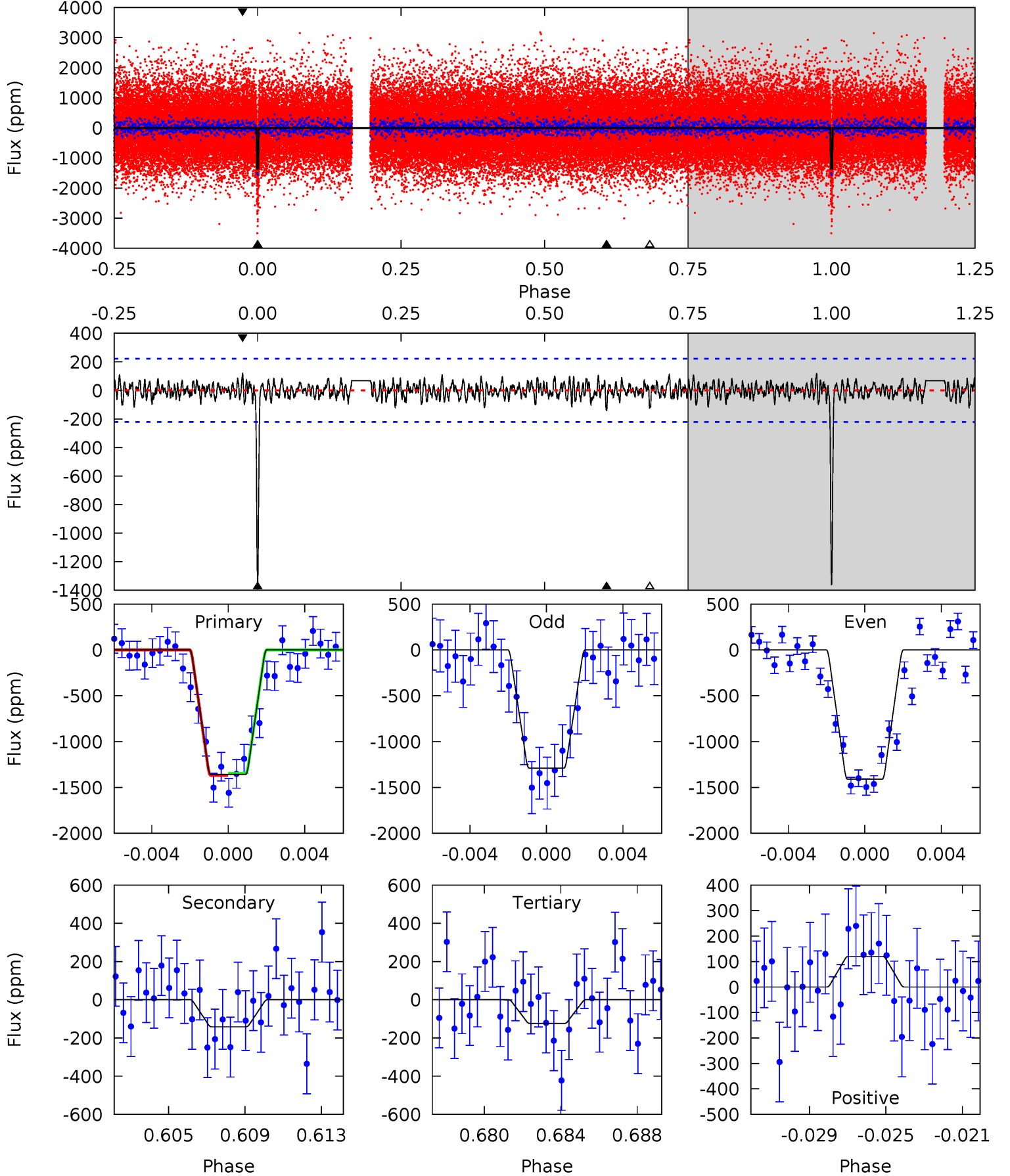
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.2	4.64	3.72	3.46	5.13	2.76	1.45	29.5	29.7	0.92	1.18	1.02	1.08	0.09	1.06



Alt Model-Shift Uniqueness Test

003644653-02, $P = 119.676880$ Days, $E = 34.872101$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
31.7	3.31	2.90	2.81	5.19	2.86	0.98	28.8	28.9	0.41	0.50	1.39	1.02	0.08	0.26



Stellar Parameters For KIC 003644653

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5778^{+162}_{-182}	$4.531^{+0.035}_{-0.196}$	$0.070^{+0.250}_{-0.300}$	$0.911^{+0.257}_{-0.086}$	$1.028^{+0.100}_{-0.125}$	$1.914^{+0.362}_{-0.964}$
	+3%/-3%	+1%/-4%	+357%/-429%	+28%/-9%	+10%/-12%	+19%/-50%
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 003644653-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-171 ± 37	$6.88^{+4.91}_{-4.48}$	504^{+34}_{-24}	3168^{+1336}_{-452}	429^{+3154}_{-281}
Alt.	-142 ± 43	$5.63^{+4.57}_{-3.53}$	504^{+33}_{-21}	3265^{+1281}_{-537}	527^{+3149}_{-374}

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 $A_{obs} \gg 1.0$

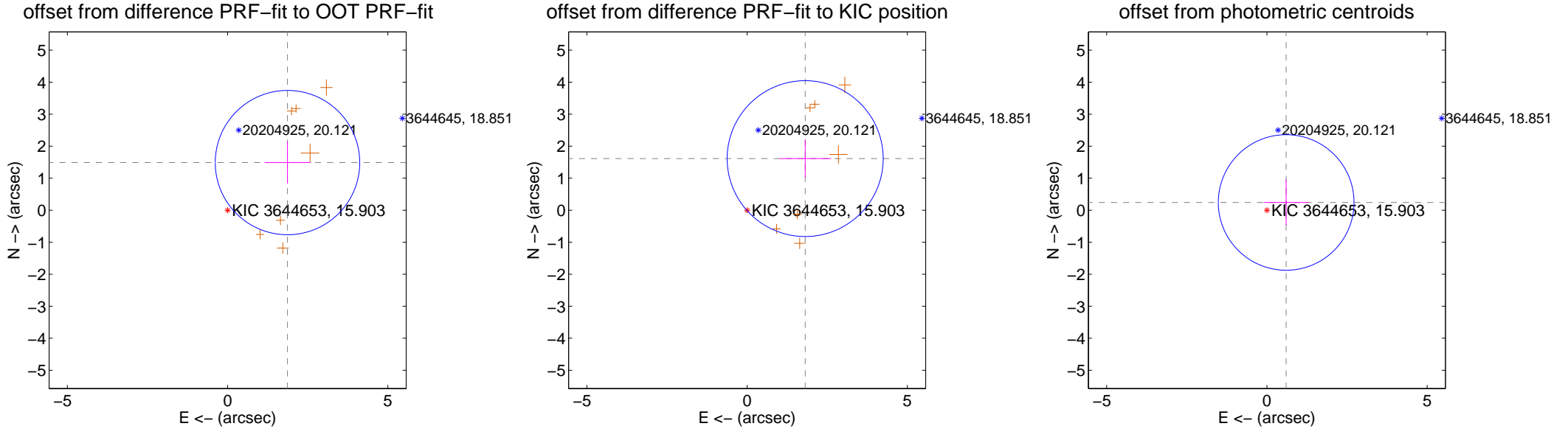
DV Centroid Data

Supplemental centroid analysis for 003644653-02. Kepler magnitude: 15.90. Transit SNR 20.47

There are 2 quarters with good PRF difference image offsets

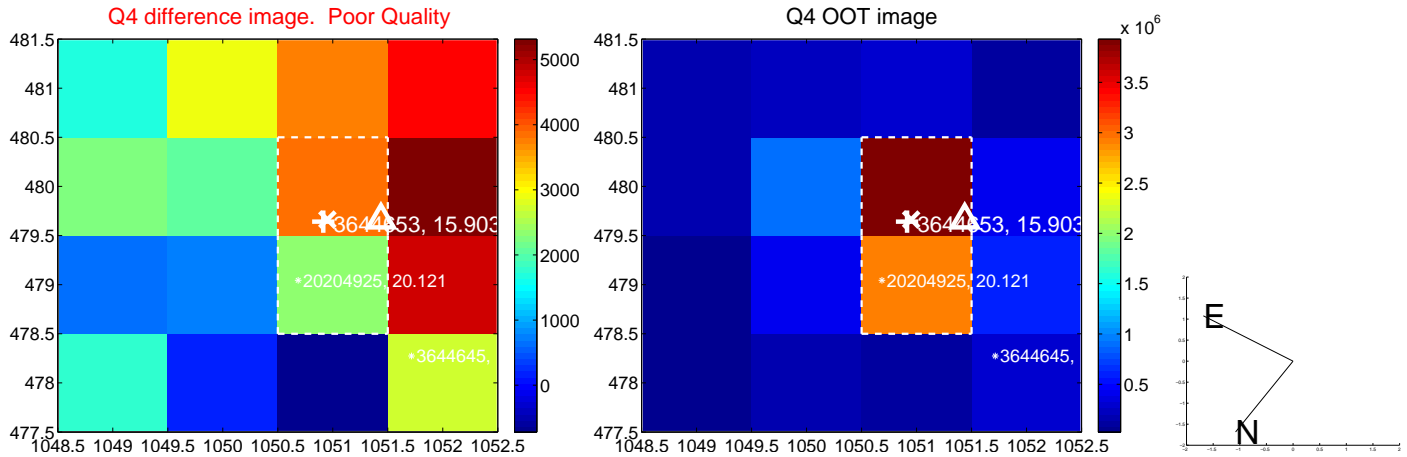
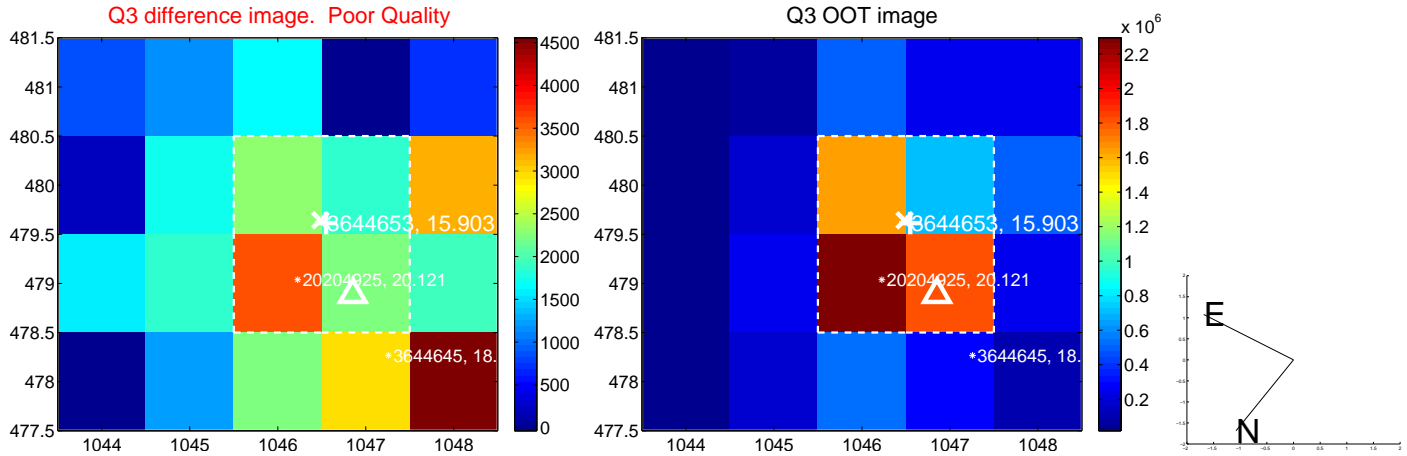
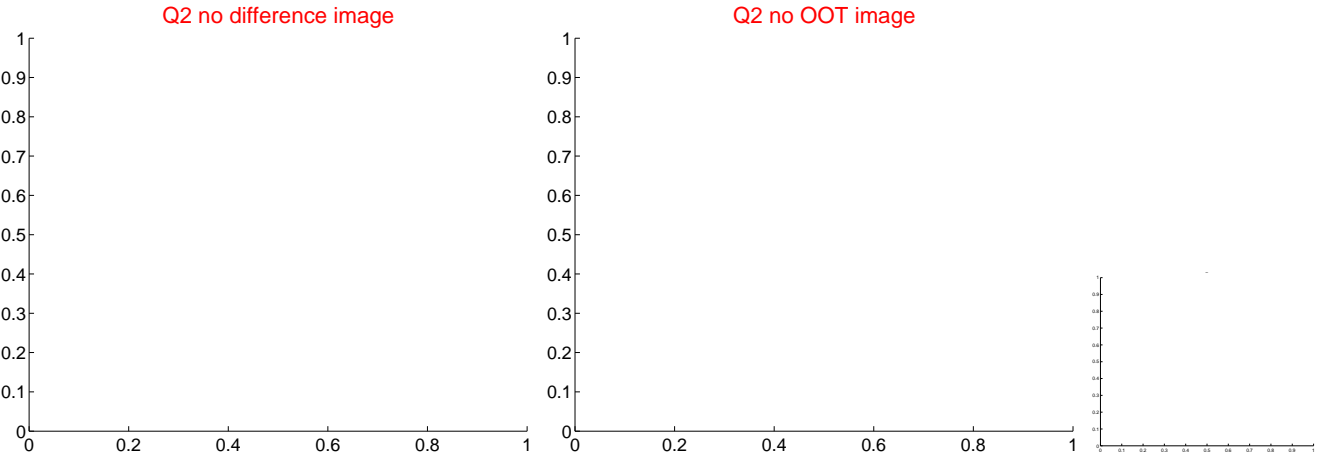
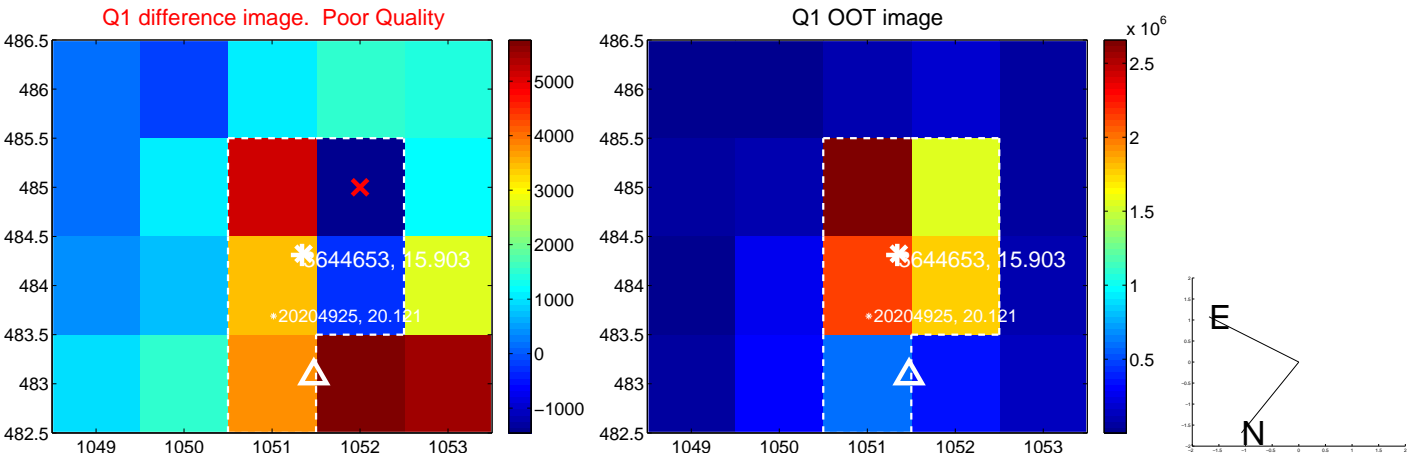
The direct PRF centroid is offset from the target star catalog position by about 0.35 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.389 \pm 0.751	3.18	-1.869 \pm 0.717	1.487 \pm 0.657
PRF-fit source offset from KIC position	2.425 \pm 0.812	2.99	-1.812 \pm 0.807	1.612 \pm 0.588
photometric centroid source offset	0.65 \pm 0.71	0.92	-0.60 \pm 0.71	0.24 \pm 0.71

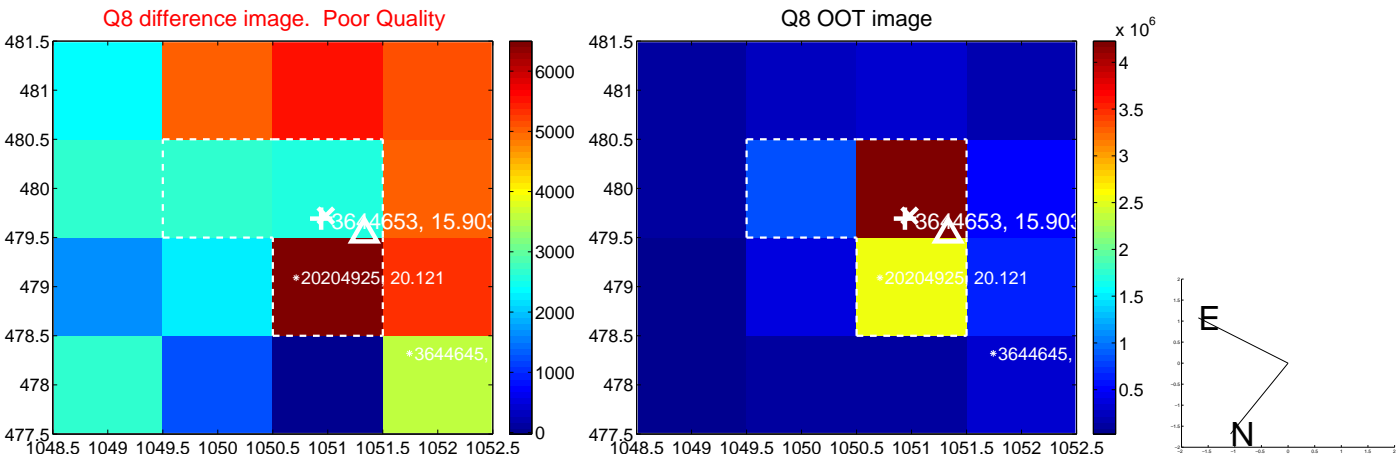
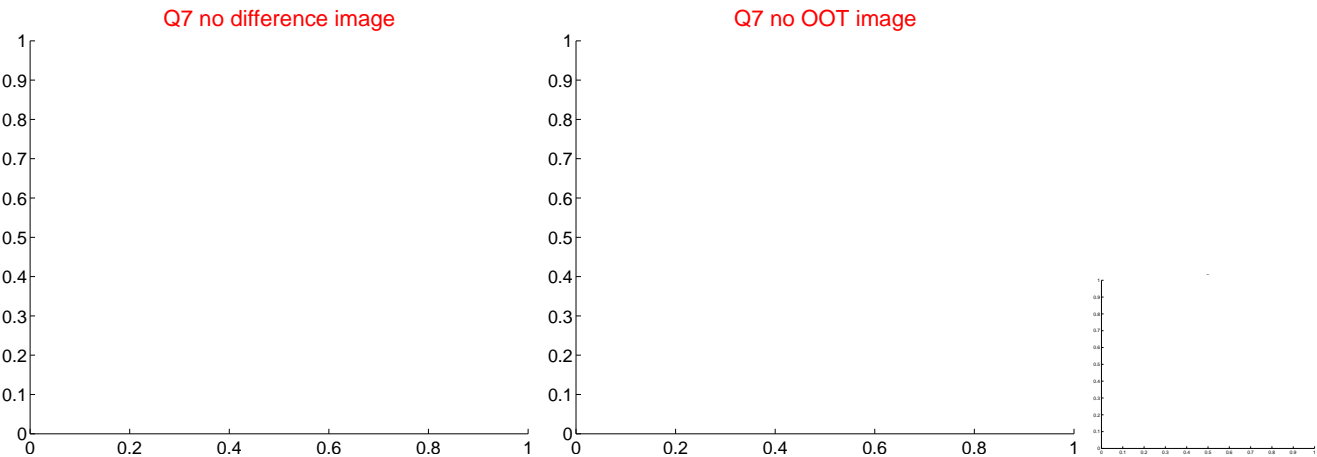
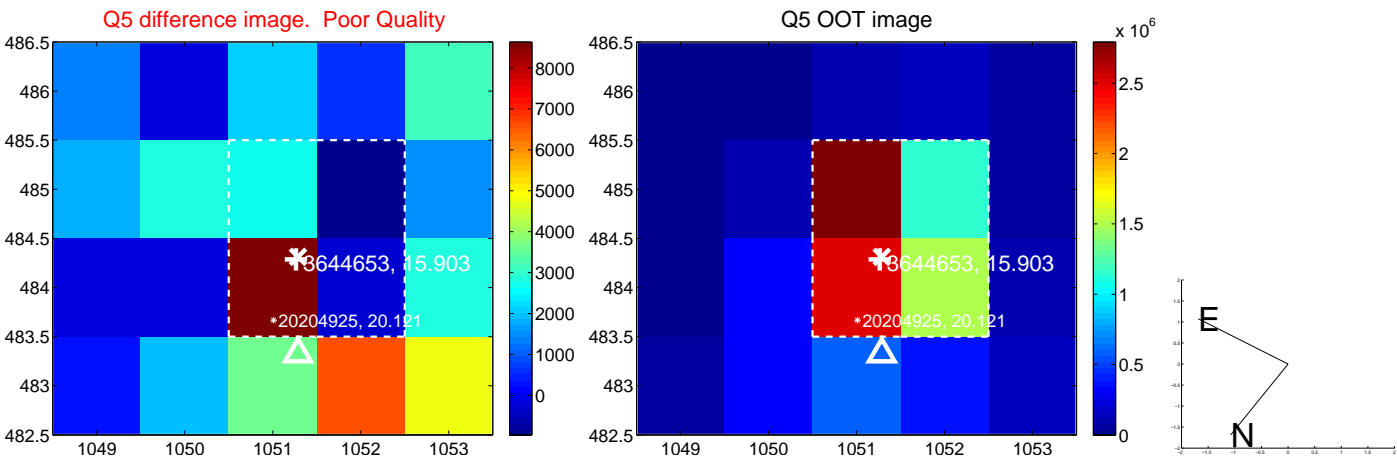


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

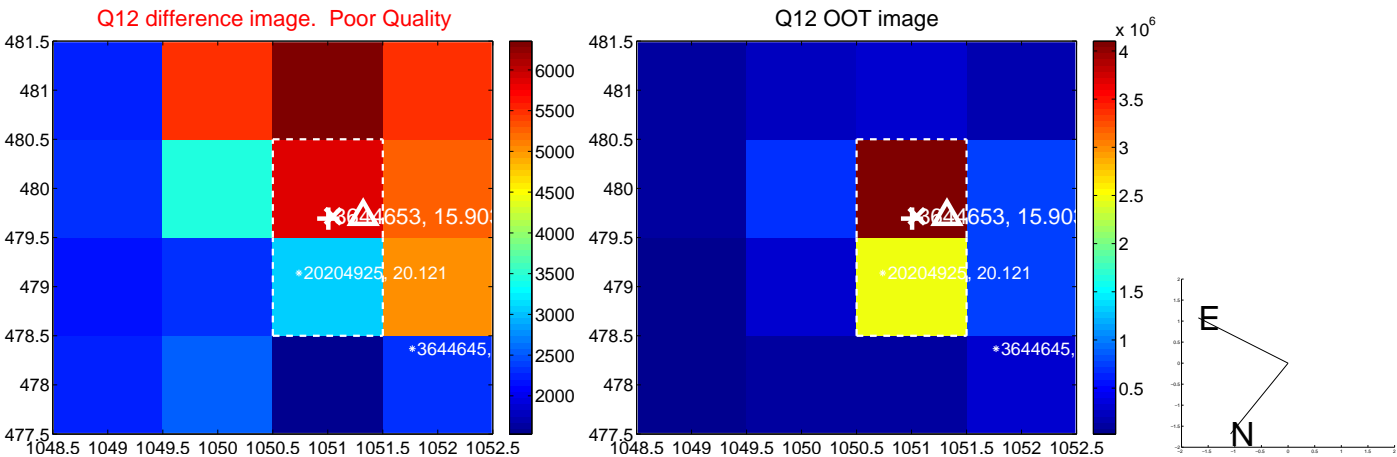
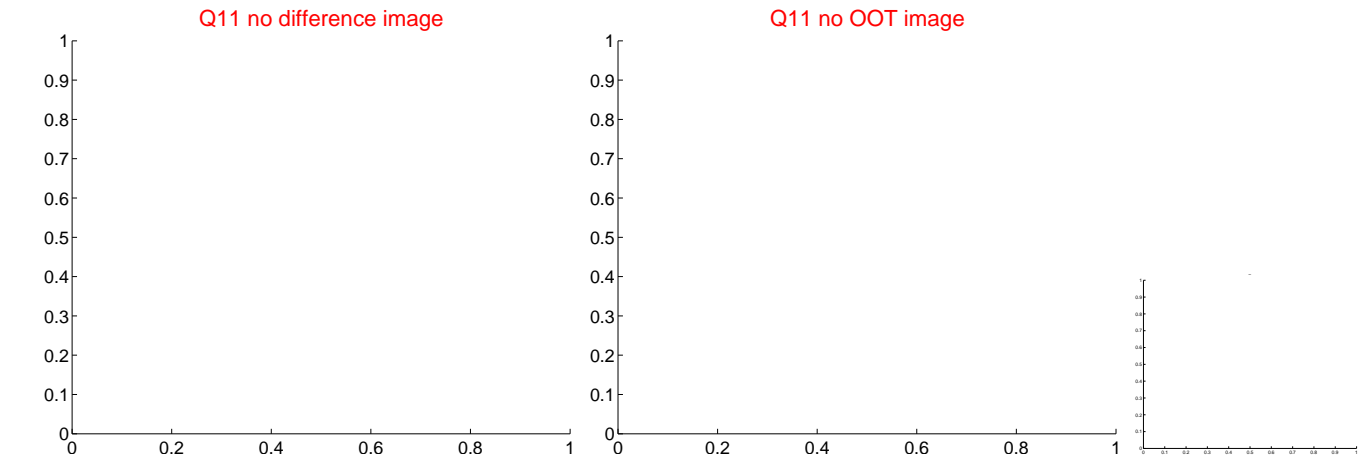
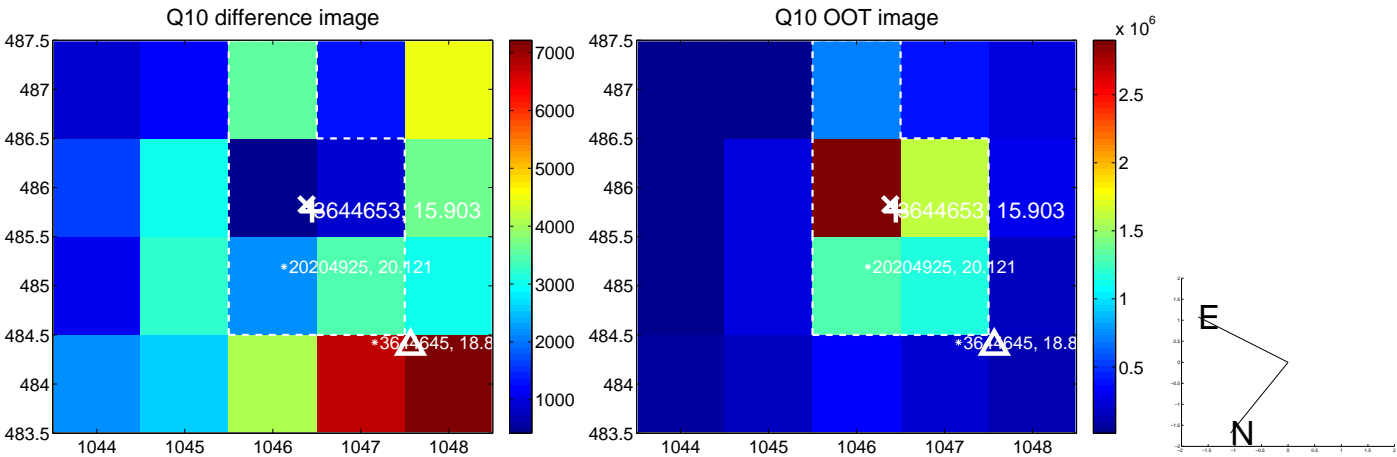
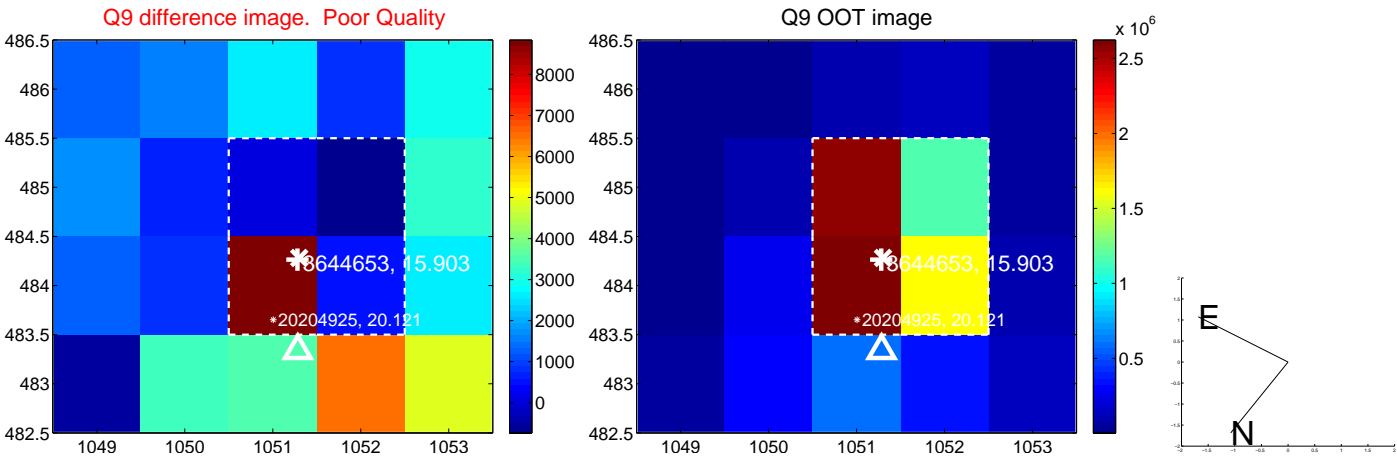
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



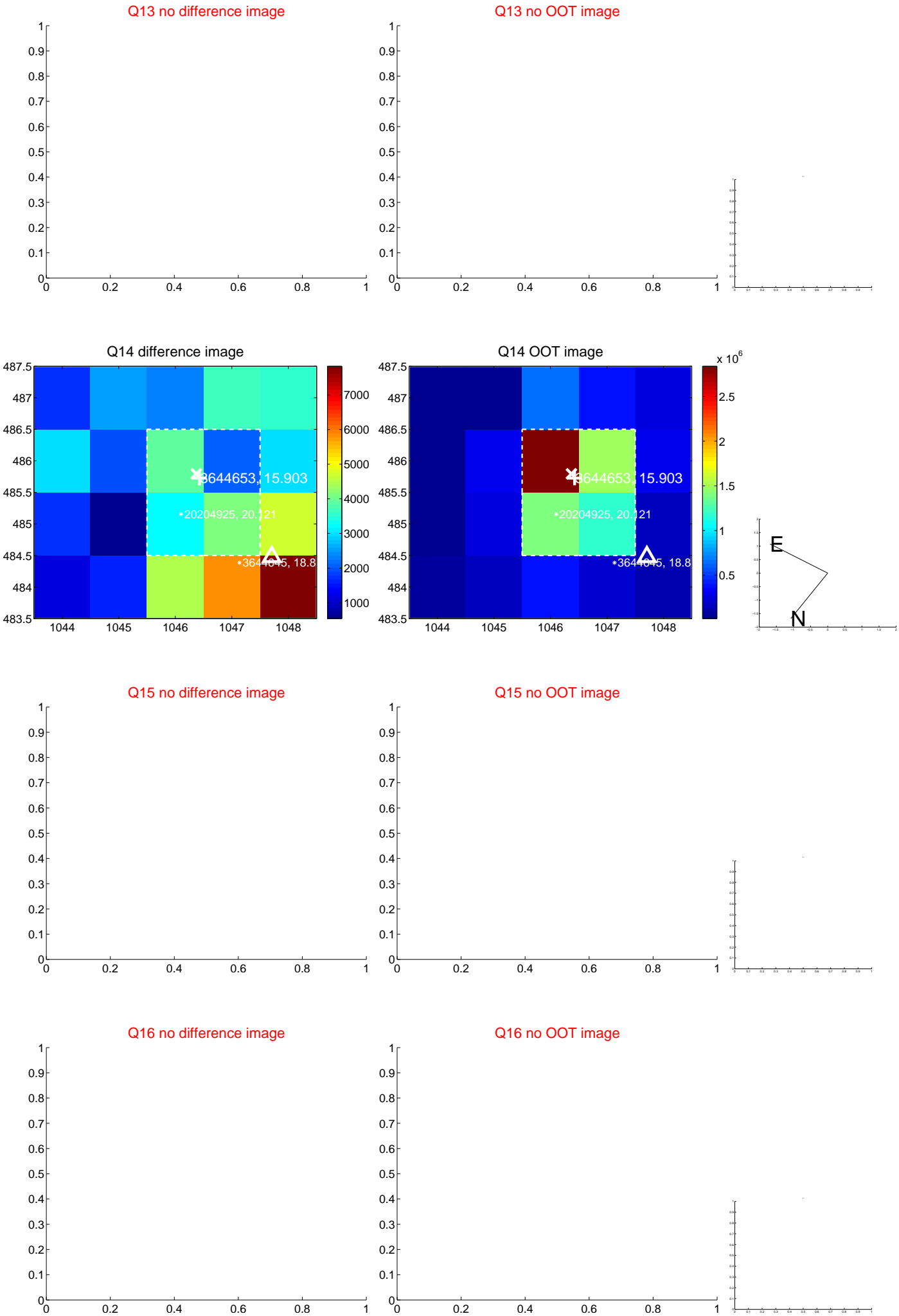
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



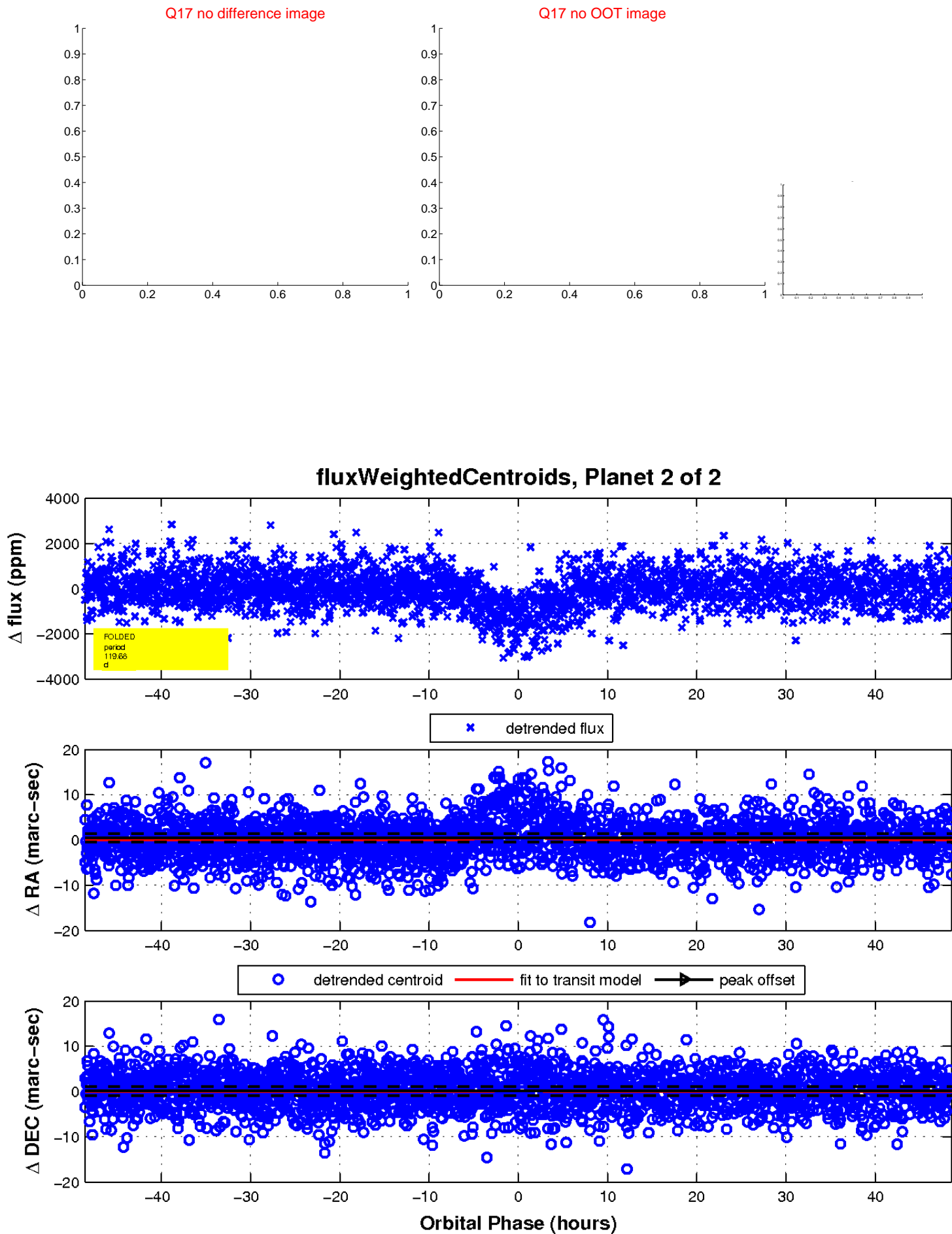
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



UKIRT Image

Declination

