

KIC 012644769

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})
012644769-01	OBS	1611.01	41.077595	132.658196	134509.7	6.202	14980.5	9694.4	0.62	4451	23.32	3.38
012644769-02	OBS	No	41.077785	152.717254	15922.3	4.577	1778.6	1072.7	0.62	4451	8.56	3.38
012644769-03	OBS	No	451.772670	140.431046	17681.6	7.032	725.1	609.8	0.62	4451	8.12	0.14
012644769-04	OBS	No	239.288871	147.350781	16458.0	3.000	473.1	-1.0	0.62	4451	7.68	0.32

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012644769-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_KIC_POS
012644769-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_KIC_POS
012644769-03	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—PERIOD_ALIAS_ALT—CENT_KIC_POS
012644769-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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 012644769-01

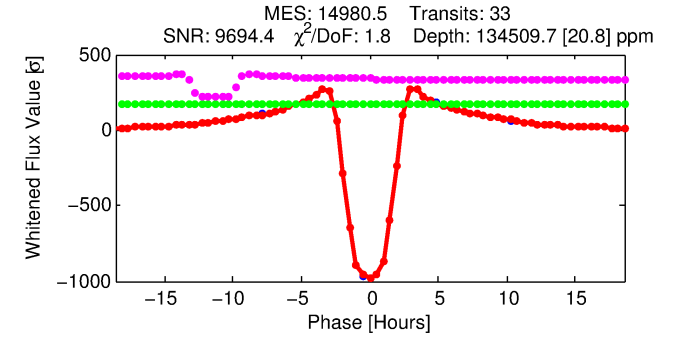
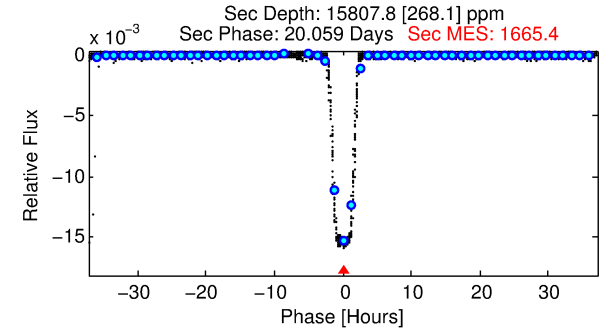
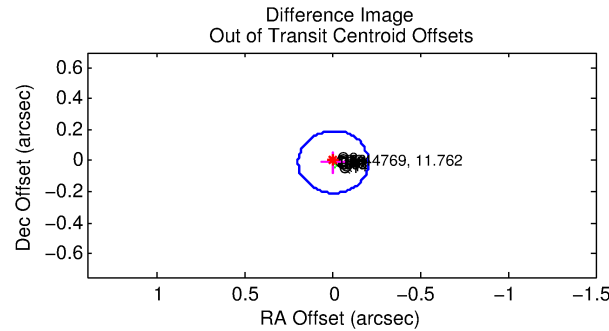
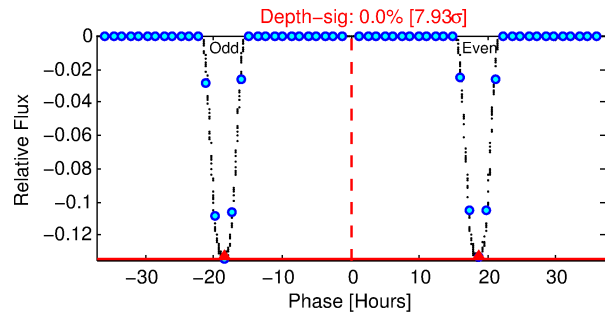
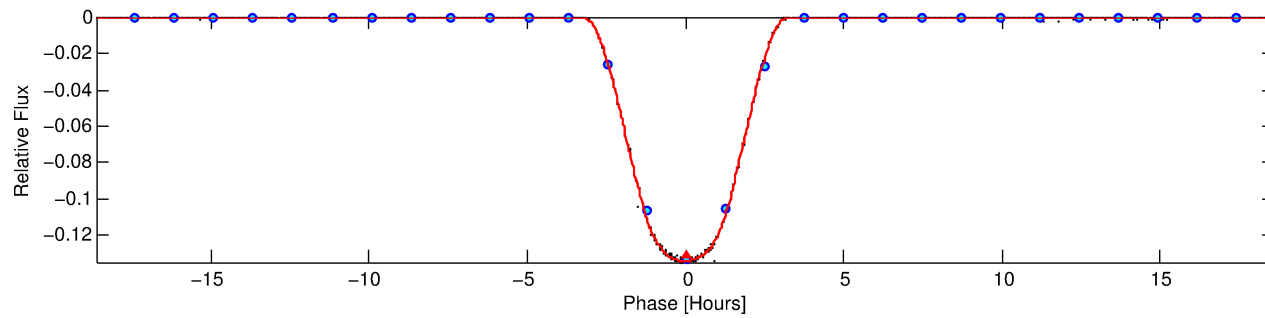
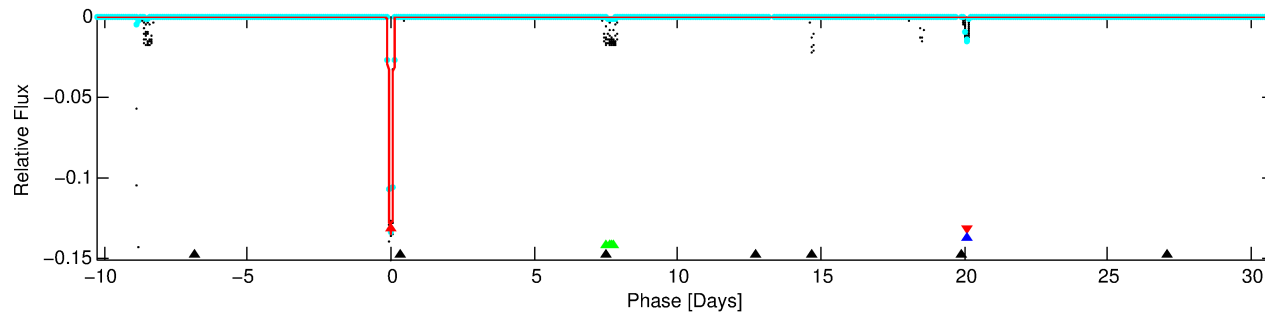
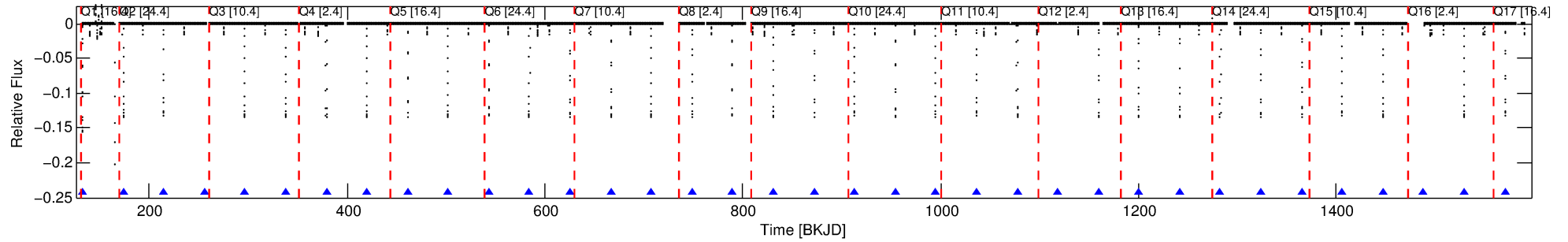
No Significant Match Found

DV One-Page Summary

KIC: 12644769 Candidate: 1 of 4 Period: 41.078 d

KOI: K01611.01 Corr: 0.993

Kp: 11.76 R*: 0.62 Rs Teff: 4451.0 K Logg: 4.65 Fe/H: -0.300



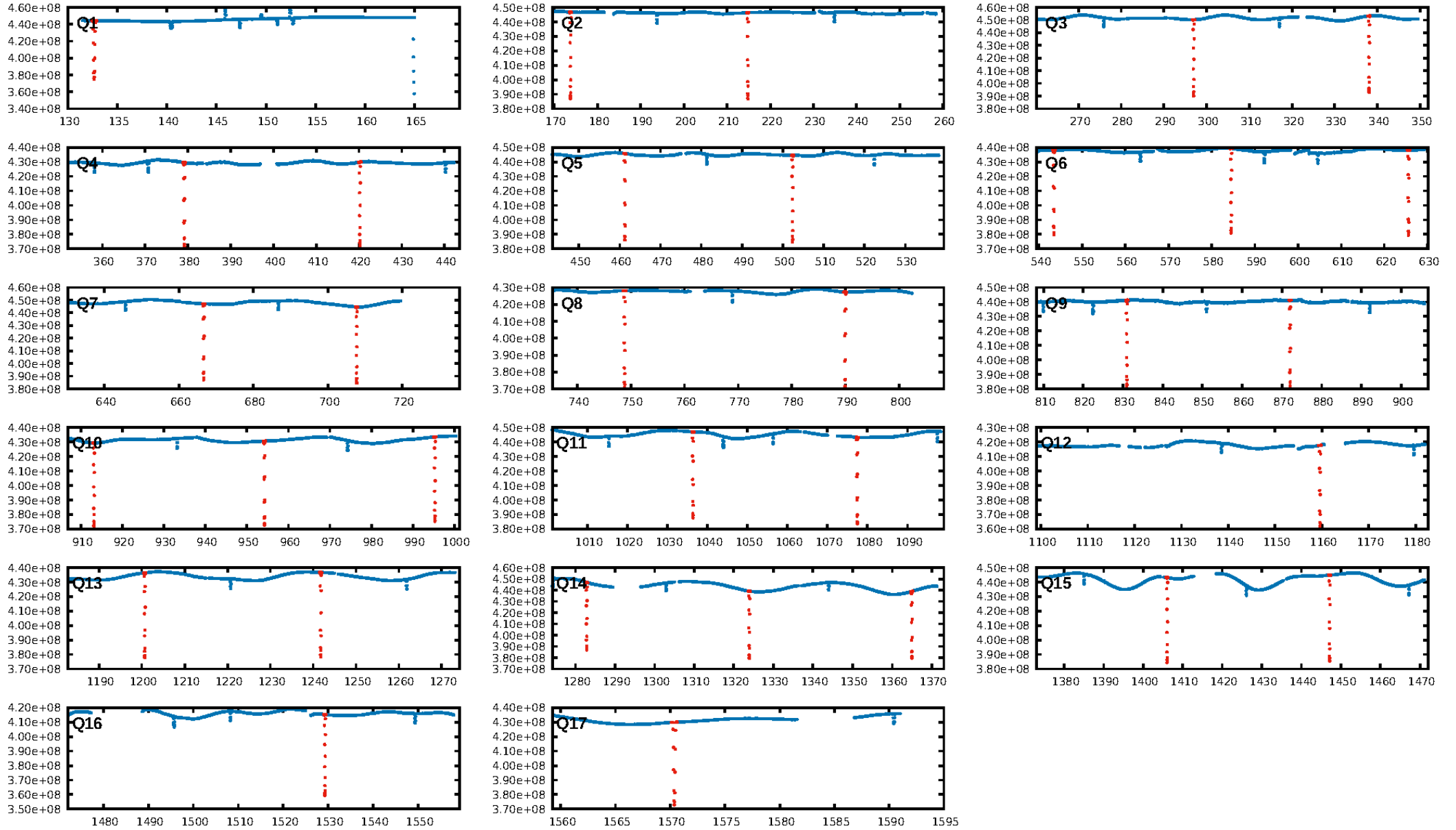
DV Fit Results:

Period = 41.07760 [0.00000] d
Epoch = 132.6582 [0.0000] BKJD
Rp/R* = 0.3446 [0.0000]
a/R* = 62.92 [0.01]
b = 0.51 [0.00]
Seff = 3.38 [0.31]
Teq = 346 [8] K
Rp = 23.32 [1.02] Re
a = 0.2000 [0.0067] AU
Ag = 639.79 [30.49] [20.95σ]
Teffp = 2688 [55] K [42.20σ]

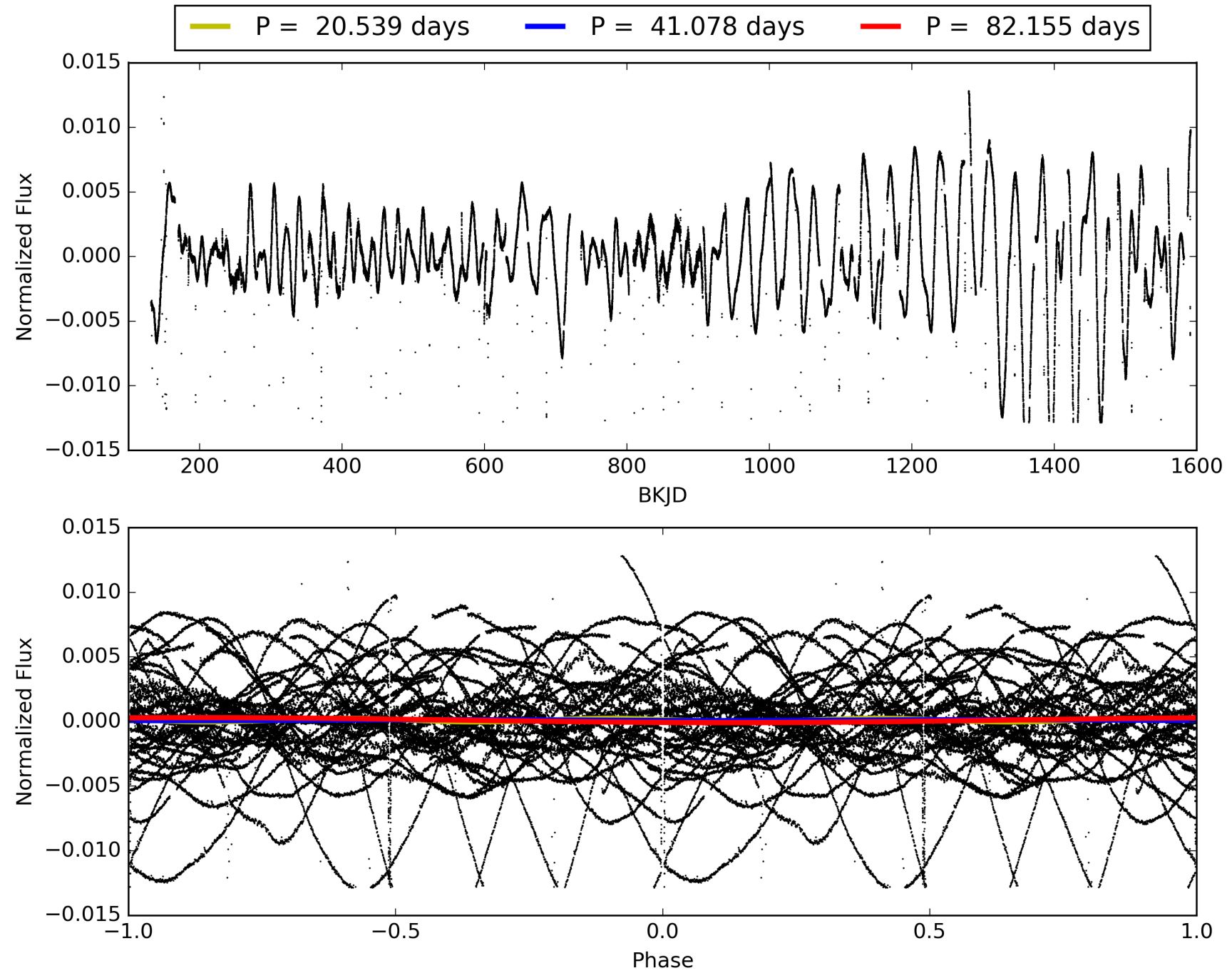
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 0.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [31/31]
GhostDiagnostic-chr: 6.199
Centroid-sig: N/A
Centroid-so: 0.371 arcsec [464.03σ]
OotOffset-rm: 0.009 arcsec [0.14σ]
KicOffset-rm: 0.469 arcsec [6.73σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 1.00 [16/16]
DiffImageOverlap-fno: 1.00 [16/16]

TCE 012644769-01, PDC Light Curves

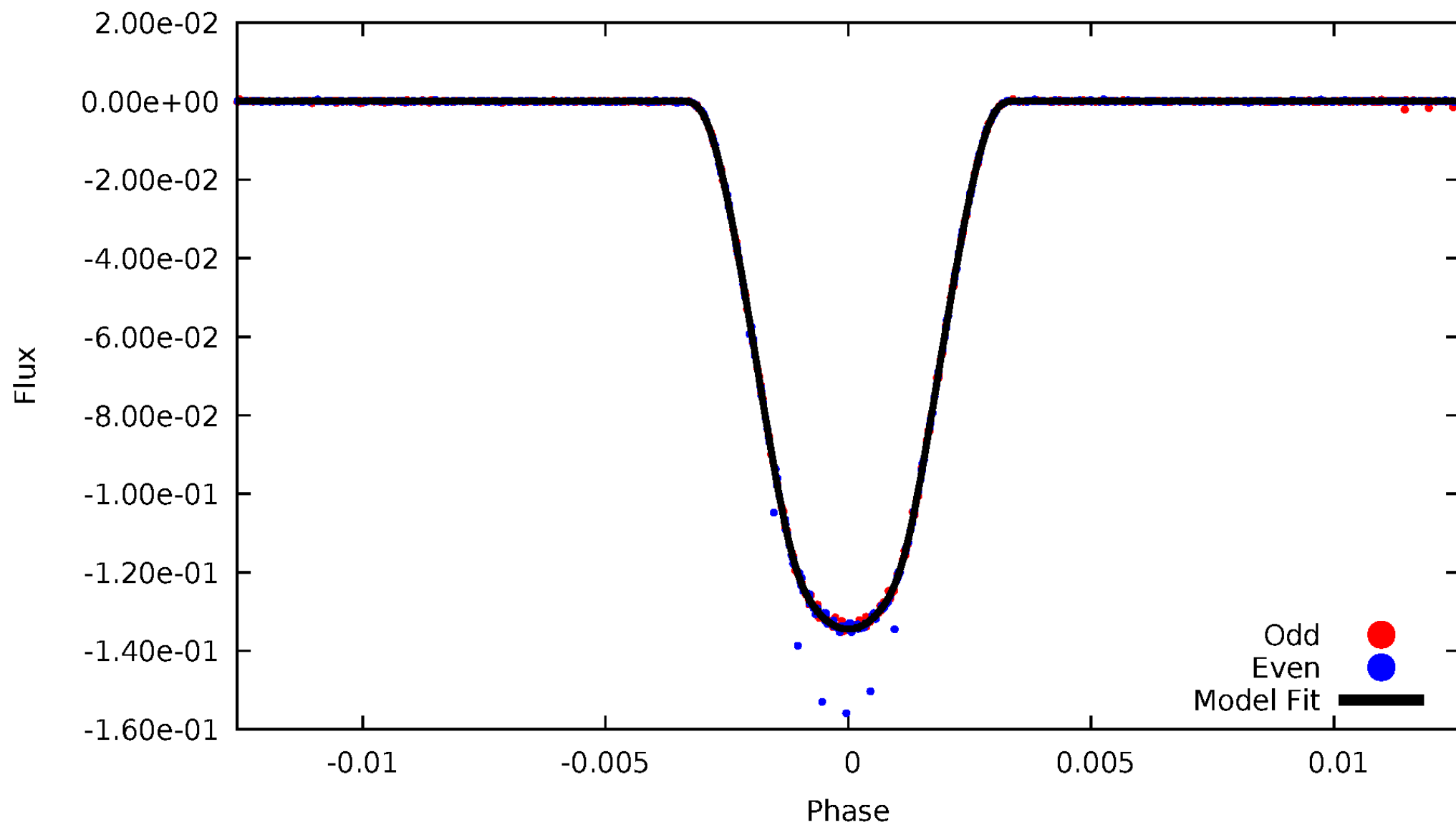


TCE 012644769-01



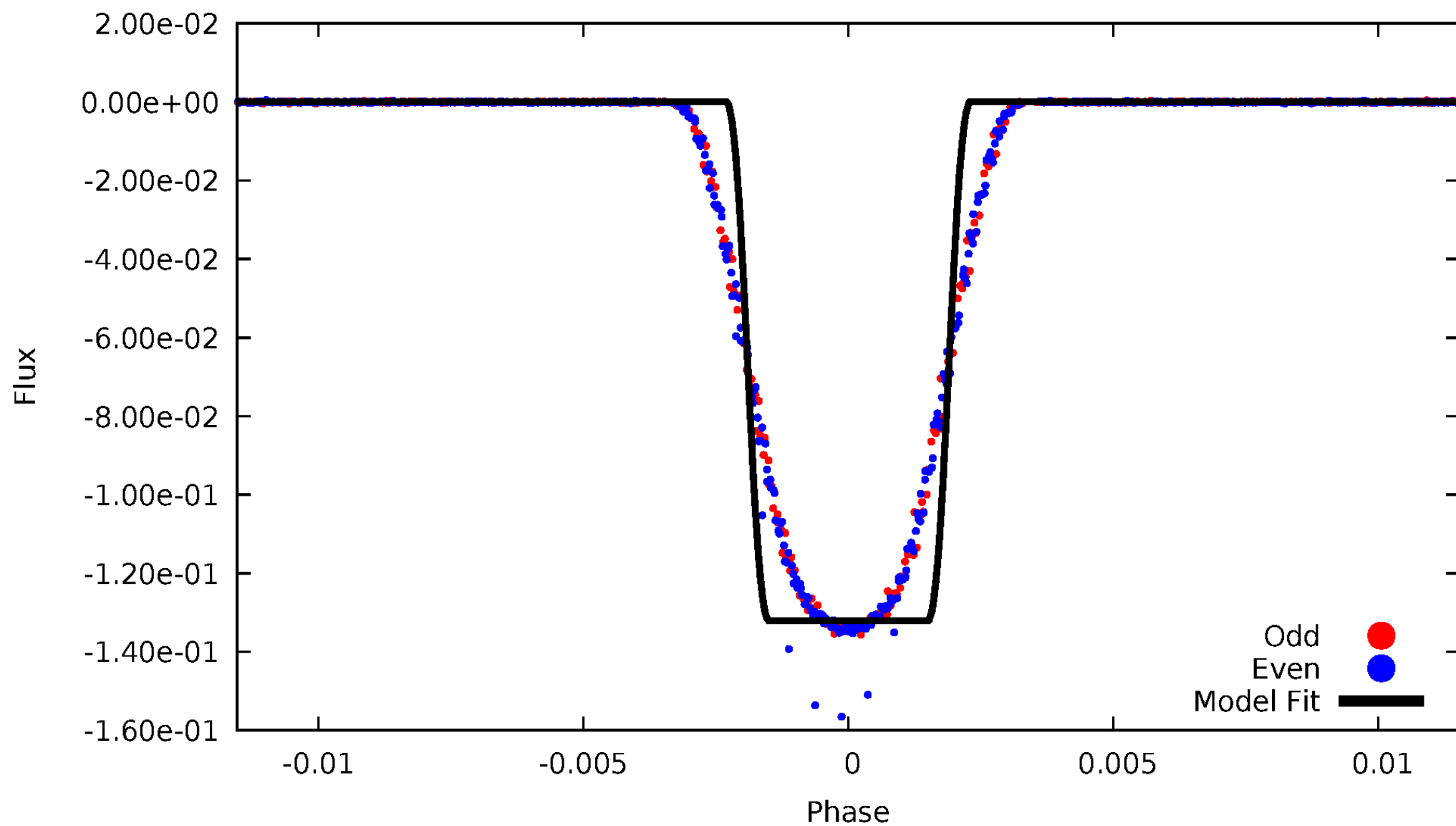
DV Odd/Even

TCE 012644769-01



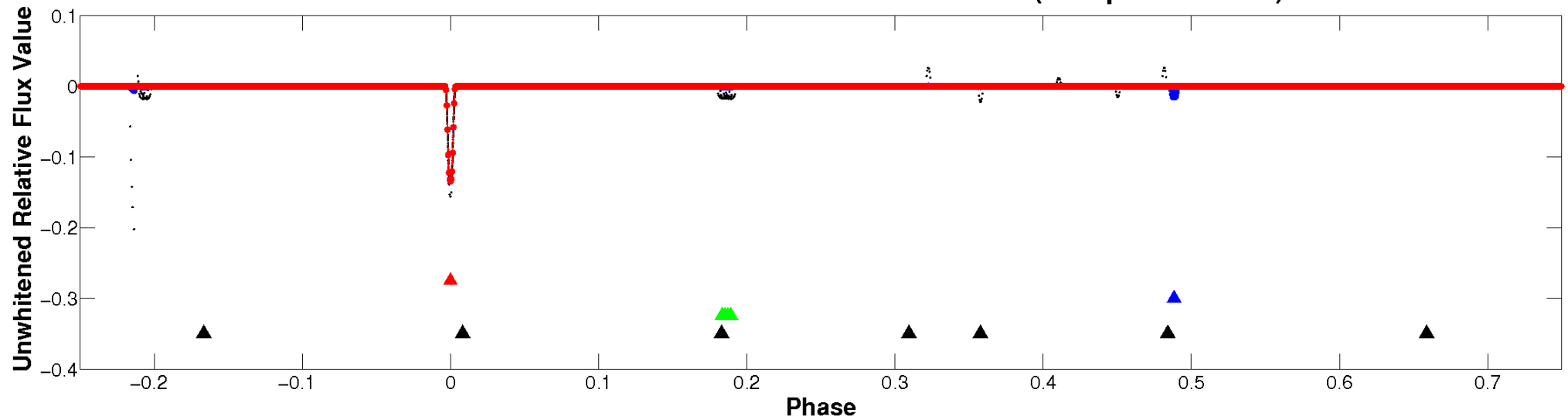
ALT Odd/Even

TCE 012644769-01

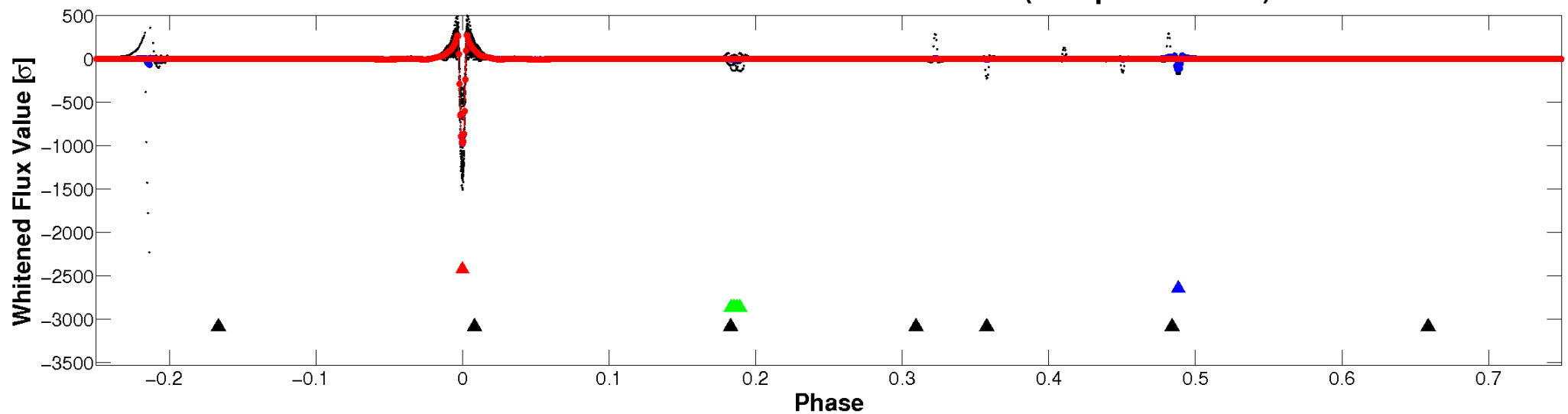


Non-Whitened Vs. Whitened Light Curve

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

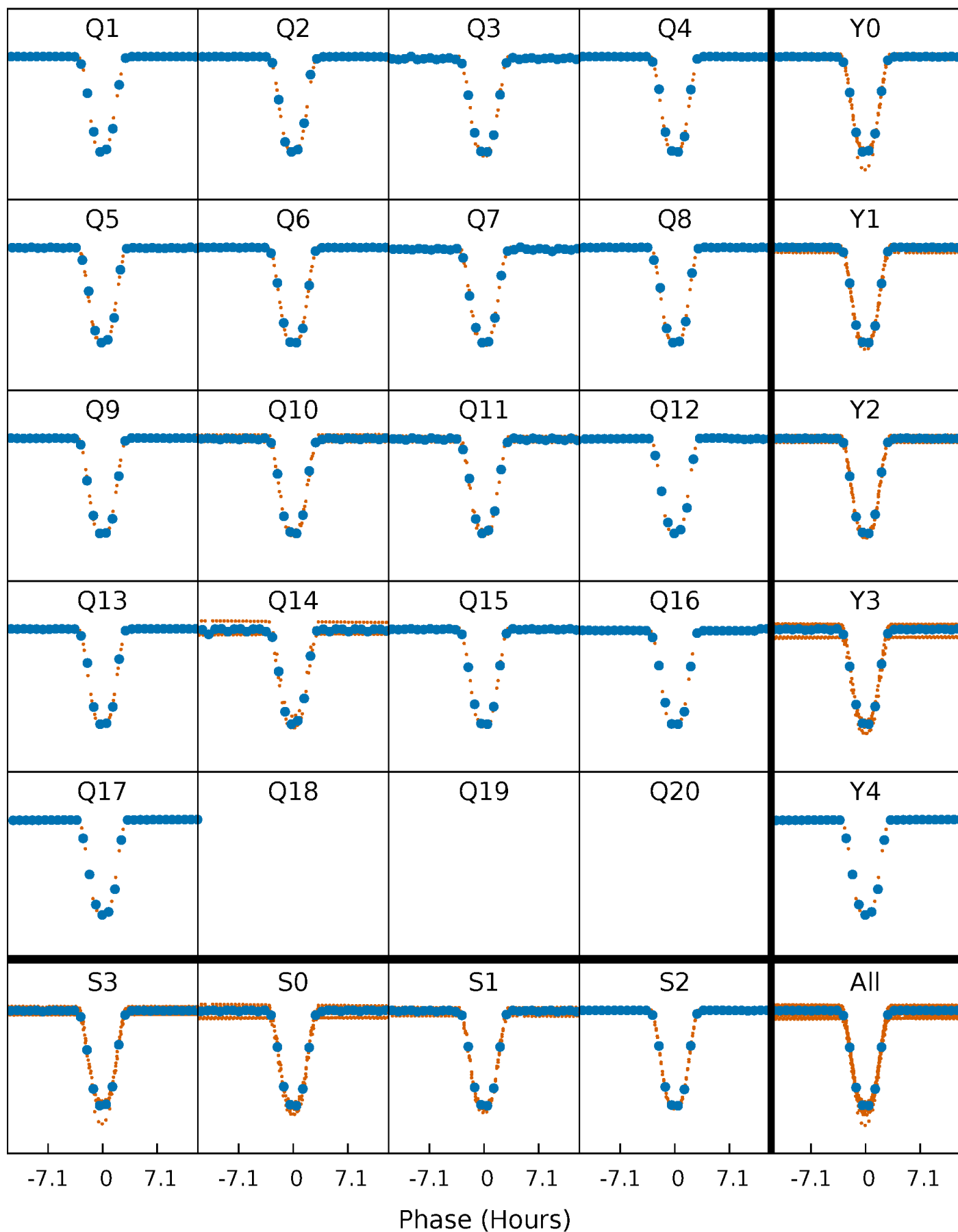


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



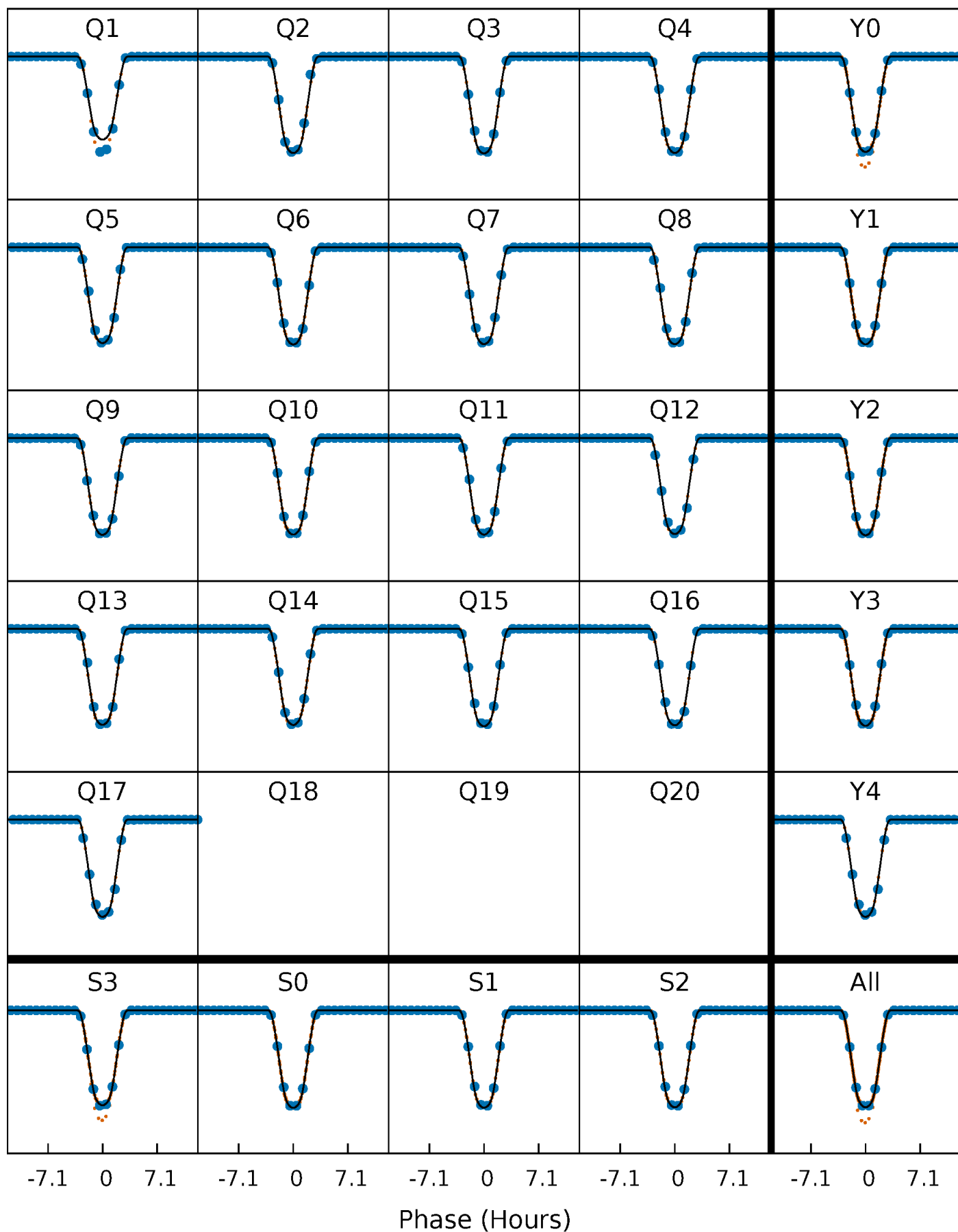
PDC Quarter-Phased Transit Curves

TCE 012644769-01 P= 41.077595 Days $T_0=132.658196$ (BKJD)



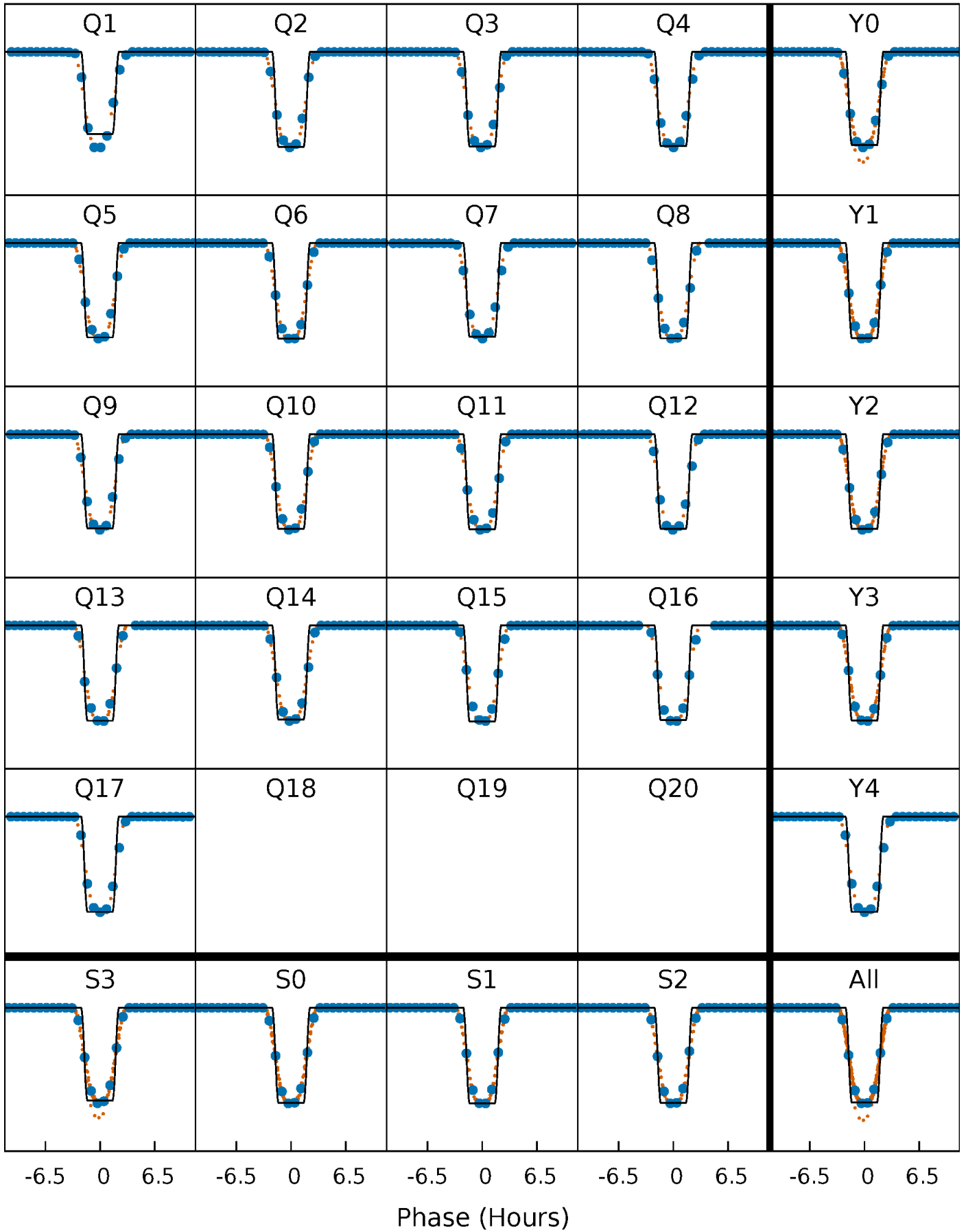
DV Quarter-Phased Transit Curves

TCE 012644769-01 P= 41.077595 Days $T_0=132.658196$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

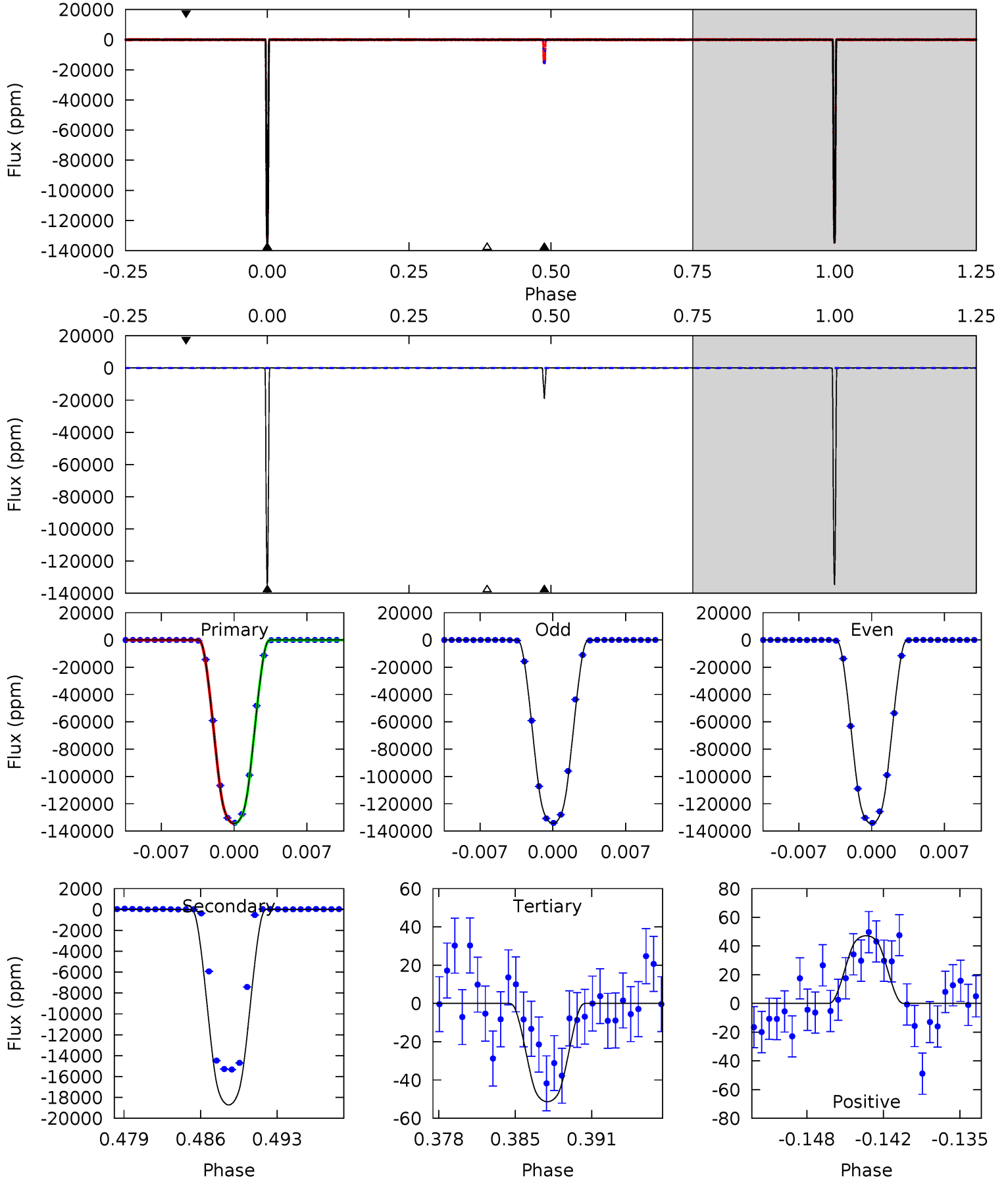
TCE 012644769-01 P= 41.077412 Days $T_0=132.661645$ (BKJD)



DV Model-Shift Uniqueness Test

012644769-01, P = 41.077595 Days, E = 91.580601 Days

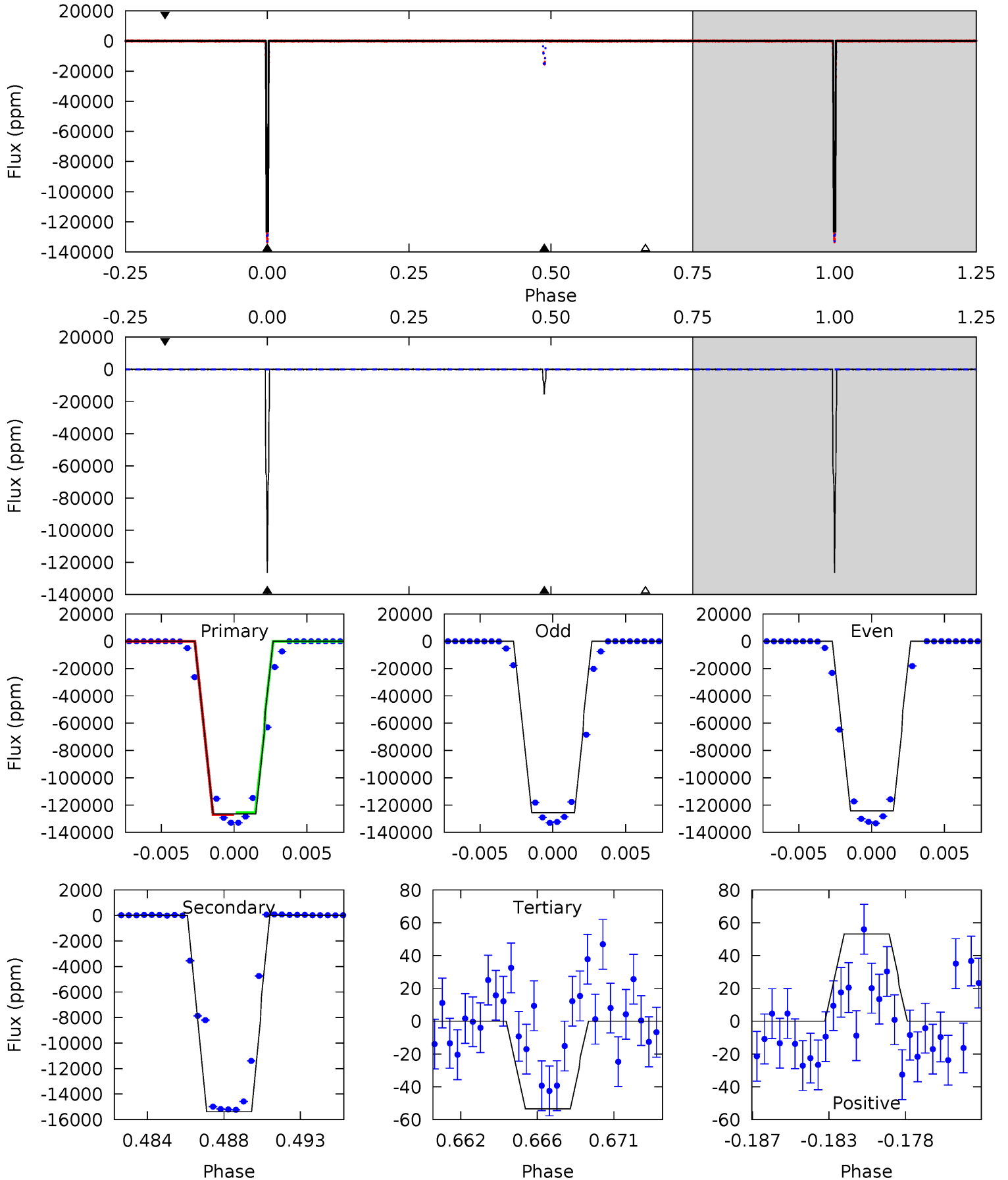
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21117	2939	8.06	7.41	5.10	2.71	2.86	21109	21109	2931	2932	18.3	1.00	0.00	0



Alt Model-Shift Uniqueness Test

012644769-01, P = 41.077412 Days, E = 91.584233 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10205	1241	4.32	4.29	5.17	2.84	1.13	10201	10201	1237	1237	57.1	1.00	0.00	9.67



Stellar Parameters For KIC 012644769

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4451^{+89}_{-89}	$4.654^{+0.022}_{-0.022}$	$-0.300^{+0.150}_{-0.150}$	$0.620^{+0.027}_{-0.025}$	$0.633^{+0.033}_{-0.030}$	$3.740^{+0.362}_{-0.331}$
	+2%/-2%	+0%/-0%	+50%/-50%	+4%/-4%	+5%/-5%	+10%/-9%
Source	SPE28	TRA28	SPE28	DSEP		

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

Secondary Eclipse Parameters for KIC 012644769-01 / KOI 1611.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-18723 ± 6	$23.32^{+0.62}_{-0.54}$	483^{+11}_{-11}	3266^{+48}_{-52}	771^{+27}_{-24}
Alt.	-15375 ± 12	$24.60^{+0.67}_{-0.65}$	483^{+11}_{-10}	3122^{+43}_{-46}	568^{+23}_{-19}

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 $A_{obs} \gg 1.0$

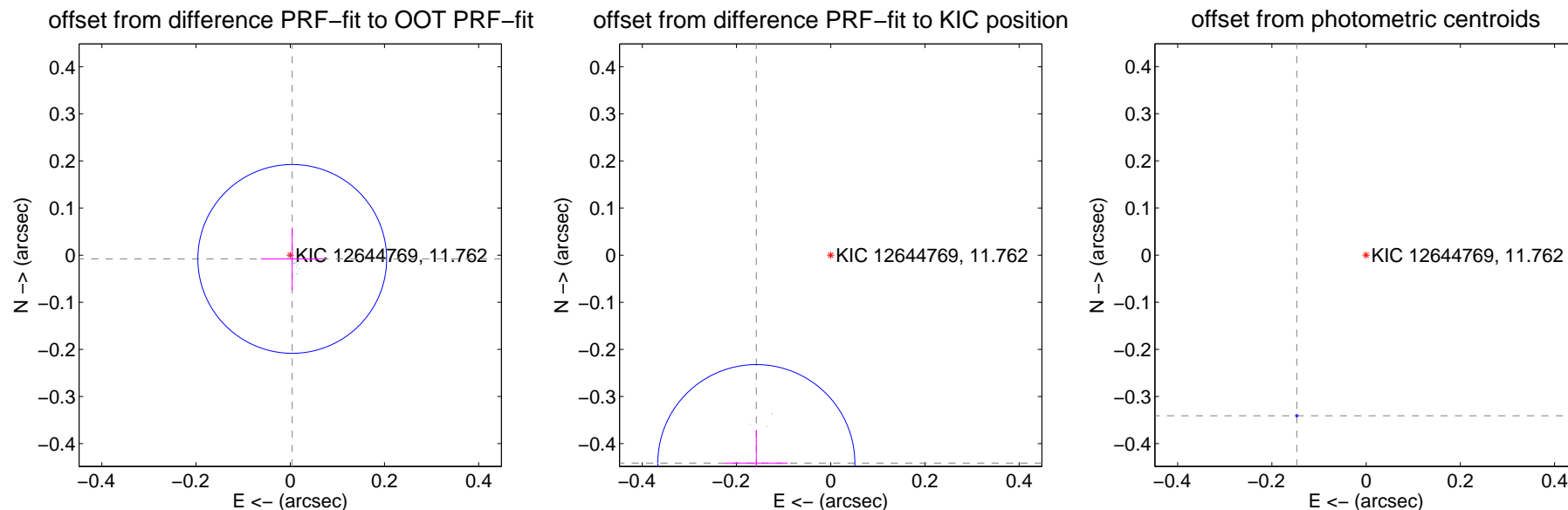
DV Centroid Data

Supplemental centroid analysis for 012644769-01. **Kepler magnitude: 11.76.** Transit SNR 9694.36

There are 16 quarters with good PRF difference image offsets

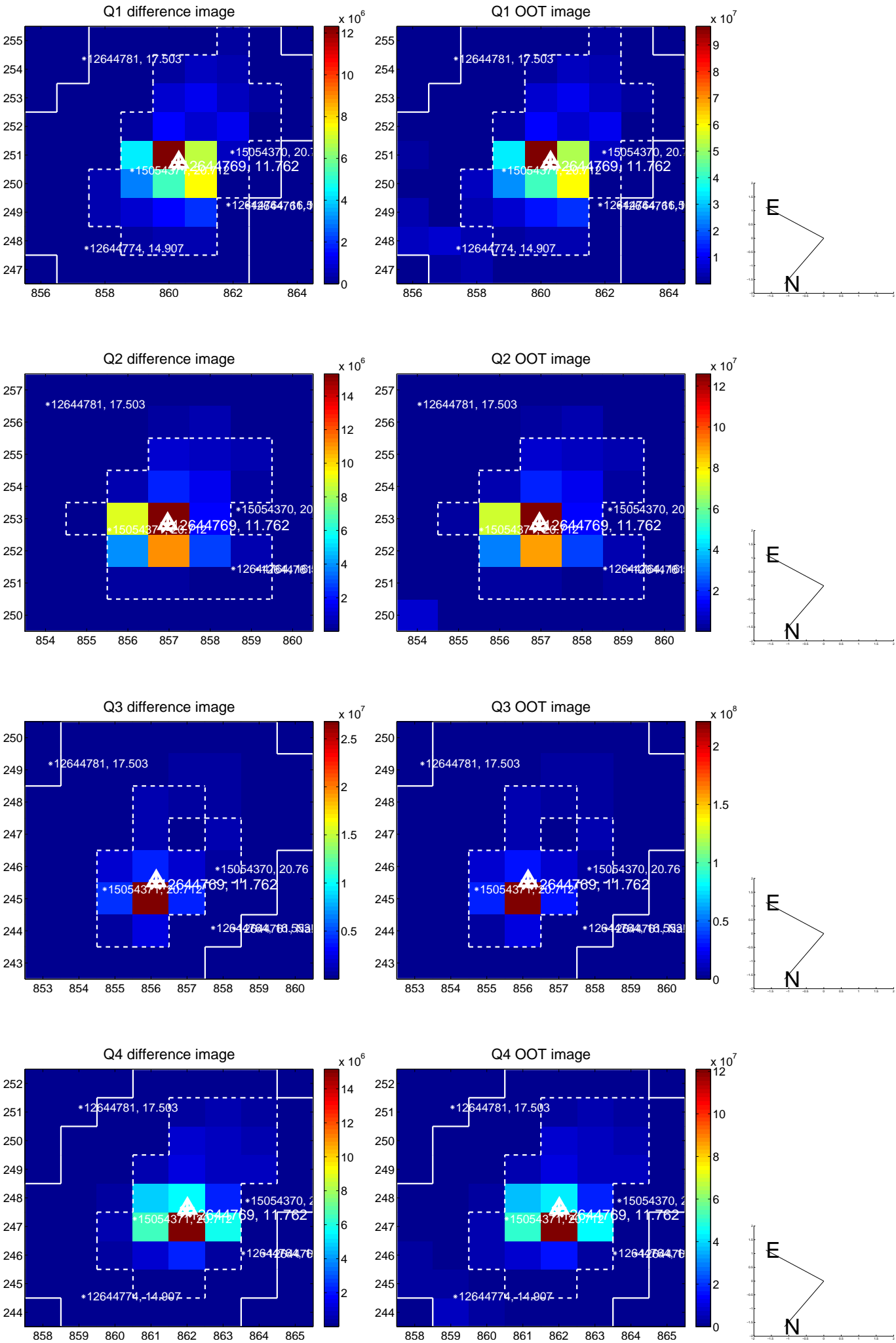
The direct PRF centroid is offset from the target star catalog position by about 0.51 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.009 ± 0.067	0.14	-0.004 ± 0.067	-0.008 ± 0.067
PRF-fit source offset from KIC position	0.469 ± 0.070	6.73	0.158 ± 0.067	-0.441 ± 0.070
photometric centroid source offset	0.37 ± 0.00	464.03	0.15 ± 0.00	-0.34 ± 0.00

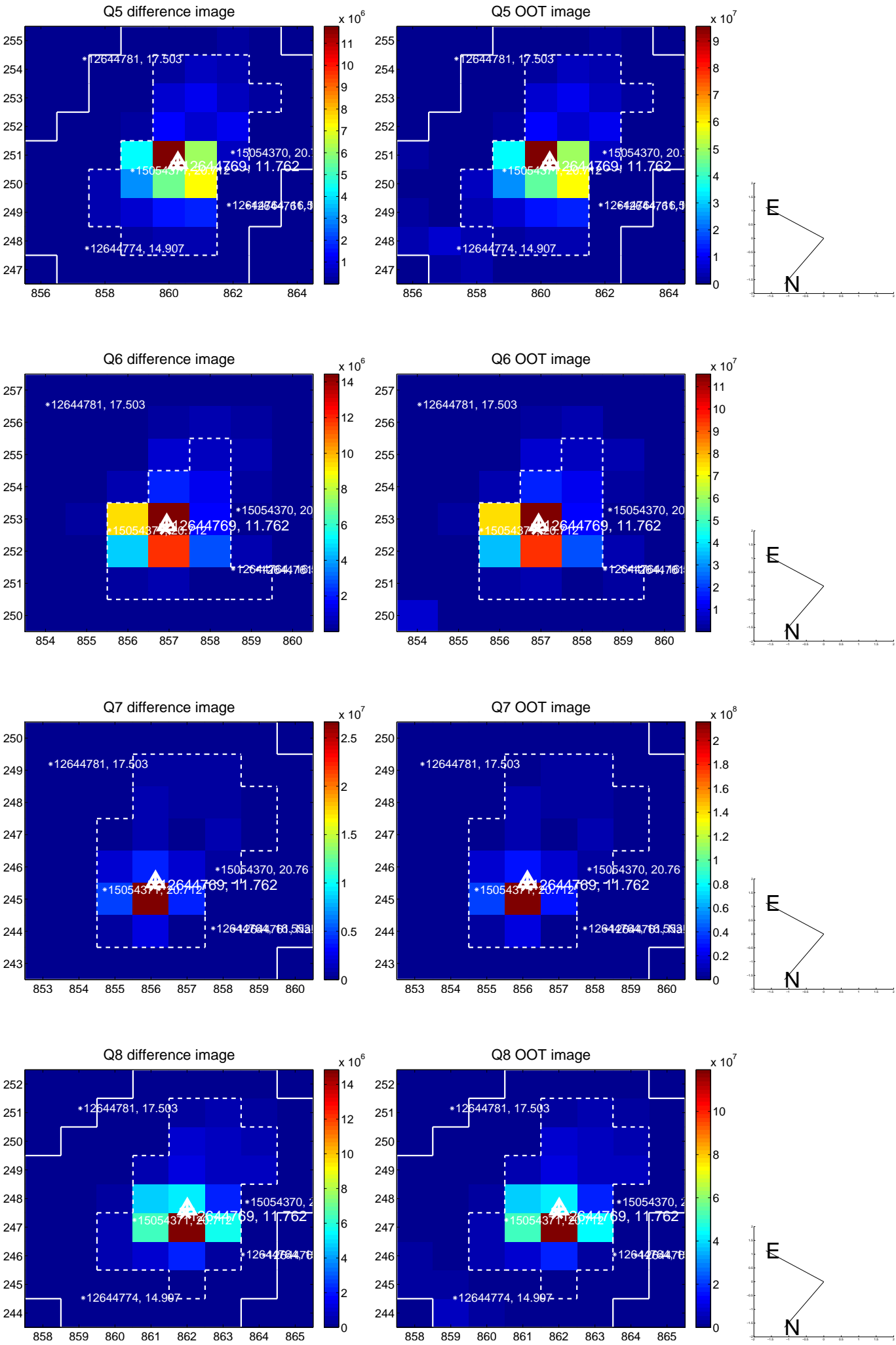


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

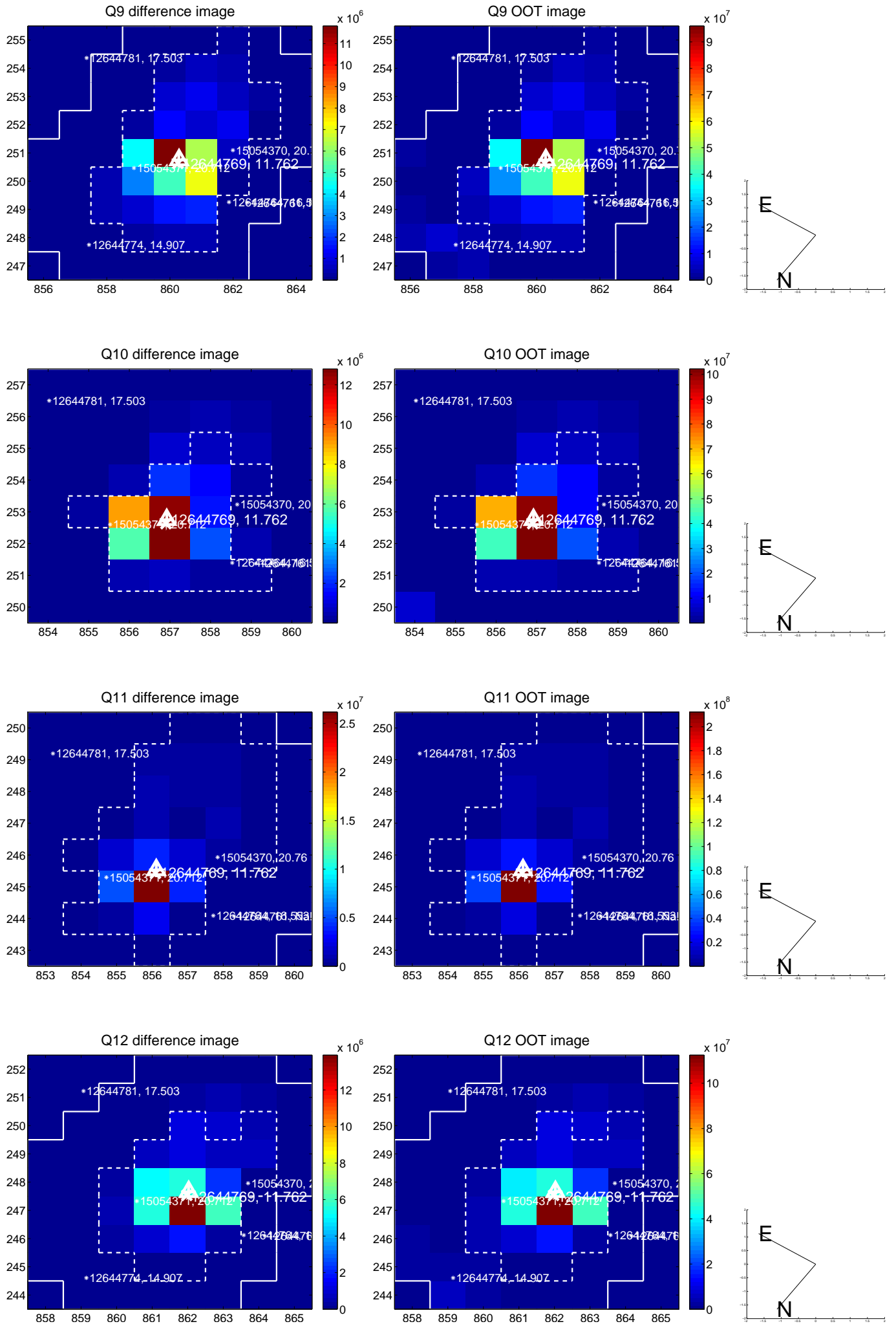
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



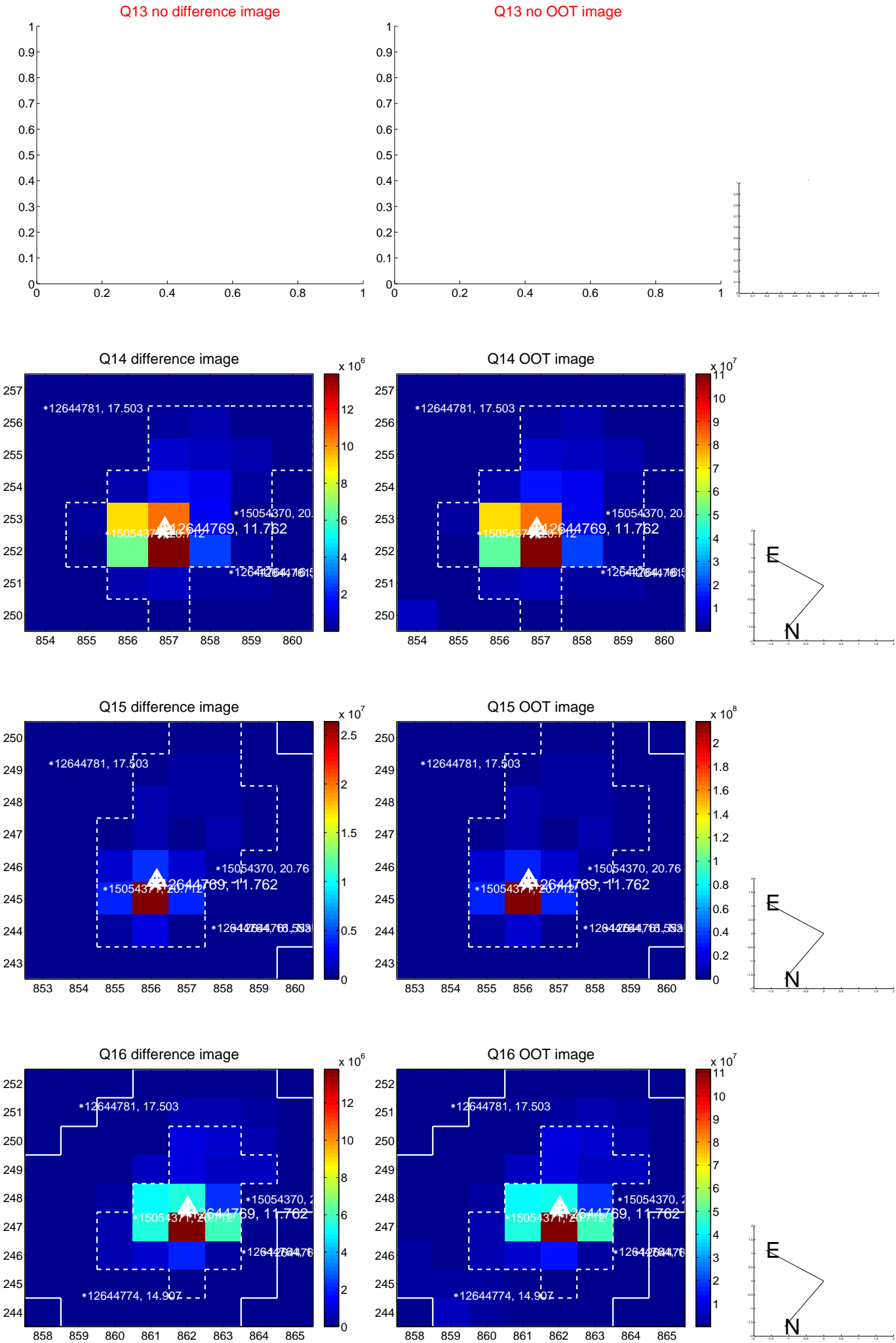
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



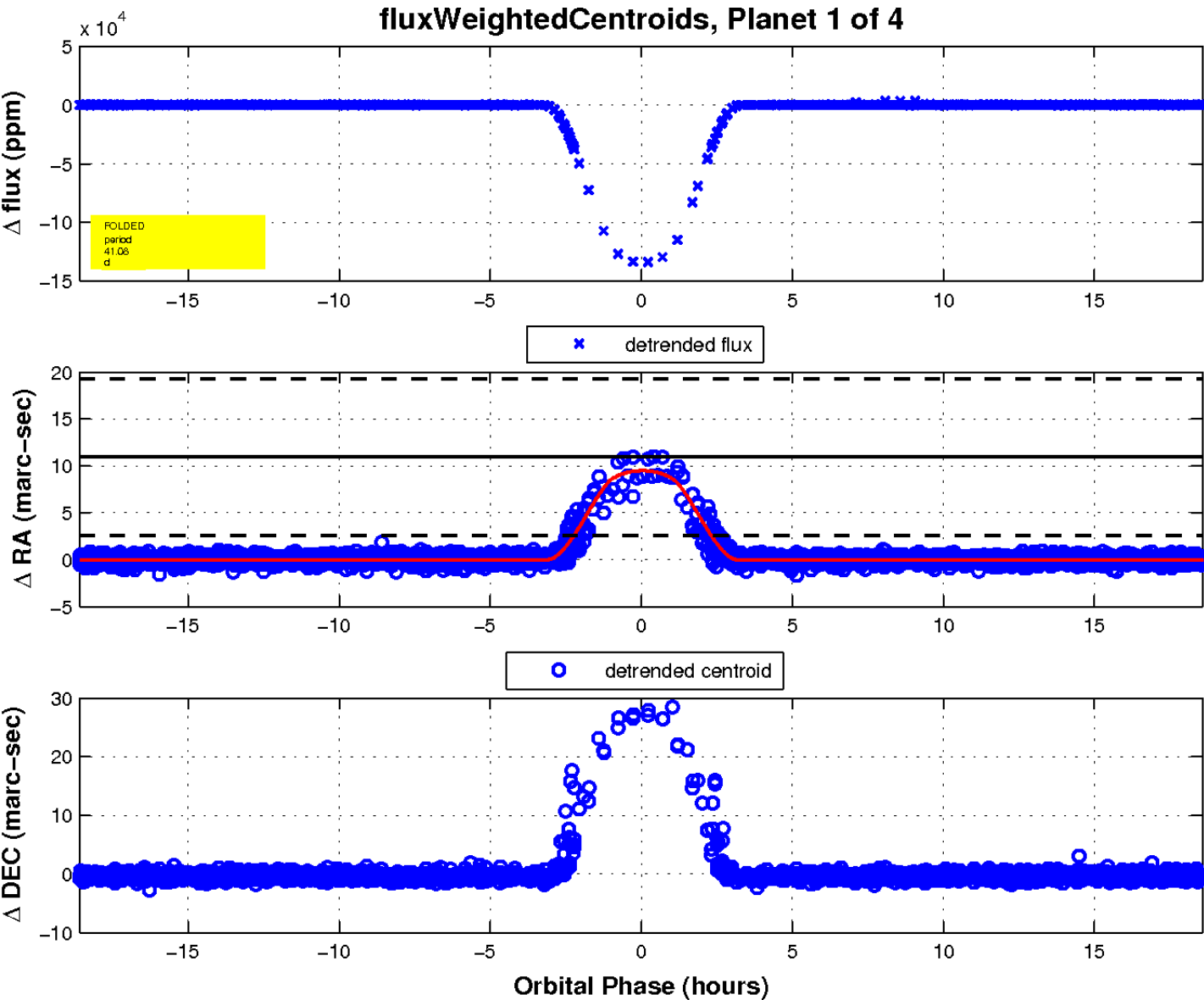
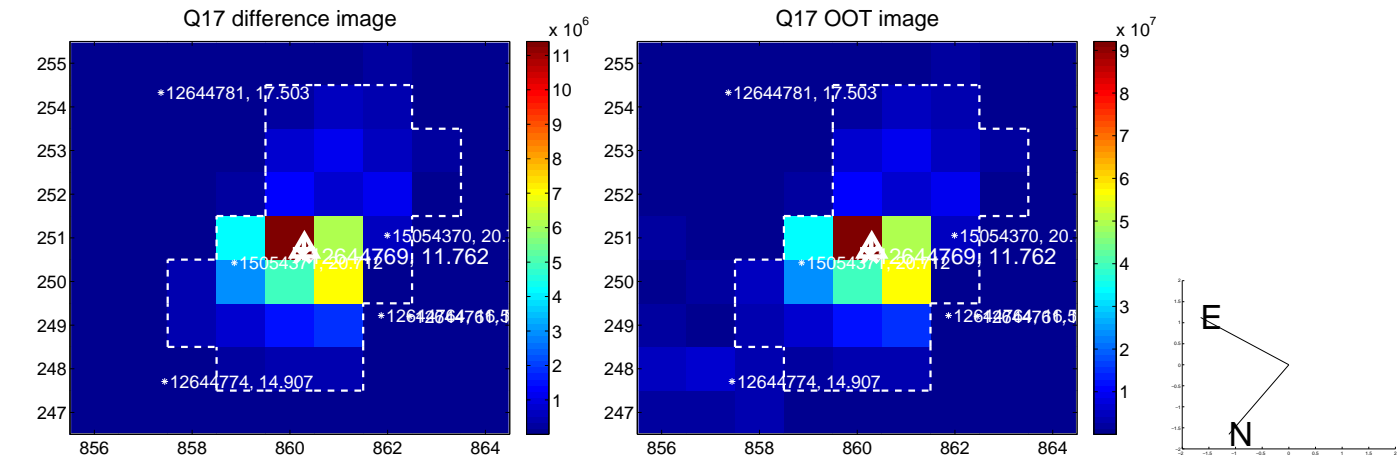
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



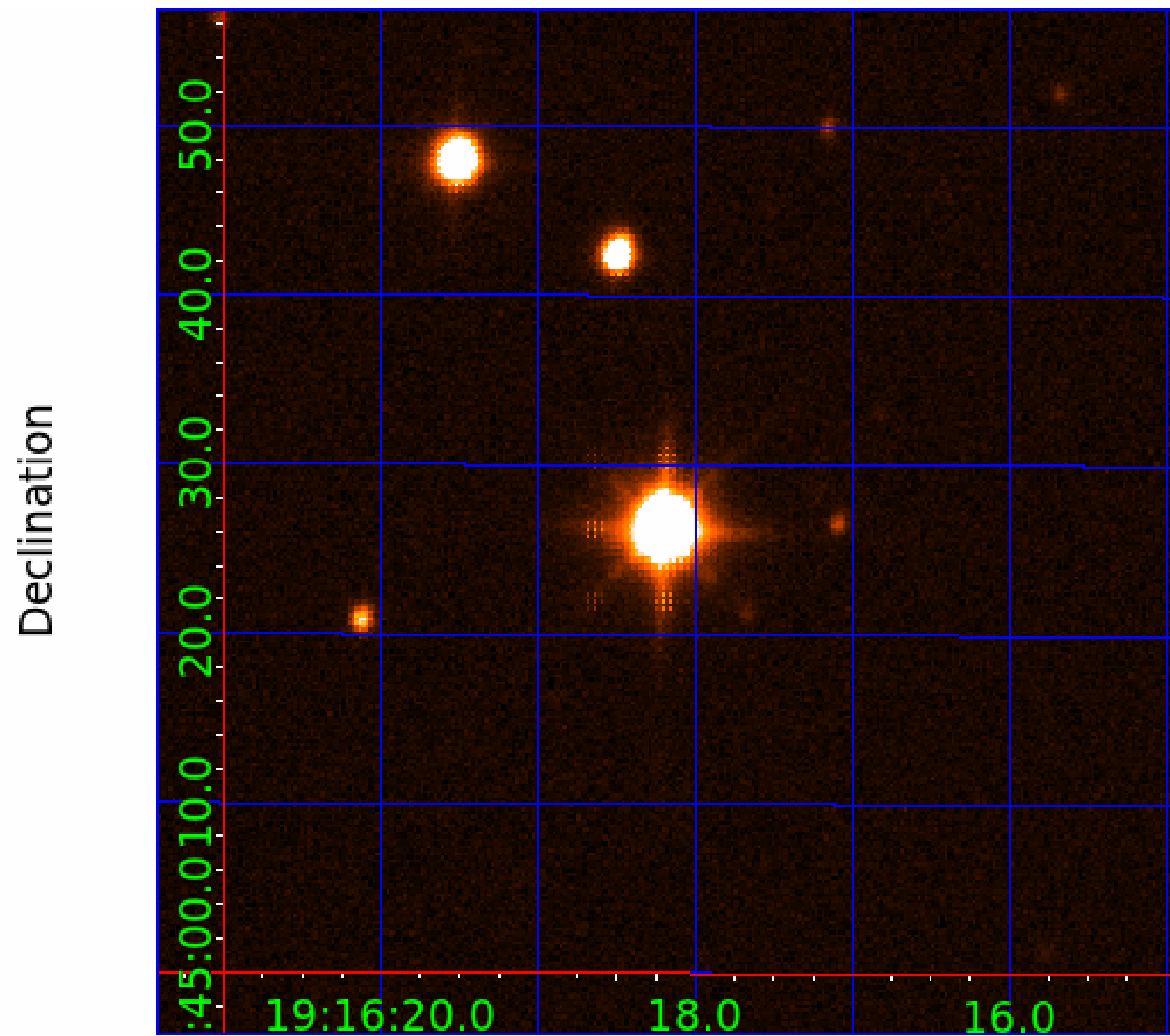
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 012644769

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})
012644769-01	OBS	1611.01	41.077595	132.658196	134509.7	6.202	14980.5	9694.4	0.62	4451	23.32	3.38
012644769-02	OBS	No	41.077785	152.717254	15922.3	4.577	1778.6	1072.7	0.62	4451	8.56	3.38
012644769-03	OBS	No	451.772670	140.431046	17681.6	7.032	725.1	609.8	0.62	4451	8.12	0.14
012644769-04	OBS	No	239.288871	147.350781	16458.0	3.000	473.1	-1.0	0.62	4451	7.68	0.32

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012644769-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_KIC_POS
012644769-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_KIC_POS
012644769-03	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—PERIOD_ALIAS_ALT—CENT_KIC_POS
012644769-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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.

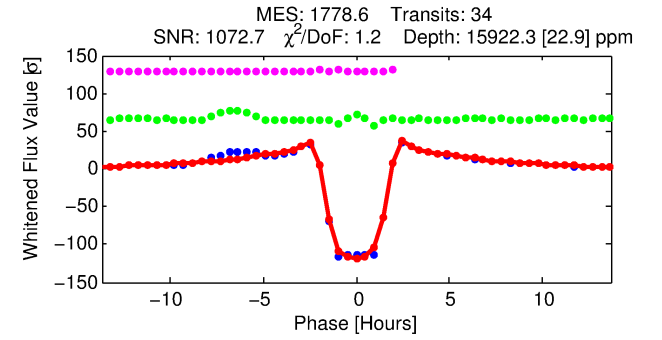
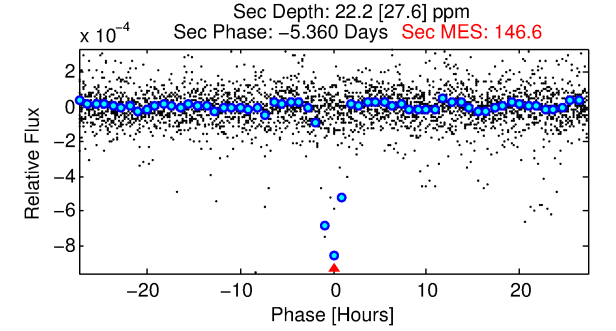
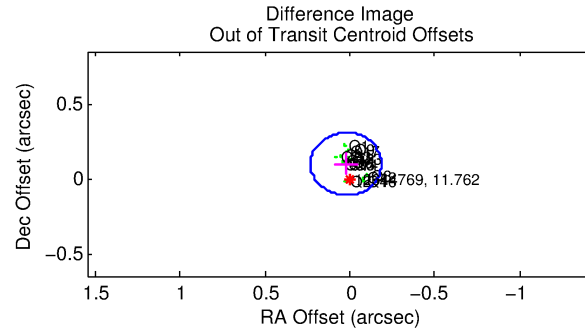
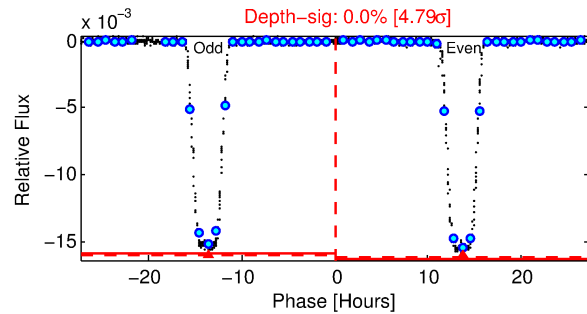
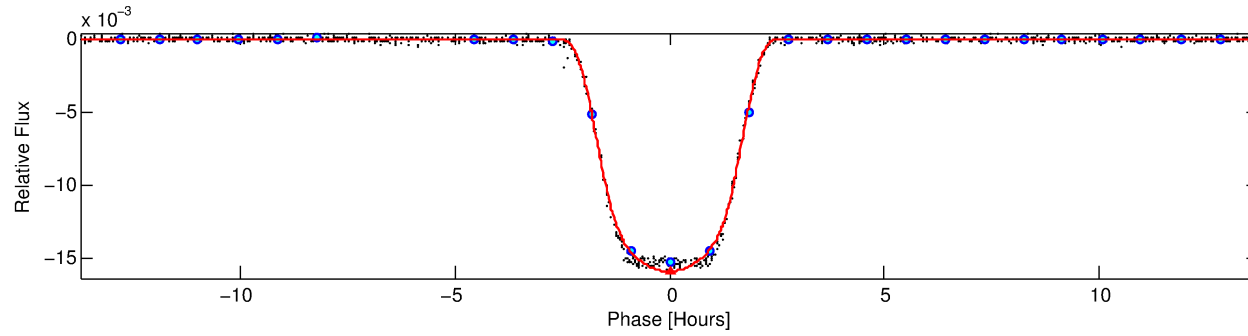
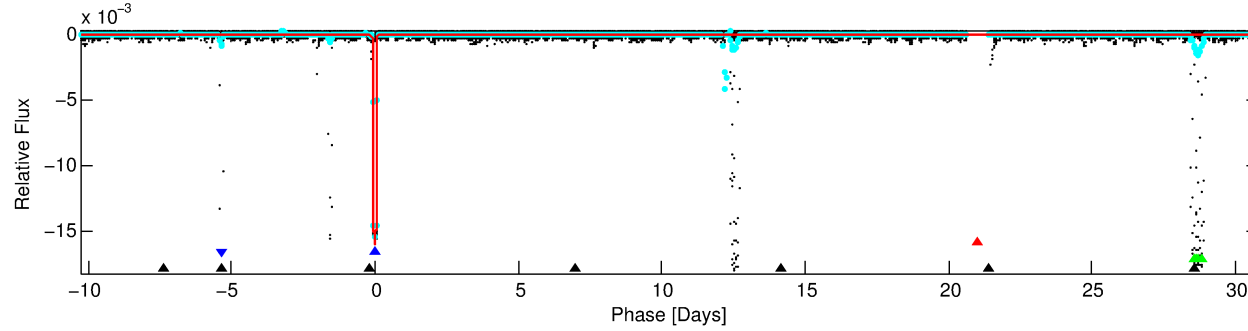
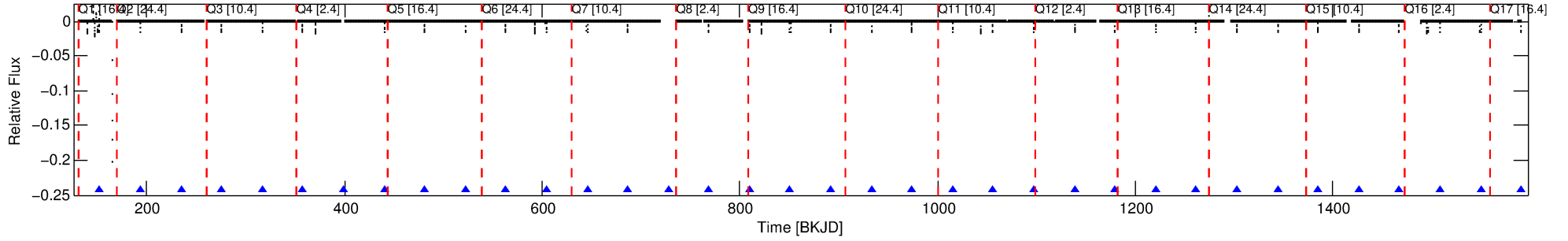
Ephemeris Match Information For 012644769-02

No Significant Match Found

DV One-Page Summary

KIC: 12644769 Candidate: 2 of 4 Period: 41.078 d
KOI: K01611 Corr: No Ephemeris Match

Kp: 11.76 R*: 0.62 Rs Teff: 4451.0 K Logg: 4.65 Fe/H: -0.300



DV Fit Results:

Period = 41.07779 [0.00001] d
Epoch = 152.7173 [0.0001] BKJD
Rp/R* = 0.1266 [0.0002]
a/R* = 57.90 [0.23]
b = 0.75 [0.00]
Seff = 3.38 [0.31]
Teq = 346 [8] K
Rp = 8.56 [0.37] Re
a = 0.2000 [0.0067] AU
Ag = 6.66 [8.28] [0.68σ]
Teffp = 859 [267] K [1.92σ]

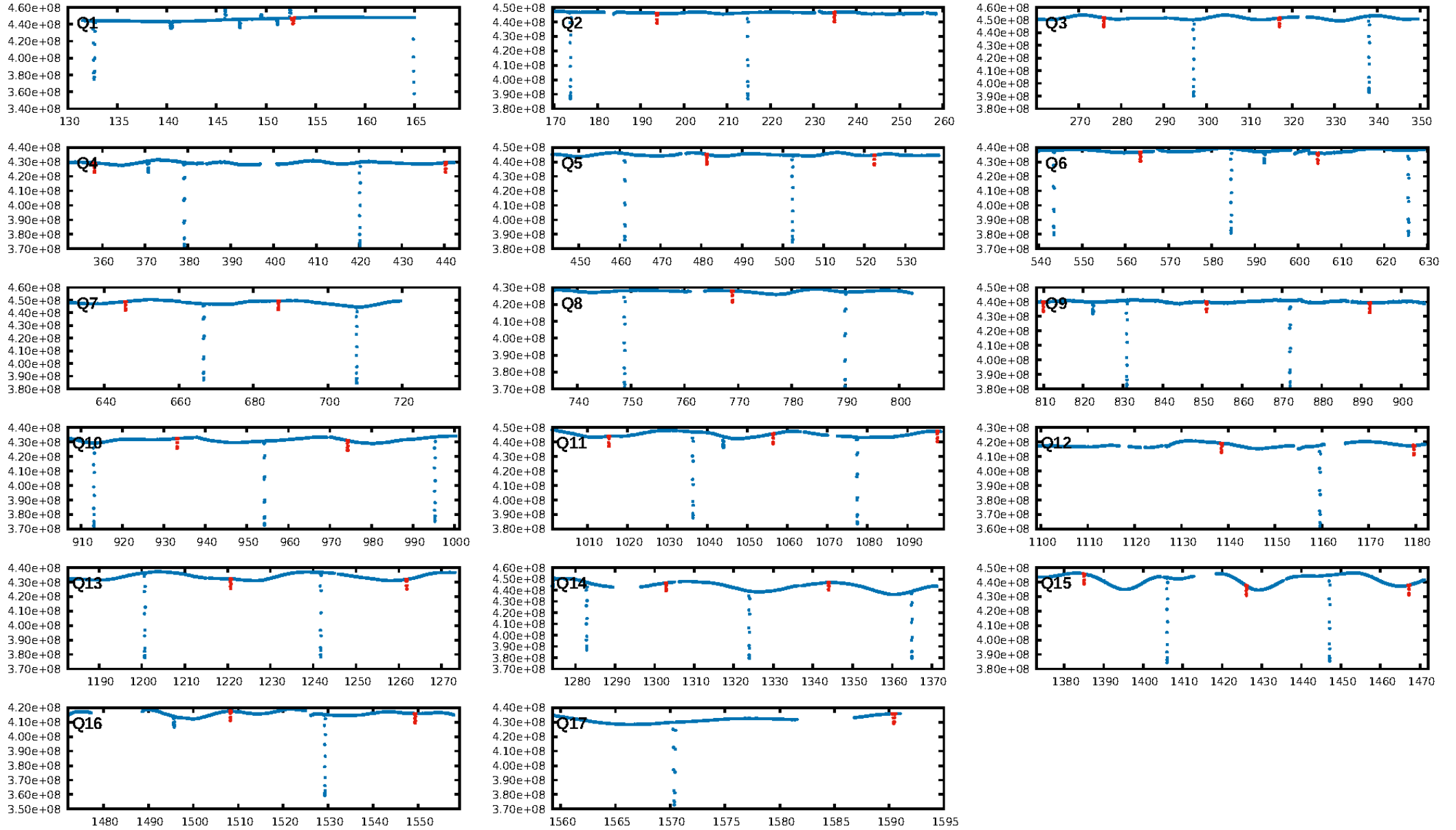
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: 100.0% [869.24σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 98.1%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [32/32]
GhostDiagnostic-chr: 5.474
Centroid-sig: N/A
Centroid-so: 0.265 arcsec [39.61σ]
OotOffset-rm: 0.100 arcsec [1.44σ]
KicOffset-rm: 0.374 arcsec [5.05σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

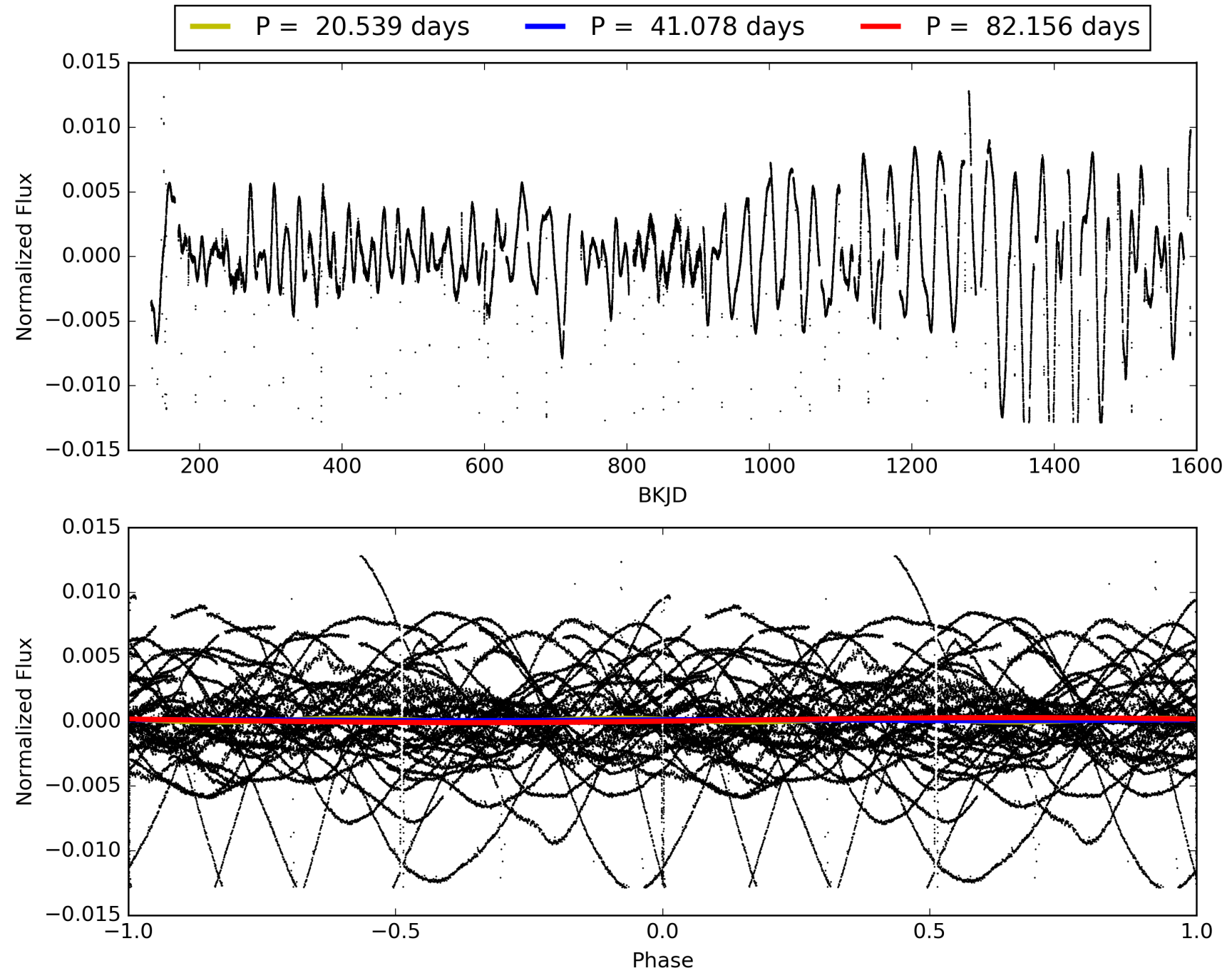
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:39:39 Z

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

TCE 012644769-02, PDC Light Curves

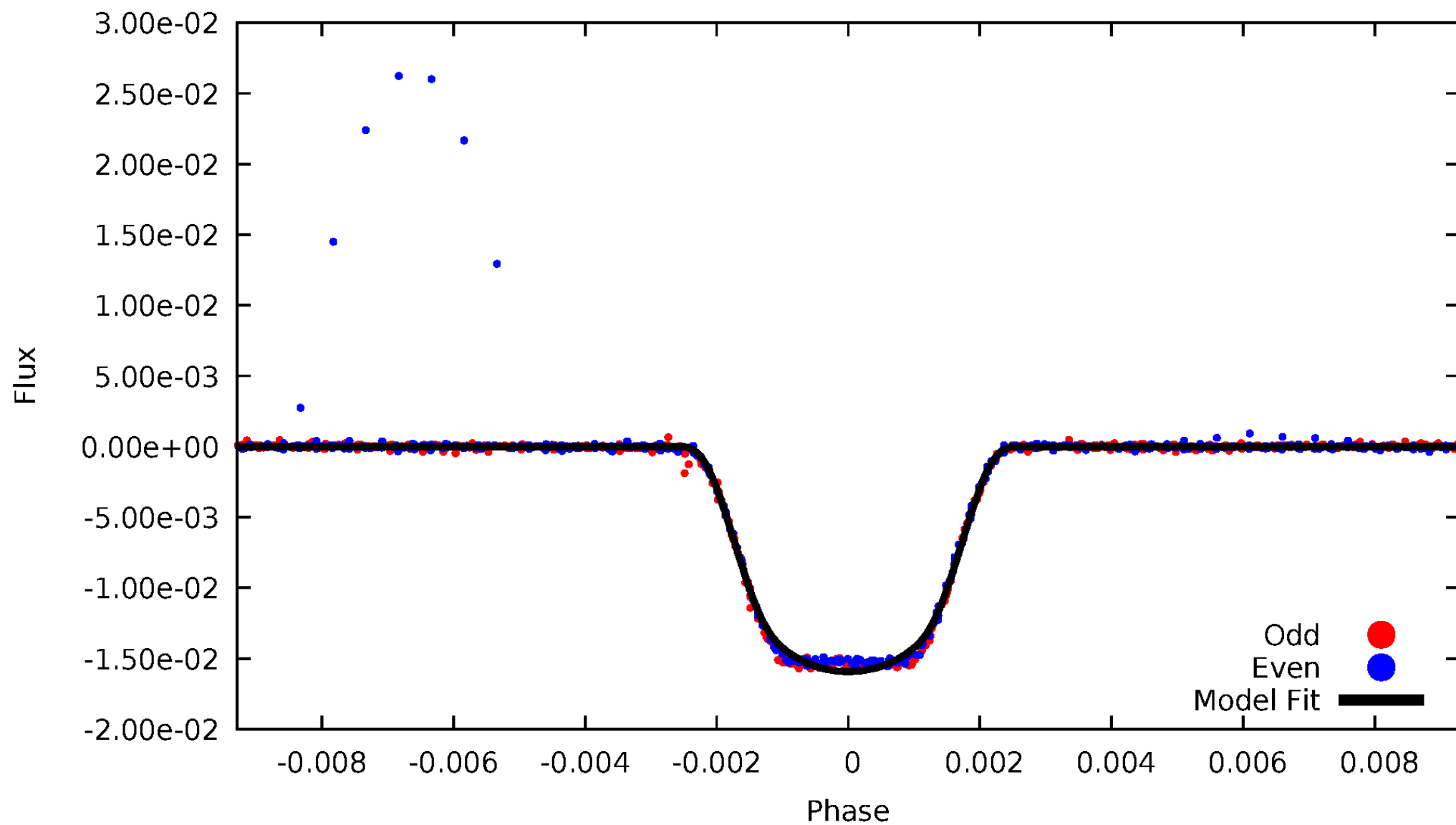


TCE 012644769-02



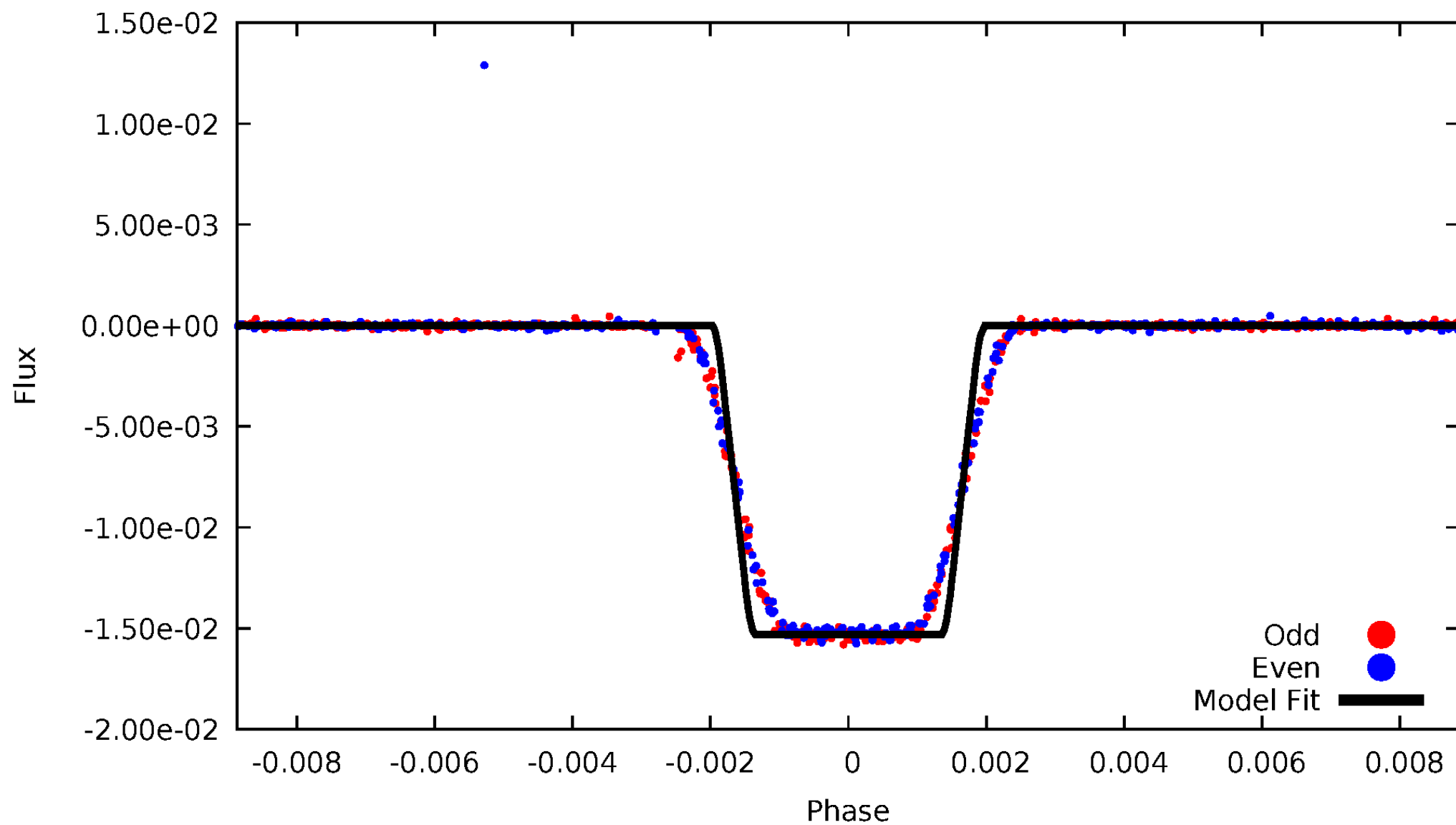
DV Odd/Even

TCE 012644769-02



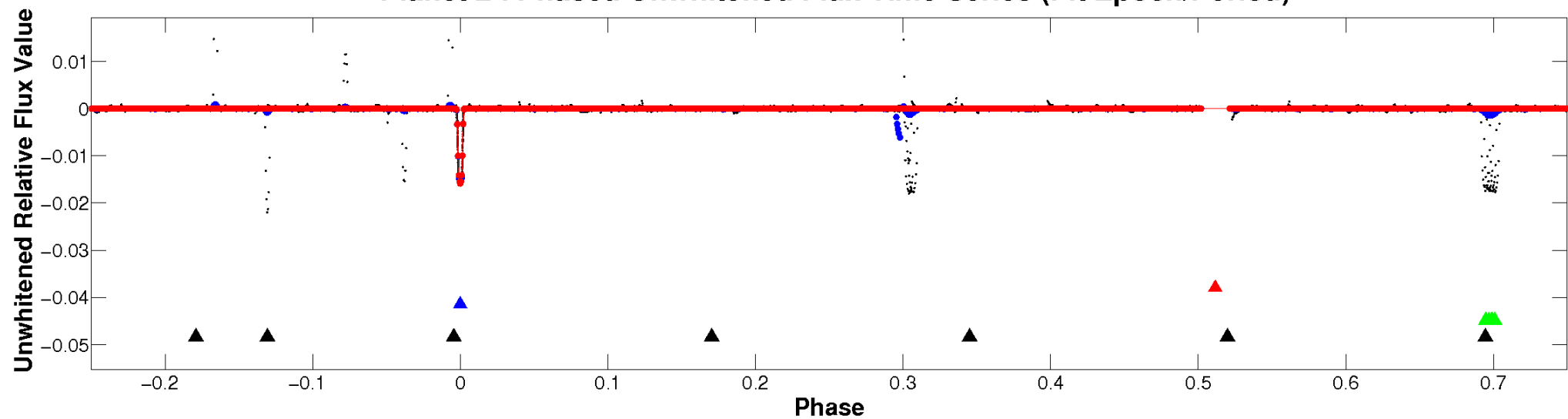
ALT Odd/Even

TCE 012644769-02

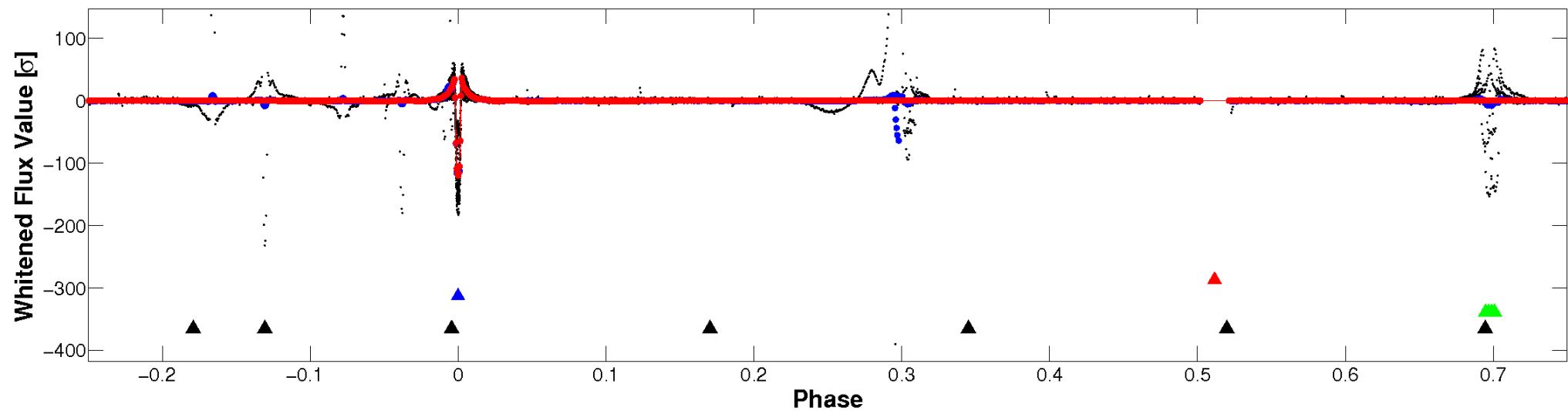


Non-Whitened Vs. Whitened Light Curve

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

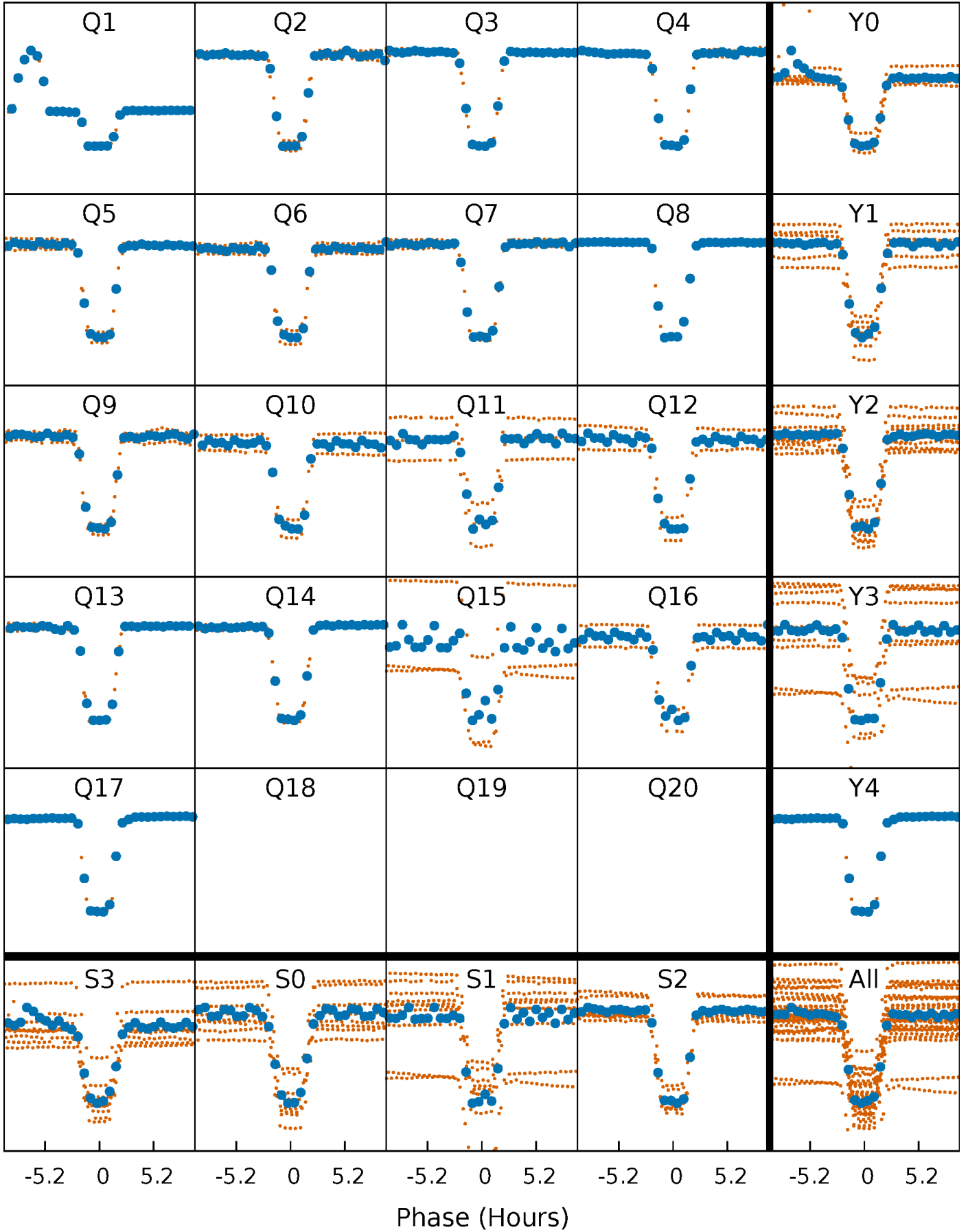


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



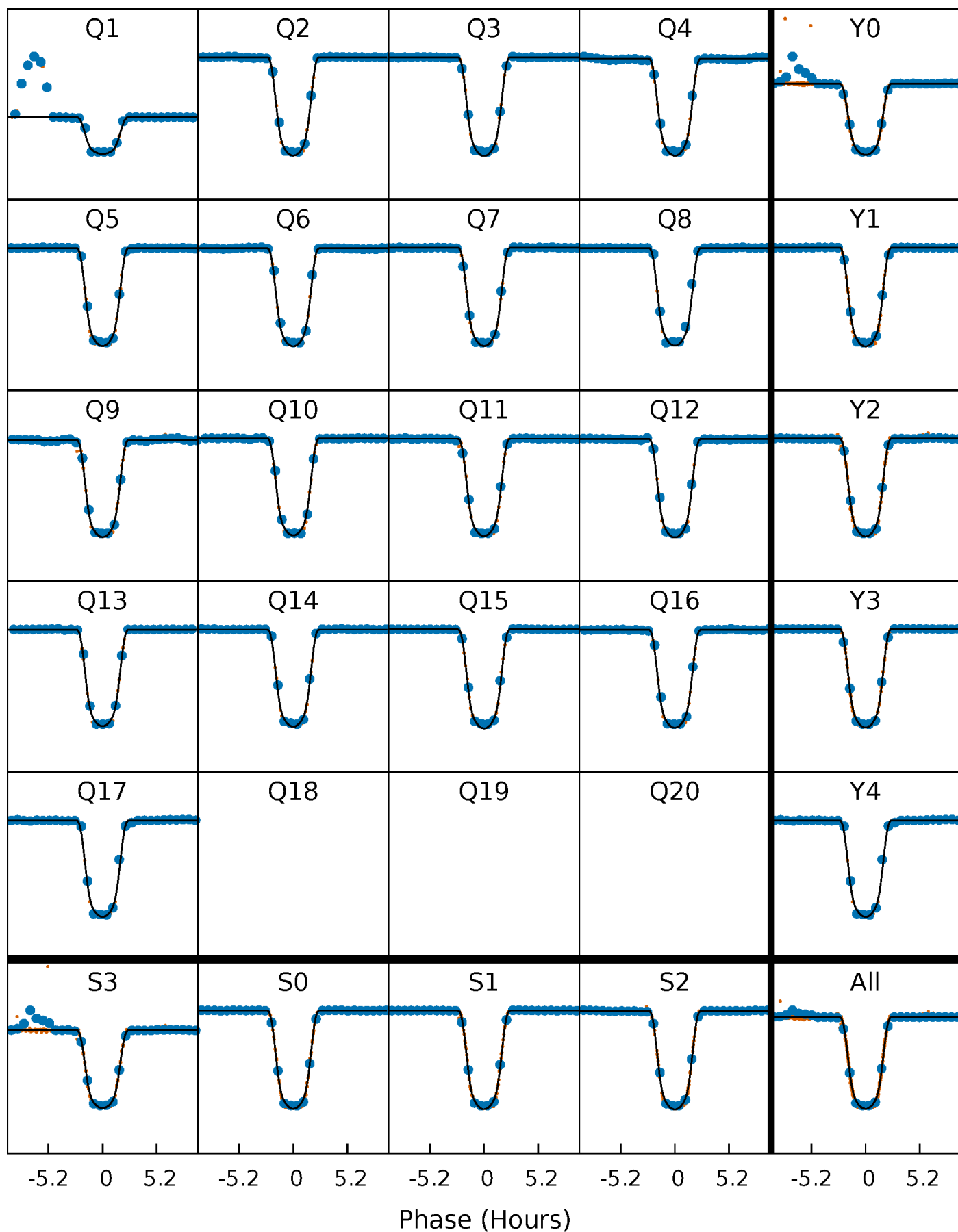
PDC Quarter-Phased Transit Curves

TCE 012644769-02 P= 41.077785 Days $T_0=152.717254$ (BKJD)



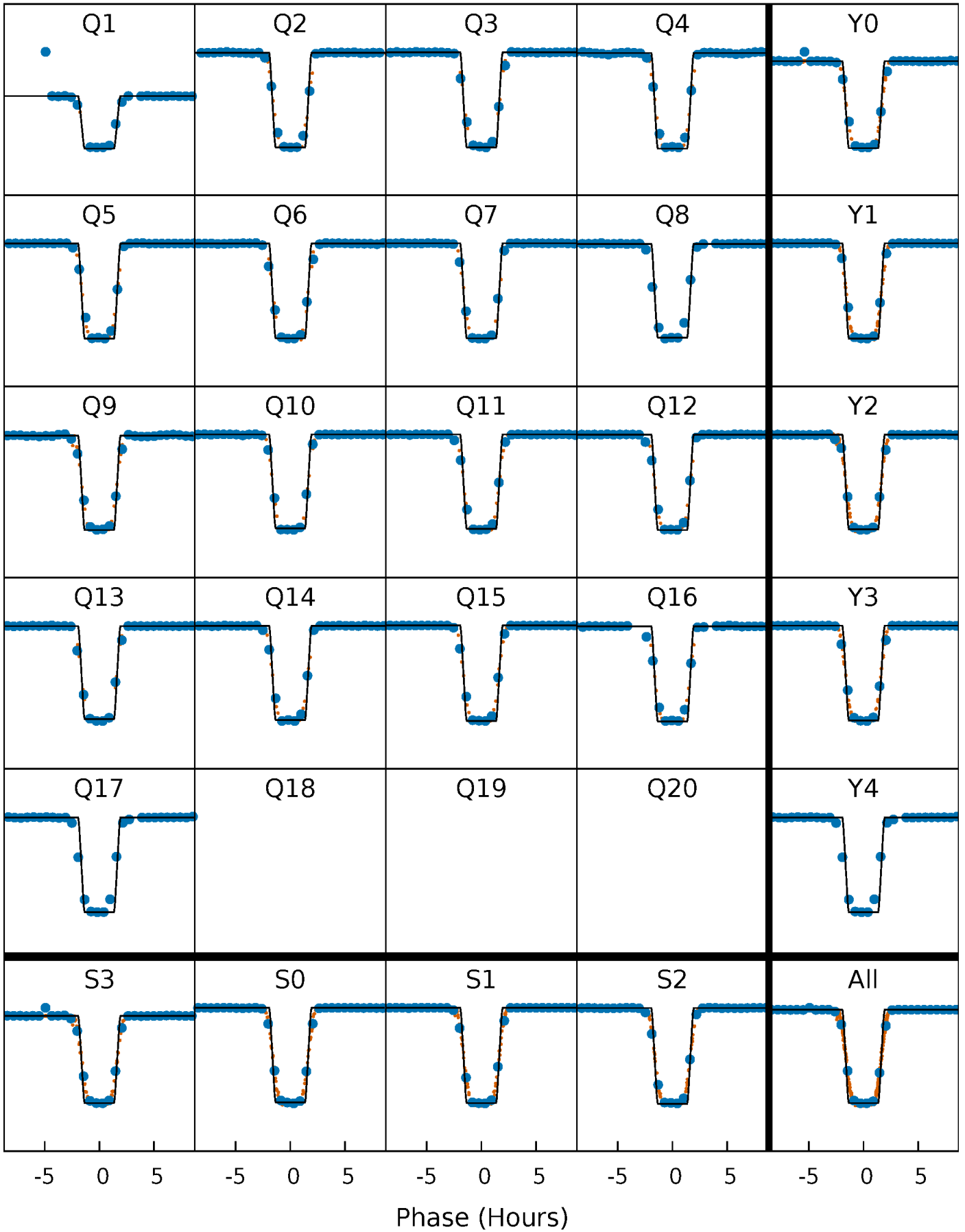
DV Quarter-Phased Transit Curves

TCE 012644769-02 P= 41.077785 Days $T_0=152.717254$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

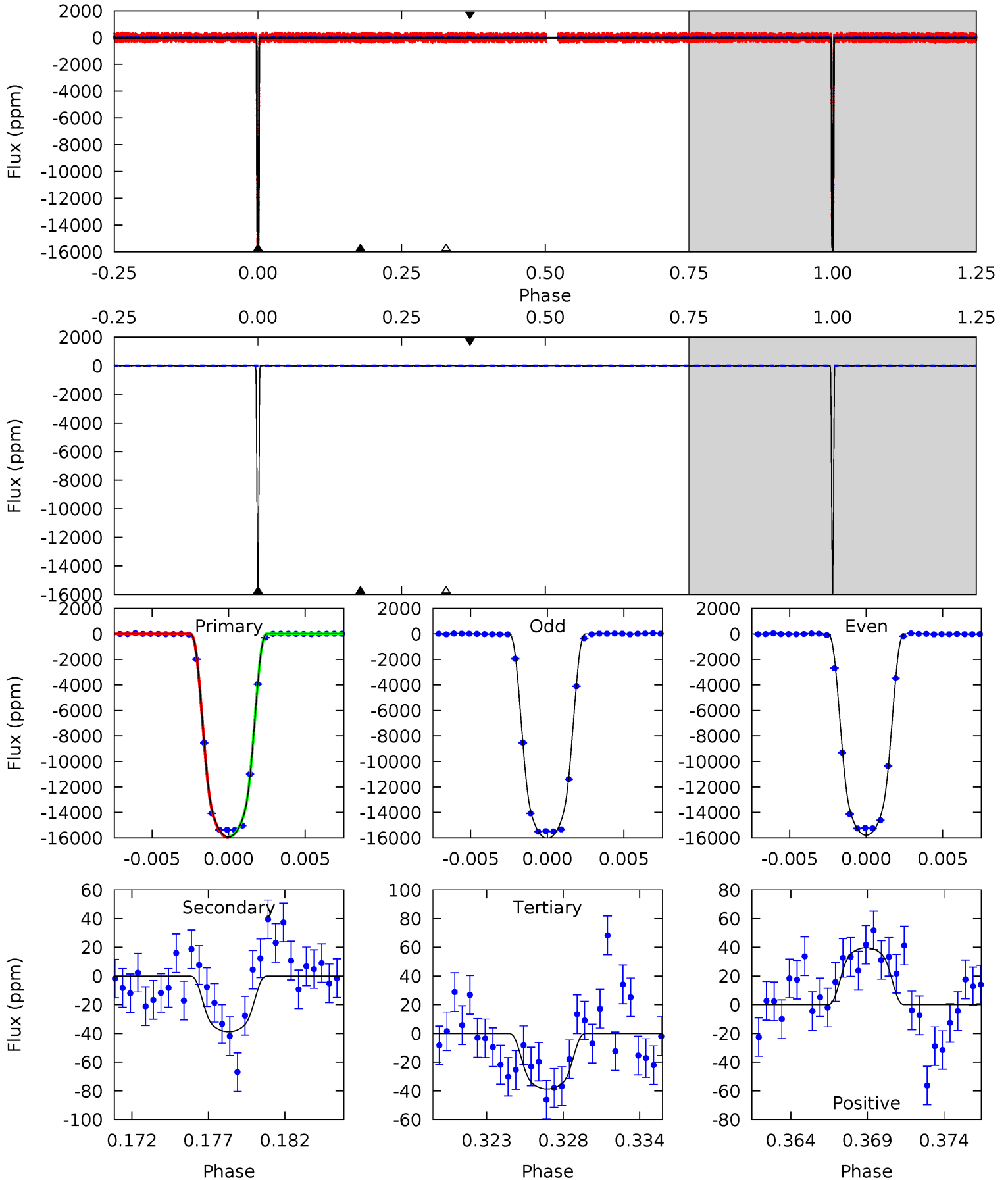
TCE 012644769-02 P= 41.077894 Days $T_0=152.714770$ (BKJD)



DV Model-Shift Uniqueness Test

012644769-02, P = 41.077785 Days, E = 111.639469 Days

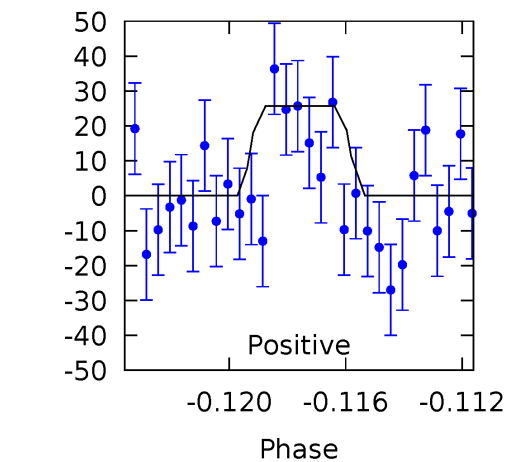
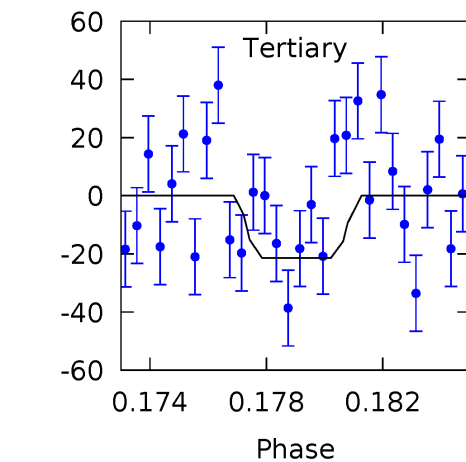
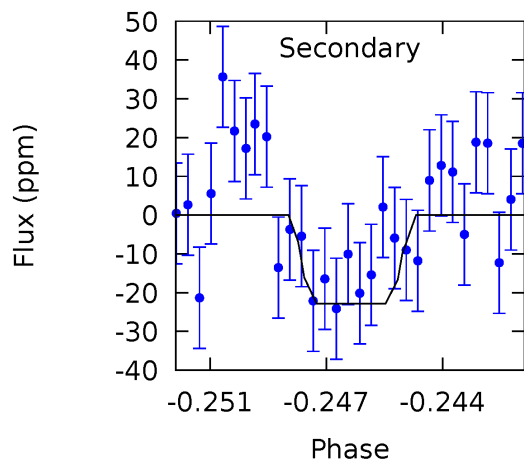
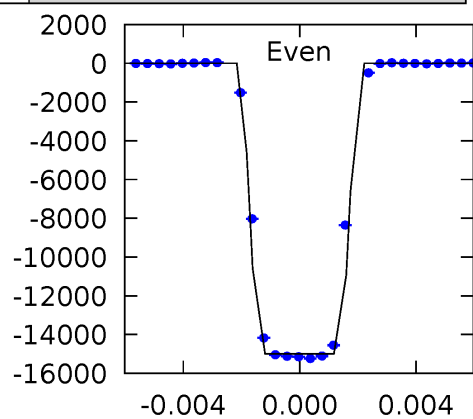
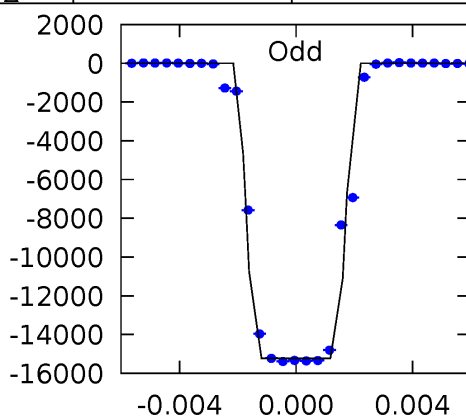
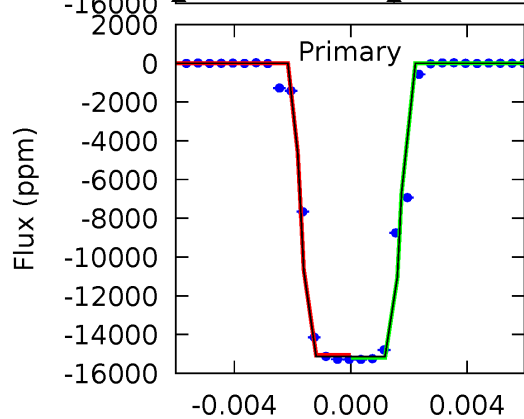
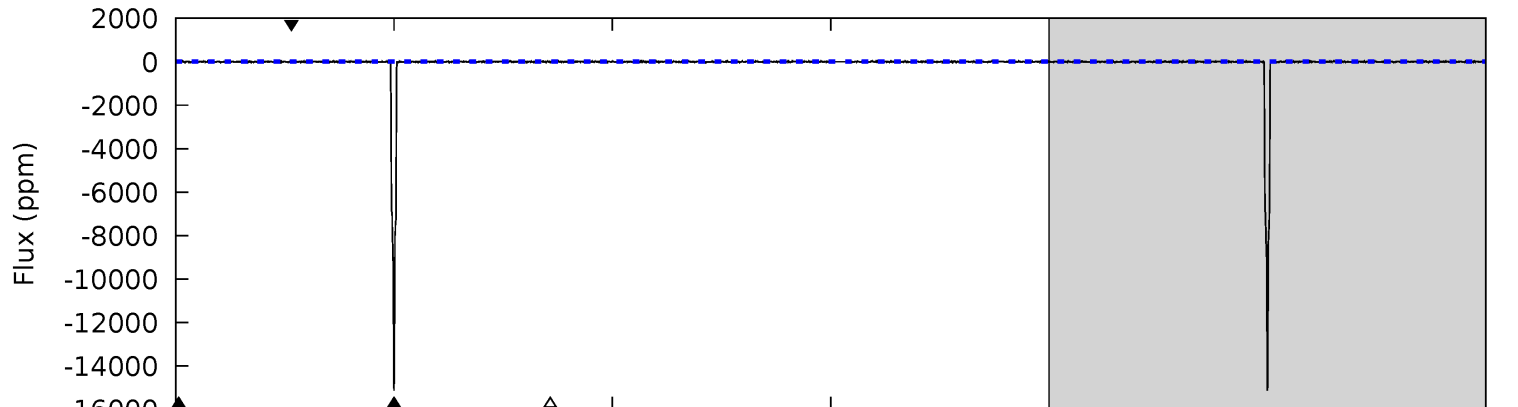
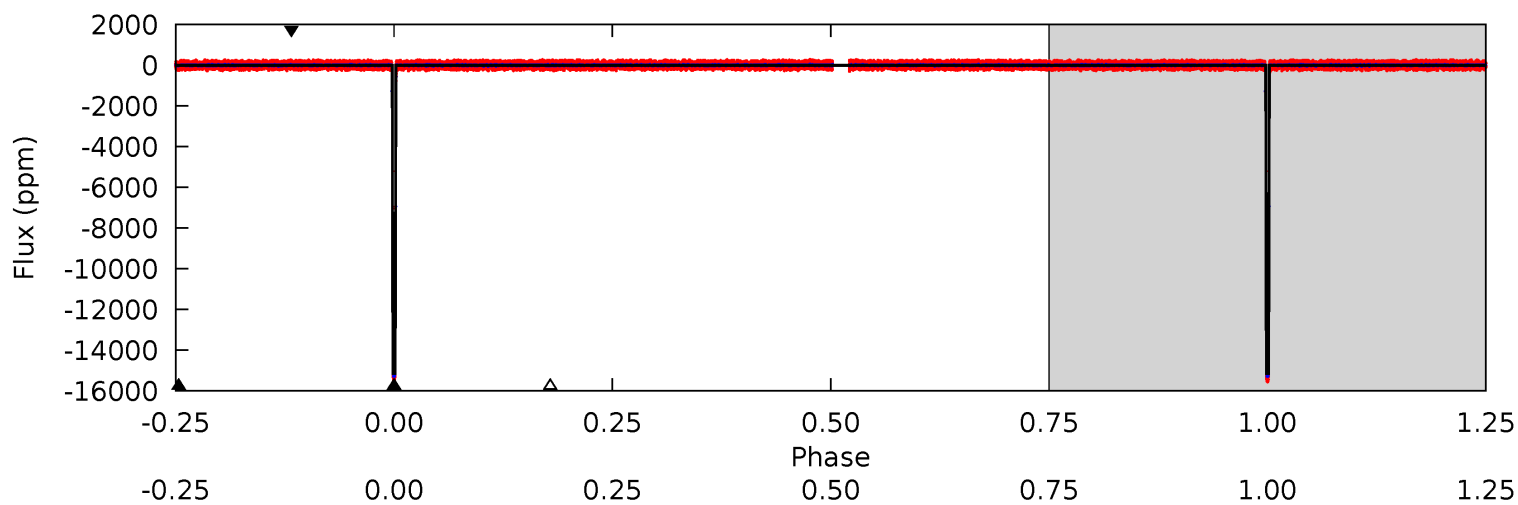
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2696	6.57	6.55	6.73	5.16	2.80	2.19	2690	2690	0.03	-0.15	21.3	1.00	0.00	6.56



Alt Model-Shift Uniqueness Test

012644769-02, P = 41.077894 Days, E = 111.636876 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2380	3.59	3.37	4.04	5.21	2.89	1.03	2377	2376	0.22	-0.45	19.9	1.00	0.00	9.29



Stellar Parameters For KIC 012644769

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4451^{+89}_{-89}	$4.654^{+0.022}_{-0.022}$	$-0.300^{+0.150}_{-0.150}$	$0.620^{+0.027}_{-0.025}$	$0.633^{+0.033}_{-0.030}$	$3.740^{+0.362}_{-0.331}$
	+2%/-2%	+0%/-0%	+50%/-50%	+4%/-4%	+5%/-5%	+10%/-9%
Source	SPE28	TRA28	SPE28	DSEP		

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

Secondary Eclipse Parameters for KIC 012644769-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-39 ± 6	$8.58^{+0.21}_{-0.20}$	483^{+11}_{-11}	1952^{+35}_{-40}	12^{+2}_{-2}
Alt.	-23 ± 6	$8.39^{+0.22}_{-0.22}$	482^{+11}_{-10}	1854^{+51}_{-59}	$7.063^{+2.073}_{-1.889}$

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

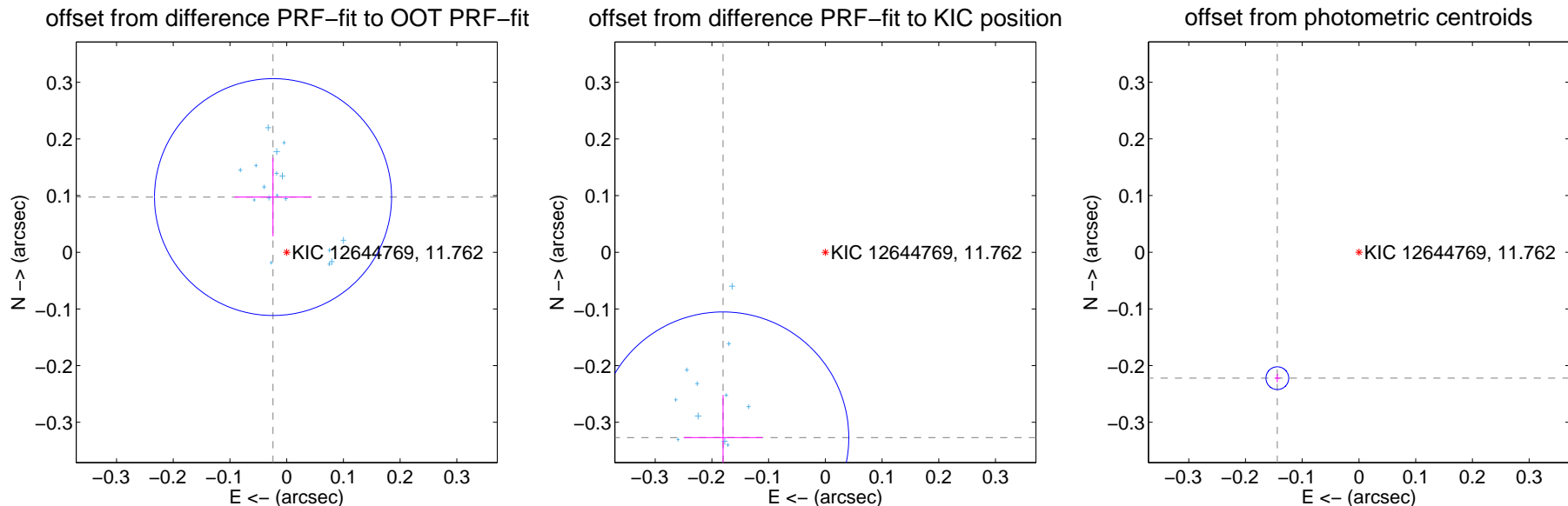
DV Centroid Data

Supplemental centroid analysis for 012644769-02. **Kepler magnitude: 11.76**. Transit SNR 1072.66

There are 17 quarters with good PRF difference image offsets

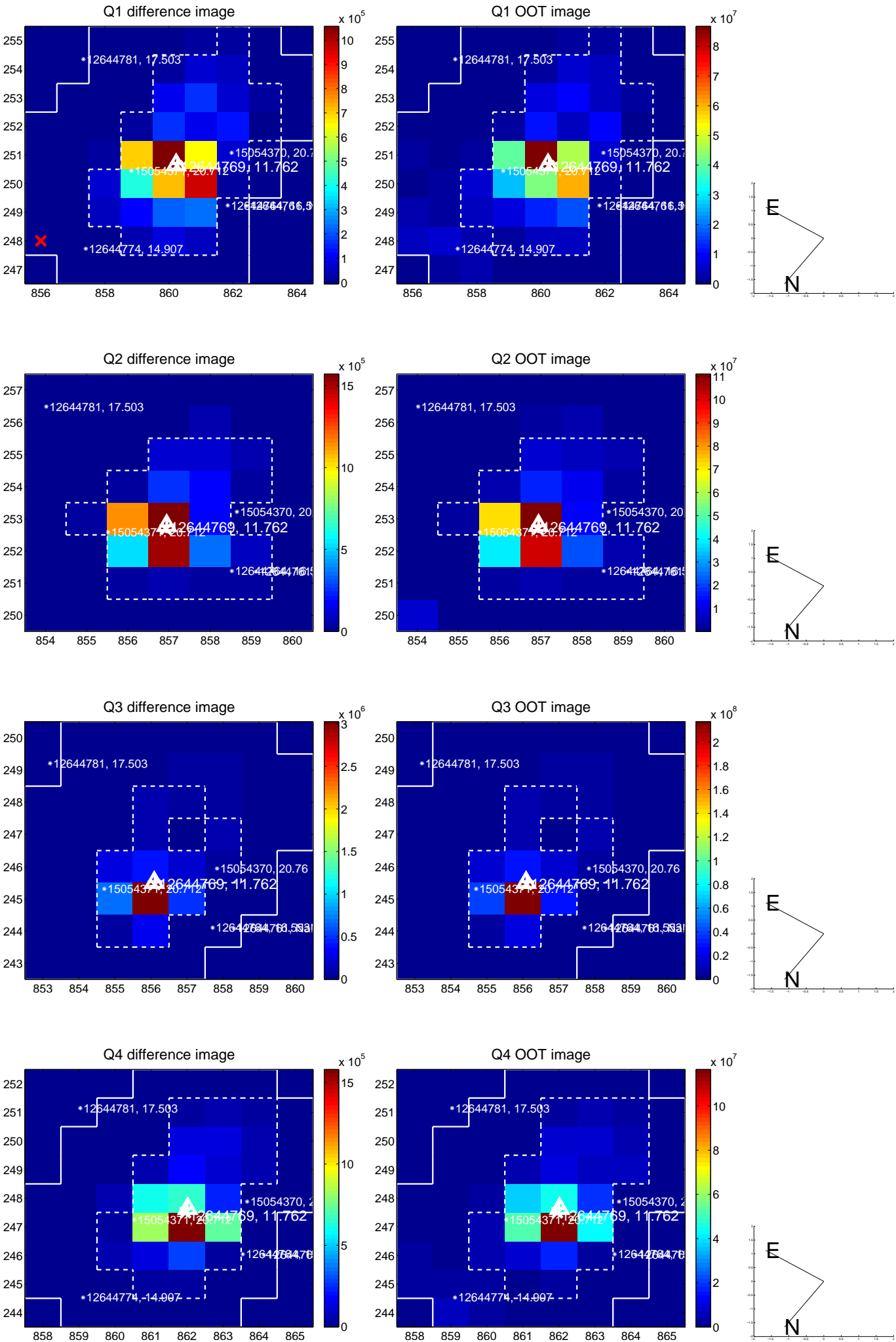
The direct PRF centroid is offset from the target star catalog position by about 0.51 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.100 ± 0.070	1.44	0.024 ± 0.068	0.097 ± 0.069
PRF-fit source offset from KIC position	0.374 ± 0.074	5.05	0.180 ± 0.070	-0.327 ± 0.075
photometric centroid source offset	0.26 ± 0.01	39.61	0.14 ± 0.01	-0.22 ± 0.01

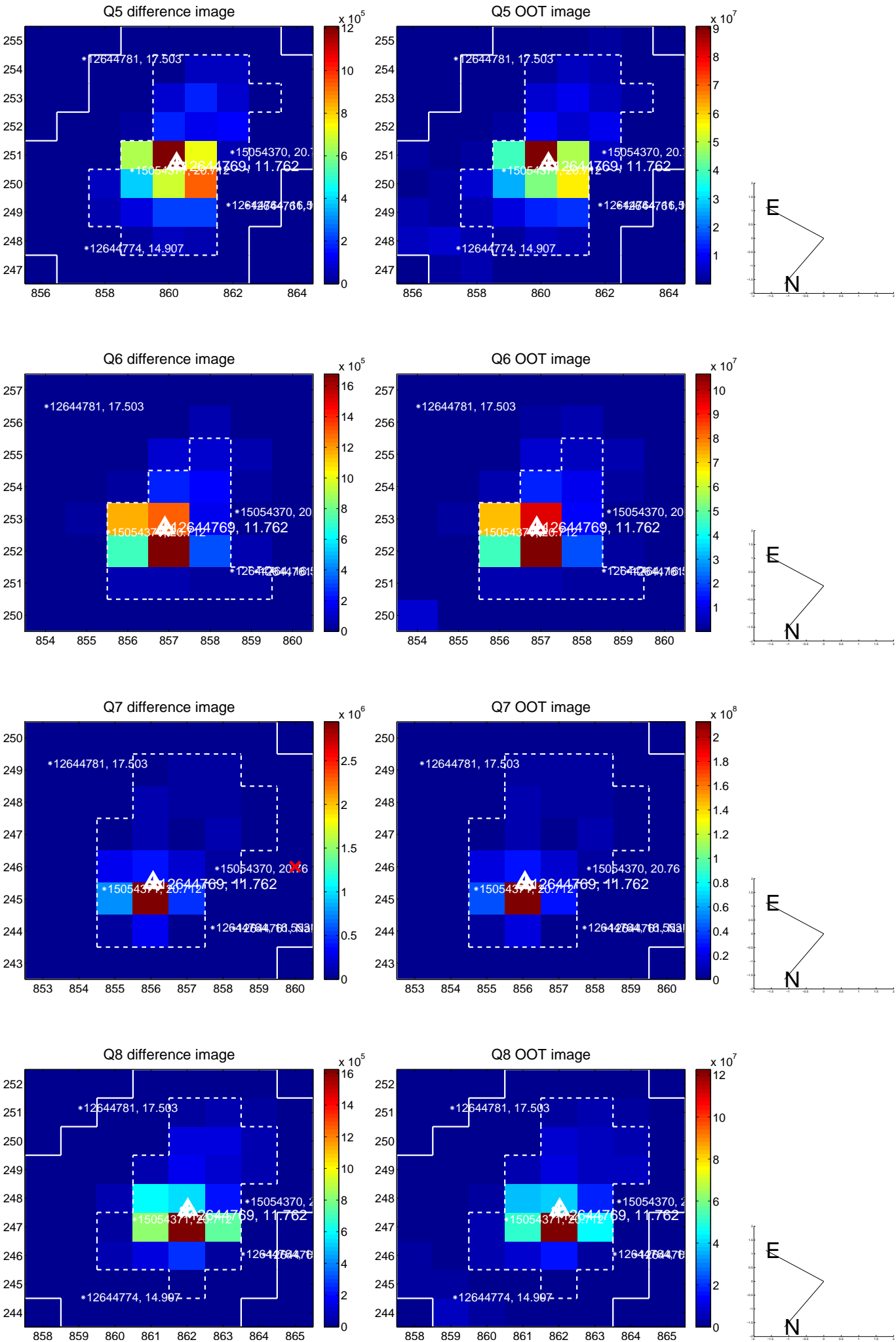


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

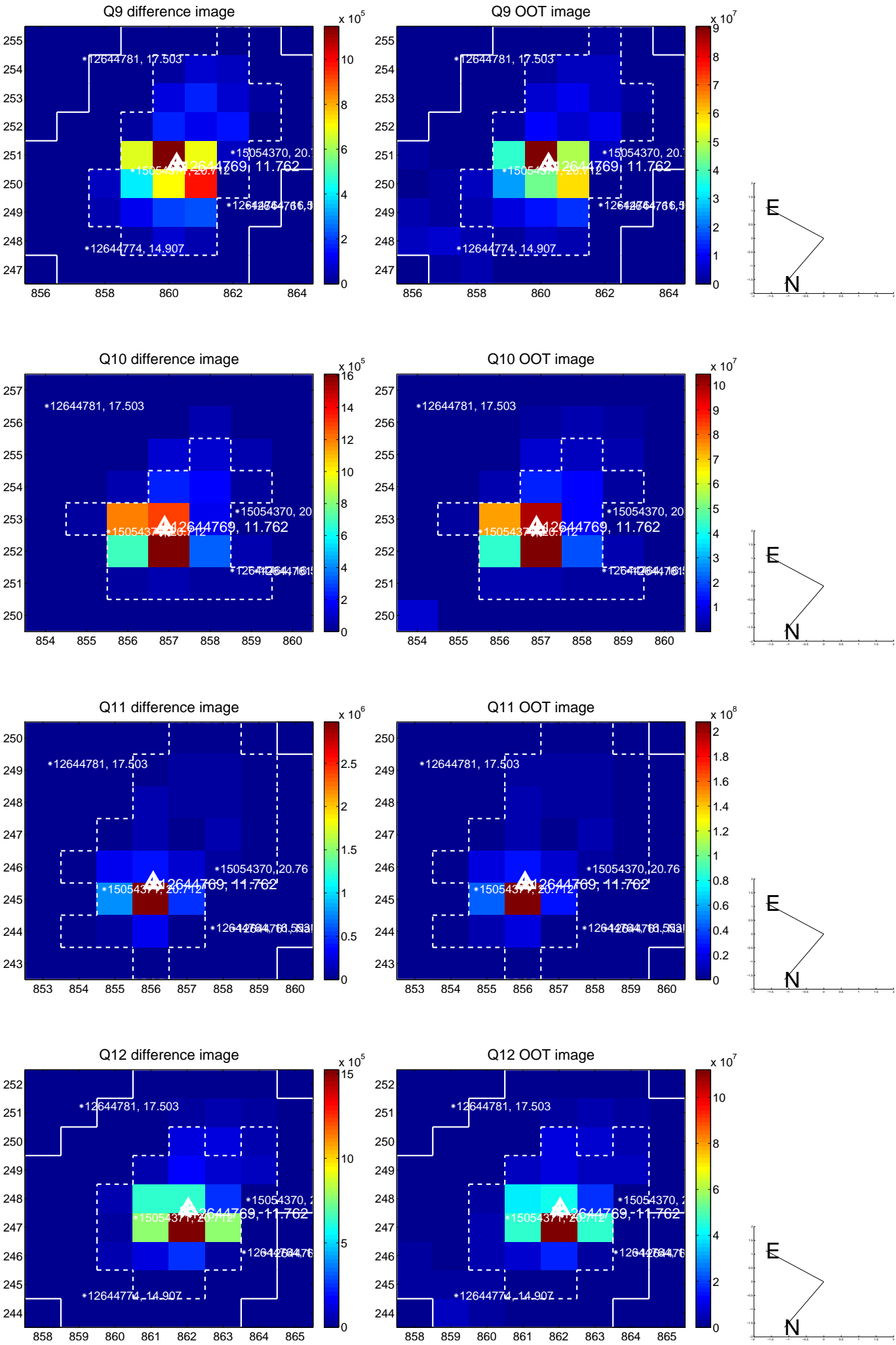
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



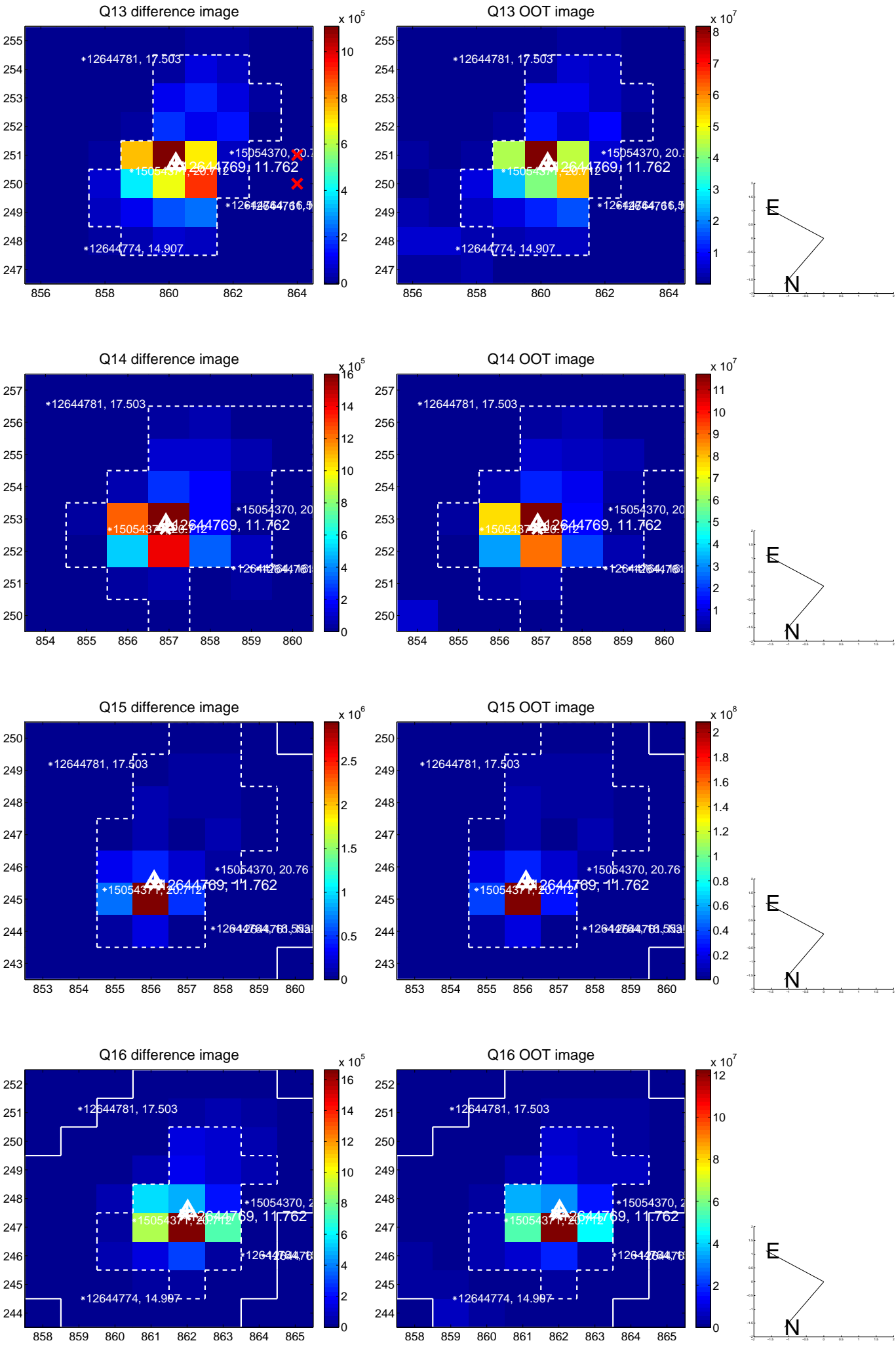
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



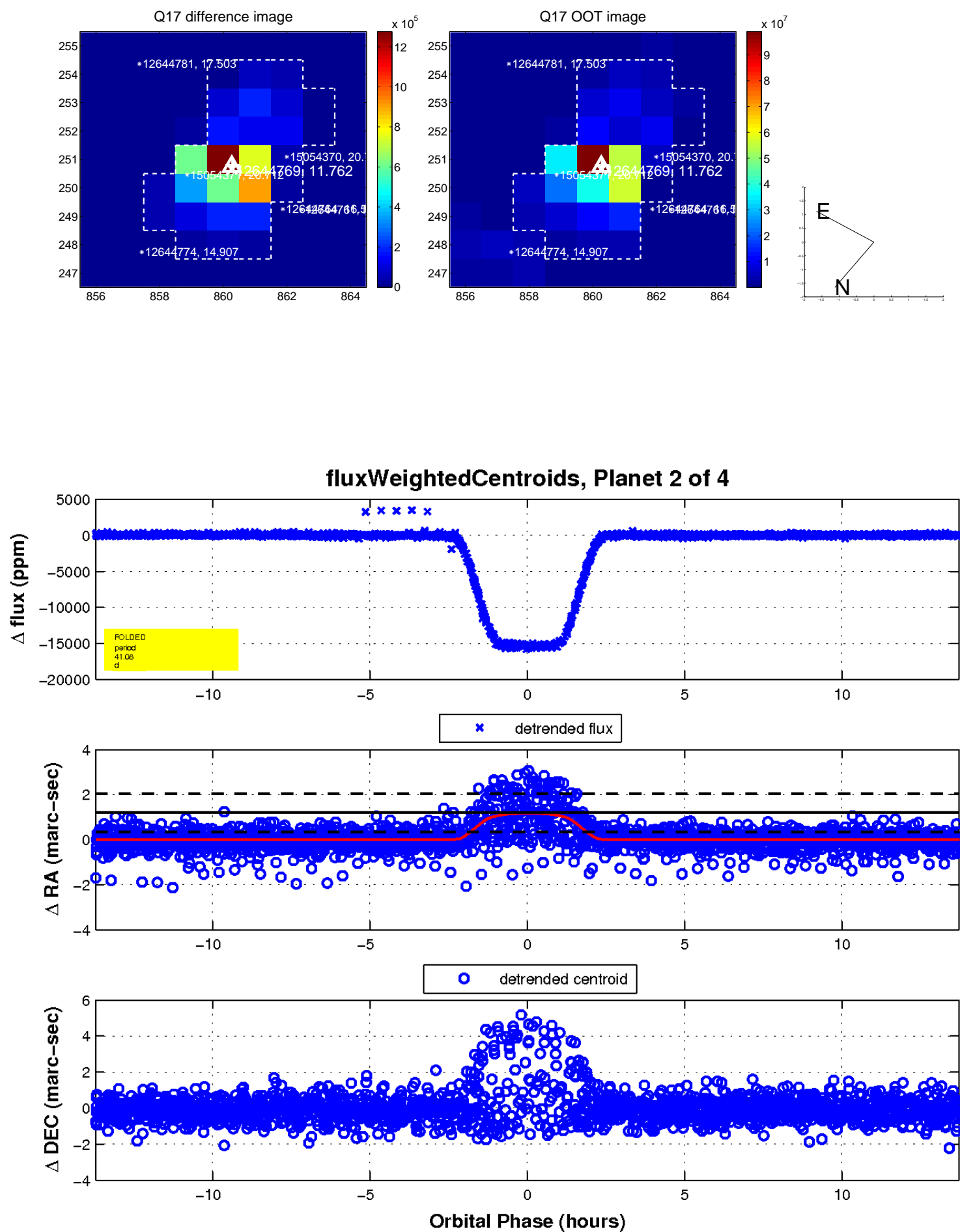
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



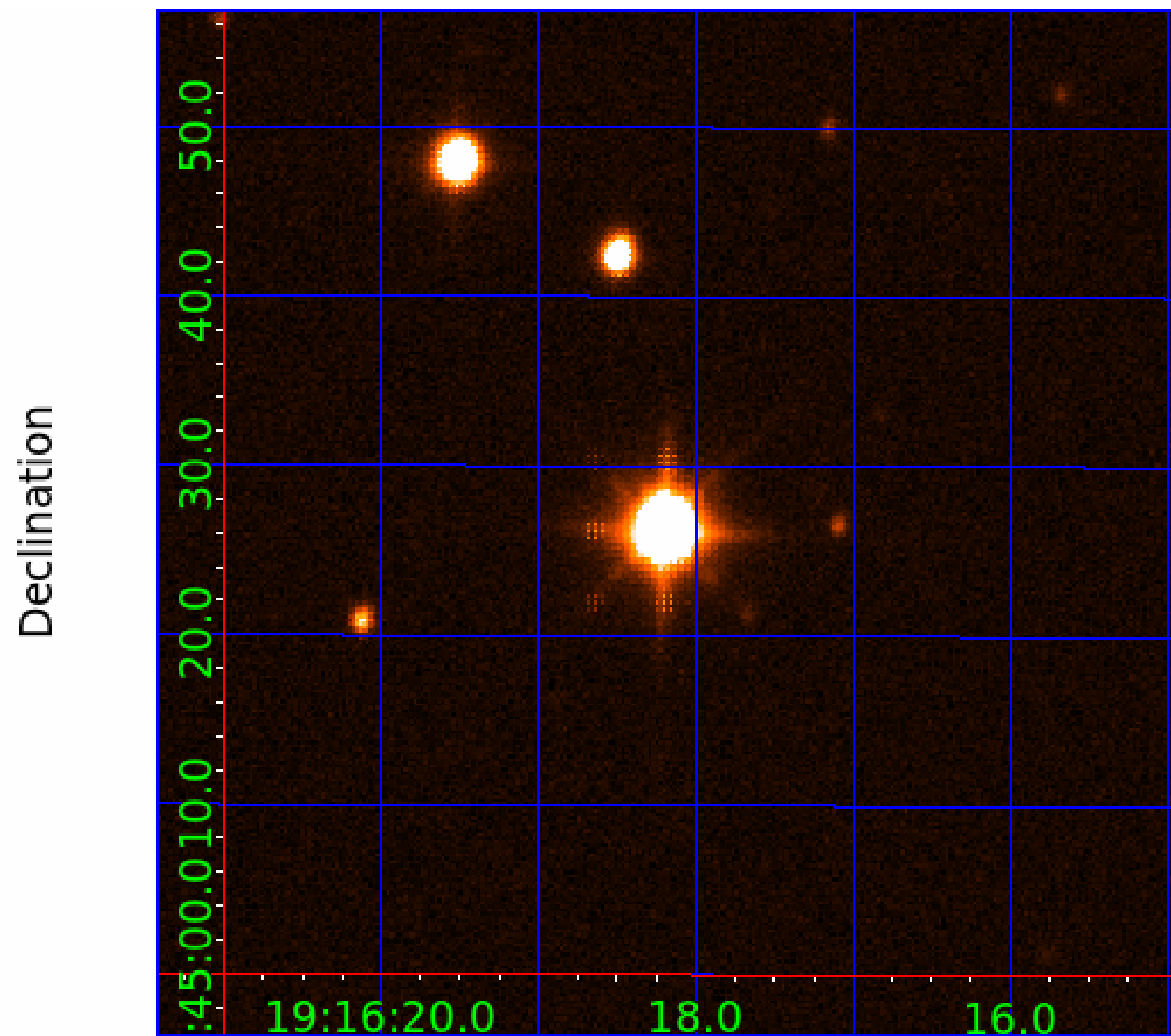
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



1



UKIRT Image



KIC 012644769

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})
012644769-01	OBS	1611.01	41.077595	132.658196	134509.7	6.202	14980.5	9694.4	0.62	4451	23.32	3.38
012644769-02	OBS	No	41.077785	152.717254	15922.3	4.577	1778.6	1072.7	0.62	4451	8.56	3.38
012644769-03	OBS	No	451.772670	140.431046	17681.6	7.032	725.1	609.8	0.62	4451	8.12	0.14
012644769-04	OBS	No	239.288871	147.350781	16458.0	3.000	473.1	-1.0	0.62	4451	7.68	0.32

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012644769-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_KIC_POS
012644769-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_KIC_POS
012644769-03	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—PERIOD_ALIAS_ALT—CENT_KIC_POS
012644769-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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.

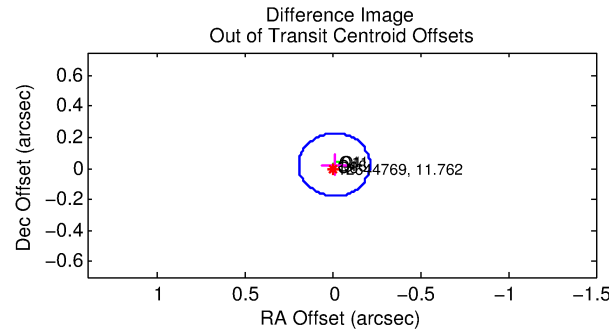
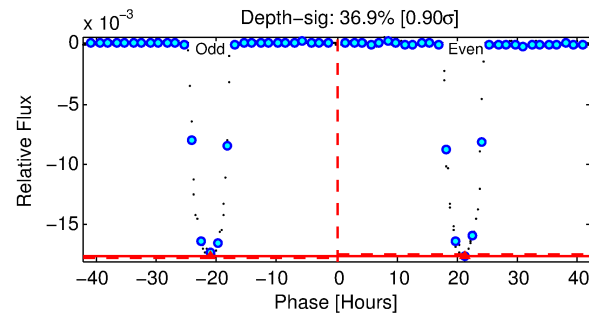
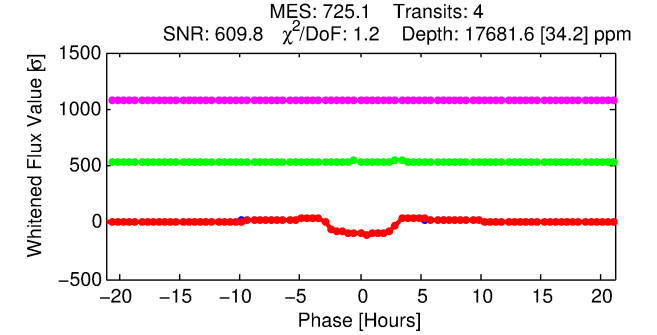
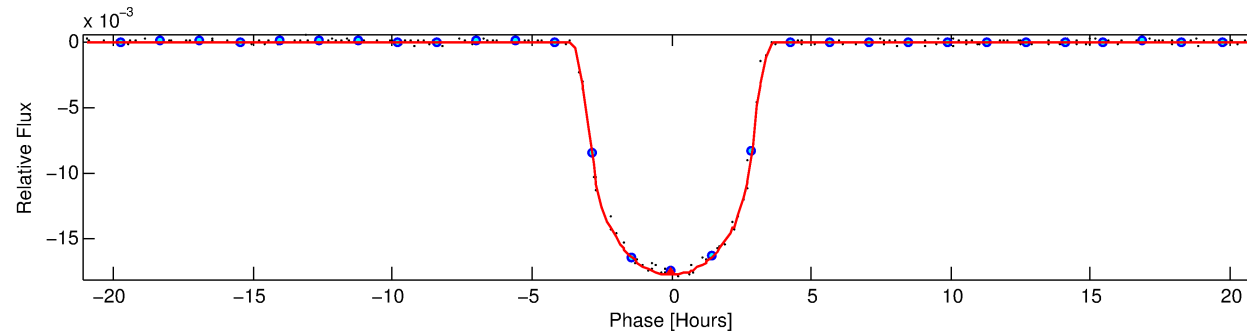
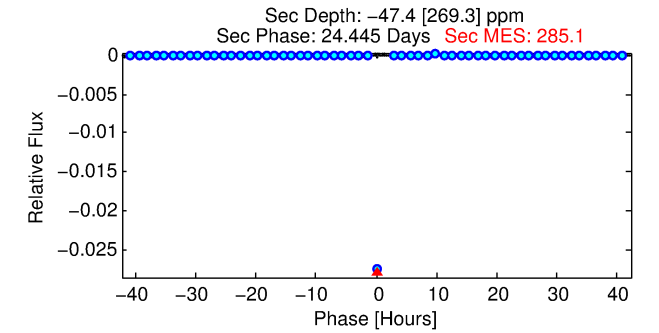
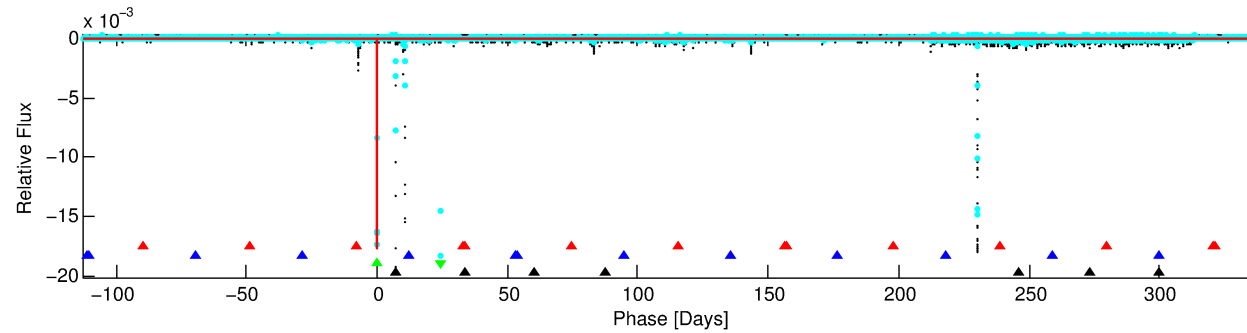
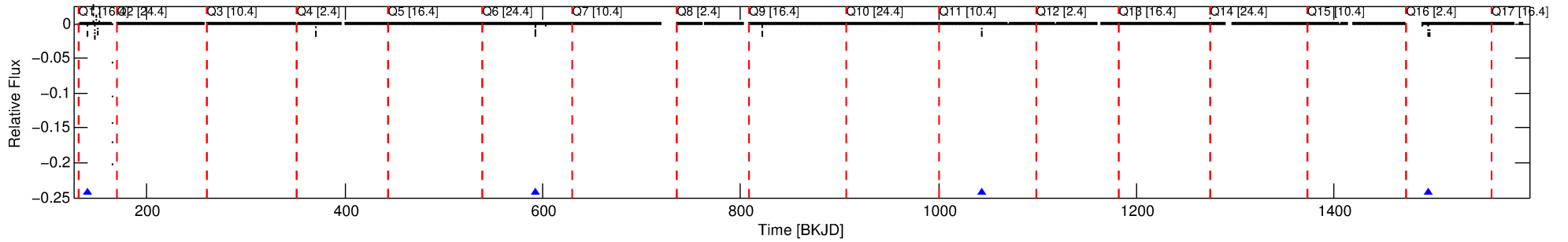
Ephemeris Match Information For 012644769-03

No Significant Match Found

DV One-Page Summary

KIC: 12644769 Candidate: 3 of 4 Period: 451.773 d
KOI: K01611 Corr: No Ephemeris Match

Kp: 11.76 R*: 0.62 Rs Teff: 4451.0 K Logg: 4.65 Fe/H: -0.300



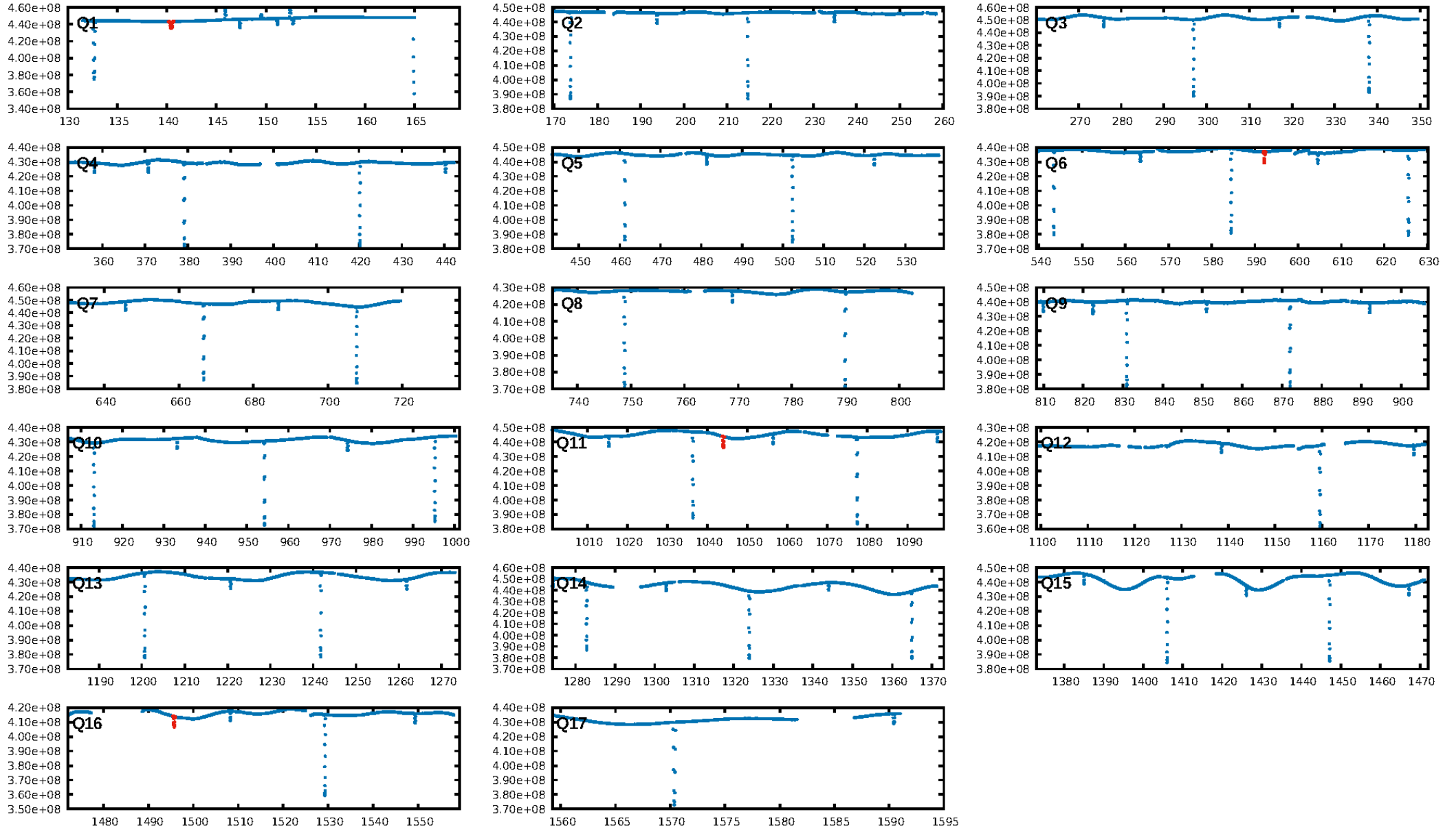
DV Fit Results:

Period = 451.77267 [0.00009] d
Epoch = 140.4310 [0.0002] BKJD
Rp/R* = 0.1200 [0.0004]
a/R* = 519.38 [4.70]
b = 0.37 [0.02]
Seff = 0.14 [0.01]
Teq = 155 [4] K
Rp = 8.12 [0.35] Re
a = 0.9891 [0.0332] AU
Ag = N/A
Teffp = N/A

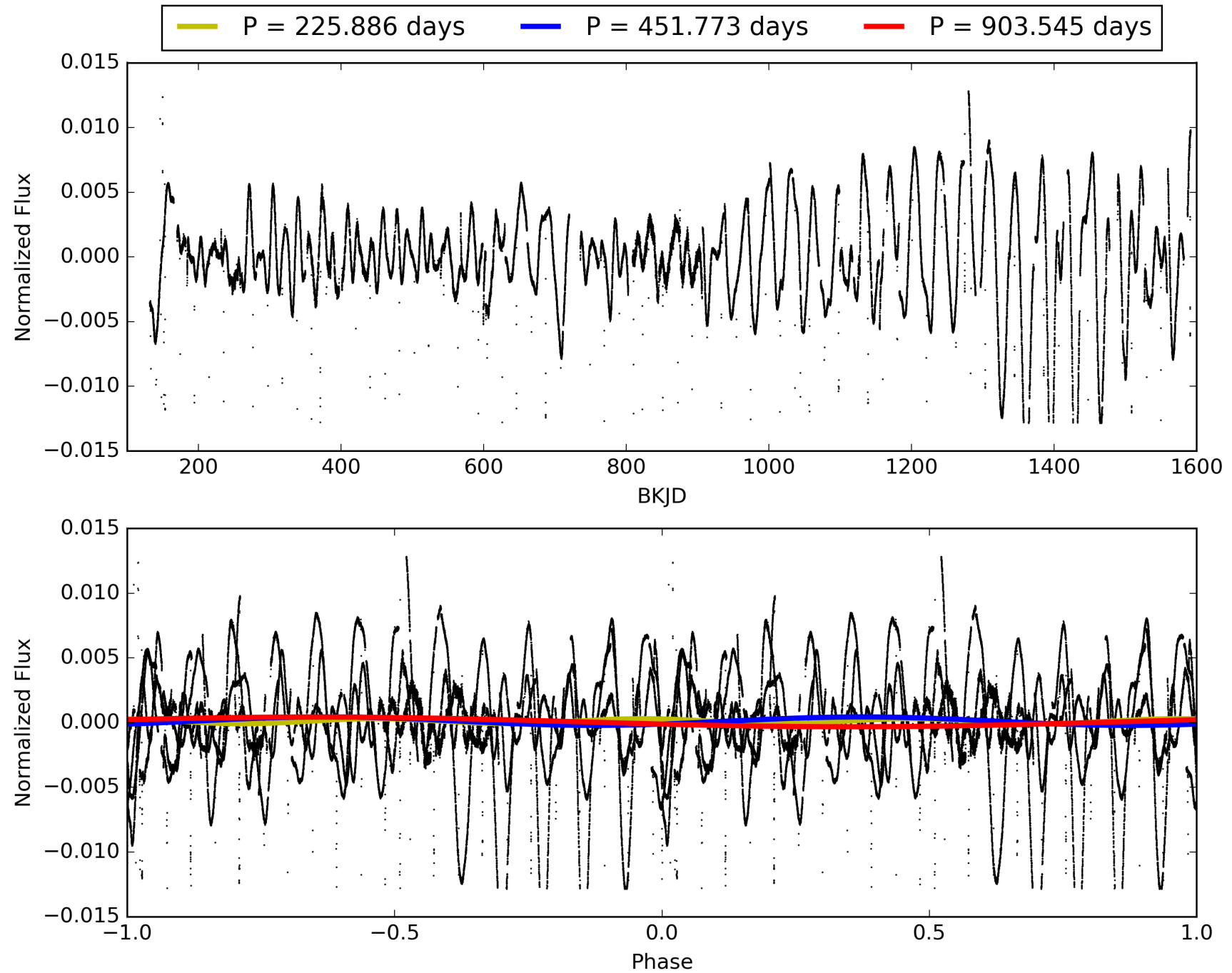
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [667.07σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 90.0%
ModelChiSquareGof-sig: 75.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 7.424
Centroid-sig: N/A
Centroid-so: 0.348 arcsec [21.42σ]
OotOffset-rm: 0.026 arcsec [0.38σ]
KicOffset-rm: 0.419 arcsec [4.48σ]
OotOffset-st: 1/1/1/1 [4]
KicOffset-st: 1/1/1/1 [4]
DiffImageQuality-fgm: 1.00 [4/4]
DiffImageOverlap-fno: 1.00 [4/4]

TCE 012644769-03, PDC Light Curves

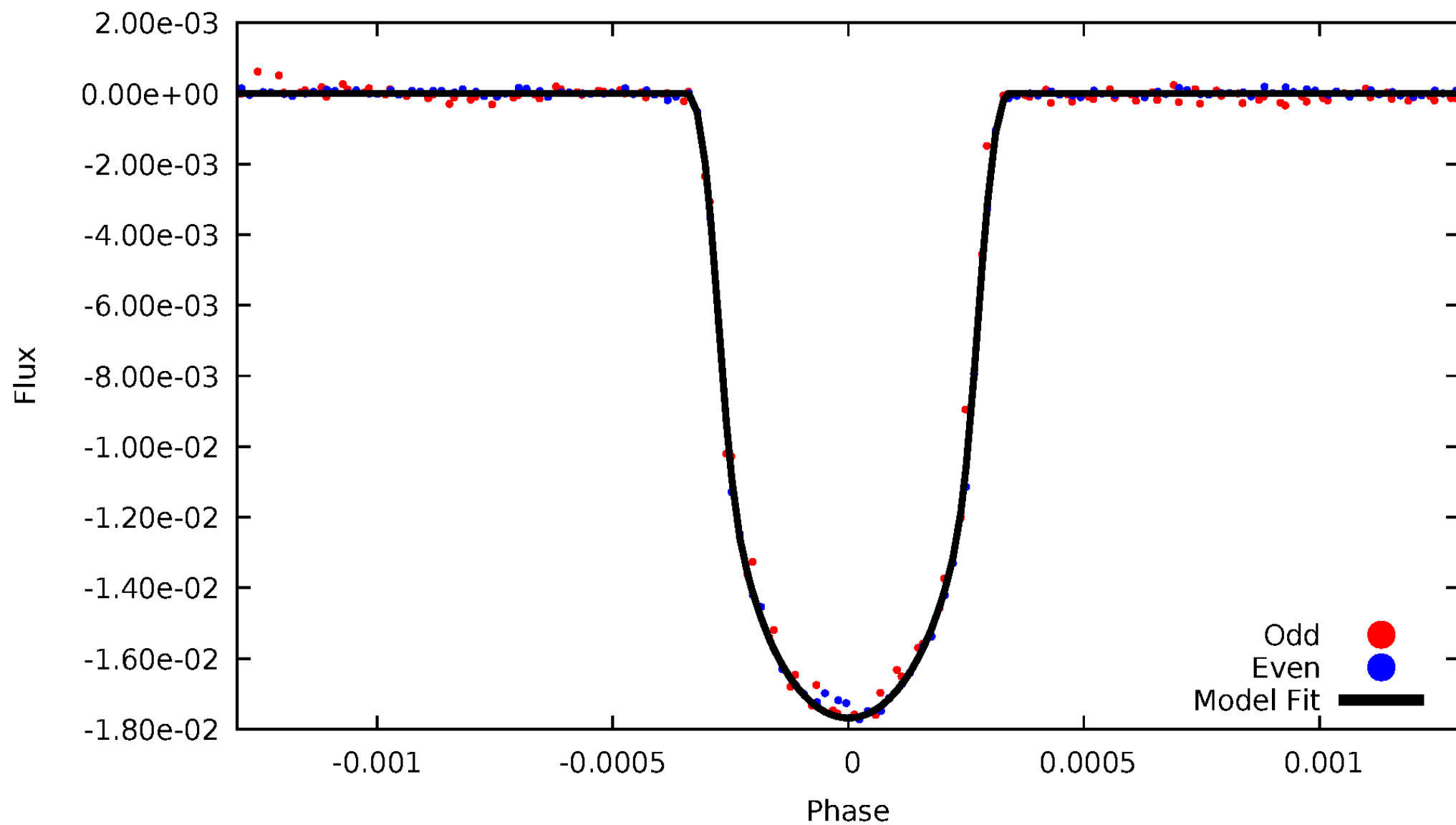


TCE 012644769-03



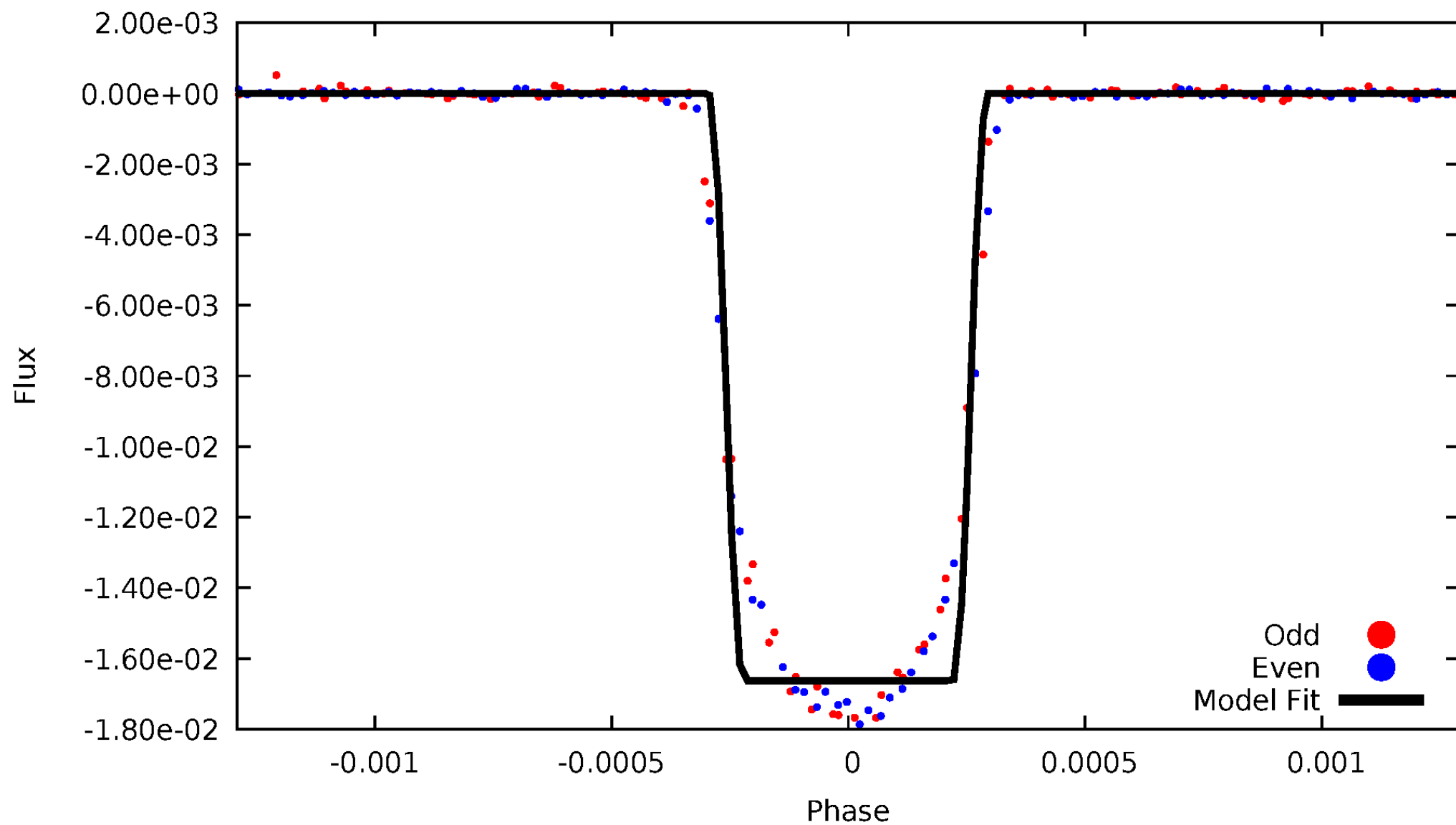
DV Odd/Even

TCE 012644769-03



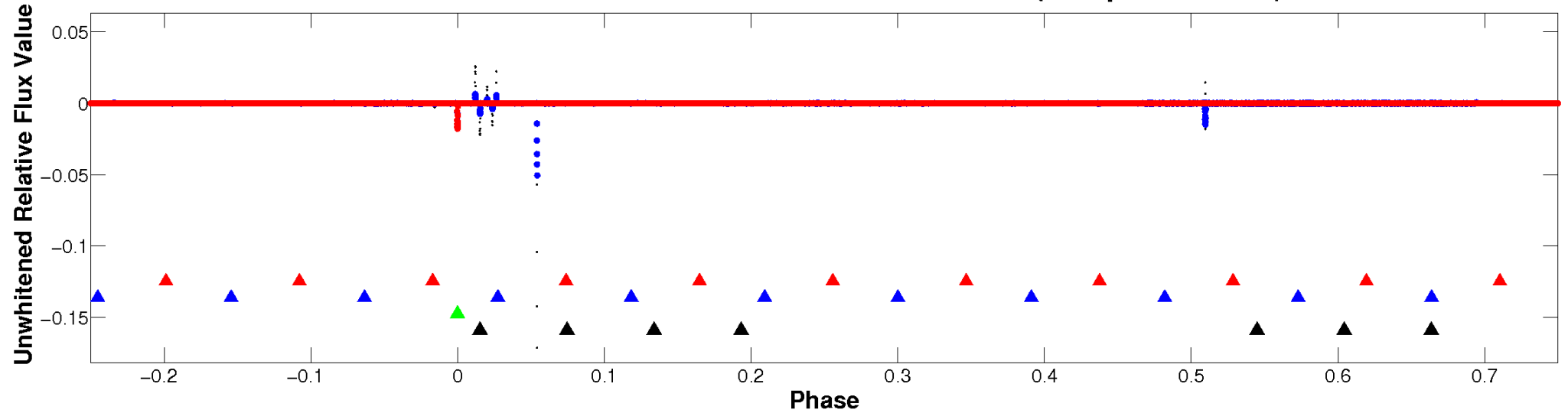
ALT Odd/Even

TCE 012644769-03

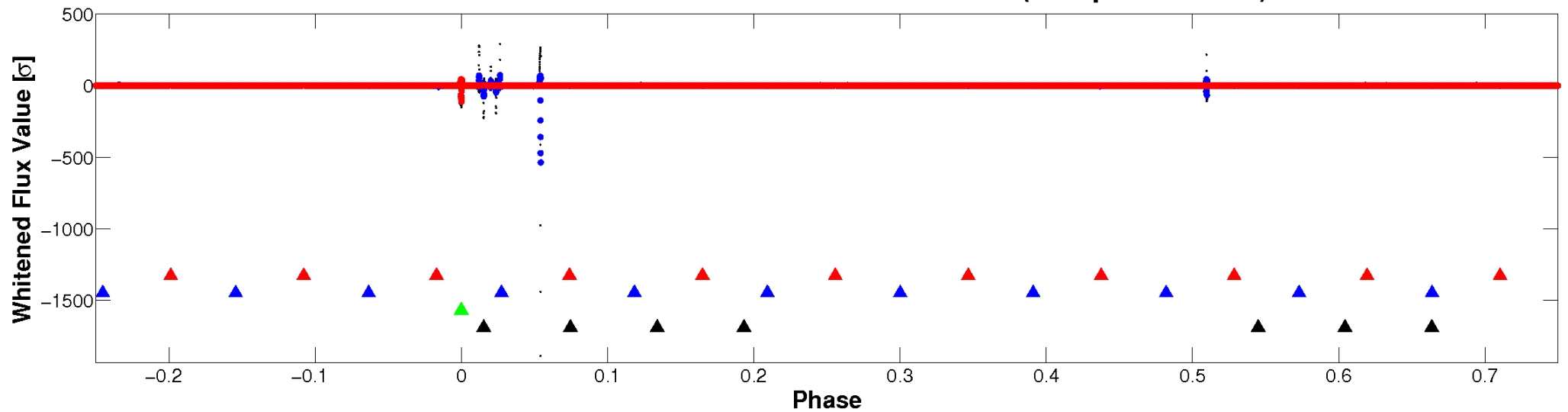


Non-Whitened Vs. Whitened Light Curve

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

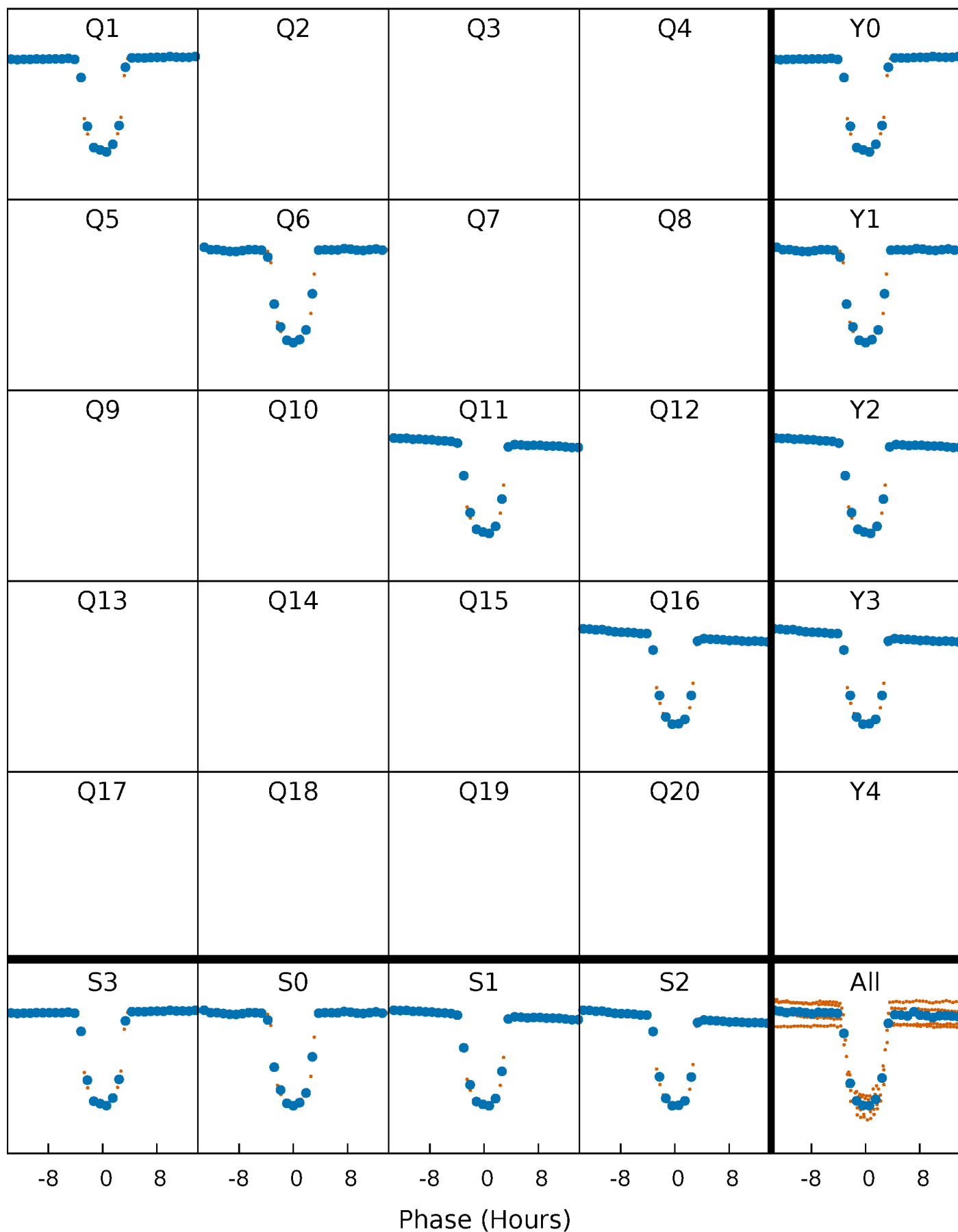


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



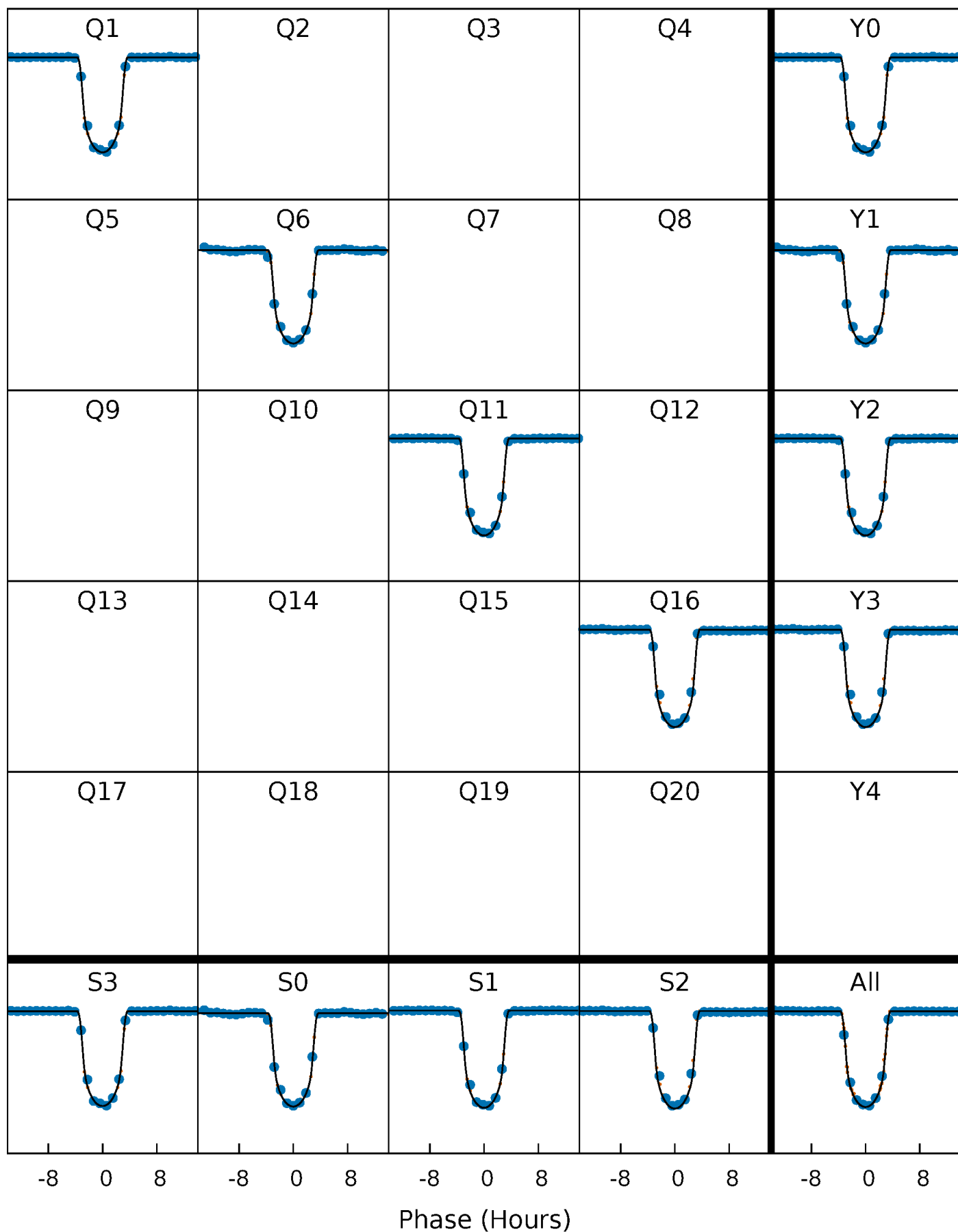
PDC Quarter-Phased Transit Curves

TCE 012644769-03 $P=451.772670$ Days $T_0=140.431046$ (BKJD)



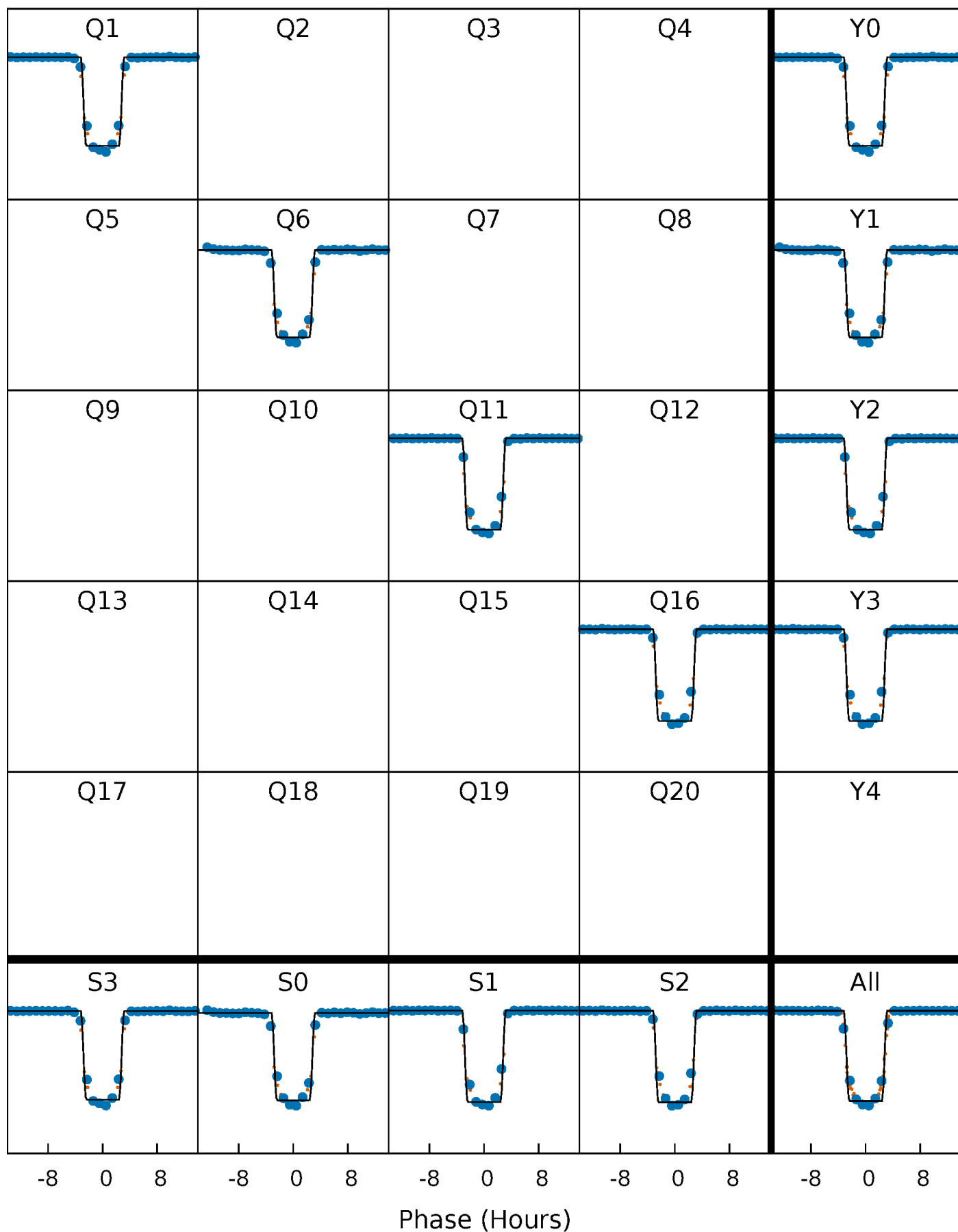
DV Quarter-Phased Transit Curves

TCE 012644769-03 P=451.772670 Days $T_0=140.431046$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

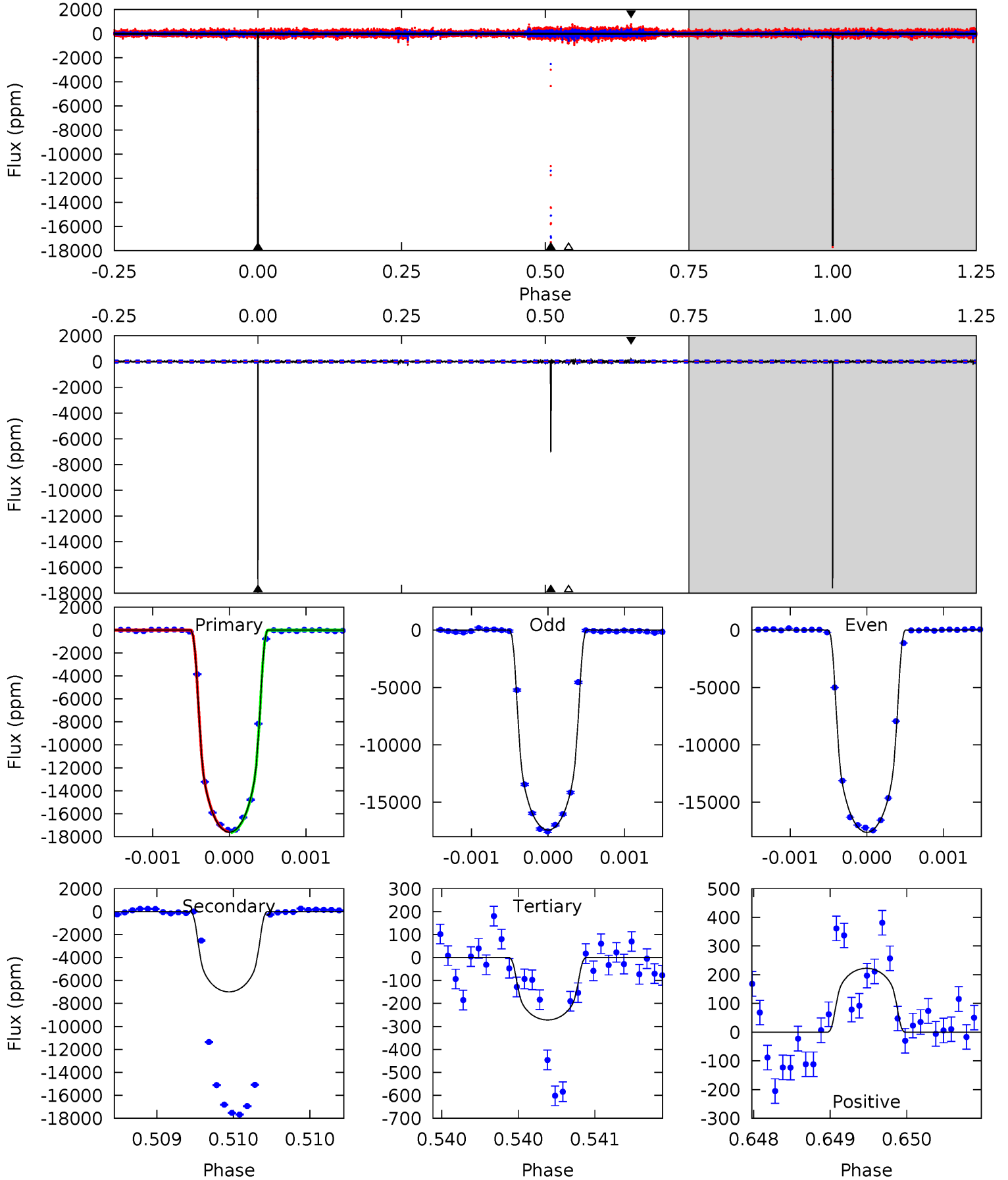
TCE 012644769-03 P=451.772389 Days $T_0=140.431030$ (BKJD)



DV Model-Shift Uniqueness Test

012644769-03, P = 451.772670 Days, E = 140.431046 Days

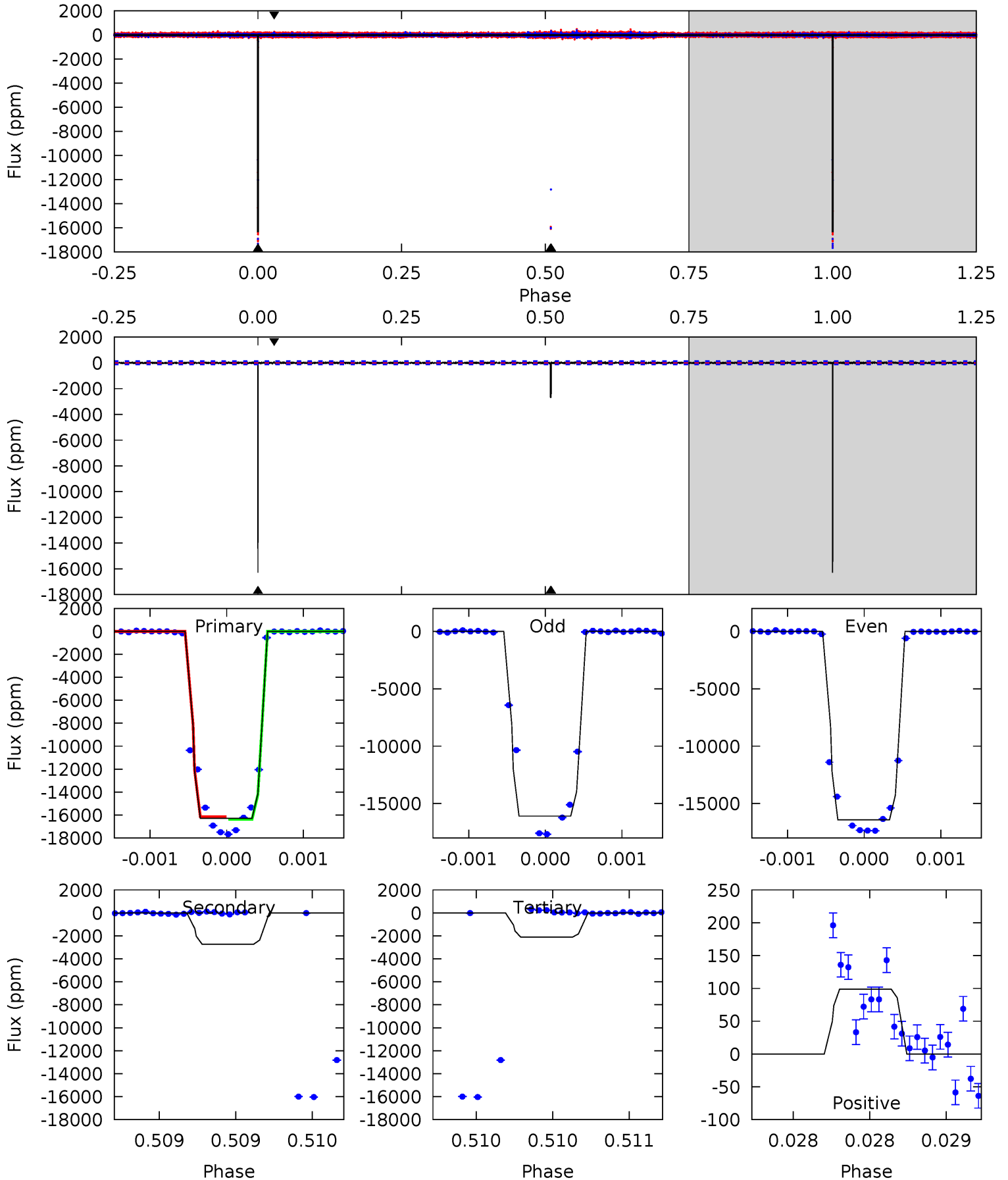
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1071	425.2	16.5	13.5	5.52	3.40	2.29	1054	1057	408.7	411.7	5.75	0.99	0.01	0.99



Alt Model-Shift Uniqueness Test

012644769-03, P = 451.772389 Days, E = 140.431030 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
762.7	127.5	98.8	4.62	5.55	3.44	1.65	663.9	758.1	28.7	122.9	7.87	1.00	0.01	3.82



Stellar Parameters For KIC 012644769

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4451^{+89}_{-89}	$4.654^{+0.022}_{-0.022}$	$-0.300^{+0.150}_{-0.150}$	$0.620^{+0.027}_{-0.025}$	$0.633^{+0.033}_{-0.030}$	$3.740^{+0.362}_{-0.331}$
	+2%/-2%	+0%/-0%	+50%/-50%	+4%/-4%	+5%/-5%	+10%/-9%
Source	SPE28	TRA28	SPE28	DSEP		

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

Secondary Eclipse Parameters for KIC 012644769-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-6994 ± 16	$8.13^{+0.21}_{-0.20}$	217^{+5}_{-5}	3907^{+70}_{-69}	57494^{+2029}_{-1999}
Alt.	-2724 ± 21	$8.75^{+0.23}_{-0.22}$	217^{+5}_{-5}	3272^{+52}_{-52}	19277^{+696}_{-702}

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

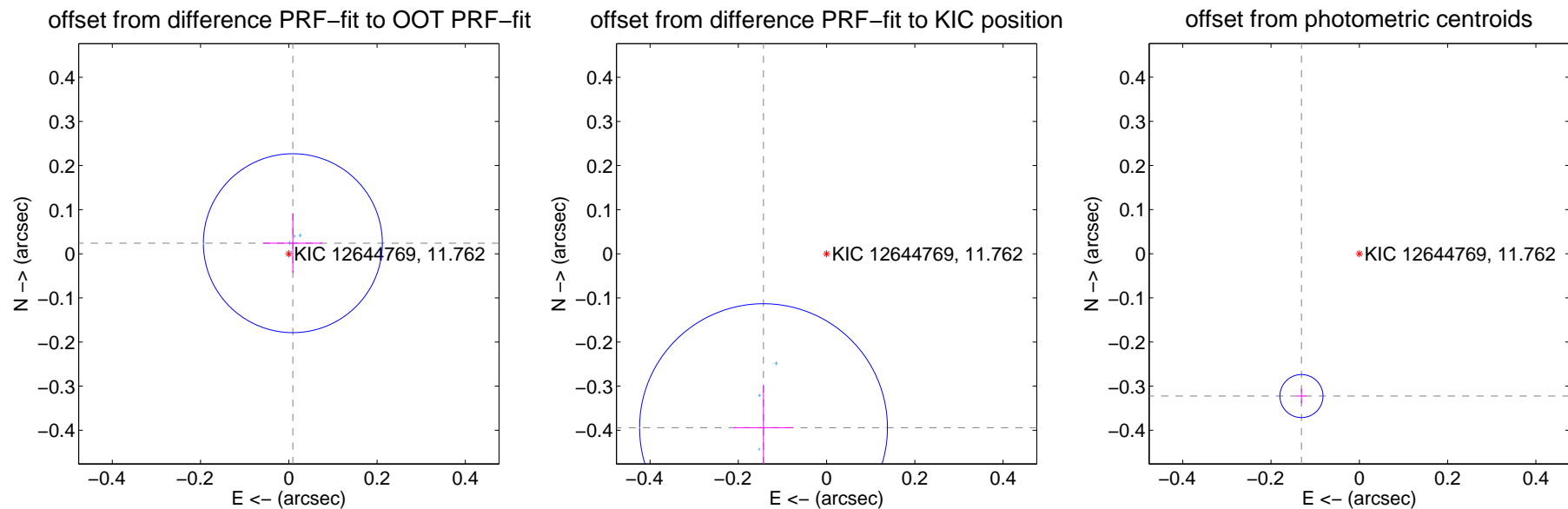
DV Centroid Data

Supplemental centroid analysis for 012644769-03. **Kepler magnitude: 11.76**. Transit SNR 609.81

There are 4 quarters with good PRF difference image offsets

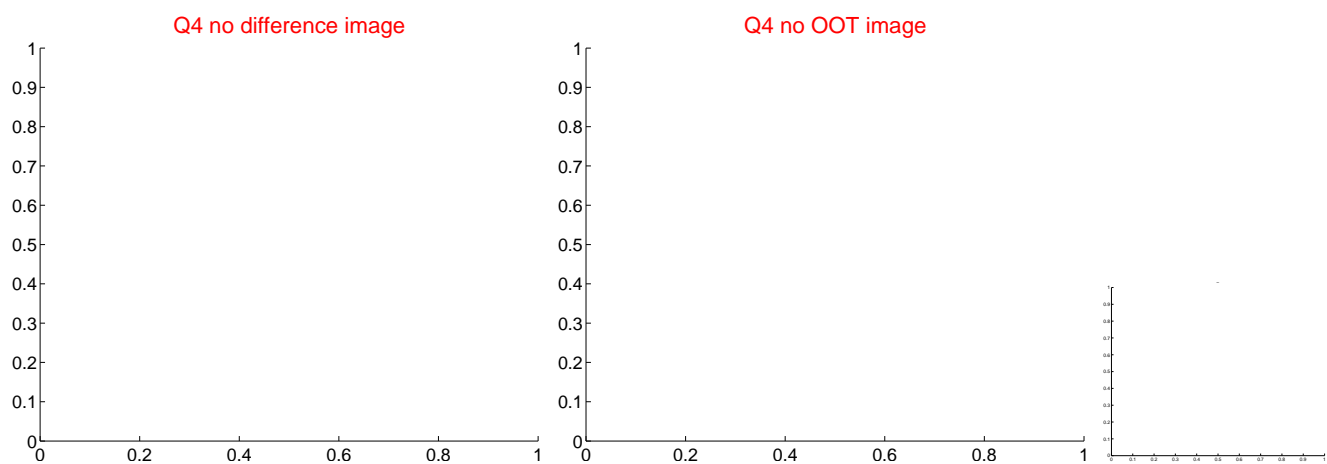
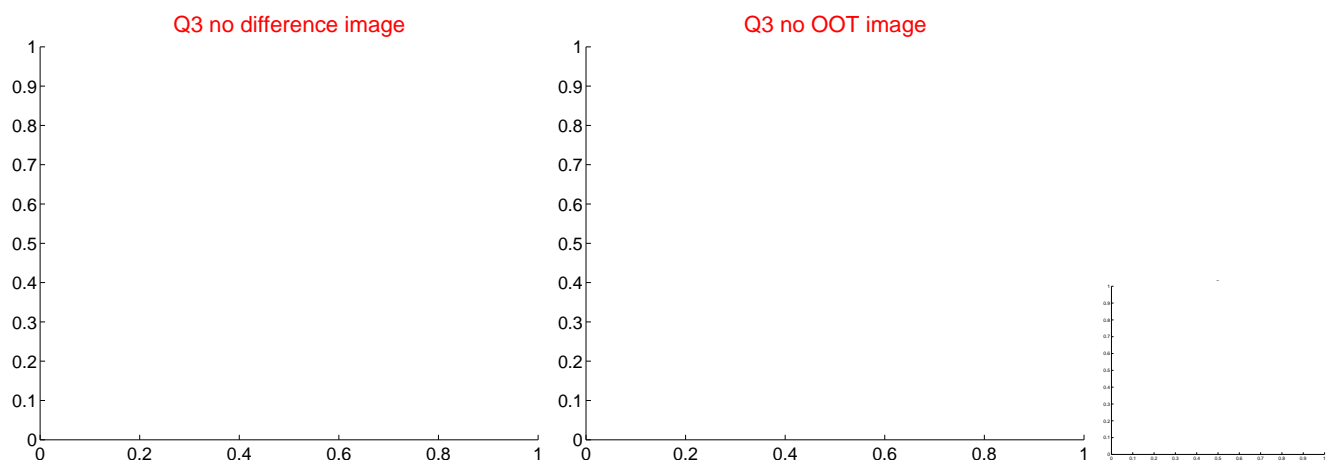
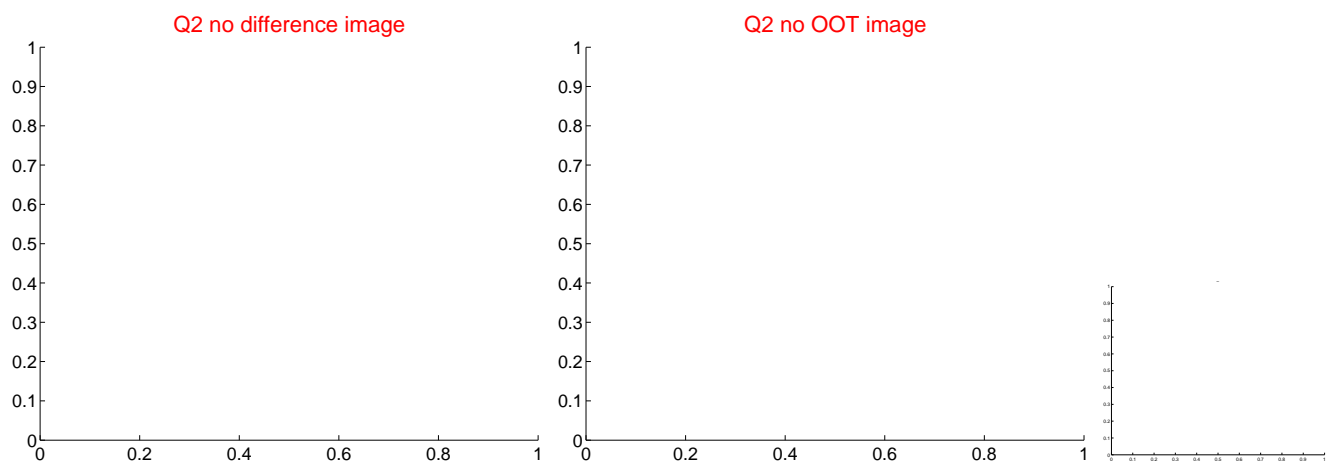
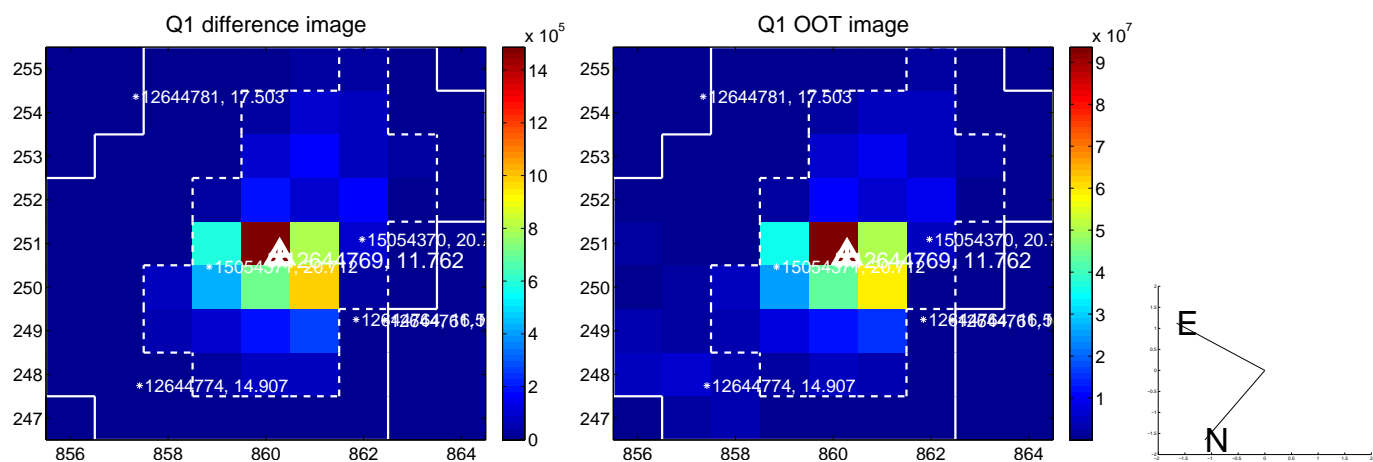
The direct PRF centroid is offset from the target star catalog position by about 0.61 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.026 ± 0.068	0.38	-0.009 ± 0.067	0.024 ± 0.068
PRF-fit source offset from KIC position	0.419 ± 0.094	4.48	0.143 ± 0.067	-0.394 ± 0.097
photometric centroid source offset	0.35 ± 0.02	21.42	0.13 ± 0.01	-0.32 ± 0.02

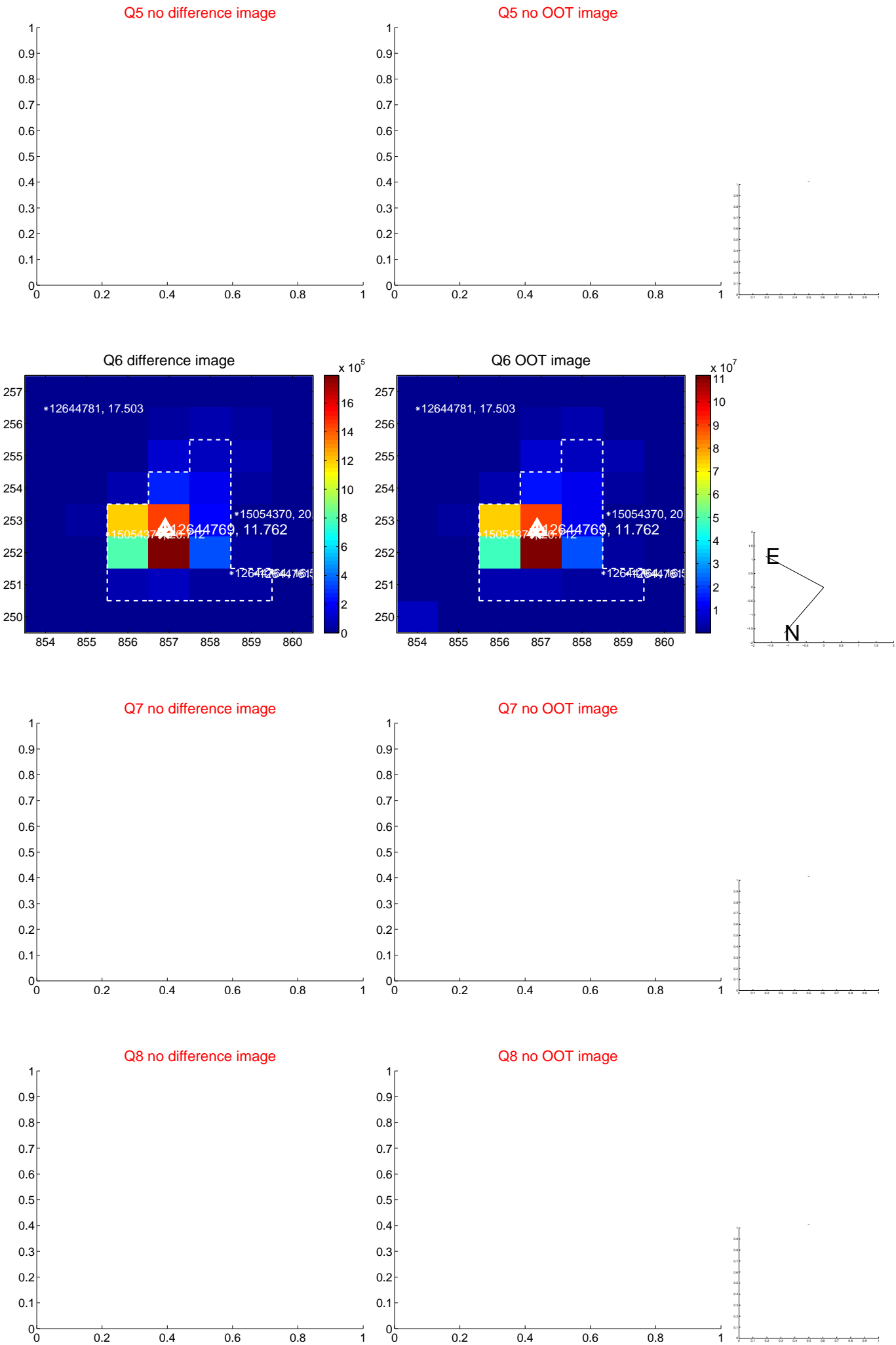


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

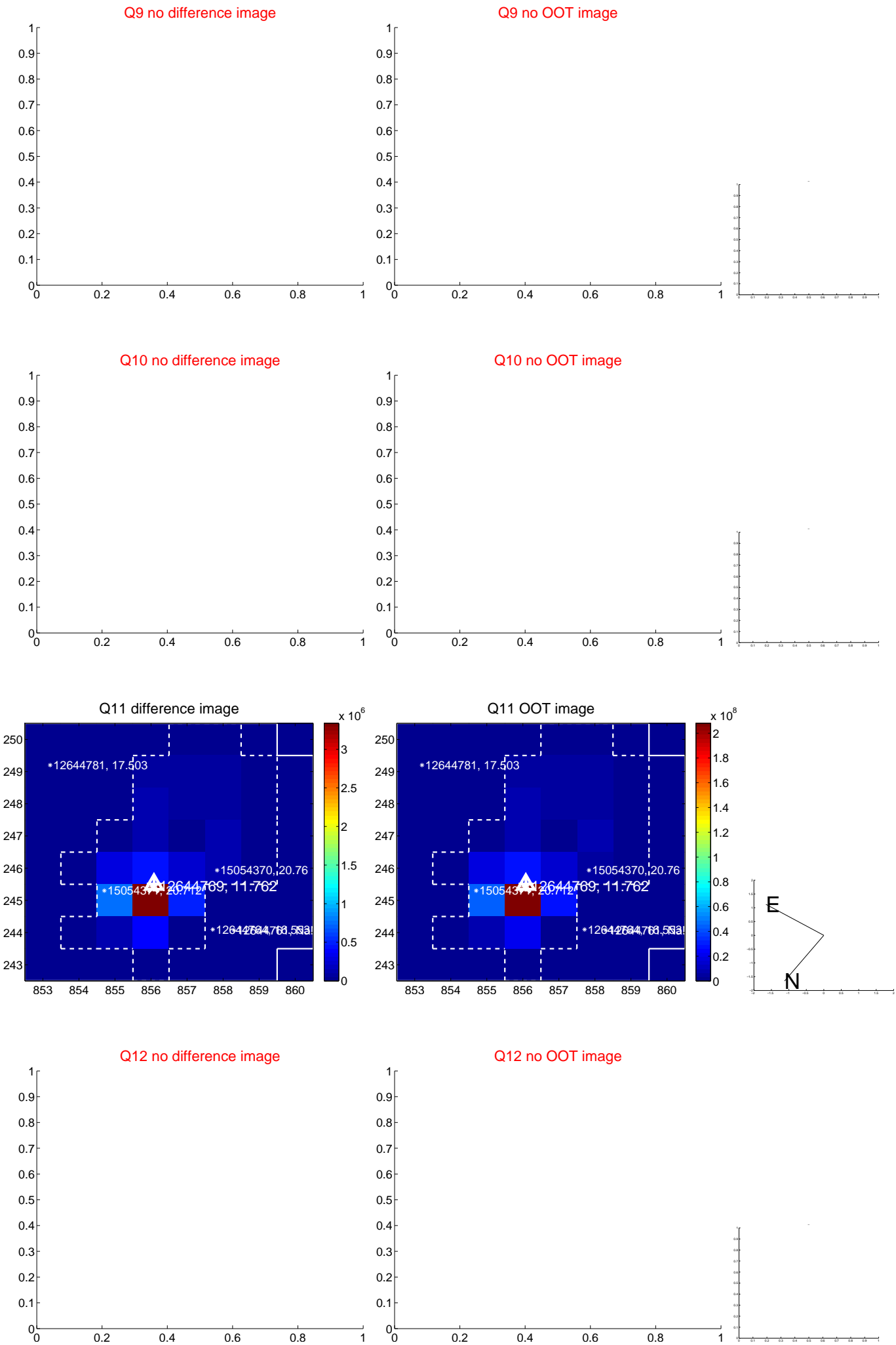
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



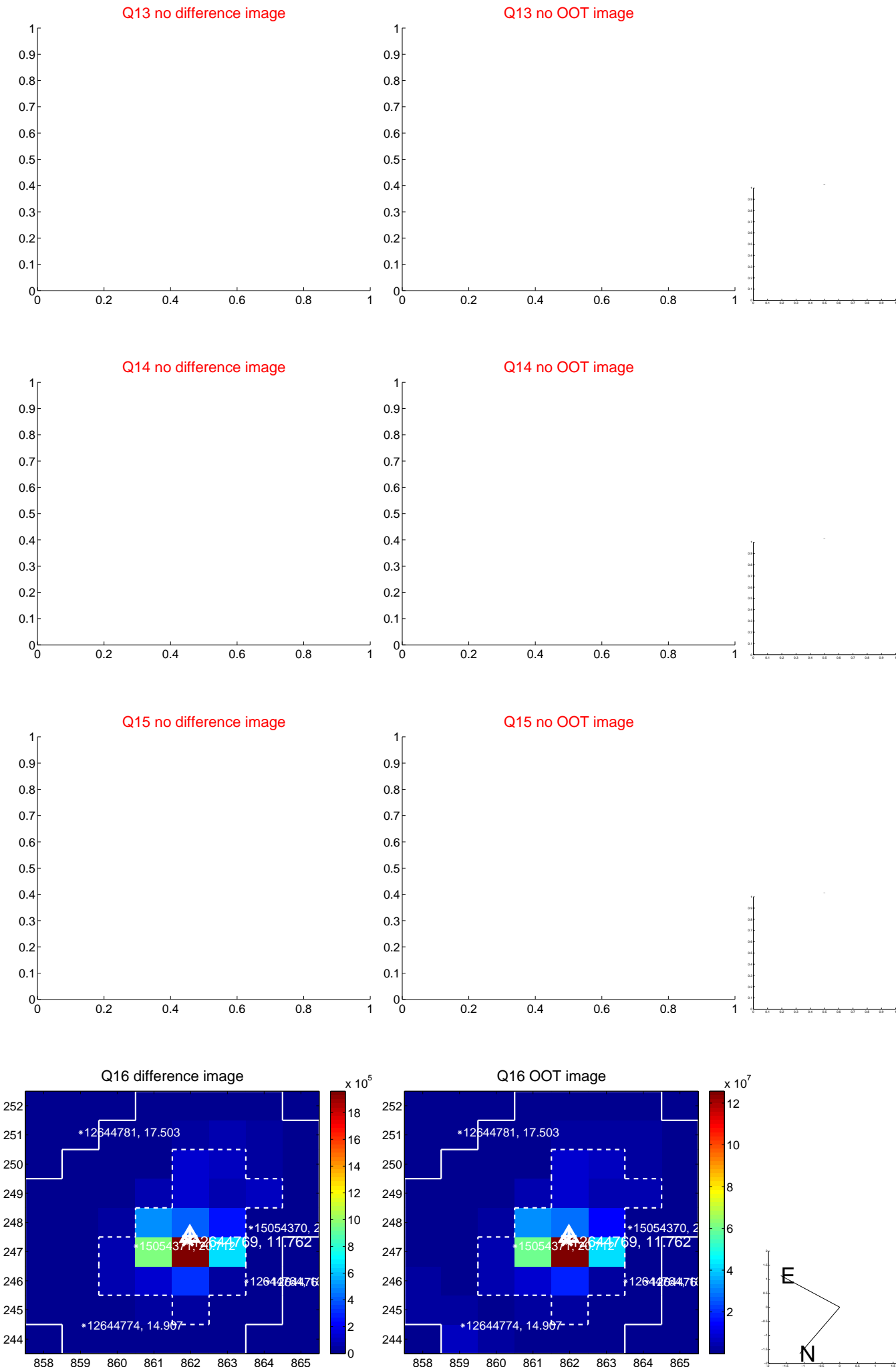
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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.



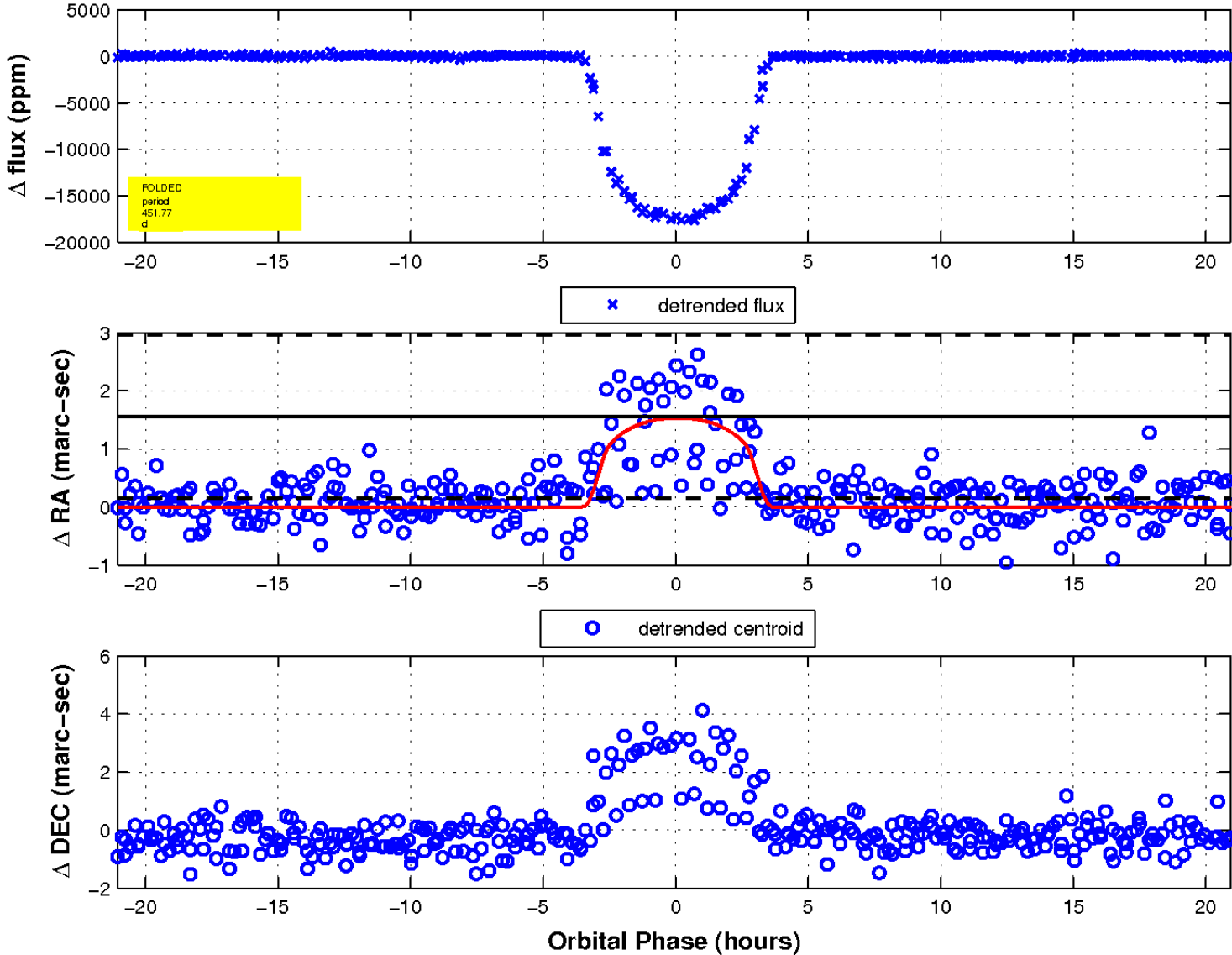
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

Q17 no difference image

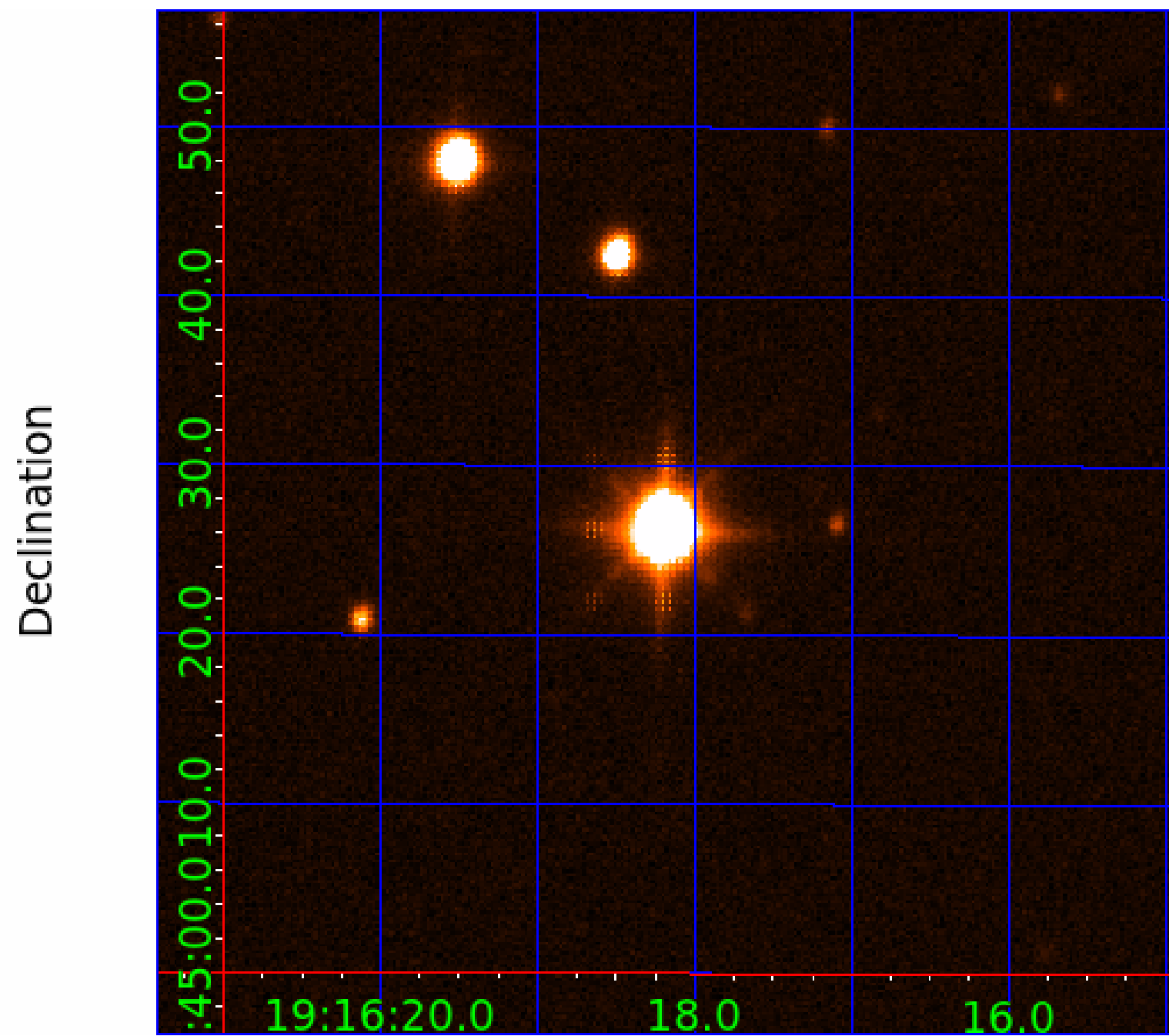
Q17 no OOT image



fluxWeightedCentroids, Planet 3 of 4



UKIRT Image



KIC 012644769

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})
012644769-01	OBS	1611.01	41.077595	132.658196	134509.7	6.202	14980.5	9694.4	0.62	4451	23.32	3.38
012644769-02	OBS	No	41.077785	152.717254	15922.3	4.577	1778.6	1072.7	0.62	4451	8.56	3.38
012644769-03	OBS	No	451.772670	140.431046	17681.6	7.032	725.1	609.8	0.62	4451	8.12	0.14
012644769-04	OBS	No	239.288871	147.350781	16458.0	3.000	473.1	-1.0	0.62	4451	7.68	0.32

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012644769-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_KIC_POS
012644769-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_KIC_POS
012644769-03	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—PERIOD_ALIAS_ALT—CENT_KIC_POS
012644769-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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 012644769-04

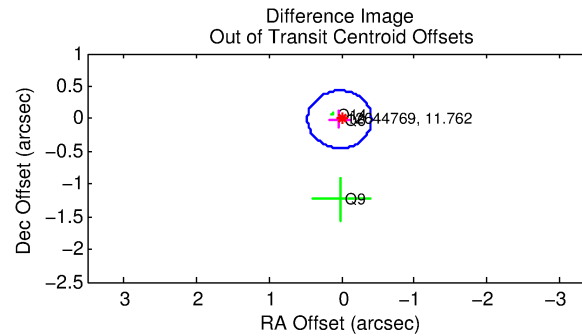
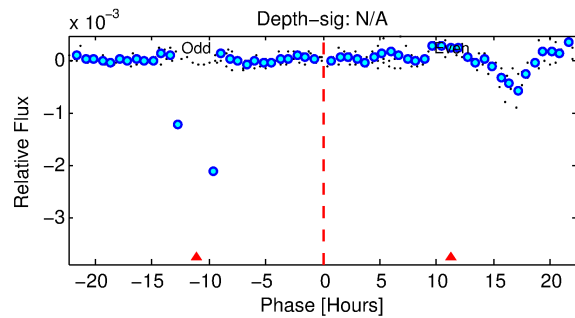
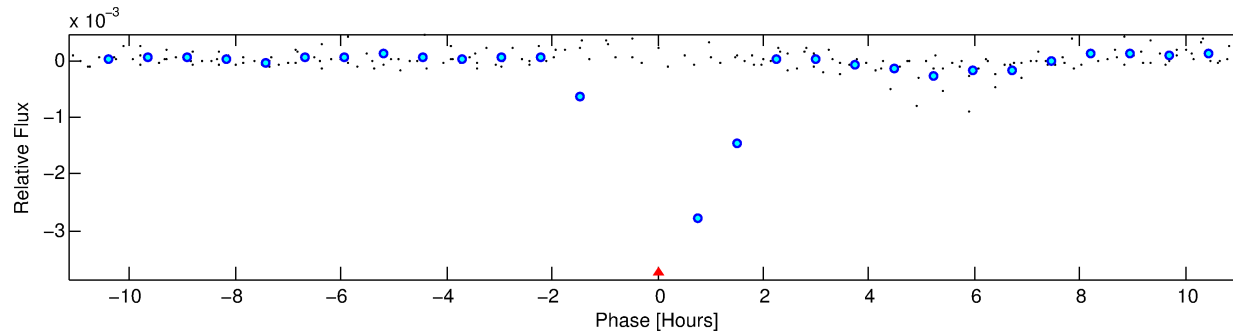
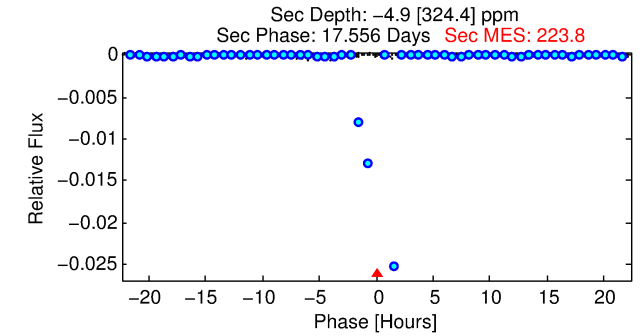
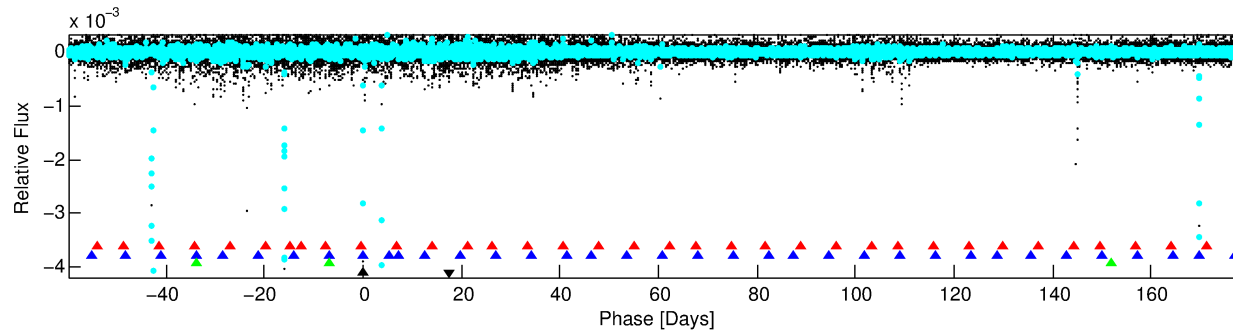
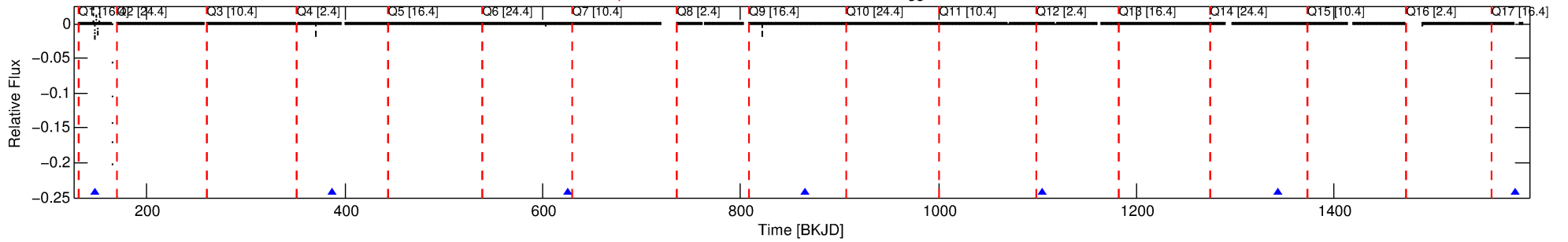
No Significant Match Found

DV One-Page Summary

KIC: 12644769 Candidate: 4 of 4 Period: 239.289 d

KOI: K01611 Corr: No Ephemeris Match

Kp: 11.76 R*: 0.62 Rs Teff: 4451.0 K Logg: 4.65 Fe/H: -0.300



TPS TCE Results:

Period = 239.28887 d
Epoch = 147.3508 BKJD

DV fit results are unavailable

DV Diagnostic Results:

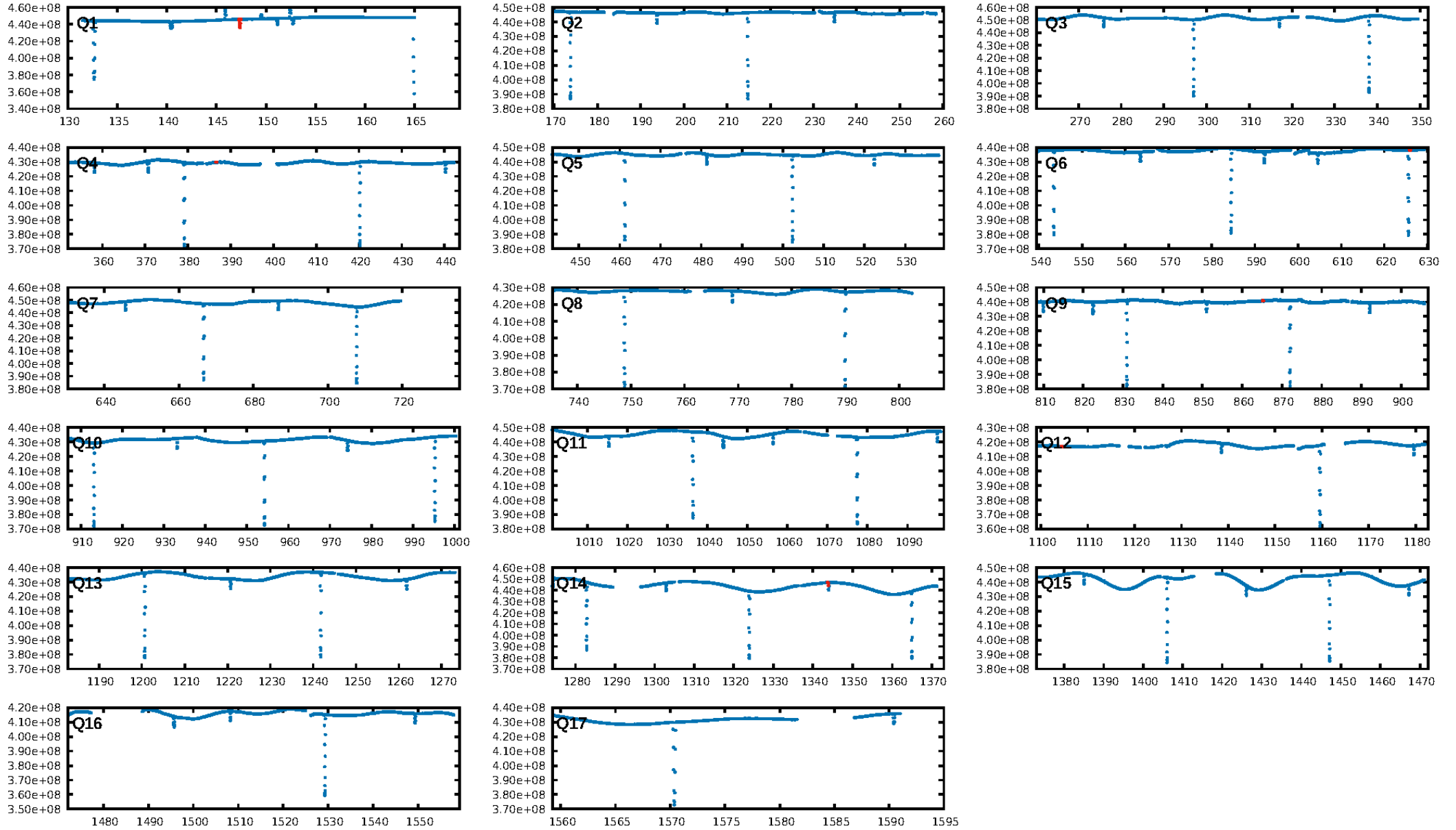
ShortPeriod-sig: 100.0% [869.24 σ]
LongPeriod-sig: 100.0% [667.07 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 0.4864

Centroid-sig: N/A
Centroid-so: 0.254 arcsec [3.88 σ]
OotOffset-rm: 0.028 arcsec [0.19 σ]
KicOffset-rm: 0.535 arcsec [1.81 σ]
OotOffset-st: 2/0/0/1 [3]
KicOffset-st: 2/0/0/1 [3]
DiffImageQuality-fgm: 0.00 [0/3]
DiffImageOverlap-fno: 0.60 [3/5]

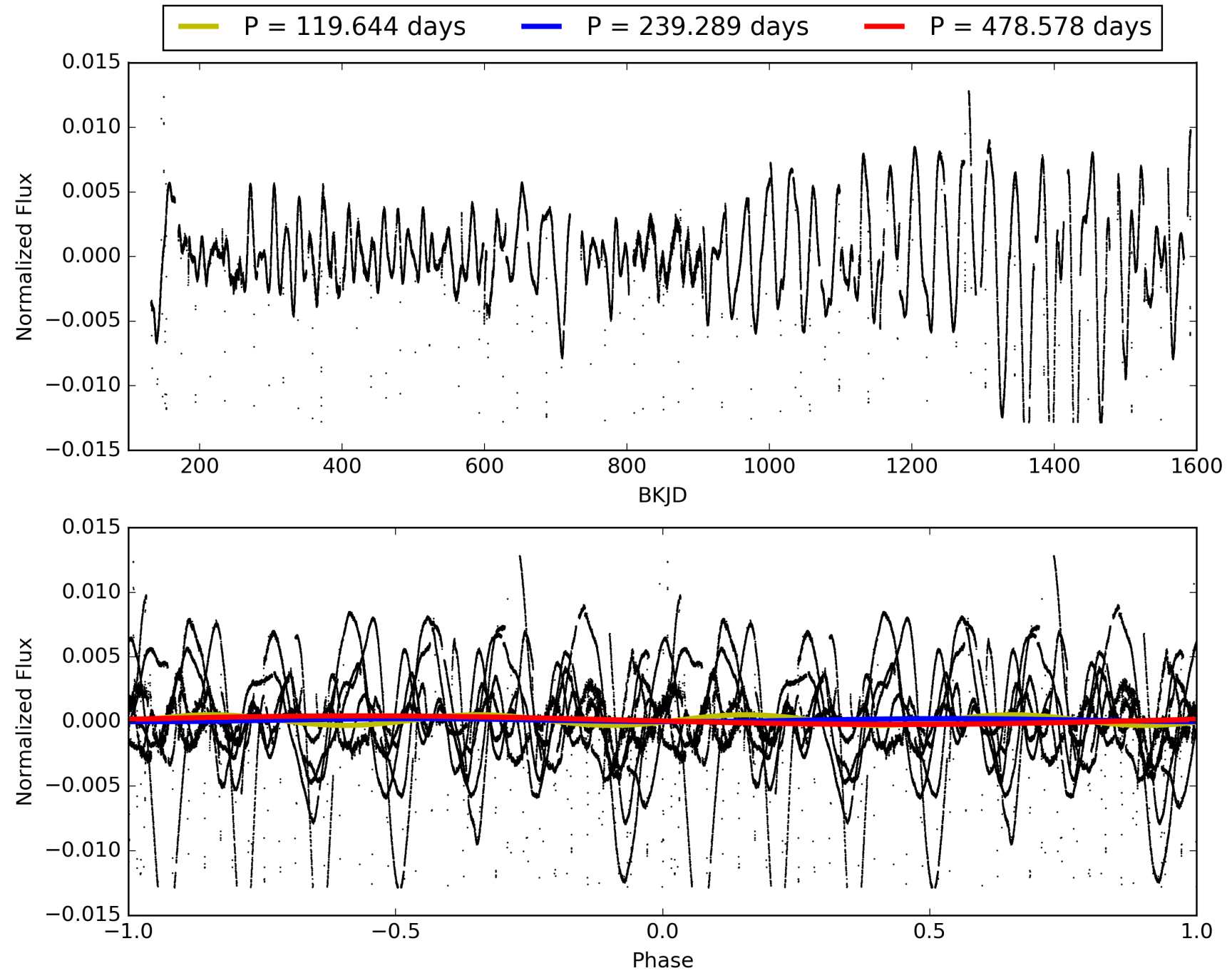
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:39:59 Z

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

TCE 012644769-04, PDC Light Curves

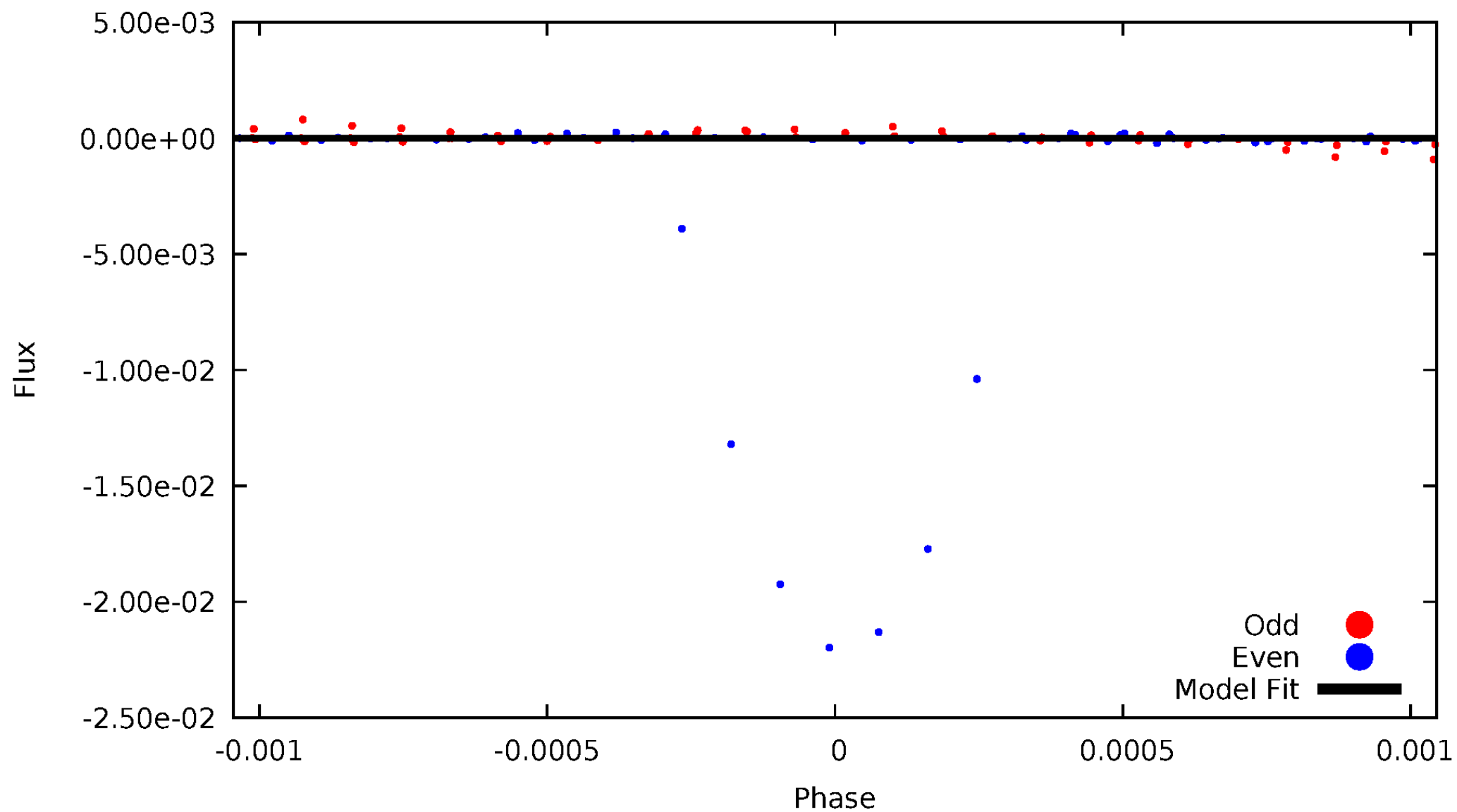


TCE 012644769-04



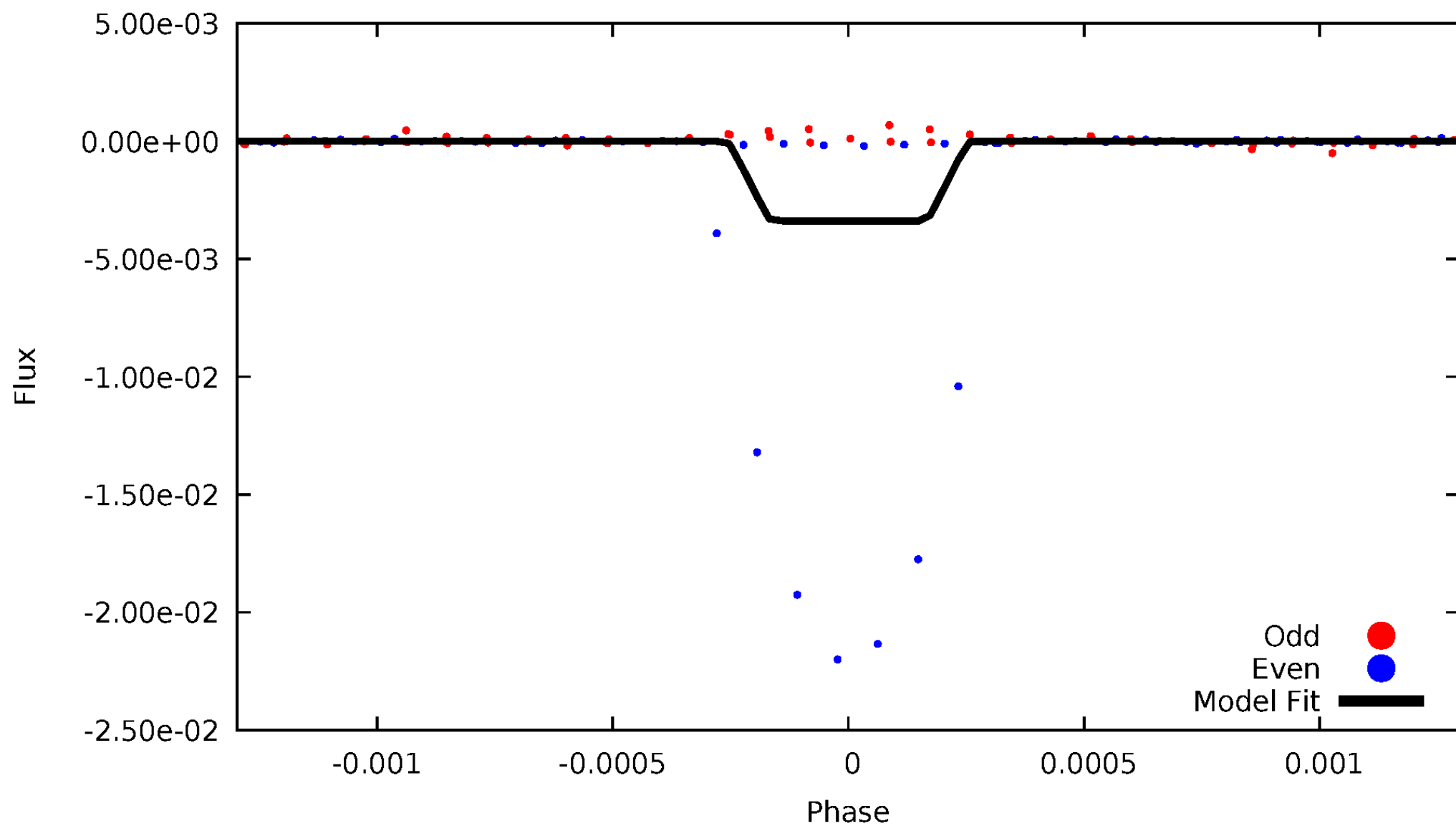
DV Odd/Even

TCE 012644769-04



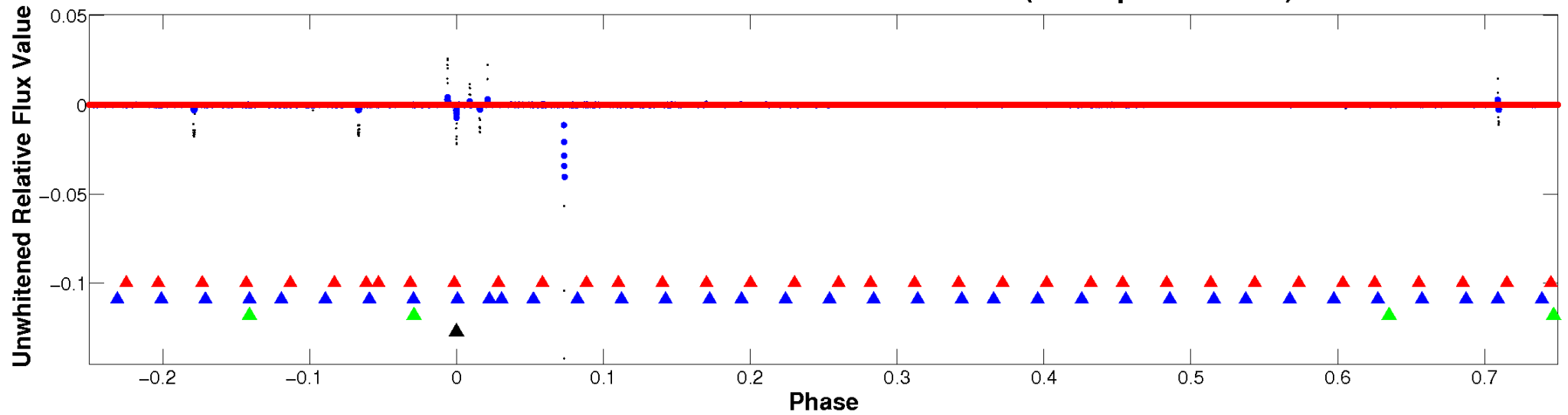
ALT Odd/Even

TCE 012644769-04



Non-Whitened Vs. Whitened Light Curve

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

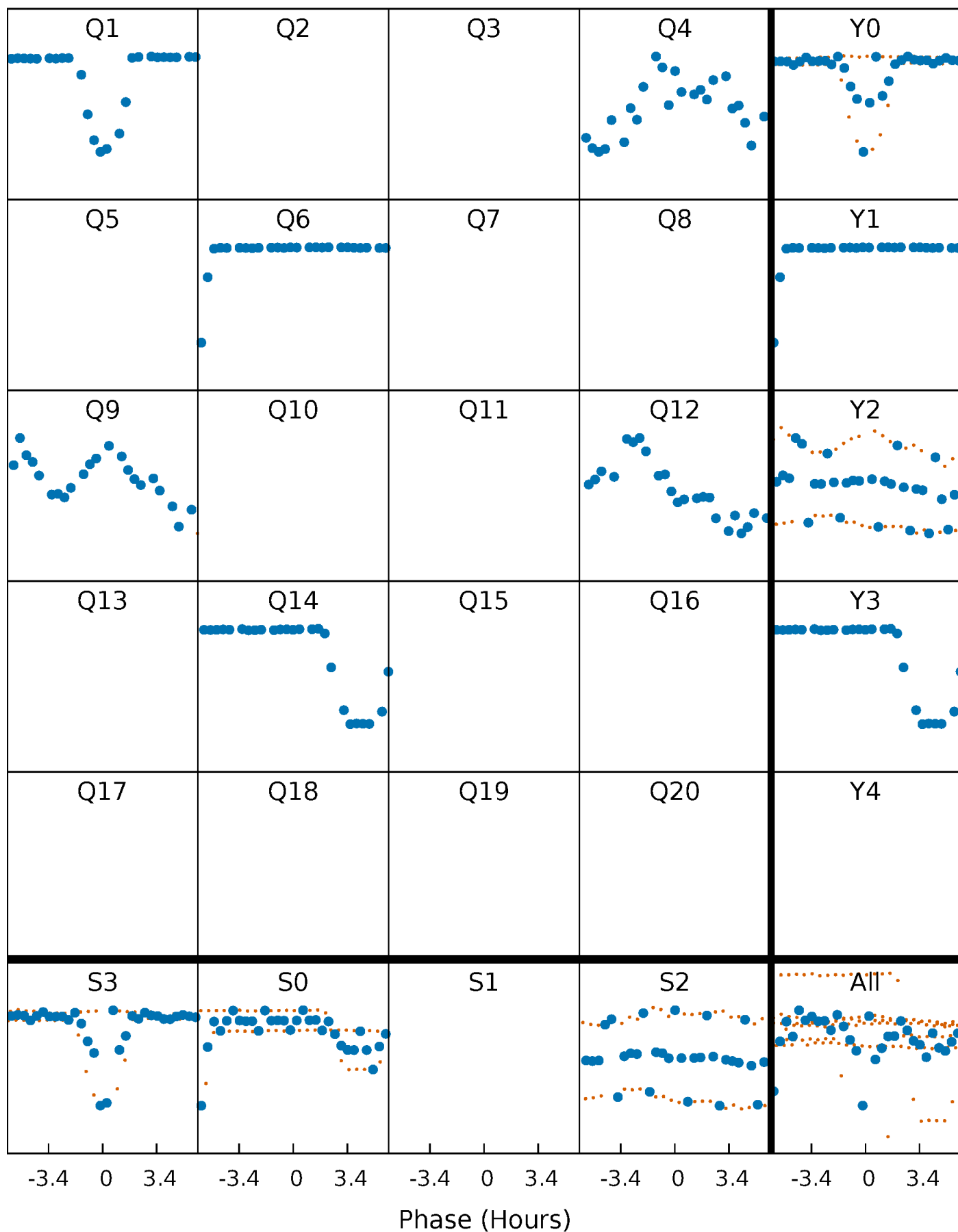


Planet 4 : Phased Whitened Flux Time Series (TPS Epoch/Period)



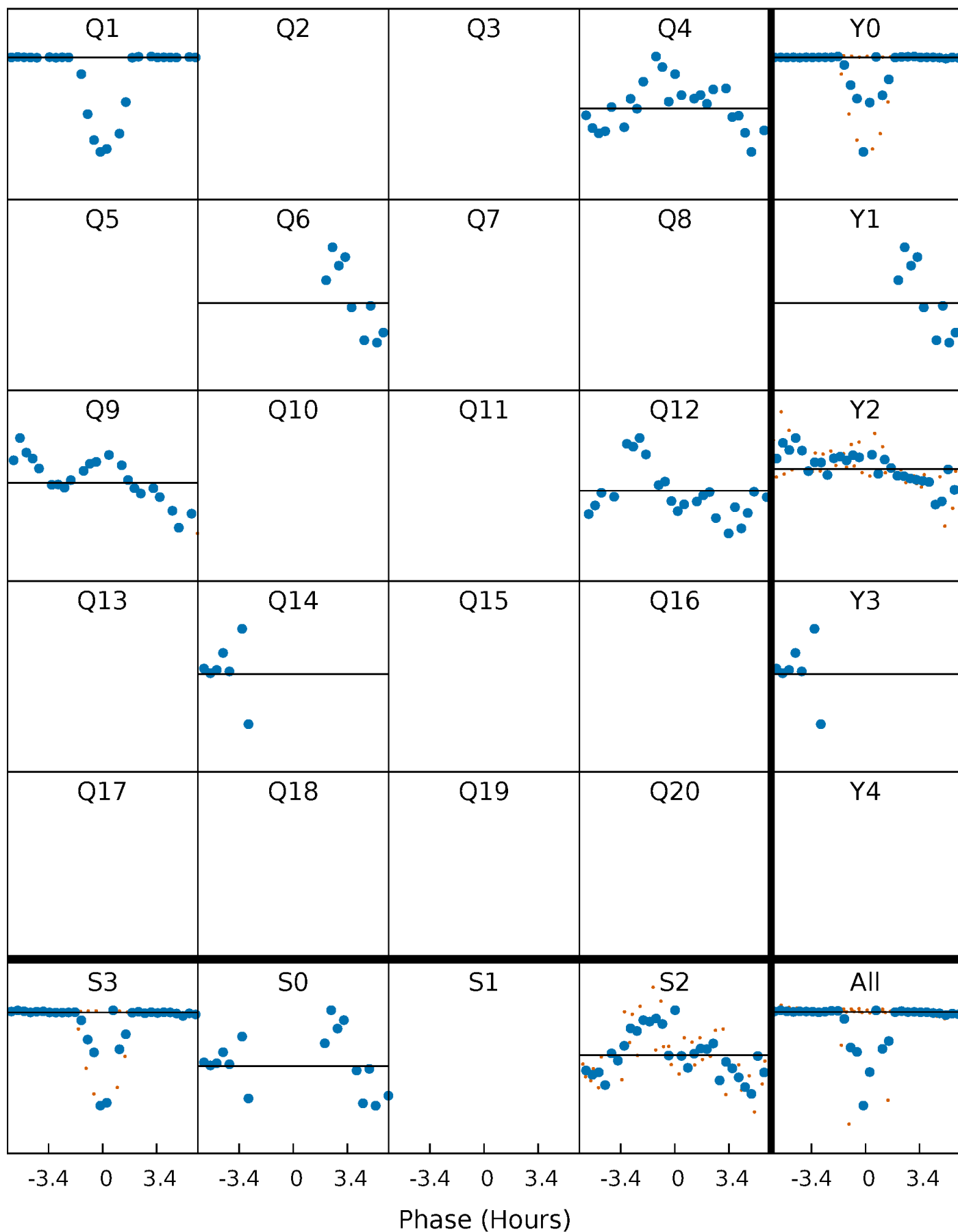
PDC Quarter-Phased Transit Curves

TCE 012644769-04 P=239.288871 Days $T_0=147.350781$ (BKJD)



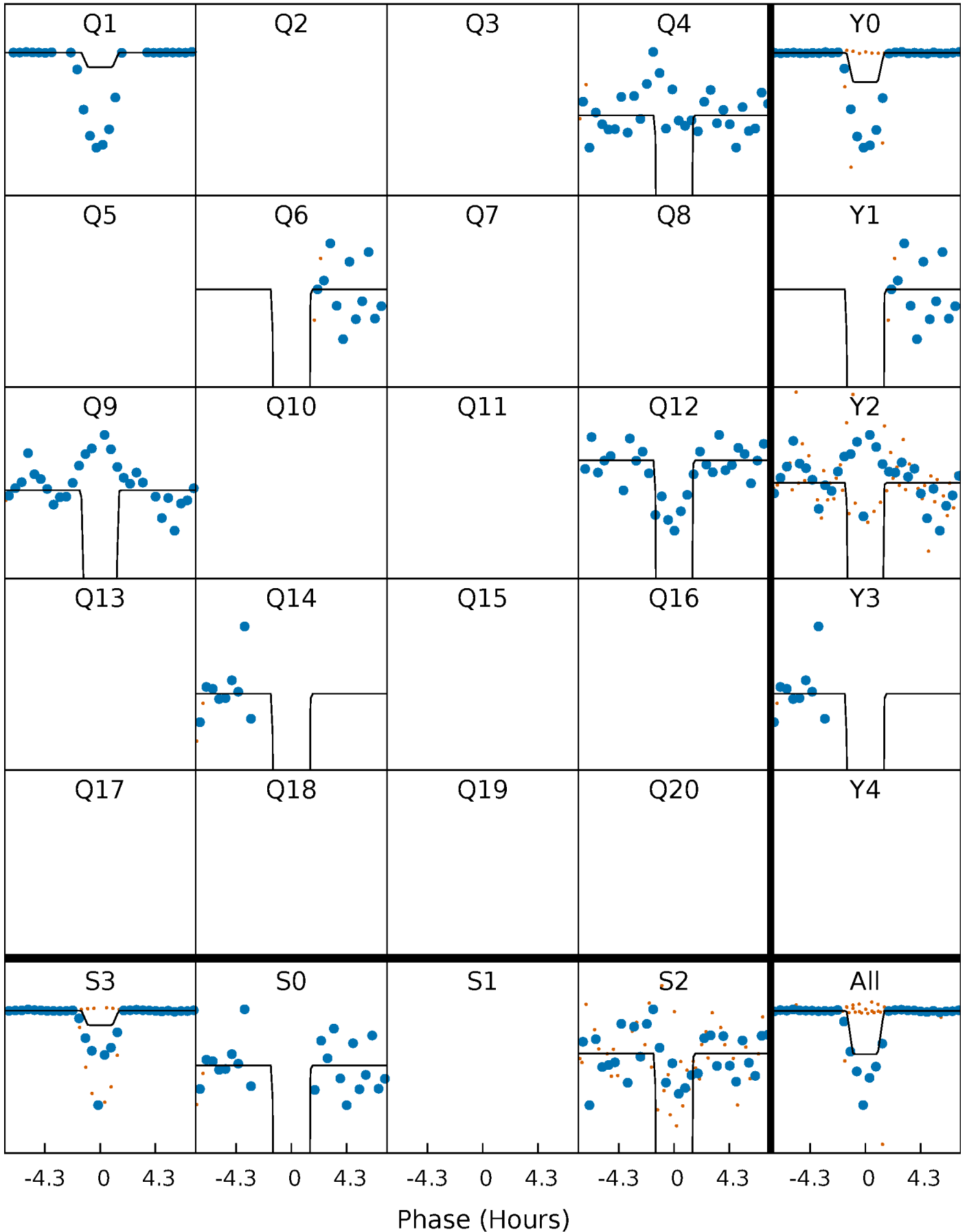
DV Quarter-Phased Transit Curves

TCE 012644769-04 P=239.288871 Days $T_0=147.350781$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

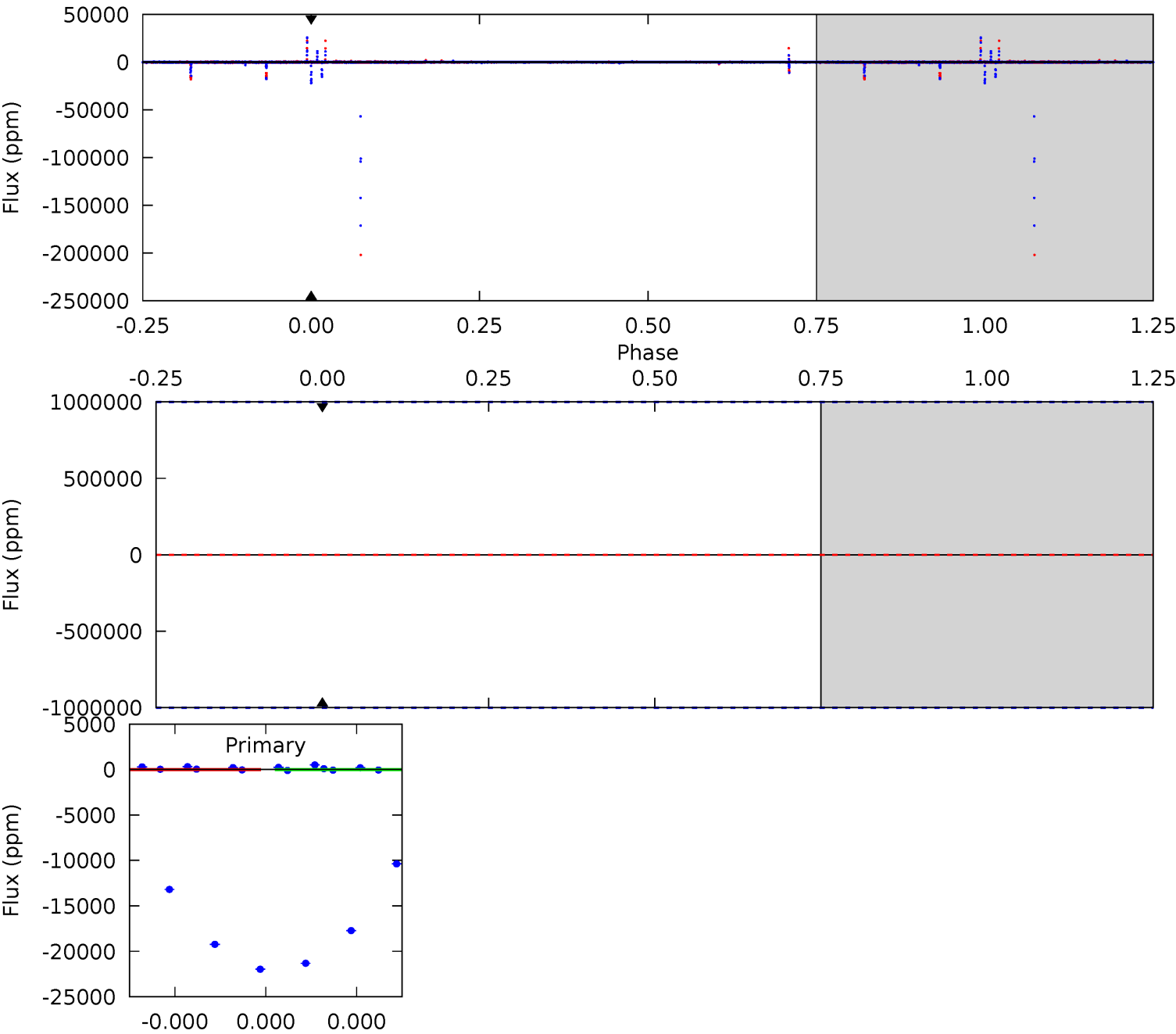
TCE 012644769-04 P=239.288871 Days $T_0=147.354008$ (BKJD)



DV Model-Shift Uniqueness Test

012644769-04, P = 239.288871 Days, E = 147.350781 Days

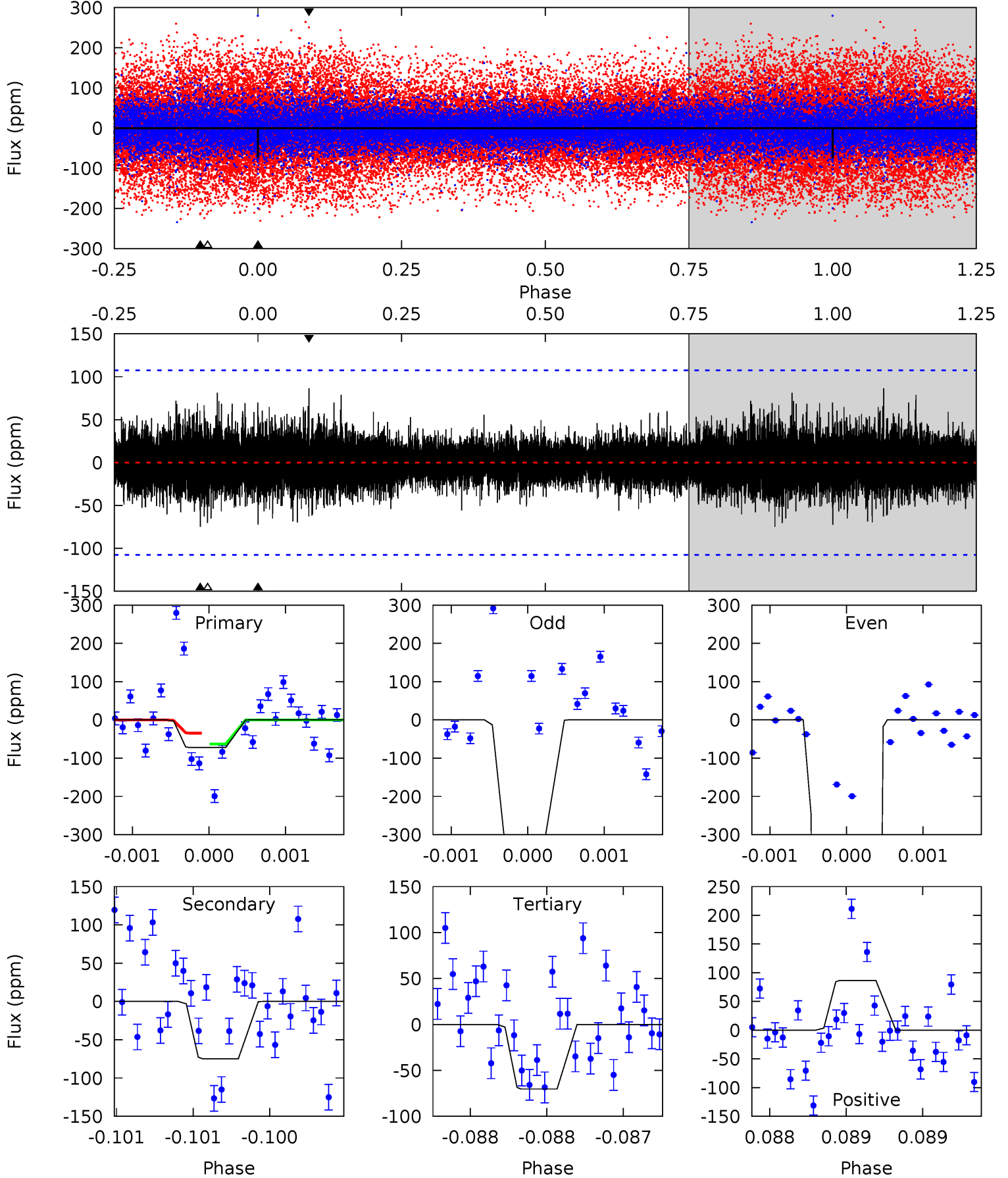
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

012644769-04, P = 239.288871 Days, E = 147.354008 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.74	3.86	3.64	4.48	5.56	3.46	0.81	0.11	-0.74	0.23	-0.61	149.2	79.7	0.54	0



Stellar Parameters For KIC 012644769

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	4451^{+89}_{-89}	$4.654^{+0.022}_{-0.022}$	$-0.300^{+0.150}_{-0.150}$	$0.620^{+0.027}_{-0.025}$	$0.633^{+0.033}_{-0.030}$	$3.740^{+0.362}_{-0.331}$
	+2%/-2%	+0%/-0%	+50%/-50%	+4%/-4%	+5%/-5%	+10%/-9%
Source	SPE28	TRA28	SPE28	DSEP		

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

Secondary Eclipse Parameters for KIC 012644769-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	0 ± 1000000	$8.75^{+6.06}_{-5.24}$	268^{+6}_{-6}	-3168^{+10632}_{-4230}	$-6831.352^{+426957.193}_{-421447.828}$
Alt.	-75 ± 19	$6.82^{+5.68}_{-4.53}$	268^{+6}_{-6}	2187^{+627}_{-273}	357^{+2424}_{-256}

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 $A_{obs} \gg 1.0$

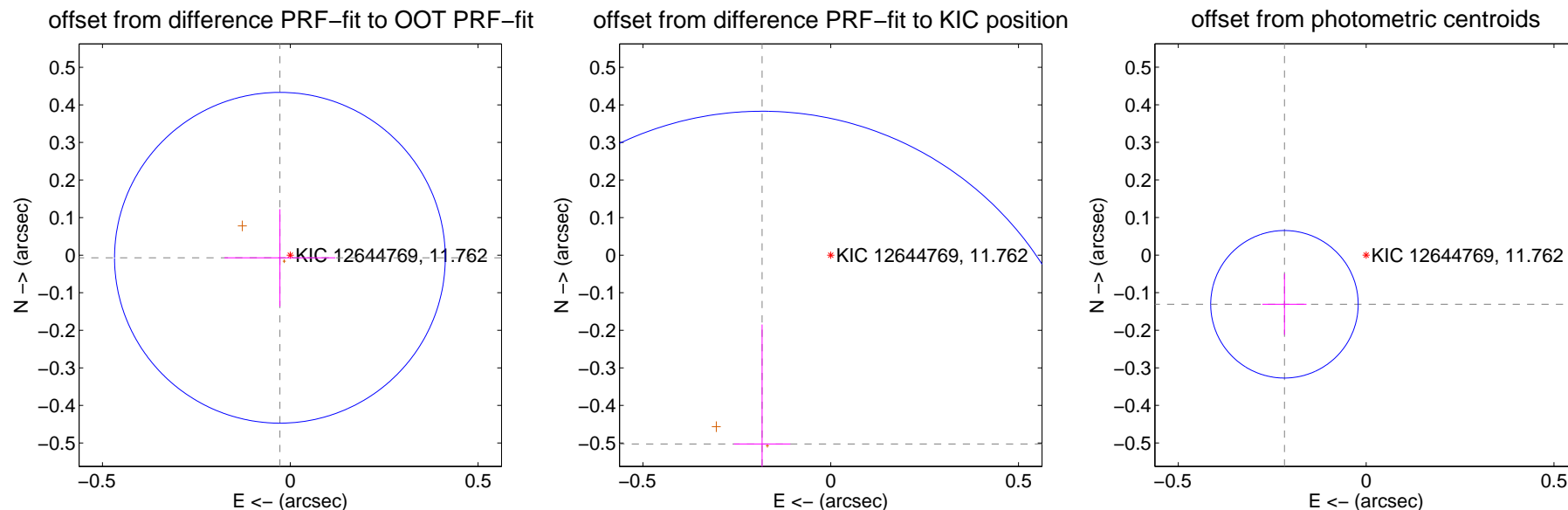
DV Centroid Data

Supplemental centroid analysis for 012644769-04. **Kepler magnitude: 11.76.** Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

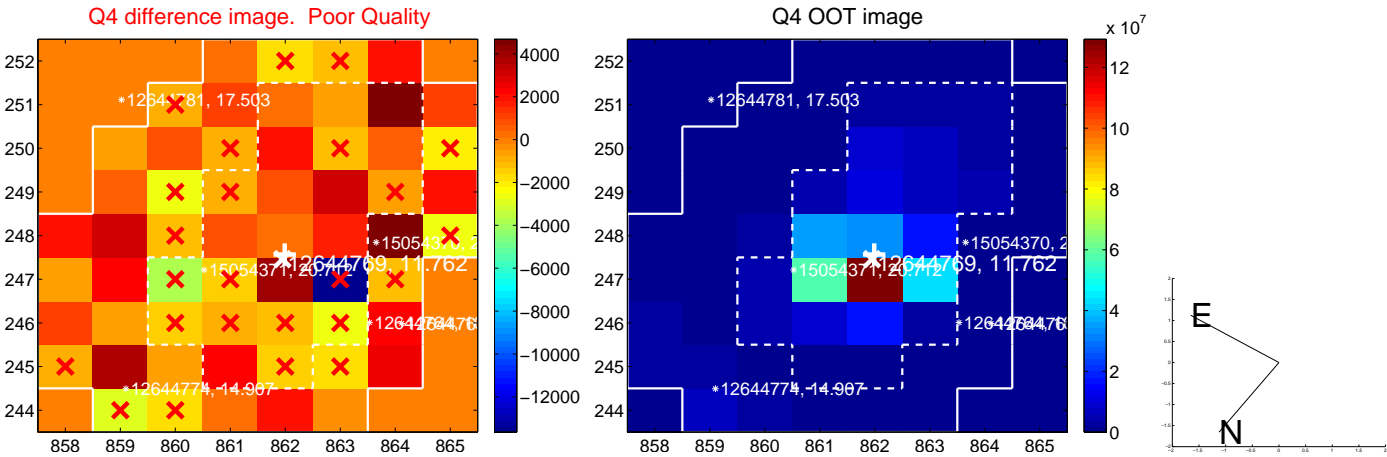
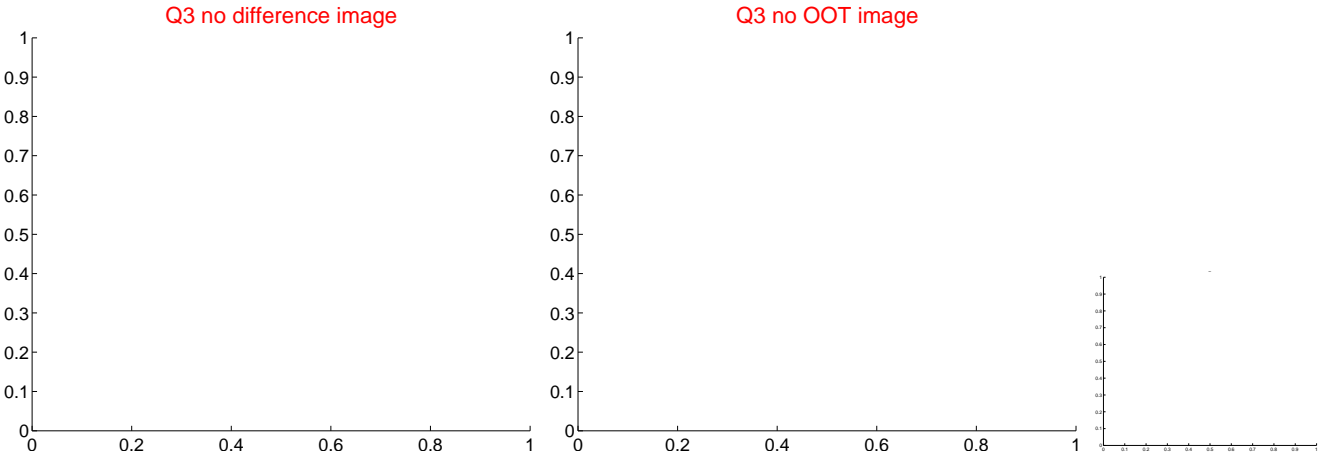
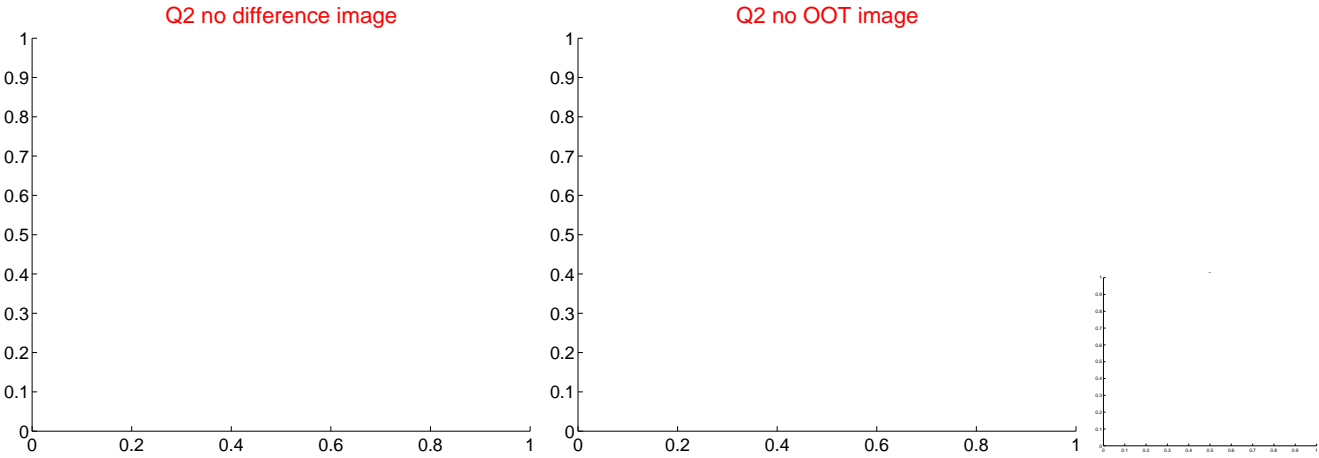
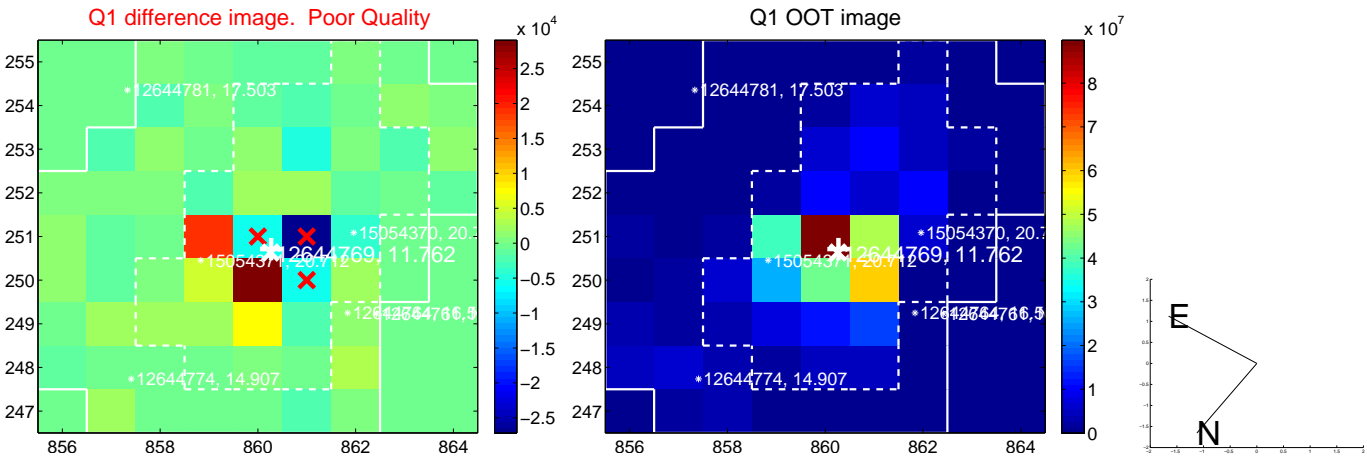
The direct PRF centroid is offset from the target star catalog position by about 0.56 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.028 ± 0.147	0.19	0.028 ± 0.148	-0.007 ± 0.129
PRF-fit source offset from KIC position	0.535 ± 0.295	1.81	0.183 ± 0.075	-0.503 ± 0.318
photometric centroid source offset	0.25 ± 0.07	3.88	0.22 ± 0.06	-0.13 ± 0.08

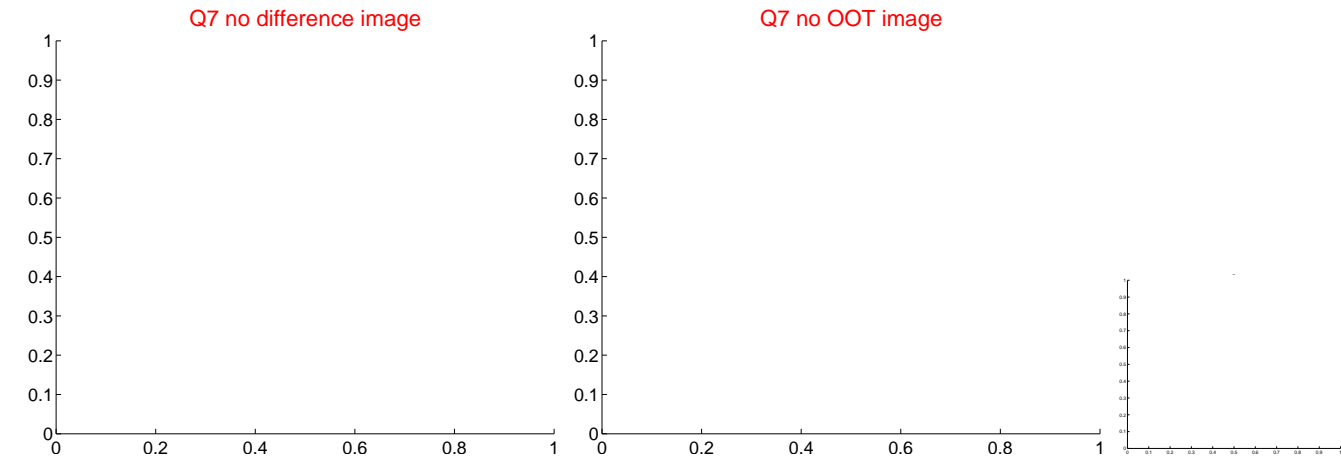
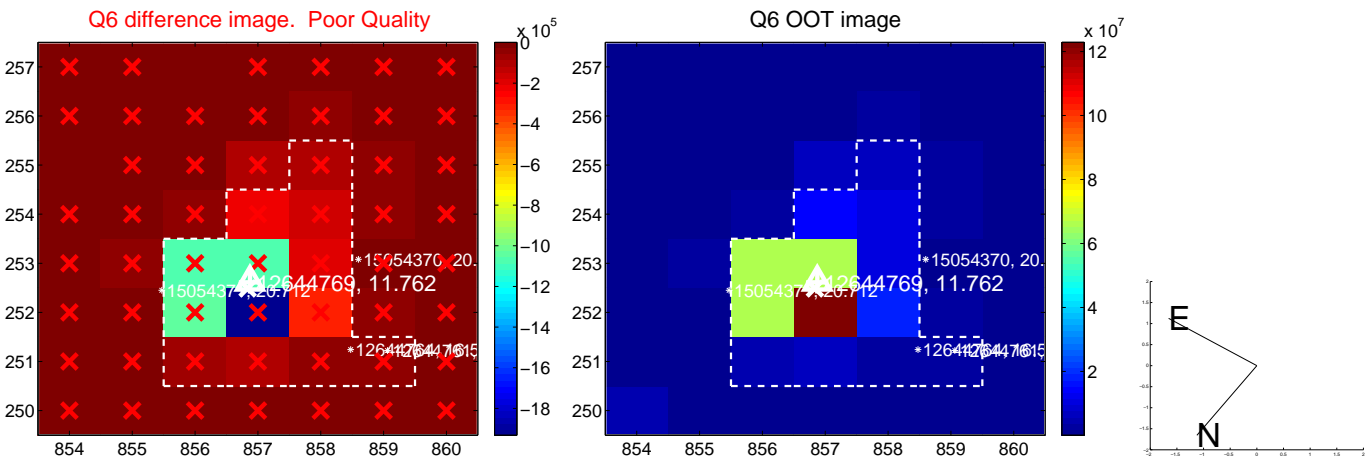


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

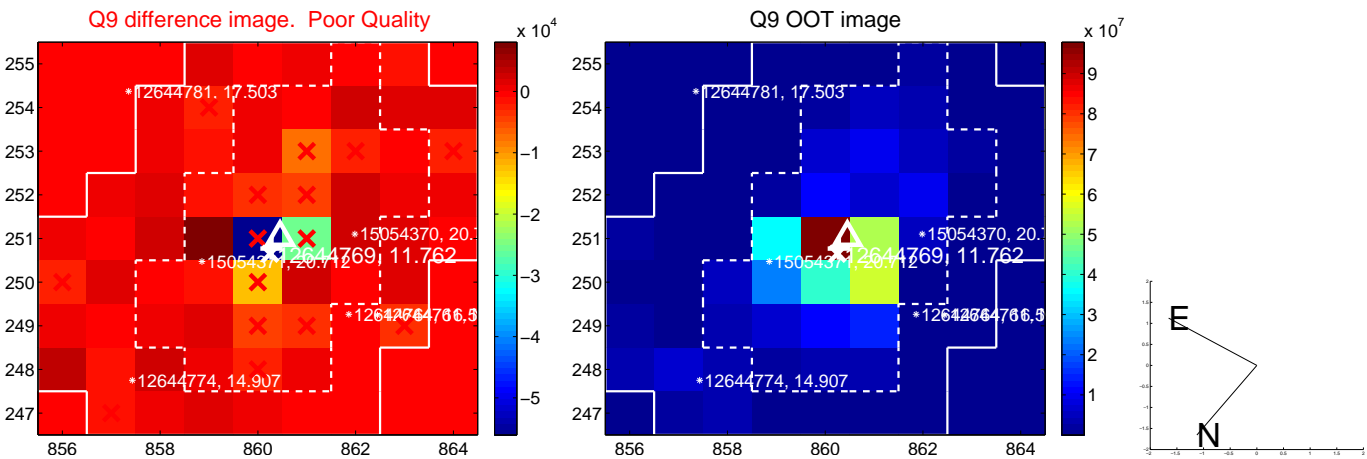
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



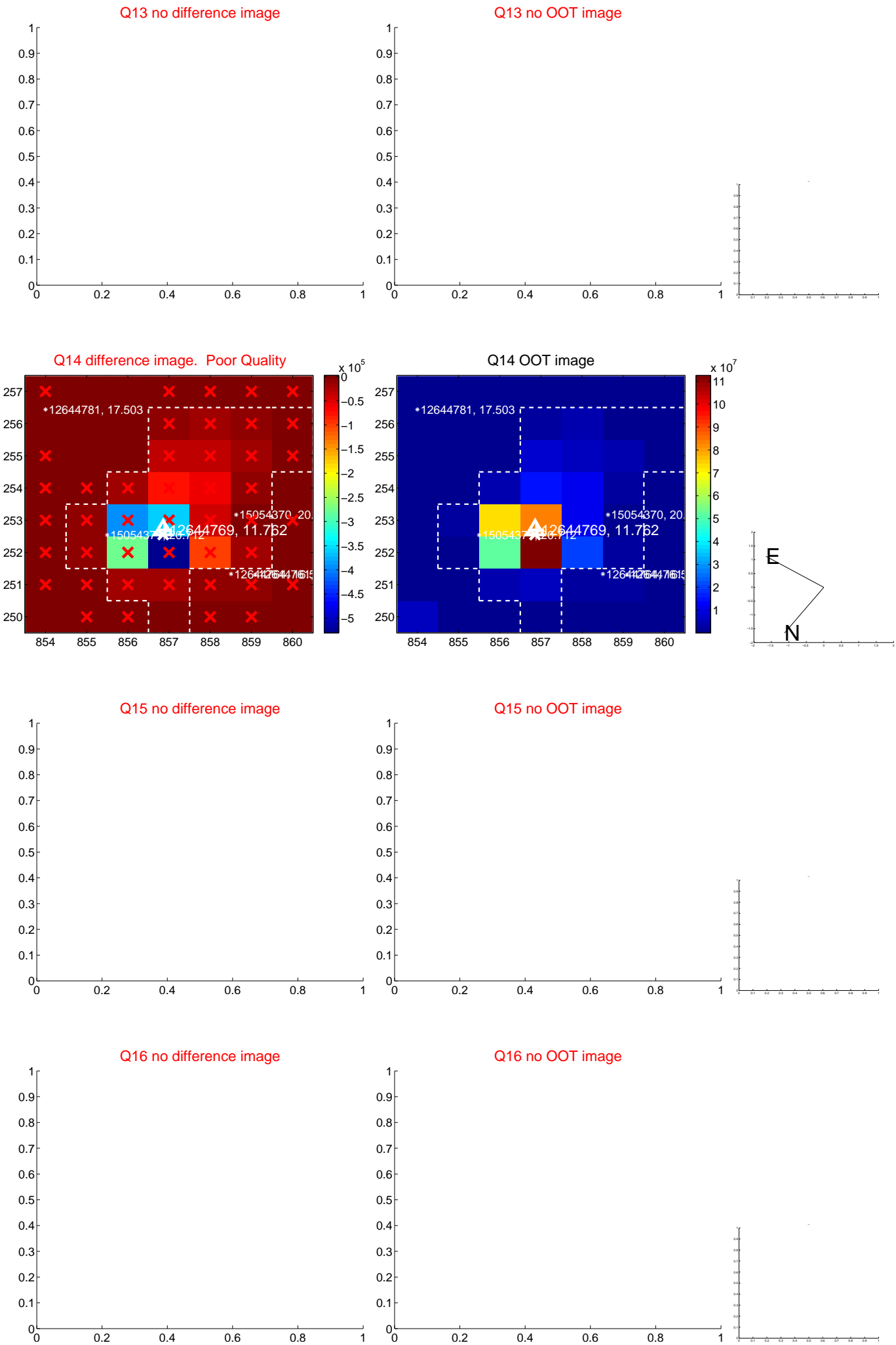
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



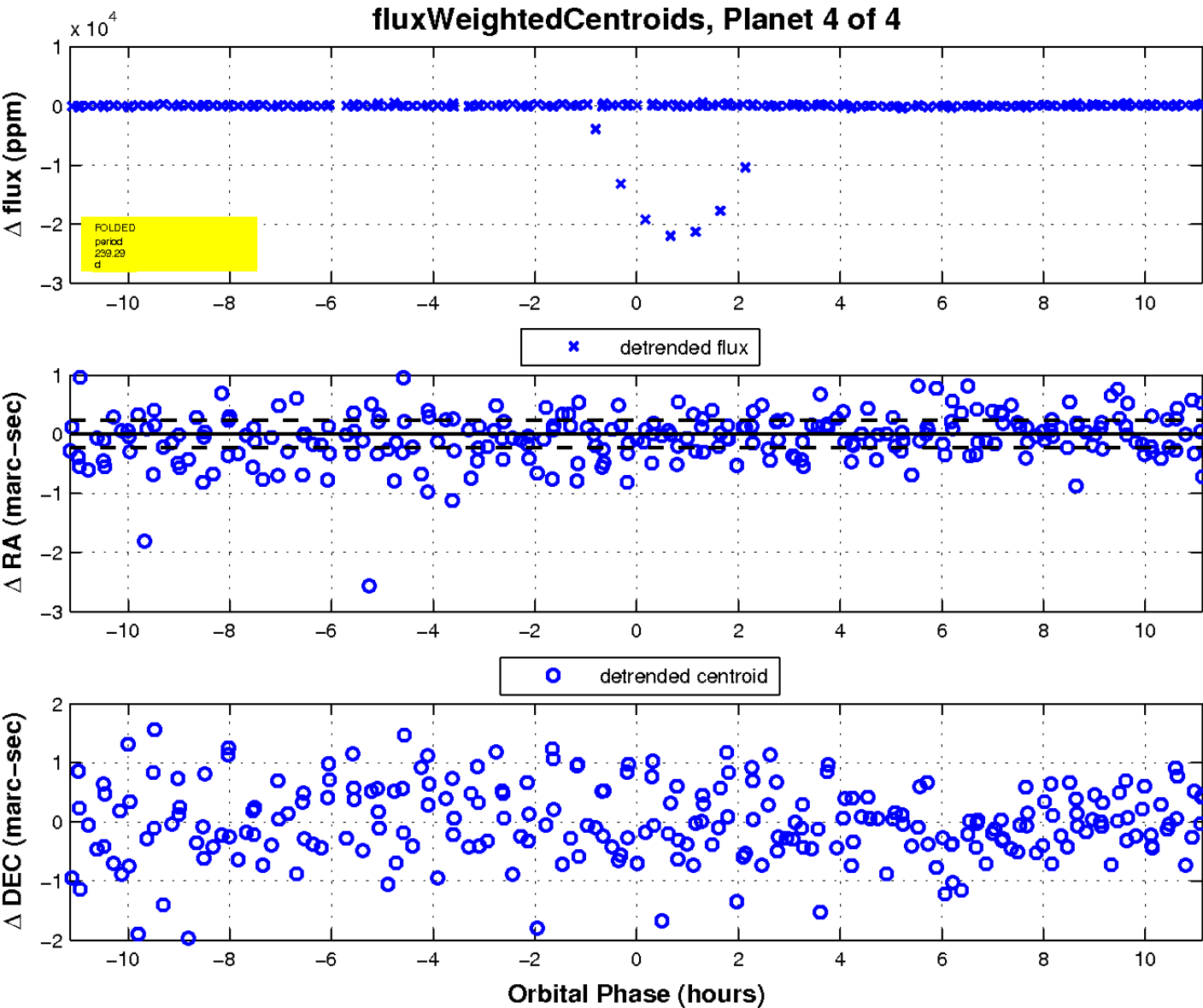
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



UKIRT Image

